OFFER DOCUMENT
Dated April 8, 2026
Book Built Issue

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CITIUS TRANSNET INVESTMENT TRUST

(Registered in the Republic of India as an irrevocable trust set up under the Indian Trusts Act, 1882, on July 21, 2025 and registered as an infrastructure investment trust under the Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014, on August 1, 2025 having registration number IN/InvIT/25-26/0032)

Principal place of business and correspondence address: Plot 294/3, Edelweiss House, Off CST Road, Kalina, Santacruz East, Mumbai 400 098, Maharashtra, India
Tel: +91 22 4019 4700; **Compliance Officer**: Pravin Karambelkar
E-mail: Compliance_Citius@eaaa.in; **Website**: www.citiustransnet.in

SPONSOR	INVESTMENT MANAGER	TRUSTEE
Epic Transnet Infrastructure Private Limited	EAAA TransInfra Managers	AXIS TRUSTEE
Epic Transnet Infrastructure Private Limited (*formerly known as Watrak Infrastructure Private Limited*)	**EAAA TransInfra Managers Limited**	**Axis Trustee Services Limited**

Citius TransNet Investment Trust (the "**Trust**") is issuing up to [●] Units (as defined hereinafter) for cash at a price of ₹ [●] per Unit aggregating up to ₹ 11,050 million (the "**Issue**"). The Issue is an initial public offer in reliance upon Regulation 14(4) of the Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014, as amended (the "**InvIT Regulations**"). Our Units are proposed to be listed on BSE Limited ("**BSE**") and National Stock Exchange of India Limited ("**NSE**", together with BSE, the "**Stock Exchanges**"). The Trust has received in-principle approvals from the Stock Exchanges for listing of our Units pursuant to letters each dated February 3, 2026. National Stock Exchange of India Limited is the Designated Stock Exchange for the Issue. The Issue will constitute [●]% of the issued and paid-up Units on a post-Issue basis in accordance with Regulation 14(4) of the InvIT Regulations.

The Price Band and the Minimum Bid Size (as determined by our Investment Manager in consultation with the Lead Managers) will be announced on the respective websites of the Trust, the Sponsor, the Investment Manager and the Stock Exchanges, as may be applicable, as well as advertised in all editions of Financial Express (a widely circulated English national daily newspaper), Jansatta (a widely circulated Hindi national daily newspaper), and all editions of Navshakti (a widely circulated Marathi daily newspaper in Maharashtra) at least two Working Days prior to the Bid/ Issue Opening Date. The announcement/ advertisement shall contain relevant financial ratios computed for both the upper and lower end of the Price Band. For further information, see "*Basis for Issue Price*" beginning on page 120. In case of any revision to the Price Band, the Bid/ Issue Period will be extended by at least one Working Day, and in case of force majeure, banking strike or similar circumstances, for reasons to be recorded in writing, the Bid/ Issue Period will be extended for a minimum period of three Working Days, subject to the total Bid/ Issue Period not exceeding 30 days, provided that there shall not be more than two revisions to the Price Band during the Bid/ Issue Period. Any revision to the Price Band and the revised Bid/ Issue Period, if applicable, will be widely disseminated by notification to the Stock Exchanges during the Bid/ Issue Period and by indicating the change on the respective websites, as may be applicable.

The Issue is being made through the Book Building Process and in compliance with the InvIT Regulations (as defined hereinafter) and the InvIT Master Circular (as defined hereafter), wherein not more than 75% of the Issue shall be available for allocation on a proportionate basis to Institutional Investors, provided that our Investment Manager may, in consultation with the Lead Managers, allocate up to 60% of the Institutional Investor Portion to Anchor Investors on a discretionary basis in accordance with the InvIT Regulations and the InvIT Master Circular. Further, not less than 25% of the Issue shall be available for allocation on a proportionate basis to Non-Institutional Investors, in accordance with the InvIT Regulations and the InvIT Master Circular, subject to valid Bids being received at or above the Issue Price. Our Investment Manager, in consultation with the Lead Managers, may retain oversubscription in the Issue in accordance with the InvIT Regulations and the InvIT Master Circular. All Bidders, other than Anchor Investors, are required to utilise the Application Supported by Blocked Amount ("**ASBA**") process by providing details of their respective ASBA accounts and UPI ID (in case of individual Non-Institutional Investors using the UPI Mechanism Bidding with a Bid Amount of ₹ 500,000 or less), in which case the corresponding Bid Amounts will be blocked by the Self Certified Syndicate Banks ("**SCSBs**") or under the UPI Mechanism, as applicable, to participate in this Issue. For details, please see "*Issue Information*" beginning on page 472.

The Units have not been and will not be registered under the United States Securities Act of 1933, as amended (the "**Securities Act**") or any other applicable law of any state of the United States and, unless so registered, and may not be offered or sold within the United States except pursuant to an exemption from, or in a transaction not subject to, the registration requirements of the Securities Act and applicable U.S. state securities laws. The Units are only being offered and sold outside the United States in "offshore transactions" as defined in and in reliance on Regulation S under the Securities Act ("**Regulation S**") and the applicable law of the jurisdictions where such offers and sales are made.

RISKS IN RELATION TO THE FIRST ISSUE

This being the first public offer of Units by the Trust, there has been no formal market for our Units. The Issue Price should not be taken to be indicative of the market price of our Units after our Units are listed. No assurance can be given regarding the active or sustained trading in Units or regarding the price at which our Units will be traded after listing.

GENERAL RISKS

Investments in the Units involves a degree of risk and investors should not invest any funds in the Issue unless they can afford to take the risk of losing their entire investment. Prospective investors are advised carefully to read this Offer Document, including the sections "*Risk Factors*" and "*Rights of Unitholders*" on pages 64 and 464 carefully before taking an investment decision with respect to the Issue. For taking such investment decision, prospective investors must rely on their own examination of the Trust and the Issue including the risks involved. Each prospective investor is advised to consult its own advisors in respect of the consequences of an investment in the Units being issued pursuant to this Offer Document. This Offer Document has been prepared by our Investment Manager solely for providing information in connection with the Issue and a copy of this Offer Document has been delivered to the Securities and Exchange Board of India ("**SEBI**") and the Stock Exchanges. However, the Units have not been recommended or approved by SEBI and the Stock Exchanges and nor do SEBI or the Stock Exchanges guarantee the accuracy or adequacy of any statements made, opinions expressed or reports contained herein and accordingly, admission of the Units to be allotted pursuant to the Issue for trading on the Stock Exchanges should not be taken as an indication of the merits of the Trust or of the Units.

INVESTMENT MANAGER'S AND SPONSOR'S ABSOLUTE RESPONSIBILITY

The Investment Manager and Sponsor, severally, having made all reasonable inquiries, accepts responsibility for and confirms that (i) this Offer Document contains all such information with respect to the Trust and the Issue, which is material in the context of the Issue in accordance with the InvIT Regulations and the InvIT Master Circular; (ii) the information contained in this Offer Document is true, correct and adequate in all material aspects and is not misleading in any material respect; and (iii) the opinions and intentions expressed herein are honestly held and that there are no other facts, the omission of which makes this Offer Document as a whole or any of such information or the expression of any such opinions or intentions misleading in any material respect.

LEAD MANAGERS			REGISTRAR TO THE ISSUE
AXIS CAPITAL	AMBIT Acumen at work	ICICI Securities	KFINTECH
Axis Capital Limited Axis House, 1st Floor Pandurang Budhkar Marg, Worli Mumbai 400 025 Maharashtra, India **Tel**: +91 22 4325 2183 **E-mail**: citius.ipo@axiscap.in **Investor grievance e-mail**: complaints@axiscap.in **Website**: https://www.axiscapital.co.in **Contact Person**: Tosit Agarwal **SEBI Registration No.**: INM000012029	**Ambit Private Limited** Ambit House, 449 Senapati Bapat Marg Lower Parel, Mumbai 400 013 Maharashtra, India **Tel**: +91 22 6623 3030 **E-mail**: citius.ipo@ambit.co **Investor grievance e-mail**: customerservicemb@ambit.co **Website**: www.ambit.co **Contact Person**: Janit Sethi / Bhavya Jalan **SEBI Registration No.**: INM000010585	**ICICI Securities Limited** ICICI Venture House Appasaheb Marathe Marg Prabhadevi, Mumbai 400 025 Maharashtra, India **Tel**: +91 22 6807 7100 **E-mail**: citius.ipo@icicisecurities.com **Investor grievance e-mail**: customercare@icicisecurities.com **Website**: www.icicisecurities.com **Contact Person**: Shri Subramanyam / Sumit Singh **SEBI Registration No.**: INM000011179	**KFin Technologies Limited** Selenium, Tower-B, Plot No. 31 & 32, Financial District Nanakramguda, Serilingampally, Rangareddi Hyderabad 500 032 Telangana, India **Tel:** + 91 40 6716 2222/ 1800 309 4001 **E-mail:** citius.invit@kfintech.com **Investor grievance e-mail:** einward.ris@kfintech.com **Website:** www.kfintech.com **Contact Person:** M. Murali Krishna **SEBI Registration No.:** INR000000221

BID/ ISSUE PROGRAM

BID/ ISSUE OPENS ON: April 17, 2026*	BID/ ISSUE CLOSES ON: April 21, 2026**

**Our Investment Manager may, in consultation with the Lead Managers, consider participation by Anchor Investors in accordance with the InvIT Regulations and the InvIT Master Circular. The Anchor Investor Bidding Date shall be one Working Day prior to the Bid/ Issue Opening Date.*
***Our Investment Manager may, in consultation with the Lead Managers, consider closing the Bid/ Issue period for Institutional Investors one Working Day prior to the Bid/ Issue Closing Date in accordance with the InvIT Master Circular.*

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NOTICE TO INVESTORS

The statements contained in this Offer Document relating to the Trust and the Units are, in all material respects, true, correct, not misleading, and adequate to enable the investors to make an informed decision. The opinions and intentions expressed in this Offer Document with regard to the Trust and the Units are honestly held, have been reached after considering all relevant circumstances and are based on reasonable assumptions and information presently available with the Investment Manager, the Sponsor or both, the Investment Manager and the Sponsor, as applicable. There are no other facts in relation to the Trust and the Units, the omission of which would, in the context of the Issue, make any statement in this Offer Document misleading in any material respect. Further, each of the Investment Manager and the Sponsor has made all reasonable enquiries to ascertain such facts and to verify the accuracy of all such information and statements disclosed in this Offer Document in all material respects.

Bidders acknowledge that they have neither relied on the Lead Managers nor any of their respective shareholders, employees, counsel, officers, directors, representatives, agents or affiliates in connection with such person's investigation of the accuracy of such information or such person's investment decision, and each such person must rely on his/her own examination of the Trust and the merits and risks involved in investing in the Units. Bidders should not construe the contents of this Offer Document as legal, business, tax, accounting or investment advice. Each Bidder acknowledges that in making an investment decision, such investor has relied solely on the information contained in this Offer Document and the Final Offer Document and not on any other disclosure or representation by the Investment Manager, the Project Manager, the Trustee, the Sponsor, the Lead Managers or any other party. Save as expressly stated in this Offer Document, nothing contained herein is, or may be relied upon as, a promise or representation as to the future performance of the Trust.

No person is authorized to give any information or to make any representation not contained in this Offer Document and any information or representation not so contained must not be relied upon as having been authorized by or on behalf of the Trust or by, or on behalf of the Sponsor, the Investment Manager or by or on behalf of the Lead Managers.

SEBI Disclaimer

It is to be distinctly understood that submission of the Draft Offer Document to SEBI should not in any way be deemed or construed that the same has been cleared or approved by SEBI. SEBI does not take any responsibility either for the financial soundness of any scheme or the project for which the Issue is proposed to be made or for the correctness of the statements made or opinions expressed in the Draft Offer Document.

NSE Disclaimer

"*As required, a copy of this Offer Document has been submitted to National Stock Exchange of India Limited (hereinafter referred to as NSE). NSE has, vide its letter Ref.: NSE/LIST/C/2026/0105 dated February 03, 2026, given permission to the Issuer to use the Exchange's name in this Offer Document as one of the stock exchanges on which this Issuer's units are proposed to be listed. The Exchange has scrutinized this offer document for its limited internal purpose of deciding on the matter granting the aforesaid permission to this Issuer. It is to be distinctly understood that the aforesaid permission given by NSE should not in any way be deemed or construed that the offer document has been cleared or approved by NSE of been cleared or approved by NSE; nor does it in any manner warrant, certify or endorse the correctness or completeness of any of the contents of this offer document; nor does it warrant that this Issuer's units will be listed or will continue to be listed on the Exchange; nor does it take any granting the aforesaid permission to this Issuer. It is to be distinctly understood that the aforesaid permission given by NSE should not in any way be deemed or construed that the offer document has responsibility for the financial or other soundness of this InvITs, its Sponsor, its Investment Manager or any project of this InvITs.*

Every person who desires to apply for or otherwise acquire any units of this InvITs may do so pursuant to independent inquiry, investigation and analysis and shall not have any claim against the Exchange whatsoever by reason of any loss which may be suffered by such person consequent to or in connection with such subscription /acquisition whether by reason of anything stated or omitted to be stated herein or any other reason whatsoever."

BSE Disclaimer

"*BSE Limited (the "Exchange") has given vide its letter dated February 3, 2026, permission to this Trust to use the Exchange's name in this offer document as one of the stock exchanges on which this Units of this Trust are*

proposed to be listed. The Exchange has scrutinized this offer document for its limited internal purpose of deciding on the matter of granting the aforesaid permission to this Trust. The Exchange does not in any manner: -

- *warrant, certify or endorse the correctness or completeness of any of the contents of this offer document; or*
- *warrant that this Trust Units will be listed or will continue to be listed on the Exchange; or*
- *take any responsibility for the financial or other soundness of this Trust, its Investment Manager, its Sponsor(s), its Trustee or Project Manager(s);*

and it should not for any reason be deemed or construed that this offer document has been cleared or approved by the Exchange. Every person who desires to apply for or otherwise acquires the Units of this Trust may do so pursuant to independent inquiry, investigation and analysis and shall not have any claim against the Exchange whatsoever by reason of any loss which may be suffered by such person consequent to or in connection with such subscription/acquisition whether by reason of anything stated or omitted to be stated herein or for any other reason whatsoever."

Certain U.S. Matters

The Units to be issued pursuant to the Issue have not been approved, disapproved or recommended by any regulatory authority in any jurisdiction, including the United States Securities and Exchange Commission ("**SEC**"), any other federal or state authorities in the United States, the securities authorities of any non-United States jurisdiction or any other United States or non-United States regulatory authority. No authority has passed on or endorsed the merits of the Issue or the accuracy or adequacy of this Offer Document. Any representation to the contrary is a criminal offence in the United States and may be a criminal offence in other jurisdictions.

The Units have not been, and will not be, registered under the Securities Act or any other applicable state securities laws of the United States and, unless so registered, may not be offered or sold within the United States except pursuant to an exemption from, or in a transaction not subject to, the registration requirements of the Securities Act and applicable state securities laws. The Units are being offered and sold outside the United States in "**offshore transactions**", as defined in and in reliance on Regulation S, in each case in compliance with the applicable law of the jurisdictions where those offers and sales occur. The Units are transferable only in accordance with the restrictions described under the section "*Selling and Transfer Restrictions*" on page 459 of this Offer Document.

Each purchaser of the Units offered by this Offer Document will be deemed to have made the representations, agreements and acknowledgments as described in this section, the "*Issue Information*" on page 472 and the "*Selling and Transfer Restrictions*" on page 459.

Notice to Investors in certain other jurisdictions

The distribution of the Draft Offer Document, this Offer Document and the Final Offer Document and the issuance or the offer of the Units in certain jurisdictions may be restricted by law. As such, this Offer Document and the Final Offer Document do not constitute, and may not be used for, or in connection with, an offer or solicitation by anyone in any jurisdiction in which such offer or solicitation is not authorized or to any person to whom it is unlawful to make such offer or solicitation. In particular, no action has been taken by the Investment Manager, the Sponsor or the Lead Managers which would permit an offer of the Units or distribution of the Draft Offer Document, this Offer Document and the Final Offer Document in any jurisdiction, other than India. Accordingly, the Units may not be offered or sold, directly or indirectly, and neither this Offer Document nor the Final Offer Document nor any Issue materials in connection with the Units be distributed or published in or from any country or jurisdiction that would require registration of the Units in such country or jurisdiction. Each purchaser of the Units in this Issue will be deemed to have made acknowledgments and agreements as described under this section and the section "*Issue Information*" on page 472. Please also see "*Selling and Transfer Restrictions*" on page 459.

Available Information

The Investment Manager agrees to comply with any undertakings given by it from time to time in connection with the Units and, without prejudice to the generality of foregoing, shall furnish to the Unitholders all such information as may be required under the InvIT Regulations.

Disclaimer

This Offer Document does not, directly or indirectly, relate to any invitation, offer or sale of any securities, instruments or loans (including listed non-convertible debentures or bonds, if any) that may be issued by the Trust after the listing of the Units. Any person or entity investing in such issue or transaction by the Trust should consult its own advisors. Neither the Lead Managers, nor their associates or affiliates have any responsibility or liability for such issue or transaction by the Trust.

IMPORTANT NOTICE

THE VALUE OF UNITS AND THE INCOME DERIVED FROM THEM MAY FALL AS WELL AS RISE. UNITS ARE NOT OBLIGATIONS OF, DEPOSITS IN, OR GUARANTEED BY, THE TRUST, THE TRUSTEE, THE SPONSOR, THE INVESTMENT MANAGER, THE LEAD MANAGERS OR ANY OF THEIR RESPECTIVE SHAREHOLDERS, AS APPLICABLE, EMPLOYEES, COUNSEL, OFFICERS, DIRECTORS, REPRESENTATIVES, AGENTS, ASSOCIATES OR AFFILIATES. AN INVESTMENT IN UNITS IS SUBJECT TO INVESTMENT RISKS, INCLUDING THE POSSIBLE LOSS OF THE PRINCIPAL AMOUNT INVESTED. FURTHER, LISTING OF THE UNITS ON THE STOCK EXCHANGES DOES NOT GUARANTEE A LIQUID MARKET FOR THE UNITS. INVESTORS HAVE NO RIGHT TO REQUEST THE TRUST, THE TRUSTEE, THE SPONSOR OR THE INVESTMENT MANAGER OR ANY OF THEIR RESPECTIVE SHAREHOLDERS, AS APPLICABLE, EMPLOYEES, COUNSEL, OFFICERS, DIRECTORS, REPRESENTATIVES, AGENTS, ASSOCIATES OR AFFILIATES TO REDEEM THEIR UNITS WHILE THE UNITS ARE LISTED, UNLESS OTHERWISE PERMITTED BY APPLICABLE LAW. THE PERFORMANCE OF ANY OF THE LISTED UNITS OF THE TRUST IS NOT NECESSARILY INDICATIVE OF THE FUTURE PERFORMANCE OF UNITS OF THE TRUST.

DEFINITIONS AND ABBREVIATIONS

This Offer Document uses the definitions and abbreviations, which unless the context otherwise indicates or implies, shall have the meanings ascribed to such terms herein below which you should consider when reading the information contained herein.

References to any legislation, act, regulations, rules, guidelines, circulars, notifications, clarification or policies shall be to such legislation, act, regulations, rules, guidelines, circulars, notifications, clarification or policies as amended, supplemented, or re-enacted from time to time and any reference to a statutory provision shall include any subordinate legislation made under that provision.

The words and expressions used in this Offer Document but not defined herein shall have the meaning ascribed to such terms under the InvIT Regulations, the SEBI Act, the SCRA, the Depositories Act, and the rules and regulations made thereunder.

*Notwithstanding the foregoing, the terms not defined but used in "Special Purpose Combined Financial Statements" attached as **Annexure D**, "Projections of Revenue from Operations and Cash Flow from Operating Activities" attached as **Annexure E**, "Statement of Possible Special Tax Benefits available to Citius TransNet Investment Trust and its unitholders under the applicable laws in India" and "Legal and Other Information" on pages 498 and 445, respectively, shall have the meanings ascribed to such terms in those respective sections.*

In this Offer Document, unless the context otherwise requires, a reference to "we", "us" and "our" refers to the Trust and/ or the Initial Portfolio Assets on a combined basis.

Trust Related Terms

Term	Description
AMTPL	Ahmedabad - Maliya Tollway Private Limited
Associate	Associate shall have the meaning under Regulation 2(1)(b) of the InvIT Regulations
Auditors	The current statutory auditors are S R B C & CO LLP, Chartered Accountants
Audit Committee	The audit committee of the Investment Manager constituted by the board of directors of the Investment Manager pursuant to applicable law
Capital Contribution	The total subscription amounts (either by way of cash or share swap or otherwise (including transfer of interest in the InvIT Assets by the Sponsor and any other entities)) received by the Trust from the Unitholders (including the Sponsor), for subscription of Units, in accordance with applicable law and the InvIT Documents
Citius	Citius TransNet Investment Trust
Compliance Officer	The compliance officer of the Trust, *i.e.*, Pravin Karambelkar
Concession Agreements	Collectively, the concession agreements entered into between the various relevant Initial Portfolio Assets and the relevant concessioning authorities. For details, please see "*Summary of Concession Agreements*" on page 298
CRISIL or CRISIL Intelligence	CRISIL Intelligence, a division of CRISIL Limited
CRISIL Report	The report titled "*Connecting India: Unlocking Investment Potential in Transport Infrastructure*", dated March 23, 2026 prepared by CRISIL
Debenture Transfer Agreement(s)	Collectively, the debenture transfer agreements entered in relation to certain non-convertible debentures issued by certain of the Project SPVs, as set forth below: *DTAs – Cash Consideration:* (i) Trust (acting through its Trustee), Investment Manager, EIYP and Dibang dated April 8, 2026; (ii) Trust (acting through its Trustee), Investment Manager, EIYP and Dhola dated April 8, 2026; (iii) Trust (acting through its Trustee), Investment Manager, EIYP and JSEL dated April 8, 2026; and (iv) Trust (acting through its Trustee), Investment Manager, EIYP and TEL dated April 8, 2026. *DTAs – Swap Consideration:* (i) Trust (acting through its Trustee), Investment Manager, Sponsor, India Infrastructure Yield Plus II, Infrastructure Yield Plus IIA and AMTPL dated April 8, 2026; (ii) Trust (acting through its Trustee), Investment Manager, debenture trustee and other

Term	Description
	sellers dated March 23, 2026 in relation to TEL; (iii) Trust (acting through its Trustee), Investment Manager, Sponsor and PECPL dated April 8, 2026; (iv) Trust (acting through its Trustee), Investment Manager, Neelambur Madukkarai Tollway Private Limited and PECPL dated April 8, 2026; and (v) Trust (acting through its Trustee), Investment Manager, Sponsor and RVTPL dated April 8, 2026. For further details, please see "*Financial Indebtedness and Deferred Payments – Debt obligations – Debenture Transfer Agreement(s)*" on page 368
Deed(s) of assignment	Collectively, the deeds of assignment each dated April 7, 2026 entered into in the following manner in relation to certain inter-corporate deposits/ loans by certain of the Project SPVs, as set forth below: (i) Trust, Investment Manager, DTPL, Sponsor and Neelambur Madukkarai Tollway Private Limited; (ii) Trust, Investment Manager, AMTPL and the Sponsor; (iii) Trust, Investment Manager, SBGTPL, Sponsor and Neelambur Madukkarai Tollway Private Limited; and (iv) Trust, Investment Manager, RVTPL, Sponsor and Neelambur Madukkarai Tollway Private Limited.
Dhola	Dhola Infra Projects Private Limited
Dibang	Dibang Infra Projects Private Limited
DTPL	Deccan Tollways Private Limited
EAAA	EAAA India Alternatives Limited
EAAA Platform	EAAA and its affiliates, and entities or pooled vehicles directly or indirectly controlled, managed and/or advised by EAAA and/or its affiliates provided that any portfolio companies of such affiliate entities or pooled vehicles shall not be considered to be part of the EAAA Platform
EIYP	Edelweiss Infrastructure Yield Plus
Epic 2 SPA	Securities purchase agreements, and other transaction documents, entered inter alia into amongst EPIC Concesiones 2 Private Limited, Infrastructure Yield Plus II, Infrastructure Yield Plus IIA and India Infrastructure Yield Plus II (schemes of Infrastructure Yield Trust and managed by their investment manager, EAAA India Alternatives Limited), Ashoka Buildcon Limited and Ashoka Concessions Limited
Epic 3	Epic Concesiones 3 Private Limited
Erstwhile Epic SPA	Share purchase agreement dated December 16, 2022 entered into between the erstwhile sellers of Epic 3, Epic Concesiones Limited (now merged with Epic 3) and Epic 3 (as amended from time to time)
Formation Transactions	The transactions pursuant to which the Trust will acquire the securities and ICDs of the Initial Portfolio Assets prior to the Allotment
Holdco(s)/ Holding Company(ies)	Collectively, (i) Epic 3; and (ii) SRPL
JSEL	Jorabat Shillong Expressway Limited
Identified ROFO Assets	Collectively, (i) Kharar Ludhiana Road Limited; (ii) Ranastalam Anandapuram Road Limited; (iii) Ankleshwar Manubar Expressway Private Limited; (iv) Khairatunda Barwa Adda Road Limited; (v) Kandi Ramsanpalle Road Private Limited; (vi) Ashoka Belgaum Khanapur Road Private Limited; (vii) Ashoka Mallasandra Karadi Road Private Limited; (viii) Ashoka Karadi Banwara Road Private Limited; (ix) Ashoka Banwara Bettadahalli Road Private Limited; (x) Ashoka Bettadahalli Shivamogga Road Private Limited; and (xi) Ashoka Baswantpur Singnodi Road Private Limited
IM Board	The board of directors of the Investment Manager
Initial Contribution	The initial corpus of the Trust amounting to ₹ 10,000 (Rupees Ten Thousand) transferred by the Sponsor to the Trustee, to settle and establish the Trust.
Initial Portfolio Asset(s)	Unless the context otherwise requires, collectively, (i) Epic 3; (ii) SRPL; (iii) AMTPL; (iv) SBGTPL; (v) PECPL; (vi) SRTPL; (vii) DTPL; (viii) RVTPL; (ix) JSEL; (x) Dhola; (xi) Dibang; and (xii) TEL
Investment Management Agreement	The investment management agreement dated July 22, 2025 entered into between the Trustee and the Investment Manager
Investment Manager	EAAA TransInfra Managers Limited
Investment Objectives	The investment objectives of the Trust, as provided under "*Overview of the Trust*" on page 23
InvIT Assets	InvIT assets as defined in Regulation 2(l)(zb) of the InvIT Regulations, in this case being the assets held by the Initial Portfolio Assets
InvIT Committee	The InvIT committee of the Investment Manager constituted by the board of directors of

Term	Description
	the Investment Manager
InvIT Documents	The Trust Deed, the Investment Management Agreement, the Project Implementation and Management Agreement, Securities Purchase Agreements, policies adopted by the Investment Manager on behalf of the Trust for the purpose of the administration and management of the Trust, any other document, letter or and any agreement between the Trustee and/ or the Investment Manager and/ or the Project Manager with respect to the Trust or to which the Investment Manager or the Trustee or the Project Manager is a party in their capacity as the investment manager or trustee or project manager of the Trust or any other obligations, securities or instruments as permitted under the applicable law, executed for the purpose of the Trust, the offer documents and such other documents in connection therewith, as originally executed and amended, modified, supplemented or restated from time to time, together with the respective annexures, schedules and exhibits, if any
Matters Management Agreement	The matters management agreement each dated April 7, 2026 entered into amongst the following entities: (i) Epic Concesiones 3 Private Limited, the Trust, EAAA TransInfra Managers Limited, Epic Transnet Infrastructure Private Limited, Infrastructure Yield Plus II, Infrastructure Yield Plus IIA and India Infrastructure Yield Plus II; (ii) SRPL Roads Private Limited, Dibang Infra Projects Private Limited, the Trust, EAAA TransInfra Managers Limited, Epic Transnet Infrastructure Private Limited and Edelweiss Infrastructure Yield Plus; and (iii) Epic Concesiones 3 Private Limited, Deccan Tollways Private Limited, the Trust, EAAA TransInfra Managers Limited, Epic Transnet Infrastructure Private Limited, Infrastructure Yield Plus II, Infrastructure Yield Plus IIA and India Infrastructure Yield Plus II.
Nomination and Remuneration Committee	The nomination and remuneration committee of the Investment Manager constituted by the board of directors of the Investment Manager pursuant to applicable law
O&M Contractor	In relation to the Project SPVs, shall mean such O&M contractor appointed or acting as an O&M Contractor in accordance with the provisions of the Concession Agreements
PECPL	Panipat Elevated Corridor Private Limited
Parties to the Trust	Collectively, the Sponsor, the Sponsor Group, the Trustee, the Investment Manager and the Project Manager
Project Implementation and Management Agreement	The project implementation and management agreement dated April 7, 2026 entered into amongst the Trust (acting through its Trustee), the Project Manager, the Investment Manager and the Initial Portfolio Assets
Project Manager	Epic Transnet Project Management Private Limited (*formerly known as Chennai -Tada Tollway Private Limited*)
Projections of Revenue from Operations and Cash Flow from Operating Activities	Projections of revenue from operations and cash flow from operating activities of the Trust (consisting of the Trust and the Initial Portfolio Assets) and the Initial Portfolio Assets, individually, for the years ended March 31, 2027, March 31, 2028, March 31, 2029 and March 31, 2030 along with the basis of preparation and underlying assumptions
Project SPV(s)	Collectively, (i) AMTPL; (ii) SBGTPL; (iii) PECPL; (iv) SRTPL; (v) DTPL; (vi) RVTPL; (vii) JSEL; (viii) Dhola; (ix) Dibang; and (x) TEL
RVTPL	Rajkot-Vadinar Tollway Private Limited
Related Parties	Related parties, as defined under Regulation 2(1)(zv) of the InvIT Regulations
Risk Management Committee	The risk management committee of the Investment Manager constituted by the board of directors of the Investment Manager pursuant to applicable law
ROFO Assets	Eligible road infrastructure projects acquired and/or developed by the ROFO SPVs
ROFO SPVs	Special purpose vehicles (which hold the ROFO Assets) that are proposed to be acquired by the Trust under the ROFO Agreement
ROFO Agreement	Right of first offer agreement dated April 7, 2026 entered into amongst the Trust (acting through its Trustee), the Investment Manager, Sponsor, EPIC Concesiones 2 Private Limited, Infrastructure Yield Plus II, Infrastructure Yield Plus IIA and India Infrastructure Yield Plus II
SBGTPL	Samkhiali Bhachau Gandhidham Tollway Private Limited
Securities Purchase Agreements or SPAs	The respective securities purchase agreements each dated April 7, 2026 entered into amongst the Trust (acting through its Trustee), the Investment Manager, the relevant Initial Portfolio Assets namely, (i) Epic 3 (holding company of SRTPL, PECPL, RVTPL, SBGTPL, DTPL, AMTPL); (ii) SRPL (holding company of JSEL, Dhola, Dibang); and (iii) TEL, and other shareholders of the relevant Initial Portfolio Assets. For details in relation to the other shareholders, please see, "*Formation Transactions in Relation to the Trust – Details of Arrangement pertaining to the Trust*" on page 26
Securities Swap Agreements	Collectively, the securities swap agreements entered into in the following manner:

Term	Description
or SSAs	(i) Trust (acting through its Trustee), Investment Manager, Sponsor, Epic 3 and relevant sellers dated March 23, 2026; (ii) Trust (acting through its Trustee), Investment Manager, Sponsor, Epic 3 and relevant sellers dated March 24, 2026; and (iii) Trust (acting through its Trustee), Investment Manager, Sponsor, TEL and relevant sellers dated March 24, 2026.
Special Purpose Combined Financial Statements	Special purpose combined financial statements of the Initial Portfolio Assets, which comprise the Combined Balance Sheets as at December 31, 2025, March 31, 2025, March 31, 2024 and March 31, 2023, the Combined Statements of Profit and Loss (including Other Comprehensive Income), the Combined Cash Flow Statements, the Combined Statements of Changes in Equity for the nine months period ended December 31, 2025 and for the years ended, March 31, 2025, March 31, 2024 and March 31, 2023 and a summary of material accounting policies and other explanatory information prepared in accordance with the Guidance Note on Combined and Carve-out Financial Statements, Guidance Note on Reports in Company Prospectus (Revised 2019) issued by the Institute of Chartered Accountants of India (the "ICAI") (the "Guidance Notes"), to the extent not inconsistent with SEBI (Infrastructure Investment Trusts) Regulations, 2014, SEBI master circular no. SEBI/HO/DDHS-PoD-2/P/CIR/2025/102 dated July 11, 2025, ("**SEBI Circular**") and other circulars issued thereunder ('**InvIT Regulations**'), as amended and in accordance with Indian Accounting Standards (Ind AS) notified under the Companies (Indian Accounting Standards) Rules, 2015 (as amended from time to time) and other accounting principles generally accepted in India and presentation requirements of Division II of Schedule III to the Companies Act, 2013 (as amended from time to time), with the exceptions and modifications as mentioned in InvIT Regulations.
Sponsor	Epic Transnet Infrastructure Private Limited (*formerly known as Watrak Infrastructure Private Limited*)
Sponsor Group	Collectively, (i) the Sponsor; (ii) Infrastructure Yield Trust (through its schemes Infrastructure Yield Plus II, Infrastructure Yield Plus IIA and India Infrastructure Yield Plus II), (iii) Epic Transnet Project Management Private Limited (*formerly known as Chennai -Tada Tollway Private Limited*) and (iv) Neelambur Madukkarai Tollway Private Limited
SPV(s)	Special purpose vehicles, as defined under Regulation 2(l)(zy) of the InvIT Regulations and includes the Project SPVs
SRPL	SRPL Roads Private Limited
SRTPL	Sambalpur-Rourkela Tollway Private Limited
Stakeholders Relationship Committee	The stakeholders relationship committee of the Investment Manager constituted by the board of directors of the Investment Manager pursuant to applicable law
Technical Consultant(s)	Ramboll India Private Limited and Samarth Infraengg Technocrats Private Limited
Technical Reports	Collectively, the technical reports, prepared by the Technical Consultants in relation to (i) AMTPL; (ii) SBGTPL; (iii) PECPL; (iv) SRTPL; (v) DTPL; (vi) RVTPL; (vii) JSEL; (viii) Dhola; (ix) Dibang; and (x) TEL
TEL	Thrissur Expressway Limited
Traffic Consultant(s)	CRISIL Limited
Traffic Reports	Collectively, the traffic reports, prepared by the Traffic Consultant in relation to (i) AMTPL; (ii) SBGTPL; (iii) PECPL; (iv) SRTPL; (v) DTPL; (vi) RVTPL and (vii) TEL and the Executive Summary of Toll Assets
Trust	Citius TransNet Investment Trust
Trust Deed	The trust deed of the Citius TransNet Investment Trust dated July 21, 2025 entered into between the Sponsor and the Trustee
Trust Loan Agreement	Trust loan agreement to be entered into between the Trustee (acting on behalf of the Trust), the Investment Manager and certain Project SPVs
Trustee	Axis Trustee Services Limited
Unit	An undivided beneficial interest in the Trust, and such units together represent the entire beneficial interest in the Trust
Unitholder	Any Person or entity who holds Units of the Trust
Valuation Report	The valuation report issued by the Valuer, which sets out its opinion as to the fair enterprise value of the Project SPVs as on December 31, 2025
Valuer	S. Sundararaman

Issue Related Terms

Term	Description
Acknowledgement Slip	The slip or document issued by the Designated Intermediary to a Bidder as proof of

Term	Description
	registration of the Bid cum Application Form
Allocated/ Allocation	Allocation of Units, following the determination of the Issue Price by the Investment Manager, in consultation with the Lead Managers, to Bidders on the basis of the Application Form submitted by the Bidder
Allot/ Allotment/ Allotted	Unless the context otherwise requires, the allotment of Units pursuant to the Issue to the successful Bidders
Allotment Advice	Note, advice or intimation of Allotment sent to the Bidders who have been or are to be Allotted Units after the Basis of Allotment has been approved by the Designated Stock Exchange
Allottees	Bidders to whom Units are Allotted
Anchor Investor	An Institutional Investor, making an application of a value of at least ₹ 100 million, applying under the Anchor Investor Portion in accordance with the requirements specified in the InvIT Regulations in terms of this Offer Document
Anchor Investor Allocation Price	Price at which Units will be Allocated to Anchor Investors in terms of this Offer Document, as decided by the Investment Manager in consultation with the Lead Manager
Anchor Investor Application Form	The form used by an Anchor Investor to make a Bid in the Anchor Investor Portion and which will be considered as an application for Allotment in terms of this Offer Document
Anchor Investor Bidding Date	One Working Day prior to the Bid/ Issue Opening Date, on which Bids by Anchor Investors are to be submitted and allocation to Anchor Investors shall be completed
Anchor Investor Portion	Not more than 60% of the Institutional Investor Portion, which may be allocated by the Investment Manager in consultation with the Lead Managers on a discretionary basis
Anchor Investor Issue Price	Final price at which Units will be Allotted to Anchor Investors in terms of this Offer Document and the Final Offer Document, which price will be equal to or higher than the Issue Price but not higher than the Cap Price. The Anchor Investor Issue Price will be decided by the Investment Manager in consultation with the Lead Manager
Application Supported by Blocked Amount or ASBA	An application, whether physical or electronic, used by ASBA Bidders to make a Bid by authorizing an SCSB to block the Bid Amount in the ASBA Account and will include applications made by individual Non-Institutional Investors using the UPI Mechanism where the Bid Amount will be blocked upon acceptance of UPI Mandate Request by individual Non-Institutional Investors using the UPI Mechanism
ASBA Account	A bank account maintained with an SCSB and specified in the ASBA Form for blocking the Bid Amount mentioned in the ASBA Form and includes the account of individual Non-Institutional Investors which is blocked upon acceptance of a UPI Mandate Request made by the individual Non-Institutional Investors using the UPI Mechanism
ASBA Bid	A Bid made by an ASBA Bidder including all revisions and modifications thereto as permitted under the InvIT Regulations
ASBA Bidder	All Bidders other than Anchor Investors
ASBA Form	An application form, whether physical or electronic, used by ASBA Bidders which will be considered as the application for Allotment in terms of this Offer Document and the Final Offer Document
Basis of Allotment	The basis on which Units will be Allotted to successful Bidders under the Issue and which is described in "*Issue Information*" on page 472
Bid(s)	An indication to make an offer during the Bid/Issue Period by an ASBA Bidder pursuant to submission of the ASBA Form, or on the Anchor Investor Bidding Date by an Anchor Investor pursuant to submission of the Anchor Investor Application Form, to subscribe to or purchase Units of the Trust at a price within the Price Band, including all revisions and modifications thereto as permitted under the InvIT Regulations. The term "Bidding" shall be construed accordingly.
Bid Amount	The highest value of optional Bids indicated in the Bid cum Application Form and payable by the Bidder or blocked in the ASBA Account of the ASBA Bidder, as the case may be, upon submission of the Bid in the Issue
Bid cum Application Form	The Anchor Investor Application Form and/or the ASBA Form, as the context requires
Bid/ Issue Closing Date	Except in relation to any Bids received from the Anchor Investors, the date after which the Designated Intermediaries will not accept any Bids, being April 21, 2026 which will be published in editions of Financial Express (a widely circulated English national daily newspaper), in all editions of Jansatta (a widely circulated Hindi national daily newspaper and Navshakti (a widely circulated Marathi daily newspaper in Maharashtra)
Bid/ Issue Opening Date	Except in relation to any Bids received from the Anchor Investors, the date on which the Designated Intermediaries shall start accepting Bids, being April 17, 2026 which will be published in editions of Financial Express (a widely circulated English national daily newspaper), in all editions of Jansatta (a widely circulated Hindi national daily newspaper and Navshakti (a widely circulated Marathi daily newspaper in Maharashtra)
Bid/Issue Period	Period between the Bid/ Issue Opening Date and the Bid/ Issue Closing Date, inclusive of

Term	Description
	both days, during which Bidders, other than Anchor Investors can submit their Bids, including any revisions thereof
Bidder	Any prospective investor who makes a Bid pursuant to the terms of this Offer Document and the Bid cum Application Form and unless otherwise stated or implied, includes an Anchor Investor in terms of the unit subscription agreement with such investor
Bidding Centres	Centres at which the Designated Intermediaries shall accept ASBA Forms, *i.e.*, Designated SCSB Branch for SCSBs, Specified Locations for Syndicate, Broker Centres for Registered Brokers, Designated RTA Locations for RTAs and Designated CDP Locations for CDPs
Body(ies) Corporate	Body(ies) corporate as defined in Regulation 2(1)(d) of the InvIT Regulations
Book Building Process	The book building process, as provided in Part A of Schedule XIII of the SEBI ICDR Regulations
Broker Centres	Broker centres notified by the Stock Exchanges where Bidders can submit the ASBA Forms to a Registered Broker. The details of such broker centres, along with the names and contact details of the Registered Brokers are available on the websites of the respective Stock Exchanges (www.bseindia.com and www.nseindia.com)
Business Day	Any day from Monday to Friday, excluding any public holiday
Cash Escrow and Sponsor Bank Agreement	The cash escrow and sponsor bank agreement dated April 7, 2026 entered into amongst the Trust (acting through the Trustee), the Sponsor, the Investment Manager, the Lead Managers, Sponsor Banks, Syndicate Members and the Registrar for, among others, collection of Bid Amounts and for remitting funds, if any, of the amounts collected to the Bidders
Cap Price	The higher end of the Price Band, being ₹ [●] per Unit, above which the Issue Price will not be finalized and above which no Bids will be accepted
Client ID	Client identification number maintained with one of the Depositories in relation to a demat account
Closing Date	Date on which Allotment shall be made, *i.e.*, on or about April 24, 2026
Confirmation of Allocation Note or CAN	Notice or intimation of allocation of Units sent to Anchor Investors who have been allocated Units, after the Anchor Investor Bidding Date, as applicable
Collecting Depository Participant or CDP	A depository participant as defined under the Depositories Act, registered with SEBI and who is eligible to procure Bids at the Designated CDP Locations in terms of circular no. CIR/CFD/POLICYCELL/11/2015 dated November 10, 2015 issued by SEBI
Demographic Details	Details of the Bidders, including the Bidder's address, investor status, occupation and bank account details, PAN, DP ID and Client ID
Depository Participant or DP	A depository participant as defined under the Depositories Act, 1996
Designated Date	The date on which funds are transferred from the Escrow Accounts and the amounts blocked by the SCSBs are transferred from the ASBA Accounts, as the case may be, to the Public Issue Account or the Refund Account, as appropriate
Designated Intermediaries	Syndicate, sub-syndicate/agents, SCSBs, Registered Brokers, CDPs and RTAs, who are authorized to collect ASBA Forms from the ASBA Bidders, in relation to the Issue
Designated CDP Locations	Such locations of the CDPs where Bidders can submit the ASBA Forms. The details of such Designated CDP Locations, along with names and contact details of the CDPs eligible to accept Bid Cum Application Forms are available on the respective websites of the Stock Exchanges (www.bseindia.com and www.nseindia.com)
Designated RTA Locations	Such locations of the RTAs where Bidders can submit ASBA Forms to RTAs. The details of such Designated RTA Locations, along with names and contact details of the RTAs eligible to accept Bid cum Application Forms are available on the respective websites of the Stock Exchanges (www.bseindia.com and www.nseindia.com)
Designated SCSB Branches	Such branches of the SCSBs which shall collect the ASBA Forms, a list of which is available on the website of SEBI at https://www.sebi.gov.in/sebiweb/other/OtherAction.do?doRecognised=yes or at such other website as may be prescribed by SEBI from time to time
Designated Stock Exchange	National Stock Exchange of India Limited
DP ID	Depository Participant's Identification
Draft Offer Document	The draft offer document dated December 3, 2025, issued in accordance with the InvIT Regulations, which does not contain complete particulars of the price at which the Units will be Allotted and the size of the Issue, including any addenda or corrigenda thereto
Escrow Account	The 'no-lien' and 'non-interest bearing' accounts opened with the Escrow Collection Bank(s) and in whose favour the Bidders (excluding ASBA Bidders) will transfer money through NACH/direct credit/NEFT/RTGS in respect of the Bid Amount when submitting a Bid
Escrow Collection Bank	ICICI Bank Limited
Final Offer Document	Final offer document to be filed with SEBI and the Stock Exchanges after the Pricing Date in accordance with the InvIT Regulations containing, amongst other things, the Issue Price

Term	Description
	that is determined at the end of the Book Building Process, the size of this Issue and certain other information, including any addenda or corrigenda thereto
First Bidder	Bidder whose name shall be mentioned first in the Bid cum Application Form or the Revision Form and in case of joint Bids, whose name shall also appear as the first holder of the beneficiary account held in joint names
Floor Price	The lower end of the Price Band, subject to any revision thereto, in this case being ₹ [●] at or above which the Issue Price and the Anchor Investor Issue Price will be finalised and below which no Bids will be accepted
Institutional Investors	Institutional investor means (i) a Qualified Institutional Buyer, or (ii) a family trust or an intermediary registered with the SEBI, having a net worth of more than ₹ 5,000 million, as per the latest audited financial statements
Institutional Investor Portion	Portion of the Issue (including the Anchor Investor Portion) being not more than 75% of the Issue Size, comprising not more than [●] Units which shall be available for allocation to Institutional Investors (including Anchor Investors), subject to valid Bids being received at or above the Issue Price
Issue	The issue of up to [●] Units (as defined below) for cash at a price of ₹ [●] per Unit aggregating up to ₹ 11,050 million
Issue Agreement	Issue Agreement entered into among the Trust (acting through its Trustee), the Investment Manager, the Trustee, the Sponsor, the Project Manager, and the Lead Managers, dated December 3, 2025
Issue Price	₹ [●] per Unit, being the final price at which Units will be Allotted to successful Bidders, other than Anchor Investors in terms of this Offer Document. The Issue Price will be decided by the Investment Manager in consultation with the Lead Managers on the Pricing Date in accordance with the Book Building Process and in terms of this Offer Document and the Final Offer Document
Issue Size	[●] Units aggregating up to ₹ 11,050 million
Lead Managers	Collectively, Axis Capital Limited, Ambit Private Limited and ICICI Securities Limited
Listing	The listing and admission to trading of the Units on the Stock Exchanges pursuant to the Issue
Listing Agreement	Any listing agreement to be entered into with the Stock Exchanges by the Trust, in line with the format as specified under the SEBI master circular number SEBI/HO/CFD/PoD2/CIR/P/2023/120 dated July 11, 2023 on "Master circular for compliance with the provisions of the Securities and Exchange Board of India (Listing Obligations and Disclosure Requirements) Regulations, 2015 on "Format of uniform Listing Agreement"
Listing Date	Date on which the Units will be listed on the Stock Exchange
Minimum Bid Size	₹ [●]
Mutual Funds	Mutual funds registered with SEBI under the Securities and Exchange Board of India (Mutual Funds) Regulations, 2026 with effect from April 1, 2026
Net Proceeds	The proceeds of the Issue that are available to the Trust
Non-Institutional Investors	All Bidders, who are not Institutional Investors, who have Bid for Units in the Issue
Non-Institutional Investor Portion	Portion of the Issue being not less than 25% of the Issue Size, comprising at least [●] Units, which shall be available for allocation on a proportionate basis to Non-Institutional Investors, subject to valid Bids being received at or above the Issue Price
Non-Resident Indian/ Non-Resident	An individual resident outside India who is a citizen or is an 'overseas citizen of India' cardholder within the meaning of Section 7A of the Citizenship Act, 1955 and includes a Non-Resident Indian, FVCIs, FIIs and FPIs
Offer Document	This offer document dated April 8, 2026 to be issued in accordance with the provisions of the InvIT Regulations, which does not have complete particulars of the Price Band and the Issue Price at which the Units will be offered and the size of this Issue including any addenda, corrigenda thereto. This Offer Document has been filed with SEBI and the Stock Exchanges and shall become the Final Offer Document which shall be filed with SEBI and the Stock Exchanges after the Pricing Date
Price Band	Price band between the minimum price of ₹ [●] per Unit (Floor Price) and the maximum price of ₹ [●] per Unit (Cap Price) including any revision thereof. The Price Band will be decided by the Investment Manager, in consultation with the Lead Managers, and will be announced at least two Working Days prior to the Bid/ Issue Opening Date, on the websites of the Trust, the Sponsor and the Investment Manager, as may be applicable, and shall be made available to the Stock Exchanges for the purpose of uploading on their respective websites
Pricing Date	The date on which the Investment Manager in consultation with the Lead Managers, finalizes the Issue Price in accordance with the Book Building Process and in terms of this Offer Document and the Final Offer Document
Public Issue Account	'No-lien and 'non-interest bearing' bank account opened to receive monies from the Escrow Accounts and from the ASBA Accounts on the Designated Date

Term	Description
Public Issue Account Bank	Axis Bank Limited
Qualified Institutional Buyers or QIB(s)	Qualified institutional buyers, as defined under Regulation 2(1)(ss) of the SEBI ICDR Regulations, which currently includes (i) a mutual fund, a VCF, an AIF and an FVCI registered with SEBI, (ii) an FPI, other than individuals, corporate bodies and family offices, (iii) a public financial institution as defined in section 2(72) of the Companies Act, 2013, (iv) a scheduled commercial bank, (v) a multilateral and bilateral development financial institution, (vi) a state industrial development corporation, (vii) an insurance company registered with the IRDAI, (viii) a provident fund with minimum corpus of ₹ 250 million, (ix) a pension fund with minimum corpus of ₹ 250 million, (x) National Investment Fund set up by resolution no. F. No. 2/3/2005-DDII dated November 23, 2005 of the GoI published in the Gazette of India, (xi) insurance funds set up and managed by army, navy or air force of the Union of India, (xii) insurance funds set up and managed by the Department of Posts, India, (xiii) systemically important non-banking financial companies, and (xiv) accredited investors as defined in clause (ab) of sub-regulation (1) of regulation 2 of the Securities and Exchange Board of India (Alternative Investment Funds) Regulations, 2012, for the limited purpose of their investment in Angel Funds registered with the Board, under the Securities and Exchange Board of India (Alternative Investment Funds) Regulations, 2012
Refund Account(s)	'No-lien' and 'non-interest bearing' account(s) opened with the Refund Bank, from which refunds, if any, of the whole or part of the Bid Amount to Anchor Investors shall be made
Refund Bank	ICICI Bank Limited
Registered Brokers	Stockbrokers registered with the stock exchanges having nationwide terminals, other than Lead Managers and the Syndicate Members, eligible to procure Bids in terms of circular no. CIR/CFD/14/2012 dated October 4, 2012 issued by SEBI
Registrar Agreement	The agreement dated December 3, 2025 entered into between the Trustee (on behalf of the Trust), the Investment Manager, and the Registrar to the Issue in relation to the responsibilities and obligations of the Registrar to the Issue pertaining to the Issue
Registrar or Registrar to the Issue	KFin Technologies Limited
Revision Form	Form used by the Bidders to modify the quantity of Units or the Bid Amount in any of their ASBA Forms or any previous Revision Forms. Bidders are not allowed to withdraw or lower their Bids (in terms of number of Units or the Bid Amount) at any stage.
Self-Certified Syndicate Bank(s) or SCSB(s)	Banks registered with SEBI, offering services in relation to ASBA, a list of which is available on the website of SEBI at https://www.sebi.gov.in/sebiweb/other/OtherAction.do?doRecognisedFpi=yes&intmId=34 or https://www.sebi.gov.in/sebiweb/other/OtherAction.do?doRecognisedFpi=yes&intmId=35, as applicable, or such other website as updated from time to time, and updated from time to time
Specified Locations	Bidding centers where the Syndicate shall accept ASBA Forms from Bidders
Sponsor Bank(s)	Axis Bank Limited and ICICI Bank Limited
Syndicate Agreement	The agreement dated April 7, 2026, entered into between the Trustee (on behalf of the Trust), the Investment Manager, the Lead Managers, the Syndicate Members and the Registrar to the Issue in relation to collection of Bid cum Application Forms by the Syndicate
Syndicate/ Members of the Syndicate	Lead Managers and the Syndicate Member
Syndicate Member(s)	Intermediaries, registered with SEBI who are permitted to carry out activities as an underwriter, being, Axis Capital Limited, Ambit Private Limited, Ambit Capital Private Limited and ICICI Securities Limited
Underwriters	[●]
Underwriting Agreement	The agreement to be entered into between the Trustee (on behalf of the Trust), the Underwriters, the Investment Manager, the Trustee and the Sponsor
UPI	Unified Payments Interface, which is an instant payment mechanism, developed by NPCI
UPI Bidder(s)	Individual Non-Institutional Investors with an application size of up to ₹ 500,000 in the Non-Institutional Category, and Bidding under the UPI Mechanism through ASBA Form(s) submitted with Syndicate Members, Registered Brokers, Collecting Depository Participants and Registrar and Share Transfer Agents
UPI ID	ID created on the UPI for single-window mobile payment system developed by the NPCI
UPI Mandate Request	A request (intimating the UPI Bidders, by way of a notification on the UPI linked mobile application and by way of an SMS directing the UPI Bidders to such UPI linked mobile application) to the UPI Bidders using the UPI Mechanism initiated by the Sponsor Bank(s) to authorise blocking of funds equivalent to the Bid Amount in the relevant ASBA Account through the UPI linked mobile application, and the subsequent debit of funds in case of Allotment
UPI Mechanism	The Bidding mechanism that may be used by UPI Bidders to make Bids in the Issue in accordance with the InvIT Regulations

Term	Description
Working Day	Working day, with reference to (a) announcement of Price Band; and (b) Bid/ Issue Period, shall mean all days, excluding Saturdays, Sundays and public holidays, on which commercial banks in Mumbai are open for business; and (c) the time period between the Bid/ Issue Closing Date and the listing of the Units on the Stock Exchanges, shall mean all trading days of Stock Exchanges, excluding Sundays and bank holidays

Technical and Industry Related Terms

Term	Description
ARR	Aggregate Revenue Requirement
BOO	Build, Own, Operate
BOT	Build, Operate and Transfer
CAs	Concession Agreements
COD	Commercial Operations Date
COD to acquisition	COD to acquisition by an InvIT measures the time period between the COD of an infrastructure asset and the date the InvIT acquires the asset.
CC	Completion Certificate
EHS	Environment, Occupational Health and Safety
EPC	Engineering, Procurement and Construction
Expected Residual Concession Period	The balance duration of the concession agreement for an asset from the cut-off date (December 31, 2025) for which concessionaire has the right to operate and maintain the asset and generate revenue.
GoI	Government of India
GSRDC	Gujarat State Road Development Corporation Limited
HAM	Hybrid Annuity Model
HTMS	Highway Traffic Management Systems
iHAMS	Intelligent Highway Asset Monitoring System
Lane kilometres	The total length of roads or highways factoring in the number of lanes that are operated and maintained by the trust.
MCLR	Marginal cost of funds based on lending rate
MoEF	Ministry of Environment, Forest and Climate Change
MORTH	Ministry of Road Transport and Highways
NHAI	National Highways Authority of India
OWD	Odisha Works Department
O&M	Operation and maintenance
PCOD	Provisional commercial operations date
PCU	Passenger Car Unit
PoC	Point of Connection
TAS	Toll Analytics System
TOT	Toll Operate Transfer

Abbreviations

Term	Description
AIF	Alternative Investment Fund as defined in and registered with SEBI under the SEBI AIF Regulations
BOCW Act	Building and Other Construction Workers (regulation of Employment and Conditions of Service) Act, 1996 Act
BSE	BSE Limited
CAN	Confirmation of Allocation Note
CCDs	Compulsorily Convertible Debentures
CCPS	Compulsorily Convertible Preference Shares
CCEA	Cabinet Committee on Economic Affairs
CCI	Competition Commission of India
CDSL	Central Depository Services (India) Limited
CLRA Act	Contract Labour (Regulation & Abolition) Act, 1970
Companies Act	Companies Act, 1956 and/or the Companies Act, 2013, as applicable
Companies Act, 1956	Erstwhile Companies Act, 1956, read with the rules and regulations thereunder
Companies Act, 2013	Companies Act, 2013, read with the rules and regulations thereunder, each as amended
Competition Act	Competition Act, 2002
CGST Act	Central Goods and Services Tax Act, 2017, as amended
CPI	Consumer Price Index
Depositories Act	Depositories Act, 1996, as amended

Term	Description
Depository	A depository registered with SEBI under the Securities and Exchange Board of India (Depositories and Participants) Regulations, 2018, as amended
Depository Participant	A depository participant as defined under the Depositories Act
DIN	Director Identification Number
FCNR(B)	Foreign Currency Non Resident (Bank)
FEMA	Foreign Exchange Management Act, 1999, as amended, read with rules and regulations thereunder
FEMA Rules	Foreign Exchange Management (Non-debt Instruments) Rules, 2019
Financial Year or Fiscal Year or Fiscal	Period of 12 months ended March 31 of that particular year, unless otherwise stated
FPI	Foreign Portfolio Investors
FVCI	Foreign venture capital investors, as defined under the SEBI FVCI Regulations
GAAR	General Anti-Avoidance Rules
GoI or Government	Government of India
GST	Goods and Services Tax
ICAI	Institute of Chartered Accountants of India
ICDs	Inter-corporate deposits
Ind AS/ Indian Accounting Standards	Indian Accounting Standards as defined in Rule 2(1)(a) of the Companies (Indian Accounting Standards) Rules, 2015 prescribed under Section 133 of the Companies Act, 2013, including any amendments or modifications thereto
Indian GAAP	Accounting standards notified under Section 133 of the Companies Act, 2013, read with Companies (Accounting Standards) Rules, 2006, as amended and the Companies (Accounts) Rules, 2014, as amended
Indian GAAS	Generally Accepted Auditing Standards in India
InvIT	Infrastructure investment trust
InvIT Master Circular	Master circular no. SEBI/HO/DDHS-PoD-2/P/CIR/2025/102 dated July 11, 2025 issued by SEBI, including any amendments or modifications thereto
InvIT Regulations	Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014, and the InvIT Master Circular, including any amendments or modifications, including any circulars, notifications, guidelines and clarifications issued thereunder
IRDAI	Insurance Regulatory and Development Authority of India
IRR	Internal rate of return
IT Act	Income-tax Act, 2025
Kilometers	Kms
Listing Regulations	Securities and Exchange Board of India (Listing Obligations and Disclosure Requirements) Regulations, 2015, as amended
MCA	Ministry of Corporate Affairs
NACH	National Automated Clearing House
NASD	National Association of Securities Dealers
NAV	Net Asset Value
NBFC	Non-Banking Financial Company
NCDs	Non-convertible debentures
NDCF	Net Distributable Cash Flows
NEFT	National Electronic Funds Transfer
NPCI	National Payments Corporation of India
NRE	Non-Resident External
NSDL	National Securities Depository Limited
NSE	The National Stock Exchange of India Limited
PAN	Permanent Account Number
RBI	Reserve Bank of India
Regulation S	Regulation S under the Securities Act
ROFO	Right of First Offer
Rs./ Rupees/ INR/ ₹	Indian Rupees
RTGS	Real Time Gross Settlement
RTM	Regulated Tariff Mechanism
SCRA	Securities Contracts (Regulation) Act, 1956
SCR (SECC) Regulations	Securities Contract (Regulation) (Stock Exchanges and Clearing Corporations) Regulations, 2018
SCRR	Securities Contracts (Regulation) Rules, 1957
SEBI	Securities and Exchange Board of India
SEBI Act	The Securities and Exchange Board of India Act, 1992
SEBI AIF Regulations	Securities and Exchange Board of India (Alternative Investments Funds) Regulations, 2012, as amended

Term	Description
SEBI FPI Regulations	Securities and Exchange Board of India (Foreign Portfolio Investors) Regulations, 2019, as amended
SEBI FVCI Regulations	Securities and Exchange Board of India (Foreign Venture Capital Investors) Regulations, 2000, as amended
SEBI ICDR Regulations	Securities and Exchange Board of India (Issue of Capital and Disclosure Requirements) Regulations, 2018, as amended
SEBI Merchant Bankers Regulations	Securities and Exchange Board of India (Merchant Bankers) Regulations, 1992, as amended
SEBI VCF Regulations	Securities and Exchange Board of India (Venture Capital Funds) Regulations, 1996, as amended
Securities Act	United States Securities Act of 1933, as amended
Stock Exchanges	Collectively, BSE and NSE
SPA(s)	Securities Purchase Agreement(s)
U.S./USA/United States	United States of America
USD/US$	United States Dollars
VCF	Venture capital funds as defined under the SEBI VCF Regulations
WPI	Wholesale Price Index

PRESENTATION OF FINANCIAL DATA AND OTHER INFORMATION

Certain Conventions

All references in this Offer Document to "India" are to the Republic of India, all references to the "U.S.", or the "United States" are to the United States of America.

Unless stated otherwise, all references to page numbers in this Offer Document are to the page numbers of this Offer Document.

Financial Data

The financial year for the Trust, the Sponsor, the Initial Portfolio Assets and the Investment Manager commences on April 1 of the immediately preceding calendar year and ends on March 31 of that particular calendar year. Accordingly, all references to a particular financial year (unless stated otherwise) are to the 12 month period commencing on April 1 of the immediately preceding calendar year and ending on March 31 of that particular calendar year.

Unless stated otherwise or unless context requires otherwise, the financial information in this Offer Document is derived from the Special Purpose Combined Financial Statements. Further, financial information for the nine months ended December 31, 2025 is not indicative of full year results and are not comparable with annual financial information.

The Special Purpose Combined Financial Statements have been prepared in accordance with the Guidance Note on Combined and Carve-out Financial Statements, Guidance Note on Reports in Company Prospectus (Revised 2019) issued by the ICAI, to the extent not inconsistent with the InvIT Regulations and InvIT Master Circular, as amended and in accordance with Ind AS notified under the Companies (Indian Accounting Standards) Rules, 2015 (as amended from time to time) and other accounting principles generally accepted in India and presentation requirements of Division II of Schedule III to the Companies Act, 2013 (as amended from time to time), with the exceptions and modifications as mentioned in InvIT Regulations. For further details, please see "*Special Purpose Combined Financial Statements*" attached as **Annexure D**.

Further, this Offer Document includes projections of revenue from operations and cash flows from operating activities of the Trust and the Initial Portfolio Assets on a combined basis and each of Initial Portfolio Assets, individually, for the financial years ended March 31, 2027, March 31, 2028, March 31, 2029 and March 31, 2030, prepared in accordance, prepared in accordance with InvIT Regulations and InvIT Master Circular. For further details, please see "*Projections of Revenue from Operations and Cash Flow from Operating Activities*" attached as **Annexure E.**

Further, this Offer Document includes summary financial statements of the Sponsor, as of and for the financial years ended March 31, 2025, March 31, 2024, March 31, 2023, prepared in accordance with applicable accounting standards and rules issued thereunder. Further, our Investment Manager is a newly incorporated company, having been incorporated on April 18, 2025, and accordingly financial statements of the Investment Manager are not available for the previous financial years. For further details, please see "*Summary Financial Information of the Sponsor*" on page 49 and "*Summary Financial Information of the Investment Manager*" on page 53.

The degree to which the financial information included in this Offer Document will provide meaningful information is entirely dependent on the reader's level of familiarity with Indian accounting policies and practices, the Companies Act, 2013, the Indian GAAP, Ind AS and the InvIT Regulations. The Investment Manager has not attempted to explain these differences or quantify their impact on the financial data included in this Offer Document, and it is urged that you consult your own advisors regarding such differences and their impact on our financial data. Any reliance by persons not familiar with Indian accounting policies and practices on the financial disclosures presented in this Offer Document should accordingly be limited.

In this Offer Document, any discrepancies in any table between the total and the sums of the amounts listed are due to rounding off. All figures and percentage figures have been rounded off to two decimal places.

Non-GAAP Measures

Certain non- GAAP measures like EBITDA, EBITDA Margin, Net Debt and Debt Equity Ratio (together, "**Non-GAAP Measures**"), presented in this Offer Document are a supplemental measure of our performance and liquidity that is not required by, or presented in accordance with, Ind AS or Indian GAAP. Further, these Non-

GAAP Measures are not a measurement of our financial performance or liquidity under Ind AS or Indian GAAP and should not be considered in isolation or construed as an alternative to cash flows, profit/ (loss) for the years/ period or any other measure of financial performance or as an indicator of our operating performance, liquidity, profitability or cash flows generated by operating, investing or financing activities derived in accordance with Ind AS or Indian GAAP. In addition, EBITDA and EBITDA Margin are not standardised terms, hence a direct comparison of these Non-GAAP Measures between companies may not be possible. Other companies may calculate these Non-GAAP Measures differently from us, limiting its usefulness as a comparative measure. Although such Non-GAAP Measures are not a measure of performance calculated in accordance with applicable accounting standards, the Investment Manager believes that they are useful to an investor in evaluating us as they are widely used measures to evaluate our operating performance. For further details please see, "*Risk Factors - We have in this Offer Document included certain Non-GAAP Measures that may not be comparable with financial or industry related statistical information of similar nomenclature computed and presented by other infrastructure trusts*" on page 90.

Currency and Units of Presentation

All references to:

- "Rupees" or "₹" or "INR" or "Rs." are to Indian Rupees, the official currency of the Republic of India;
- "USD" or "US$" or "$" or "U.S. dollars" are to United States Dollars, the official currency of the United States.

Except otherwise specified, certain numerical information in this Offer Document has been presented in "million" units. (i) one million represents 1,000,000; (ii) one billion represents 1,000,000,000; and (iii) one lakh represents 1,00,000.

Unless the context requires otherwise, any percentage amounts, as set forth in this Offer Document, have been calculated on the basis of the Special Purpose Combined Financial Statements and the summary financial statements of the Sponsor, as the case may be.

Exchange Rates

This Offer Document contains conversion of certain other currency amounts into Indian Rupees. These conversions should not be construed as a representation that these currency amounts could have been, or can be converted into Indian Rupees, at any particular rate.

The following table sets forth, for the periods indicated, information with respect to the exchange rate between the Rupee and the US$:

(in ₹ per US$)

Currency	As of December 31, 2025	As of March 31, 2025	As of March 31, 2024	As of March 31, 2023
1 US$	89.92	85.58	83.37	82.22

Source: www.fbil.org
Note: If the RBI reference rate is not available on a particular date due to a public holiday, exchange rates of the previous Working Day has been disclosed. The reference rates are rounded off to two decimal places.

Industry and Market Data

Unless stated otherwise, industry and market data used in this Offer Document has been obtained or derived from the CRISIL Report as well as certain other publicly available sources. The Investment Manager has commissioned the CRISIL Report, to provide an independent estimation of the road and transport sector, which is based on historical data and certain assumptions.

Industry publications as well as government publications generally state that the information contained in such publications has been obtained from various sources believed to be reliable but that their accuracy and completeness are not guaranteed and their reliability cannot be assured. Accordingly, no investment decisions should be based solely on such information. The data used in these sources may have been re-classified for the purposes of presentation. Data from these sources may also not be comparable. Such data involves risks, uncertainties and numerous assumptions and is subject to change based on various factors, including those disclosed under "*Risk Factors – The accuracy of statistical and other information with respect to the road infrastructure sector, the Traffic Reports and the Technical Reports commissioned by us, which are based on*

certain estimates and assumptions that are subjective in nature, cannot be guaranteed" on page 75.

The extent to which the market and industry data used in this Offer Document is meaningful depending on the reader's familiarity with and understanding of the methodologies used in compiling such data. There are no standard data gathering methodologies in the industry in which the business of the Trust and the Initial Portfolio Assets is conducted, and methodologies and assumptions may vary widely among different industry sources.

References to various segments in the Traffic Reports, CRISIL Report and the Technical Reports and information derived therefrom are references to industry segments and in accordance with the presentation, analysis and categorisation in the Traffic Reports, CRISIL and Technical Reports. The segment reporting in the Special Purpose Combined Financial Statements is based on the criteria set out in Ind AS 108 (Operating Segments) we do not report such segment as our operating segments.

Disclaimer of Crisil Intelligence

"Crisil Intelligence, a division of Crisil Limited, provides independent research, consulting, risk solutions, and data & analytics to its clients. Crisil Intelligence operates independently of Crisil's other divisions and subsidiaries, including, Crisil Ratings Limited. Crisil Intelligence's informed insights and opinions on the economy, industry, capital markets and companies drive impactful decisions for clients across diverse sectors and geographies. Crisil Intelligence's strong benchmarking capabilities, granular grasp of sectors, proprietary analytical frameworks and risk management solutions backed by deep understanding of technology integration, makes it the partner of choice for public & private organisations, multi-lateral agencies, investors and governments for over three decades.

For the preparation of this report, Crisil Intelligence has relied on third party data and information obtained from sources which in its opinion are considered reliable. Any forward-looking statements contained in this report are based on certain assumptions, which in its opinion are true as on the date of this report and could fluctuate due to changes in factors underlying such assumptions or events that cannot be reasonably foreseen. This report does not consist of any investment advice and nothing contained in this report should be construed as a recommendation to invest/disinvest in any entity."

Disclaimer of Ramboll India Private Limited

"*In preparing this report, Ramboll India Private Limited relied, in whole or in part, on data and information provided by Client, which information has not been independently verified by Ramboll and which Ramboll has assumed to be accurate, complete, reliable, and current. Therefore, while Ramboll has utilized its best efforts in preparing this Report, Ramboll does not warrant or guarantee the conclusions set forth in this Report which are dependent or based upon data, information, or statements supplied by third parties or the client.*

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Disclaimer of India Ratings & Research Private Limited

India Ratings & Research Private Limited ("India Ratings") relies on information obtained from multiple sources and there may be instances where the information is not accurate/incomplete, despite efforts been taken to verify the same. Ultimately, the issuer /its advisers are responsible for the accuracy of the information they provide to India Ratings and to the market in offering documents and other reports. In issuing its rating, India Ratings relies on the work of experts, including independent auditors with respect to financial statements and attorneys with respect to legal and tax matters. Further, ratings are inherently forward-looking and embody assumptions and predictions about future events that by their nature cannot be verified as facts. As a result, despite any verification of current facts, ratings can be affected by future events or conditions that may not have been anticipated at the time a rating was issued or affirmed.

It needs to be noted that ratings are not a recommendation or suggestion, directly or indirectly, to you or any other person, to buy, sell, make or hold any investment, loan or security or to undertake any investment strategy with respect to any investment, loan or security of any issuer. Credit Ratings do not comment on the adequacy of market price, the suitability of any investment, loan or security for a particular investor (including without limitation, any accounting and/or regulatory treatment), or the tax-exempt nature or taxability of payments made in respect of any investment, loan or security. The Rating Agency shall neither construed to be nor acting under the capacity or nature of an 'expert' as defined under Section 2(38) of the Companies Act, 2013. India Ratings does not provide any financial, legal, auditing, accounting, appraisal, valuation or actuarial services in any manner. A rating should not be viewed as a replacement for such advice or services. Investors may find our ratings to be important information, and India Ratings notes that you are responsible for communicating the contents of this letter, and any changes with respect to the rating, to investors.

Websites

The information contained on the websites of the Trust, the Sponsor, as may be applicable, the Trustee and the Lead Managers, or the other websites referred in this Offer Document or that can be accessed through our websites or such other websites, neither constitutes part of this Offer Document, nor is it incorporated by reference therein and should not form the basis of any investment decision. For details of the websites of the Trust, Trustee and the Lead Managers, please see "*General Information*" on page 112.

FORWARD-LOOKING STATEMENTS

Certain statements contained in this Offer Document that are not statements of historical fact constitute "forward-looking statements". Bidders can generally identify forward-looking statements by terminology such as "aim", "anticipate", "believe", "continue", "can", "could", "estimate", "expect", "intend", "likely", "may", "objective", "plan", "potential", "project", "propose", "pursue", "seek", "shall", "should", "will", "would", or other words or phrases of similar import. Similarly, statements that describe the strategies, objectives, plans or goals of the Trust, including the Trust's business strategy, revenue and profitability (including, without limitation, any financial or operating projections or forecasts) and other matters discussed in this Offer Document that are not historical facts, are also forward-looking statements. However, these are not the exclusive means of identifying forward-looking statements.

All statements regarding the Trust's expected financial conditions, results of operations, business plans and prospects are forward-looking statements. These forward-looking statements include statements as to the Trust's business strategy, planned projects, revenue and profitability (including, without limitation, any financial or operating projections or forecasts), new business and other matters discussed in this Offer Document that are not historical facts. These forward-looking statements and any other projections contained in this Offer Document (whether made by the Trustee, Investment Manager or any third party), are predictions and involve known and unknown risks, uncertainties, assumptions and other factors that may cause the Trust's actual results, performance or achievements to be materially different from any future results, performance or achievements expressed or implied by such forward-looking statements or other projections. Further, this Offer Document also includes the section "*Projections of Revenue from Operations and Cash Flow from Operating Activities*" attached as **Annexure E**.

The Valuation Report included in this Offer Document, is based on certain projections and accordingly, should be read together with assumptions and notes thereto. For further details, please see the "*Valuation Report*" attached as **Annexure A**. The Technical Reports and the Traffic Reports include projections and estimates in relation to routine and periodic maintenance, including operation and maintenance and traffic data and accordingly, should be read in conjunction with the relevant notes and assumptions thereto. For further details, please see the "*Technical Reports*" attached as **Annexure B** and the "*Traffic Reports*" attached as **Annexure C**.

All forward-looking statements and financial projections are subject to risks, uncertainties and assumptions. Actual results may differ materially from those suggested by forward-looking statements and financial projections due to certain known or unknown risks or uncertainties associated with the Investment Manager's expectations with respect to, but not limited to, the actual growth in the infrastructure sector, the Investment Manager's ability to successfully implement the strategy, growth and expansion plans, technological changes, cash flow projections, exposure to market risks, general economic and political conditions in India, monetary and fiscal policies of India, inflation, deflation, foreign exchange rates, performance of financial markets in India or globally, changes in domestic laws, regulations and taxes, changes in competition in the infrastructure sector, the outcome of any legal or regulatory proceedings and the future impact of new accounting standards. By their nature, certain of the market risk disclosures are only estimates and could be materially different from what actually occurs in the future. As a result, actual future gains, losses or impact on net income could materially differ from those that have been estimated.

Factors that could cause actual results, performance or achievements of the Trust to differ materially include, but are not limited to, those discussed under "*Risk Factors*", "*Industry Overview*", "*Business*" and "*Discussion and analysis by the Directors of the Investment Manager of the financial condition, results of operations and cash flows of the Initial Portfolio Assets of the Trust*", on pages 64, 176, 240 and 375, respectively. Some of the factors that could cause the Trust's actual results, performance or achievements to differ materially from those in the forward-looking statements, financial projections and financial information include, but are not limited to, the following:

- The Trust has no operating track record and may not be able to operate our business successfully, achieve business objectives or generate sufficient cash flows to make or sustain distributions.
- The Special Purpose Combined Financial Statements included in this Offer Document may not accurately reflect our future financial position, results of operation and cash flows.
- We have incurred losses before tax in the nine months ended December 31, 2025 and Financial Years 2025, 2024 and 2023, and similar losses in the future may adversely affect our business, financial condition and cash flows.

- A significant portion of our revenue is concentrated in a few Project SPVs, and any adverse developments affecting such Project SPVs may impact our financial condition, revenue from operations, cash flows and ability to make distributions to Unitholders.

- Our revenues from certain of our Project SPVs are dependent on receiving consistent annuity income and interest on annuity income from NHAI and MORTH and other compensation payments.

The forward-looking statements, Projections of Revenue from Operations and Cash Flow from Operating Activities, Valuation Report, Traffic Reports and Technical Reports reflect current views as of the date of this Offer Document and are not a guarantee of future performance or returns to Bidders. These statements and projections are based on certain beliefs and assumptions, which in turn are based on currently available information. Although the Investment Manager and the Sponsor believe that the expectations and the assumptions upon which such forward-looking statements are based, are reasonable at this time, however, none of the Investment Manager or the Sponsor can assure Bidders that such expectations will prove to be correct or accurate. Given these uncertainties, investors are cautioned not to place undue reliance on such forward-looking statements and not to regard such statements as a guarantee of future performance.

In accordance with the InvIT Regulations, the Projections of Revenue from Operations and Cash Flow from Operating Activities have been examined by the Auditors in accordance with SAE 3400. The Projections of Revenue from Operations and Cash Flow from Operating Activities have been prepared for inclusion in this Offer Document for the purposes of this Issue, using a set of assumptions that include hypothetical assumptions about future events and management's actions that are not necessarily expected to occur, and have been approved by the IM Board. Consequently, Bidders are cautioned that the Projections of Revenue from Operations and Cash Flow from Operating Activities may not be appropriate for purposes other than that described above. In any event, these statements speak only as of the date of this Offer Document or the respective dates indicated in this Offer Document.

The Trust, the Investment Manager, the Sponsor and the Lead Managers or any of their affiliates or advisors, undertake no obligation to update or revise any of statements reflecting circumstances arising after the date hereof or to reflect the occurrence of underlying events, whether as a result of new information, future events or otherwise after the date of this Offer Document. If any of these risks and uncertainties materialize, or if any of the Investment Manager's underlying assumptions prove to be incorrect, the actual results of operations or financial condition or cash flow of the Trust could differ materially from that described herein as anticipated, believed, estimated or expected. All subsequent forward-looking statements attributable to the Trust are expressly qualified in their entirety by reference to these cautionary statements. Given these uncertainties, Bidders are cautioned not to place undue reliance on such forward-looking statements and financial projections, and not to regard such statements to be a guarantee or assurance of the Trust's future performance or returns to investors.

THE ISSUE

The following is a general summary of the terms of this Issue. This summary should be read in conjunction with, and is qualified in its entirety by, the detailed information appearing elsewhere in this Offer Document:

Issue	Initial offer of up to [●] Units aggregating up to ₹11,050 million through a public issue
Of which	
Institutional Investor Portion (not more than 75% of the Issue Size)*	Not more than [●] Units
Non-Institutional Investor Portion (not less than 25% of the Issue Size)	Not less than [●] Units
Floor Price	₹ [●] per Unit
Cap Price	₹ [●] per Unit
Issue Price	₹ [●] per Unit
Minimum Bid Size	Minimum [●] and in multiples of [●] thereafter by Bidders (other than Anchor Investor)
Bid/ Issue Opening Date**	April 17, 2026
Bid/ Issue Closing Date***	April 21, 2026
Sponsor	Epic Transnet Infrastructure Private Limited (*formerly known as Watrak Infrastructure Private Limited*)
Trustee	Axis Trustee Services Limited
Investment Manager	EAAA TransInfra Managers Limited
Project Manager	Epic Transnet Project Management Private Limited (*formerly known as Chennai -Tada Tollway Private Limited*)
Authority for this Issue	This Issue was authorised and approved by the IM Board on November 28, 2025
Tenure of the Trust	The Trust shall remain in force perpetually until it is dissolved or terminated in accordance with the Trust Deed. For details, please see, "*Parties to the Trust*" on page 122
Units issued and outstanding as of the date of this Offer Document	Nil
Units issued and outstanding immediately after this Issue	Up to [●] Units
Sponsor and Sponsor Group(s) Units	Up to [●] Units The Units to be held by the Sponsor and Sponsor Group shall rank *pari passu* with and have the same rights as the Units to be Allotted pursuant to this Issue. The Units to be held by the Sponsor and the Sponsor Group will be allotted to the Sponsor and Sponsor Group pursuant to a resolution of the IM Board dated [●] prior to the Allotment of Units in the Issue.
Distribution	Please see "*Distribution*" on page 372
Indian Taxation	For details of possible Special Tax Benefits available to the Trust and its unitholders under the applicable laws in India, please see "*Statement of Possible Tax Benefits available to the Citius TransNet Investment Trust ("**Trust**") and its unitholders under the applicable laws in India"* on page 498
Use of Proceeds	Please see *"Use of Proceeds*" on page 356
Listing	Prior to this Issue, there has been no market for the Units. The Units are proposed to be listed on the Stock Exchanges. In-principle approval for listing of the Units have been received from NSE and BSE each dated February 3, 2026. The Investment Manager shall apply to the Stock Exchanges for the final listing and trading approval, after the Allotment and the credit of the Units to the demat accounts of the Allottees. The Units are required to be listed within six Working Days from the Bid/Issue Closing Date.
Designated Stock Exchange	NSE
Closing Date	The date on which Allotment of the Units pursuant to this Issue shall be made, *i.e.*, on or about April 24, 2026
Ranking	The Units being issued shall rank *pari passu* in all respects, including rights in respect of distribution. Please see, *"Rights of Unitholders"* on page 464
Lock-in and rights of Unitholders	For details, please see, "*Information Concerning the Units*" and "*Rights of Unitholders*" on pages 354 and 464, respectively
Risk Factors	Prior to making an investment decision, Bidders should consider carefully the matters discussed in *"Risk Factors*" on page 64

* *The Investment Manager may, in consultation with the Lead Managers, consider participation by Anchor Investors in this Issue for up to 60% of the Institutional Investor Portion in accordance with the InvIT Regulations.*

** *The Anchor Investor Bidding Date shall be one Working Day prior to the Bid/ Issue Opening Date.*

*** *The Investment Manager may in consultation with the Lead Managers, consider closing the Bid/ Issue Period for Institutional Investors one Working Day prior to the Bid/ Issue Closing Date, in accordance with the InvIT Regulations.*

Allocation in all categories, except the Anchor Investor Portion, shall be made on a proportionate basis. In case of under-subscription in any category, the unsubscribed portion may be allotted to investors in the other category at the discretion of the Investment Manager, in consultation with the Lead Managers and the Designated Stock Exchange.

The Issue is being made through the Book Building Process, wherein not more than 75% of the Issue Size shall be available for allocation to Institutional Investors on a proportionate basis, provided that the Investment Manager, in consultation with the Lead Managers, may allocate up to 60% of the Institutional Investor Portion to Anchor Investors on a discretionary basis in accordance with the InvIT Regulations. Further, not less than 25% of the Issue Size shall be available for allocation on a proportionate basis to Non-Institutional Investors, subject to valid Bids being received at or above the Issue Price. In case of under-subscription in any category, the unsubscribed portion in either category may be Allotted to Bidders in the other category at the discretion of the Investment Manager, in consultation with the Lead Managers and the Designated Stock Exchange.

The Units, on Allotment, shall be traded only in the dematerialized segment of the Stock Exchanges.

In accordance with the InvIT Regulations, the Investment Manager undertakes that at any given time, there shall only be one denomination for the Units, and no Unitholder shall enjoy superior voting or any other rights over another Unitholder, except as per Regulation 4(2)(i), pursuant to which the unitholder(s) holding not less than ten percent of the total outstanding units of the InvIT, either individually or collectively, shall be entitled to nominate one director on the board of directors of the Investment Manager. Further, there shall not be multiple classes of Units.

In case the Trust receives oversubscription of the Issue, then the Investment Manager, in consultation with the Lead Managers, reserves the right to retain oversubscription of not more than 25% of the Issue in accordance with the InvIT Regulations. The Investment Manager, in consultation with the Lead Managers, will decide whether or not to retain any oversubscription in the Issue only after the Bid/Issue Closing Date. The maximum subscription from any investor, other than the Sponsor, its related parties and its associates, taken together with Units held by them and persons acting in concert with them in the Trust, shall not be more than 25% of the total unit capital of the Trust.

For further details in relation to this Issue, including the method of application, please see, "*Issue Information*" on page 472.

OVERVIEW OF THE TRUST

The following overview is qualified in its entirety by, and is subject to, the more detailed information contained in, or referred to elsewhere in this Offer Document. Statements contained in this summary that are not historical facts may be forward-looking statements. Such statements are based on certain assumptions and are subject to certain risks, uncertainties and assumptions that could cause actual results of the Trust to differ materially from those forecasted or projected in this Offer Document. Under no circumstances should the inclusion of such information herein be regarded as a representation, warranty or prediction of the accuracy of the underlying assumptions by the Trust or the Parties to the Trust or the Lead Managers or any other person that these results will be achieved or are likely to be achieved.

Structure and description of the Trust

Epic Transnet Infrastructure Private Limited (*formerly known as Watrak Infrastructure Private Limited*), the Sponsor, in its capacity as the settlor ("**Settlor**") set up the Trust on July 21, 2025, as a contributory, determinate, irrevocable infrastructure investment trust under the provisions of the Indian Trusts Act, 1882, pursuant to the Trust Deed. The Trust was registered as an infrastructure investment trust with the SEBI under the InvIT Regulations on August 1, 2025 having registration number IN/InvIT/25-26/0032. The Settlor has settled the Trust for an initial sum of ₹ 10,000. The Sponsor shall not have any beneficial interest in such an initial sum of the Trust and such sum shall not be distributed to the Sponsor under any circumstances. For details of the registered office and contact person of the Sponsor, please see "*General Information*" on page 112.

Further, EAAA TransInfra Managers Limited has been appointed as the Investment Manager pursuant to the Investment Management Agreement, and Epic Transnet Project Management Private Limited *(formerly known as Chennai-Tada Tollway Private Limited)* has been appointed as the Project Manager to the Trust. For further details, please see "*General Information*" and "*Parties to the Trust*" beginning on pages 112 and 122, respectively.

Investment Objectives

In terms of the Trust Deed, the object and purpose of the Trust is to carry on the activities of an infrastructure investment trust, as permissible under the InvIT Regulations, to raise funds through the Trust, to make investments in any manner permissible in accordance with the InvIT Regulations and applicable law, the Trust objectives and investment strategy, to the extent applicable, including in such Holdco(s) and/or SPV(s), investment entities and/or infrastructure projects and/or securities in India, and to carry on the activities as may be required for operating the Trust, including incidental and ancillary matters thereto.

The Trustee shall ensure that the Initial Contribution and other InvIT Assets shall not be utilized for any activities prohibited under the InvIT Regulations. Further, the Trustee shall ensure that the InvIT complies with any additional conditions as may be specified by SEBI or applicable law. The Trustee shall ensure that at all times during the term of the InvIT, the activities of the InvIT shall comply with the provisions of the InvIT Documents and the InvIT Regulations or applicable law and the InvIT shall not engage in or undertake any other business or trade, other than as set out herein or otherwise permitted under applicable law.

Fee and expenses

Annual Expenses

The expenses in relation to the Trust, other than such expenses incurred in relation to operations of the Initial Portfolio Assets, would broadly include fee payable to: (i) the Trustee; (ii) the Investment Manager; (iii) the Project Manager; (iv) the Auditors, (v) the Valuer; and (vi) other intermediaries and consultants.

The estimated recurring expenses on an annual basis, including but not limited to, are as follows:

(₹ in million)

Payable by the Trust	Estimated Expenses*
Fee payable to Trustee	Please see Note 1
Fee payable to the Investment Manager	Please see Note 2
Fee payable to the Project Manager	Please see Note 3
Fee payable to the Auditors	12.15
Fee payable to the Valuer	2.71
Fee payable to the Registrar	1.00
Fee payable to the Stock Exchanges and Depositories	[●]

Payable by the Trust	Estimated Expenses*
Fee payable to Credit Rating Agency	14.6

** All fee details disclosed above are exclusive of applicable taxes.*

Note 1:

The Trustee will be entitled to an initial acceptance fee of ₹ 0.90 million and an annual fee of ₹1.4 million, which will be paid annually to the Trustee for the services rendered to the Trust. The initial fee plus applicable taxes shall be payable within 15 days from the date of issuance of invoice. The initial fee is non-refundable. The initial fee shall not be subject to execution of finance and security documents/ transaction documents or completion of the transaction. The annual fee plus all applicable taxes shall be payable within 30 days from the date of issuance of invoice. The first annual fee would commence from the date of the trust deed till end of the financial year on pro-rata basis. The subsequent annual fee shall be payable financial year wise until cessation of the Trustee's services and/ or satisfaction of charges, if any, on the security to the transaction and issuance of no dues certificate/ no objection certificate by the Trustee. The annual fee may be revised as per the mutually agreed terms between the Sponsor and the Trustee from time to time.

Note 2:

The Investment Manager shall be entitled to a fee from the funds of the Trust, in accordance with the Investment Management Agreement ("**Investment Management Fees**").

The Investment Management Fees shall be calculated annually and shall be the higher of: (a) up to 1.5% of the gross revenue of the InvIT Assets ("**Fee Percentage**"); or (b) ₹ 150 million ("**Minimum Threshold**") subject to an escalation of 7% per annum.

The Investment Manager shall raise invoices on gross revenue generated by the InvIT Assets during every financial quarter, payable at the end of every financial quarter. Notwithstanding the foregoing, the Investment Management Fees shall accrue from the date of execution of the Investment Management Agreement and the Investment Manager shall raise its first invoice only upon acquisition of the InvIT Assets. All the invoices shall be raised by the Investment Manager to the Trustee (on behalf of the Trust). Each such invoice shall be raised within 30 (thirty) days from the close of every financial quarter and payable within 30 (thirty) days upon receipt thereof. The Investment Manager may charge a delay interest at the rate of 12% per annum in case of failure of the Trustee (on behalf of the Trust) to make the payment within the time mentioned above and such interest shall be payable for the period of delay. All payments to the Investment Manager shall be made in cash to the bank account provided in writing by the Investment Manager to the other Parties to the Investment Management Agreement.

Note 3:

In consideration of the services to be rendered by the Project Manager to each SPV, either directly or through the appointment and supervision of agents, in accordance with and subject to the terms of the Project Implementation and Management Agreement and Applicable Law, each SPV agrees to pay the fees of up to 1.5% of its gross revenue ("**Fee**") from its funds, on an arm's length basis, either to the Project Manager or directly to any agent appointed in this regard, as the case may be. It is clarified that in the event the Project Manager undertakes the services through the appointment and supervision of agents, the SPVs may pay fees directly to such agent, as may be mutually agreed upon by the Project Manager, the relevant SPVs and the agent.

The Project Manager shall raise invoices on quarterly basis for the services provided to each SPV during each quarter in Indian Rupees. All the invoices raised by the Project Manager will be at an arm's length price, based on a benchmarking study. Each such quarterly invoice shall be raised within thirty (30) days from the close of every quarter and payable within forty-five (45) days upon receipt thereof.

Set-up expenses

The expenses in relation to the setting up the Trust, being an aggregate of ₹ 1.33 million have been borne by the Sponsor, on behalf of the Trust, and shall be reimbursed by the Trust.

Issue Expenses

The total expenses of this Issue are estimated to be up to ₹ [●] million and the expenses incurred by the Sponsor or the Investment Manager (on behalf of the Trust) which will be reimbursed by the Trust. For details in relation

to the Issue expenses, please see "*Use of Proceeds – Issue Expenses*" on page 360.

FORMATION TRANSACTIONS IN RELATION TO THE TRUST

Details of arrangement pertaining to the Trust

The Initial Portfolio Assets comprise two Holdcos along with ten Project SPVs to be acquired by the Trust pursuant to the completion of the actions as contemplated under the respective Securities Purchase Agreements and the Formation Transactions.

The details of the Initial Portfolio Assets as of the date of this Offer Document are provided below:

A. HoldCos

1. Epic Concesiones 3 Private Limited ("Epic 3")

Corporate information

Epic 3 was incorporated on February 26, 2001 under the Companies Act, 1956, having the CIN U65993TN2001PTC046691 and is currently a private limited company. Its registered office is located at 4th Floor, Tower B, Commerzone IT Park, Mount Ponnamallee Road, Porur, Kanchipuram, Sriperumbudur, Chennai-600116, Tamil Nadu, India. Epic 3 is one of the HoldCos proposed to be acquired by the Trust. As of the date of this Offer Document, Epic 3 holds six SPVs, namely, AMTPL, DTPL, PECPL, RVTPL, SRTPL, and SBGTPL. In addition to these SPVs, as on the date of the Draft Offer Document, Epic 3 also held (a) 11% of the issued and paid-up equity share capital of Sical Iron Ore Terminals Limited ("**SIOTL**" and such shareholding, "**SIOTL Shares**"); and (b) 3.06% of the issued and paid-up equity share capital of Indian Highways Management Company Limited ("**IHMCL**", and such shareholding, "**IHMCL Shares**"). However, as on the date of this Offer Document, Epic 3 has divested its shareholding in SIOTL and IHMCL in the following manner:

(a) Epic 3 had filed an application under the Insolvency and Bankruptcy Code, 2016, and rules framed thereunder, dated September 8, 2025 with the National Company Law Tribunal, Chennai ("**NCLT, Chennai**"), seeking permission to, inter alia, undertake the transfer of the SIOTL Shares. Pursuant to an order passed by the NCLT, Chennai dated January 30, 2026, such application was allowed and Epic 3 has accordingly divested its shareholding in SIOTL.

(b) Epic 3 has transferred the IHMCL Shares to Neelambur Madukkarai Tollway Private Limited, and accordingly, has divested its shareholding in IHMCL.

Accordingly, as on the date of this Offer Document, Epic 3 is not a shareholder in any entity other than the aforementioned SPVs, namely, AMTPL, DTPL, PECPL, RVTPL, SRTPL, and SBGTPL.

Capital structure

As on date of this Offer Document, the capital structure of Epic 3 is as follows:

Particulars	Aggregate nominal value (in ₹)
Authorised share capital	
3,099,810,000 equity shares of ₹ 10 each	30,998,100,000
200,000 compulsorily convertible preference shares of ₹ 10 each	2,000,000
Total	**31,000,100,000**
Issued, subscribed and paid-up share capital	
28,078,967 equity shares of ₹ 10 each	280,789,670
179,545 compulsorily convertible preference shares of ₹10 each	1,795,450
Total	**282,585,120**

Shareholding pattern

As on date of this Offer Document, the shareholding pattern of Epic 3 is as follows:

Sr No.	Name of the shareholders	Number of shares	Face value (₹)	Amount (₹)	% of shareholding
Equity shares					
1.	Infrastructure Yield Plus II[#]	16,500,412	10	165,004,120	58.76

Sr No.	Name of the shareholders	Number of shares	Face value (₹)	Amount (₹)	% of shareholding
2.	Infrastructure Yield Plus IIA[#]	7,856,604		78,566,040	27.98
3.	India Infrastructure Yield Plus II[#]	3,721,951		37,219,510	13.26
A	**Total**	**28,078,967**		**280,789,670**	**100.00**
Compulsorily Convertible Preference shares					
1.	Larsen & Toubro Limited[*]	51,000	10	510,000	28.41
2.	CPPIB India Private Holdings Inc.[*]	49,000		490,000	27.29
3.	Infrastructure Yield Plus II	46,744		467,440	26.03
4.	Infrastructure Yield Plus IIA	22,257		222,570	12.40
5.	India Infrastructure Yield Plus II	10,544		105,440	5.87
B	**Total**	**179,545**		**1,795,450**	**100.00**
(A+B)	**Total number of shares**	**28,258,512**		**282,585,120**	

[*] *CCPS held by these shareholders are linked to payouts to be made to the CCPS holders subject to achievement of certain milestones under the concession agreements/ trigger based contractual mechanism for some of our Initial Portfolio Assets, pursuant to the terms of the Erstwhile Epic SPA, which are required to be made out of certain escrow accounts maintained for this purpose, which have been presently funded based on certain assumptions. These shareholders shall continue holding the CCPS post-listing and have executed letter agreements on the compliance with Regulation 18(3A) of the InvIT Regulations pursuant to which these shareholders shall not act in any manner that prevents the Trust (acting through the Trustee), the Investment Manager or Epic 3 from complying with the provisions of the InvIT Regulations. For further details of the Erstwhile Epic SPA, and the assignment of the Erstwhile Epic SPA as well as the escrow arrangement in favour of the Trust, please see "Related Party Transactions – Acquisitions of the Initial Portfolio Assets by the Trust" on page 420. For further details, please refer to the table below.*

[#] *Infrastructure Yield Plus II, Infrastructure Yield Plus IIA and India Infrastructure Yield Plus II acquired their respective shareholding in Epic 3 pursuant to a scheme of merger amongst EPIC Concesiones Private Limited ("**Epic**") (the erstwhile holding company of Epic 3), Vadodara Bharuch Tollway Limited ("**VBTL**"), Rewin Infrastructure Limited ("**RIL**") and Palanpur-Swaroopgunj Road Project Limited ("**PSRPL**"),which was approved by the National Company Law Tribunal Division Bench – II, Chennai pursuant to its order dated February 18, 2025. Following the effectiveness of the merger, Infrastructure Yield Plus II, Infrastructure Yield Plus IIA and India Infrastructure Yield Plus II became direct shareholders of Epic 3, and the shareholding of Epic 3 in VBTL, RIL and PSRPL ceased to exist.*

Brief details of the above-mentioned milestones/ trigger based contractual mechanism for transfer of the CCPS and cash payouts proposed to be made pursuant to the transfer of the CCPS currently held by Larsen & Toubro Limited ("**L&T**") and CPPIB India Private Holdings Inc. ("**CPPIB**") is set forth below:

S. No.	Name of Project SPV	Brief Details of the milestone/ trigger event	Current status of milestone/ trigger	Number of CCPS	Cash payout for transfer upon achieving milestone/ trigger event[**]	Tentative timeline for transfer of CCPS[*]
1.	AMTPL Series 1 CCPS	Extension or non-extension of concession period by concessioning authority	Milestone/ trigger event not yet achieved	L&T: 25,500 CPPIB: 24,500	Assuming 1 year extension, the estimated cash payout is ₹ 63 crore which has been funded into the escrow account (subject to revision based on the actual number of extension days)	Trigger may occur anytime prior to the end of the concession period, *i.e.*, June 2032. CCPS shall be transferred to the Trust in terms of the Erstwhile Epic SPA once trigger has been achieved
2.	SBGTPL Series 3 CCPS	Non-occurrence or occurrence of reduction of concession period by concessioning authority	Milestone/ trigger event not yet achieved	L&T: 25,500 CPPIB: 24,500	₹ 180 crore if there is no reduction in the concession period (the cash payout will be adjusted to the actual number of days of reduction of the concession period received from the concessioning authority) ₹ 90 crore already funded	Trigger may occur anytime before June 2032, *i.e.*, 876 days prior to the scheduled end of concession period. CCPS shall be transferred to the Trust in terms of the Erstwhile Epic SPA once trigger has been achieved

S. No.	Name of Project SPV	Brief Details of the milestone/ trigger event	Current status of milestone/ trigger	Number of CCPS	Cash payout for transfer upon achieving milestone/ trigger event[**]	Tentative timeline for transfer of CCPS[*]
					into escrow account Balance ₹ 90 crore to be funded in escrow prior to Formation Transactions in relation to the Trust and transfer of escrow account to the Trust[***]	

[*] *In the event that the CCPS for both AMTPL and SBGTPL are not transferred as per S. No. 1 and 2, the CCPS shall be converted (on a 1:1 basis) into equity shares in terms of the Erstwhile Epic SPA, one day prior to the expiry of 10 years from the date of allotment of the CCPS (i.e., January 12, 2023) in terms of the Erstwhile Epic SPA. The estimated percentage of shareholding of L&T and CPPIB in Epic 3 upon conversion (on a fully diluted basis), shall be as follows (i) L&T: less than or equal to 0.18%; and (ii) CPPIB: less than or equal to 0.18%. Further, the amounts lying in the escrow accounts shall be utilised by the Trust in accordance with the InvIT Regulations, including the provisions applicable for undertaking the distribution for the same to the Unitholders in accordance with the distribution policy adopted by the Trust.*

[**] *The escrow accounts presently held by the Sponsor Group shall be assigned and transferred to the Trust, pursuant to a deed of adherence. For further details of such escrow arrangement in favour of the Trust, please see "Related Party Transactions – Acquisitions of the Initial Portfolio Assets by the Trust" on page 420.*

[***] *At the time of the assignment and transfer of the escrow accounts to the Trust, the escrow accounts shall be funded for such milestone/ trigger event.*

Further, Epic 3 has also issued 20,000,000 CCDs of ₹100 each. For further details of Epic 3 CCDs please see '*Financial Indebtedness*' and "- *Acquisition of the Initial Portfolio Assets by the Trust - Epic 3 SSAs*" on pages 362 and 38.

Directors of Epic 3

The directors of Epic 3 are entrusted with the overall management of Epic 3. Please see below the brief profiles of directors of Epic 3:

Niraj Mohanty is a non-executive Director of Epic 3. He holds a masters' degree in engineering (civil) with specialization in soil mechanics and foundation engineering from Regional Engineering College, Rourkela. He has experience of over 31 years in the core construction industry, experience in highways, bridges, railways, tunnels, and irrigation canals.

He is currently serving as the Senior Vice President and Head of Projects of Sekura India Management Limited and oversees 15 highway projects across India, managing the entire gamut of O&M activities (including execution of capex), toll operations, annuity collections, and stakeholder coordination. His expertise spans project planning, budgeting, execution, value engineering and cost control etc.

Esther Malini Victor is a non-executive Director of Epic 3. She holds a bachelor's degree in engineering (civil) from Bharathiar University, and a master's degree in engineering (urban) from Anna University. Further, she also has been conferred with a doctorate of philosophy in recognition of her research on 'Evaluation of policy parameters, uncertainties and risks in build, operate and transfer BOT projects for transport infrastructure development' from the Indian Institute of Science, Bangalore and a certificate of achievement from the Institute for Public-Private Partnerships for completion of 'Structuring legal agreements for public-private partnership projects' program. She has also been awarded a medal by the Indian Roads Congress for her paper entitled 'Evaluation of financial viability of BOT transfer infrastructure projects' and a production engineering division gold medal for her paper on 'Fuel savings in bus transit using depot-terminal bus allocation model'.

She has over 27 years of experience, which includes experience in PPP projects. She was previously associated with L&T Infrastructure Development Projects Limited (*currently known as Epic Concesiones 3 Private Limited*) and Larsen & Toubro Limited and Tamil Nadu Road Development Company Limited. She has been instrumental in contracts and claims management and manages client relations for all on-board projects. She has also played a

pivotal role in conceptualizing, developing, and implementing major road projects.

Mohankumar Kolli is a non-executive Director of Epic 3. He holds a bachelor's degree in civil engineering from Nagarjuna University. He has over 20 years of experience in the highway infrastructure sector, contract administration, claims management, project planning and commercial strategy including engineering, procurement and construction and was previously associated with Apco Infratech Private Limited. Further, he is certified by the Institute of Engineers (India) as a Chartered Engineer and a fellow, and has completed the internal auditors training program conducted by TUV India Private Limited.

He leads corporate-level procurement and sub-contracts administration for all PPP projects and oversees these activities for the entire portfolio. Apart from the above, he also leads contract management advisory on key contractual issues for some projects in the portfolio. His role involves risk assessment, bid support, while driving commercial and contract administration strategies aligned with organizational goals in our company.

As on date December 31, 2025, Epic 3 has an employee strength of 21 professionals who work with the Project Manager and in-house O&M teams of the underlying Project SPVs to meet the, operational, functional requirements and the obligations under the respective Concession Agreements of the Project SPVs.

2. SRPL Roads Private Limited (*formerly known as Sekura Roads Private Limited*) ("SRPL")

Corporate information

SRPL was incorporated on April 5, 2018 under the Companies Act, 2013, having the CIN U74999MH2018PTC307603 and is currently a private limited company. Its registered office is located at 504 & 505, 5th Floor, Windsor, Off CST Road, Kalina, Santacruz (East), Mumbai – 400 098, Maharashtra, India.

SRPL is one of the HoldCos proposed to be acquired by the Trust. As of the date of this Offer Document, SRPL holds 3 SPVs, namely, Dhola, Dibang and JSEL.

Capital structure

As on date of this Offer Document, the capital structure of SRPL is as follows:

Particulars	Aggregate nominal value (in ₹)
Authorised share capital	
8,000,000 equity shares of ₹ 10 each	80,000,000
Issued, subscribed and paid-up share capital	
7,250,000 equity shares of ₹ 10 each	72,500,000

Shareholding pattern

As on date of this Offer Document, the shareholding pattern of SRPL is as follows:

Sr No.	Name of the shareholders	Number of shares	Face value (₹)	Amount (₹)	% of shareholding
Equity Shares					
1.	Edelweiss Infrastructure Yield Plus	72,49,999	10	72,499,990	100
2.	Vinit Agrawal*	1		10	Negligible
	Total	7,250,000		72,500,000	**100**

**Nominee of Edelweiss Infrastructure Yield Plus*

Further, SRPL has also issued 2,235,700 CCDs of face value of ₹1,000 each.

Directors of SRPL

The directors of SRPL are entrusted with the overall management of SRPL. Please see below the brief profiles of directors of SRPL:

Pramod Mulchand Sharma is a non-executive Director of SRPL. He holds a masters' degree in engineering (civil) and a bachelor's degree in civil engineering from Maharaja Sayajirao University of Baroda. He has over 18 years of experience in infrastructure development, specializing in roads and bridges. He has been instrumental in concluding strategic PPP deals, driving operational efficiency and leading new technical initiatives to sustain

and improve O&M performance and enhance long-term growth by fostering collaborative relationships with all stakeholders.

Kevinkumar Parshottambhai Chothani is a non-executive Director of SRPL. He holds a bachelor's degree in engineering (electrical) from Saurashtra University, a post diploma in industrial safety issued by Technical Examinations Board, Gujarat, and an international diploma in occupation, safety and health from the British Safety Council. He has over 22 years of experience across sectors such as infrastructure, manufacturing, energy, and chemical sectors in EHS & ESG practices.

He is a certified safety professional, certified industrial hygienist, and a chartered member of the institution of occupational safety and health. He leads safety and sustainability strategies across renewable energy, transmission, and highway assets and ESG due diligence for asset acquisitions aligned with IFC performance standards and has implemented digital EHS systems. He has played a key role in achieving ISO 14001, ISO 45001, and ISO 55001 certifications across all infrastructure assets. His initiatives resulted in zero lost time incidents and successful ISO certifications at international sites.

Sandip Das is a non-executive Director of SRPL. He holds a bachelor's degree in engineering (civil) from University of Calcutta and a masters' degree in engineering (civil) with a specialization in soil mechanics and foundation engineering from Indian Institute of Technology, Kharagpur. He has over 28 years of experience in construction of highways, expressways and infrastructure projects, specializing in materials engineering, pavement design, highway maintenance and quality assurance and was previously associated with Sekura Roads Private Limited, Larsen & Toubro Limited and Hindustan Construction Company Limited.

He heads the process of pavement analysis and determination of pavement life cycle using high end technology supported by analytical tools and ensuring quality of the riding surface is maintained. He is involved in carrying out thorough quality testing to assess the pavement strength in highway assets proposed to be acquired. Further, his core domain includes technical support to execution teams, engineering departments, and tendering units, ensuring adherence to approved designs and budgetary constraints.

As on December 31, 2025, SRPL has an employee strength of seven professionals who work with the Project Manager and in-house O&M teams of the underlying Project SPVs to meet the operational, functional requirements and the obligations under the respective concession agreements of the Project SPVs.

B. Project SPVs

1. Ahmedabad - Maliya Tollway Private Limited ("AMTPL")

Corporate information

AMTPL was incorporated on September 9, 2008 under the Companies Act, 1956, having the CIN U45203TN2008PTC069211 and is currently a private limited company. Its registered office is located at 4th Floor, Tower B, Commerzone IT Park, Mount Ponnamallee Road, Porur, Kanchipuram, Sriperumbudur, Chennai-600116, Tamil Nadu, India.

Capital structure

As on date of this Offer Document, the capital structure of AMTPL is as follows:

Particulars	Aggregate nominal value (in ₹)
Authorised share capital	
150,000,000 equity shares of ₹ 10 each	1,500,000,000
270,000,000 compulsorily convertible preference shares of ₹ 10 each	2,700,000,000
Total	**4,200,000,000**
Issued, subscribed and paid-up share capital	
149,000,000 equity shares of ₹ 10 each	1,490,000,000
268,944,604 compulsorily convertible preference shares of ₹10 each	2,689,446,040
Total	**4,179,446,040**

Shareholding pattern

As on date of this Offer Document, the shareholding pattern of AMTPL is as follows:

Sr No.	Name of the shareholders	Number of shares	Face value (₹)	Amount (₹)	% of shareholding
Equity shares					
1.	Epic Concesiones 3 Private Limited	148,999,994	10	1,489,999,940	100
2.	Amit Dasgupta*	1		10	Negligible
3.	Manish Chitkara*	1		10	Negligible
4.	Mohankumar Kolli*	1		10	Negligible
5.	Sandip Das*	1		10	Negligible
6.	Vaibhav Bhandari*	1		10	Negligible
7.	Niraj Mohanty*	1		10	Negligible
A	**Total**	**149,000,000**		**1,490,000,000**	**100**
Compulsorily Convertible Preference shares					
1.	Infrastructure Yield Plus II	158,043,493	10	1,580,434,930	58.76
2.	Infrastructure Yield Plus IIA	75,251,766		752,517,660	27.98
3.	India Infrastructure Yield Plus II	35,649,345		356,493,450	13.26
B	**Total**	**268,944,604**		**2,689,446,040**	**100**
(A+B)	**Total number of shares**	**417,944,604**		**4,179,446,040**	

** Nominees of Epic Concesiones 3 Private Limited*

Further, AMTPL has also issued 800,000 NCDs of face value of ₹1000 each, please see "*Financial Indebtedness and Deferred Payments – Principal terms of the non-convertible debentures issued by AMTPL, TEL, PECPL and RVTPL"* on page 367.

2. Deccan Tollways Private Limited ("DTPL")

Corporate information

DTPL was incorporated on December 20, 2011 under the Companies Act, 1956, having the CIN U45203TN2011PTC083661 and is currently a private limited company. Its registered office is located at 4th Floor, Tower B, Commerzone IT Park, Mount Ponnamallee Road, Porur, Kanchipuram, Sriperumbudur, Chennai-600116, Tamil Nadu, India.

Capital structure

As on date of this Offer Document, the capital structure of DTPL is as follows:

Particulars	Aggregate nominal value (in ₹)
Authorised share capital	
310,000,000 equity shares of ₹ 10 each	3,100,000,000
54,000,000 compulsorily convertible preference shares of ₹ 10 each	540,000,000
Total	**3,640,000,000**
Issued, subscribed and paid-up share capital	
285,340,000 equity shares of ₹ 10 each	2,853,400,000
54,000,000 compulsorily convertible preference shares of ₹10 each	540,000,000
Total	**3,393,400,000**

Shareholding pattern

As on date of this Offer Document, the shareholding pattern of DTPL is as follows:

Sr No.	Name of the shareholders	Number of shares	Face value (₹)	Amount (₹)	% of shareholding
Equity shares					
1.	Epic Concesiones 3 Private Limited	243,339,994	10	2,433,399,940	85.28
2.	Neelambur Madukkarai Tollway Private	42,000,000		420,000,000	14.72

Sr No.	Name of the shareholders	Number of shares	Face value (₹)	Amount (₹)	% of shareholding
	Limited				
3.	Amit Dasgupta*	1		10	Negligible
4.	Manish Chitkara*	1		10	Negligible
5.	Mohankumar Kolli*	1		10	Negligible
6.	Sandip Das*	1		10	Negligible
7.	Vaibhav Bhandari*	1		10	Negligible
8.	Niraj Mohanty*	1		10	Negligible
A	**Total**	**285,340,000**		**2,853,400,000**	**100**
Compulsorily Convertible Preference shares					
1..	Epic Concesiones 3 Private Limited	54,000,000	10	540,000,000	100
B	**Total**	**54,000,000**		**54,00,00,000**	**100**
(A+B)	**Total number of shares**	**339,340,000**		**3,393,400,000**	

** Nominees of Epic Concesiones 3 Private Limited*

3. Dibang Infra Projects Private Limited ("Dibang")

Corporate information

Dibang was incorporated on July 23, 2010 under the Companies Act, 1956, having the CIN U45203MH2010PTC356297 and is currently a private limited company. Its registered office is located at 504 & 505, 5th Floor, Windsor, Off CST Road, Kalina, Santacruz (East), Mumbai – 400 098, Maharashtra, India.

Capital structure

As on date of this Offer Document, the capital structure of Dibang is as follows:

Particulars	Aggregate nominal value (in ₹)
Authorised share capital	
3,100,000 equity shares of ₹ 10 each	31,000,000
Issued, subscribed and paid-up share capital	
1,662,799 equity shares of ₹ 10 each	16,627,990

Shareholding pattern

As on date of this Offer Document, the shareholding pattern of Dibang is as follows:

Sr No.	Name of the shareholders	Number of shares	Face value (₹)	Amount (₹)	% of shareholding
Equity Shares					
1.	SRPL Roads Private Limited	1,662,796**	10	16,627,960	100
2.	Sandip Das	1		10	Negligible
3.	Nitin Dhokale*	1		10	Negligible
4.	Manoj Thapliyal*	1		10	Negligible
	Total	1,662,799		**16,627,990**	**100**

** Nominees of SRPL Roads Private Limited*
*** 848,027 equity shares which are presently under pledge*

For details in relation to the NCDs issued by Dibang, please see "*Use of Proceeds - Key terms of the non-convertible debentures issued by TEL, JSEL, Dhola and Dibang ("**NCDs**")"* on page 358.

4. Dhola Infra Projects Private Limited ("Dhola")

Corporate information

Dhola was incorporated on July 29, 2010 under the Companies Act, 1956, having the CIN U45400MH2010PTC358297 and is currently a private limited company. Its registered office is located at 504 & 505, 5th Floor, Windsor, Off CST Road, Kalina, Santacruz (East), Mumbai – 400 098, Maharashtra, India.

Capital structure

As on date of this Offer Document, the capital structure of Dhola is as follows:

Particulars	Aggregate nominal value (in ₹)
Authorised share capital	
3,010,000 equity shares of ₹ 10 each	30,100,000
Issued, subscribed and paid-up share capital	
3,008,331 equity shares of ₹ 10 each	30,083,310

Shareholding pattern

As on date of this Offer Document, the shareholding pattern of Dhola is as follows:

Sr No.	Name of the shareholders	Number of shares	Face value (₹)	Amount (₹)	% of shareholding
Equity Shares					
1.	SRPL Roads Private Limited	3,008,328**	10	30,083,280	100
2.	Sandip Das	1		10	Negligible
3.	Nitin Dhokale*	1		10	Negligible
4.	Manoj Thapliyal*	1		10	Negligible
	Total	**3,008,331**		**30,083,310**	**100**

** Nominees of SRPL Roads Private Limited*
*** 1,534,249 equity shares which are presently under pledge*

For details in relation to the NCDs issued by Dhola, please see "*Use of Proceeds - Key terms of the non-convertible debentures issued by TEL, JSEL, Dhola and Dibang ("**NCDs**")"* on page 358.

5. Jorabat Shillong Expressway Limited ("JSEL")

Corporate information

JSEL was incorporated on June 18, 2010 under the Companies Act, 1956, having the CIN U45203MH2010PLC204456 and is currently a public limited company. Its registered office is located at 504 & 505, 5th Floor, Windsor, Off CST Road, Kalina, Santacruz (East), Mumbai – 400 098, Maharashtra, India.

Capital structure

As on date of this Offer Document, the capital structure of JSEL is as follows:

Particulars	Aggregate nominal value (in ₹)
Authorised share capital	
85,000,000 equity shares of ₹ 10 each	850,000,000
Issued, subscribed and paid-up share capital	
84,000,000 equity shares of ₹ 10 each	840,000,000

Shareholding pattern

As on date of this Offer Document, the shareholding pattern of JSEL is as follows:

Sr No.	Name of the shareholders	Number of shares	Face value (₹)	Amount (₹)	% of shareholding
Equity Shares					
1.	SRPL Roads Private Limited	83,999,994	10	839,999,940	100
2.	Bhanuprakash Anisetty*	1		10	Negligible
3.	Manish Chitkara*	1		10	Negligible
4.	Mohankumar Kolli *	1		10	Negligible
5.	Niraj Mohanty*	1		10	Negligible
6.	Parveen Kumar*	1		10	Negligible
7.	Sandip Das*	1		10	Negligible
	Total	**84,000,000**		**840,000,000**	**100**

** Nominees of SRPL Roads Private Limited*

For details in relation to the NCDs issued by JSEL, please see "*Financial Indebtedness and Deferred Payments*"

and "*Use of Proceeds - Key terms of the non-convertible debentures issued by TEL, JSEL, Dhola and Dibang ("**NCDs**")"* on pages 361 and 358 respectively.

6. Panipat Elevated Corridor Private Limited ("PECPL")

Corporate information

PECPL was incorporated on July 21, 2005 under the Companies Act, 1956, having the CIN U45203TN2005PTC056999 and is currently a private limited company. Its registered office is located at 4th Floor, Tower B, Commerzone IT Park, Mount Ponnamallee Road, Porur, Kanchipuram, Sriperumbudur, Chennai-600116, Tamil Nadu, India.

Capital structure

As on date of this Offer Document, the capital structure of PECPL is as follows:

Particulars	Aggregate nominal value (in ₹)
Authorised share capital	
85,000,000 equity shares of ₹ 10 each	850,000,000
60,000,000 preference shares of ₹ 10 each	600,000,000
Total	*1,450,000,000*
Issued, subscribed and paid-up share capital	
30,046,606 equity shares of ₹ 10 each	300,466,060

Shareholding pattern

As on date of this Offer Document, the shareholding pattern of PECPL is as follows:

Sr No.	Name of the shareholders	Number of shares	Face value (₹)	Amount (₹)	% of shareholding
Equity Shares					
1.	Epic Concesiones 3 Private Limited	30,046,600	10	300,466,000	100
2.	Niraj Mohanty*	1		10	Negligible
3.	Mohankumar Kolli*	1		10	Negligible
4.	Vaibhav Bhandari*	1		10	Negligible
5.	Manish Chitkara*	1		10	Negligible
6.	Amit Dasgupta*	1		10	Negligible
7.	Sandip Das*	1		10	Negligible
	Total	**30,046,606**		**300,466,060**	**100**

* *Nominees of Epic Concesiones 3 Private Limited*

For details in relation to the non-convertible debentures issued by PECPL, please see "*Financial Indebtedness and Deferred Payments – Principal terms of the non-convertible debentures issued by AMTPL, TEL, PECPL and RVTPL"* on page 366.

7. Rajkot-Vadinar Tollway Private Limited ("RVTPL")

Corporate information

RVTPL was incorporated on September 8, 2008, under the Companies Act, 1956, having the CIN U45203TN2008PTC069184 and is currently a private limited company. Its registered office is located at 4th Floor, Tower B, Commerzone IT Park, Mount Ponnamallee Road, Porur, Kanchipuram, Sriperumbudur, Chennai-600116, Tamil Nadu, India.

Capital structure

As on date of this Offer Document, the capital structure of RVTPL is as follows:

Particulars	Aggregate nominal value (in ₹)
Authorised share capital	
110,000,000 equity shares of ₹ 10 each	1,100,000,000
200,000,000 preference shares of ₹ 10 each	2,000,000,000
Total	**3,100,000,000**

Particulars	Aggregate nominal value (in ₹)
Issued, subscribed and paid-up share capital	
110,000,000 equity shares of ₹ 10 each	1,100,000,000
171,794,452 preference shares of ₹10 each	1,717,944,520
Total	**2,817,944,520**

Shareholding pattern

As on date of this Offer Document, the shareholding pattern of RVTPL is as follows:

Sr No.	Name of the shareholders	Number of shares	Face value (₹)	Amount (₹)	% of shareholding
Equity shares					
1.	Epic Concesiones 3 Private Limited	109,999,994**	10	1,099,999,940	100
2.	Amit Dasgupta*	1		10	Negligible
3.	Manish Chitkara*	1		10	Negligible
4.	Mohankumar Kolli*	1		10	Negligible
5.	Sandip Das*	1		10	Negligible
6.	Vaibhav Bhandari*	1		10	Negligible
7.	Niraj Mohanty*	1		10	Negligible
A	**Total**	**110,000,000**		**1,100,000,000**	**100**
Preference shares					
1.	Epic Concesiones 3 Private Limited	171,794,452	10	1,717,944,520	100
B	**Total**	**171,794,452**		**1,717,944,520**	**100**
(A+B)	**Total number of shares**	**281,794,452**		**2,817,944,520**	

** Nominees of Epic Concesiones 3 Private Limited*
*** 56,100,000 equity shares which are presently under pledge*

For details in relation to the non-convertible debentures issued by RVTPL, please see "*Financial Indebtedness and Deferred Payments – Principal terms of the non-convertible debentures issued by AMTPL, TEL, PECPL and RVTPL"* on page 366.

8. Sambalpur-Rourkela Tollway Private Limited ("SRTPL")

Corporate information

SRTPL was incorporated on October 18, 2013 under the Companies Act, 1956, having the CIN U45206TN2013PTC093395 and is currently a private limited company. Its registered office is located at 4th Floor, Tower B, Commerzone IT Park, Mount Ponnamallee Road, Porur, Kanchipuram, Sriperumbudur, Chennai-600116, Tamil Nadu, India.

Capital structure

As on date of this Offer Document, the capital structure of SRTPL is as follows:

Particulars	Aggregate nominal value (in ₹)
Authorised share capital	
290,500,000 equity shares of ₹ 10 each	2,905,000,000
Issued, subscribed and paid-up share capital	
290,030,000 equity shares of ₹ 10 each	2,900,300,000

Shareholding pattern

As on date of this Offer Document, the shareholding pattern of SRTPL is as follows:

Sr No.	Name of the shareholders	Number of shares	Face value (₹)	Amount (₹)	% of shareholding
1.	Epic Concesiones 3 Private Limited	290,029,995	10	2,900,299,950	100
2.	Niraj Mohanty*	1		10	Negligible
3.	Mohankumar Kolli*	1		10	Negligible
4.	Vaibhav Bhandari*	1		10	Negligible
5.	Manish Chitkara*	1		10	Negligible

Sr No.	Name of the shareholders	Number of shares	Face value (₹)	Amount (₹)	% of shareholding
6.	Sandip Das*	1		10	Negligible
	Total	**290,030,000**		**2,900,300,000**	**100**

** Nominees of Epic Concesiones 3 Private Limited*

9. Samkhiali Bhachau Gandhidham Tollway Private Limited ("SBGTPL")

Corporate information

SBGTPL was incorporated on February 5, 2010 under the Companies Act, 1956, having the CIN U45203TN2010PTC074501 and is currently a private limited company. Its registered office is located at 4th Floor, Tower B, Commerzone IT Park, Mount Ponnamallee Road, Porur, Kanchipuram, Sriperumbudur, Chennai-600116, Tamil Nadu, India.

Capital structure

As on date of this Offer Document, the capital structure of SBGTPL is as follows:

Particulars	Aggregate nominal value (in ₹)
Authorised share capital	
80,540,000 equity shares of ₹ 10 each	805,400,000
205,490,000 compulsorily convertible preference shares of ₹ 10 each	2,054,900,000
Total	**2,860,300,000**
Issued, subscribed and paid-up share capital	
80,540,000 equity shares of ₹ 10 each	805,400,000
198,184,003 compulsorily convertible preference shares of ₹10 each	1,981,840,030
Total	**2,787,240,030**

Shareholding pattern

As on date of this Offer Document, the shareholding pattern of SBGTPL is as follows:

Sr No.	Name of the shareholders	Number of shares	Face value (₹)	Amount (₹)	% of shareholding
Equity shares					
1.	Epic Concesiones 3 Private Limited	80,539,994	10	805,399,940	100
2.	Amit Dasgupta*	1		10	Negligible
3.	Manish Chitkara*	1		10	Negligible
4.	Mohankumar Kolli*	1		10	Negligible
5.	Sandip Das*	1		10	Negligible
6.	Vaibhav Bhandari*	1		10	Negligible
7.	Niraj Mohanty*	1		10	Negligible
A	**Total**	**80,540,000**		**805,400,000**	**100**
Compulsorily Convertible Preference shares					
1.	Epic Concesiones 3 Private Limited	128,184,003	10	1,281,840,030	64.68
2.	Epic Transnet Infrastructure Private Limited (*formerly known as Watrak Infrastructure Private Limited*)	70,000,000		700,000,000	35.32
B	**Total**	**198,184,003**		**1,981,840,030**	**100**
(A+ B)	**Total number of shares**	**278,724,003**		**2,787,240,030**	

** Nominees of Epic Concesiones 3 Private Limited*

10. Thrissur Expressway Limited ("TEL")

Corporate information

TEL was incorporated on April 8, 2009 under the Companies Act, 1956, having the CIN U74900TG2009PLC063297 and is currently a public limited company. Its registered office is located at Madhapur LVS Arcade, 71, Jubilee Enclave, HITEC City, Madhapur, Shaikpet, Hyderabad – 500 081, Telangana, India.

Capital structure

As on date of this Offer Document, the capital structure of TEL is as follows:

Particulars	Aggregate nominal value (in ₹)
Authorised share capital	
3,000,000 equity shares of ₹ 10 each	30,000,000
12,000,000 compulsorily convertible preference shares of ₹ 10 each	120,000,000
Total	**150,000,000**
Issued, subscribed and paid-up share capital	
77,297 equity shares of ₹ 10 each	772,970
11,617,027 compulsorily convertible preference shares of ₹10 each	116,170,270
Total	**116,943,240**

Shareholding pattern

As on date of this Offer Document, the shareholding pattern of TEL is as follows:

Sr No.	Name of the shareholders	Number of shares	Face value (₹)	Amount (₹)	% of shareholding
Equity shares					
1.	Edelweiss Infrastructure Yield Plus	77,291	10	772,910	100
2.	Bhanuprakash Anisetty*	1		10	Negligible
3.	Manish Chitkara*	1		10	Negligible
4.	Mohankumar Kolli*	1		10	Negligible
5.	Niraj Mohanty*	1		10	Negligible
6.	Parveen Kumar*	1		10	Negligible
7.	Sandip Das*	1		10	Negligible
A	**Total**	**77,297**		772,970	**100**
Compulsorily Convertible Preference shares					
1.	Edelweiss Infrastructure Yield Plus	11,617,027	10	116,170,270	100
B	**Total**	**11,617,027**		**116,170,270**	**100**
(A+B)	**Total number of shares**	**11,694,324**		**116,943,240**	

** Nominees of Edelweiss Infrastructure Yield Plus*

Further, TEL has also issued 13,700,000 CCDs of face value of ₹100 each. For details in relation to the CCDs and NCDs issued by TEL, please see "- *Acquisition of the Initial Portfolio Assets by the Trust - TEL SSAs"* and *"Financial Indebtedness and Deferred Payments - Principal terms of the non-convertible debentures issued by AMTPL, TEL, PECPL and RVTPL*" on pages 39 and 366, respectively.

Acquisition of the Initial Portfolio Assets by the Trust

The Trust acting through the Trustee proposes to acquire, or redeem as applicable *inter-alia*:

(i) 100.00% of the equity shareholding, CCPS *(except certain CCPS held by third parties. For details, please see "– HoldCos – Epic Concesiones 3 Private Limited" on page 26*);

(ii) 100% of CCPS in AMTPL, 35.32% of CCPS in SBGTL and 14.72% of equity shares in DTPL, currently owned by Sponsor Group;

(iii) outstanding inter-corporate deposits ("**ICDs**") held by the Sponsor Group in AMTPL, DTPL, RVTPL, and SBGTPL;

(iv) 100.00% of the equity shareholding and CCDs of SRPL;

(v) 100.00% of the equity shareholding, CCPS and CCDs of TEL; and

(vi) outstanding non-convertible debentures ("**NCDs**") issued by Dibang, Dhola, JSEL, RVTPL, AMTPL, PECPL and TEL (except any senior secured NCDs of JSEL and TEL).

The Trust proposes to undertake the aforementioned acquisitions, or, as applicable, redemptions (in case of NCDs) through a combination of, *inter alia*, (i) swap of securities for Units of the Trust; (ii) utilization of the proceeds of the Issue; and/ or (iii) infusion of debt by the Trust into the relevant Project SPVs as applicable. For further details

on use of proceeds, please see "*Use of Proceeds*" and "*Financial Indebtedness and Deferred – Proposed Borrowings by the Trust*" payments on pages 356 and 369, respectively.

The Trust shall undertake all aforementioned acquisitions after the Bid/ Issue Closing Date prior to the Allotment. The acquisition of the equity shareholding, CCPS and CCDs shall be undertaken prior to the acquisition of the ICDs and NCDs. To the extent that any of the aforementioned acquisitions are not completed pursuant to the swap of securities for Units of the Trust or the utilization of proceeds of the Issue, or in the event that the Trust is required to acquire any other securities issued by the Initial Portfolio Assets, such acquisitions may be undertaken by the Trust in accordance with the applicable law. For further details, please see "*Risk Factors - The Formation Transactions or usage of Issue Proceeds will only be given effect to after the Bid/Issue Closing Date, and our ability to consummate these transactions will impact the size of the Issue and the ability of the Investment Manager to complete this Offer*" on page 67.

For details in relation to the (a) Securities Purchase Agreements, (b) Debenture Transfer Agreements and the Deeds of Assignment pursuant to which all securities and ICDs are proposed to be acquired by the Trust, please see "*Related Party Transactions - Acquisition of the Initial Portfolio Assets by the Trust*" and "*Financial Indebtedness and Deferred Payments - Debt obligations*" on pages 420 and 368, respectively.

Further, certain CCDs issued by Epic 3 and TEL are proposed to be acquired by the Trust, in accordance with the securities swap agreements ("**SSAs**"), as set forth below:

Epic 3 SSAs

The Trust (acting through its Trustee) (the "**Buyer**"), has entered into a securities swap agreement dated March 24, 2026 and March 23, 2026, respectively, with (i) Munjal Mavjibhai Lakhani, Ashta Liners Private Limited, and MVS Ventures Private Limited (collectively, the "**Tranche I Sellers**"), Epic 3, the Investment Manager and the Sponsor; and (ii) Unifi Financial Pvt Ltd, Hindustan Composites Limited, and Biostadt India Limited (collectively, the "**Tranche II Sellers**", and together with the Tranche I Sellers, the "**Sellers**"), Epic 3, the Investment Manager and the Sponsor (collectively, the "**Epic 3 SSAs**").

The Trust (acting through its Trustee), by itself or through its nominee(s), acting for and on behalf of the Trust, shall acquire (i) 10,000,000 CCDs bearing face value of ₹100 each from Tranche I Sellers ("**Tranche I CCDs**"); and (ii) 10,000,000 CCDs bearing face value of ₹100 each ("**Tranche II CCDs**" and collectively, the "**Sale CCDs**"), subject to and in accordance with the provisions of the Epic 3 SSAs. The Trust shall undertake all aforementioned acquisitions after the Bid/ Issue Closing Date and prior to the Allotment.

Consideration: The Trust has agreed to issue such number of Units payable against the purchase of Sale CCDs, as determined upon the finalisation of the Issue Price in accordance with the formula set forth in the Epic 3 SSAs.

Representations and Warranties:

The representations and warranties provided by the Buyer under the Epic 3 SSAs pertain to, amongst others:

(i) due establishment and existence under the laws of India;

(ii) due authorization for consummation of the Epic 3 SSAs;

(iii) non-contravention of trust deed, applicable law and material agreements to which the Buyer is a party; and

(iv) duly authorized to undertake valid issuance of units, free and clear from any encumbrances (except in accordance with applicable law).

Subject to the provisions of the Epic 3 SSAs, the representations and warranties provided by the respective Sellers, pertain to, amongst others:

(i) warranties in relation to due incorporation and existence, due authorisation and legal and beneficial ownership of the Sale CCDs, free of all encumbrances;

(ii) not insolvent or bankrupt under applicable law and no liquidation, dissolution, winding up, commencement of bankruptcy, or similar proceedings, with respect to the Sellers is admitted or pending, or to the knowledge of the Sellers, threatened in any court of competent jurisdiction against it;

(iii) non-contravention of the charter documents and applicable law;

(iv) warranties in relation to demands, tax returns and notices.

Indemnity:

The Sellers (the "**Indemnifying Party**") are required to indemnify, defend, and hold harmless the Buyer, the Investment Manager, Sponsor, officers and directors of each of the Buyer, the Investment Manager and Sponsor (each, an "**Indemnified Party**") from and against any and all Losses, suffered or incurred by any of the Indemnified Parties arising out of, or result from any misrepresentation in, inaccuracy in or breach of any of the Seller's Warranties. A claim for indemnity is required to be initiated by the Indemnified Party by giving a notice in writing within 30 days of becoming aware of such claim, specifying in reasonable detail the circumstances, basis for the allegation, and an estimate of the amount of Loss arising out of, or resulting from the claim.

TEL SSA

The Trust (acting through its Trustee) (the "**Buyer**"), has entered into a securities swap agreement dated March 24, 2026 with Svastha Consulting LLP, SJPM Enterprise Private Limited, Malpani Retails Private Limited, KRBL Limited, Famy Finance Private Limited and Grow 5 (collectively, the "**Sellers**"), TEL, the Investment Manager and the Sponsor (the "**TEL SSA**").

The Trust (acting through its Trustee), by itself or through its nominee(s), acting for and on behalf of the Trust, shall acquire 13,700,000 CCDs bearing face value of ₹100 each from the Sellers (the "**Sale CCDs**"), subject to and in accordance with the provisions of the TEL SSA. The Trust shall undertake all aforementioned acquisitions after the Bid/ Issue Closing Date and prior to the Allotment.

Consideration: The Trust has agreed to issue such number of Units payable against the purchase of Sale CCDs, as determined upon the finalisation of the Issue Price in accordance with the formula set forth in the TEL SSA.

Representations and Warranties:

The representations and warranties provided by the Buyer under the TEL SSA pertain to, amongst others:

(i) warranties in relation to due establishment and existence and due authorization;

(ii) non-contravention of trust deed, applicable law and material agreements to which the Buyer is a party; and

(iii) duly authorized to undertake valid issuance of units, free and clear from any encumbrances (except in accordance with applicable law).

Subject to the provisions of the TEL SSA, the representations and warranties provided by the respective Sellers, pertain to, amongst others:

(i) due incorporation and existence under the laws of India;

(ii) due authorisation for consummation of the TEL SSA;

(iii) legal and beneficial ownership of the Sale CCDs, free of all encumbrances;

(iv) not insolvent or bankrupt under applicable law and no liquidation, dissolution, winding up, commencement of bankruptcy, or similar proceedings, with respect to the Sellers is admitted or pending, or to the knowledge of the Sellers, threatened in any court of competent jurisdiction against it;

(v) non-contravention of the charter documents and applicable law;

(vi) warranties in relation to demands, tax returns and notices.

Indemnity:

The Sellers (the "**Indemnifying Party**") are required to indemnify, defend, and hold harmless the Buyer, the Investment Manager, Sponsor, officers and directors of each of the Buyer, the Investment Manager and Sponsor (each, an "**Indemnified Party**") from and against any and all Losses, suffered or incurred by any of the

Indemnified Parties arising out of, or result from any misrepresentation in, inaccuracy in or breach of any of the Seller's Warranties. A claim for indemnity is required to be initiated by the Indemnified Party by giving a notice in writing within 30 days of becoming aware of such claim, specifying in reasonable detail the circumstances, basis for the allegation, and an estimate of the amount of Loss arising out of, or resulting from the claim.

For details in relation to the acquisition of debt securities and ICDs by the Trust, please see "*Financial Indebtedness and Deferred Payments – Debenture Transfer Agreement(s)*" and "*Financial Indebtedness and Deferred Payments – Deed(s) of Assignment*" on pages 368 and 369, respectively.

Accordingly, the Proposed Transfer shall be as set out below:

Shareholding

Sr. No.	Name of the Initial Portfolio Assets	Pre-Issue shareholding		Proposed post-Issue shareholding of the Trust (in %)
		Name of entity	Pre-Issue shareholding (in %)	
Epic 3*				
1.	Equity Shares	Infrastructure Yield Plus II	58.76	100.00
		Infrastructure Yield Plus IIA	27.98	
		India Infrastructure Yield Plus II	13.26	
2.	Compulsorily Convertible Preference Shares	Larsen & Toubro Limited[#]	28.41	-
		CPPIB India Private Holdings Inc.[#]	27.29	-
		Infrastructure Yield Plus II	26.03	44.30
		Infrastructure Yield Plus IIA	12.40	
		India Infrastructure Yield Plus II	5.87	
SRPL*				
3.	Equity Shares	Edelweiss Infrastructure Yield Plus	100.00	100.00
TEL				
4.	Equity Shares	Edelweiss Infrastructure Yield Plus	100.00	100.00
5.	Compulsorily Convertible Preference Shares	Edelweiss Infrastructure Yield Plus	100.00	100.00

[*] Epic 3 holds 100% of the pre-Issue shareholding of SRTPL, PECPL, RVTPL, AMTPL, SBGTPL and holds 85.28% of DTPL. Pursuant to the transfer 100% of CCPS in AMTPL, 35.32% of CCPS in SBGTL and 14.72% of equity shares in DTPL shall also be transferred to the Trust.
[**] SRPL holds 100% of the pre-Issue shareholding of JSEL, Dhola and Dibang.
[#] CCPS held by these shareholders are linked to payouts to be made to the CCPS holders subject to achievement of certain milestones under the concession agreements/ trigger based contractual mechanism for some of our Initial Portfolio Assets, pursuant to the terms of the Erstwhile Epic SPA, which are required to be made out of certain escrow accounts maintained for this purpose, which have been presently funded based on certain assumptions. These shareholders shall continue holding the CCPS post-listing and have executed letter agreements on the compliance with Regulation 18(3A) of the InvIT Regulations pursuant to which these shareholders shall not act in any manner that prevents the Trust (acting through the Trustee), the Investment Manager or Epic 3 from complying with the provisions of the InvIT Regulations. For further details of the Erstwhile Epic SPA, and the assignment of the Erstwhile Epic SPA as well as the escrow arrangement in favour of the Trust, please see "Related Party Transactions – Acquisitions of the Initial Portfolio Assets by the Trust" on page 420. For further details, please refer to the table included above.

Debt

Nature of security	Pre-Issue				Proposed post-Issue holding of the Trust
	Name of entity	Number of securities	Face Value	Value	
Epic 3					
CCDs	Other investors	20,000,000	100	2,000,000,000	100
SRPL					
CCDs	Edelweiss Infrastructure Yield Plus	2,235,700	1,000	2,235,700,000	100
TEL					
CCDs	Other investors	13,700,000	100	1,370,000,000	100
NCDs	Edelweiss Infrastructure Yield Plus	5,766,882	1,000	5,766,882,000	100
NCDs	Other investors	65,000	100,000	6,500,000,000	
PECPL					
NCDs	Sponsor	1,227,163	1,000	1,227,163,000	100

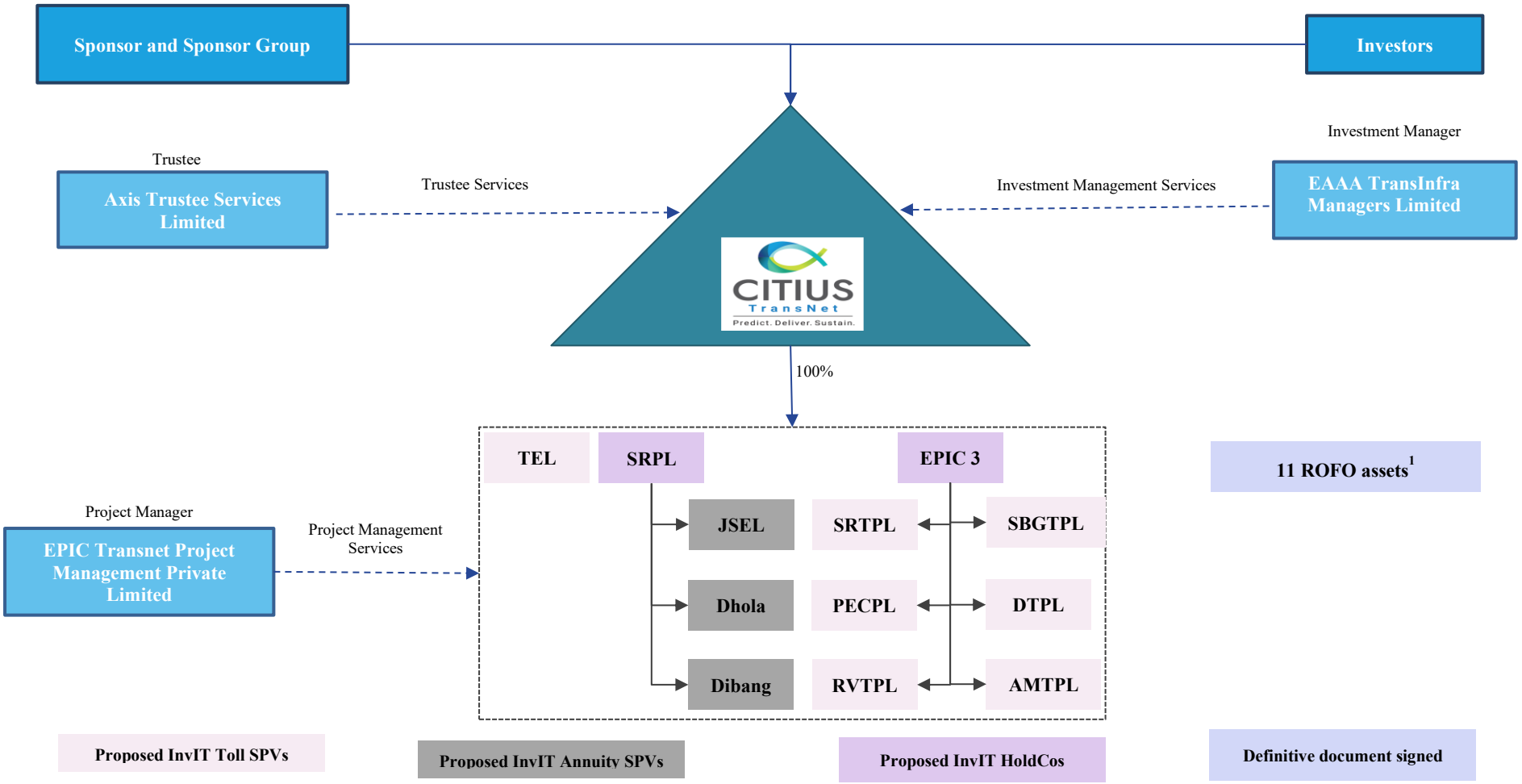
Nature of security	Pre-Issue				Proposed post-Issue holding of the Trust
	Name of entity	Number of securities	Face Value	Value	
NCDs	Neelambur Madukkarai Tollway Private Limited	450,000	1,000	450,000,000	
RVTPL					
NCDs	Sponsor	2,522,062	1,000	2,522,062,000	100
ICD	Neelambur Madukkarai Tollway Private Limited	-	-	979,508,870	
Dibang					
NCDs	Edelweiss Infrastructure Yield Plus	554,853	1,000	554,853,000	100
Dhola					
NCDs	Edelweiss Infrastructure Yield Plus	671,330	1,000	671,330,000	100
JSEL					
NCDs	Edelweiss Infrastructure Yield Plus	3,947,570	1,000	3,947,570,000	100
SBGTL					
ICD	Neelambur Madukkarai Tollway Private Limited	-	-	618,014,857	100
ICD	Sponsor	-	-	478,864,691	
AMTPL					
ICD	Sponsor	-	-	2,005,551,012	100
NCDs	India Infrastructure Yield Plus II	106,042	1,000	106,042,000	
	Infrastructure Yield Plus II	470,115	1,000	470,115,000	
	Infrastructure Yield Plus IIA	223,843	1,000	223,843,000	
DTPL					
ICD	Sponsor	-	-	734,160,742	100
ICD	Neelambur Madukkarai Tollway Private Limited	-	-	1,960,000,000	

Utilisation of Net Proceeds

Upon the Allotment and listing of the Units, the Trust shall utilize the Net Proceeds towards (i) partial or full acquisition of securities of a) SRPL; and b) certain identified Project SPVs namely TEL, JSEL, Dhola and Dibang; and (ii) general purposes. For further details, please see "*Use of Proceeds*" on page 356.

Proposed post-listing structure

The following structure illustrates the relationship between the Trust, the Trustee, the Sponsor, the Project Manager, the Investment Manager and the Unitholders as on the Listing Date:



[1]EAAA Platform has signed definitive documents to acquire ROFO assets. It has completed acquisition of five assets and is in process of completing the acquisition for balance six assets. These assets are proposed to be offered to the Trust under the ROFO Agreement.

SUMMARY SPECIAL PURPOSE COMBINED FINANCIAL STATEMENTS

*The following tables set forth the summary special purpose combined financial information derived from the Special Purpose Combined Financial Statements. The Special Purpose Combined Financial Statements referred to above are presented under the section "Special Purpose Combined Financial Statements" attached as **Annexure D**. The summary special purpose combined financial information presented below should be read in conjunction with these financial statements, the notes thereto and the sections entitled "Special Purpose Combined Financial Statements" attached as **Annexure D** and "Discussion and analysis by the Directors of the Investment Manager of the financial condition, results of operations and cash flows of the Initial Portfolio Assets of the Trust" on page 375.*

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Citius TransNet Investment Trust

Summary of Special Purpose Combined Balance Sheet

(₹ in million)

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
ASSETS				
(1) Non-current assets				
(a) Property, plant and equipment	148.54	151.51	118.80	97.05
(b) Investment properties	18.11	18.49	18.97	19.44
(c) Intangible assets	51,552.21	56,653.84	64,406.14	70,575.94
(d) Right-of-use assets	87.33	58.26	27.98	7.23
(e) Capital Work in Progress	2.11	-	-	-
(f) Intangible assets under development	3.80	45.17	35.00	1.90
(g) Financial assets				
(i) Receivable under service concession arrangements	8,494.83	9,532.55	10,985.00	11,944.92
(ii) Other financial assets	157.13	508.65	308.95	741.75
(h) Income tax assets (net)	722.58	689.53	730.01	660.17
(i) Other non-current assets	70.67	66.43	76.27	1,129.29
Total non-current assets	**61,257.31**	**67,724.43**	**76,707.12**	**85,177.69**
(2) Current assets				
(a) Financial assets				
(i) Investments	8,367.57	7,548.32	4,197.95	5,582.13
(ii) Trade receivables	484.27	223.68	228.24	394.07
(iii) Cash and cash equivalents	1,539.86	1,857.33	13,405.18	4,273.21
(iv) Bank balances other than (iii) above	3,826.99	2,654.90	4,194.70	7,195.50
(v) Receivable under service concession arrangements	1,861.45	1,385.16	772.49	1,700.46
(vi) Other financial assets	3,144.95	1,974.76	2,718.43	9,249.84
(b) Other current assets	261.01	341.81	854.81	396.60
Total current assets	**19,486.10**	**15,985.96**	**26,371.80**	**28,791.81**
Total assets	**80,743.41**	**83,710.39**	**103,078.92**	**113,969.50**
EQUITY AND LIABILITIES				
EQUITY				
(a) Capital	774.13	493.34	6,789.16	7,629.06
(b) Share capital pending issuance	-	253.85	-	-
(c) Other equity	(40,440.39)	(41,521.71)	(22,556.01)	(15,391.32)
(d) Instrument entirely equity in nature	6,537.44	3,847.99	4,410.89	3,628.13
Total Equity	**(33,128.82)**	**(36,926.53)**	**(11,355.96)**	**(4,134.13)**
LIABILITIES				
(1) Non-current liabilities				
(a) Financial liabilities				
(i) Borrowings	36,240.04	38,671.15	42,667.76	49,060.25
(ii) Lease liabilities	48.52	36.26	21.02	-
(iii) Other financial liabilities	41,341.91	41,041.31	41,109.10	39,225.55
(b) Deferred tax liabilities (net)	31.58	31.58	58.33	54.53
(c) Provisions	4,514.03	2,723.78	4,282.56	2,772.31
Total non-current liabilities	**82,176.08**	**82,504.08**	**88,138.77**	**91,112.64**
(2) Current liabilities				
(a) Financial liabilities				
(i) Borrowings	22,847.86	28,328.79	19,047.49	12,799.25

(₹ in million)

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
(ii) Lease liabilities	44.78	26.95	8.72	8.36
(iii) Trade payables				
- Total outstanding dues to micro enterprises and small enterprises	22.68	122.88	105.21	85.20
- Total outstanding dues of creditors other than micro enterprises and small enterprises	1,071.63	981.40	1,247.40	3,145.24
(iv) Other financial liabilities	3,612.28	3,241.20	2,768.34	6,205.33
(b) Other current liabilities	320.16	274.44	491.27	1,390.82
(c) Provisions	3,776.76	5,157.18	2,615.23	3,343.46
(d) Current tax liabilities (net)	-	-	12.45	13.33
Total current liabilities	**31,696.15**	**38,132.84**	**26,296.11**	**26,990.99**
Total liabilities	**113,872.23**	**120,636.92**	**114,434.88**	**118,103.63**
Total equity and liabilities	**80,743.41**	**83,710.39**	**103,078.92**	**113,969.50**

Citius TransNet Investment Trust

Summary of Special Purpose Combined Statement of Profit and Loss

(₹ in million)

Particulars	Nine months period ended December 31, 2025	Year ended March 31, 2025	Year ended March 31, 2024	Year ended March 31, 2023
INCOME				
Revenue from operations	14,963.64	19,870.46	18,731.73	17,735.16
Other income	740.25	1,785.71	1,653.57	1,117.79
Total Income	**15,703.89**	**21,656.17**	**20,385.30**	**18,852.95**
EXPENSES				
Operation and maintenance expense	2,941.39	5,585.34	5,947.26	6,277.21
Employee benefits expense	373.39	548.60	569.84	594.92
Finance costs	8,316.74	11,506.41	13,053.33	10,085.06
Depreciation and amortisation expense	5,256.75	6,998.42	6,922.15	7,094.90
Other expenses	959.79	1,172.72	1,274.13	1,139.17
Total Expenses	**17,848.06**	**25,811.49**	**27,766.71**	**25,191.26**
Loss before tax	**(2,144.17)**	**(4,155.32)**	**(7,381.41)**	**(6,338.31)**
Tax expense:				
(1) Current tax	46.31	42.64	355.56	200.32
(2) Deferred tax	-	(26.75)	3.80	(4.05)
(3) Adjustment of Tax relating to earlier periods	-	6.30	0.41	5.50
	46.31	**22.19**	**359.77**	**201.77**
Loss for the period/year [A]	**(2,190.48)**	**(4,177.51)**	**(7,741.18)**	**(6,540.08)**
Other Comprehensive Income				
Items not to be reclassified to profit or loss in subsequent period				
Re-measurement of defined benefit plans, net of tax	(13.17)	(12.48)	0.65	(0.30)
Total other comprehensive income for the period/year, net of tax [B]	**(13.17)**	**(12.48)**	**0.65**	**(0.30)**
Total comprehensive income for the period/year, net of tax [A+B]	**(2,203.65)**	**(4,189.99)**	**(7,740.53)**	**(6,540.38)**

Citius TransNet Investment Trust

Summary of Special Purpose Combined Statement of Cash Flows

(₹ in million)

Particulars	Nine months period ended December 31, 2025	Year ended March 31, 2025	Year ended March 31, 2024	Year ended March 31, 2023
Cash flow from operating activities				
Loss before tax	(2,144.17)	(4,155.32)	(7,381.41)	(6,338.31)
Adjustments to reconcile loss before tax to net cash flows:				
Depreciation and amortisation expense	5,256.75	6,998.42	6,922.15	7,094.90
Finance costs	8,316.74	11,506.41	13,053.33	10,085.06
Interest income	(342.83)	(622.27)	(937.22)	(790.44)
Net gain on fair valuation of current investments	(44.77)	(119.41)	(15.04)	(110.89)
Profit on sale of current investments	(303.60)	(424.30)	(397.65)	(176.70)
(Gain)/loss on disposal of property, plant and equipment	(1.33)	0.26	3.90	(2.20)
Interest income (net) on account of claim settlement with authorities	-	(532.57)	(143.37)	-
Liabilities no longer required written back	(1.54)	(24.71)	(106.43)	(16.85)
Modification gain on financial asset	-	-	(16.43)	-
Rental income	(3.38)	(1.90)	(1.59)	(0.16)
Bad debts written off	0.37	25.26	128.17	17.84
Modification loss on financial assets	-	-	38.29	-
Provision for doubtful debts	5.10	0.16	12.97	0.05
Finance income on receivable under service concession arrangements	(821.32)	(1,189.76)	(1,352.97)	(1,526.52)
Periodic Major Maintenance Expenses	1,664.48	2,879.25	3,449.31	3,944.38
Operating profit before working capital changes	**11,580.50**	**14,339.52**	**13,256.01**	**12,180.16**
Working capital adjustment				
(Increase) / Decrease in other financial assets	(201.49)	129.93	432.99	527.28
(Increase) / Decrease in receivable under service concession arrangements	1,382.75	2,029.54	3,202.56	2,726.10
(Increase) / Decrease in other assets	70.39	510.13	427.02	(261.31)
(Increase) / Decrease in trade receivables	(266.06)	4.56	165.83	(127.23)
Increase / (Decrease) in trade payables	(9.97)	195.27	(483.28)	(38.19)
Increase / (Decrease) in other financial liabilities	(2,808.23)	(3,954.86)	(2,971.33)	(3,816.24)
Increase / (Decrease) in other liabilities	45.72	(216.83)	(899.55)	(96.64)
Increase / (Decrease) in provisions	(1,900.45)	(2,650.34)	(3,318.31)	(1,876.12)
Cash flow generated from operations	**7,893.16**	**10,386.92**	**9,811.94**	**9,217.81**
Income tax paid (net of refund)	(73.01)	62.60	(419.43)	(138.56)
Net cash flow from operating activities [A]	**7,820.15**	**10,449.52**	**9,392.51**	**9,079.25**
Cash flow from investing activities				
Purchase of property, plant and equipment, investment property and Intangible assets	(90.62)	(301.98)	(1,989.72)	(603.70)
Proceeds from road authorities on settlement	-	1,055.27	581.56	-
Proceeds from sale of property, plant and equipment, investment property and Intangible assets	1.33	-	-	12.73
Proceeds from / (Investment) in fixed deposits with banks having maturity more than 3 months	(1,673.17)	1,836.45	9,422.76	(1,411.54)
Proceeds from/(Investment) in mutual funds	(470.88)	(2,806.66)	1,796.87	1,091.01
Interest received	220.38	635.38	898.07	379.25
Rental income	3.38	1.90	1.59	-

(₹ in million)

Particulars	Nine months period ended December 31, 2025	Year ended March 31, 2025	Year ended March 31, 2024	Year ended March 31, 2023
Adjustments on account of acquisition of subsidiaries	-	(24,272.10)	-	-
Net cash flow from/(used in) investing activities [B]	**(2,009.58)**	**(23,851.74)**	**10,711.13**	**(532.25)**
Cash flow from financing activities				
Proceed from issue of share capital (including securities premium)	455.99	-	0.10	0.50
Proceeds from transfer of compulsorily convertible preference shares	2,689.45	-	-	-
Proceeds from issue of compulsorily convertible debentures	1,550.00	-	666.59	240.30
Proceeds from Borrowings	7,436.78	46,851.59	22,417.36	2,730.00
Repayment of Borrowings	(16,898.82)	(41,716.60)	(21,533.61)	(9,140.36)
Repayment of non convertible debentures	-	-	-	(1,750.00)
Payment of principal portion of lease liabilities	(22.16)	(22.11)	(8.82)	(9.99)
Payment of interest portion of lease liabilities	(4.95)	(5.36)	(1.19)	(2.04)
Payment of interest and other finance costs	(4,190.25)	(6,408.79)	(10,330.63)	(4,241.38)
Movement of owner's net investment (carve-out difference)	2,855.92	3,155.64	(2,181.47)	5,587.33
Net cash generated from/(used in) financing activities [C]	**(6,128.04)**	**1,854.37**	**(10,971.67)**	**(6,585.64)**
Net increase / (decrease) in cash and cash equivalents [A+B+C]	**(317.47)**	**(11,547.85)**	**9,131.97**	**1,961.36**
Cash and cash equivalents at the beginning of the period/ year	1,857.33	13,405.18	4,273.21	2,311.85
Cash and cash equivalents at the end of the period/ year	**1,539.86**	**1,857.33**	**13,405.18**	**4,273.21**

SUMMARY FINANCIAL INFORMATION OF THE SPONSOR

The following tables set forth the summary financial information derived from the audited financial statements of the Sponsor as of and for the financial years ended March 31, 2025, March 31, 2024, March 31, 2023, prepared in accordance with applicable accounting standards and rules issued thereunder.

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Epic Transnet Infrastructure Private Limited

Summary of Balance Sheet

(₹ in million, unless otherwise stated)

Particulars	As at 31-03-2025	As at 31-03-2024	As at 31-03-2023
ASSETS			
Non-current assets			
a) Financial Assets			
i) Investments	700.00	700.00	700.00
ii) Other financial assets	317.19	317.19	317.06
b) Income Tax Assets (Net)	5.69	5.68	8.86
	1,022.88	**1,022.87**	**1,025.92**
Current Assets			
a) Financial Assets			
i) Cash and Bank Balances	13.99	0.15	0.70
ii) Trade receivables	6.28	-	-
	20.28	**0.15**	**0.70**
TOTAL ASSETS	**1,043.16**	**1,023.02**	**1,026.62**
EQUITY AND LIABILITIES			
Equity			
a) Equity share capital	223.93	223.93	223.93
b) Other equity	742.39	743.23	740.34
	966.32	**967.16**	**964.27**
Current liabilities			
a) Financial Liabilities			
i) Short term borrowings	76.05	55.30	53.22
ii) Trade Payables			
- Total outstanding dues to Micro Enterprise & Small Enterprise	0.10	-	-
- Total outstanding dues of Creditors other than Micro Enterprise & Small Enterprise	0.08	0.08	0.40
iii) Other Financial Liabilities	0.42	0.45	8.53
b) Other current liabilities	0.20	0.03	0.20
	76.84	**55.86**	**62.35**
TOTAL EQUITY AND LIABILITIES	**1,043.16**	**1,023.02**	**1,026.62**

Epic Transnet Infrastructure Private Limited

Summary of Profit & Loss account

(₹ in million, unless otherwise stated)

Particulars	April 2024-March 2025	April 2023-March 2024	April 2022-March 2023
Revenue from operations	5.60	-	-
Other income	0.03	10.28	0.90
Total income	**5.62**	**10.28**	**0.90**
Expenses:			
Operating expenses	5.37	-	-
Administration and other expenses	1.15	0.30	2.00
Finance costs	-	3.76	2.00
Total expenses	**6.52**	**4.06**	**4.00**
Profit/(Loss) before tax	**(0.90)**	**6.22**	**(3.10)**
Tax expense:			
Current tax	-	-	-
Current tax pertaining to prior year	-	3.31	17.50
Total Tax expense	-	3.31	17.50
Profit/(Loss) for the year	**(0.90)**	**2.91**	**(20.60)**
Other comprehensive income			
Items that will not be reclassified to profit or loss	-	-	-
Total other comprehensive income	**-**	**-**	**-**
Total comprehensive income for the year	**(0.90)**	**2.91**	**(20.60)**
Earnings per equity share (Basic and Diluted) in Rs.	(0.04)	0.13	(0.92)
Face value per equity share	10.00	10.00	10.00

Epic Transnet Infrastructure Private Limited

Summary of Statement of Cash Flows

(₹ in million, unless otherwise stated)

S. No.	Particulars	Year Ended March 31, 2025	Year Ended March 31, 2024	Year Ended March 31, 2023
A	**Cash Flow from Operating Activities**			
	Net Profit/(Loss) before Exceptional Items and Tax	(0.90)	6.20	(3.10)
	- Liabilities no longer required written back	-	(10.30)	-
	- Interest Expense	-	3.80	-
	Operating profit before working capital changes	**(0.90)**	**(0.30)**	**(3.10)**
	Adjustments for:			
	Increase / (decrease) in other current liabilities	0.06	(1.60)	2.10
	Increase / (decrease) in other financial liabilities	0.07	-	-
	Increase / (decrease) in other current assets	-	(0.06)	-
	Increase / (decrease) in Trade Payables	0.10	(0.09)	0.10
	Increase / (decrease) in Trade Receivables	(6.29)	-	-
	Net cash generated from/(used in) operating activities	**(6.95)**	**(2.05)**	**(0.90)**
	Net Income tax (paid)/refunds	-	-	(271.00)
	Net Cash(used in)/generated from Operating Activities	**(6.95)**	**(2.05)**	**(271.90)**
B	**Cash flow from Investing activities**			
	Realisation from Fixed Deposit	-	-	218.20
	Issue of equity shares	-	-	-
	Investment in equity shares of Group entities	-	-	-
	Net Cash(used in)/generated from Investing Activities	**-**	**-**	**218.20**
C	**Cash flow from Financing activities**			
	Interest Exps	-	(3.80)	-
	Increase/Decrease in Short Term Borrowings	20.78	5.30	53.30
	Net cash (used in)/generated from financing activities	**20.78**	**1.50**	**53.30**
	Cash and cash equivalents as at the beginning of the year	0.15	0.70	1.10
	Net increase / (decrease) in cash and cash equivalents (A+B+C)	**13.84**	**(0.55)**	**(0.40)**
	Cash and cash equivalents as at the end of the year	**13.99**	**0.15**	**0.70**

SUMMARY FINANCIAL INFORMATION OF THE INVESTMENT MANAGER

Our Investment Manager is a newly incorporated company and has been incorporated on April 18, 2025, accordingly financial statements of the Investment Manager are yet to be prepared in accordance with applicable accounting standards and rules issued thereunder and therefore have not been included in this Offer Document.

SUMMARY OF INDUSTRY

Unless otherwise stated, the information contained in this section is derived from the CRISIL Report. Industry sources and publications generally state that the information contained therein has been obtained from sources generally believed to be reliable, but that their accuracy, completeness and underlying assumptions are not guaranteed, and their reliability cannot be assured. Industry publications are also prepared based on information available as of specific dates and may no longer be current or reflect current trends. Accordingly, investment decisions should take these limitations into account. All references to years refer to calendar years except as otherwise stated. References to Indian fiscal years are to the one-year period ending March 31 of the named year.

References to various segments in the CRISIL Report and information derived therefrom are references to industry segments and in accordance with the presentation, analysis and categorization in the CRISIL Report. Our segment reporting in our financial statements is based on the criteria set out in Ind AS 108, Operating Segments and we do not present such industry segments as operating segments. All figures should be read in conjunction with the respective footnotes/endnotes.

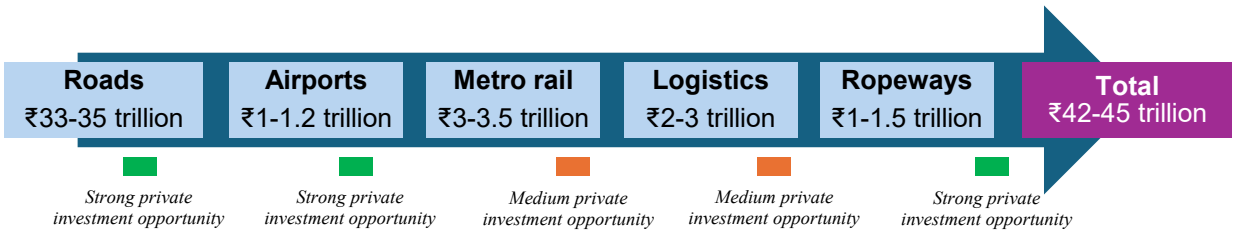
Transportation Sector in India

Infrastructure development is a key factor in India's long-term economic transformation, serving as a catalyst for productivity and connectivity. Over the past decade, the country has witnessed a fundamental transformation in its transport landscape, from expressways and dedicated freight corridors to modern metro systems and expanding airport networks. These developments have significantly improved connectivity, reduced logistics costs, and supported industrial growth, establishing infrastructure as a key pillar of India's growth narrative.

India's economic expansion and the government's long-term Viksit Bharat 2047 vision have placed infrastructure at the centre of policy planning. Total infrastructure investments are expected to nearly double from ₹47.8 trillion during FY2019-24 to ~₹93 trillion in FY2025-30, reflecting sustained public spending and growing private sector participation. Transport infrastructure alone is projected to attract ₹42-45 trillion over FY2025-30, underscoring its pivotal role in supporting the movement of goods, people, and services across sectors.

During FY2025-30, of the total investment potential across the transport infrastructure, roads is expected to attract the largest share at ₹33-35 trillion, followed by ₹3-3.5 trillion in metro rail, ₹2-3 trillion in logistics infrastructure, ₹1-1.5 trillion in ropeways, and ₹1-1.2 trillion in airports. These investments highlight the government's focus on multimodal transport integration, sustainable mobility, and logistics efficiency while also presenting significant opportunities for private participation.

Investment potential during fiscals 2025-2030



Note: The logistics sector includes warehousing and distribution, rail freight terminals, civil aviation, ports and shipping, container freight station and inland container depot
Source: Crisil Intelligence

The funding composition of this investment pipeline reflects a balanced mix of central, state, and private participation. Public funding remains the principal driver, with the central government expected to contribute about 53% of total infrastructure investment, states accounting for 32%, and the private sector providing around 15%. The mix varies across modes: roads are predominantly financed by the central government, railways and urban transport involve larger state-level participation, and airports and logistics infrastructure attract higher private sector involvement due to their mature project structures and established concession frameworks. This diversification of funding sources demonstrates a clear policy intent, using public capital for backbone infrastructure while leveraging private capital for commercially viable assets.

Road Infrastructure in India

India's logistics ecosystem is road-dominant, with roads accounting for nearly 90% of passenger traffic and close to 64.5% of freight traffic as of 2025. This makes the sector not only a facilitator of day-to-day mobility but also a central pillar in ensuring supply chain efficiency, rural connectivity, and market access.

The contribution of the road transport sector to India's Gross Value Added (GVA) has shown a relatively stable trend over the last decade, though with some fluctuations in recent years. From FY14 to FY20, the sector consistently accounted for around 3.2%-3.3% of GVA at constant prices, reflecting its steady role in supporting economic activity.

Over the past decade, India has prioritised road development through major programmes such as Bharatmala, PMGSY and the National Infrastructure Pipeline, supported by strong budgetary allocations, digital tools like FASTag, and innovative financing models such as HAM and TOT. This push has accelerated construction, expanded access in remote areas and strengthened logistics efficiency. National highways have grown rapidly from about 91,000 km in 2014 to nearly 1.46 lakh km in 2025 with four-lane and above stretches rising sharply, improving connectivity and reducing travel time.

Length of National Highway Lane increase (in km)



Note: Data of FY25 is till 31st December 2024

Source: MoRTH Annual Report 2024-25, CRISIL Intelligence

In the early years, the expansion was largely driven by 2-lane highways, which later shifted to 4 and 6-lane/ 8-lane roads. From FY15 to FY24 the share of 4-lane roads has increased by a CAGR of 20% and share of 6-lane/ 8-lane roads has increased by a CAGR of 28.5% from FY18 to FY24, reflecting a transition toward higher-capacity and better-quality road infrastructure.

Strengthening of existing roads has emerged as a consistent component, pointing to a growing emphasis on maintenance and lifecycle improvement rather than only new construction. It is expected that this steady momentum with substantial contributions from 2-lane and 4-lane expansions alongside strengthening works is continued going forward, demonstrating the government's focus on both expanding connectivity and enhancing the durability of the national highway network.

Infrastructure Trusts in India

Infrastructure investment trusts (InvITs) are pooled-investment vehicles registered with the Securities and Exchange Board of India (SEBI) under the SEBI (Infrastructure Investment Trusts) Regulations, 2014.

These trusts raise funds by issuing units to investors and invest the proceeds primarily in infrastructure assets, either directly or through special purpose vehicles (SPVs) or holding companies (holdcos).

The income generated from the underlying assets is regularly distributed to unitholders.

Under SEBI regulations, these trusts own assets from sub-sectors listed in the Harmonised Master List of Infrastructure Sub-sectors, notified by the Ministry of Finance. The country's infrastructure assets comprise a range of sectors, including transportation (such as roads, highways, warehouses, etc.), energy (including power generation, transmission, storage, energy product pipelines etc), and storage facilities, among others These assets contribute to the overall growth and development of the country's infrastructure.

InvITs can attract foreign direct investment without prior government approval, which gives them a wider investor base and, thereby, facilitates financing of large-scale infrastructure projects.

InvITs have become a crucial component of the domestic financial sector. By offering investors a platform to participate in infrastructure development and directing the funds towards strong, income-producing infrastructure assets, these trusts have emerged as a viable alternative to traditional financing methods. Not surprisingly, retail participation and investment from international investors have grown over the years.

Importance of InvITs in infrastructure financing in India

- **Priority of Infrastructure Development:** Infrastructure development has consistently been a high-priority area for the Indian government, resulting in increased public investments and large-scale projects that need substantial capital.

- **Role of Government Policy and InvITs:** The government’s strong focus on infrastructure and adoption of innovative mechanisms like InvITs has ensured continuous investment in roads, highways, railways, and urban projects, which supports long-term economic growth and job creation.

- **InvITs as Capital Recycling Tools:** InvITs act as powerful capital recycling mechanisms, allowing infrastructure developers to monetize operational assets and free up capital for new projects, while enabling developers to retain operational control.

- **Enhancing Project Viability and Reducing Risks:** The use of InvITs helps to improve project viability through consistent funding, and reduces the risks related to project delays and cost overruns. They also drive operational excellence by linking performance-based distributions with professional oversight.

- **Attracting Diverse Investment and Risk Diversification:** InvITs have attracted both domestic and international investors by offering diversified risk through pooled assets. These trusts allow exposure to multiple projects without direct ownership, spreading risk across sectors.

SUMMARY OF BUSINESS

Some of the information in this section, including information with respect to our plans, strengths, and strategies, contain forward-looking statements that involve risks and uncertainties. You should read "Forward-Looking Statements" on page 19 for a discussion on the risks and uncertainties related to those statements, "Risk Factors" and "Discussion and Analysis by the Directors of the Investment Manager of the Financial Condition, Results of Operations and Cash Flows of the Initial Portfolio Assets of the Trust" on pages 64, 375 and "Special Purpose Combined Financial Statements" and "Projections of Revenue From Operations and Cash Flow from Operating Activities" attached as Annexure D, and Annexure E, respectively, for a discussion of certain factors that may affect our business, financial condition, or results of operations. Our actual results may differ materially from those expressed in or implied by these forward-looking statements.

Unless otherwise stated or the context requires otherwise, the financial information included herein is based on our Special Purpose Combined Financial Statements included in this Offer Document. For further details, see the section "Special Purpose Combined Financial Statements" attached as Annexure D. Unless otherwise stated or the context requires otherwise, references in this section to "we," "our," or "us" are to the Trust along with the Initial Portfolio Assets. Furthermore, references in this section to "EAAA Platform" refers to EAAA and its affiliates, and entities or pooled vehicles directly or indirectly controlled, managed and/or advised by EAAA and/or its affiliates provided that any portfolio companies of such affiliate entities or pooled vehicles shall not be considered to be part of the EAAA Platform. We have included various operational and financial performance indicators in this section, some of which may not have been derived from our Special Purpose Combined Financial Statements. The manner in which such operational and financial indicators are calculated and presented, and the assumptions and estimates used in such calculations, may vary from that used by other entities in businesses similar to ours. Investors are accordingly cautioned against placing undue reliance on such information in making an investment decision and must evaluate such information in the context of the Special Purpose Combined Financial Statements. Certain Non-GAAP Measures relating to our operations and financial performance have been included in this Offer Document. For further information, see "Risk Factors - We have in this Offer Document included certain Non-GAAP Measures that may not be comparable with financial or industry related statistical information of similar nomenclature computed and presented by other infrastructure trusts." on page 90.

*Unless otherwise indicated, industry and market data used in this section has been derived from industry publications, in particular, the report titled "Connecting India: Unlocking Investment Potential in Transport Infrastructure" dated March 23, 2026 (the "**CRISIL Report**") prepared and issued by CRISIL Intelligence ("**CRISIL**"), appointed by us and exclusively commissioned and paid for by us in connection with the Offer. Additionally, for further details and risks in relation to CRISIL Report, please see "Risk Factors" on page 64.*

Overview

We are a transport sector-focused infrastructure investment trust (the "**Trust**"), established with an objective to acquire, manage and invest in a portfolio of transport infrastructure assets, including roads, in India. We were settled by way of the Trust Deed, by the Sponsor, and registered as an InvIT with SEBI on August 1, 2025, in accordance with the provisions of the InvIT Regulations. The sponsor of the Trust is Epic TransNet Infrastructure Private Limited (*formerly known as Watrak Infrastructure Private Limited*) (the "**Sponsor**"). Our Sponsor is wholly owned by the schemes of the Infrastructure Yield Trust (that is, Infrastructure Yield Plus II, Infrastructure Yield Plus IIA and India Infrastructure Yield Plus II), an AIF managed by EAAA India Alternatives Limited ("**EAAA**"). As of March 31, 2025, EAAA managed three out of the 16 funds focused on infrastructure investments and ranks third among infrastructure investment managers by total assets under management ("**AUM**") (*Source: CRISIL Report*). EAAA operates a diversified, multi-strategy platform, in large, under-tapped and fast-growing alternative asset classes, focusing on providing income and yield solutions to a diverse client base, including, global pension funds, insurance companies and ultra-high net worth individuals. It is supported by an asset management team of 61 members (in addition to in-house teams of our Initial Portfolio Assets comprising 279 employees), 71 employees in the Project Manager of the Trust and 80 investment professionals as of December 31, 2025. Our sponsor group comprises the Sponsor, Infrastructure Yield Trust (through its schemes Infrastructure Yield Plus II, Infrastructure Yield Plus IIA and India Infrastructure Yield Plus II), Epic Transnet Project Management Private Limited (*formerly known as Chennai-Tada Tollway Private Limited*) (the "**Project Manager**"), and Neelambur Madukkarai Tollway Private Limited (collectively, the "**Sponsor Group**").

Subject to completion of the Formation Transactions, our initial portfolio of road assets will comprise 10 toll and annuity projects, together with the relevant project special purpose vehicles (the "**Project SPVs**") through which they are held, and Epic Concesiones 3 Private Limited and SRPL Roads Private Limited, the holding companies

of all Project SPVs (the "**HoldCos**", and together with the Project SPVs, the "**Initial Portfolio Assets**"), except for one Project SPV, Thrissur Expressway Limited ("**TEL**"), which will be held directly by us. The Initial Portfolio Assets comprise a total of 3,406.71 lane-kilometers (seven toll assets spanning more than 3,043.22 lane-kilometers, and three annuity assets spanning more than 363.49 lane-kilometers) across nine different Indian states as of the date of this Offer Document. We believe the Project SPVs have a strong operational history as four of our toll assets have a tolling history of more than 12 years and two of our other toll assets have been collecting toll for over 5 years. During the Financial Year 2025, the toll collection (net of revenue share) was ₹15,632.30 million and the revenue receipts for annuity-based projects (excluding GST) was ₹3,362.00 million, contributing 82.30% and 17.70% to our total cash revenue receipts from our Project SPVs, respectively[1] (*Source: CRISIL Report*)**.** As of the date of this Offer Document, the Project SPVs are held directly or indirectly by alternate investment funds ("**AIFs**") registered with SEBI and managed by EAAA. They have, as such, prior to the completion of the Formation Transactions, benefited from the regulated management framework applicable to them as companies held by AIFs. The Trust has also entered into an agreement that grants a right of first offer for the acquisition of 11 hybrid annuity model ("**HAM**") road assets held or to be acquired by the EAAA Platform (the "**Identified ROFO Assets**", and the agreement, the "**ROFO Agreement**").

The EAAA Platform, our Sponsor and members of the Sponsor Group have experience in managing and operating road, renewable, and transmission infrastructure assets, with an established governance framework that guides investment and asset management practices. The origination efforts of the EAAA Platform are driven by an investment team, which included 80 members as of December 31, 2025, enabling access to promoters, developers, and financial institutions. We believe that, given the size of our assets, our strong track record, and the ongoing support from the EAAA Platform, we are well positioned to capitalize on the growth potential of India's transport sector, including the roads sector, and deliver consistent distributions to our Unitholders. For further details, please see "*Parties to the Trust*" on page 122. The EAAA Platform has a proven track record of acquiring, managing, and scaling infrastructure projects at various stages, and through several acquisition strategies, from various developers. The EAAA Platform is well positioned for further growth in the future, given its established asset acquisition and capital-raising capabilities, which in turn enable it to identify and pursue new opportunities in the transport sector, including the roads sector. Furthermore, the EAAA Platform has set up, and continues to manage, operate and grow the AnZen India Energy Yield Plus Trust ("**AnZen**"), an energy-focused infrastructure investment trust registered in India with SEBI demonstrating the ability of the EAAA Platform to launch and manage assets with the structure of the InvIT. For further details, please see "*Parties to the Trust*" on page 122.

The investment manager of the Trust is EAAA TransInfra Managers Limited (the "**Investment Manager**"). The Investment Manager is a wholly-owned subsidiary of EAAA. Our Project Manager is a wholly-owned subsidiary of the Sponsor and part of the Sponsor Group. The Project Manager shall, including through the in house teams of Project SPVs and HoldCos, undertake operations and management of the InvIT Assets, and ensure compliance with the respective concession agreements and project documents, making arrangements for appropriate maintenance, oversee the progress of development, status of approvals and other aspects of the projects of the Project SPVs. These in-house asset management teams of the HoldCos and Project SPVs have significant capabilities and extensive experience across all stages of the asset life cycle, including construction, operations, and asset handover at the end of a project's term. These in-house asset management capabilities are supported by the EAAA Platform, which brings in a wealth of project management expertise. The asset management capabilities are backed by technology enabled operations and maintenance ("**O&M**") processes, which helps deliver operational excellence with minimal manual intervention. Over past three Financial Years and up to the date of this Offer Document, the Project SPVs have received 28 awards, recognitions and accreditations for a wide range of achievements, including operational excellence, construction innovation, O&M practices, health and safety, environmental management and social impact. For further details on key features of our technology and AI based tools and awards, recognitions and accreditations, see "*Business – IT Infrastructure* " on page 294 and "*Business – Experienced team with full spectrum asset management and maintenance capabilities, spanning the entire asset life cycle, backed by tech-enabled operations and maintenance* " on page 257, respectively.

We are also supported by Axis Trustee Services Limited, the trustee (the "**Trustee**"), which is registered with SEBI as a debenture trustee under the Securities and Exchange Board of India (Debenture Trustees) Regulations, 1993, as amended from time to time. On behalf of our Unitholders, the Trustee is responsible for (a) ensuring that our business objectives and investment policies comply with the provisions of the InvIT Regulations and other applicable law, and (b) monitoring the activities of the Investment Manager (in terms of the Investment Management Agreement) and the Project Manager (in terms of the Project Implementation and Management

[1] Considering toll receipts (less revenue share) and actual annuity receipts for the Financial Year 2025

Agreement). For further details, please see "*Parties to the Trust – The Trustee – Axis Trustee Services Limited*" on page 124.

The details of our Project SPVs as of December 31, 2025 and our project wise revenue from operations (net of eliminations) for the year ended March 31, 2025 are provided in the table below:

Numbers ₹ in million, unless stated otherwise

Asset Name	Type	Authority	Location	Lanes *(in nos)*	Length *(kms)*	Concession period* *(years)*	PCOD	FCOD	Project wise revenue from operations (net of eliminations) (for Financial Year 2025 in ₹ million)	Operational history (in years)	Residual Life (in years)
Dibang Infra Projects Private Limited ("**Dibang**")	Annuity	MoRTH	Arunachal Pradesh	2	29.63	17	May 19, 2018	December 12, 2018	384.14	7.62	4.89
Dhola Infra Projects Private Limited ("**Dhola**")	Annuity	MoRTH	Assam	2	28.51	17	August 31, 2017	October 13, 2018	658.82	8.33	4.16
Jorabat Shillong Expressway Limited ("**JSEL**")	Annuity	NHAI	Assam and Meghalaya	4	61.80	20	January 28, 2016	August 30, 2019	1,479.25	9.92	5.25
Sub-total									**2,522.21**		
Samkhiali Bhachau Gandhidham Tollway Private Limited ("**SBGTPL**")	Toll with 1 toll plazas	NHAI	Gujarat	6	56.16	24	January 04, 2020	December 9, 2024	2,803.84	15.25	8.87
Rajkot-Vadinar Tollway Private Limited ("**RVTPL**")	Toll with 3 toll plazas	Gujarat Road State Development Corporation ("**GSRDC**")	Gujarat	4	131.65	20	January 27, 2012	June 17, 2023	2,291.56	13.91	4.14
Sambalpur-Rourkela Tollway Private Limited ("**SRTPL**")	Toll with 3 toll plazas	Works Department, Government of Odisha ("**OWD**")	Odisha	4	161.73	22	March 13, 2018 for 159.57 km [(1)] August 12, 2019 for 2.16 km	March 30, 2021	3,039.18	7.80	14.93
Ahmedabad-Maliya Tollway Private Limited ("**AMTPL**")[(3)]	Toll with 4 toll plazas	GSRDC	Gujarat	4[(2)]	180.70 [(2)]	22	Section III April 7, 2012 Section IV May 5, 2012 Section I August 27, 2012 Section II November 1, 2012	June 22, 2023	4,003.37	13.67	11.38
Deccan Tollways Private Limited ("**DTPL**")	Toll with 2 toll plazas	NHAI	Karnataka/ Telengana	4	144.95	25	October 14, 2017	September 17, 2019 for 142.786 km October 20, 2023 for 2.164 km	2,466.11	8.21	18.26
Thrissur Expressway Limited ("**TEL**")	Toll with 1 toll plazas	NHAI	Kerala	6	28.36	20	March 09, 2022	June 14, 2024	1,628.30	3.81	10.70
Panipat Elevated Corridor	Toll with 1 toll plazas	NHAI	Haryana	6	10.00	20	July 17, 2008	March 17, 2011	1,115.90	17.46	1.08

Numbers ₹ in million, unless stated otherwise

Asset Name	Type	Authority	Location	Lanes	Length	Concession period*	PCOD	FCOD	Project wise revenue from operations (net of eliminations) (for Financial Year 2025 in ₹ million)	Operational history (in years)	Residual Life (in years)
				(in nos)	*(kms)*	*(years)*					
Private Limited ("**PECPL**")											
Sub-total									**17,348.26**		
Total project wise revenue from operations (net of eliminations)									**19,870.46**		

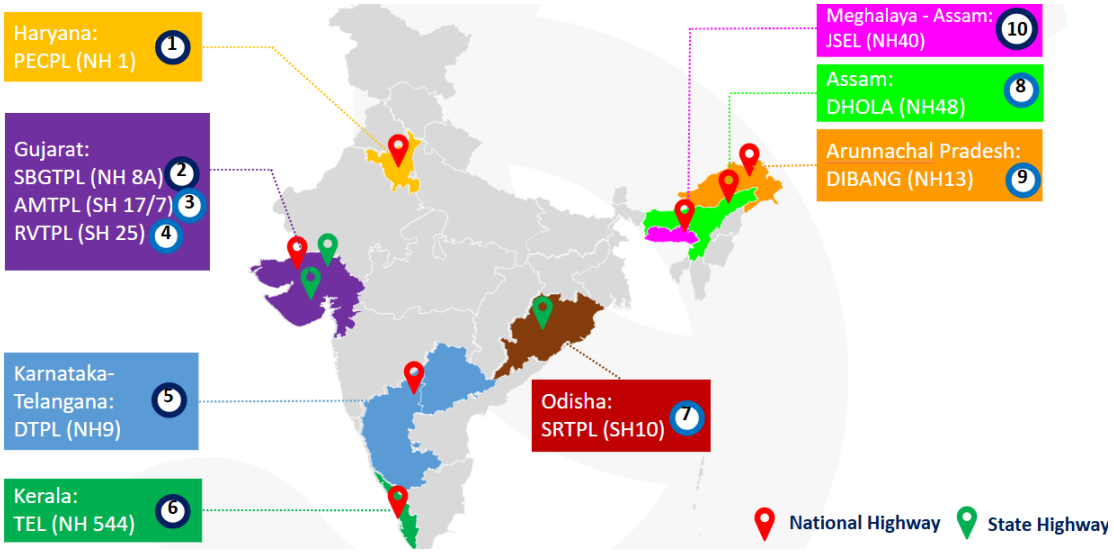
**As per the respective Concession Agreements*
(1) the PCOD certificate is dated March 12, 2018, however, SRTPL was fit for commercial entry from March 13, 2018 for a length of 159.57 kms and from August 12, 2019 for the remaining length of 2.16 km
(2) excluding 4 lane to 6 lane expansion for a stretch of approximately 28.75 km
(3) GSRDC has entered into a separate, additional concession agreement with AMTPL dated October 30, 2025 to augment a section of the highway (for a length of 28.75 km) from the existing four lanes to six lanes, on a construction, operation and maintenance to build, operate and transfer basis

Our Project SPVs forming part of the Initial Portfolio Assets will include seven toll assets and three annuity assets, ensuring diversification of revenue streams. Furthermore, the Identified ROFO Assets we intend to acquire in the future are HAM assets, further diversifying our portfolio. We believe that the toll assets particularly benefit from India's economic growth, leveraging increase in GDP and serving as an effective hedge against inflation. Toll-based road assets provide a degree of income stability and inflation protection, as most concessions have inflation-linked toll rate revisions or periodic toll hikes (*Source: CRISIL Report*). Combined with steady traffic growth on key national corridors, this structure allows InvIT cash flows to naturally adjust for inflation, thereby offering investors a built-in hedge and stable real returns over time (*Source: CRISIL Report*). The annuity and HAM assets typically provide stable cash flows over the residual concession life. With respect to annuity assets, the concessionaire is responsible for the construction and maintenance of the project during the concession period. Variability in user fee gives rise to revenue risk, which is borne by the authority in annuity and HAM assets. The concessionaire generates revenue through fixed annuity payments received from the authority over the concession period (*Source: CRISIL Report*). In a HAM project, the concessioning authority grants 40% of the total project cost during the construction phase and the remaining 60% is borne by the concessionaire. HAM projects combine elements of Engineering, Procurement, and Construction ("**EPC**") and annuity-based approaches, aiming to balance financial responsibility between the government and the concessionaire (*Source: CRISIL Report*). Under this model, the concessionaire's financial burden during the construction phase is reduced, while assured revenues are ensured during the operational phase through fixed annuity payments, interest on the diminishing balance of project cost, and inflation-linked O&M payments (*Source: CRISIL Report*). The concessionaire undertakes both construction and maintenance responsibilities, while revenue risks arising from fluctuations in user fees are borne by the authority. Variability in user fee gives rise to revenue risk, which is borne by the authority. However, the concessionaire generates revenue through fixed annuity payments received from the authority over the concession period (*Source: CRISIL Report*). Furthermore, given the relevant authority is the central government or its agencies, the counterparties present a low risk of default, offering assurance regarding the stability of the revenue under the concession agreements with these authorities (*Source: CRISIL Report*). We believe that this balanced strategy results in a resilient income profile, reduces dependence on any single revenue source, and supports the delivery of stable returns.

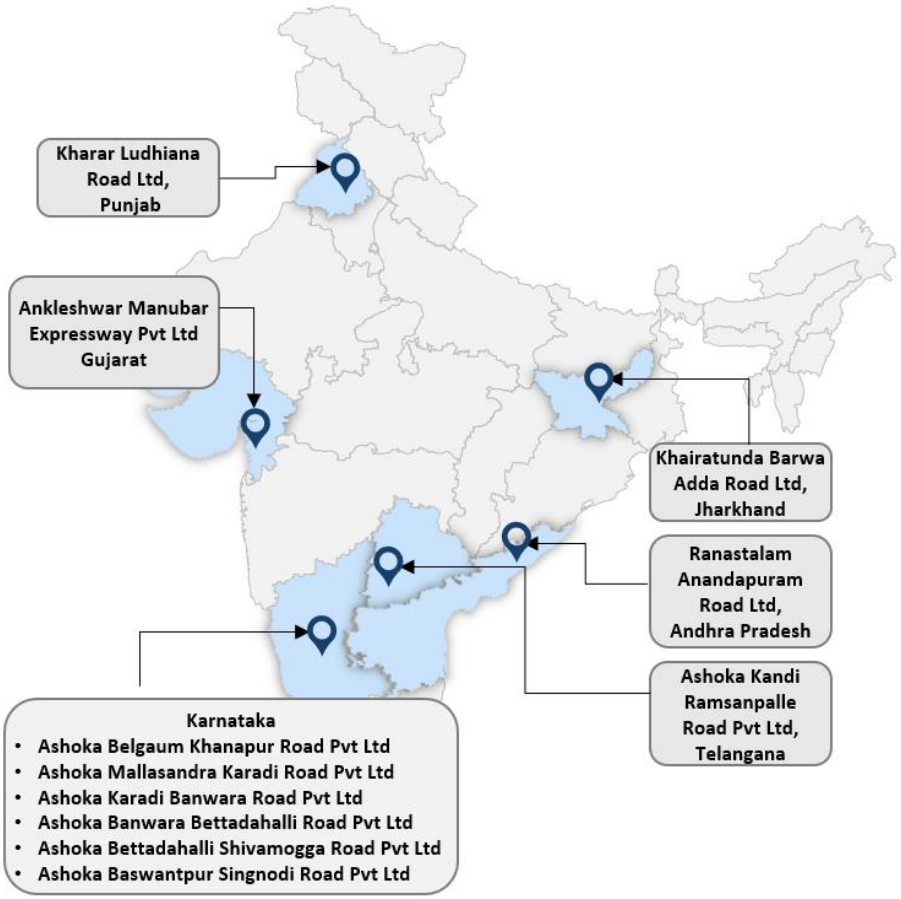
Our toll assets are mature and also have average residual lives of more than 10 years, which may be considered relatively long for road assets (*Source: CRISIL Report*). As of December 31, 2025, our toll based Project SPVs had a simple average operational history of 10.13 years and a weighted average residual life (by enterprise value ("**EV**") weight) of 12.93 years (*Source: CRISIL Report*). Furthermore, the EV of our largest asset (as a proportion of overall EV of our Initial Portfolio Assets) standing at 26.11% is comparable to some of the other financial sponsor driven road InvITs, indicating that our portfolio is less concentrated, thereby limiting the impact if any single asset were to underperform or face valuation changes (*Source: CRISIL Report*). The metric expresses the EV of the single largest asset as share of its total portfolio EV, providing an immediate read on dominant-asset dependence (*Source: CRISIL Report*). Additionally, our Herfindahl-Hirschman Index ("**HHI**") score (a measure of portfolio dispersion) is lower at 40.01 compared to some of the other road InvITs (*Source: CRISIL Report*). The HHI takes into account both the number of assets and their relative EV weights, with a lower HHI score indicating a more diversified portfolio (*Source: CRISIL Report*).

The toll roads forming part of our Project SPVs are situated in regions with high economic activity, thereby indicating strong, stable and predictable long-term traffic as well as revenue growth prospects (*Source:*

CRISIL Report). The locations of our toll and annuity assets forming part of the Project SPVs, as of the date of this Offer Document are indicated in the map below[2]:



Furthermore, the locations of our Identified ROFO Assets, as of the date of this Offer Document are indicated in the map below[3]:



2 The map has not been drawn to scale
3 The map has not been drawn to scale

The toll based Project SPVs had an AUM weighted annual average daily traffic PCU growth[4] of 7.10% between the Financial Years 2023 and 2025 (excluding PECPL[5]) and 6.46% between the Financial Years 2018 and 2025 (excluding PECPL[6] and TEL[7]), demonstrating both consistent growth and resilience. In addition to their geographic diversity, the toll assets Project SPVs also serve two key segments: passenger and commercial traffic. The overall PCU composition across all toll assets reflects a well-diversified traffic base spread across multiple regions of the country. Across all toll assets, passenger vehicles account for approximately 37.80% of the PCU mix in the Financial Year 2026, while commercial / freight vehicles contribute around 62.20%[8], indicating a healthy balance between personal and economic mobility (*Source: Traffic Reports*). In line with this, the revenue mix further highlights the strong presence of major economic and industrial corridors within the portfolio (*Source: Traffic Reports*). Freight vehicles contribute nearly 74.00% of toll collection[9], underscoring the critical role of goods movement and logistics activity in driving asset performance. The remaining 26.00% toll collection is contributed by passenger traffic, reflecting steady commuter movement across key routes. In road traffic commercial traffic is typically less volatile than passenger traffic and more resilient during economic fluctuations thereby reducing risk and allowing more efficient resource planning and utilization, and in turn improving its operational efficiency for platforms/concessionaires with a higher share of commercial traffic (*Source: Traffic Reports*).

Furthermore, the commercial traffic operating on road assets carry a variety of commodities, supporting additional stability through intra-portfolio dispersion and exposure to different industries. This approach helps mitigate the risks that could arise from over-concentration in a single region or market sector (*Source: CRISIL Report*). Similarly, our portfolio is less concentrated in terms of value, which helps to limit the impact if any single asset underperforms or experiences a change in valuation (*Source: CRISIL Report*) **.**

The key counterparties for our annuity assets include NHAI and the Ministry of Road Transport and Highways ("**MoRTH**"). For our toll assets, our key counterparties are NHAI, the Government of Odisha, and the Gujarat State Road Development Corporation Limited ("**GSRDC**"). Given the strong governmental backing and proven history, our counterparties have a low risk of default, providing assurance regarding the reliability and stability of revenue under the commercial arrangements with them (*Source: CRISIL Report*)

The table below sets out our key financial and operational measures as of and/or for the nine months ended December 31, 2025, and the Financial Years 2025, 2024 and 2023:

Particulars	As at and for the nine months ended December 31, 2025	As at and for the Financial Year ended March 31,		
		2025	2024	2023
	(₹ in million , except percentages)			
Total Income (A)	15,703.89	21,656.17	20,385.30	18,852.95
Revenue from operations	14,963.64	19,870.46	18,731.73	17,735.16
Revenue from operations from toll collection (B)	13,804.48	17,179.29	16,196.21	15,259.26
Revenue from operations from toll collection as a percentage of total income (%) (B/A*100)	87.90%	79.33%	79.45%	80.94%
EBITDA	11,429.32	14,349.51	12,594.07	10,841.65
EBITDA Margin (%)	72.78%	66.26%	61.78%	57.51%
Total borrowings (current and non-current)	59,087.90	66,999.94	61,715.24	61,859.50
Net Debt	42,470.51	52,557.50	37,238.87	35,708.16
Total Expenses	17,848.06	25,811.49	27,766.71	25,191.26
Loss before tax	(2,144.17)	(4,155.32)	(7,381.41)	(6,338.31)
Loss for the period/year	(2,190.48)	(4,177.51)	(7,741.18)	(6,540.08)

4 Average traffic growth is a weighted average computation of traffic PCU at respective SPVs using AUM as on 31st December 2025 as weights and further considering respective weights of tollable lengths for each toll plaza at SPV level

5 PECPL excluded on account of short residual life; PECPL concession will end in February 2027

6 PECPL excluded on account of short residual life; PECPL concession will end in February 2027

7 For TEL, PCOD was achieved in March 2022 and toll collection commenced thereafter

8 The PCU Mix for the Financial Year 2026 has been derived by applying historical seasonal correction factors to the actual traffic volumes recorded during April–July 2025, thereby estimating the base year traffic (*Source: Traffic Reports*)

9 The PCU Mix for the Financial Year 2026 has been derived by applying historical seasonal correction factors to the actual traffic volumes recorded during April–July 2025, thereby estimating the base year traffic (*Source: Traffic Reports*)

Particulars	As at and for the nine months ended December 31, 2025	As at and for the Financial Year ended March 31,		
		2025	2024	2023
	(₹ in million , except percentages)			
Net cash flow from operating activities	7,820.15	10,449.52	9,392.51	9,079.25

RISK FACTORS

An investment in the Units involves a high degree of risk. Before investing in the Units, prospective investors should pay particular attention to the fact that the Trust, Parties to the Trust, Initial Portfolio Assets and each of their activities are governed by the legal, regulatory and business environment in India, which differs from that which prevails in other countries. Prospective investors should carefully consider all the information in this Offer Document, including the risks and uncertainties described below, before making an investment in the Units. The risks and uncertainties described in this section may not be the only risks and uncertainties the Trust currently faces or may face in the future. Additional risks and uncertainties not presently known to the Trustee or the Investment Manager, or that the Trustee or the Investment Manager currently deem immaterial, may arise or may adversely affect our business, prospects, financial condition, cash flows, results of operations and the price of the Units. If any of the risks described below occur, or other risks that are not currently known or are now deemed immaterial, actually occur, our business and prospects, results of operations, cash flows and financial could be materially and adversely affected, and the trading price of the Units could decline, and prospective investors may lose all or part of their investments.

The financial and other implications of risks, wherever quantifiable, have been disclosed in the risk factors mentioned below. However, there are risks where the effect is not quantifiable and hence have not been disclosed in the applicable risk factors. Unless otherwise stated in the relevant risk factors set forth below, the Trustee and the Investment Manager are not in a position to specify or quantify the financial or other risks mentioned herein. Investors should be aware that the price of the Units, and the income from them may be subject to volatility.

This Offer Document also contains forward-looking statements (including the projections of revenue from operations and cash flows from operating activities of the Trust over the next three Financial Years (the "Projections of Revenue from Operations and Cash Flow from Operating Activities" attached as Annexure E) that involve risks, uncertainties and assumptions. Our actual results could differ materially from those anticipated in these forward-looking statements as a result of certain factors, including the considerations described below and elsewhere in this Offer Document. For details, please see "Forward-Looking Statements" on page 19.

In making an investment decision, prospective investors must rely upon their own examination and the terms of the Issue, including the merits and the risks involved. To obtain a complete understanding, prospective investors should read this section in conjunction with the sections entitled "Industry Overview", Business", "Rights of Unitholders" and "Discussion and Analysis by the Directors of the Investment Manager of the Financial Condition, Results of Operations and Cash Flows of the Initial Portfolio Assets of the Trust" on pages 176, 240, 464, 375 and Special Purpose Combined Financial Statements" attached as Annexure D, respectively as well as all other information contained in this Offer Document. Prospective investors should consult their tax, financial and legal advisors about the particular consequences of investing in the Issue. In this section, unless the context otherwise requires, a reference to "we", "us" and "our" refers to the Trust together with the Initial Portfolio Assets.

Risks Related to our Business and Industry

1. The Trust and the Investment Manager have no operating track record and may not be able to operate our business successfully, achieve business objectives or generate sufficient cash flows to make or sustain distributions.

The Trust was settled as a contributory, irrevocable and determinate trust, under the provisions of the Indian Trusts Act, 1882, on July 21, 2025 and registered with SEBI as an infrastructure investment trust on August 1, 2025. Subject to receipt of requisite approvals, the Trust proposes to acquire 100% securities and ICDs, unless otherwise specified, of the Initial Portfolio Assets pursuant to the Formation Transactions. For further details, please see "*Formation Transactions in relation to the Trust*" on page 26. The Trust does not have an operating history or its own historical financial information by which its performance may be evaluated. We are subject to business risks and uncertainties associated with any new business enterprise formed through a combination of existing business enterprises. Furthermore, our Investment Manager has been recently incorporated and the Initial Portfolio Assets are proposed to be acquired to form the Trust. The Investment Manager does not have any operational history of similar investment management or other activities in the infrastructure sector. There is no assurance that the Investment Manager will be able to implement these strategies successfully or that it will be able to expand our portfolio at any specified rate or to any specified size or to maintain distributions at projected levels. Accordingly, we cannot assure you that we will be able to operate our business successfully or profitably or achieve our investment objectives as described in this Offer Document.

2. The Special Purpose Combined Financial Statements included in this Offer Document may not accurately reflect our future financial position, results of operation and cash flows.

The Special Purpose Combined Financial Statements included in this Offer Document are prepared by combining the historical financial data of the Initial Portfolio Assets, as required under the InvIT Regulations and the InvIT Master Circular. The Special Purpose Combined Financial Statements have been prepared and presented on the basis that the Trust will hold the Initial Portfolio Assets pursuant to the Securities Purchase Agreements and other agreements on or prior to the date of the Allotment of the Units pursuant to the Issue. You will be unable to rely on the Special Purpose Combined Financial Statements presented in this Offer Document if this does not occur. Furthermore, such event may materially and adversely affect the ability of the Trust to make, or prevent the Trust from making, distributions to the Unitholders. For the purpose of this Offer Document, the Special Purpose Combined Financial Statements have been prepared in order to present the financial position, results of operations and cash flows of the Initial Portfolio Assets, on a combined historical basis, as of and for the Financial Years 2023, 2024 and 2025 and the nine months ended December 31, 2025, and do not necessarily represent the financial position, results of operations and cash flows had we been in existence during the periods presented. As a result, we cannot assure you that our future performance will be consistent with the historical financial performance included elsewhere in this Offer Document.

Additionally, the growth prospects, day to day operations and financial performance as an infrastructure investment trust can be affected by a wide variety of factors, including, inability to raise funds required for our operations, adverse developments in tax regulations affecting our Unitholders, operational performance, distribution, and acquiring new assets. Any inability to meet these challenges could cause disruptions to our operations and could be detrimental to our long-term business outlook. There can be no assurance that the Initial Portfolio Assets will be able to generate sufficient cash flows from their operations to make distributions to Unitholders or that such distributions will be as anticipated with those set out in the section titled "*Projections of Revenue from Operations and Cash Flow from Operating Activities*" attached as **Annexure E**.

3. We have incurred loss before tax amounting to ₹2,144.17 million, ₹4,155.32 million, ₹7,381.41 million and ₹6,338.31 million in the nine months ended December 31, 2025 and the Financial Years 2025, 2024 and 2023, respectively. Any similar losses in the future may adversely affect our business, financial condition and cash flows.

We have incurred losses in the nine months ended December 31, 2025 and the Financial Years 2025, 2024 and 2023. Further details are set out in the table below:

(₹ in million)

Particulars	For the nine months ended December 31, 2025	Financial Year		
		2025	2024	2023
Revenue from operations	14,963.64	19,870.46	18,731.73	17,735.16
Loss before tax	(2,144.17)	(4,155.32)	(7,381.41)	(6,338.31)
Loss for the period/year	(2,190.48)	(4,177.51)	(7,741.18)	(6,540.08)

However, our Project SPVs have positive cash flows from operating activities for the same period/years. Details of our net cash flow from operating activities is as follows:

(₹ in million)

Particulars	For the nine months ended December 31, 2025	Financial Year		
		2025	2024	2023
Net cash flow from operating activities	7,820.15	10,449.52	9,392.51	9,079.25

The losses reflected above are primarily attributable to non-cash items and/or provisions, including the following:

(i) High depreciation and amortisation expenses, which are inherent in the nature of transport infrastructure assets. Since the assets are already constructed and there is no requirement for replacement capital expenditure, depreciation constitutes an entirely non-cash item in the case of concession-based assets

such as transport infrastructure assets. This reduces accounting profit without impacting the cash position.

(ii) As per the requirements of the Concession Agreements, the concessionaires are required to undertake major periodic maintenance at periodic intervals of five to seven years. However, as per Ind AS, provisions for such expenditure are estimated for the relevant year and discounted in the financial statements for the period under consideration. Interest accretion on these provisions impacts accounting profitability, thereby reducing accounting profit without impacting the cash position.

(iii) Certain of our assets are subject to revenue share and/or additional concession fee obligations, payment of which is deferred. However, as per Ind AS requirements, such revenue share and additional concession fee pertaining to the entire concession period are required to be recognised as a liability upfront in the books. Similarly, interest accretion on the same is also required to be recognised. This further impacts accounting profit without affecting the cash position for the period under consideration.

Details of such accounting treatment and the relevant amounts are set out below:

(₹ in million)

Particulars	For the nine months ended December 31, 2025	Financial Year		
		2025	2024	2023
Depreciation and amortization expense	5,256.75	6,998.42	6,922.15	7,094.90
Provision for periodic major maintenance expense	1,664.48	2,879.25	3,449.31	3,994.38
Finance costs: - Unwinding of interest on major maintenance provision	634.17	741.78	651.68	364.08
Finance costs: - Interest for financial liabilities at amortized cost on additional concession fees	3,329.39	4,439.84	4,389.31	4,207.86

For further details pertaining to the reasons for these losses please see, "*Discussion and analysis by the Directors of the Investment Manager of the financial condition, results of operations and cash flows of the Initial Portfolio Assets of the Trust*" beginning on page 375.

Our costs may increase over time due to various factors including but not limited to inflation, changes in regulatory requirements, increased maintenance obligations, and employee benefit expenses, which may result in reduced distributable cash flows or losses in the future. Furthermore, we have expended and will continue to expend financial resources.

4. A significant portion of our revenue is concentrated in a few Project SPVs, and any adverse developments affecting these SPVs could materially impact our financial condition, revenue from operations, cash flows and ability to make distributions to Unitholders.

Three of our Project SPVs, namely; AMTPL, SRTPL and SBGTPL, collectively contributed to 49.55% of our revenue from operations for the Financial Year 2025. Below are the details of AMTPL, SRTPL and SBGTPL contribution to our revenue from operations for the following period/years:

Particulars	Nine months period ended December 31, 2025		Financial Year					
			2025		2024		2023	
	(₹ in million)	(% of Revenue from operations)	(₹ in million)	(% of Revenue from operations)	(₹ in million)	(% of Revenue from operations)	(₹ in million)	(% of Revenue from operations)
AMTPL (A)	3,285.94	21.96%	4,003.37	20.15%	3,642.64	19.45%	3,709.98	20.92%
SRTPL (B)	2,183.91	14.59%	3,039.18	15.29%	2,830.34	15.11%	2,196.42	12.38%
SBGTPL (C)	2,262.37	15.12%	2,803.84	14.11%	2,616.75	13.97%	2,320.46	13.08%

Particulars	Nine months period ended December 31, 2025		Financial Year					
			2025		2024		2023	
	(₹ in million)	(% of Revenue from operations)	(₹ in million)	(% of Revenue from operations)	(₹ in million)	(% of Revenue from operations)	(₹ in million)	(% of Revenue from operations)
Total (D = (A)+(B)+(C))	**7,732.22**	**51.67%**	**9,846.39**	**49.55%**	**9,089.73**	**48.53%**	**8,226.86**	**46.39%**

If any of these Project SPVs underperform relative to projections, or if the asset-specific assumptions underlying their valuations and cash flow projections do not materialize as anticipated, our revenue from operations, cash flows, and our ability to make distributions to Unitholders could be adversely impacted. For further details on the assumptions underlying the valuation of our Initial Portfolio Assets, please see "*Risk Factors - The Valuation Report and any underlying reports, are not opinions on the commercial merits of the Trust or the Initial Portfolio Assets, nor are they opinions, expressed or implied, as to the future trading price of the Units or the financial condition of the Trust upon listing, and the valuation contained therein may not be indicative of the true value of the Initial Portfolio Assets*" on page 79.

Any adverse developments affecting these Project SPVs, including but not limited to traffic volume decline, toll rate restrictions, concession period reductions, operational disruptions, force majeure events, regulatory changes, or defaults under their respective financing arrangements, could have a disproportionately material adverse effect on our overall revenue, cash flows, financial condition, and our ability to make distributions to Unitholders.

5. The Formation Transactions or usage of Issue Proceeds will only be given effect to after the Bid/Issue Closing Date, and our ability to consummate these transactions will impact the size of the Issue and the ability of the Investment Manager to complete this Offer.

While we have executed binding agreements with respect to the proposed acquisitions of the Initial Portfolio Assets, the underlying transactions, along with the Formation Transactions will be consummated or become effective, as applicable, after the Bid/Issue Closing Date. For further details, please see "*Formation Transactions in relation to the Trust*" on page 26. As of the date of this Offer Document, we have obtained relevant approvals for the Formation Transactions. Furthermore, certain agreements have also been entered into in relation to the Formation Transactions for the purposes of, *inter alia*, (i) assignment of rights and obligations under underlying acquisition agreements, including the escrow arrangements which are in place pursuant to the underlying acquisition agreements, to the Trust; (ii) assignment of inter-corporate deposits from certain lenders, including our Sponsor and certain members of the Sponsor Group, to the Trust, in consideration of Units of the InvIT; and (iii) management of identified matters and claims post-listing of the Trust. If we are unable to consummate any of the Formation Transactions in the manner described in this Offer Document, it may adversely impact our ability to complete the Issue within the anticipated time frame or at all. Additionally, while the underlying acquisition agreements for the Initial Portfolio Assets shall be assigned in favour of the Trust, we cannot assure you that the Trust will be able to exercise its rights under such agreements in a timely manner, or at all. Separately, the Initial Portfolio Assets are proposed to be acquired by the Trust pursuant to the completion of the actions as contemplated under the respective Securities Purchase Agreements and the Formation Transaction, except certain CCPS held by third parties in Epic 3 which will continue to be held by such third parties until certain milestone-linked payments are made pursuant to the Erstwhile Epic SPA. For further details, please see "*Formation Transactions in relation to the Trust - The details of the Initial Portfolio Assets as of the date of this Offer Document are provided below-HoldCos- Epic Concesiones 3 Private Limited ("**Epic 3**")*" on page 26.

We have executed binding agreements with respect to the proposed utilization of the Issue Proceeds, including the securities purchase agreements and debenture transfer agreements for the proposed acquisition or, as applicable, redemptions (in case of NCDs) of securities of SRPL, TEL, Dhola, Dibang and JSEL by the Trust. which are proposed to be acquired or redeemed by the Trust from Edelweiss Infrastructure Yield Plus, an alternative investment fund registered with the Securities and Exchange Board of India, which is managed by EAAA India Alternatives Limited. For further details, please see "*Use of Proceeds*" on page 356. While such agreements have been executed, the underlying transactions shall be consummated or become effective, as applicable, after the Bid/Issue Closing Date and prior to the Allotment of Units pursuant to the Issue, with the consideration being paid only after the Listing Date in accordance with applicable laws.

In the event of a shortfall of funds from the Issue Proceeds for the purposes of the proposed acquisitions, the Trust shall be required to rely on alternative sources of funding, including, *inter alia*, external debt, and we cannot assure you that funds shall be available to the Trust in a timely manner, or at all. As of the date of this Offer Document, the Trust has executed sanction letters with various lenders in relation to the external financing proposed to be availed by the Trust. However, the definitive documentation in this regard is yet to be finalised and executed. To the extent that the Trust does not acquire or redeem any non-convertible debentures as disclosed in the section entitled "*Use of Proceeds*" on page 356 of the Offer Document pursuant to the utilization of the Issue Proceeds, it is proposed that the proceeds from the external financing shall be utilized by the Trust to undertake the acquisition or redemption, as applicable, of the non-convertible debentures. Accordingly, such non-convertible debentures shall be acquired or redeemed by the Trust only subsequent to the disbursement of the Trust level external financing.

Further, the Trust also proposes to infuse the proceeds from external financing into the Project SPVs by way of a loan. The definitive documentation in this regard is yet to be finalised and executed. While we have filed applications with the relevant concessioning authorities in respect of the Project SPVs where the existing external debt is proposed to be refinanced, we cannot assure you that we will obtain such approvals in a timely manner, or at all. In the event that we do not receive any refinancing approvals for one or more of our Project SPVs, which may also be after Listing, the Trust will not be in a position to infuse any funds into such Project SPVs for the purposes of refinancing the existing debt in such Project SPVs, which might impact our financial condition, revenue from operations, cash flows and ability to make distributions to Unitholders.

6. Our revenues from certain of our Project SPVs are dependent on receiving consistent annuity income and interest on annuity income from NHAI and MoRTH and other compensation payments.

As of the date of this Offer Document, certain of our Project SPVs are operated on an annuity basis. Furthermore, all the ROFO Assets proposed to be acquired are operated on hybrid annuity basis. Pursuant to the relevant Concession Agreements, a fixed amount is paid bi-annually as annuity by the relevant concessioning authority. In case of hybrid annuity assets the relevant Project SPVs are entitled to receive annuity amounts, interest on unpaid annuity amounts, and certain O&M payments from the concessioning authority. Any reduction or non-receipt of annuity income from the responsible concessioning authority may adversely affect our distributions. Although arrangements to determine and ensure the timely payment of such compensation have operated effectively for a reasonable period, there is no assurance that there will be no shortfall in determination or delay or certainty of payment in such compensation payments in the future which consequently may affect our business, prospects, financial condition, cash flows, and results of operations.

7. Disruptions to the roadways connecting to the toll roads, including as a result of construction or maintenance activities are outside of our control and such disruptions may have an impact on revenue from operations, financial position and cash flows.

Disruptions to the roadways connecting to the toll roads, including as a result of construction or maintenance activities, is and will continue to be outside of our control. Any such construction or maintenance activities along the long network corridors of the toll roads may have a significant impact on the level of service offered to the users of such routes, particularly if there is a disruption to the flow of traffic, which may cause road users to take alternative routes to avoid such disruptions. Further, if the local or state agencies responsible for the maintenance of the long network corridors do not properly maintain the connecting roadways, or if such maintenance requires any material closure of such roadways, the toll roads may experience a decrease in traffic volume on the toll roads, which could adversely affect our toll collections and our ability to make distributions to the Unitholders.

8. Our toll revenues and traffic volumes depend on regulatory limitations and the number of people using our roads, which in turn are dependent on factors beyond our control.

Toll revenue is determined by both the base rates set by the concessioning authority under the Concession Agreements and the actual volume of traffic on our roads. The National Highways Fee (Determination of Rates and Collection) Rules, 2008, as amended from time to time (the "**Fee Rules**") read with our Concession Agreements executed by our toll-based Project SPVs awarded by the NHAI, typically restrict the extent to which toll rates can fluctuate and prescribe related regulations. Usually, the relevant concessioning authority establishes the applicable user fees and outlines the methods for periodic adjustments. As a result, we may not be able to increase toll rates sufficiently to offset increases in our operating, financing, or other costs. The concessioning authority may revise user fees in accordance with the changes in the tolls related policies or terms of the concession agreement and relevant laws. Consequently, our revenue from tolls depends on both traffic volume and user fees, neither of which we control.

The toll rate structure is laid down under the Fee Rules. The Fee Rules specify that the applicable toll rates specified thereunder shall be increased by three percent each year along with an adjustment based on an increase in the WPI. Furthermore, for certain toll roads the adjustment in toll rates on account of WPI is capped at a percentage of the increase in the WPI. As such, in the event of high consumer price index inflation or increased minimum wages, we may experience significantly higher operating costs, but there may be little variation in the WPI resulting in a muted increase in the applicable toll rate. As the determination of the applicable toll rates does not take account of changes in our operating, financing or other costs, there can be no assurance that the toll rates will be sufficient to cover any increase in such costs or that we will be able to implement any changes in the toll rates at the time or in the manner which we believe is in our best interest. Thus, while our toll rates may increase with an increase in WPI, any increase may not be adequate to offset the negative impact of increases in interest rates or O&M costs. Furthermore, our toll rates may also decrease with a decrease in WPI and accordingly, the business, financial condition, results of operations and cash flows of the Trust may be adversely affected. For example, the NHAI recently released a circular regarding the change in the linking factor for converting the WPI from the 2011-12 base year to the previous base year of 2004-05, potentially lowering toll rates (the "**Circular**"). While the Circular has been kept in abeyance by the Delhi High Court, we cannot guarantee that similar developments will not affect our project portfolio in the future. Furthermore, any adverse change to existing government policies, incentives, allocations, or resources including, the envisaged implementation of the Global Navigation Satellite System ("**GNSS**") or Multi-lane Free Flow (**"MLFF"**) based Electronic Toll Collection ("**ETC**") in India or any negative shift in our relationships with these governmental entities could materially and adversely affect our toll operations, toll revenue collection, and consequently, our business, prospects, financial condition, cash flows, and results of operations. For further details see, "*Risk Factors - Changes in policies adopted by governmental entities, or our relationships with various stakeholders, including government entities, could materially and adversely affect our business, prospects, financial performance, cash flows, and results of operations*" on page 82.

Our toll collections may also be affected by the level of exemptions. For example, a toll fee may not be levied during certain festive periods, the number of road users may be exempted to pay the applicable toll rates when using the toll roads beyond the provisions under the respective Concession Agreements. The Concession Agreements provide that certain users of the toll roads are exempt from paying user fees for non-commercial use of the roads, while frequent users are entitled to discounted fees to use the toll roads. For further details, please see, "*Summary of the Concession Agreements*" on page 298 of this Offer Document.

Traffic volumes on our toll roads and the toll revenue we collect are directly and indirectly affected by several factors outside our control, including but not limited to:

- A decline in the manufacturing or export of commodities transported on the toll roads, which may occur due to regulatory restrictions, financial crises, war, or other reasons that could distort global commodity prices.

- The number and type of motor vehicles in operation, as well as the costs associated with purchasing and operating vehicles in areas served by the toll roads such as financing costs, compliance with environmental laws, exchange rate fluctuations, and fuel prices in the areas in which our roads operate.

- Adverse weather conditions, such as floods or heavy rain, acts of God and other force majeure events, including natural disasters, strikes, outbreaks of diseases or pandemics like COVID-19, or political and non-political unrest that could impair the safe operation or lead to temporary suspension of flow of traffic and/or toll collection or, prevent use or accessibility of the toll roads.

- Traffic levels and the physical condition of roads providing access to and from the toll roads including coming up of alternate routes, the waiting time at toll plazas and congestion at the gateways, or the physical condition of such roads, which may affect users' ability to reach or depart from our toll roads.

- Construction, maintenance or widening of highways or adjacent project roads or any entry restrictions of vehicles or material closures on account of safety precautions by the local administration may adversely impact the revenue of the project.

- The capacity of the toll roads and associated structures such as bridges, bypasses, or tunnels as well as maintenance and repair requirements of parts or all of the toll roads, or any structure forming part of the toll roads, which may result in restricted or no access to the toll roads for material periods of time.

- Security of the toll roads as managed by security contractors, including the possible threat of terrorism against the toll roads or associated infrastructure.
- Changes in tolling policies or other applicable laws (including environmental regulations) that affect certain vehicle or fuel categories.
- The development of alternative transport modes (such as railways, pipelines, and waterways) and incentives associated with such modes such as the National Rail Plan (NRP) – 2030 that is expected to increase rail's modal share traffic which may adversely impact the modal share for road-freight.
- Shifts in consumption patterns of goods transported on the toll roads or any restrictions on their manufacturing, mining or transportation related restrictions in relation to heavy vehicles.
- Changes to axle load norms in India that could increase permissible limits, potentially affecting traffic growth along Indian national and state highways and cause accelerated–and hastening road surface deterioration.
- Public or governmental reactions to any increases in user fees.
- Toll leakage or other violations by road users.
- Seasonal fluctuations, especially during the monsoon season, which often lead to lower traffic volumes and cash flow. Traffic volumes tend to drop during monsoons but rise during the holiday season. The monsoon may also impede our ability to carry out operational and maintenance tasks, resulting in maintenance delays and reduced productivity, which could negatively impact our business, financial condition, and results.

If there is a significant decrease in traffic volume or changes to user fees on the toll roads, the resulting reduction in toll collections may materially and adversely affect our ability to make distributions to unitholders. Furthermore, certain regulatory and policy guidelines issued by the NHAI from time to time may adversely affect the business of certain toll-based Project SPVs, results of operations, cash flows and financial condition. For instance, NHAI had temporarily suspended tolling on project roads due to COVID-19 during the nationwide lockdown from March 25, 2020 to April 19, 2020. Furthermore, the implementation of an annual pass, which is a capped tolling system may reduce average toll revenue per vehicle with effect from August 15, 2025 may also affect our toll revenue. For further details see, "*Risk Factors - Changes in policies adopted by governmental entities, or in the relationships between any member of the Initial Portfolio Assets and the Government of India, could materially and adversely affect our business, prospects, financial performance, cash flows, and results of operations*" on page 82.

9. The development or improvement of competing roads, bridges, or alternative modes of transport may reduce traffic volumes and toll collections on our toll assets, which in turn could affect our business, financial position, results of operations and cash flows.

For the nine months ended December 31, 2025, and Financial Years 2025, 2024 and 2023, the revenue from operations from our toll collection contributed 92.25%, 86.46%, 86.46% and 86.04%, respectively, of our total revenue from operations. Traffic volumes, and accordingly, toll collections, depend on external factors such as regional economic conditions, government policy, the competitiveness of alternative routes or modes of transport, weather events, and broader shifts in travel or commercial behaviour. As a result, actual traffic volumes may fluctuate or remain below projections. Any reduction in traffic, limitations on toll rate increases, or changes to collection mechanisms may negatively affect our revenue and our ability to achieve financial and operational targets. Although varied compensation provisions may be provided in the Concession Agreements, in certain restricted scenarios, there is no assurance that these mechanisms will fully mitigate the financial impact of regulatory or market-driven disruptions.

Furthermore, the principal source of revenue for the toll-based Project SPVs is the collection of toll fees from users of the toll roads. The level of toll collections may be affected by competing routes and alternative modes of transport, such as adjacent free roads, new or existing toll roads, railways, waterways, air transport or other modes of transport. Although the Concession Agreements typically restrict the relevant concessioning authorities and central, state or local governments from constructing or improving competing roads in certain circumstances, there

are notable exceptions as well as differences across Concession Agreements on the provisions in relation to competing routes. For instance, some agreements prohibit the widening of an existing highway by more than two metres over at least 75% of its length after the tenth anniversary of the project, provided the length of such competing road does not exceed 20% of the project highway. Similarly, as per some agreements, for any additional highway developed in the last ten years of the concession period, the restriction applies if its length does not exceed 20% of the project highway. However, neither NHAI nor the GoI is prohibited from constructing or improving competing free or toll roads if the average traffic on the toll road exceeds 90% of its designated designed capacity for three consecutive years. Additionally, neither the relevant central, state or local government nor the respective concessioning authorities are restricted under some of the Concession Agreements from constructing alternative routes of travel which service the same areas as are serviced by the toll roads. In the event such alternative modes of travel are constructed, it may adversely impact our revenue of the toll roads. Furthermore, our Concession Agreements typically include a clause in relation to payment of compensation computed on the basis of the difference between realizable fee and projected fee resulting from any competing roads. However, we cannot assure you that the relevant Project SPV shall be able to seek compensation from the relevant concessioning authority in every instance, or whether such compensation shall be paid to the Project SPV in a timely manner, or at all, which may adversely impact our revenue and financial condition.

For further details please see, "*Summary of Concession Agreements*" on page 298.

Furthermore, given the renewed focus of central, state and local authorities, on the development and strengthening of the highway network across India, there can be no assurance that there will not be any construction, widening or improvement of any free or toll roads, or construction of other modes of transport including local routes by local authorities and communities, in the proximity of the toll roads or which provide an alternative or more direct routing to locations served by the toll roads. Any such construction, widening or improvement may divert traffic away from the toll roads, which may adversely affect toll collections and, therefore, our ability to make distributions to the Unitholders.

10. Consummation of the Formation Transactions pursuant to which we will acquire the Project SPVs is subject to certain conditions.

In accordance with the Concession Agreements, certain Project SPVs require prior consents from and/or prior intimation to the respective concessioning authorities, including the NHAI, MoRTH and certain state concessioning authorities, for amongst others, undertaking or permitting any change in ownership of the relevant Project SPVs from national security and public interest perspective. Typically, "change in ownership" under the Concession Agreements includes any acquisition of equity, including by transfer of legal or beneficial ownership of more than 15% of the total equity of the concessionaire, and the approval from the concessioning authority is required from a national security and public interest perspective. In accordance with such consent requirements, the Project SPVs (except AMTPL, SRTPL and RVTPL for which only intimations were required to be made under their respective Concession Agreements) have applied and received, as applicable, for change of control approval from NHAI and/ or MoRTH. The consents, as and if provided by NHAI and/ or MoRTH or any communication from such authorities (including the state concessioning authorities) in relation to the change in ownership, might be subject to certain conditions and we cannot assure you that we will be able to comply with some or all the conditions stipulated under such approvals. If any conditions remain unmet, the secured consent or approval may not be considered complete, which may adversely impact our ability to acquire the Project SPVs and complete the Formation Transactions and the Issue within the anticipated time frame or at all.

11. Potential challenges in acquiring and integrating the ROFO Assets under the ROFO Agreement could adversely affect our business, financial position, operating results, and cash flows. In addition, the ROFO Agreement is subject to various terms and conditions, and we cannot assure you that we will be able to complete these transactions in a timely manner, or at all.

We have entered into a ROFO Agreement in relation to the future acquisition of assets which are held, or will be held by Epic 2 and certain schemes of Infrastructure Yield Trust ("**Seller Entities**"). As of the date of this Offer Document, there are 11 HAM assets under NHAI concessions which are ROFO Assets in terms of the ROFO Agreement. As of the date of this Offer Document, (i) five HAM assets are presently held by the Seller Entities, and (ii) six HAM assets are in the process of being acquired by the Seller Entities, pursuant to binding documentation entered into by the Seller Entities, subject to all conditions precedent under the binding documentation being satisfied. For further details on the ROFO Agreement, please see "*Related Party Transactions – Acquisition of future assets by the Trust – ROFO Agreement*" on page 424. We cannot assure you we would have achieved or will be able to achieve such terms in the future if such transactions were not entered into with related parties.

Pursuant to the terms of the ROFO Agreement, in the event of the proposed sale of the ROFO Assets by the Seller Entities, we will have a right of first offer over all ROFO Assets, and such ROFO Assets may be acquired by us. However, there may be instances where we are unable to exercise our option for certain ROFO Assets, and we may not be able to successfully acquire all 11 ROFO Assets presently held, or which shall be held by the Seller Entities. Furthermore, the Seller Entities are in the process of acquiring the remaining six of the eligible ROFO Assets. While the necessary due diligence and valuation exercise prior to making an offer to buy such ROFO Assets will be undertaken, there may still be uncertainties, including in relation to the acquisition, till the acquisitions are completed, including but not limited to potential exposure to regulatory hurdles and sanctions resulting from previous activities of the ROFO Assets and unforeseen financial liabilities. Additionally, even after the acquisition of the ROFO Assets from the Seller Entities, there may be uncertainties in terms of diligence, unexpected hurdles etc. Furthermore, the pipeline of ROFO Assets may also be limited or ineligible for acquisition by the Trust due to the investment conditions applicable to the Trust, due to the limited availability or access to funds, or on account of one or more of the ROFO Assets not being classified as 'completed and revenue generating assets' or 'under construction assets' in accordance with the InvIT Regulations at the time of the proposed acquisition. Furthermore, the Trust may not be able to continue acquiring new transport sector assets, including roads to its portfolio.

Furthermore, the ROFO Agreement may be terminated due to, among other things, mutual consent and if the Sponsor and/ or its Affiliates cease to be Unitholders of the Trust. We cannot assure you that we will be able to exercise such rights and that such rights will be exercised by us in a timely manner, or at all. For further details on the ROFO Agreement, please see "*Related Party Transactions – Acquisition of future assets by the Trust – ROFO Agreement*" on page 424. As of the date of this Offer Document, 10 of the 11 HAM Assets have either received the provisional commercial operations date or the commercial operations date, and one of the 11 HAM Assets is currently under-construction and the certificate of commencement approval is pending. Additionally, consummation of the transactions under the binding documentation entered into by the Seller Entities and the ROFO Agreements may also necessitate the prior approval of NHAI before undertaking any "change in ownership" as defined under the relevant Concession Agreement or change in the O&M operator and refinancing.

The ROFO Assets may also be subject to certain residual construction related risks, including time and costs overruns and delays in obtaining regulatory approvals. These risks may delay or prevent the Seller Entities from selling their shareholding in such ROFO Assets to the Trust. Moreover, any future acquisition will have to be undertaken by the Trust in compliance with, and subject to any restrictions prescribed under, the then prevailing policy framework for divestment of equity by concessionaires or developers, as prescribed by NHAI. Any such assets proposed to be acquired by the Trust shall also be required to meet the requirements prescribed under the InvIT Regulations, the InvIT Documents, and other applicable laws.

Furthermore, the acquisition of the ROFO Assets also exposes us to the risk of being unable to successfully integrate the operations of the acquired businesses with our own, risk of failure of these business entities, financial risks and risks related to integrating enterprise resource planning systems. We may be unable to successfully integrate the acquired assets, and key personnel may decide to disengage with us or otherwise refuse to cooperate with our personnel and existing systems. As such, there can be no assurance that we will be able to realize economies of scale and other synergies from the acquisition of the ROFO Assets.

12. Potential defects in acquired assets may present significant risks which could affect our business, financial position, results of operations and cash flows.

The Initial Portfolio Assets and the ROFO Assets might not be free from defects or be subject to approval requirements and other restrictions when they are acquired by or offered to the Trust. For example, certain assets could have pending litigation which may not always be apparent prior to acquisition. Additionally, obtaining the necessary approvals from government authorities or third parties, for example, in relation to transfer of shareholding, or contractual consents, may take longer than expected, or may impose additional conditions or costs or not be received at all. These factors may delay the integration of such assets into the Trust's portfolio or result in unforeseen expenses. Furthermore, any inaccuracies in the initial assumptions or projections about the Initial Portfolio Assets and ROFO Assets could lead to increased costs, delays, or reduced returns, thereby adversely affecting the Trust's financial performance and strategic objectives. Additionally, in the event that the rights and obligations under the Erstwhile Epic SPA or the Epic 2 SPAs are not assigned to the Trust for any reason or where following an assignment the Trust is not in a position to enforce any or all of the warranties and indemnities provided for by the sellers in the Erstwhile Epic SPA or the Epic 2 SPAs it may have an adverse effect on our business, financial position, results of operations and cash flows.

13. Failure to maintain certain investment ratio requirements may present significant risks which could affect our business, financial position, results of operations and cash flows.

Under the InvIT Regulations, we are required to invest at least 80% of the value of the InvIT Assets (proportionate to the holding of the Trust) in completed and revenue-generating infrastructure projects, subject to the conditions specified in the InvIT Regulations. In addition, we may not invest more than 20% of the value of the InvIT Assets in certain permitted forms of investment, including, among other things, listed or unlisted debt of companies in the infrastructure sector, equity shares of companies listed on Stock Exchanges deriving not less than 80% of its operating income from the infrastructure sector, government securities, money market instruments or cash equivalents, unlisted equity shares of a company providing project management and other incidental services subject to certain conditions, units of liquid mutual fund schemes and interest rate derivatives, subject to the relevant conditions and thresholds under the InvIT Regulations. Additionally, out of the 20% of the value of the InvIT Assets, the Trust is permitted to invest not more than 10% of the value of the InvIT Assets in under-construction infrastructure projects. Such conditions and limitations may restrict our ability to make or hold investments, including acquisition of other transport sector assets, including roads or bid for transport sector assets. Recently, the concessioning authority in the state of Gujarat, GSDRC, has signed a concession agreement with AMTPL on October 30, 2025 for the upgradation to six lanes of an existing four lane section of approximately 28.75 km. AMTPL will continue to collect tolls on the entire road length, including on the 28.75 km section corridor while it is being widened. The six lane widening of the said corridor is within the permitted 10% limit of the value of InvIT Assets. Any future change in scope by the authority in respect of six lane works, this percentage of value of InvIT Assets exceeding the permitted limits for a temporary period. Furthermore, certain third-party shareholders, which presently hold preference shares in Epic 3, shall continue to hold their shareholding following the Listing of the Trust. While such shareholding is proposed to be held in compliance with the InvIT Regulations, we cannot assure you that the exercise of rights by such third-party shareholders may not have an impact on the ability of Epic 3 to comply with the provisions of the InvIT Regulations.

If these requirements are not met or are breached due to market movements affecting the prices of underlying assets or securities, the Investment Manager must inform the Trustee and ensure compliance within six months of such breach (or within one year, if approved by the unitholders in accordance with the InvIT Regulations). Failure to comply with these requirements may expose us to additional risks, including the potential divestment of some or all of our assets, delisting of our units from the stock exchanges, other penalties, and could prevent us from acquiring further assets, including pursuant to the terms of the ROFO Agreement. These actions could have a material adverse effect on our business, financial condition, cash flows, and results of operations. For further details, please see "*Formation Transactions – The details of the Initial Portfolio Assets as of the date of this Offer Document are provided below – HoldCos – Epic Concesiones 3 Private Limited*" on page 26.

14. We may be liable for outstanding penalties relating to our ROFO Assets, and we may not be able to fully recover these amounts.

We intend to acquire certain HAM assets under NHAI concessions which are ROFO Assets as per the terms of the ROFO Agreement. Some of these HAM assets may have outstanding demands for penalties from relevant authorities relating to operational matters or alleged non-compliances that occurred before the completion of the acquisitions.

Typically, buyers of infrastructure assets, including HAM assets, secure indemnities and liability protection from sellers for identified penalties. However, if the amounts agreed amongst the parties in respect of such penalties or claims are capped, the buyer may be liable for any shortfall and may not have recourse against the seller for an amount exceeding that cap. Additionally, where the buyer is not able to secure an indemnity for such identified penalties, it may be fully liable for any penalties that are imposed and would be required to settle these liabilities using its own funds. As the proposed buyer of the ROFO Assets, the Trust may be subject to similar considerations in the future, which could have a material adverse effect on our business, financial condition, results of operations, and cash flows.

15. Any loss or misappropriation of toll fees from any of the toll-based Project SPVs could have a material and adverse effect on our revenues and financial condition.

Toll receipts of each toll-based Project SPV depend primarily on the integrity of its toll-collection systems and the willingness of road users to pay the tolls. Although integrated and advanced toll-collection systems are in place for each toll-based Project SPV, revenue from toll collections may be reduced by leakage resulting from toll evasion, pilferage, theft, fraud, technical failures in the toll systems, or deliberate violations by users of the toll roads.

Additionally, toll-collection errors can lead to revenue loss, particularly due to the inherent risk of under-collection when users pay toll fees in cash, although the substantial FASTag adoption has reduced the use of cash payments, as 97% of our toll collection in the Financial Year 2025 was through FASTag (excluding SRTPL, for which FASTag adoption commenced in January 2025). While we have standard operating procedures in place for collecting cash-related revenue and had no material incidents of toll-collection errors in the past, any failure to continue monitoring and controlling leakage in our toll-collection systems could have a material adverse effect on our business, prospects, financial condition, operational results, and ability to make distributions.

Furthermore, a toll-based Project SPV may at times be unable to collect tolls due to political protests or other forms of unrest, including protests specifically relating to tolling. For instance, in the Financial Year 2021 and 2022, due to political unrests in the state of Haryana, PECPL invoked the force majeure clause under its Concession Agreement with NHAI. Consequently, NHAI granted an extension of concession period by 350 days as per the relevant provisions of the Concession Agreement, towards the toll suspension due to farmers' agitation from December 25, 2020 to January 28, 2021 (33 days) and from January 29, 2021 to December 13, 2021 (317 days). In certain circumstances, governmental authorities or Indian courts may suspend toll collection on toll roads, either fully or partially, during specified periods. Any such suspension could lead to a reduction in our revenue and affect our financial condition.

16. Our financial projections, valuations, and distributions depend on assumptions about the concession periods for the Project SPVs, which are subject to extension approvals and various operational factors. If we fail to secure the expected extensions, or if the actual concession periods are shorter than assumed, our revenues, valuations, and distributions to Unitholders could be adversely affected.

The Concession Agreements entered into by the Project SPVs generally provide for fixed-term concessions, after which operation of the relevant toll road will be transferred to the relevant concessioning authority. Certain Concession Agreements may allow for extension if actual traffic levels are lower than anticipated. However, there is no assurance that the relevant concessioning authority will grant such extensions for the toll roads. Furthermore, the relevant concessioning authority may also reduce the concession period, if actual traffic levels are higher than anticipated, which may have a material adverse impact on our business, revenue from operations, financial position and cash flows on account of such reduction in the envisaged concession period. For instance, GSRDC vide its letter dated July 19, 2024 has reduced the concession period for AMTPL by 2.2 years upon noting that the actual traffic volume ("**ATV**") had exceeded the target traffic volume ("**TTV**") as mentioned in the concession agreement dated September 17, 2008 entered between AMTPL and GSRDC. AMTPL submitted a response letter dated August 2, 2024 to GSRDC, stating that, inter alia, the calculations for variations in traffic growth has some major anomalies and the methodologies applied by GSRDC are erroneous and not in line with the applicable provisions of AMTPL concession agreement. AMTPL has also requested for a joint meeting with GSRDC and the independent engineer and the matter is currently pending.

There is a risk that required extensions are delayed, denied, or only granted in part. If any of the assumed extensions are not granted, or if the concession period terminates sooner than anticipated in the Valuation Report, the revenue-generating life of the respective Project SPVs could be substantially shortened. This may result in lower-than-expected revenues and cash flows, a reduction in asset valuation, and a negative impact on distributions to Unitholders.

For the purposes of the Trust's financial model and unit valuation, the concession period for each asset has been calculated on the basis of assumptions set out in the Valuation Report. These assumptions include, amongst others, the possibility of extensions to the original concession periods, the concession agreement for PECPL ending in Financial Year 2027, subject to fulfilment of pre-defined conditions under the concession agreements, most notably, the achievement of prescribed traffic volumes in our toll-based Project SPVs. The end-dates and lengths of the concession periods, as reflected in the Valuation Report, are based on the assumption that the required approvals for extension will be obtained. For further details please see, "*Valuation Report*" attached as **Annexure A.**

The Trust's valuation, expected revenues, and distribution forecasts rely on the assumption that the concession periods for these assets will be as outlined above. Extensions typically require approval by the relevant grantor or authority, which is not guaranteed and is often contingent on various factors including traffic performance, the methodology adopted for determination of traffic or compliance with other contractual terms.

There is no assurance that the assumptions underlying the valuation reports will materialize as expected, or that any applications for extension of the concession periods will be successful in a timely manner or on terms that are favourable to us. Any such event could materially and adversely affect our business, financial condition, results

of operations, cash flows and ability to make distributions and compliance with the provisions of the InvIT Regulations in relation to divestment of infrastructure assets.

17. The concessions held by the Project SPVs may be terminated early under certain circumstances, which could materially affect our business, operating results, financial condition and cash flows, and we may not adequately be compensated for the actual costs and investments associated with our assets in a timely manner or at all.

The concessions held by the Project SPV are our principal assets. Our ability to collect tolls or receive contractual payments from the authorities and distribute funds to our unitholders depends on each Project SPV maintaining its concession rights from the NHAI or the relevant concessioning authority. These Concession Agreements may be terminated early if certain conditions are not met, such as a Project SPV's failure to comply with change of ownership requirements, make required payments (including premium related payments) to the relevant concessioning authority on time, adhere to operational and maintenance standards or the occurrence of an event of default on the part of the concessioning authority. Other grounds for termination include improperly creating an encumbrance, abandoning operations without the concessioning authority's written consent, failing to address a force majeure event that continues beyond the period specified in the agreements, or breaching any other material provisions that adversely affect the relevant concessioning authority.

If a Project SPV defaults on its obligations, the responsible concessioning authority has the right to suspend its operational rights (including collection of tolls and fees), claim compensation for direct additional costs, or terminate the Concession Agreement. In the event of a material default, the responsible concessioning authority may also seek compensation in addition to any applicable termination payment (along with interest, if any) which we may not be able to determine or account for prior to the determination by the relevant concessioning authority. Conversely, a Project SPV may terminate a concession agreement if the responsible concessioning authority materially defaults or evidences an intention not to be bound by the terms; in such cases, the responsible concessioning authority must pay the Project SPV a contractually agreed termination amount (including interest, if any). For further details, please see "*Summary of Concession Agreements*" on page 298. Termination of any Concession Agreement, suspension of toll or annuity income, or imposition of compensation or damages could have a material adverse effect on our business, financial condition, cash flows, and results of operations.

Additionally, as the termination payment payable to us in the event of a breach by us could be lower than what we would have otherwise been entitled to receive in the event that the Concession Agreement had not been terminated, we may not be adequately compensated for the actual costs and investments associated with our assets and, therefore, may adversely affect our ability to make distributions to the Unitholders. Furthermore, such termination payments may be subject to adjustments in relation to any outstanding amounts payable to the authority, including for example the nature of deferred premium (if applicable) and/or any outstanding penalties/damages imposed on our Project SPVs by the relevant concessioning authority till that date. There is no assurance that any termination payment due to us will be paid in full or part, within the timelines specified in the Concession Agreement or at all. In the event of a delay in the disbursement of a termination payment by the concessioning authority, in particular, if any dispute arises in respect of such payment, or in the event the concessioning authority fails to make the termination payment at all, we may be unable to make distributions to the Unitholders.

18. The accuracy of statistical and other information with respect to the road infrastructure sector, the Traffic Reports and the Technical Reports commissioned by us, which are based on certain estimates and assumptions that are subjective in nature, cannot be guaranteed.

Certain data relating to the business of the Project SPVs has been assessed and quantified by the Project SPVs internally, as no other credible third-party sources are available for such data. Such assessment is based on each Project SPV's understanding, experience and internal estimates of its business.

We have appointed CRISIL Intelligence (a division of CRISIL Limited) which is an independent advisory firm, as the traffic consultant (the "**Traffic Consultant**") to forecast the traffic volumes for the toll assets and to prepare Traffic Reports, which are traffic reports specific to the relevant section of the road. Furthermore, we have appointed Samarth Infraengg Technocrats Private Limited & Ramboll India Private Limited as the technical consultants (the "**Technical Consultants**") to prepare the Technical Reports. The Traffic Reports and the Technical Reports are subject to various limitations and are based upon certain estimates, methodologies and assumptions that are subjective in nature and that are based, in part, on information provided by and discussions with or on our behalf, the Investment Manager and/or the Sponsor, as applicable. The Traffic Reports and the Technical Reports reflect current expectations and views regarding future events, and therefore, necessarily

involve known and unknown risks and uncertainties. The Traffic Reports and the Technical Reports contain forecasts, projections and other "forward-looking" statements that relate to future events, which are, by their nature, subject to significant risks and uncertainties, including but not limited to population growth, gross domestic product growth, vehicle ownership rates, per capita income, wholesale price index, agricultural output and fuel consumption. Factors such as future traffic growth, economic conditions, regulatory changes, evolution of new or alternative transport mode and technological advancements can significantly influence these forecasts, projections and other "forward-looking" statements. As a result, variation in traffic and revenue forecasts may have a higher range than expected. Additionally, these are long-term projections and do not take into account short-term or microeconomic factors which may impact or affect traffic volumes in the near term. Therefore, these projections may not take into account, reflect or portray any short-term effect of unforeseen situations which may arise during the term of the projects. For more details, see "*Technical Reports" and "Traffic Reports" attached as* ***Annexure B*** *and* ***Annexure C****,* respectively.

The future events referred to in the Traffic Reports and/or the Technical Reports involve risks, uncertainties and other factors which may cause the actual traffic volumes to differ materially from any future traffic volumes expressed or implied by the Traffic Reports and/or the Technical Reports. The estimates, methodologies and assumptions adopted by the Traffic Consultant and/or the Technical Consultants for preparing the respective Traffic Reports and the Technical Reports might not prove to be accurate. If any of these assumptions is incorrect, future traffic volumes or conditions, including estimation of related expenses, for the assets could be materially different from those set forth in the Traffic Reports and/or Technical Reports and this Offer Document.

19. We have commissioned an industry report titled 'Connecting India: Unlocking Investment Potential in Transport Infrastructure' ("CRISIL Report") from CRISIL Intelligence, a division of CRISIL Limited, which has been used for industry related data in this Offer Document and such data has not been independently verified by us.

The industry and market information contained in this Offer Document includes information that is derived from the CRISIL Report dated March 23, 2026, prepared by CRISIL Intelligence, a division of CRISIL Limited which has been paid for by us. The CRISIL Report has been commissioned and paid for by us for the purposes of confirming our understanding of the transport sector, including roads in India. The CRISIL Report uses certain methodologies for market sizing and forecasting and may include numbers that differ from those we record internally. Furthermore, the CRISIL Report also contains comparative information with a select set of infrastructure investment trusts on certain parameters. While to the extent possible, the information has been sourced from publicly available data, there is a certain degree of subjectivity, and the presentation of assets and/or portfolio may differ in the methodology or benchmarks adopted by the relevant infrastructure investment trusts. Furthermore, the information in the CRISIL Report is on a particular date, and therefore, some or all parameters considered may change with time or cease to be relevant. Given the scope and extent of the CRISIL Report, disclosures herein are limited to certain excerpts and the CRISIL Report has not been reproduced in its entirety in this Offer Document. Neither the Trust, the Investment Manager, the Sponsor and Sponsor Group, and their respective promoters, directors or managerial personnel or the Lead Managers are related to CRISIL. Accordingly, investors should read the industry related disclosure in this Offer Document in this context.

Industry sources and publications are also prepared based on information as of specific dates. Industry sources and publications may also base their information on estimates, projections, forecasts, other third-party sources and assumptions that may prove to be incorrect. Due to possibly flawed or ineffective collection methods or discrepancies between published information and market practice and other problems, the statistics herein may be inaccurate or may not be comparable to statistics produced for other economies and should not be unduly relied upon. Furthermore, we cannot assure you that they are stated or compiled on the same basis or with the same degree of accuracy as may be the case elsewhere. Statements from third parties that involve estimates are subject to change, and actual amounts may differ materially from those included in this Offer Document. Accordingly, investors should not place undue reliance on or base their investment decision solely on this information. For further details, see "*Industry Overview*" on page 176.

20. The use of additional leverage by the Trust is subject to risks.

There are significant risks associated with rising interest rates or the imposition of additional financial covenants by lenders, either of which could materially and adversely affect our business, prospects, financial performance, cash flows, and results of operations. Higher interest rates will increase our borrowing costs, thereby reducing our net income and the cash flow available for operations and investment. In addition, more stringent financial covenants may restrict our operational flexibility, limit our ability to raise further capital, and potentially result in covenant breaches. Any such breaches could trigger penalties, accelerate debt repayments, reduce the credit

ratings of our Project SPVs, or subject us to increased lender scrutiny, all of which may negatively impact our financial stability and growth prospects. Furthermore, consequently, we may not be able to obtain additional financing at favourable terms for working capital, capital expenditures, expansion plans and other corporate actions.

21. The Projections of Revenue from Operations and Cash Flow from Operating Activities presented in this Offer Document may not be indicative of the future financial condition, cash flows and results of operations of the InvIT.

Projections of revenue from operations and cash flow from operating activities of the Trust (consisting of the Trust and the Initial Portfolio Assets) and the Initial Portfolio Assets, individually, for the years ended March 31, 2027, March 31, 2028, March 31, 2029 and March 31, 2030 along with the basis of preparation and underlying assumptions have been included in the Offer Document. The Auditor's report on our projections of revenue from operations and cash flow from operating activities contains restrictions with respect to the purpose and use of the report by investors in the United States. The InvIT Regulations require the Auditor to issue a report on the projections and such report is issued for the sole purpose of the Issue in accordance with the InvIT Regulations. The Auditor's work has not been carried out in accordance with auditing or other standards and practices generally accepted in jurisdictions outside India, including in the United States, and accordingly should not be relied upon as if it had been carried out in accordance with those standards and practices. U.S. securities regulations do not require profit forecasts to be reported by a third party. The Auditor accepts no responsibility and denies any liability to any person who seeks to rely on the report and who may seek to make a claim in connection with any offering of securities on the basis that they had acted in reliance of such information under the protections afforded by the laws and regulations of the United States.

22. We may incur increased costs, including those related to operations and maintenance, which we may not be able to recover through higher toll fees or additional annuity income under the relevant Concession Agreements.

We may experience increases in operating and maintenance costs that we cannot fully recover by raising toll fees or annuity income, as toll fees are subject to specified annual revision methodologies under appliable rules and annuity payments can only be adjusted in limited circumstances such as 'change in law' or 'change in scope' provisions under the Concession Agreements.

These cost increases could arise in comparison to the present estimates due to a number of factors beyond the control of each Project SPV, which may not be covered in force majeure or change in law provisions given in the Concession Agreements. Examples include:

- increase in the cost of labour, materials (for example, bitumen and aggregate market price), royalty on mining/quarrying, and insurance;
- the Project SPVs being required to install intelligent toll-collection systems or other new technologies for monitoring projects at their own costs (whether at the instance of concession authorities or otherwise), including remedial costs incurred to rectify any defects caused on account of a failure of any technology;
- the Project SPVs being required to install/ deploy sustainable solutions to adhere with evolving and stringent environmental and social norms;
- higher axle loading, traffic volume or environmental stress leading to more extensive or more frequent heavy repairs or maintenance costs, which may be substantial;
- the Project SPVs being required to restore their project roads in the event of any landslides, floods, road subsidence, other natural disasters, accidents or other events causing structural damage or compromising safety to the extent the insurance cover is inadequate (if at all);
- changes to the laws and regulations relating to insurance in India which results in an increase in the insurance premiums payable by the Project SPVs;

- increase in electricity tariff rates or other fuel costs resulting in an increase in the cost of energy;
- adverse weather conditions;
- an increase in minimum wages or other operating costs;
- the introduction of a levy on the usage of water and/or other inputs for maintenance of the toll roads, among other things, in states in which the toll roads are located;
- unforeseen legal, tax and accounting liabilities relating to acquired assets;
- other unforeseen operational and maintenance costs; or
- any non-political events & indirect political events (to the extent the compensation not provided by the Concession Authority)

While we mitigate the increase in costs through relevant contractual provisions and insurance coverage, our costs may still rise beyond budgeted levels, and we may not be able to offset these increases by raising toll fees due to the restrictions of the Concession Agreements. This could reduce our profitability, expose us to penalties from authorities, and negatively impact our business, financial condition and results. Such events may also impact the ability of the Project SPVs to service the debt obtained from the Trust and our ability to make distributions to the Unitholders. As such, the inability to change the terms and conditions, including the toll fees of the concession during the concession period, may materially and adversely affect our operational and financial flexibility.

23. Mandatory escrow arrangements may restrict our ability to use available funds, potentially limiting our financial flexibility.

Under the Concession Agreements, all funds received by any Project SPV including financing for concession fees, toll and annuity revenues, and payments from the NHAI and the relevant concessioning authorities, must be deposited into an escrow account and can only be used according to a pre-determined order set out in the escrow agreement. For a summary of the escrow arrangements, please see "*Summary of Concession Agreements*" on page 298.

The escrow arrangements typically prioritize the payment of all taxes due, followed by payment of expenses in connection with the construction of the project, operation and maintenance expenses including expenses for repair works reimbursement of expenditure incurred by the NHAI and concession fee due and payable to NHAI. Beyond these requirements, lenders to our Project SPVs (including, where applicable, in certain cases the concessioning authority, where such concessioning authority has approved the deferment of premium) have also imposed additional restrictions on how funds in the escrow account may be used. Furthermore, there is no assurance that future lenders to the Trust or Project SPVs will not impose similar limitations. Any withdrawals from the escrow accounts by the Project SPVs during the concession periods must be made strictly in accordance with the terms of the Concession Agreements, debt documentation and escrow agreements, thereby limiting the flexibility of the Project SPVs in utilising available funds to plan for, or react to, changes in their business needs, which could have an adverse effect on their business, financial condition, results of operations and cash flows and accordingly, distributions to the Unitholders.

24. Decreases in demand for, or production of, certain commodities and regulatory changes affecting those commodities or their transportation may negatively impact traffic volumes and our toll collections.

Traffic on our toll roads depends significantly on the movement of various commodities, including among others, the couriers and parcels, industrial, construction material and pipes, metal and mining and energy sectors. These commodities are produced in different parts of the country, and are transported through national and state highways, including our toll roads, to other regions in India. Consequently, both our traffic volumes and toll collections are sensitive to changes in the demand for or production of these commodities. A reduction in demand or production could therefore lead to lower traffic volumes and decreased toll collections. Additionally, future bans or regulatory restrictions on the mining or production of commodities such as sand, stone, or iron ore, or other regulatory actions could further decrease traffic volumes and toll revenue.

Some of our toll roads are located near state borders, including, DTPL, TEL and PECPL, making them particularly vulnerable to changes in regulations governing interstate transit costs. Any increase in interstate transportation costs or additional restrictions or imposition of additional levies mining and/or on the transport of commodities across state lines may discourage such movement, prompting industries to source commodities locally. This could further lower traffic volumes and adversely affect toll collections. Overall, any decline in the demand for, production of, or interstate transport of these commodities or any increase in related transportation costs, could materially affect our toll collections and our ability to distribute returns to Unitholders.

25. Any significant costs incurred in implementing new technologies or refurbishing existing equipment for the operation, maintenance and monitoring of the toll roads could materially and adversely affect our ability to distribute returns to Unitholders.

Our future success will partly depend on our ability to respond to technological advances, emerging standards, and evolving practices for asset management in a cost-effective and timely manner. Rapid and frequent changes in technology and market demand can make existing technologies and equipment obsolete, which may require substantial capital expenditure and/or asset write-downs. If we fail to adopt new technologies efficiently and promptly, our operating costs could increase.

Additionally, Government authorities may require the use of specific technologies in project execution. We may not be able to implement these requirements within the necessary timeframe, or at all. Furthermore, we may incur significant costs for which we may not receive any or adequate reimbursement or compensation. For example, the authorities introduced FASTag lanes at toll plazas. This policy initiative requires an exclusive lane for vehicles equipped with FASTag, a device affixed to the vehicle's front windscreen that enables online toll payment. The proper functioning of such technology infrastructure is crucial to our business operations and may require significant investments and/or higher recurring costs.

Furthermore, we are dependent on the EAAA Platform and certain third-parties for our technological capabilities for which we have entered into various agreements. For further details please see "*Related Party Transactions*" on page 417. If any third-party service provider fails to provide the services we require, meet contractual requirements (including compliance with applicable laws and regulations), maintain adequate data privacy controls and electronic security systems, or suffers a cyber-attack or other security breach, we could be subject to regulatory enforcement actions, claims from third parties, and suffer economic and reputational harm that could have an adverse effect on our business.

Additionally, some equipment used on the toll roads has defined useful lives and must be replaced or refurbished at regular intervals. There can be no assurance that we will be able to do so as required, or that such replacement or refurbishment will be undertaken cost-effectively. Any increase in costs resulting from these replacements or refurbishments would adversely affect our profit margins and cash flows.

26. Interruptions in our toll-linked projects arising from systems failures, cyber security breaches or attacks could adversely affect our business, financial condition, cash flows and operating results.

Our electronic toll collection systems may experience service interruptions or degradation or other performance problems. We are also dependent on the systems and services of third parties, including under the National Electronic Toll Collection programme, the National Payments Corporation of India, and various banks providing FASTag services, and any failure or interruption in their systems could adversely affect our operations. Such service interruptions or performance problems can arise because of, amongst other, hardware and software defects or malfunctions, unexpected high volume of transactions, cyberattacks and cyber-security breaches, infrastructure changes, human error, natural disasters, power losses, disruptions in telecommunications services, unauthorized access, fraud, military or political conflicts, terrorist attacks, legal or regulatory takedowns, computer viruses, ransomware, malware, or other events. Additionally, any future movement to new technologies, such as satellite-based navigation systems, may also expose us to additional risks in this regard. In some instances, we may not be able to identify the cause or causes of these performance problems within an acceptable period of time. Furthermore, as techniques used to obtain unauthorized access to or sabotage systems change frequently and may not be known until launched against us, we may be unable to anticipate, or implement adequate measures to protect against, these attacks. Inaccuracies in data due to IT system errors can lead to incorrect assessments of the Trust's performance, poor investment decisions, and misrepresentation of the Trust's financial health to investors and regulator. While there have been no such incidents in the nine months ended December 31, 2025 and the Financial Years 2025, 2024 and 2023, we cannot assure you that such incidents will not arise in the future, and as a result, our business, financial condition, cash flows, and results of operations will not be adversely affected.

Furthermore, our insurance coverage may not be sufficient to cover all of our losses that may result from interruptions in our service as a result of systems failures and similar events and we may need to expend significant financial and development resources to analyse, correct, or eliminate errors or defects or to address and eliminate vulnerabilities. Any failure to timely and effectively resolve any such errors, defects, or vulnerabilities could adversely affect our business, financial condition, cash flows and results of operations.

27. The Valuation Report and any underlying reports, are not opinions on the commercial merits of the Trust or the Initial Portfolio Assets, nor are they opinions, expressed or implied, as to the future trading price of the Units or the financial condition of the Trust upon listing, and the valuation contained therein may not be indicative of the true value of the Initial Portfolio Assets.

The Investment Manager, in consultation with the Trustee, has appointed Mr. S Sundararaman as the Valuer to conduct a comprehensive valuation of the Initial Portfolio Assets proposed to be held by the Trust, in accordance with the InvIT Regulations. The resulting Valuation Report, which provides an opinion on the fair enterprise value of the Project SPVs as of December 31, 2025, is included in this Offer Document. For further details, please see "*Valuation Report*" attached as **Annexure A**.

To prepare the Valuation Report, the Valuer based their assumptions on various factors, including traffic volumes, extension of the concession period, toll rates operating revenue, routine maintenance expenses, major maintenance and repair costs, project management expenses, insurance costs, depreciation and amortization, taxes, capital expenditure and working capital. These assumptions were derived from the Traffic Reports, the Technical Reports, information provided by and discussions with the Sponsor and the Investment Manager. The Valuation Report reflects current expectations and views regarding future events and, therefore, necessarily involves known and unknown risks and uncertainties. It is not an opinion on the commercial merits and structure of the Trust or the Initial Portfolio Assets, nor is it an opinion, express or implied, as to the current or future trading price of the Units in or the financial condition of the Trust. The Valuation Report does not purport to contain all the information that may be necessary or desirable to fully evaluate the Trust or the Initial Portfolio Assets or an investment in the Trust or the Units or the Issue. The Valuation Report makes no representation or warranty, expressed or implied, in this regard. The Valuation Report does not confer rights or remedies upon investors or any other person, and does not constitute and should not be construed as any form of assurance as to the financial condition or future performance of the Trust or as to any other forward-looking statements included therein, including those relating to certain macro-economic factors, by or on behalf of the Investment Manager, the Sponsor, the Project Manager, the Trust or the Lead Managers.

Furthermore, we cannot assure you that the valuation prepared by the Valuer reflects the true value of the net future revenues of the Initial Portfolio Assets or that other valuers would arrive at the same valuation. Accordingly, the valuation contained therein may not be indicative of the true value of the Initial Portfolio Assets. The Valuation Report has not been updated since the date of its issue, does not take into account any subsequent developments and should not be considered as a recommendation by the Investment Manager, the Sponsor, the Project Manager, the Trust or the Lead Managers or any other party that any person should take any action based on the Valuation Report.

28. Certain Initial Portfolio Assets have incurred indebtedness and are subject to restrictive covenants under their financing agreements. An inability to comply with repayment and other covenants in such financing agreements could adversely affect our business and financial condition.

As of March 24, 2026, our total borrowings (secured and unsecured) was ₹85,658.20 million, of which the aggregate secured borrowings was ₹36,608.44 million. For further details on the nature of our outstanding borrowings, see "*Financial Indebtedness and Deferred Payments*" on page 361.

The financing agreements that the Project SPVs have entered into with certain banks and financial institutions contain certain restrictive covenants, including, but not limited to a requirement of intimating the lenders or obtaining their consent, as applicable, prior to, (i) any change in the capital structure; (ii) amendment of constitutional documents; (iii) create or incur any financial indebtedness from external sources or permit any encumbrance; and (iv) pre-pay any financial indebtedness of any other lender, entity or person.

In certain cases, lenders may require our receivables (including the cash flows) to be secured in their favour. Furthermore, the assets of our Project SPVs may be used as collateral security for any borrowings by other Project SPVs. While we have not encountered any instances of material breaches which have resulted in an event of default under the loan agreements of the Project SPVs, post-acquisition of the Project SPVs by EAAA Platform, in the past three Financial Years and the nine months ended December 31, 2025, we cannot assure you that such

instances will not arise in the future and that we would be able to obtain waivers in respect of any breach or default by us under any of our existing or future debt agreements. In such case, the lenders could elect to declare outstanding amounts due and payable, restructure the management of the borrower including appointment of a nominee director on the board of the borrower, terminate their existing or future commitments, and enforce their interests against existing collateral. There can be no assurance that our assets and our cash flows would be sufficient to repay in full all of the debts as they become due, or that we would be able to find alternative financing on terms that are favourable or acceptable to us, or at all.

In addition, these restrictive covenants may also affect some of the Trust's rights as a shareholder of Project SPVs or the future SPVs' ability to make distributions if they are in breach of any obligations under the applicable financing agreement. For more details concerning material covenants of the relevant financing agreements, please see "*Financial Indebtedness and Deferred Payments*" and "*Use of Proceeds*" on pages 361 and 356, respectively.

29. Certain Project SPVs' financing agreements entail interest at floating rates, and any increase in interest rates may adversely affect our results of operations, financial condition and cash flows.

Certain of our Initial Portfolio Assets are susceptible to changes in interest rates. For details, see section "*Financial Indebtedness and Deferred Payments*" on page 361. As of the date of this Offer Document, certain of the Initial Portfolio Assets' borrowings are at floating rates of interest. Additionally, our future borrowings may also be subject to floating interest rates. We may contract certain amount of debt in the form of fixed-interest instruments. It is possible that refinancing of such instruments may happen at a higher interest rate. Furthermore, in the past, the Government has taken measures to control inflation, which have included tightening monetary policy by raising interest rates. Any increase in interest rates may have an adverse effect on our results of operations, financial condition and cash flows.

30. The terms of the Project Implementation and Management Agreements may change subject to comments that may be provided by the relevant concessioning authority.

Pursuant to the terms of the respective concession agreements, the Project SPVs are required to submit to their respective concessioning authorities, drafts of all project agreements or any amendments or replacements, pursuant to which the relevant concessioning authorities have the right to review and provide comments within specified time periods. Accordingly, the Project SPVs have submitted drafts of the Project Implementation and Management Agreement to the relevant concessioning authorities for their review and comments prior to filing of the Draft Offer Document with SEBI. As of the date of this Offer Document, while we have entered into the Project Implementation and Management Agreement, it may be required to be amended subject to any comments or observations received from the concessioning authority.

31. The Project SPVs may be subject to penalties and claims from concessioning authorities and third parties and may not be able to recover all operational losses from the Project Manager, and/or other contractors providing operations and maintenance services to the projects for material default, breach or non-compliance that may have a material adverse effect on our results of operations, cash flows and our ability to make distributions to the Unitholders.

Under the terms of the Concession Agreements, a Project SPV may be liable to pay damages and/or compensation to the concessioning authority for material default or breach or non-compliance or delayed compliance with certain terms of the Concession Agreements, including for delays in completing items specified in the punch list annexed to the provisional completion certificates or otherwise or for a failure to comply with the maintenance obligations set out in the Concession Agreements.

Failure by any Project SPV to maintain or repair the road assets in conformity with the maintenance requirements specified in the Concession Agreements, the maintenance program, maintenance manual or safety requirements, or failure to commence required remedial works within a stipulated period of receipt of an inspection report from the independent engineer or such other period specified by the concession authority, entitles the concessioning authority, in addition to any other rights available to it, including the right to terminate the Concession Agreements, to take the required remedial measures (including recoveries from the relevant escrow account and withhold or deduct annuity related payments) at the concerned Project SPV's risk and cost.

Furthermore, in the event that any Project SPV fails to repair or rectify any defect or deficiency in respect of the road assets in accordance with the maintenance requirements specified in the Concession Agreement, or if it is in

breach of the maintenance program, maintenance manual or safety requirements, it will be liable to pay damages to the concessioning authority, in addition to any other rights available to the concessioning authority, including the right to terminate the Concession Agreement. The damages typically payable, in case of toll assets, for such a breach may be an amount equal to the higher of 0.5% of average daily fee and 0.1% of the cost of such repair or rectification as estimated by the independent engineer, and will be payable for each day of delay until the breach is cured, or in case of one of our Project SPVs is ₹10,000. The damages payable, in case of annuity assets, for such a breach may be an amount equal to the higher of 0.5% - 2% of average daily annuity or 0.1% - 0.4% cost of such repair or rectification, as estimated by the independent engineer. In the event we fail to maintain the roads to the standards set forth in the relevant Concession Agreements, the relevant Concessioning Authority, may impose penalties, reduce annuity payments and demand remedies, as applicable, within cure periods. Furthermore, in the event we are required to cure any defaults, and we fail to cure such defaults within such time as may be prescribed under the Concession Agreements, the Concession Agreements may lead to termination.

Any failure by the Project SPVs to maintain compliance with the operation and maintenance specifications set out in the agreements may result in the imposition of financial penalties on us, and we may not be able to recover the losses, damages, penalties from our contractors which consequently, may have a material adverse effect on our results of operations, cash flows and our ability to make distributions to the Unitholders.

32. Changes in policies adopted by governmental entities, or our relationships with various stakeholders, including government entities, could materially and adversely affect our business, prospects, financial performance, cash flows, and results of operations.

Certain Project SPVs, namely Jorabat Shillong Expressway Limited, Samkhiali Bhachau Gandhidham Tollway Private Limited, Panipat Elevated Corridor Private Limited, Thrissur Expressway Limited, Deccan Tollways Private Limited; Dhola Infra Projects Private Limited and Dibang Infra Projects Private Limited, generate their revenue from their respective Concession Agreements with the NHAI and MoRTH, respectively. Furthermore, certain Project SPVs, including Ahmedabad - Maliya Tollway Private Limited, Sambalpur-Rourkela Tollway Private Limited and Rajkot-Vadinar Tollway Private Limited, have entered into Concession Agreements with state authorities such as Gujarat State Road Development Corporation Limited and Odisha Works Department. Our business depends on the policies governing concession terms and other incentives offered by these Governmental entities for both the current road assets and any future projects. Furthermore, the operation of our road assets relies on the policies, incentives, budgetary allocations, and other resources provided by various central and state government entities to the road sector generally. Any adverse change to existing government policies, incentives, allocations, or resources or any negative shift in our relationships with these governmental entities could materially and adversely affect our business, prospects, financial condition, cash flows, and results of operations. For example, on September 9, 2024, the Ministry of Road Transport and Highways published a notification in the official gazette regarding the collection of tolls through the GNSS, a satellite-based tolling system. The notification specifies that tolls are to be calculated based on the distance travelled. While this scheme does not currently apply to any of the road assets, if NHAI and/or any concessioning authority were to extend it, we cannot assure that it would not adversely impact our revenues and/or increase our operating costs, and there is no certainty that NHAI would provide adequate or timely compensation for any such impacts. Furthermore, the recent implementation of an annual pass with effect from August 15, 2025 may also affect our toll revenue notwithstanding any change in law compensation and/or processes or procedures that NHAI may lay down for compensation in respect of the annual pass. Pursuant to the implementation of the same, our compensation may be delayed, denied or only granted in part which in turn may have an impact on our business, prospects, financial condition, cash flows, and results of operations. For further information, please see "*Risk Factors - Any significant costs incurred in implementing new technologies or refurbishing existing equipment for the operation, maintenance and monitoring of the toll roads could materially and adversely affect our ability to distribute returns to Unitholders*" on page 78.

In addition, road assets developed through public-private partnerships may be subject to delays, complex internal processes, policy shifts, local or national political pressures, changes in government budget allocations, and potential insufficiencies in funding. For instance, under the current policy, NHAI bears the cost of intermediaries such as banks for FASTag fee collection; however, in future, like in the case of certain Project SPVs that have state government as concessioning authorities, NHAI may require concessionaires to bear these costs, as toll revenues ultimately belong to the project concessionaires. As governmental entities are involved in awarding, developing, and operating the awarded projects, our business is directly and significantly dependent on their ongoing support. As of the date of this Offer Document, there are three outstanding claims filed by three of our Project SPVs against NHAI in relation to non-implementation of revised user fees from April 1, 2024 to June 2, 2024. We are yet to receive full compensation from the relevant concessioning authorities. For further details, please see "*Legal and other Information*" on page 445.

33. Our ability to negotiate the standard form of concession agreement may be limited. In addition, the Concession Agreements contain certain restrictive terms and conditions that could be subject to varying interpretations.

We have entered into Concession Agreements with the various concessioning authorities, and our ability to negotiate the terms of these contracts is limited, as they are based on the standard model concession agreement approved by the Government of India, and duly prescribed by the relevant concessioning authorities. For instance, the toll fees under these agreements are fixed, subject only to annual adjustments for inflation as detailed in the agreements. In addition, the operation and maintenance standards and specifications require the Project SPVs to incur regular and periodic operation and maintenance costs. The model concession agreement also prescribes a fixed concession term. Although some agreements may permit an extension or reduction of this term, which is subject to the approval and assessment of the relevant concessioning authority, based on factors such as actual traffic volumes on a specified date, they do not provide for renewal after expiry.

Over the past decade, the form of the model concession agreement has evolved, but there remains limited guidance on the interpretation of several of its terms and conditions and some of these provisions remain untested. Specific terms such as those concerning capacity augmentation of toll roads, the substitution of the relevant concessioning authorities in project agreements, termination payments by the relevant concessioning authorities, the process in respect of calculation of traffic on target traffic dates, construction of additional competing roads by the relevant concessioning authorities or other governmental bodies, and compensation for changes in law are also subject to interpretation. As a result, the relevant concessioning authorities, the courts, or regulators may interpret certain terms and conditions in the Concession Agreements differently from our own understanding.

These agreements also contain restrictive provisions. For example, certain Concession Agreements require that project agreements include substitution clauses, which enable lenders to a Project SPV to replace the SPV with new concessionaires, subject to the responsible concessioning authority's approval, if the Project SPV defaults under the concession, financing, or other project agreements. Furthermore, Concession Agreements allow responsible concessioning authority or senior lenders to suspend rights of the Project SPV (concessionaire) and replace the Project SPV if a concessionaire default occurs. The Concession Agreements also contain terms that may be onerous to the Project SPVs in relation to, among other things, compliance with and monitoring of O&M requirements. The O&M requirements include, among other things, permitting the safe, smooth and uninterrupted flow of traffic, undertaking routine maintenance, including repairs of potholes, cracks, concrete joints, drains, line markings, lighting and signage, undertaking major maintenance in accordance with the relevant concession agreement, including but not limited to resurfacing of pavements, repairs to structures, and repairs and refurbishment of tolling system and other equipment and preventing, with the assistance of the concerned law enforcement agencies, any encroachments on, or unauthorized entry to the relevant Project SPV. Failure to comply with these requirements could result in adverse consequences, including the Project SPVs being liable for compensating the relevant concessioning authorities for such default or breach or termination, or even being blacklisted by certain authorities which could impact our ability to acquire new assets and grow our operations.

In addition, the Concession Agreements signed by the Project SPVs are inherently illiquid. This is due to prevailing market conditions, the remaining tenure of the agreements, the various approvals, consents, and confirmations required from the relevant concessioning authorities, and the limited number of disposal options and potential buyers. Consequently, it may be difficult for us to realise, sell, or dispose of our shareholdings in the Project SPVs at a favourable price, within the desired timeframe, or at all. This illiquidity could have a material adverse effect on our market value, business, planning, strategy, prospects, financial condition, cash flows, and results of operations.

In the event the concessioning authority or a lender invokes any restrictive term or condition in the Concession Agreements, or the concessioning authority, a court, or regulator interprets any term or condition in an adverse manner, such invocation or interpretation may materially and adversely affect our business, financial condition, results of operations and cash flows.

34. The Trust does not own the trademark "Citius TransNet" and the associated logos and proposed to be used by them for their business and their ability to use their respective trademarks may be impaired.

EAAA India Alternatives Limited, the holding company of our Investment Manager has made applications for the registration of the trademark "Citius TransNet" and the associated logos "  " and "  ". We cannot assure you that the trademark registrations will be obtained in a timely manner, including prior to the Listing of the Trust or at all. Our Investment Manager and the Trust's ability to use the trademark and the associated logos

may be impaired till such time or if one or more of such applications are rejected. Furthermore, EAAA India Alternatives Limited will be the owners of the trademark. Consequently, the Trust and the Investment Manager may not have the ability to restrict any unrelated third-party from the unauthorized usage of such trademarks and logos or any authorized usage of such trademarks and logos by EAAA India Alternatives Limited and could also be required to cease using the trademarks and the associated logos, which may have an adverse impact on their respective operations.

35. There can be no assurance that we will be able to successfully undertake future acquisitions of transport assets, including roads or efficiently manage the transport sector assets, including roads we have acquired or may acquire in the future.

We may not be able to identify and acquire new transport or road assets upon the expiry of our existing Concession Agreements of the Initial Portfolio Assets or at any time thereafter For instance, the concession period for PECPL is scheduled to end in Financial Year 2027, subject to fulfilment of pre-defined conditions under the Concession Agreement. We may not be able to identify and acquire replacement assets to maintain our financial position, result of operations and cash flows, or consequently make distributions to the Unitholders. Furthermore, the ROFO Assets might not be free from defects or be subject to approval requirements and other restrictions when they are offered to the Trust under the ROFO Agreement and the Trust may decide not to acquire any of the ROFO Assets.

Accordingly, the number of assets forming part of our portfolio and the revenue generated by them may vary from time to time. Furthermore, even if new transport assets, including roads, whether from the pool of ROFO Assets or otherwise, are added to our portfolio, such transport assets, including roads, might not be able to generate comparable or higher cash flows, revenues and profits, than the Initial Portfolio Assets whose concession periods have expired.

Whether we can pursue future acquisitions will depend on several factors, including our ability to identify, finance, and acquire transport sector assets, including roads in the future, cost-effectively; our ability to integrate acquired personnel, operations, products, and technologies into our organization effectively; unforeseen issues or legal liabilities connected to acquired businesses; and any tax or accounting issues relating to those businesses. Moreover, our asset management teams may not have the ability to manage other transport sector assets we acquire, and we may need to further enhance our capabilities or establish outsourcing arrangements. Without effective management, we risk operational inefficiencies, higher costs, and greater exposure to compliance and safety issues. Such challenges could ultimately weaken our competitive position and limit our ability to adapt quickly to changes in the market or regulatory environment.

There can be no assurance that we will be able to obtain financing for new projects or that the interest rates and the other terms of available financing will remain attractive. In addition, rising interest rates could adversely affect our ability to secure financing on favourable terms and increase our cost of capital. Any additional equity financing may be dilutive to our Unitholders and any debt financing may contain restrictive covenants that limits our flexibility going forward. Even if the Investment Manager is able to successfully make additional acquisitions or investments, there can be no assurance that such acquisitions or investments will produce incremental distributions to our Unitholders. There is no assurance that we will achieve the strategic objectives of such acquisitions, successfully integrate operations, or attain acceptable returns on these investments. Failure to do so may materially and adversely affect our profits, financial condition, and distributions. Similarly, there can be no assurance that we will be able to acquire new assets once the existing Concession Agreements expire. If the operating periods of the toll roads are reduced or disrupted, or if the Project SPVs' rights to operate these toll roads are terminated before the concessions expire, our business, financial condition, results of operations and cash flows may be adversely affected.

Furthermore, Concession Agreements or business agreements governing the future projects may include terms and conditions that are more restrictive than those in the current Project SPVs' Concession Agreements. Such restrictions could limit our flexibility in managing our business or projects, and may, in turn, materially and adversely affect our business prospects, financial condition, results of operations and cash flows.

36. The Project SPVs are subject to force majeure risks, which may adversely affect our ability to make distributions to the Unitholders.

If any Project SPV is unable to perform its obligations under the Concession Agreements as a result of a force majeure event, such as a war, strike, riot, act of terrorism, natural catastrophe or epidemic, although it would not be in breach of the Concession Agreements, its toll collections may be adversely affected, or in case of our annuity assets, the impact the ability of the relevant concessioning authorities to make the contracted payments to the

Project SPVs. Upon the occurrence of any force majeure event prior to the commencement of the concession period, and subject to the concessioning authority's approval, the concession period commencement date may be extended by a period equal to the force majeure event, provided that the concerned Project SPV notifies the concessioning authority of such force majeure event. Any delay in the commencement of the concession period would cause a delay in our toll collections or receipt of contracted payments, which would have an adverse impact on our business, results of operations, cash flows and, therefore our ability to make distributions to the Unitholders.

In the event that any force majeure event, such as flooding, damage to the toll roads or the destruction of our toll-collection computer system, interrupts our ability to operate the toll roads, there may be a significant reduction in toll collections, which may adversely affect our ability to make distributions to the Unitholders. In addition, we may not have sufficient insurance coverage to protect us against all resulting losses. Upon the occurrence of certain indirect political events, such as war, strikes or industrial action and public agitation, we will be liable for the costs attributable to such events. If the costs exceed our insurance for such events, the concessioning authority will typically be obligated to reimburse us for one half of the excess amount of the costs over and above the insurance limit. Upon the occurrence of certain other political events, such as a change in law or compulsory acquisition or expropriation of any road asset, the concessioning authority will be obligated to reimburse us for all costs attributable to such events subject to the terms of the Concession Agreements. In certain circumstances, the term of the Concession Agreement may be extended by the length of the duration of the force majeure event or the length of the duration of the period during which we were prevented from collecting toll fees.

Notwithstanding the terms of the Concession Agreements, there can be no assurance that, if certain political events occur causing damage or other loss to us, the concessioning authority will reimburse us in a timely manner or at all. In the event the concessioning authority fails to meet its reimbursement obligations under the terms of the Concession Agreements, our business, financial position, results of operations and cash flows may be significantly adversely affected and we may be unable to make distributions to the Unitholder.

37. Any government proposals to reform toll collection, including annual toll passes, may adversely affect the revenues and financial condition of the toll-based Project SPVs.

The Government of India has recently indicated it is considering reforms to the tolling system, such as the possible implementation of a single annual toll payment mechanism for highway users in place of distance-based or journey-based toll charges. Such proposals are intended to create a seamless tolling experience and reduce congestion, with potential changes including a one-time or annual fee for unlimited access to tolled networks. If implemented, such reforms could significantly affect the toll collection model presently used by the Project SPVs. The Government of India has implemented an annual pass system that allows for unlimited travel for a fixed fee for non-commercial passenger vehicles, which may reduce average toll revenue per vehicle, particularly for frequent highway users, which could alter projected cash flows and reduce overall revenues. Furthermore, the proposed transition to a distance-based GNSS could require capital investment and presents technical and operational risks The introduction of a new tolling regime may also require operational adjustments and investments in technology and systems.

While recent reforms and potential reforms in the future may trigger the change in law clauses in the relevant Concession Agreements, the Government has indicated that there will be a compensation mechanism for concessionaires to address the financial impact of a revised tolling structure. The details of the compensation mechanism, including its scope, calculation methodology, and how it will be implemented have been issued by the relevant authority, and there remains significant uncertainty in respect of the operating arrangements in this regard and as to whether it will provide adequate and timely protection for existing projects.

Uncertainty regarding the precise terms and adequacy of compensation, as well as the timing and manner in which tolling reforms may be implemented, increases financial and operational risk. Any material reduction in toll revenue, prolonged uncertainty, or inadequacy in compensation may therefore have a material adverse effect on the Trust's business, financial condition, results of operations and cash flows.

38. We may face delays and cost overruns if we are unable to complete under construction projects or certain works on schedule, which may materially affect our business, results of operations, financial condition and cash flows.

The projects undertaken by the Project SPVs are complex and are subject to various construction risks. For example, there may be geological complications, adverse weather conditions, or unexpected contingencies during the construction and operational phases, and in case of recent awarded AMTPL six-lane works, there may be

delays in toll collection and potential reduction in operating period. These factors can result in significant unanticipated expenses, leading to time and cost overruns.

Additionally, changes in project scope and delays in regulatory approvals may also lead to delays and cost overruns. For more details, see "*Risk Factors — Our ability to negotiate the standard form of concession agreement may be limited. In addition, the Concession Agreements contain certain restrictive terms and conditions that could be subject to varying interpretations"* on page 82. Accordingly, this could materially and adversely affect our financial condition, business, prospects, cash flows and results of operations, and consequently we may be unable to make distributions to the Unitholder.

Furthermore, for under construction projects and augmentation works, we may engage engineering, procuring and construction ("**EPC**") contractors to undertake construction activities. While EPC contractors are typically responsible for defects and deficiencies arising in the constructed or augmented stretch of the road for a specified defect liability period following the completion of such work, we may be exposed to significant risks in this regard. If the EPC contractor fails to repair or rectify defects or deficiencies arising in the constructed or augmented stretch in a timely manner or at all, we may be liable for the costs to repair such defects or deficiencies. Furthermore, if such defects or deficiencies arise after the expiry of the defect liability period, we may be solely responsible for bearing the costs of such repairs or rectification. In the event of financial distress, insolvency, or default by the EPC contractor, we may need to engage alternative contractors to complete the pending works or rectify deficiencies, which may result in additional costs, delays, and disputes regarding liability. Poor quality of construction or workmanship by the EPC contractor may lead to premature deterioration of road infrastructure, requiring costly repairs or reconstruction, which may not be fully recoverable from the EPC contractor. In certain cases where capacity augmentation work or other construction work is carried out by an EPC contractor appointed by the concessioning authority, there is no assurance that such authority would compensate us for any additional costs incurred in connection with any work undertaken by us to repair the constructed or augmented stretch of the relevant road in the event the EPC Contractor fails to comply with its obligations. Any of the foregoing risks could materially and adversely affect our financial condition, business, prospects, cash flow, and results of operations.

39. Inflation or deflation may materially affect our business, results of operations, financial condition and cash flows.

Rising inflation in India could increase our operation and maintenance costs. If these higher costs persist and we are unable to reduce expenses or pass on the increased costs to users, our results of operations, cash flows and financial condition may be materially and adversely affected.

The user fees specified under the Concession Agreements for our Project SPVs, as set out in the relevant toll notification, are subject to revision for inflation. For example, user fees for certain projects may be adjusted annually according to the escalation formula prescribed by the relevant concessioning authority. In the event of deflation, user fees for the Project SPVs may be revised downwards. This downward adjustment could reduce our income from toll collections and may also materially and adversely affect our results of operations, cash flows and financial condition. Such revisions may not align in direction and magnitude of the increase in our operating and interest costs.

40. The Project SPVs may be directed by the relevant concessioning authorities to undertake additional construction works, such as capacity augmentation requiring further capital expenditure, which could in turn materially affect our business, financial condition, cash flows and results of operations.

The relevant concessioning authority may revoke a Concession Agreement if a Project SPV fails to comply with a material term of the agreement. Under some Concession Agreements, the Project SPVs may be required to undertake capacity augmentation of the current road assets to avoid premature termination of the concession, and we may be required to lower user charges during the period of such construction. In some cases, there may be no compensation, either through an extension of the concession period or otherwise, for this additional work. For example, in certain instances, we may choose to take up opportunities for capacity augmentation even if not mandatory under the existing concession terms. As a result, we may be exposed to project related risks arising from such project investments and our underlying assumptions relating to resultant benefits may not materialize. Additionally, the Project SPVs may be liable for the costs to repair any defects or deficiencies arising in the augmented stretch of the roads as a result of capacity augmentation work undertaken by a contractor or sub-contractor. Furthermore, the relevant concessioning authority may require additional change-of-scope works in the future, which could adversely affect the revenues, profitability, and operational results of both the Project SPVs and the Trust. The Concession Agreements may also impose penalties or allow for termination in the event of delays or non-completion of such additional development. For further details, please see "*Risk Factors — We*

may face delays and cost overruns if we are unable to complete under construction projects or certain works on schedule, which may materially affect our business, results of operations, financial condition and cash flows" on page 85. Our business, financial condition, cash flows, and results of operations could be materially and adversely affected if the additional development required by the relevant concessioning authority or set out in the Concession Agreements is delayed or not completed as specified.

Not all potential liabilities arising from delays or underperformance can be accurately estimated in the planned costs for the additional development or in the relevant Concession Agreements. Nor can it be assured that damages which may be claimed from contractors engaged by the Project SPVs for such works will be adequate to cover any resulting loss of revenue or profit. These risks may increase if the completion of works is delayed for an extended period. If we do not manage these or other unforeseen risks effectively, our business, financial condition, cash flows and results of operations could be adversely affected.

41. Our insurance policies may not provide adequate protection against various risks associated with our operations.

Infrastructure development project contracts are subject to various risks that we may not be insured against, adequately or at all, including changes in governmental and regulatory policies, shortages of, or adverse price movement for, construction materials, design and engineering defects, breakdown, failure or substandard performance of the road assets and other equipment, improper installation or operation of the road assets and other equipment, labour disturbances, public agitations and demonstrations, terrorism and acts of war, inclement weather and natural disasters, environmental hazards, including flooding, cyclones, droughts, tsunamis and landslides, and adverse developments in the overall economic environment in India. Furthermore, we are subject to various risks in the operation of the current transport and road sector assets, including on account of accidents, thefts and vandalism of assets and equipment.

As of the date of this Offer Document, all insurance policies required for our Initial Portfolio Assets are valid and in force. However, we cannot assure you that we will be able to obtain and/or renew our insurance policies in a timely manner in the future. Furthermore, our insurance coverage might not be adequate to cover all risks or losses that may arise, or we might not be able to procure adequate insurance coverage at commercially reasonable rates in the future. Our insurance may not provide adequate coverage in certain circumstances and is subject to certain deductibles, exclusions and limits on coverage. As of the date of this Offer Document, our Project SPVs have made certain insurance claims in the ordinary course of business. To the extent we suffer damage or loss which is not covered by insurance, or exceed our insurance coverage or where any pending claims are denied, such damage or loss would have to be borne by us. Losses in excess of insurance proceeds (if any at all) could materially and adversely affect our business, prospects, financial condition, cash flows and results of operations.

42. Certain Initial Portfolio Assets, the Parties to the Trust and certain Associates of the Parties to the Trust are, or in the future may be, involved in certain legal and other proceedings, which may not be decided in their favour.

From time to time, our Initial Portfolio Assets, the Parties to the Trust, their respective Associates and the Trustee may be involved in litigation, claims and other proceedings relating to the conduct of their business, including regulatory claims, compensation and contractual claims, civil matters, criminal matters and tax disputes. Any claims could result in litigation against us, the Investment Manager, the Sponsor and their respective Associates and the Trustee, and could also result in regulatory proceedings being brought against us by various government and state agencies that regulate our businesses.

The Project SPVs, Holdcos, the Parties to the Trust and certain Associates of the Parties to the Trust and the Trustee are involved in legal proceedings or claims which are pending at different levels of adjudication before various courts, tribunals and regulatory authorities. Unfavourable outcomes or developments relating to these proceedings may have a material, adverse effect on our or their respective business, prospects, financial condition, cash flows and results of operations. For details of certain material outstanding legal proceedings, please see "*Legal and Other Information*" on page 445. If the courts or tribunals rule against the Project SPVs, HoldCos, the Trustee, or such Associates of the Parties to the Trust we or such entities may face monetary and/or reputational losses and may have to make provisions in our financial statements, which could increase expenses and liabilities. Furthermore, certain of the Initial Portfolio Assets have received certain notices from tax authorities and are involved in tax proceedings. In addition to the ongoing legal proceedings, there may also be legal proceedings involving the Initial Portfolio Assets in the future. Pursuant to the completion of the Formation Transactions, we will be responsible for legal proceedings involving the Initial Portfolio Assets, that may arise in the future. While the Sponsor will provide certain indemnities under the relevant Securities Purchase Agreements, we cannot assure

you that the relevant Initial Portfolio Asset or the Trust will be able to successfully bring a claim against the Sponsor under the relevant Securities Purchase Agreements or that such indemnities will be adequate to satisfy all the losses, damages, costs and expenses suffered by the Trust and the Initial Portfolio Assets arising from such proceedings or the consequences thereof. Additionally, given that the sellers which are proposing to enter into the Formation Transactions and the Sponsor Group has historically acquired the Project SPVs from third parties, the third-party sellers have provided indemnities which are proposed to be assigned to the Trust in relation to various matters for periods prior to the acquisition under the relevant acquisition agreements. However, such indemnities may also not be adequate to satisfy all the losses, damages, costs and expenses suffered by the Trust and the Initial Portfolio Assets arising from such proceedings or the consequences thereof.

43. Our business is subject to seasonal fluctuations and business and economic cycles that may affect our cash flows.

Our cash flows from toll assets are affected by seasonal factors and business and economic cycles, which may materially and adversely affect traffic volumes. Traffic volumes tend to decrease during the monsoon season and conversely tend to increase during holiday seasons. The monsoon season may also restrict our ability to carry on activities related to our operation and maintenance of the transport sector assets, including roads. This may result in delays in periodic maintenance and reduce productivity thereby materially and adversely affecting our business, financial condition, results of operations and cash flows. Furthermore, actual traffic volumes are influenced by the robustness of economic activity in the relevant region. Key factors include trends in manufacturing growth, the volume of commercial vehicle traffic, and broader economic drivers such as industrial production, trade activity, and consumer demand. Variations in these underlying economic indicators may cause deviations in traffic volumes from initial forecasts. Any substantial shortfall between actual and forecast traffic volume or revenue may have a material adverse effect on the Project SPVs' cash flows, results of operations, and financial condition.

44. We have certain contingent liabilities as of December 31, 2025, which, if they materialize, may affect our results of operations, financial condition and cash flows.

The following table sets forth certain information relating to our contingent liabilities which have not been provided for, as of December 31, 2025, as per IND AS-37 Provisions, Contingent Liabilities and Contingent Assets:

(₹in million)

Particulars	As at December 31, 2025
In respect of Income tax matters	1,215.19
In respect of Indirect tax matters	2,566.10
In respect of guarantee and securities offered	775.19
In respect of other matters	573.35

Notes:

1. *In respect of income tax matters, the Group is contesting Income tax related demand/notices with respect to certain disallowance proposed by the Income tax authorities such as method of amortisation of intangibles, notional interest computed under IND AS etc. Management believes that it's position will likely be upheld in the appellate process. No expense has been accrued in the special purpose combined financial statements for the tax demands/notices raised. The management believes that the ultimate outcome of the proceedings will not have a material adverse effect on the Group financial position and results of the operations.*
2. *In respect of indirect tax matters, the Group is contesting excise, service tax and goods and services tax related demand/notices with respect to additional tax demanded by the tax authorities on certain annuity payments collected from highway authorities. Management believes that it's position will likely be upheld in the appellate process. No expense has been accrued in the special purpose combined financial statements for the tax demands/notices raised. The management believes that the ultimate outcome of the proceedings will not have a material adverse effect on the Group financial position and results of the operations.*
3. *In respect of guarantee and securities offered, the guarantees include bank guarantees given against certain on going arbitrations on behalf of EPIC Transnet Infrastructure Private Limited (formerly known as Watrak Infrastructure Private Limited)/Neelambur Madukkari Tollway Private Limited (formerly known as Transportation Infrastructure Limited), DSRA (Debt Service Reserve Account) and bid bond guarantees.*
4. *In respect of other matters, the Group has received communication from Accountant General, Ahmedabad, the Office of the Superintendent of Stamps and Registration, Gandhinagar alleging that the Concession Agreement ("**CA**") was not adequately stamped and has instructed to pay additional stamp duty for Ahmedabad - Maliya Tollway Private Limited ("**AMTPL**") & Rajkot-Vadinar Tollway Private Limited ("**RVTPL**"). No liability has been recognised in the special purpose combined financial statements for the demand raised. The management believes that the ultimate outcome of the proceedings will not have a material adverse effect on the Group financial position and results of the operations.*

5. *While in March 2026, bank guarantees given against certain ongoing arbitrations on behalf of EPIC Transnet Infrastructure Private Limited (formerly known as Watrak Infrastructure Private Limited) of ₹697.70 million have been released.*

We cannot assure you that we will not incur similar or increased levels of contingent liabilities in the future. If a significant portion of our contingent liabilities materialize and become actual liabilities, it could have an adverse effect on our results of operations, financial condition and cash flows. For details, please see "*Discussion and analysis by the Directors of the Investment Manager of the financial condition, results of operations and cash flows of the Initial Portfolio Assets of the Trust– Provisions and Contingent Liabilities*" on page 395.

45. As a shareholder of the Project SPVs, our Trust's rights are subordinated to the rights of creditors, debt holders and other parties specified under Indian law in the event of insolvency or liquidation of the Project SPVs.

If any Initial Portfolio Asset is liquidated, both secured (if any) and unsecured creditors of the relevant Project SPV will have priority over the Trust, as the equity shareholder, in receiving payments from the liquidation proceeds. According to the Insolvency and Bankruptcy Code, 2016, when an Initial Portfolio Asset is wound up, workmen's dues and debts owed to secured creditors that rank *pari passu* must be paid first, ahead of all other outstanding debts. These claims are followed by wages and salaries of employees, debts owed to unsecured creditors, amounts due to the central or state government, any other debts, preference shareholders, and finally equity shareholders.

In addition, any amounts payable to us in respect of unsecured debt issued to an Initial Portfolio Asset will be subordinated according to the payment waterfall described above. Any surplus amount distributed to the Trust in such instances may be required to be mandatorily pre-paid to the lenders of the Trust in accordance with the terms of the relevant financing agreements. If the Trust is dissolved, the distribution of assets will depend on the circumstances and the specific terms of asset disposal, and there is no guarantee that a Unitholder will recover all or any part of their investment. There may also be uncertainty around the interpretation and implementation of certain provisions in relation to insolvency of a trust under the Insolvency and Bankruptcy Code, 2016.

46. We may be unable to renew or maintain the statutory and regulatory permits and approvals required to operate the transport sector assets, including roads which may have an adverse effect on our business, results of operation, financial condition and cash flows.

We are required to obtain and maintain certain permits, approvals, licenses, and registrations under various regulations, guidelines, circulars and statutes regulated by various regulatory and Governmental authorities for operating the transport sector assets, including roads. While our Project SPVs secure the material permits required under the Concession Agreement before construction, we must still maintain certain approvals during the operations and maintenance phase. If we or the Project Manager, fail to obtain the necessary permits, approvals, licenses, and registrations, or maintain them, or if there is any delay in obtaining or renewing them, or in making any payments in this respect or of any claims relating to the same including, in certain instances we may be liable for unpaid amounts by these contractors, like minimum wages, our business, financial condition, results of operations and cash flows could be adversely affected. These permits, approvals, licenses, registrations and permissions could also be subject to several conditions, and we or the Project Manager might not be able to meet such conditions or be able to prove compliance with such conditions to the statutory authorities. This could lead to the cancellation, revocation or suspension of relevant permits, licenses or approvals, which may result in the interruption of our operations and may adversely affect our business, prospects, financial condition, cash flows and results of operations. Furthermore, certain regulatory authorities may raise claims or issue notices in future, which may adversely affect our business, prospects, financial condition, cash flows and results of operations. Furthermore, we may not be able to recover damages or claims from the Project Manager. For further details, please see "*Regulatory Approvals*" on page 438.

47. We have entered and may continue to enter into related-party transactions and there can be no assurance that such transactions will not have an adverse effect on our results of operations, cash flows and financial condition.

We have entered and may continue to enter into transactions with related parties, including with the Investment Manager, Sponsor and members of the Sponsor Group, pursuant to the Formation Transactions, Securities Purchase Agreements, ROFO Agreement, Investment Management Agreement, and Project Implementation and Management Agreement.

Such transactions or any future transactions with related parties may potentially involve conflicts of interest and impose certain liabilities on the Trust or the Project SPVs. There can be no assurance that related party transactions we may enter into from time to time may not be made on more favourable terms with unrelated parties, and there can be no assurance that related party transactions we may enter into in the future, individually or in the aggregate, will not have an adverse effect on our results of operations, cash flows and financial condition. For detailed information on related party transactions, please see "*Related Party Transactions*" on page 417.

48. Reliance on professionals and consultants may affect the Trust's business operations and performance.

The road and transport sectors are regulated by various local (including Gram Sabhas and Panchayats), municipal, state, and central laws, as well as related taxes and compliance requirements. The specific regulations and obligations applicable will vary across different projects. Consequently, the Investment Manager and/or the Project Manager may consult professionals and advisors with relevant local expertise and experience and may also rely on decisions made by members of the investment committee of the Investment Manager. The Trust's performance may be influenced by the quality and suitability of the advice and services provided by these consultants and professionals.

49. Any incorrect assumptions made by the Investment Manager regarding the acquisition of a transport sector asset, including roads may lead to delays in completion of the acquisition or increased costs.

In deciding whether to acquire a particular transport sector asset, including roads in the future, the Investment Manager may make certain assumptions regarding the expected future performance of that project. The Investment Manager may underestimate the costs necessary for the project or may be unable to procure increase in revenues on such project as expected or at all or fail to obtain financing on competitive or acceptable terms in respect of such acquisitions. Any substantial or unanticipated delays or failure and higher than estimated expenses could adversely affect the investment returns from these projects and impair our operating results, liquidity and financial conditions. There is also the risk that inadequate supervision over local contractors, architects or engineers may result in poor quality construction, or the diversion of funds intended for construction. The quality of construction may not be commensurate with international or similarly prescribed standards and/or commensurate with the specifications laid down in underlying concession agreements.

50. The ability to make or maintain consistency in distributions to Unitholders depends on the financial performance of the Project SPVs and their profitability.

There is no assurance or guarantee that unitholders will receive distributions from the Trust. The declaration and payment of distributions depend on various factors such as the Trust's financial performance, cash flow position, capital requirements, prevailing market conditions, and the discretion of the manager or trustee, subject always to applicable laws and regulations.

In certain situations, such as periods of reduced profitability, increased operating costs, regulatory changes, or unforeseen events impacting the Trust, the Trust may be unable to make distributions to Unitholders. The ability of the Project SPVs to make dividend payments is subject to, among other things, applicable laws and regulations in India, any past losses, net debt, net worth and other contractual restrictions that they may be bound by. In such cases, distributions may be reduced, suspended, or omitted entirely. The absence of regular distributions could have a negative effect on the expected returns of unitholders and may make the investment less attractive compared to others that provide more consistent income streams. Under the terms of the InvIT Regulations, in the event any assets are sold by the Trust or any Initial Portfolio Assets or if the equity shareholding or interest in any Initial Portfolio Assets is disposed of by the Trust and the proceeds of such sale are proposed by the Trust to be reinvested in another infrastructure asset, then the Trust is not obligated to make any distributions from such proceeds to the Trust or to the Unitholders. For detailed information on distributions, please see "*Distribution*" on page 372. There is no assurance that the Trust will be able to make distributions to the Unitholders or that such distributions will be consistent across various periods. Furthermore, the ability of each Project SPV to make distributions to the Trust, or the HoldCos, as the case may be, shall also depend on the capital structure of such Project SPV, and the extent of debt infused into such Project SPV through available means of finance.

Additionally, the method of calculating the net distributable cash flows of an Initial Portfolio Asset is subject to change and any change in the applicable laws in India or elsewhere may limit the ability to pay or maintain consistency in distributions to Unitholders. There is also no assurance that the expansion of the portfolio of infrastructure assets will increase the cash flows and thereby result in an increase in the level of distributions to Unitholders over time.

51. We have in this Offer Document included certain Non-GAAP Measures that may not be comparable with financial or industry related statistical information of similar nomenclature computed and presented by other infrastructure trusts.

Certain Non-GAAP Measures like EBITDA, EBITDA Margin, Net Debt and Debt Equity Ratio and certain other industry measures relating to our operations and financial performance have been included in this Offer Document. We have computed and disclosed such Non-GAAP Measures as we consider such information to be useful measures of the Initial Portfolio Assets' business and financial performance. These Non-GAAP Measures presented in this Offer Document are a supplemental measure of our performance and liquidity that is not required by, or presented in accordance with, Ind AS or Indian GAAP. Furthermore, these Non-GAAP Measures are not a measurement of our financial performance or liquidity under Ind AS or Indian GAAP and should not be considered in isolation or construed as an alternative to cash flows, profit/ (loss) for the years/ period or any other measure of financial performance or as an indicator of our operating performance, liquidity, profitability or cash flows generated by operating, investing or financing activities derived in accordance with Ind AS or Indian GAAP. In addition, these Non-GAAP Measures are not standardized terms, hence a direct comparison of these Non-GAAP Measures between companies may not be possible. Other companies may calculate these Non-GAAP Measures differently from us, limiting its usefulness as a comparative measure. Although such Non-GAAP Measures are not a measure of performance calculated in accordance with applicable accounting standards, the Investment Manager believes that they are useful to an investor in evaluating us as they are widely used measures to evaluate our operating performance.

52. Significant differences could exist between Ind AS and other accounting principles, such as IFRS, which may affect investors' assessments of the Trust's financial condition.

The Special Purpose Combined Financial Statements have been prepared in accordance with the Guidance Note on Combined and Carve-out Financial Statements, Guidance note on Reports in Company Prospectus (Revised 2019) issued by the Institute of Chartered Accountants of India (the "**ICAI**") (the "**Guidance Notes**"), to the extent not inconsistent with SEBI (Infrastructure Investment Trusts) Regulations, 2014, SEBI master circular no. SEBI/HO/DDHS-PoD-2/P/CIR/2025/102 dated July 11, 2025, ('SEBI Circular') and other circulars issued thereunder('InvIT Regulations'), as amended and in accordance with Indian Accounting Standards (Ind AS) notified under the Companies (Indian Accounting Standards) Rules, 2015 (as amended from time to time) and other accounting principles generally accepted in India and presentation requirements of Division II of Schedule III to the Companies Act, 2013 (as amended from time to time), with the exceptions and modifications as mentioned in InvIT Regulations. The impact of IFRS on such financial information included in this Offer Document has not been quantified and the Special Purpose Combined Financial Statements have been prepared without reconciliation to any other body of accounting principles. IFRS differs in significant respects from Ind AS. Accordingly, the degree to which the Consolidated Financial Statements included in this Offer Document will provide meaningful information is dependent on the reader's level of familiarity with the relevant accounting practices. Any reliance by persons not familiar with such accounting practices on the financial disclosures presented in this Offer Document should accordingly be limited.

53. We may be unable to successfully diversify our asset portfolio.

Our investment strategy includes the potential diversification of our portfolio by acquiring more road assets as well as other assets in the transport sector. However, we may be unable to identify and acquire suitable assets in the roads sector as well as the other transport infrastructure classes on commercially acceptable terms, or at all. The process of acquiring such assets is subject to significant risks, including intense competition for a limited number of opportunities that meet our investment criteria and the challenges of evaluating and managing assets in sectors where we have less operational experience. Any failure to successfully diversify our portfolio would result in our continued dependence on the performance of our Initial Portfolio Assets. This concentration would magnify our exposure to sector-specific risks, such as adverse changes in traffic patterns or government tolling policies, which could materially and adversely affect our business, financial condition, results of operations, cash flows and our ability to make distributions to Unitholders.

Risks Related to the Trust's Relationships with the Sponsor and the Investment Manager

54. Dependence on the Investment Manager's directors and key employees to carry out its duties.

The Trust's performance and success are closely linked to the skills, experience, and judgement of the Investment Manager. In particular, the ongoing ability of the Investment Manager to devise and execute the Trust's investment strategy relies on specific directors, executive officers, and other key personnel. For further details see, "*Parties to the Trust*" on page 122. These individuals typically possess long-standing relationships with key stakeholders, deep knowledge of target sectors, and insights that underpin the Trust's competitive positioning. Furthermore, the Investment Manager shall be entitled to a fee from the funds of the Trust, in accordance with the Investment Management Agreement which shall be calculated annually and shall be the higher of: (a) up to 1.5% of the gross revenue of the InvIT Assets; or (b) ₹150 million subject to an escalation of 7% per annum. As we grow, this may be a significant expense for our business, and may impact our financial condition, results of operations and cash flows, and consequently the amount of distribution made to the unitholders.

Should the Investment Manager lose one or more of these directors or key employees, the ability of the Investment Manager to carry out its duties for the Trust could be materially compromised. Such losses may result in diminished investment performance, disruptions to the continuity of the Trust's strategy, and the potential erosion of stakeholder confidence. In cases where directors or other key employees are difficult to replace or require a lengthy transition period, there is an increased risk of adverse effects on the Trust's business, financial condition, results of operations and cash flows.

While the Investment Manager may have policies in place such as succession planning, employment covenants, or incentive arrangements to retain key staff, there can be no assurance that these will be sufficiently effective in preventing the departure of critical personnel. Accordingly, investors should be aware that a significant degree of risk arises from the Trust's dependence on the continued service and expertise of the Investment Manager's directors and key employees.

55. The Investment Manager has limited experience in investment management activities and may not be able to implement its capital and risk management strategies. Additionally, the EAAA Platform's experience in the transport sector is currently limited to the roads as the sub sector, and it may not have the requisite expertise in other transport sectors.

The Investment Manager and its directors and key personnel, while having experience in the infrastructure sector, have limited experience in the investment management activities for an infrastructure investment trust. Furthermore, while the EAAA Platform has differentiated and proven expertise in asset acquisitions in the infrastructure sector, this track record relates primarily to road and energy infrastructure assets. The EAAA Platform may therefore not have the requisite experience if the Trust expands into other transport infrastructure sectors.

There is no assurance that the Investment Manager and the EAAA Platform will be able to implement the investment objectives and strategies successfully or that it will expand the portfolio of the Trust at a particular rate or to a particular size or sustain distributions at projected levels. The Investment Manager and the EAAA Platform may be unable to make acquisitions or investments on favourable terms or within the desired period and may not manage the operations of the underlying assets profitably. Risks affecting these outcomes may include changes in the Indian regulatory framework, increased competition for assets, partial awards of concessions or licences that favour local or other competitors of the Trust, changes in legal or macro-economic conditions in India, and other factors.

Furthermore, the Investment Manager can also stop acting as the Investment Manager by providing notice under the Investment Management Agreement or the Trust may replace the Investment Manager in accordance with the terms of the Trust Deed. The replacement or appointment of a new Investment Manager may involve additional processes, delays and costs. A newly appointed Investment Manager may also seek to introduce a different commercial structure, any of which could affect our business operations. There is no assurance that the financial performance of the Trust would not be affected upon the appointment of a new investment manager.

56. Parties to the Trust are required to maintain the eligibility conditions specified under Regulation 4 of the InvIT Regulations on an ongoing basis. The Trust may not be able to ensure such ongoing compliance by the Sponsor, Project Manager, the Investment Manager and the Trustee, which could result in the cancellation of the registration of the Trust.

Each of the Parties to the Trust are required to maintain the eligibility conditions specified under Regulation 4 of the InvIT Regulations on an ongoing basis. These eligibility conditions include, among other things, that (a) the

Sponsor, Investment Manager and Trustee are separate entities, (b) the Sponsor has a net worth of not less than ₹ 1,000 million and has a sound track record in the development of infrastructure or fund management in the infrastructure sector, (c) the Investment Manager has a net worth of not less than ₹ 100 million and has not less than five years' experience in fund management or advisory services or development, in the infrastructure sector or the combined experience of the directors, partners and employees of the Investment Manager (each with at least five years of experience, in fund management or advisory services or development) in fund management or advisory services or development in the infrastructure sector is not less than 30 years, (d) the Trustee is registered with the SEBI under Securities and Exchange Board of India (Debenture Trustees) Regulations, 1993 and is not an associate of the Sponsor or Investment Manager and (e) each of the Sponsor, Investment Manager, Project Manager and Trustee are "fit and proper persons" as defined under Schedule II of the Intermediaries Regulations on an ongoing basis. The Trust may not be able to ensure such ongoing compliance by the Sponsor, the Investment Manager, the Project Manager and the Trustee, which could result in the cancellation of the registration of the Trust or applicable penalties under the InvIT Regulations, the SEBI Intermediaries Regulations and/or the SEBI Act.

57. Upon completion of the Issue, the Sponsor and Sponsor Group may be able to exercise significant influence over activities of the Trust on which Unitholders are entitled to vote. The Sponsor and Sponsor Group's interests may be different from Unitholders.

Under the InvIT Regulations, upon completion of the Issue, the Sponsor and Sponsor Group, collectively, must continue to own all of Units held by them for one year and must own 15% of the outstanding Units for three years from the date of listing of the Units, subject to the conditions specified in the InvIT Regulations. The Sponsor, and the Sponsor Group may be able to control the outcome of matters on which Unitholders are entitled to vote and for which the Sponsor and Sponsor Group are not prohibited from voting due to a conflict of interest. The interests of the Sponsor and Sponsor Group may be different from those of the other Unitholders.

58. The Investment Manager is required to comply with certain ongoing reporting and management obligations in relation to the Trust. The Investment Manager might not be able to comply with such requirements. Furthermore, certain Associates of the Investment Manager are also regulated entities which are subject to ongoing compliance requirements.

The Investment Manager is required to comply with certain ongoing reporting and management obligations in relation to the Trust in accordance with the InvIT Regulations. These requirements include, among other things, (a) making investment decisions with respect to the underlying assets or projects of the Trust, (b) overseeing the activities of the Project Manager, (c) investing and declaring distributions in accordance with the InvIT Regulations, (d) submitting reports to the Trustee and (e) ensuring the audit of the Trust's accounts. We cannot assure you that the Investment Manager will be able to comply with such requirements in a timely manner or at all, which could subject the Investment Manager, the other parties to the Trust, the Trust or any person involved in the activity of the Trust to applicable penalties under the InvIT Regulations, the SEBI Intermediaries Regulations and/or the SEBI Act. Any such failure to comply or the imposition of any penalty could have an adverse effect on our business, financial condition, results of operations and cash flows. Under the InvIT Regulations, the SEBI also has the right to inspect documents, accounts and records relating to the activity of the Trust, Project SPVs or parties to the Trust and may issue directions in the nature of, *inter alia*, (i) requiring the Trust to delist its Units and surrender its certificate of registration; (ii) requiring the Trust to wind-up; (iii) requiring the Trust to sell its assets; (iv) requiring the Trust or Parties to the Trust to take such action as may be in the interest of investors; or (v) prohibiting the Trust or Parties to the Trust from operating in the capital market or from accessing the capital market for a specified period. The InvIT Regulations are continuing to evolve, which may result in increased compliance requirements, more onerous reporting obligations, and uncertainty in interpreting any new provisions. The failure on the part of the Investment Manager to comply with such requirements in a timely manner or at all could have a material adverse effect on our business, financial condition, results of operations and cash flows.

Additionally, certain Associates of the Investment Manager are entities which are regulated by sector-specific regulators such as SEBI. As registered and regulated entities, such Associates are subject to various ongoing compliance and reporting requirements, and may also be subjected to inspections from the relevant regulator from time to time. In the past, there have been instances where certain such entities, including directors of Parties of the Trust, have been parties to regulatory proceedings, settlement proceedings, and penalties have been imposed which have been paid. For details in relation to the outstanding regulatory matters involving the Parties to the Trust or their respective Associates, see the section titled "*Legal and Other Information*" on page 445. In the event that any adverse regulatory action is taken against such entities in the future, or if any adverse orders are passed

or findings made against such regulated entities, or their respective directors or key management personnel, it may have an adverse impact on the reputation of such entities and personnel.

59. We depend on the Investment Manager, the Project Manager and the Trustee to manage our business and InvIT Assets, and our financial condition, results of operations and cash flows and our ability to make distributions may be harmed if the Investment Manager, Project Manager or the Trustee fail to perform satisfactorily. The rights of the Trust and the rights of the Unitholders to recover claims against the Project Manager, the Investment Manager or the Trustee may be limited.

The success of our business and growth strategy and the operational success of our assets will depend significantly upon the Investment Manager, the Project Manager and the Trustee's satisfactory performance of their respective services. Our recourse against the Project Manager, the Trustee and Investment Manager is limited in accordance with the Project Management Agreement, Trust Deed and Investment Management Agreement. If the Trustee is required by the InvIT Regulations or any applicable law to provide information regarding the Trust or the Sponsor or the Unitholders, the investments made by the Trust and income therefrom and provisions of such presents, and complies with such request in good faith, whether or not it was in fact enforceable, the Trustee shall not be liable to the Unitholders or to any other party as a result of such compliance or in connection with such compliance. To promote continuity of management, ensure periodic evaluation of directors and mitigate key person risk, our Investment Manager has implemented and adopted a (i) policy for the evaluation of the performance of the board of directors, on November 19, 2025 and a (ii) policy on succession planning for the board and the senior management, on November 19, 2025. Notwithstanding these policies, there can be no assurance that changes in the members of the board, senior management or the Investment Manager's key personnel will not lead to operational disruption. For further details in relation to such policies, please see, "*Corporate Governance - Policies of the Board of Directors of the Investment Manager in relation to the Trust*" on page 167 of this Offer Document.

The Trustee is also not liable on account of anything done or omitted to be done or suffered by the Trustee in good faith in accordance with, or in pursuance of any request or advice of the Investment Manager. Furthermore, the Trustee is not liable for any act or omission that may result in a loss to a Unitholder (by reason of any depletion in the value of the Trust Fund (*as defined in the Trust Deed*)), except in the event that such depletion is a result of fraud, gross negligence or misconduct on the part of the Trustee as determined by a court of competent jurisdiction or results from a breach by the Trustee, as conclusively determined by a court of competent jurisdiction. The liability of the Trustee shall be limited to the extent of the fees received by it, except in case of any gross negligence, misconduct or fraud on the part of the Trustee as conclusively determined by a court of competent jurisdiction. The Investment Manager shall not be liable for any losses (including indirect or consequential losses), costs, damages or expenses incurred in any way arising from anything which the Investment Manager does or fails to do during the course of discharge of its duties as an Investment Manager to the Trust. Furthermore, the liability of the Investment Manager during each financial year is limited to the aggregate fees paid to the Investment Manager for the immediately preceding financial year under the Investment Management Agreement, except in the event that such liability arises out of any gross negligence, gross and wilful misconduct, wilful default and fraud of the Investment Manager, as finally determined by a court of law or an arbitral tribunal of competent jurisdiction. Furthermore, the Investment Manager is not liable for any act or omission which may result in a loss to a Unitholder (by reason of any depletion in the value of the Trust Fund (*a defined in the Investment Agreement*), for the non-recoverability or non-realisability of any of the Investments or other assets forming part of the Trust Fund or otherwise), except in the event that such loss is a direct result of the Investment Manager's gross negligence, gross and wilful misconduct, wilful default and fraud. Accordingly, the Unitholders may not be able to recover claims against the Project Manager, the Trustee or the Investment Manager.

Other present and future activities of the EAAA Platform, the Sponsor, the Investment Manager and the Trustee may also give rise to additional conflicts of interest relating to us and our investment activities. In the event that any such conflict of interest arises, we will attempt to resolve such conflicts in a fair and reasonable manner; however, investors should be aware that conflicts will not necessarily be resolved in favour of our interests.

60. Conflicts of interest may arise out of common business objectives shared by the Investment Manager, the Sponsor, the Project Manager, EAAA Platform and us.

We have and will continue to rely on the resources of the Sponsor and the EAAA Platform including with respect to infrastructure, technical capabilities and human resources. We may compete with existing and future private and public investment vehicles established and/or managed by the Sponsor and the EAAA Platform, which may present various conflicts of interest. Certain of these divisions and entities have or may have an investment strategy similar to our investment strategy and therefore may compete with us. For instance, Sponsor or its associates may

pursue competing investment or acquisition strategies and may choose to offer incremental assets to third parties instead of to us. Furthermore, some of the Investment Manager's, Sponsor's and Project Manager's directors, key personnel and/or members of governing committees may be associated as directors and/or key personnel with other entities or funds, which pursue competing investment or acquisition strategies. Accordingly, conflicts of interest may arise in allocating or addressing business opportunities and strategies amongst the Sponsor, the Investment Manager, the Project Manager, the EAAA Platform and us, in circumstances where our interests differ from theirs. In addition, the Trustee and/or Unitholders may not be aware of any such conflict, and even if made so aware, the Trustee and the Unitholders' ability to recover claims against the Investment Manager are limited. Moreover, the Investment Manager's liability is limited under the Investment Management Agreement and the Trustee has agreed to indemnify the Investment Manager out of the Trust Fund (as defined in the Investment Management Agreement) against certain liabilities. As a result, we could experience poor performance or losses for which the Investment Manager would not be liable.

61. The Trust may be unable to dispose its non-performing assets in a timely manner.

Due to the nature of its structure, the Trust may be unable to dispose its non-performing or underperforming assets in a commercially viable or timely manner, or at all. For example, under the InvIT Regulations, any infrastructure asset acquired by the Trust is required to be held for a period of at least three years from the date of acquisition by the Trust, directly or through its Initial Portfolio Assets. As a result, no assurance can be given that the Trust may be able to adapt to market developments, changes in asset quality, or adverse macroeconomic factors in a way comparable to, or competitive with, its competitors (whether infrastructure investment trusts, public or private companies). Any inability to dispose non-performing assets may in turn adversely affect the financial condition, business and prospects of the Trust, as well as distributions to the Unitholders.

Risks Related to India

62. We are exposed to risks associated with the transport sector, including the road sector in India.

We derive and expect to continue to derive in the foreseeable future, a substantial portion of our revenues and operating profits from the roads sector in India. Changes in macroeconomic conditions generally impact the road industry and could have a negative impact on our business. Accordingly, our business is highly dependent on the state of development of the Indian economy and the macroeconomic environment prevailing in India. The use of our toll roads, our expansion plans and future projects depend or will depend on macroeconomic factors that may negatively impact demand the development of road infrastructure projects in India, or the timely commencement of their operations which could in turn have a material adverse effect on our growth prospects, business and cash flows. In addition, access to financing may be more expensive or not available on commercially acceptable terms during economic downturns. Any of these factors and other factors beyond our control could have a material adverse effect on our business, prospects, financial condition, results of operations and cash flows.

63. Changing laws, rules and regulations, including changes in legislation, legal uncertainties and the political situation in India may adversely affect our business, financial condition, cash flows and results of operations.

Our business, financial condition, cash flows and results of operations could be adversely affected materially and by any change in laws or interpretations of existing, or the promulgation of new laws, rules and regulations applicable to us and our business. We cannot assure you that the GoI or the state governments will not implement new regulations and policies which will require the Trust and the Project SPVs to obtain additional approvals and licenses from governmental and other regulatory bodies or impose onerous requirements and conditions on our operations. The Investment Manager cannot predict the terms of any new policy, and there can be no assurance that such policy will not be onerous. For example, the Government of India has introduced (a) the Code on Wages, 2019 ("**Wages Code**"); (b) the Code on Social Security, 2020 ("**Social Security Code**"); (c) the Occupational Safety, Health and Working Conditions Code, 2020; and (d) the Industrial Relations Code, 2020 (collectively, the "**Labour Codes**") which consolidate, subsume and replace numerous existing central labour legislations and have been implemented with effect from November 21, 2025. Further, the Reserve Bank of India introduced draft guidelines which focus on strengthening digital security, enhancing customer protection in online fraud, and tightening recovery agent conduct and are effective from 2026. We are yet to determine the impact of all or some of such laws on our business and operations which may restrict our ability to grow our business in the future.

64. Any delays or disputes relating to such acquisition could lead to delays and disruptions in the execution of our projects

The right to own property in India is subject to restrictions that may be imposed by the Government of India. In particular, the Government of India under the provisions of the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 ("**Land Acquisition Act**") has the right to compulsorily acquire any land if such acquisition is for a "public purpose," after providing compensation to the owner. However, the compensation paid pursuant to such acquisition may not be adequate to compensate the owner for the loss of such property. The likelihood of such acquisitions may increase as central and state governments seek to acquire land for the development of infrastructure projects such as roads, railways, airports and townships. While the NHAI or the relevant concessioning authority is responsible for the acquisition of the land underlying road infrastructure projects, any delays or disputes relating to such acquisition could lead to delays and disruptions in the execution of our projects, which would have an adverse effect on our business, financial condition, cash flows and results of operations. For further details, see the section titled "*Regulations and Policies*" on page 427.

65. Our business depends on economic growth in India and financial stability in Indian markets, and any slowdown in the Indian economy or in Indian financial markets could have a material, adverse effect on our business, results of operations, financial condition and the price of our Units.

The Trust and our Investment Manager is registered in India, and all of our assets are located in India. As a result, we are highly dependent on the prevailing economic conditions in India and our results of operations are significantly affected by factors influencing the Indian economy. Factors that may adversely affect the Indian economy, and hence our results of operations, may include any increase in interest rates or inflation in India, any exchange rate fluctuations, any scarcity of credit or other financing in India, prevailing income, consumption and saving conditions among consumers and corporations in India, volatility in, and actual or perceived trends in trading activity on, India's principal stock exchanges, changes in India's tax, trade, fiscal or monetary policies, political instability, terrorism or military conflict in India, including increased tensions on the Indian borders, or in countries in the region or globally, including in India's various neighbouring countries, the occurrence of natural or man-made disasters, prevailing regional or global economic conditions, the balance of trade movements, including export demand and movements in key imports, including oil and oil products, annual rainfall which affects agricultural production, the occurrence of force majeure events under the contractual arrangements of the Project SPVs and other significant regulatory or economic developments in or affecting India or its infrastructure sector.

Inflation rates in India have been volatile in recent years, and such volatility may continue. High fluctuations in inflation rates may make it more difficult for us to accurately estimate or control our costs. Any increase in inflation in India can increase our expenses, whether entirely or in part, and may adversely affect our business and financial condition. If we are unable to increase our revenues sufficiently to offset our increased costs due to inflation, it could have an adverse effect on our business, prospects, financial condition, results of operations and cash flows.

Any slowdown or perceived slowdown in the Indian economy, or in specific regions or sectors of the Indian economy, could have a material, adverse effect on our business, financial condition, results of operations, cash flows and the price of the Units. Furthermore, the Indian economy and Indian financial market are influenced by economic and market conditions in other countries, particularly in emerging market in Asian countries. Financial turmoil in Asia, Europe, the United States and elsewhere in the world in recent years has affected the Indian economy. Investors' reactions to developments in one country can have a material, adverse effect on the securities of companies in other countries, including India. A loss in investor confidence in the financial systems of other emerging markets may cause increased volatility in Indian financial markets and, indirectly, in the Indian economy in general. Any global financial instability could also have a negative impact on the Indian economy. Financial disruptions may occur again and could harm our results of operations, cash flows and financial condition.

66. Compliance with, and changes in, safety, health and environmental laws and regulations in India may materially and adversely affect our business, results of operation, financial condition and cash flows.

Our business is subject to a number of environmental, social, health, and safety regulations and standards, as well as various labour, workplace, and related laws in India. If we or our contractors fail to obtain, or renew, necessary approvals required to undertake our businesses, or if there is any delay in obtaining these approvals, or payments (including any shortfall in payments) to be made under the same, our businesses and financial condition could be adversely affected. Furthermore, government approvals and licenses are subject to numerous conditions, some of

which are onerous and require us to incur substantial expenditure. We cannot assure you that that we would be able to continuously meet such conditions or the approvals, licenses, registrations, consents and permits issued to us would not be suspended or revoked in the event of non-compliance with any terms or conditions thereof, or pursuant to any regulatory action. This may result in the interruption of our operations and may materially and adversely affect our business, financial condition and results of operations.

Additionally, the Project Manager and/or the Project SPVs may appoint independent contractors who, in turn, engage onsite contract labour to perform certain operations. Some of the Project SPVs have obtained the relevant registrations under the Contract Labour (Regulation and Abolition) Act, 1970 (the "**Contract Labour Act**") for certain locations where workmen are employed through contractors or agencies licensed under the Contract Labour Act. Although the Project Manager and/or the Project SPVs do not engage the labourers directly, in the event of default by any independent contractor, the relevant Project SPV may be held responsible for any wage payments and other statutory benefits due to the labourers of such contractor. Any violation of the provisions of the Contract Labour Act by a Project SPV may result in penalties pursuant to the provisions of the Contract Labour Act. If any of the Project SPVs are required to pay the wages of contracted workmen and subjected to other penalties under the Contract Labour Act, the reputation, results of operations, cash flows and financial condition of the Trust could be adversely affected.

Failure to meet these safety, health, social, or environmental requirements may expose us to administrative, civil, or criminal proceedings by governmental authorities, as well as actions from environmental groups or other individuals. Such proceedings could result in significant fines and penalties. In addition, penalties imposed on us, or on key third-party contractors or partners, could disrupt our business and operations. For further information, please refer to the section titled "*Regulations and Policies*" on page 427.

Furthermore, we are also subject to risks associated with unidentified environmental issues and changes to applicable law. Regulatory changes in India may result in the requirement to allocate incremental costs that may adversely affect our operation of the toll roads, the performance obligations of the Project SPVs under the Concession Agreements and ultimately our toll collections. For example, there have been declarations by state governments in Gujarat and Maharashtra, among others, in the past that all passenger vehicles travelling on state highways are permitted to use such highways toll free. Furthermore, the implementation of the annual pass scheme by the NHAI may divert traffic away from our state toll concessions. Any similar announcement in any states in which the toll roads are located may result in a diversion of traffic from tolled national highways to such state highways which have been declared toll free.

We may also face future litigation or other proceedings related to safety, health, or environmental matters, or be held liable in connection with such cases. The costs associated with clean-up and remediation, as well as damages, fines, penalties, and other liabilities, including related litigation, could materially and adversely affect our business, prospects, financial condition, cash flows, and results of operations.

67. Our performance is linked to the stability of policies and the political situation in India.

The Government of India and State Governments have traditionally exercised, and continue to exercise, significant influence over many aspects of the economy. As a result, our business, and the market price and liquidity of the Units, may be affected by interest rates, changes in governmental policy, taxation, social and civil unrest and other political, economic or other developments in or affecting India. Since 1991, successive governments have pursued policies of economic liberalization and financial sector reforms. The current Government continues India's current economic and financial sector liberalization and deregulation policies. However, such policies might not continue and a significant change in the Government's policies in the future could affect business and economic conditions in India and could also materially and adversely affect our business, financial condition, results of operations and cash flows.

Any political instability in India may materially and adversely affect the Indian securities markets in general, which could also materially and adversely affect the trading price of the Units. Political instability could delay the reform of the Indian economy and could have a material, adverse effect on the market for the Units. Protests against privatization and/or public private partnerships could slow down the pace of liberalization and deregulation. The rate of economic liberalization could change, and specific laws and policies affecting companies in the road infrastructure sector, foreign investment, currency exchange rates and other matters affecting investment in our Units could change as well. A significant change in India's economic liberalization and deregulation policies could disrupt business and economic conditions in India and thereby affect our business.

Any significant changes in a particular government's policy for the road or other transport infrastructure sector could have a significant effect on the Trust's revenues, expenditure and growth prospects as they relate to future projects. The results of operations of future projects are likely to be affected by budgetary allocations made by the various central and state government agencies for the infrastructure sector as well as funding provided by international and multilateral development finance institutions for road infrastructure projects. Any adverse change in focus or policy framework regarding infrastructure development or the transport industry, or the Trust's relationship with stakeholders or various governmental entities in India could adversely affect the Trust's business, financial condition, results of operations and cash flows. Changing political or social imperatives can also affect the Trust's and the Project SPVs' businesses.

68. Financial instability in other countries may cause increased volatility in Indian financial markets.

The Indian market and the Indian economy are influenced by economic and market conditions in other countries, including conditions in the United States, Europe and certain emerging economies in Asia. Financial turmoil in Asia, Russia and elsewhere in the world in recent years has adversely affected the Indian economy. Any such financial instability may cause increased volatility in the Indian financial markets and, directly or indirectly, adversely affect the Indian economy and financial sector and us. Conditions outside India, such as the Israel-Hamas, U.S./Israel-Iran conflict, Russia-Ukraine war resulting in a slowdown or recession in the economic growth of other major countries and regions, especially in the U.S., Europe and China, may have an impact on the growth of the Indian economy, and the Indian Government's policy may change in response to such conditions.

Although economic conditions vary across markets, loss of investor confidence in one emerging economy may cause increased volatility across other economies, including India. Financial instability in other parts of the world could have a global influence and thereby negatively affect the Indian economy. Financial disruptions could materially and adversely affect our business, prospects, financial condition, results of operations and cash flows. Furthermore, economic developments globally can have a significant impact on our principal markets. Concerns related to a trade war between large economies may lead to increased risk aversion and volatility in global capital markets and consequently have an impact on the Indian economy. The imposition of sanctions on Russia have also impacted economic conditions in various parts of the world, including Europe.

In addition, China is one of India's major trading partners and there are rising concerns of a possible slowdown in the Chinese economy as well as the relationships being the two countries subject to strains from time to time, which could have an adverse impact on the trade relations between the two countries.

In response to such developments, legislators and financial regulators in the United States and other jurisdictions, including India, have implemented or may implement from time to time, a number of policy measures designed to add stability to the financial markets. However, the overall long-term effect of these and other legislative and regulatory efforts on the global financial markets is uncertain, and they may not have the intended stabilizing effects. Any significant financial disruption could have a material adverse effect on our business, financial condition, results of operation, and cash flows. These developments, or the perception that any of them could occur, have had and may continue to have a material adverse effect on global economic conditions and the stability of global financial markets, and may significantly reduce global market liquidity, restrict the ability of key market participants to operate in certain financial markets or restrict our access to capital. This could have a material adverse effect on our business, financial condition, results of operations, and cash flows, and reduce the price of the Units.

69. Significant increases in the price or shortages in the supply of crude oil and products derived therefrom, including petrol and diesel fuel, could materially and adversely affect the volume of traffic at the projects operated by the Project SPVs and the Indian economy in general, including the infrastructure sector.

India imports most of its requirements of crude oil. Crude oil prices are volatile and are subject to number of factors, including the level of global production and political factors, such as war and other conflicts, particularly in the Middle East, where a substantial proportion of the world's oil reserves are located. Furthermore, with the implementation of tariffs on trading partners by the United States globally, the prices of crude oil remain volatile. Any significant increase in the price of or shortages in the supply of crude oil could materially and adversely affect the volume of traffic at the projects operated by the Project SPVs and materially and adversely affect the Indian economy in general, including the infrastructure and manufacturing sector, which could have a material, adverse effect on our business, financial condition, results of operations and cash flows. We may face limitations and risks associated with debt financing and refinancing.

70. Our ability to raise additional debt capital may be constrained by Indian law.

Indian entities are subject to regulatory restrictions in relation to borrowing in foreign currencies, including restrictions in relation to eligibility, amount of borrowings which may be incurred, end-use and creation of security, and may require the prior approval of Indian regulatory authorities. Such restrictions could limit our ability to raise financing on competitive terms and refinance existing indebtedness. Additionally, our ability to borrow foreign currency denominated money against the security of our immovable and/or movable assets, as applicable, in India is subject to the FEMA and exchange control regulations in India and may require the prior approval of the Indian regulatory authorities. Any approval required to raise borrowings might not be granted without onerous conditions, or at all. Such limitations on debt may have a material, adverse effect on our business growth, financial condition, cash flows and results of operations.

As per the InvIT Regulations, the aggregate consolidated borrowings and deferred payments of the Trust and the Initial Portfolio Assets (net of cash and cash equivalents) cannot exceed 70% of the value of the InvIT Assets and any borrowings exceeding 25% of the value of the InvIT Assets shall be subject to certain conditions specified under the InvIT Regulations, including obtaining requisite Unitholders approval. Furthermore, as an Indian trust, we are subject to exchange controls that regulate borrowing in foreign currencies, and our ability to access certain sources of financing may accordingly be limited or restricted. Additionally, our ability to secure additional debt financing or refinance our existing indebtedness is also subject to factors such as our future operating performance, the general availability of debt in the market, including changes of regulations / directives with regard to lending by RBI or other regulatory body, which may not be available on short notice, and the need to obtain approvals from our Unitholders or consents from existing lenders. Such regulatory restrictions limit our financing sources for projects under development and hence could constrain our ability to obtain financing on competitive terms and refinance existing indebtedness. In addition, any required regulatory approvals for borrowing in foreign currencies might not be granted to us without onerous conditions, or at all. Limitations on foreign debt may have a material, adverse effect on our business growth, financial condition, results of operations and cash flows.

71. Growing competition among infrastructure investment trusts and other infrastructure investors in the road sector may constrain our ability to acquire quality transport sector assets, including roads, increase acquisition costs, and negatively impact Unitholder returns.

The market for road sector assets in India is becoming increasingly competitive. Numerous infrastructure investment trusts, private equity funds, pension funds, sovereign wealth funds, and infrastructure-focused investment platforms are actively seeking to acquire operational road projects. As the infrastructure investment trust model becomes more established in India, traditional infrastructure investors have entered the sector, and sponsor continue to launch new infrastructure investment trusts, further intensifying competition for available assets. There is also no certainty that we will be able to achieve our objective by diversifying into other types of transport infrastructure.

The Trust's growth and return objectives depend significantly on our ability to acquire high-quality, income-generating transport sector assets, including roads on commercially viable terms. However, as competition increases, we may face several challenges. Other acquirers may be willing to pay higher prices or accept lower returns in order to build their asset base or market share, which can drive up valuations and acquisition costs. Some competitors may benefit from wider access to capital, stronger sponsor backing, or established strategic relationships with project developers, allowing them priority access to preferred assets. In addition, intensified competition may limit our opportunities to acquire new projects or require us to accept less favourable risk-return profiles or contractual terms. Acquisition due diligence and transaction costs may also rise, which would put further pressure on acquisition economics and timelines.

We also compete with other infrastructure investment trusts and investment products, such as mutual funds and direct infrastructure equity funds, for investor interest and capital. If competitors offer stronger historical returns, more innovative products, or greater perceived stability, demand for our Units or our ability to raise new capital may be adversely affected. If we are unable to secure a sufficient pipeline of quality transport sector assets, including roads or if acquisition costs increase significantly due to competitive bidding, our ability to sustain or grow distributable cash flows and provide attractive returns to Unitholders may be impaired.

72. Any downgrading of India's sovereign debt rating by a domestic or international rating agency could materially and adversely affect our ability to obtain financing and, in turn, our business and financial performance.

Our borrowing costs and our access to the debt capital markets depend significantly on the credit ratings of India. India's sovereign debt rating could be downgraded due to various factors, including changes in tax or fiscal policy or a decline in India's foreign exchange reserves, which are outside of our control. India's sovereign rating has been affirmed to (i) 'Baa3' with a 'stable' outlook by Moody's; (ii) 'BBB-' with a 'stable' outlook by Fitch; and (iii) 'BBB' with a 'stable' trend by Morningstar DBRS. Furthermore, India's sovereign ratings from S&P is BBB with a "stable" outlook with the short-term rating upgraded to 'A-2' from 'A-3'. Any adverse revisions to India's credit ratings for domestic and international debt by domestic or international rating agencies may materially and adversely impact our ability to raise additional financing, and the interest rates and other commercial terms at which any such additional financing is available. This could have a material, adverse effect on our business and financial performance, ability to obtain financing for capital expenditures and the price of the Units.

73. Terrorist attacks, civil unrest and other acts of violence or war involving India and other countries could adversely affect the financial markets and could have an adverse effect on the business, financial condition, results of operations and cash flows of the Project SPVs and the price of the Units.

Terrorist attacks, civil unrest, and other acts of violence or war or armed conflicts may negatively affect the Indian markets in which the Units are traded, and may also have an adverse impact on global financial markets. Such incidents can erode business confidence, disrupt travel and other essential services, and ultimately have a detrimental effect on the operations of some or all of the Project SPVs and parties to the Trust.

In recent years, India has experienced communal disturbances, terrorist attacks, general strikes, and riots. If similar events recur, the business of the Trust could be adversely affected. Asia has also experienced episodes of civil unrest and hostilities from time to time, and such tensions may arise again in the future, potentially on a wider scale. Military conflict or terrorist attacks in India, as well as other acts of violence or war, could increase the perception that investments in India carry higher levels of risk.

Future incidents of this nature, as well as social and civil unrest in other countries, could influence the Indian economy and negatively affect the market for Indian securities, including the Units.

74. India is vulnerable to natural disasters that could severely disrupt the normal operation of the Project SPVs.

India has experienced natural calamities, such as tsunamis, floods, droughts and earthquakes in the past few years. The extent and severity of these natural disasters determine their impact on the Indian economy. Unforeseen circumstances of below normal rainfall and other natural calamities could also have a negative impact on the Indian economy. As the projects are located in India, the business and operations of the Project SPVs could be interrupted or delayed as a result of a natural disaster in India, which could affect the business, financial condition, results of operations and cash flows of the Project SPVs and the price of the Units. Pandemics, such as the outbreak of the COVID-19 have in the past had a negative impact on our operations. Potential effects may include damage to infrastructure and the loss of business continuity and business information. If our projects are affected by any of these events, our operations may be significantly interrupted, which could materially and adversely affect our business, financial condition, results of operations and cash flows.

75. It may not be possible for the Unitholders to enforce foreign judgments.

The Trustee, the Investment Manager and the Sponsor are incorporated in India, and the Trust is settled and registered in India. All of our assets are located in India, and we may, from time to time, invest in toll roads in India. Where investors wish to enforce foreign judgments in India, where our assets are or will be located, they may face difficulties in enforcing such judgments. India is not a party to any international treaty in relation to the recognition or enforcement of foreign judgments. India exercises reciprocal recognition and enforcement of judgments in civil and commercial matters with a limited number of jurisdictions, including Singapore. In order to be enforceable, a judgment obtained in a jurisdiction which India recognizes as a reciprocating territory must meet certain requirements of the Code of Civil Procedure, 1908 (**"Civil Code"**). Furthermore, the Civil Code only permits enforcement of monetary decrees not being in the nature of any amounts payable in respect of taxes, or other charges of a like nature or in respect of a fine or other penalty and does not provide for the enforcement of arbitration awards even if such awards are enforceable as a decree or judgment. Judgments or decrees from jurisdictions not recognized as a reciprocating territory by India cannot be enforced or executed in India except

through a fresh suit upon judgment. Even if we or a Unitholder were to obtain a judgment in such a jurisdiction, we or it would be required to institute a fresh suit upon the judgment and would not be able to enforce such judgment by proceedings in execution. In addition, the party which has obtained such judgment must institute the new proceedings within three years of obtaining the judgment. It is unlikely that an Indian court would award damages on the same basis or to the same extent as was awarded in a judgment rendered by a foreign court if the Indian court believed that the amount of damages awarded was excessive or inconsistent with public policy in India. In addition, any person seeking to enforce a foreign judgment in India is required to obtain prior approval of the Reserve Bank of India to repatriate outside India any amount recovered pursuant to the execution of the judgment.

Consequently, it may not be possible to enforce in an Indian court any judgment obtained in a foreign court, or effect service of process outside of India, against Indian companies, their directors and executive officers, and any other parties resident in India. Additionally, a suit brought in an Indian court in relation to a foreign judgment might not be disposed of in a timely manner.

76. We may be affected by competition law in India and any adverse application, or interpretation of the Competition Act could materially and adversely affect our business.

The Competition Act, 2002, as amended (the **"Competition Act"**), regulates practices having an appreciable adverse effect on competition in the relevant market in India. Under the Competition Act, any formal or informal arrangement, understanding or action in concert, which causes or is likely to cause an appreciable adverse effect on competition is considered void and results in the imposition of substantial monetary penalties. Furthermore, any agreement among competitors which directly or indirectly involves the determination of purchase or sale prices, limits or controls production, supply, markets, technical development, investment or provision of services, shares the market or source of production or provision of services by way of allocation of geographical area, type of goods or services or number of customers in the relevant market or directly or indirectly results in bid-rigging or collusive bidding is presumed to have an appreciable adverse effect on competition. The Competition Act also prohibits abuse of a dominant position by any enterprise.

The Competition Act also regulates acquisitions of shares, voting rights, assets or control or mergers or amalgamations that cross the prescribed asset-and turnover-based thresholds and require such combinations to be mandatorily notified to the Competition Commission of India (the "**CCI**"). Furthermore, the CCI has extra-territorial powers and can investigate any agreements, abusive conduct or combination occurring outside India if such agreement, conduct or combination has an appreciable adverse effect on competition in India.

While the Competition (Amendment) Act, 2023 (the "**Competition Amendment Act**") has been implemented, only certain amendments have been enforced. The Competition Amendment Act amends the Competition Act and gives the CCI additional powers to prevent practices that harm competition and the interests of consumers. The Competition Amendment Act, among others, modifies the scope of certain factors used to determine appreciable adverse effect on competition, reduces the overall time limit for the assessment of combinations by the CCI from 210 days to 150 days and empowers the CCI to impose penalties based on the global turnover of entities, for anti-competitive agreements and abuse of dominant position.

In the event any of the Project SPVs or the Trust enters into any agreements or transactions that have an appreciable adverse effect on competition in the relevant market in India, the provisions of the Competition Act will be applicable. Any prohibition or substantial penalties levied under the Competition Act could materially and adversely affect our financial condition, results of operations and cash flows. Any adverse impact on our financial condition or operations due to the Competition Act may have a material adverse impact on our business, prospects, financial condition, cash flows, results of operations and our ability to make distributions to the Unitholders.

Risks Related to Ownership of the Units

77. The price of the Units may decline after the Issue.

The Issue Price will be determined by the Investment Manager in consultation with the Lead Managers. The Issue Price may not be indicative of the market price of the Units upon completion of the Issue. The market price of the Units may also be highly volatile and could be subject to wide fluctuations. If the market price of the Units declines significantly, investors may be unable to resell their Units at or above their purchase price, if at all. The market price of the Units might fluctuate or decline significantly in the future. The market price of the Units will depend on many factors, including, among others:

- the perceived prospects of our business and investments and the market for roads and other infrastructure projects;
- differences between our actual financial and operating results and those expected by investors and analysts;
- the perceived prospects of future roads and other transport infrastructure projects that may be added to our portfolio in accordance with our investment mandate;
- changes in research analysts' recommendations or projections;
- changes in general economic or market conditions;
- the market value of our assets;
- the perceived attractiveness of the Units against those of other business trusts, equity or debt securities;
- the balance of buyers and sellers of the Units;
- the size and liquidity of the Indian business trusts market;
- any changes to the regulatory system, including the tax system, both generally and specifically in relation to India business trusts;
- the ability of the Investment Manager to implement successfully its investment and growth strategies;
- foreign exchange rates;
- broad market fluctuations, including increases in interest rates and weakness of the equity and debt markets;
- variations in our quarterly operating results;
- difficulty in assessing our performance against either domestic or international benchmarks, as there are few listed comparables;
- publication of research reports about us, other road businesses, the road industry in general or other relevant sectors, or the failure of securities analysts to cover the Units after the Issue;
- additions or departures of key management personnel of the Trust and/or the Trust Group;
- changes in the amounts of our distributions, if any, and changes in the distribution payment policy or failure to execute the existing distribution policy;
- actions by the Unitholders;
- changes in market valuations of similar business entities or companies;
- announcements by us or our competitors of significant contracts, acquisitions, disposals, strategic partnerships, joint ventures or capital commitments;
- speculation in the press or investment community; and
- changes or proposed changes in laws or regulations affecting the road industry and infrastructure development in India or enforcement of these laws and regulations, or announcements relating to these matters.

To the extent that we retain operating cash flow for investment purposes, working capital reserves or other purposes, these retained funds, while increasing the value of our underlying assets, may not correspondingly increase the market price of the Units. Our failure to meet market expectations with regard to future earnings and cash distributions may materially and adversely affect the market price of the Units.

Where new Units are issued at less than the market price of the Units, the value of an investment in the Units may be affected. In addition, with new issuances the Unitholders may experience a dilution of their interest in the Trust. Furthermore, the Units are not capital-safe products and there is no guarantee that the Unitholders can regain the amount invested, in full or in part. If the Trust is extinguished, it is possible that investors may lose a part or all of their investment in the Units.

78. No investors are permitted to withdraw or lower their bids (in terms of quantity of Units or the bid amount) at any stage after submitting a bid.

Pursuant to the InvIT Regulations, investors are required to pay the Bid Amount on submission of the Bid, and are not permitted to withdraw or lower their Bids (in terms of quantity of Units or the Bid Amount) at any stage after submitting a Bid, notwithstanding adverse developments in international or national monetary policy, financial, political or economic conditions, our business, cash flows, results of operations, or otherwise, at any stage after the submission of their bids. For details in relation to the Bidding process, please see "*Issue Information*" on page 472.

79. The Trust may be dissolved, and the proceeds from the dissolution thereof may be less than the amount invested by the Unitholders.

The Trust is an irrevocable trust registered under the Indian Registration Act, 1908, and it may only be extinguished (i) if it is impossible to continue with the Trust or if the Trustee, on the advice of the Investment Manager, deems it impracticable to continue with the Trust; (ii) if the Units of the Trust are delisted from the Stock Exchanges; (iii) if the SEBI passes a direction for the winding up of the Trust or if the Trust is required to be wound up pursuant to the InvIT Regulations; (iv) in the event the Trust becomes illegal; or (v) if the Trust fails to make any offer of Units by way of public issue or private placement (as applicable) within the time period stipulated in the InvIT Regulations or any other time period as specified by SEBI (whichever is earlier), in which case the Trust shall surrender its certificate to SEBI and cease to operate as an infrastructure investment trust, unless the period is extended by SEBI. Under the Trust Deed, in the event of dissolution, the net assets of the Trust, remaining after settlement of all liabilities as on the date of such dissolution. Should the Trust be dissolved, depending on the circumstances and the terms upon which assets of the Trust are disposed of a Unitholder might not recover all or any part of his investment.

80. The reporting requirements and other obligations of infrastructure investment trusts post-listing are still evolving. Accordingly, the level of ongoing disclosures made to, and the protection granted to our Unitholders may be more limited than those made to or available to shareholders of a company that has listed its equity shares upon a recognised stock exchange in India.

The reporting requirements and other obligations of infrastructure investment trusts post-listing are still evolving. Accordingly, the level of ongoing disclosures made to, and the protection granted to our Unitholders may be more limited than those made to or available to shareholders of a company that has listed its equity shares upon a recognised stock exchanges in India.

The InvIT Regulations, along with the guidelines and circulars issued by the SEBI from time to time, govern the infrastructure investment trusts in India. However, as compared with the statutory and regulatory framework governing companies that have listed their equity shares or debt securities on recognised stock exchanges in India, the regulatory framework applicable to infrastructure investment trusts is relatively nascent and thus, still evolving. Accordingly, the disclosures made to our Unitholders under the InvIT Regulations may differ from those made to shareholders of accompany that has listed its equity shares on a recognised stock exchange in India in accordance with the Securities and Exchange Board of India (Listing Obligations and Disclosure Requirements) Regulations, 2015 or under the laws of other jurisdictions. Furthermore, the rights of our Unitholders may not be as extensive as the rights of shareholders of a company that has listed its equity shares on a recognised stock exchange in India, and accordingly, the protection available to our Unitholders may be more limited than those available to such shareholders.

Furthermore, the Trust Deed and various provisions of Indian law govern our corporate affairs. Legal principles relating to these matters and the validity of corporate procedures, fiduciary duties and liabilities, and Unitholders'

rights may differ from those that would apply to a company in India or a trust in another jurisdiction. Unitholders' rights and disclosure standards under Indian law may also differ from the laws of other countries or jurisdictions. For details, please see "*Rights of Unitholders*" on page 464 of this Offer Document.

81. It may be difficult for the Unitholders to remove the Trustee or the Investment Manager.

Under the InvIT Regulations, the Trustee or the Investment Manager cannot be removed without the prior approval of Unitholders where the votes cast in favour of the resolution shall be at least 60% of the total votes cast for such resolution. Accordingly, the Unitholders may face difficulties in removing and replacing the Trustee or the Investment Manager. Furthermore, under the InvIT Regulations, prior approval of SEBI is required for change in the Investment Manager of the Trust. Similarly, Unitholders may remove the Trustee only if they believe that the acts of the Trustee are detrimental to the interests of the Unitholders and by way of a resolution where the votes cast in favour of the resolution must meet the required percentage as set out in the InvIT Regulations. Furthermore, the Investment Manager and the Trustee cannot be discharged until a suitable replacement is appointed in their place, and there can be no guarantees that a suitable replacement will be appointed, or that appointment will take place in a timely manner, or at all.

82. Unitholders will have no vote in the election or removal of Directors in the Investment Manager.

Unitholders have no vote in the election or removal of directors of the Investment Manager except for Unitholders, holding not less than 10% of the total outstanding Units, either individually or collectively, have a right to nominate one director on the board of directors of the Investment Manager. Unitholders' recourse is the removal of the Investment Manager by way of a resolution where Unitholders holding at least 60% of the Units must vote in favour of the resolution. In comparison, the Companies Act, 2013 requires the removal of a director of a public company to be by way of an ordinary resolution approved by a simple majority. Accordingly, as opposed to shareholders removing a director of a public company, it may not be possible for Unitholders to remove the directors of the Investment Manager.

83. The sale or possible sale of a substantial number of Units by the Sponsor in the public market following the lapse of its lock-in requirements as prescribed under the InvIT Regulations or any further issuances by us could adversely affect the price of the Units and the status of the Sponsor of the Trust.

Under the InvIT Regulations, as the Project Manager is an associate of the Sponsor and Sponsor Group are collectively required to hold a minimum of 15% of the total outstanding Units on a post-Offer basis for a minimum period of three years from the date of listing. Furthermore, in accordance with the InvIT Regulations, the Sponsor and Sponsor Group, collectively, are required to lock-in the Units as follows:

Period of unitholding	Percentage
From the beginning of 4th year after the date of listing pursuant to the initial offer and till the end of 5th year from the date of listing pursuant to the initial offer	5% of total Units or ₹ 500 crores, whichever is lower
From the beginning of 6th year after the date of listing pursuant to the initial offer and till the end of 10th year from the date of listing pursuant to the initial offer	3% of total Units or ₹ 500 crores, whichever is lower
From the beginning of 11th year after the date of listing pursuant to the initial offer and till the end of 20th year from the date of listing pursuant to the initial offer	2% of total Units or ₹ 500 crores, whichever is lower
After completion of the 20th year from the date of listing pursuant to the initial offer	1% of total Units or ₹ 500 crores, whichever is lower

If the Sponsor, following the lapse of the aforesaid lock-in periods directly or indirectly, sells or is perceived as intending to sell a substantial number of its Units, or if a secondary offering of the Units is undertaken, the market price for the Units could be adversely affected.

Additionally, any issuance of Units by us in the future could dilute investors' holdings of Units. Any such future issuance of Units may also materially and adversely affect the trading price of the Units and could impact our

ability to raise capital through an offering of our securities. We might issue further Units. In addition, any perception by investors that such issuances might occur could also affect the trading price of the Units.

84. Under Indian law, foreign investors are subject to restrictions that limit their ability to transfer or redeem Units, which may adversely impact the trading price of the Units.

Under foreign exchange regulations currently in force in India, transfers of units between non-residents and residents are permitted, subject to certain exceptions, if they comply with the pricing and reporting requirements specified by the Reserve Bank of India. If a transfer of units is not compliant with such pricing or reporting requirements and does not fall under any of the exceptions specified by the Reserve Bank of India, then the Reserve Bank of India's prior approval is required. Additionally, unitholders who seek to convert Indian rupee proceeds from a sale of units in India into foreign currency and repatriate that foreign currency from India require a no-objection or a tax clearance certificate from the Indian income tax authorities.

We cannot assure you that any required approval from the Reserve Bank of India or any other Governmental agency can be obtained on any particular terms or in a timely manner, or at all. Our Unitholders will not have the right to redeem or request the redemption of our Units while our Units are listed on the Stock Exchanges. In terms of the InvIT Regulations, an infrastructure investment trust may redeem units only by way of a buyback or at the time of delisting of units and may be subject to additional conditions and restrictions under Indian regulations.

85. Any additional debt financing or issuance of additional Units may have a material, adverse effect on the Trust's distributions, and your ability to participate in future rights offerings may be limited.

The Investment Manager may require additional debt financing or the issuance of additional Units in order to support the operating business or to make acquisitions and investments or to meet any part of major maintenance related expenditure or capital expenditure for development of eligible projects. If obtained, any such additional debt financing may decrease distributable income, and any issuance of additional Units may dilute existing Unitholders' entitlement to distributions.

We are not required to offer pre-emptive rights to existing Unitholders when issuing new Units. Compliance with securities laws or other regulatory provisions in some jurisdictions may prevent certain investors from participating in any future rights issuances and thereby result in dilution of their existing holdings in Units.

86. The Units have never been traded and the listing of the Units on the Stock Exchanges may not result in an active or liquid market for the Units.

There is no market for the Units prior to the Issue and an active market for the Units may not develop or be sustained after the Issue. Moreover, the listing and quotation do not guarantee that a trading market for the Units will develop or, if a market does develop, the liquidity of that market for the Units. The price of the Units may be volatile, and investors may be unable to resell the Units at or above the Issue Price, or at all. Although it is currently intended that the Units will remain listed on the Stock Exchanges, there is no guarantee of the continued listing of the Units. There is no assurance that the Trust will continue to satisfy the listing requirements for Trusts. Furthermore, it may be difficult to assess the Trust's performance against domestic benchmarks.

87. Any future issuance of Units by us or sales of Units by the Sponsor or any other significant Unitholders may materially and adversely affect the trading price of the Units.

Any future issuance of Units by us could dilute investors' holdings of Units. Any such future issuance of Units may also materially and adversely affect the trading price of the Units, and could impact our ability to raise capital through an offering of our securities. There can be no assurance that we will not issue further Units. In addition, any perception by investors that such issuances might occur could also affect the trading price of the Units. The Units will be tradable on the Stock Exchanges. If the Sponsor (following the lapse of their lock-up arrangements), directly or indirectly, sell or pledge or encumber or otherwise dispose or are perceived as intending to sell or pledge or encumber or otherwise dispose a substantial number of Units, or if a secondary offering of the Units is undertaken, the market price for the Units could be materially and adversely affected. These sales may also make it more difficult for us to raise capital through the issue of new units at a time and at a price we deem appropriate.

88. Investors will not be able to sell immediately on an Indian stock exchange any of the Units purchased in the Issue until the Issue receives the appropriate trading approvals.

The Units will be listed on NSE and BSE. Pursuant to Indian regulations, certain actions must be completed before the Units can be listed and trading may commence. Following the Allotment of the Units, the Investment Manager

will apply for final listing and trading approval from the Stock Exchange. Furthermore, allotment of Units in the issue is subject to, inter-alia, our ability to successfully undertake and complete the transactions pursuant to which we will acquire the Initial Portfolio Assets, which are subject to certain conditions. There is no assurance that the Units will be credited to investors' demat accounts, or that the transactions contemplated above will be completed in time, or that trading in the Units will commence, within the time periods specified above. Any delay in obtaining final listing and trading approvals would restrict your ability to dispose of units.

89. There is no assurance that our Units will remain listed on the Stock Exchanges.

Although it is currently intended that the Units will remain listed on the Stock Exchanges, there is no guarantee of the continued listing of the Units. Among other factors, we may not continue to satisfy the listing requirements of the Stock Exchanges. Accordingly, Unitholders will not be able to sell their Units through trading on the Stock Exchanges if the Units are no longer listed on the Stock Exchanges. While the InvIT Regulations state that we must provide Unitholders with an exit prior to delisting, the specific mechanism of such delisting and related exit offer has not yet been finalised by the SEBI.

Furthermore, under the InvIT Regulations, we are required to maintain a minimum number of Unitholders (other than the Sponsor, its related parties and its associates) at all times after the listing of the Units pursuant to the Issue and certain minimum public holding requirements. Failure to maintain such minimum number of Unitholders or public holding may result in action being taken against us by the SEBI and the Stock Exchanges, including the compulsory delisting of our Units.

90. Market and economic conditions may affect the market price and demand for the Units.

Movements in domestic and international securities markets, economic conditions, foreign exchange rates and interest rates may affect the market price of and demand for the Units and result in higher interest costs. In particular, an increase in market interest rates may have an adverse impact on the market price of the Units if the annual yield on the price paid for the Units gives investors a lower return as compared to other investments.

91. Fluctuations in the exchange rate of the Indian Rupee with respect to other currencies will affect the foreign currency equivalent of the value of the Units and any distributions.

Fluctuations in the exchange rates between the Indian Rupee and other currencies will affect the foreign currency equivalent of the Indian Rupee price of the Units. Such fluctuations will also affect the amount that holders of the Units will receive in foreign currency upon conversion of any cash distributions or other distributions paid in Indian Rupees by us on the Units, and any proceeds paid in Indian Rupees from any sale of the Units in the secondary trading market.

Risks Related to Tax

92. We may be required to pay additional stamp duty if any Concession Agreement is subject to payment of stamp duty as a deed creating leasehold rights, or as a development agreement.

For the purposes of stamp duty payment, a stamp duty ranging between ₹ 100 and ₹ 500 is typically paid on the concession agreements under the category of general agreement or other agreements. However, revenue departments of certain states in India have issued notices to some concessionaires alleging inadequate stamp duty on the concession agreements executed between the concessionaires and the relevant concessioning authority treating the concession agreements as lease deeds. The stamp authorities have claimed that since concession agreements relate to the letting of tolls to the concessionaires in the form of leases, or as development agreements, such agreements were required to be stamped as lease agreements or development agreements, as applicable. The stamp duty for a lease agreement or a development agreement ranges between 1.00% and 11.00% of the annual rent or premium payable or the market value of the property. The revenue departments of any state may impose penalties for payment of inadequate stamp duty, which could extend up to 10 times the amount of the stamp duty payable. Pursuant to the Gujarat Stamp (Amendment) Act, 2025, the stamp duty applicable for projects under the build-operate-transfer system or any project built under other modes of public-private partnership (including hybrid annuity mode and build-operate-transfer annuity mode) which are not covered under any other existing

article, whether with or without toll or free collection rights, shall be 0.10% of the amount agreed in the contract, subject to a maximum of ₹ 25,00,000 and a minimum of ₹ 5,000. Furthermore, pursuant to the judgments issued by the Hon'ble Supreme Court of India, a concession agreement for a toll road has been categorized as a "lease" under the Indian Stamp Act, 1899. As a result, the stamp duty provisions that apply to leases are now applicable to these agreements. This change could lead to substantial financial consequences for the concessionaire, as lease agreements are typically subject to significant ad valorem stamp duties, which vary across different states, potentially increasing the financial burden on the concessionaire. As of the date of this Offer Document, our certain of our Project SPVs, namely AMTPL and RVTPL, have received notices for alleged deficiency in stamp duty on concession agreements aggregating to ₹563.60 million. For further details, please see "*Legal and Other Information*" on page 445.

If any of the Concession Agreements were determined to be inadequately stamped, then such agreements would be inadmissible as evidence in any legal action, until the deficient amount of stamp duty together with penalties, if any, was paid. Any deficiently stamped documents can also be impounded by any person having authority, by law or consent, to receive evidence or every person who is in-charge of a public office, and such impounded documents could be made subject to stamp duty and penalty. In addition, a person who signs an instrument chargeable with stamp duty will be subject to a fine if such instrument is not duly stamped. If any demand for payment of a higher stamp duty or penalty is imposed which would increase the costs of the InvIT Assets, then to the extent such additional costs are not recoverable from the concession authorities, such demand could adversely affect our business, cash flows, results of operations and prospects. Even in case where Initial Portfolio Assets are demanded payment of a higher stamp duty or penalty, the Concession Agreements of our Initial Portfolio Assets contain change in law provisions which extend to a change in the interpretation or application of any Indian law by a court of record after the date of the Concession Agreement or the submission of the bid documents, as the case may be. Under the terms of the Concession Agreements, if any financial burden exceeding a certain prescribed threshold is imposed on a concessionaire as a result of such change in law, then it may be entitled to approach the concessioning authority to amend the Concession Agreements or seek compensation to place the concessionaire in its former financial condition. However, relief under the Concession Agreements may be limited in nature. There can be no assurance that the concessioning authority will consider additional stamp duty on the Concession Agreements as a change in law for which they will amend the Concession Agreements or agree to provide compensation to the concessionaire. Any disagreement between the concessionaire and the concessioning authority may result in arbitration proceedings between the parties which could lead to increased costs. Additionally, the Sponsor Group have historically acquired the Project SPVs from third parties, and the third-party sellers have provided certain indemnities which are proposed to be assigned to the Trust in relation to such matters for periods prior to the acquisition under the relevant acquisition agreements. However, such indemnities may also not be adequate in their coverage and/or satisfy all the losses, damages, costs and expenses suffered by the Trust and the Initial Portfolio Assets arising from such proceedings or the consequences thereof.

93. Change in ownership of Project SPVs may result in the inability to carry forward and set off accumulated losses and unabsorbed depreciation, which could adversely affect cash flows and distributions to Unitholders.

Under the Income Tax Act, 2025, a company's ability to carry forward and set off accumulated losses from prior years is subject to shareholding continuity requirements. Where there is a change in shareholding, losses can only be carried forward if shares carrying not less than 51% of the voting power continue to be beneficially held by the same persons who held such shares on the last day of the year in which the loss was incurred.

In the event, tax authorities take a view that the Formation Transactions, or any subsequent restructuring or reorganization involving a Project SPV, amounts to a change in beneficial ownership of such Project SPV, it could result in the affected Project SPV losing its ability to carry forward and set off accumulated losses against future taxable income. There can be no assurance that the Project SPVs will be able to retain the benefit of past period losses. Any loss of such tax benefits could materially and adversely affect the financial condition, results of operations and cash flows of the affected Project SPVs and, consequently, the Trust's ability to make distributions to Unitholders.

94. Entities operating in India are subject to a variety of Government and state government tax regimes and surcharges and changes in legislation or the rules relating to such tax regimes and surcharges could materially and adversely affect our business, prospects, cash flows and results of operations.

There have been two recent major reforms in Indian tax laws, namely the introduction of the GST and provisions relating to general anti-avoidance rules ("**GAAR**").

The GST regime came into effect on July 1, 2017, combining taxes and levies by the Government and state governments into a unified rate structure. Given the limited availability of information in the public domain concerning the GST, we cannot assure you as to the tax regime following implementation of the GST. Additionally, there is limited clarity on the availability of input tax credit, and any unfavourable orders, including in respect of grants or annuity from relevant concessioning authorities in this regard may have an adverse effect on our financial position and cash flows. Furthermore, any application of existing law or future amendments may affect our overall tax efficiency and may result in significant additional taxes becoming payable. The GAAR regime came into effect on April 1, 2017. The tax consequences of the GAAR provisions being applied to an arrangement could result in denial of tax benefit, amongst other consequences, including on the interest paid by the Project SPVs on the debt from the Trust. In the absence of any precedents on the subject, the application of these provisions is uncertain. If the GAAR provisions are made applicable to any member of the Trust, it may have an adverse effect on the Trust.

Furthermore, by way of the Finance Act, 2021, the Government, amongst others, amended the Securities Contracts (Regulation) Act, 1956 ("**SCRA**") to recognize pooled investment vehicles and recognize the Units, debentures, other marketable securities and other instruments issued by infrastructure investment trusts as "*securities*". The Finance Act, 2021 exempted the payment of tax deducted at source on dividends paid by the Project SPVs to infrastructure investment trusts. For further details, please see "*Risk Factors - Investors may be subject to Indian taxes arising out of capital gains on the sale of Units and on any dividend or interest component of any returns from the Units*" on page 108.

Section 175 (8) of the IT Act provides that in certain situation, loss, if any, arising from the sale and purchase of securities and units, to the extent of dividend or income received or receivable on such securities or unit, shall be ignored for computing income chargeable to tax. The Section 175(9) read with section 175(10) of the IT Act (commonly known as bonus stripping) provides certain other situations where loss, if any, arising from the sale and purchase of all or any of the units shall be ignored for computing income chargeable to tax and notwithstanding anything contained in any other provision of the IT Act, the amount of loss so ignored shall be deemed to be the cost of purchase or acquisition of additional/ bonus units as are held on the date of such sale or transfer.

The IT Act provides for tax on the unitholders for such portion of distribution received by them that is not covered under Schedule V (Table: Sl. No. 3 or 4) of the IT Act and that which is not chargeable to tax under section 223(2) of the IT Act. Any distribution not covered under the aforementioned clauses will be taxed in the hands of the unitholders as 'income' under section 92(2)(k) of the IT Act, provided the amount received (including similar distributions in earlier years to the same unitholder or any other unitholder) is in excess of the amount at which units were issued by the Trust, as reduced by the amount which would have been charged to tax earlier under this provision. The aforementioned amounts received by a unitholder being a specified person covered under Schedule V (Table Sl. No. 7) of the IT Act shall not be subject to taxes upon the fulfilment of certain conditions set out in the IT Act. Further, any such distribution received by a unitholder to the extent not chargeable to tax under section 92(2)(k) and 223 and not covered under Schedule V (Table: Sl. No. 3 or 4) shall be reduced from the cost of units. We cannot assure you that there will be no adverse impact on the tax incidence to the unitholders pursuant to these provisions. For details, please see "*Statement of Possible Tax Benefits Available to the Citius TransNet Investment Trust ("**Trust**") and its Unit-holders under the applicable laws in India*" on page 498.

Tax laws and regulations are subject to differing interpretations by tax authorities. Differing interpretations of tax and other fiscal laws and regulations may exist within governmental ministries, including tax administrations and appellate authorities, thus creating uncertainty and potential unexpected results. The degree of uncertainty in tax laws and regulations, combined with significant penalties for default and a risk of aggressive action, including by retrospective legislation, by the governmental or tax authorities, may result in tax risks in the jurisdictions in which we operate being significantly higher than expected. These events may result in an adverse effect on our business, financial condition, cash flows, results of operations and prospects. Tax authorities in India may also introduce additional or new regulations applicable to our business which could adversely affect our business and profitability. For instance, the recently enacted Finance Act, 2026 introduces certain changes in respect of minimum alternate tax, which could impact future tax liabilities of some of our SPVs.

The Investment Manager has not determined the impact of such existing or proposed legislation on our business. Uncertainty in the applicability, interpretation or implementation of any amendment to, or change in, governing law, regulation or policy, including by reason of an absence, or a limited body, of administrative or judicial precedent, may be time consuming as well as costly for us to resolve and may impact the viability of our current business or restrict our ability to grow our business in the future. The Investment Manager intends to take measures to ensure that it is in compliance with all relevant tax laws. However, the tax authorities might take a position that differs from the position taken by us with regard to our tax treatment of various items.

Furthermore, the recently enacted Finance Act 2026 introduces certain changes including in respect of reduction of rate of minimum alternate tax, restriction on availability of credit of minimum alternate tax, shifting from old to new regime for minimum alternate tax. We have not yet fully determined the impact of all or some such laws on our business and operations, which may restrict our ability to grow our business in the future and potentially impact distributions from our Project SPVs.

95. Investors may be subject to Indian taxes arising out of capital gains on the sale of Units and on any dividend or interest component of any returns from the Units.

Under current Indian tax laws, listed units of a business trust held for more than 12 months are considered as long-term capital assets. In case of sale of such units through a recognised stock exchange in India and subject to payment of securities transaction tax ("**STT**"), any gain arising in excess of ₹0.125 million per annum is subject to long term capital gains tax at a rate of 12.5% (plus applicable surcharge and cess). However, if the said units are sold in any other manner, the same shall be subject to long-term capital gains tax at rate of 12.5% (plus applicable surcharge and cess).

In case the units are held for less than or up to 12 months, the same shall be regarded as short-term capital assets. Any gain arising in case of sale of such units through a recognised stock exchange in India and subject to payment of STT, is subject to short-term capital gains tax at concessional rate of 20% (plus applicable surcharge and cess). However, if the said units are sold in any other manner, the same shall be subject to short-term capital gains tax at the tax rates applicable to the holder (plus applicable surcharge and cess).

Furthermore, any distribution received by a unitholder to the extent not chargeable to tax under section 92(2)(k) and 223 and not covered under Schedule V (Table: Sl. No. 3 or 4) of the IT Act shall be reduced from the cost of units.

The aforesaid taxability in India is subject to tax treaty benefits in the case of a non-resident holder. Furthermore, the applicable taxes on the sale of Units and on any dividend or interest component of any returns from the Unit will also depend on the category of investor holding or selling the Units.

Under the IT Act, a distribution made by a business trust, being in nature dividend income received from a special purpose vehicle, will not be subject to tax in the hands of a unitholder, so long as the special purpose vehicle has not opted to pay corporate tax under the beneficial regime introduced under section 200 of the IT Act. Similarly, a business trust (which includes an infrastructure investment trust) will not be required to withhold tax on any distributions which are in the nature of dividend income received from a special purpose vehicle, so long as such special purpose vehicle has not opted to pay corporate tax under the beneficial regime introduced under section 200 of the IT Act. However, where the special purpose vehicle opts to pay tax under section 200 of the IT Act, dividend income distributed by the business trust would be taxed in the hands of a non-resident unitholder at 20% (plus applicable surcharge and cess) or the applicable treaty rate whichever is more beneficial and at the ordinary tax rate for a resident unitholder. Furthermore, the business trust would be required to withhold tax on such distributions made from dividend received from the special purpose vehicle. Thus, the taxability of dividends distributed by the Trust will depend on the taxation regime opted by the special purpose vehicle as defined in Note no. 2 of Schedule V of the IT Act.

It may also be noted that any distributable income in the nature of interest income and dividend income (where the SPV has opted to pay corporate tax under the beneficial regime introduced under section 200 of the IT Act) in the hands of a resident investor is subject to deduction of tax at the rate of 10%. Similarly, any distributable income in the nature of interest income and dividend income (where the SPV has opted to pay corporate tax under the beneficial regime introduced under section 200 of the IT Act) in the hands of a non-resident is subject to deduction

of tax at the rate of 5% (plus applicable surcharge and cess) and 10% (plus applicable surcharge and cess) respectively, subject to any beneficial rate available under an applicable treaty. Furthermore, the distribution in nature of interest income is taxable at rate of 5% (plus applicable surcharge and cess) for a non-resident unitholder under the IT Act and at the applicable tax rate for a resident unitholder. The final tax rate for the resident/ non-resident unit holder may also depend on other considerations.

Under the IT Act in addition to interest or dividend, unitholders are also subject to tax on other distributions received from a business trust such as amount received on repayment of debt or return of capital or amount received on redemption of unit held by unitholder provided such distributions are not chargeable to tax in the hands of the business trust under section 223 of the IT Act. Such distributions will be taxed at the rates applicable to the taxpayer.

Furthermore, the Trust might not be able to pay or maintain the levels of distributions or ensure that the level of distributions will increase over time, or that future acquisitions will increase the Trust's distributable free cash flow to the Unitholders. Any reduction in, or elimination or taxation of, payments of distributions could materially and adversely affect the market price of the Units.

96. Tax laws are subject to changes and differing interpretations, which may materially and adversely affect our operations.

Tax laws and regulations are subject to differing interpretations by tax authorities. Differing interpretations of tax and other fiscal laws and regulations may exist within governmental ministries, including tax administrations and appellate authorities, thus creating uncertainty and potential unexpected results. For example, there have been differing interpretations under the Income-tax Act, 1961 regarding income-tax calculations for toll and annuity assets. It is unclear whether these assets can be classified as intangible assets and thereby claim depreciation at 25 per cent per annum on a written down value basis, or whether toll collection rights and service concession rights must instead be amortized using the straight-line method over the life of the concession. Another area of uncertainty relates to claiming benefits under Section 80-IA of the Income-tax Act, 1961, specifically for assets that underwent substantial development and construction before 31 March 2017 but where the project completion date falls after 31 March 2017. There are also interpretational challenges regarding the start date for the 80-IA block period of 20 years, such as whether this should be the appointed date or the commercial operations date. Such differing interpretations and uncertainties may continue even under the IT Act.

Certain of our SPVs, namely, Dhola, Dibang, AMTPL, RVTPL and JSEL have historically claimed deductions under Section 80-IA of the Income Tax Act, 1961. In the event that such deductions are disputed, restricted, withdrawn or otherwise rendered unavailable, whether for prior periods or prospectively, such SPVs may face additional taxes, interest or penalties, which may have an impact on the financial performance of such SPVs and the Trust. Further, certain of our other SPVs may have claimed depreciations, deductions or exemptions under direct and indirect tax laws in the past based on our interpretation of the requirements under the relevant tax legislation, and a different interpretation of such requirements by the tax authorities and courts, either prospectively or retrospectively, may adversely impact the business condition or financial position of such SPVs. For instance, in case of Dibang, Dhola and JSEL, there are certain ongoing matters in respect of GST exemptions claimed by the SPVs on accrued annuities, which have been challenged by the GST authorities with claims involving ₹212.6 million, ₹419.3 million and ₹2,247.9 million, respectively. Further, TEL had received GST audit notice alleging non-payment of GST of ₹559.00 million on providing construction services for receiving toll rights. While these matters are currently pending and being contested, we cannot assure you that the ongoing proceedings will result in a favorable outcome.

The degree of uncertainty in tax laws and regulations, combined with significant penalties for default and a risk of aggressive action by the governmental or tax authorities, may result in tax risks in the jurisdictions in which we operate being significantly higher than expected. For example, transactions between the Project SPVs and their respective associated enterprises may be required to be carried out at arm's length pricing and comply with the transfer pricing under the IT Act. Any failure to comply with such rules, including any failure to maintain required documentation or furnish required information to the tax regulator, may result in penalties. If we experience instances of non-compliance in the future or if tax authorities reassess or reopen inquiries into prior instances of non-compliance, we may be subject to penalties, and our business and financial conditions may be materially and adversely affected.

Our Investment Manager intends to take measures to ensure that it is in compliance with all relevant tax laws. However, the tax authorities might take a position that differs from the position taken by us with regard to our tax treatment of various items. Furthermore, certain assessments and appeals with respect to the Initial Portfolio Assets for the past taxable years have not been completed and are still pending. There is no assurance that such assessments and appeals may result in favourable outcomes for the Initial Portfolio Assets. Liabilities arising out of pending assessments, appeals or re-opening of assessment of prior years may have an adverse effect on our business, financial conditions, results of operations and cash flows.

GENERAL INFORMATION

The Trust

The Trust was set up as a contributory, determinate, irrevocable trust under the provisions of the Indian Trusts Act, 1882 pursuant to the Trust Deed dated July 21, 2025. The Trust was registered as an infrastructure investment trust under the InvIT Regulations on August 1, 2025, having registration number IN/InvIT/25-26/0032. The principal place of business and the correspondence address of the Trust is Plot 294/3, Edelweiss House, Off CST Road, Kalina, Santacruz East, Mumbai – 400 098, Maharashtra, India. The telephone number of the Trust is: +91 22 4019 4700 and the website of the Trust is: www.citiustransnet.in.

For information on the background of the Trust and the description of the Initial Portfolio Assets, please see "*Overview of the Trust*" and "*Business*" on pages 23 and 240, respectively.

Compliance Officer of the Trust

The compliance officer of the Trust, as designated by the Investment Manager, is Pravin Karambelkar ("**Compliance Officer**"). His contact details are as follows:

Pravin Karambelkar
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Bidders can contact the Compliance Officer or the Lead Managers in case of any pre-Issue or post-Issue related problems such as non-receipt of Allotment Advice/letter of Allotment, non-credit of Allotted Units in the respective beneficiary account or non-receipt of refund orders and non-receipt of funds by electronic mode.

The Sponsor – Epic Transnet Infrastructure Private Limited *(formerly known as Watrak Infrastructure Private Limited)*

Registered office address

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Contact Person of the Sponsor

Ankit Shah is the contact person of the Sponsor. His contact details are as follows:

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The Investment Manager – EAAA TransInfra Managers Limited

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The Project Manager – Epic Transnet Project Management Private Limited *(formerly known as Chennai-Tada Tollway Private Limited)*

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Inter-se Allocation of Responsibilities

The following table sets forth the inter-se allocation of responsibilities for various activities amongst the Lead Managers for this Issue:

S. No.	Activity	Responsibility	Co-ordinator(s)
1.	Assist the Investment Manager in selecting the initial portfolio of the InvIT, capital structuring, with the relative components and formalities such as type of instruments, etc.	Lead Managers	Axis Capital
2.	Due diligence of the InvIT's operations/management/ business plans/legal, etc., Sponsor's / Investment Manager's / Project Manager's experience, the proposed formation transactions, the proposed and future assets arrangements, any other related party transactions (including any name licensing or other arrangements), drafting and design of offer documents and of statutory advertisement including memorandum containing salient features of the Issue documents. The Lead Managers shall ensure compliance with stipulated requirements and completion of prescribed formalities with the Stock Exchanges and the SEBI.	Lead Managers	Axis Capital
3.	Drafting and approval of all publicity material other than statutory advertisement as mentioned above including corporate advertisement, brochure, etc.	Lead Managers	I-Sec
4.	Appointment of Registrar to the Issue, printers, advertising agency, bankers to the Issue and other intermediaries	Lead Managers	Axis Capital
5.	Finalising road show marketing presentation, FAQs	Lead Managers	I-Sec
6.	International institutional marketing of the Issue	Lead Managers	I-Sec
7.	Domestic Institutional Marketing of the Issue which will cover, inter alia: • Formulating overall institutional marketing strategy; • Finalising the list and division of investors for one-on-one meetings, institutional allocation; and • Finalizing road show schedule and investor meeting schedules	Lead Managers	Axis Capital
8.	Non-institutional marketing of the Issue	Lead Managers	Ambit
9.	Coordination with stock exchanges for book building software and submitting deposit	Lead Managers	Ambit
10.	Finalizing of pricing and allocation in consultation with the Investment Manager	Lead Managers	Axis Capital

S. No.	Activity	Responsibility	Co-ordinator(s)
11.	Assisting the Investment Manager in ensuring the completion of the formation transactions and the allotment of Units in consideration thereof	Lead Managers	I-Sec
12.	Post bidding activities including management of Escrow Account, coordinate noninstitutional and institutional allocation, coordination with Registrar and banks, intimation of allocation and dispatch of refund to Bidders, etc. The post Issue activities of the Issue will involve essential follow up steps, which include finalization of basis of allotment, trading and dealing instruments and dispatch of certificates and demat delivery of Units, with the various agencies connected with the work such as Registrar to the Issue, Banker to the Issue and the bank handling refund business. Coordinating with stock exchange(s) for release of security deposit in the manner specified by the stock exchange(s) and by the Board from time to time	Lead Managers	Ambit

Public Issue Account Bank and Sponsor Bank 1

Axis Bank Limited
Ground Floor, Manek Plaza
Opp. Mac Donald
Santacruz East, Mumbai 400 098
Maharashtra, India
Tel: +91 9833753956
E-mail: kalina.operationshead@axisbank.com; kalina.branchhead@axisbank.com
Contact person: Vijaya Shetti
Website: www.axisbank.com
SEBI Registration Number: INBI00000017

Escrow Collection Bank, Refund Bank and Sponsor Bank 2

ICICI Bank Limited
Capital Market Division, 163, 5th Floor
H.T. Parekh Marg, Backbay Reclamation
Churchgate, Mumbai 400 020
Maharashtra, India
Tel: +91 022 68052182
Fax: +91 22611138
E-mail: ipocmg@icici.bank.in
Contact person: Varun Badai
Website: www.icici.bank.in
SEBI Registration Number: INBI00000004

Syndicate Members

Axis Capital Limited
Axis House, 1st Floor
Pandurang Budhkar Marg, Worli
Mumbai 400 025
Maharashtra, India
Tel: +91 22 4325 2183
E-mail: citius.ipo@axiscap.in
Investor grievance e-mail: complaints@axiscap.in
Website: https://www.axiscapital.co.in/
Contact person: Tosit Agarwal
SEBI Registration Number: INM000012029

Ambit Private Limited
Ambit House, 449
Senapati Bapat Marg, Lower Parel

Mumbai 400 013
Maharashtra, India
Tel: +91 22 6623 3030
E-mail: citius.ipo@ambit.co
Investor grievance e-mail: customerservicemb@ambit.co
Website: www.ambit.co
Contact Person: Janit Sethi / Bhavya Jalan
SEBI Registration Number: INM000010585

Ambit Capital Private Limited
Ambit House, 449,
Senapati Bapat Marg, Lower Parel,
Mumbai 400 013
Maharashtra, India
Telephone: +91 22 6623 3000
E-mail: ketan.chaurasia@ambit.co
Investor grievance e-mail: investorgrievance.acpl@ambit.co
Website: www.ambit.co
Contact Person: Ketan Chaurasia
SEBI Registration No.: INZ000259334

ICICI Securities Limited
ICICI Venture House
Appasaheb Marathe Marg
Prabhadevi, Mumbai 400 025
Maharashtra, India
Tel: +91 22 6807 7100
E-mail: citius.ipo@icicisecurities.com
Investor grievance e-mail: customercare@icicisecurities.com
Website: www.icicisecurities.com
Contact Person: Shri Subramanyam / Sumit Singh
SEBI Registration No.: INM000011179

Legal Counsel to the Trust, the Investment Manager and the Sponsor as to Indian Law

Shardul Amarchand Mangaldas & Co.
24th Floor, Express Towers
Nariman Point
Mumbai – 400021
Maharashtra, India
Tel: +91 11 4159 0700

Legal Counsel to the Lead Managers as to Indian Law

AZB & Partners
AZB House, Peninsula Corporate Park
Ganpatrao Kadam Marg, Lower Parel
Mumbai 400 013
Maharashtra, India
Tel: +91 22 4072 9999

International Legal Counsel to the Lead Managers

Linklaters Singapore Pte. Ltd.
2 Central Boulevard Central
#28-01 West Tower, IOI Boulevard Towers
Singapore 018 916
Tel: +65 6692 5700

Registrar to the Issue

KFin Technologies Limited
Selenium Tower B, Plot No. 31 and 32
Financial District
Nanakramguda, Serilingampally
Hyderabad, Rangareddy 500 032
Telangana, India
Tel: +91 40 6716 2222/ 1800 309 4001
Fax: +91 40 6716 1563
E-mail: citius.invit@kfintech.com
Investor grievance e-mail: einward.ris@kfintech.com
Website: www.kfintech.com
Contact person: M. Murali Krishna
SEBI Registration Number: INR000000221
CIN: L72400MH2017PLC444072

Credit rating agency

India Ratings and Research Private Limited
Wockhardt Towers, 4th Floor, West Wing
Bandra Kurla Complex
Bandra (E) Mumbai-400 051
Tel: 022-40001700
Fax: 022-40001701
E-mail: infogrp@indiaratings.co.in
Contact person: Nirav Mithani
SEBI Registration Number: IN/CRA/002/1999

ICRA Limited
3rd Floor, Electric Mansion Appasaheb Marathe Marg
Prabhadevi, Mumbai – 400 025
Tel: 022-61143406
E-mail: shivakumar@icraindia.com
Contact person: L. Shivakumar
SEBI Registration Number: IN/CRA/008/2015

Credit rating

The Trust has been given a rating of 'Provisional IND AAA / Stable' by India Ratings and Research by the way of its letter dated January 20, 2026, the rationale for which is available at its website https://www.indiaratings.co.in/search/issuerid/14448.

Further, the Sponsor has been given a rating of 'ICRA AA (Stable)' by ICRA Limited by the way of its letter dated January 16, 2026, the rationale for which is available at its website https://www.icra.in/Rating/RatingDetails?CompanyId=31259&CompanyName=EPIC%20TRANSNET%20INFRASTR and has been given a rating of Provisional IND AA / Stable' by India Ratings and Research by the way of its letter dated January '20, 2026, the rationale for which is available at its website https://www.indiaratings.co.in/pressrelease/p549h45n26cd8vdbagw6xlan.

Self-Certified Syndicate Banks

The list of SCSBs notified by SEBI for the ASBA process is available at http://www.sebi.gov.in/sebiweb/other/OtherAction.do?doRecognised=yes, or at such other website as may be prescribed by SEBI from time to time. For a list of the SCSB branches named by the respective SCSBs to receive ASBA Forms from the Designated Intermediary, please refer to the above-mentioned link.

Registered Brokers

The list of the Registered Brokers, including details such as postal address, telephone number and e-mail address, is provided on the websites of the Stock Exchanges at https://www.bseindia.com/ and https://www.nseindia.com, as updated from time to time.

Registrar and Unit Transfer Agents

The list of the RTAs eligible to accept ASBA Forms at the Designated RTA Locations, including details such as address, telephone number and e-mail address, is provided on the websites of the Stock Exchanges at https://www.bseindia.com/Static/PublicIssues/RtaDp.aspx and http://www.nseindia.com/products/content/equities/ipos/asba_procedures.htm, respectively, as updated from time to time.

Collecting Depository Participants

The list of the RTAs eligible to accept ASBA Forms at the Designated RTA Locations, including details such as address, telephone number and e-mail address, is provided on the websites of the Stock Exchanges at https://www.bseindia.com/Static/PublicIssues/RtaDp.aspx and http://www.nseindia.com/products/content/equities/ipos/asba_procedures.htm, respectively, as updated from time to time.

BASIS FOR ISSUE PRICE

The Issue Price will be determined by the Investment Manager, in consultation with the Lead Managers, on the basis of assessment of market demand for the Units offered through the Book Building Process and on the basis of quantitative and qualitative factors as described below.

Bidders are requested to also refer to "*Risk Factors"*, "*Business*", and "*Special Purpose Combined Financial Statements*" on pages 64, 240 and **Annexure D**, respectively, to make an informed investment decision.

The Floor Price is ₹ [●] and the Cap Price is ₹ [●].

Based on the evaluation of the qualitative and quantitative factors listed below, the enterprise value and equity value at the Floor Price and the Cap Price and the Issue Price is as follows:

Particulars	At Floor Price	At Cap Price	At Issue Price
Equity Value (Post Issue)	[●]	[●]	[●]
Total Units Post Issue	**[●]**	**[●]**	**[●]**

Qualitative Factors

We believe that some of the qualitative factors which form the basis for computing the Issue Price are as follows:

- A large and well-dispersed portfolio of Project SPVs, with a long operating history and residual concession life, broad dispersion in terms of asset value, and proven track record of traffic growth.
- Strong pipeline of Identified ROFO Assets.
- Strategically located assets across geographically diverse clusters, situated near major economic corridors, and handling a diverse industry and commodity mix.
- De-risked portfolio providing stable cash flows from toll and annuity assets, with balanced traffic mix backed by industrial activity (commercial vehicle volume) and personal consumption activity (passenger vehicle volume) for toll assets and low counterparty risk for annuity assets.
- Experienced in-house team with full spectrum asset management and maintenance capabilities, spanning the entire asset life cycle, backed by tech-enabled operations and maintenance.
- Strong and differentiated asset acquisition and investment capabilities.
- Strong support from our Investment Manager, Project Manager and the EAAA Platform which has a proven track record in AUM growth, capital raising, and investment and asset management capabilities.
- Skilled and experienced management team with a focus on corporate governance and capital management.
- Attractive transport sector outlook with the established regulatory environment and economic and social tailwinds.

For further details, please see "*Business*" on page 240.

Quantitative Factors

Some of the information presented below is based on the Special Purpose Combined Financial Statements. For details, please see "*Special Purpose Combined Financial Statements*" attached as **Annexure D**.

Some of the quantitative factors which may form the basis for computing the Issue Price are as follows:

1. **Valuation provided by the Valuer**

The Valuer has used the discounted cash flow method to determine the value of the Initial Portfolio Assets. The assumptions on which the value of the Initial Portfolio Assets is based have been disclosed in "*Valuation Report*"

attached as **Annexure A** to this Offer Document.

2. **Enterprise Value / Cash flows from operations ratio in relation to Issue Price:**

(₹ in million)

Particulars	Amount	EV/Cash flow from operations		
		At Floor Price	At Cap Price	At Issue Price***
Cash flows from operations for the financial year ended March 31, 2025*	10,386.92	[●]	[●]	[●]
Projected cash flows from operations for the financial year ending March 31, 2027**	13,214.00	[●]	[●]	[●]
Projected cash flows from operations for the financial year ending March 31, 2028**	14,643.00	[●]	[●]	[●]
Projected cash flows from operations for the financial year ending March 31, 2029**	13,163.00	[●]	[●]	[●]
Projected cash flows from operations for the financial year ending March 31, 2030**	15,679.00	[●]	[●]	[●]

**Cash flow from operations for the financial year ended March 31, 2025 in the above table is derived from with the Special Purpose Combined Financial Statements.*

***Derived from the Projections of Revenue from Operations and Cash Flow from Operating Activities prepared by the Investment Manager. For details of the projections and notes thereto, please see "Projections of Revenue from Operations and Cash Flows from Operating Activities" attached as **Annexure E**. Also please see "Risk Factors" on page 64.*

****To be determined upon finalisation of the Issue Price.*

3. **Price / Net Asset Value per Unit ratio in relation to Issue Price:**

Particulars	Amount (₹)	Price / Net Asset Value per Unit		
		At Floor Price	At Cap Price	At Issue Price
Net Asset Value per Unit as of [●][(1)]	[●]	[●]	[●]	[●]

(1) The number of Units that the Trust will issue is not presently ascertainable. Hence, the disclosures in respect of number of Units and Net Asset Value per Unit have not been provided as on date of this Offer Document.

4. **Earnings Per Units**

Year/Period ended	Earnings per Unit (₹)*
March 31, 2025	[●]
December 31, 2025	[●]

**Earnings Per Units for the nine-month period ended December 31, 2025 is not annualized. The number of Units that the Trust will issue is not presently ascertainable. Hence, the disclosures in respect of Earnings Per Unit have not been provided as on date of this Offer Document.*

5. **Comparison with Industry Peers**

Particulars	NAV per Unit (₹)*	Premium / (Discount) to NAV%***
Cube Highways Trust*	142.70	(1.0)%
Vertis Infrastructure Trust*	103.35	2.6%
Interise Trust**	107.00	2.6%
Maple Infrastructure Trust**	146.31	(0.5)%
Roadstar Infra Investment Trust*	96.45	(32.6)%
Nxt-Infra Trust**	106.79	(6.4)%

**NAV as of December 31, 2025*

***NAV as of September 30, 2025*

****Premium / (Discount) to NAV% has been calculated as Unit Price, divided by Net Asset Value per unit minus one, based on the latest available price on the stock exchanges of the peers till March 18, 2025. The respective price available is as follows:*

Cube Highways Trust – Rs. 141.25 on NSE as on March 17, 2026

Vertis Infrastructure Trust - Rs. 106.00 on NSE as on March 18, 2026

Interise Trust - Rs. 109.75 on NSE as on September 16, 2025

Maple Infrastructure Trust – Rs. 145.60 on BSE as on December 26, 2025

Roadstar Infra Investment Trust - Rs. 65.00 on BSE as on March 17, 2026

Nxt-Infra Trust - Rs. 100.00 on NSE as on March 10, 2026

PARTIES TO THE TRUST

The summaries of the key terms of certain material contracts and agreements included in this section are not complete and are subject to, and are qualified in their entirety by reference to, the provisions of the respective material contracts and agreements. Copies of the material contracts and agreements described in this section will be available for inspection at the principal place of business of the Trust from the date of filing this Offer Document until the date of listing of the Units pursuant to this Issue. For further details, please see "Material Contracts and Documents for Inspection" on page 512.

A. The Sponsor – Epic Transnet Infrastructure Private Limited

History and certain Corporate Matters

Epic Transnet Infrastructure Private Limited is the Sponsor of the Trust. The Sponsor is a private company limited by shares and was originally incorporated as '*Watrak Infrastructure Private Limited*' in India under the Companies Act, 2013, pursuant to a certificate of incorporation issued by the Registrar of Companies, Central Registration Centre dated November 18, 2021. Subsequently, a fresh certificate of incorporation dated September 18, 2025 was issued by the Registrar of Companies, Central Registration Centre, pursuant to the change in the name of the Sponsor from '*Watrak Infrastructure Private Limited*' to '*Epic Transnet Infrastructure Private Limited*'. The corporate identification number of the Sponsor is U45309TN2021PTC148014.

The Sponsor's registered office is situated at 4th Floor, Tower B, Commerzone IT Park, Mount Ponnamallee Road, Porur, Kanchipuram, Sriperumbudur 600 116, Tamil Nadu, India and its address for correspondence is 504 & 505, 5th Floor, Windsor, Off CST Road, Kalina, Santacruz (East), Mumbai 400 098, Maharashtra, India. For further details, please see "*General Information – The Sponsor - Epic Transnet Infrastructure Private Limited*" on page 112.

Background and past experience of the Sponsor

The Sponsor was incorporated pursuant to a demerger of the infrastructure development business of LTIDPL Indvit Services Limited (*currently known as Interise Investment Managers Limited*). Accordingly, even though the Sponsor was incorporated as a private limited company on November 18, 2021, the infrastructure development business housed under the Sponsor pursuant to the demerger has been operational since 1999 (*i.e.*, the year of incorporation of the pre-demerged company). It has in the past constructed and operated a two-lane bridge at Kheda, across the River Watrak on the National Highway 8 ("**Project**"), from 1999 to 2009, in the state of Gujarat on a 'build, operate and transfer' basis, in terms of the concession agreement dated March 1, 1999 entered into with Government of India and Government of Gujarat ("**WIPL Concession Agreement**"). The construction of the Project was completed in February 2001 and the concession granted as per the WIPL Concession Agreement was valid until December 31, 2009. In accordance with the WIPL Concession Agreement, the Sponsor started collecting toll from the Project and operated and maintained the Project until December 31, 2009. The Project was handed over to the Government of Gujarat on December 31, 2009, as per the terms of the WIPL Concession Agreement.

Additionally, the Sponsor has also entered into engineering, procurement and construction contract/supply and installation agreements with two companies, pursuant to which it has been appointed as the engineering, procurement and construction contractor for the construction and development of four rooftop solar projects on a turnkey basis. The scope of work of the Sponsor included design, engineering, supply, erection, testing and commissioning of such rooftop solar projects. The Sponsor has also procured and supplied all the required material for such projects and provided installation services as per the agreed technical specifications and performance parameters. Two of such solar projects have been completed and commissioned in May 2025.

The Sponsor, being a developer, has experience of more than five years in development of projects in the infrastructure sector and has completed two projects, as set out above. Accordingly, the Sponsor complies with the eligibility requirements under the InvIT Regulations of ensuring a sound track record in development of infrastructure.

Further, in accordance with the eligibility criteria specified under the InvIT Regulations, the Sponsor has net worth of not less than ₹ 1,000 million as of December 31, 2025.

Directors of the Sponsor

The directors of the Sponsor are entrusted with the overall management of the Sponsor. Please see below the

details in relation to the directors of the Sponsor:

Sr. No.	Name	DIN	Designation
1.	Manish Chitkara	07746947	Non-executive Director
2.	Sreekumar Chatra	07149285	Non-executive Director
3.	Jimmy Jain	11134869	Non-executive Director
4.	Tharuvai Venugopal Rangaswami	01957380	Non-executive Director

Brief profiles of the Directors of the Sponsor

Please see below brief profiles of the directors of the Sponsor:

Manish Chitkara is a non-executive director of the Sponsor and the non executive director of the Project Manager. He holds a bachelor's degree in civil engineering from Thapar Institute of Engineering and Technology, Patiala and a masters' degree in construction management from National Institute of Construction Management and Research. He has extensive experience of over 33 years of techno-commercial experience in infrastructure projects with various engineering, procurement and construction companies and developers, including underground metros, hydro and highway projects. He joined SRPL Roads Private Limited in October 2018 and is also the Managing Director – Highways Portfolio of Sekura India Management Limited. He was previously associated with Hindustan Construction Co. Ltd., for 20 years in various capacities, Uniquest Infra Ventures and APCO Infratech Private Limited where he was involved in various projects such as construction of new hybrid annuity model projects and divestment of completed build-operate-transfer projects.

Sreekumar Chatra is a non-executive director of the Sponsor and the non-executive director of the Investment Manager. He holds a bachelor's degree in mechanical engineering from Sambalpur University and a post graduate diploma in management from the Indian Institute of Management, Ahmedabad. He is currently the Managing Director – Investments of EAAA India Alternatives Limited. He has over 26 years of experience in investments, asset management, mergers and acquisitions, establishing funds and principal investing in infrastructure sector. He has worked on transactions in sectors such as roads, renewables, power, airports, railways, utilities and urban infrastructure. He was previously associated with Canada Pension Plan Investment Board, Macquarie India Advisory Services Private Limited, PricewaterhouseCoopers Private Limited, PricewaterhouseCoopers LLP, London, KPMG Advisory Services Private Limited, Feedback Ventures & Collaboration Services Private Limited and Tata Engineering and Locomotive Company Limited (*currently Tata Motors*).

Jimmy Jain is a non-executive director of the Sponsor. She has over 15 years of experience in financing and ratings across the corporate and infrastructure sectors. She has passed all three levels of the CFA examinations and holds a degree in master's of business administration from ICFAI University, Dehradun. Her experience includes leadership roles at Yes Bank and CRISIL Ratings.

Tharuvai Venugopal Rangaswami is a non-executive director of the Sponsor. He has a bachelor's degree in commerce and is an associate member of the Institute of Company Secretaries of India and a graduate member of the Institute of Cost and Works Accountants of India. He has about 35 years of corporate experience. He was previously associated with Reliance Petroleum Limited, ICICI Infotech Limited, National Stock Exchange of India Limited, BSE Limited, Multi Commodity Exchange, Nicco Orissa Limited, SCICI Limited, SWIL Limited and Edelweiss Financial Services Limited.

Other Confirmations

As of the date of this Offer Document, the Sponsor is in compliance with the eligibility criteria provided under Regulation 4 of the InvIT Regulations, to the extent applicable to each of the Sponsor or Sponsor Group, severally, and are "fit and proper persons" as prescribed under SEBI Intermediaries Regulations.

B. Sponsor Group

The Sponsor, Infrastructure Yield Trust (through its schemes Infrastructure Yield Plus II, Infrastructure Yield Plus IIA and India Infrastructure Yield Plus II), Epic Transnet Project Management Private Limited (*formerly Chennai-Tada Tollway Private Limited*) and Neelambur Madukkarai Tollway Private Limited form part of the Sponsor Group. For details in relation to the Sponsor Group, please see "*Definitions and Abbreviations – Trust Related Terms – Sponsor Group*" on page 7.

Other Confirmations

Neither the Sponsor nor the Sponsor Group, nor the promoters or directors of the Sponsor, or the promoters, directors, or partners of the Sponsor Group (i) are or have been debarred from accessing the securities market by SEBI; (ii) are or have been promoters, directors or persons in control of any other company or a sponsor, investment manager or trustee of any other infrastructure investment trust or an infrastructure investment trust which is debarred from accessing the capital market under any order or direction made by SEBI; and/or (iii) are or have been declared a wilful defaulter by any bank or a financial institution or consortium thereof, in accordance with the guidelines on 'wilful defaulters' issued by the RBI.

C. The Trustee – Axis Trustee Services Limited

History and certain Corporate Matters

Axis Trustee Services Limited is the Trustee of the Trust. The Trustee is a registered intermediary with SEBI under the SEBI Debenture Trustee Regulations as a debenture trustee having registration number IND000000494 and the certificate of registration is valid until suspended. The Trustee's registered office is situated at Axis House, P B Marg, Worli, Mumbai 400 025, Maharashtra, India and corporate office at The Ruby, 2nd Floor, SW, 29, Senapati Bapat Marg, Dadar West, Mumbai 400 028, Maharashtra, India.

Background of the Trustee

The Trustee is a wholly-owned subsidiary of Axis Bank Limited. The Trustee's services are aimed at catering to the individual needs of the client and enhancing client satisfaction. As Trustee, it ensures compliance with all statutory requirements and believes in the highest ethical standards and best practices in corporate governance. It aims to provide the best services in the industry with its well trained and professionally qualified staff with a sound legal acumen. The Trustee is involved in varied facets of debenture and bond trusteeships, including, advisory functions and management functions. The Trustee also acts as a security trustee and is involved in providing services in relation to security creation, compliance and holding security on behalf of lenders.

Other Confirmations

The Trustee is not an Associate of the Sponsor or the Investment Manager or the Project Manager to the Trust. Further, neither the Trustee nor the settlors of the Trust (i) are or have been debarred from accessing the securities market by SEBI; (ii) are or have been promoters, directors or persons in control of any other company or a sponsor, investment manager or trustee of any other infrastructure investment trust or an infrastructure investment trust which is debarred from accessing the capital market under any order or direction made by SEBI; and/or (iii) are or have been declared a wilful defaulter by any bank or a financial institution or consortium thereof, in accordance with the guidelines on 'wilful defaulters' issued by the RBI.

As of the date of this Offer Document, the Trustee is in compliance with the eligibility criteria provided under Regulation 4 of the InvIT Regulations and is a "fit and proper person" as prescribed under SEBI Intermediaries Regulations.

Board of Directors of the Trustee

The board of directors of the Trustee are entrusted with the responsibility for the overall management of the Trustee. Please see below the details in relation of the board of directors of the Trustee:

Sr. No.	Name	DIN	Designations
1.	Rahul Ranjan Choudhary	10935908	Rahul Choudhary is the managing director on the board of directors of the Trustee and the chief executive officer of the Trustee
2.	Prashant Ramrao Joshi	08503064	Prashant Joshi is a director (*non-executive*) on the board of directors of the Trustee
3.	Arun Mehta	08674360	Arun Mehta is a director (*independent*) on the board of directors of the Trustee
4.	Parmod Kumar Nagpal	10041946	Parmod Kumar Nagpal is a director (*independent*) on the board of directors of the Trustee
5.	Bipin Kumar Saraf	06416744	Bipin Kumar Saraf is a director (*non-executive and non-independent*) on the board of directors of the Trustee

Key Terms of the Trust Deed

The Trustee has entered into the Trust Deed, in terms of the InvIT Regulations, the key terms of which, are

provided below:

Powers of the Trustee

The Trustee has been provided with various powers under the Trust Deed in accordance with the Indian Trusts Act, 1882 and the InvIT Regulations, including but not limited to:

(i) Subject to any restrictions expressly contained in the Trust Deed and under applicable law, the Trustee shall, have the same powers as a natural Person acting as the legal and beneficial owner of such property and such powers shall not be restricted by any principle of construction or rule or requirement, but shall operate according to the widest generality of which the foregoing words are capable.

(ii) Subject to any restrictions expressly contained in the Trust Deed and under applicable law, the Trustee shall have the power to appoint the Investment Manager as the investment manager of the Trust and shall have the power to delegate all or any of the powers and duties of the Trustee, as set out in the Truste Deed, to the Investment Manager. The Trustee shall have the power to execute the Investment Management Agreement with the Investment Manager, the Project Implementation and Management Agreement with the Project Manager, or any other agreement or arrangement, from time to time, with the Investment Manager or any of its nominees.

(iii) Without limiting the foregoing general powers and duties, the Trustee is hereby authorised and empowered on behalf of the Trust either by itself (based on the written recommendation of the Investment Manager) or through the Investment Manager, to:

(a) make all decisions, concerning the investigation, selection, development, negotiation, structuring, restructuring, monitoring, divestment of Investments (including any additions or accretions thereto) and the appointment of various advisors and service providers in connection with such Investments;

(b) acquire, subscribe, hold, manage, trade and dispose of the InvIT Assets, shares, stocks, convertibles, debentures, bonds, equity, equity-related securities, debt or mezzanine securities of all kinds issued by any Holdco or SPV (including loans convertible into equity), whether in physical or dematerialised form, including power to hypothecate, pledge or create encumbrances of any kind on such securities held by the Trust in such Holdco/ SPV to be used as collateral security for any borrowings by the Trust or any Holdco or any SPV;

(c) direct and approve the formulation of investment policies and strategies for the Trust and to direct and approve the investment of the trust fund, in accordance with the objectives of the Trust;

(d) manage, acquire, hold, sell, securitize, transfer, exchange, pledge and dispose of investments (including any additions or accretions thereto), and exercise all rights, powers, privileges and other incidents of ownership or possession with respect to investments;

(e) avail commercial loans, including the power to hypothecate, pledge or create encumbrances of any kind on the InvIT Assets as collateral security for any such loans availed by the Trust, in accordance with the InvIT Regulations and other applicable law;

(f) keep the capital and monies of the Trust, the Holdco(s) and the SPV(s) in deposit with banks or other financial institutions as permitted, under the InvIT Regulations and other applicable law;

(g) accept contributions;

(h) to give, provide and agree to provide to any SPV or Holdco, financial assistance in the form of investment in the Trust's debt securities or share capital of any class including ordinary, preference, participating, non-participating, voting, non-voting or other class, and in the form of investment in securities convertible into share capital;

(i) without limiting the generality of the foregoing, to decide, in the manner set out in the InvIT Documents, objectives of the Trust and in compliance with the InvIT Regulations, (A) the amounts to be invested in Holdco, SPVs, new entity or infrastructure asset or any other asset, as permitted under the InvIT Regulations, that is to form part of the Trust and the mode, manner,

terms and conditions for making such investment; and (B) to realize such investments and the income therefrom, and distribute the same to the unitholders or reinvest the same, as may be decided by the Investment Manager as per the terms of the Trust Deed and the InvIT Documents and in compliance with the InvIT Regulations;

(j) collect and receive the profit, interest, repayment of principal of debt or debt-like or equity or equity-like mezzanine securities, dividend, return of capital of any type by the SPV(s)/ Holdco(s) or of the InvIT Assets and any other income of the Trust;

(k) make investments, including investments in liquid mutual funds, government securities, money market instruments and cash equivalents, as set out in the InvIT Documents and objectives of the Trust and in the manner and to the extent permitted under the InvIT Regulations;

(l) institute, conduct, compromise, enforce, compound, defend, answer, oppose or abandon any legal proceedings, for or on behalf of or in the name of the Trust or the Trustee (in its capacity as the trustee of the Trust), and to defend, compound or otherwise deal with any such proceedings against the Trust or Trustee (in its capacity as the trustee of the Trust) or its officers or concerning the affairs of the Trust, and also to compound and allow time for payment or satisfaction of any equity due and of any claims or demands by or against the Trust and to refer any differences to arbitration and observe and perform any awards thereof;

(m) appoint counsel or appear before the relevant authorities, submit information, seek clarifications from any governmental agency and complete, sign and submit any applications or documents for any approvals, permissions, or actions that may be necessary or desirable;

(n) open, maintain and close bank accounts and draw cheques or other orders for the payment of money and open, maintain and close demat, brokerage, mutual fund and similar accounts;

(o) enter into, execute and/or terminate any investment pooling agreements, agreements related to strategic investments including the Share Purchase Agreements, co-investment agreements, and any and all documents and instruments of a similar nature in the name of the Trust; and

(p) to carry on any other functions, as appropriate and necessary to achieve the objectives of the Trust, subject to compliance with the Trust Deed, InvIT Documents and applicable law.

(iv) The Trustee shall have the power, whether directly (based on the written recommendation of the Investment Manager) or through the Investment Manager where the Investment Manager has been so authorised by the Trustee under the Investment Management Agreement, to appoint, determine the remuneration of and enter into, execute, deliver, perform, modify or terminate all documents, agreements and instruments containing customary terms including contractual indemnities with Valuers, Auditors, registrar and transfer agents, merchant bankers, credit rating agencies, search agents, custodians, property consultants, brokers, legal, financial and tax consultants or any other intermediary or professional service provider or agent as may be required in connection with the activities of the Trust in a timely manner and as per the provisions of the InvIT Regulations and other applicable law.

(v) The Trustee shall, based on the written recommendation by the Investment Manager, from time to time, in the interests of administrative and operational convenience, delegate to any committee or person, any powers and duties including management of the trust fund vested in it under the Trust Deed, provided, however, that the Trustee shall remain liable for all the acts of commission or omission of such person being the delegatee (such liability as may be determined finally by a court of competent jurisdiction, whose decision is final and non-appealable) except in cases of gross negligence, misconduct, wilful default and fraud by such person or committee, as determined finally by a court of competent jurisdiction, whose decision is final and non-appealable. Any action taken by such committee or person in respect of the trust fund shall be construed as an act done by the Trustee.

(vi) Subject to the provisions of the Trust Deed and the InvIT Regulations, the Trustee shall, based on the written recommendation of the Investment Manager, have the power to create such reserves in respect of the Trust, as it may deem proper, in order to meet the expenses, liabilities (including potential tax liability) or contingent liabilities of the Trust.

(vii) The Trustee shall have the power to cause the offering of Units of the Trust, cause any Offer Documents to be provided to the investors, and issue and allot Units to the Unitholders of the Trust, which power

shall be exercised by the Investment Manager in terms of the Investment Management Agreement.

(viii) The Trustee shall, based on the written recommendation of the Investment Manager, have the power to incur and pay expenses (including any taxes or other statutory charges) out of the trust fund, on behalf of the Trust, in accordance with the terms of the InvIT Documents. The Trustee (on behalf of the Trust) shall also have the power to utilise any tax credits available to the Trust, prior to making any such payment of taxes or expenses.

(ix) Subject to applicable law, the Trustee shall, based on the written recommendation of the Investment Manager, have the power to borrow monies with respect to the Trust and/or Holdco(s) and/or SPV(s) and for the purpose of fulfilling the objectives of the Trust (through any mode, including by way of issuance of debt securities, commercial paper, subordinated debt, equity or other securities or instruments permitted under the InvIT Regulations or other applicable law) from any person or authority (whether government or otherwise, whether Indian or overseas) on such terms and conditions, and for such periods and purpose, as may be permitted under the InvIT Regulations and approved by the Unitholders (to the extent required under applicable law), and offer such security as it may deem fit, for the purpose of making such borrowing. Further, the Trustee (acting in capacity of the trustee of the Trust) shall have the power, based on the written recommendation of the Investment Manager, to create charge, security interest and/or lien over any or all of the assets of the Trust (both, present or future), to secure and/or guarantee the performance of any of the obligations of the Holdco(s)/SPV(s), as it may deem fit.

(x) The Trustee shall have the power, based on the written recommendation of the Investment Manager, apart from acting personally, to employ and pay at the expense of the Trust, any agent in any jurisdiction, whether attorneys, solicitors, brokers, banks, trust companies or other agents, whether associated or connected in any way with the Trustee or not, without being responsible for the default of any agent if employed in good faith to transact any business including without limitation, the power to appoint agents to raise funds, or do any act required to be transacted or done in the execution of the trusts hereof including the receipt and payment of moneys and the execution of documents.

(xi) The Trustee, based on the written recommendation of the Investment Manager, may permit any property comprised in the Trust, or any documents in relation thereto, to be, and remain, deposited with a custodian or with any Person in India subject to such deposit being permissible under applicable law.

(xii) In the event that any capital gains tax, income tax, stamp duty or other duties, fees, cess or other taxes (and any interest or penalty chargeable thereon), become payable in any jurisdiction, the Trustee may, based on the written recommendation of the Investment Manager, pay all such duties, fees, cess or other taxes (and any interest or penalty chargeable thereon), out of the trust fund in accordance with applicable law and the advice of tax consultants. The Trustee may, based on the written recommendation of the Investment Manager, file tax returns with the relevant governmental agencies, in accordance with Applicable Law and the advice of tax consultants.

(xiii) The Trustee shall have the power, based on the written recommendation of the Investment Manager, to take the opinion of legal and tax counsel in any jurisdiction concerning any disputes or differences arising under the Trust Deed, in connection with any investments or any matter incidental thereto and the fees of such counsel shall be paid out of the trust fund.

(xiv) The Trustee shall cause the Investment Manager to insure the InvIT Assets against any loss or damage from any peril, any assets and property forming part of the Trust for any amount, as per the InvIT Regulations, and to pay the premiums out of the trust fund.

(xv) The Trustee shall ensure and cause the Investment Manager to maintain the registrar and transfer agent to maintain a register of the Units of the Trust.

(xvi) Subject to restrictions contained in the InvIT Documents and applicable laws (including the limits and restrictions prescribed under the InvIT Regulations), the Trustee may, based on the written recommendation of the Investment Manager, extend loans from the trust fund to the Holdco(s)/ SPV(s) and also subscribe to debt securities or quasi debt securities or any similar kind of securities issued by the Holdco(s)/ SPV(s) or any other person permitted under the applicable law from the trust fund.

(xvii) Subject to applicable law, the Trustee may at any time, based on the written recommendation of the Investment Manager, buyback the Units from the Unitholders.

(xviii) Subject to applicable law, the Trustee shall have the right (to be exercised based on the written recommendation of the Investment Manager) (i) to pay interest, prepay or repay any and all debt raised from any person, in accordance with the terms therein and (ii) to redeem any debt securities or other securities, obligations or instruments in accordance with the terms thereof issued to persons in compliance with the InvIT Regulations and other applicable law.

(xix) The Trustee may, in execution of the Trust hereof or in exercise of any of the powers hereby or by law given to the Trustee sell, rent or buy any property, accept any property before the time at which it is transferable or payable or borrow property from or carry out any other transaction with the trustees of any other trust or the executors or administrators of any estate notwithstanding that the Trustee is the same person as those trustees, executors or administrators or any of them and where the Trustee is the same person as those trustees, executors or administrators, the transaction shall be binding on all persons then or thereafter interested hereunder though effected and evidenced only by an entry in the books of accounts of the Trustee, provided such power is delegated to, and exclusively exercised by, the Investment Manager pursuant to the Investment Management Agreement. The Trustee shall ensure that no conflicts of interest shall arise whilst conducting such activities.

(xx) In accordance with applicable law and InvIT Regulations, the Trustee based on the written recommendation of the Investment Manager (subject to such recommendation not resulting in any additional cost to the Trust, Holdcos or SPVs), has the power to institute unit stock option schemes of the Trust including for the benefit of the employees of the Investment Manager, SPV(s) and Holdco(s) and any other employees that the Investment Manager may determine to be eligible, in accordance with applicable law, or unit stock option schemes in lieu of management fees in accordance with applicable law.

(xxi) The Trustee may, make rules to give effect to, and carry out the objectives of the Trust, subject to applicable law. In particular, and without prejudice to the generality of such power, the Trustee may provide, in a manner not inconsistent with the provisions of the Trust Deed and the InvIT Regulations, for all or any of the following matters namely:

(a) manner of maintaining of the records and particulars of the Unitholders;

(b) norms of investment by the Trust in accordance with the objectives of the Trust and in accordance with the powers and authorities of the Trustee;

(c) matters relating to entrustment, deposit or handing over of any securities or shares of the SPVs of the Trust to any one or more custodians and the procedure relating to the holding thereof by the custodian;

(d) such other administrative, procedural or other matters relating to the administration or management of the affairs of the Trust and which matters are not, by the very nature, required to be included or provided for in the Trust Deed or by the management thereof and which matters are not inconsistent with the objectives of the Trust, the Trust Deed and applicable law;

(e) procedure for seeking the vote of the Unitholders either by calling a meeting or through postal ballot or otherwise; and

(f) procedure for summoning and conducting meetings of Unitholders.

The aforementioned power to make rules may be delegated by the Trustee to the Investment Manager subject to the InvIT Regulations and in terms of the Investment Management Agreement.

(xxii) The Trustee shall also have the following powers and authorities exercisable pursuant to the written recommendation of the Investment Manager:

(a) to make and give receipts, releases and other discharges for moneys payable to the Trust and for the claims and demands of the Trust;

(b) to enter into all such negotiations and contracts, and, execute and do all such acts, deeds and things for or on behalf of or in the name of the Trust as the Trustee may consider expedient for or in relation to any of the matters or otherwise for the purposes of the Trust;

(c) to sign, seal, execute, deliver and register according to applicable law all deeds, documents, and assurances in respect of the Trust;

(d) to take into their custody and/or control all the capital, assets, property of the Trust and hold the same in trust for the Unit Holders in accordance with the Trust Deed and the InvIT Regulations; and

(e) generally, to exercise all such powers as it may be required to exercise under the InvIT Regulations for the time being in force and do all such matters and things as may promote the Trust or as may be incidental to or consequential upon the discharge of its functions and the exercise and enforcement of all or any of the powers and rights under the Trust Deed.

Duties of the Trustee

(i) The Trustee shall, with the assistance of the Investment Manager, in accordance with the Investment Management Agreement, make all necessary applications to such governmental agencies as may be required for the Trust to carry on its activities.

(ii) The Trustee shall comply with the core principles encompassing transparency, accountability, due diligence and compliance with the InvIT Regulations while carrying out its roles and responsibilities, including those as set out in the Trust Deed and, in consultation with the Investment Manager, adopt additional measures or responsibilities as may be required to meet such principles including but not limited to engaging external consultants and other intermediaries in accordance with applicable laws.

(iii) The Trustee shall use best endeavours to carry on and conduct its business in a proper and efficient manner to protect the interests of the Unitholders and in accordance with the InvIT Regulations, and act impartially in its fiduciary capacity and prioritize the protection of the interests of the unitholders.

(iv) The Trustee shall periodically review the status of Unitholders' complaints and their redressal undertaken by the Investment Manager in accordance with the InvIT Regulations.

(v) The Trustee shall ensure that all transactions executed by the Investment Manager, the Project Manager, and any service provider to whom the Trustee has delegated any powers or duties, are done in accordance with the Trust Deed, the Investment Management Agreement, the Project Implementation and Management Agreement, the InvIT Regulations and the agreement executed with such service provider.

(vi) The Trustee shall hold the trust fund and all assets comprised thereunder, in trust for the benefit of the Unitholders in accordance with the Trust Deed and the InvIT Regulations.

(vii) The Trustee shall also be responsible for opening and operating bank accounts on behalf of the Trust. It is hereby clarified that, to the extent that any authority has been delegated to the Investment Manager in accordance with the Investment Management Agreement, the Investment Manager shall be responsible for undertaking such actions.

(viii) The Trustee shall ensure that the capital contribution received whether by way of (I) public issue of Units through an offer document; or (II) private placement through a placement memorandum, as the case may be, is kept in a separate bank account in the name of the Trust and is only utilised for adjustment against allotment of Units or refund of money to the applicants in the manner set out in the InvIT Regulations, and the same will be utilised for the objectives stated in the offer document or the placement memorandum (as applicable).

(ix) The Trustee shall maintain all the records that are required to be maintained pursuant to Regulation 26(2) of the InvIT Regulations or otherwise required under applicable law. The Trustee shall ensure that the Investment Manager maintains the books of accounts of the Trust in accordance with the Trust Deed.

(x) The Trustee shall have the duty and power to pay as well as to create any reserves in relation to any capital gains tax, income tax, stamp duty or other duties, fees, cess or other taxes (and any interest or penalty chargeable thereon) payable in any jurisdiction in respect of the Trust or in respect of the Units (as specifically applicable to the Trust) in any circumstances whatsoever, out of the trust fund in accordance with the InvIT Documents and applicable law, based on the written recommendation of the Investment Manager and the advice or opinion of tax consultants. It is clarified that, no Unitholder will be required to make Capital contribution as a capital commitment to the Trust over and above the amount

already paid as the value for the Units.

(xi) The Trustee, either by itself or through the Investment Manager, shall from time to time file such reports and provide such information as may be required by the SEBI or Stock Exchanges (if applicable) or any other regulatory authority or as required under the InvIT Regulations and applicable law, with respect to the activities carried on by the Trust.

(xii) The Trustee shall, through the Investment Manager, from time to time provide such documents and information to the Unitholders, as may be required by the SEBI, Stock Exchanges (if applicable) or other governmental agencies, with respect to the activities carried on by the Trust. The Trustee shall comply with intimation requirements under the InvIT Regulations, including in relation to intimating SEBI in case of any discrepancy in the operations of the Trust with the InvIT Regulations and the offer document or the placement memorandum (as applicable). The Trustee shall also immediately inform SEBI in case any act which is detrimental to the interest of the Unitholders is noted. Further, the Trustee shall intimate SEBI, in case of failure by the Investment Manager to submit to the Trustee any information or reports as specified under the InvIT Regulations, within the timelines set out under the InvIT Regulations. It is clarified that the Trustee shall also simultaneously send a written notice to the Investment Manager in the event any such intimation has been made to SEBI.

(xiii) The assets and liabilities of the Trust shall at all times be segregated from the assets and liabilities of any other trusts managed by the Trustee. The assets held under the Trust shall be held for the exclusive benefit of the Unitholders of the Trust and such assets shall not be subject to the claims of any creditor or other person claiming under any other trust or fund administered by the Trustee or managed by the Investment Manager, as the case may be.

(xiv) The Trustee shall ensure that all acts, deeds and things are done with a view to attain the objects of the Trust as set out in the Trust Deed, and in compliance with applicable law and the InvIT Documents, in order to secure the best interests of the Unitholders.

(xv) The Trustee shall delegate all such powers to the Investment Manager as may be required by the Investment Manager to carry out its obligations under the Investment Management Agreement and under applicable law.

(xvi) The Trustee shall oversee activities of the Investment Manager in the interest of the Unitholders, ensure effective management oversight over the Investment Manager and the Trust and maintain high standards of governance of the Investment Manager and the Trust.

(xvii) The Trustee shall ensure that the Investment Manager complies with all applicable reporting and disclosure requirements in accordance with the InvIT Regulations and obtain a compliance certificate from the Investment Manager on a quarterly basis or such other time period as prescribed by applicable law, in the form prescribed by SEBI, if any, and other applicable law and in case of any delay or discrepancy, require the Investment Manager to rectify such delay or discrepancy on an urgent basis.

(xviii) The Trustee shall require the Investment Manager to set up such systems and procedures and submit such reports to the Trustee, as may be necessary for effective monitoring of the functioning of, and of the Trust.

(xix) The Trustee shall ensure that the activity of the Trust is being operated in accordance with the provisions of the Trust Deed, the InvIT Regulations and the InvIT Documents, and in the event that any discrepancy is noted the Trustee shall inform the same to the SEBI immediately in writing. However, it is provided that the Trustee shall also simultaneously send a written notice to the Investment Manager in the event any such intimation has been made to SEBI.

(xx) The Trustee shall review all documents, reports, records and information submitted by the Investment Manager to the Trustee in accordance with Regulation 10 of the InvIT Regulations and applicable provisions of the Trust Deed.

(xxi) The Trustee shall delegate all such powers to the Project Manager as may be required by the Project Manager to carry out its obligations under the Project Implementation and Management Agreement and under applicable law.

(xxii) The Trustee shall oversee activities of the Project Manager in the interest of the Unitholders, ensure that

the Project Manager complies with the InvIT Regulations and the Project Implementation and Management Agreement and obtain a compliance certificate from the Project Manager on a quarterly basis or such other time period as prescribed by applicable law, in the form prescribed by SEBI, if any.

(xxiii) The Trustee shall ensure and cause the Investment Manager to (i) convene meetings of the Unitholders in accordance with the InvIT Regulations and (ii) shall oversee the voting by the Unitholders and declare the outcome of such meetings;

Provided that, where there is: (a) a change or removal of the Investment Manager, or a change in control of the Investment Manager of the Trust, the Trustee shall be responsible for convening and conducting of the meetings of the Unitholders, as provided in the InvIT Regulations and the InvIT Documents; and (b) any issue pertaining to the Trustee, such as change in the Trustee, the Trustee shall not be involved in any manner in the conduct of the meetings of the Unitholders.

(xxiv) The Trustee shall ensure and cause the Investment Manager to convene meetings of the Unitholders at least once every year within requisite number of days from the end of a financial year (as prescribed under the InvIT Regulations) with the period between such meetings not exceeding such number of months as is prescribed under the InvIT Regulations.

(xxv) The Trustee shall take up with SEBI or with the Stock Exchanges (if applicable), any matter which has been approved in any meeting of Unitholders, if the matter requires such action.

(xxvi) The Trustee shall oversee and review the transactions carried on between the Investment Manager and its associates and where the Investment Manager has advised that there may be a conflict of interest, the Trustee must obtain a certificate from a practising chartered accountant or a Valuer as applicable specifying that such transactions are on an arms' length basis.

(xxvii) The Trustee shall (i) obtain the prior approval of the Unitholders in accordance with the requirements of the InvIT Regulations for a proposed change in the Investment Manager or change in control of the Investment Manager; and (ii) to the extent applicable, obtain prior approval of the SEBI, in the event of a proposed change in the Investment Manager or change in control of the Investment Manager.

(xxviii) The Trustee shall (i) in case of change in Project Manager due to removal or otherwise, appoint a new project manager within the time period prescribed under the InvIT Regulations; and (ii) in case of a change in control of the Project Manager in a PPP Project, ensure that the written consent of the relevant authority is obtained in terms of any applicable agreement or arrangement prior to such change, where applicable.

(xxix) The Trustee shall, promptly on occurrence, send a written notice to the Investment Manager and the Unitholders of a cancellation, revocation or suspension of its registration to act as a trustee under applicable law or a breach of the terms of such registration that will materially impair its ability to perform its obligations and exercise its powers under the Trust Deed.

(xxx) The Trustee and its directors, officers, employees and agents shall at all times maintain confidentiality as regards the activities and assets of the Trust and such other matter connected with them and the Trust generally and shall not disclose any confidential information to any other Person, other than the Investment Manager, or the Project Manager, unless such information is required to be disclosed to a governmental agency.

(xxxi) The Trustee shall wind up the Trust in accordance with the InvIT Regulations and applicable law. Upon winding up of the Trust, the Trustee shall surrender the certificate of registration to SEBI.

(xxxii) Without limiting the foregoing general duties, the Trustee shall perform all the duties and obligations set out in the InvIT Regulations, including those applicable duties and obligations set out in Regulation 9 of the InvIT Regulations, as may be amended, modified or supplemented from time to time.

(xxxiii) The Trustee shall also comply with the roles and responsibilities set out in Schedule IV of the Trust Deed in accordance with the InvIT Regulations and as may be prescribed under applicable law.

Rights of the Trustee

The Trustee shall have the following rights:

(i) The Trustee shall have the right to receive trusteeship fees from the trust fund for services to be rendered in relation to the administration and management of the Trust.

(ii) The Trustee may, in the discharge of its duties, act upon any advice obtained in writing from any qualified bankers, accountants, brokers, lawyers, professionals, consultants, or other experts acting as advisors to the Trustee.

(iii) The Trustee may, based on the written recommendation of the Investment Manager, appoint any scheduled commercial bank to act as the banker to the Trust, on the same terms and conditions extended by such a bank to similar customers.

(iv) The Trustee shall be entitled to the reimbursement of all reasonable expenses incurred by the Trustee on behalf of the Trust, including any direct or indirect tax or duty, which has become or may become leviable under applicable law. Such expenses shall be paid out of the trust fund.

(v) Subject to applicable law, the Trustee acknowledges that no Unitholder (acting in its capacity as a Unitholder) shall be entitled to inspect or examine the Trust's premises or properties (or documents relating thereto) without the prior approval of the Investment Manager. Further, no Unitholder (acting in its capacity as a Unitholder) shall be entitled to require discovery of any information with respect to any detail of the Trust's activities or any matter which may be related to the conduct of the business of the Trust and which information may, in the opinion of the Investment Manager adversely affect the interest of other Unitholders.

(vi) The Trustee may accept as sufficient evidence for the value of any investment or for the cost price or sale price thereof or for any other fact within its competence, a certificate by a Valuer or any other professional person appointed by the Investment Manager for the purpose.

Liabilities of the Trustee

The liabilities of the Trustee in terms of the Trust Deed are as follows:

(i) The Trustee shall only be liable for such monies, stocks, funds, shares, securities, investment or property as the Trustee shall have actually received and shall not be liable or responsible for any banker, broker, custodian or other person in whose hands the same may be deposited or placed, nor for the deficiency or insufficiency in the value of the trust fund nor otherwise for any involuntary loss provided that the Trustee or such person shall have acted in good faith, without gross negligence and shall have used their best efforts in connection with such dealings and matters.

(ii) Any receipt signed by the Trustee for any monies, stocks, funds, shares, securities, investment or property, paid, delivered or transferred to the Trustee by virtue of the Trust Deed or in exercise of the duties, functions and powers as Trustee, shall effectively discharge the Trustee or the person paying, delivering or transferring the same provided that the Trustee or such person shall have acted in good faith, without gross negligence and shall have used their best efforts in connection with such dealings and matters.

(iii) The Trustee shall not be under any liability on account of anything done or omitted to be done or suffered by the Trustee in good faith in accordance with, or in pursuance of any request or advice of the Investment Manager.

(iv) The Trustee shall not be responsible for the authenticity of any signature or of any seal affixed to any endorsement on any certificate or to any transfer or form of application endorsement or other document effecting the title to or transmission of interests in the Trust or of any of the investments or be in any way liable for any forged or unauthorised signature on or any seal affixed to such endorsement transfer or other document or for acting upon or giving effect to any such forged or unauthorised signature or seal. The Trustee shall be entitled but not bound to require that the signature of any Unitholder to any document required to be signed by such Unitholder under or in connection with these presents, be verified to the reasonable satisfaction of the Trustee.

(v) The Trustee shall not be liable for any act or omission that may result in a loss to an Unitholder by way of depletion in the value of the trust fund or otherwise, except in the event that such depletion is a result of fraud, gross negligence or misconduct on the part of the Trustee as determined by the court of competent jurisdiction or results from a breach by the Trustee of the Trust Deed, as conclusively

determined by a court of competent jurisdiction.

(vi) Nothing in the Trust Deed exempts or indemnifies the Trustee against liability for: (i) breach of trust under the Indian Trusts Act, 1882; or (ii) fraud, gross negligence or misconduct; or (iii) violation of applicable law by the Trustee (to the extent that such violation prejudicially affects the Trust); or (iv) failure to show the degree of care and diligence required of them as a trustee under the Indian Trusts Act, 1882 while carrying out the duties described in the Trust Deed, as conclusively determined by the court of competent jurisdiction.

(vii) The Trustee shall not be liable to the Unitholders for doing or failing to do any act or thing which by reason of any provision of applicable law, or of any decree, order or judgment of any court, or by reason of any direction made by any person acting with or purporting to exercise the authority of any governmental agency, it is directed or requested to do or perform or to forbear from doing or performing. If, for any reason it becomes impossible or impracticable to carry out any act or thing under the provisions of the Trust Deed, the Trustee shall not be under any obligation to perform such act or thing provided that the Trustee promptly provides a notice to the Sponsor and Investment Manager of such action in writing.

(viii) The Trustee shall have the right but not obligation to institute, acknowledge the service of, appear in, prosecute or defend any action, suit, proceedings or claim (including tax proceedings) in respect of the provisions hereof or in respect of the assets of the Trust or any part thereof or any corporate action which in its opinion, acting on advice of the Investment Manager would or might involve an expense or a liability, unless the Investment Manager shall so request in writing and the Trustee is satisfied that the value of the investment is sufficient to provide adequate indemnity against costs, claims, damages, expenses or demands to which it may be put as the trustee as a result thereof. The costs in relation to such action, suit, proceedings or claims (whether undertaken upon request of Investment Manager or otherwise) incurred by the Trustee in connection with or arising out of the Trust, shall be borne by the Trust.

(ix) Nothing contained in the Trust Deed shall be construed to preclude the Trustee from acting as trustee of other trusts, alternate investment funds, venture capital funds, private equity funds, real estate investments trusts, infrastructure investment trusts, private trusts or customized fiduciary trusts separate and distinct from the Trust, and retaining for its own use and benefit all remuneration, profits and advantages which it may derive therefrom, as permitted under applicable law.

(x) The liability of the Trustee shall not exceed the fees received by the Trustee, except in case of any gross negligence, misconduct or fraud on the part of the Trustee as conclusively determined by a court of competent jurisdiction.

(xi) If the Trustee engages any external advisors or experts after having obtained the consent of the Investment Manager (in accordance with the Trust Deed), to discharge its obligations under the Trust Deed, or undertakes any work (after having obtained the consent of the Investment Manager, in the interest of the Unitholders) which is not covered within the scope of work of the Trustee under the Trust Deed and such additional work is beyond the obligations of the Trustee under applicable laws, the Trustee shall be entitled to recover such costs, charges and expenses which the Trustee may incur in this regard, from the trust fund. Further, it is clarified that, the Trustee will not be required to utilize funds held by the Trustee under the Trust Deed, for any other trust for which, Axis Trustee Services Limited is appointed as a trustee.

Provisions relating to Unitholders

(i) The Unitholders shall be entitled to receive the Distributions made by the Trust in the proportion of their respective beneficial interest. The beneficial interest of each Unitholder shall be equal and limited to the proportion of the number of Units held by that Unitholder to the total number of Units issued by the Trust as on a relevant date.

(ii) No Unitholder shall have a right or authority to act for, or bind, the Trust. Further, no Unitholder shall have a right to make decisions with respect to the Trust, save and except to the extent provided in the InvIT Regulations. The approval of the Unitholders will be obtained in the manner and to the extent specified in the InvIT Regulations.

(iii) The liability of each Unitholder towards the payment of any amount (that may arise in relation to the trust fund including any taxes, duties, fines, levies, liabilities, costs or expenses) shall be limited only to the extent of the capital contribution of such Unitholder and after such capital contribution shall have been paid in full by the Unitholder, the Unitholder shall not be obligated to make any further payments pursuant to the Trust Deed. For the avoidance of doubt, no Unitholder shall have any personal liability or obligation with respect to the Trust, except as may be required under applicable law.

(iv) Each Unit allotted to the Unitholders shall have one vote for any decisions requiring a vote of Unitholders.

(v) No Unitholder shall enjoy superior voting or any other rights over another Unitholder.

(vi) Provided however, any Unitholder holding, either individually or collectively, not less than 10% (ten percent) of the total outstanding units of the Trust (or such other threshold as may be prescribed by SEBI from time to time or under applicable law), shall have the right (but not an obligation) to nominate one director on the board of directors of the Investment Manager in the manner and to the extent specified under the InvIT Regulations. The terms and conditions for the nomination and appointment of such director, as well as the vacation of office by such director, shall be as set out in (i) policies formulated in this regard by the Trust and/ or the Investment Manager; and (ii) applicable law.

(vii) In no event shall a Unitholder have or acquire any rights against the Trustee and the Investment Manager except as expressly conferred on such Unitholder in accordance with the InvIT Regulations, nor shall the Trustee or the Investment Manager be bound to make payment to any Unitholder, except out of the funds held by it for that purpose under the provisions of the Trust Deed.

(viii) A Unitholder whose name and account details are entered in the depository register shall be the only person entitled to be recognized by the Trustee as having a right, title, interest in or to the Units registered in his name and the Trustee shall recognize such holder as an absolute owner. Provided that the Trustee shall be required to recognize and give effect to the terms of any voting arrangements, power of attorneys and proxies executed by Unitholders in respect of their Units, in respect of which the Trustee has been notified.

(ix) The Unitholders (acting in their capacity as unitholders of the Trust) shall not give any directions to the Trustee, the Investment Manager or the Project Manager (whether in a meeting of Unitholders or otherwise) if it would require the Trustee, the Investment Manager or the Project Manager to do or omit doing anything which may result in:

(a) the Trust or the Trustee, in its capacity as the trustee of the Trust or the Investment Manager, in its capacity as the investment manager of the Trust or the Project Manager, in its capacity as the project manager of the Trust ceasing to comply with applicable law; or

(b) interference with the exercise of any discretion expressly conferred on the Trustee by the Trust Deed or the Investment Manager or the Project Manager by the Investment Management Agreement or the Project Implementation and Management Agreement, respectively, or the determination of any matter which requires the agreement of the Trustee or the Investment Manager, provided that nothing in the Trust Deed shall limit the right of the Unitholder to require the due administration of the Trust in accordance with the Trust Deed.

(x) The depository register shall (save in case of manifest error) be conclusive evidence of the number of Units held by each depositor and in the event of any discrepancy between the entries of the depository register and any statement issued by the depository, the entries in the depository register shall prevail unless the depositor proves to the satisfaction of the Trustee and the depository that the depository register is incorrect.

(xi) The Unitholders shall have the right to call for certain matters to be subject to their consent, in accordance with the InvIT Regulations and applicable law.

(xii) Subject to applicable restrictions, the Unitholders may, transfer any of the Units to an investor where such investor accepts all the rights and obligations of the transferor and the Trustee or the Investment Manager shall give effect to such transfer in accordance with applicable law.

(xiii) The Trustee shall ensure that the Investment Manager obtains the consent of the Unitholders for the

matters prescribed under the InvIT Regulations, in accordance with the provisions of the InvIT Regulations. For matters requiring approval under the InvIT Regulations, consent or vote of the Unitholders (as applicable), the approval, consent or vote (in each case as applicable) shall be on the basis of the relevant threshold in terms of the beneficial interest.

(xiv) The unitholders shall comply with the stewardship code under the InvIT Regulations, as applicable.

Indemnification

In addition to the fees, distributions and expense reimbursements herein described, the InvIT Assets shall be utilized to indemnify and hold harmless the Trustee, the Sponsor and any of their respective officers, directors, shareholders, sponsors, partners, members, employees, advisors and agents ("**Indemnitees**") from and against any claims, losses, costs, damages, liabilities and expenses, including legal fees ("**Losses**") suffered or incurred by them by reason of their activities on behalf of the Trust, unless such Losses resulted from fraud, gross negligence, wilful default or wilful misconduct or breach of any obligations or duties under applicable law by the relevant Indemnitee, as conclusively determined by a court of competent jurisdiction.

Termination

The Trust is subject to dissolution and termination in accordance with and subject to the InvIT Regulations and applicable laws:

(i) illegality of the Trust;

(ii) if it is impossible to continue with the Trust or if the Trustee on advice of the Investment Manager deems it impracticable to continue the Trust;

(iii) delisting of the Units of the Trust from the Stock Exchanges;

(iv) if SEBI has passed a direction for the winding up of the Trust or if the Trust is required to be wound up pursuant to the InvIT Regulations;

(v) refusal to grant a certificate of registration to the Trust by SEBI, due to any reason whatsoever; or

(vi) if the Trust fails to make any offer of Units by way of public issue or private placement (as applicable) within the time period stipulated in the InvIT Regulations or any other time period as specified by SEBI (whichever is earlier), in which case the Trust shall surrender its certificate to SEBI and cease to operate as an infrastructure investment trust, unless the period is extended by SEBI.

D. The Investment Manager – EAAA TransInfra Managers Limited

History and Certain Corporate Matters

EAAA TransInfra Managers Limited is the Investment Manager of the Trust. The Investment Manager is a public company limited by shares under the Companies Act, 2013 incorporated on April 18, 2025, pursuant to a certificate of incorporation issued by the Registrar of Companies, Central Registration Centre dated April 18, 2025 with the corporate identification number U66309MH2025PLC446014. The Investment Manager's registered office is situated at Plot 294/3, Edelweiss House, Off CST Road, Kalina, Santacruz East, Vidyanagari, Mumbai 400 098, Maharashtra, India.

Background of the Investment Manager

The principal business of the Investment Manager in terms of its memorandum of association is to carry on the business of acting as investment manager, investment adviser, trustee, settlor, sponsor, promoter, portfolio manager, manager, administrator, attorney, agent, consultant, representative or nominee of or for any investment funds, unit trusts, private equity funds, debt funds, mutual funds, venture capital funds, alternative investment funds, hedge funds, collective investment schemes, taxable or tax exempt funds, trusts, pooled investment vehicles, special purpose vehicles, infrastructure investment trusts, real estate investment trusts, or any other portfolio of securities, properties and/or assets of any kind, including any pension, provident fund or superannuation fund set up, formed or established in India or in any other country by the Investment Manager or by any other person including bodies corporate, limited liability partnerships, partnerships, trusts, societies, associations of persons, or by government, state, local authority, institute (whether incorporated or not) of any

other agency or organization with respect to any class of assets, and to thereby settle, administer, manage and deploy funds, acquire, take up, manage, invest, hold, sell, deal or dispose of all or any property, investments, securities or other assets of any kind whatsoever. To provide advisory, investment management and business consultancy services on projects relating to highways, logistics and other infrastructure assets and to render all allied services as are usually rendered by investment managers and business consultants whether directly or through third parties in India and abroad.

Being a newly incorporated company, the Investment Manager does not fulfil the experience criteria prescribed under Regulation 4(2)(e)(ii) by itself and has accordingly relied on the combined experience of its directors or employees as permitted under Regulation 4(2)(e)(ii). The cumulative experience of the key personnel (*i.e.*, directors or employees, as applicable) having more than five years of experience each, of the Investment Manager in fund management or advisory services in the infrastructure sector is at least 30 years. Accordingly, the Investment Manager is eligible to act as such, in terms of Regulation 4(2)(e)(ii) of the InvIT Regulations.

Further, in accordance with the eligibility criteria specified under the InvIT Regulations, the Investment Manager has a net worth of not less than ₹ 100 million as on December 31, 2025.

Other Confirmations

Neither the Investment Manager nor any of the promoters or directors of the Investment Manager (i) is debarred from accessing the securities market by SEBI; (ii) is a promoter, director or person in control of any other company or a sponsor, investment manager or trustee of any other infrastructure investment trust or an infrastructure investment trust which is debarred from accessing the capital market under any order or direction made by SEBI; or (iii) is in the list of wilful defaulters published by the RBI.

Board of Directors of the Investment Manager

The board of directors of the Investment Manager ("**IM Board**") is entrusted with the responsibility for the overall management of the Investment Manager. Please see below the details in relation to the IM Board:

Sr. No.	Name	DIN	Designation
1.	Bhavyang Oza	11315739	Whole-time Director*
2.	Sreekumar Chatra	07149285	Non-executive Director
3.	Subahoo Chordia	09216398	Non-executive Director*
4.	Vidya Basarkod	02799562	Independent Director*
5.	Suresh Gurumani	00636844	Independent Director*
6.	Emandi Sankara Rao	05184747	Independent Director*

* *The appointment will be regularised in next Annual General Meeting as per the Companies Act, 2013*

Brief profiles of the Directors of the Investment Manager

Please see below brief profiles of the directors of the Investment Manager:

Bhavyang Oza is the whole-time director and chief investment officer of the Investment Manager. He holds a bachelor's degree in engineering (chemical) from the University of Pune and a master's degree in management studies from the University of Mumbai. He has over 26 years of experience in infrastructure investment, fixed income business, debt placements and advisory across infrastructure sub-sectors such as roads, renewable energy generation and logistics. He was previously associated with IFCI Limited, Axis Bank Limited (*formerly known as UTI Bank Limited*), Edelweiss Capital Limited, Wachiova Management Services Private Limited, Kotak Alternate Asset Managers Ltd, Kotak Mahindra Bank.

Sreekumar Chatra is a non-executive director of the Investment Manager and a non – executive director of Sponsor. For more details, please see, "- *The Sponsor – Epic Transnet Infrastructure Private Limited- Brief profiles of the Directors of the Sponsor"* on page 122.

Vidya Basarkod is an independent director of the Investment Manager. She holds a bachelor's degree in civil engineering from Gulbarga University, Karnataka and a master's degree in technology (structural engineering) from the Indian Institute of Technology, Bombay. She has several years of experience in acquisition, development and delivery of various projects, including airports, ports, metro rails, roads, highways, etc. She is currently associated with COWI India, as its managing director. She was previously associated with Ramboll India as its managing director, Jaypee Infratech Limited as its president (real estate- marketing), Reliance Capital Limited as its vice president (infrastructure), Reliance Airport Developers Private Limited, Babtie Consultants as its Director

where she was involved in business development, divisional director of the infrastructure division of Mumbai and Mott MacDonald.

Suresh Gurumani is an independent director of the Investment Manager. He is a qualified chartered accountant. He has several years of experience in various sectors such as banking, small medium enterprises, and microfinance. He was previously associated with SKS Microfinance as its managing director and chief executive officer.

Emandi Sankara Rao is an independent director of the Investment Manager. He has over 30 years of experience across sectors such as infrastructure finance, project development, and project finance. He holds bachelor's degree in electrical engineering from Andhra University. He holds a Doctor of Philosophy from Indian Institute of Technology Bombay in project finance and network effectiveness, wherein he authored a thesis on "A techno-economic framework for sensitivity and risk analysis towards network effectiveness". He also holds a Master of Technology in reliability engineering from Indian Institute of Technology Kharagpur and a post graduate diploma in business administration from Pondicherry University and is a Chartered Engineer (India) from the Institution of Engineers (India).

He has held leadership roles in both public and private sector institutions. He served as the managing director and chief executive officer of IFCI Ltd. from 2017–2020, and was appointed by the Government of India. Prior to his role at IFCI Ltd., he associated with IIFCL Asset Management Company Limited as Director & Chief Executive Officer of IIFCL Mutual Fund (IDF) Scheme and CEO of IIFCL Projects Ltd.

Subahoo Chordia is the non-executive director of the Investment Manager. He has been associated with Edelweiss group companies since August 13, 2007 and is currently designated as the chief-executive officer of EAAA India Alternatives Limited. Further, he is also associated with EAAA Real Assets Managers Limited as a non-executive director.

He is responsible for overseeing investments MDs, Asset Management and Operation Heads, and Coverage heads, each with atleast 20 years of specialist experience and is responsible for driving the growth and management of the real assets investment strategies of EAAA India Alternatives Limited. He is an associate of the Institute of Chartered Accountants of India and prior to joining EAAA India Alternatives Limited, he was associated with IDBI Bank Limited and Axis Bank Limited (erstwhile UTI Bank Limited).

Brief profiles of the key personnel of the Investment Manager

In addition to Bhavyang Oza, Whole-time Director and Chief Investment Officer of the Investment Manager, whose details are provided under "***- Brief profiles of the Directors of the Investment Manager***" above, please see below brief profiles of the other key personnel of the Investment Manager:

Parthasarathy Padmanabhan is the Chief Financial Officer of the Investment Manager and of the Trust. He is a Cost Accountant and a member of the Institute of Cost Accountants of India. He has completed his master's degree in commerce from University of Madras and holds a diploma in IFRS from ACCA issued by KPMG, India. He has over 30 years of experience, which includes his experience at Larsen & Toubro for approximately 17 years, and thereafter after at L&T Infrastructure Projects Development Limited (*currently known as Epic Concesiones 3 Private Limited*).

Harshad Shukla is the Principal of the Investment Manager. He has passed the final examination held by the Indian Institute of Chartered Accountants and CFA Institute. He has over 17 years of experience in the fields of equity research, investments, project financing and strategy, including in the roads and highways sectors. He was previously associated with Athaang Infrastructure Private Limited / Athaang Infrastructure Investment Manager Private Limited, D.E. Shaw India Software Private Limited, Emkay Global Financial Services Limited, Lanco Vidarbha Thermal Private Limited and Essel Corporate LLP and others.

Pravin Karambelkar is the Company Secretary and Compliance Officer of the Investment Manager and the Trust. He is a member of the Institute of Company Secretaries of India and has completed his bachelors of commerce and bachelor of laws from University of Mumbai. He has over 12 years of experience in secretarial and regulatory compliance. He has worked with Athaang Infrastructure Private Limited, TRIL Urban Transport Private Limited, Tata Realty and Infrastructure Limited and TCPL Packaging Limited.

Key Terms of the Investment Management Agreement

The Investment Manager has entered into the Investment Management Agreement, in terms of the InvIT

Regulations, the key terms of which, are provided below.

Powers of the Investment Manager

The Investment Manager has been provided with various powers under the Investment Management Agreement in accordance with the InvIT Regulations, including but not limited to:

(i) The Investment Manager shall take all decisions in relation to the management and administration of the Trust, InvIT Assets, the trust fund and the investments of the Trust as may be incidental or necessary for the advancement or fulfilment of the objectives of the Trust and investment strategy in accordance with the InvIT Regulations and other applicable law.

(ii) The Investment Manager shall make investment decisions with respect to the Trust and the trust fund including any investments or divestments, subject to InvIT Regulations and in accordance with the relevant InvIT Documents, and in this regard is also empowered to do the following acts on behalf of the Trust:

(a) acquire, subscribe, hold, manage, trade and dispose of the InvIT Assets, shares, stocks, convertibles, debentures, bonds, equity, equity-related securities, debt or mezzanine securities of all kinds issued by any Holdco or SPV (including loans convertible into equity), whether in physical or dematerialised form, including power to hypothecate, pledge or create encumbrances of any kind on such securities held by the Trust in such Holdco/ SPV to be used as collateral security for any borrowings by the Trust or any Holdco or any SPV;

(b) make all decisions, concerning the investigation, selection, development, negotiation, structuring, restructuring, monitoring, divestment of investments (including any additions or accretions thereto);

(c) manage, acquire, hold, sell, securitize, transfer, exchange, pledge and dispose of investments (including any additions or accretions thereto), and exercise all rights, powers, privileges and other incidents of ownership or possession with respect to investments;

(d) without limiting the generality of the foregoing, to decide, in the manner set out in the InvIT Documents, objectives of the Trust and in compliance with the InvIT Regulations, to decide, in the manner set out in the InvIT Documents and objectives of the Trust and in compliance with the InvIT Regulations, (A) the amounts to be invested in Holdco, SPVs, new entity or infrastructure asset or any other asset, as permitted under the InvIT Regulations, that is to form part of the Trust and the mode, manner, terms and conditions for making such investment; and (B) to realize such investments and the income therefrom, and distribute the same to the Unitholders or reinvest the same, as may be decided by the Investment Manager as per the Investment Management Agreement, InvIT Documents and in compliance with the InvIT Regulations;

(e) collect and receive the profit, interest, repayment of principal of debt or debt-like or equity or equity-like mezzanine securities, dividend, return of capital of any type by the SPV(s)/ Holdco(s) or of the InvIT Assets and any other income of the Trust;

(f) make investments, including investments in liquid mutual funds, government securities, money market instruments and cash equivalents, as set out in the InvIT Documents and objectives of the Trust and in the manner and to the extent permitted under the InvIT Regulations;

(g) to give, provide and agree to provide to any SPV or Holdco, financial assistance in the form of investment in the Trust's debt securities or share capital of any class including ordinary, preference, participating, non-participating, voting, non-voting or other class, and in the form of investment in securities convertible into share capital;

(h) keep the capital and monies of the Trust, Hold Cos and SPVs in deposit with banks or other financial institutions as permitted under the InvIT Regulations and applicable law; and

(i) to carry on any other functions, as appropriate and necessary to achieve the objectives of the Trust, subject to compliance with the Trust Deed, InvIT Documents and applicable law.

(iii) The Investment Manager is hereby authorized to do all such other acts, deeds and things as may be incidental or necessary for the advancement or fulfillment of the objectives of the Trust, as set out in the Trust Deed and the relevant InvIT Documents.

(iv) The Investment Manager shall have the power to cause the issue and allotment of the Units, including specifically in accordance with the InvIT Regulations, to the extent applicable. The Investment Manager shall have the power to accept capital contribution for the Trust and subscriptions to Units and undertake all related activities. Additionally, the Investment Manager shall have the power to issue and allot debt securities and commercial paper, subject to and in accordance with the InvIT Regulations and applicable law. The Investment Manager shall also have the power to refund subscription money and pay necessary interest thereon, in accordance with applicable law. Further, the Investment Manager shall, subject to and only in accordance with the terms of the InvIT Documents and applicable law, have the power to take on record transfer of Units and other securities.

(v) The Investment Manager shall make such reserves out of the income or capital as it may deem proper and any directions of the Trustee in this behalf whether made in writing or implied from their acts shall, so far as the law may permit, be conclusive and binding. Any distribution made from such reserves shall be in accordance with the InvIT Regulations.

(vi) The Investment Manager shall cause the depository to maintain a depository register.

(vii) Subject to the provisions of the InvIT Regulations (including particularly the requirements to make distributions in accordance with Regulation 18(6) of the InvIT Regulations) and other applicable law, the Investment Manager shall, as it may deem proper make such reserves as may be required, from time to time.

(viii) The Investment Manager may cause the Trust and/ or Holdco(s) and/ or SPV(s) to issue debentures, borrow monies (through any mode, including by way of issuance of debt securities, subordinated debt, equity or other securities or instruments permitted under the InvIT Regulations or other applicable law) from any person or authority (whether government or otherwise, whether Indian or overseas) on such terms and conditions, and for such periods and purpose, as may be permitted under the InvIT Regulations or to defer payments or raise funds in any other form as per applicable law, subject to the conditions laid down in the InvIT Regulations (including the requirement to procure approvals from the Unitholders, as may be required, in accordance with the InvIT Documents and InvIT Regulations).

(ix) Subject to and in compliance with any conditions laid down in the InvIT Regulations and other applicable law, the Investment Manager shall have the power to exercise all rights in relation to the shareholding of the Trust in the Holdco(s)/ SPV(s) and other assets or securities held by the Trust, including voting rights, rights to appoint directors (in consultation with the Trustee), whether pursuant to securities held by the Trust, or otherwise.

(x) The Trustee, upon written recommendation of the Investment Manager shall, on behalf of the Trust, appoint the Project Manager to undertake, by itself or through appropriate agents, operations and management of the InvIT Assets in accordance with the InvIT Documents and applicable law and shall, for this purpose, execute the Project Implementation and Management Agreement with the Project Manager.

(xi) The Investment Manager, in consultation with the Trustee, shall have the power to appoint, determine the remuneration of and enter into, execute, deliver, perform, modify or terminate all documents and agreements, any contacts, agreements, including share purchase agreement, deed of right of first offer and refusal, escrow agreements, debt documentation, underwriting agreements and other InvIT Documents, any investment pooling agreement, agreement relating to strategic investments, co-investment agreements and other any and all documents and instruments containing customary terms including contractual indemnities with, among others, Valuers, Auditors, registrar and transfer agents, merchant bankers, credit rating agencies, custodians and any other intermediary or service provider or advisor or agent including any amendments or supplements thereto as may be required for managing the assets of the Trust and as per the provisions of the InvIT Regulations and other applicable law.

The Investment Manager shall not be responsible for the default or violation by any such professional service provider, intermediary, advisor, or agent of their terms of service, if employed in good faith to transact any business identified in the arrangement with them.

All fees in relation to such professional service providers, intermediaries and agents shall be determined by the Investment Manager and shall be to the account of the Trust, to be paid out of the trust fund or in such manner as may be permitted under applicable law. Provided however, the remuneration of the Valuer shall not be linked to or based on the value of the assets underlying the trust fund being valued by the Valuer. The Investment Manager shall be entitled to rely on the information, data, opinions and reports provided by such professional service providers, intermediaries and agents.

The Investment Manager shall not appoint an Auditor, a Valuer and such other intermediaries, advisors or agents (as applicable) for consecutive periods greater than as permitted under the InvIT Regulations, without the consent of the Unitholders or the relevant governmental agencies, as may be required under the InvIT Regulations or other applicable law.

(xii) The Investment Manager may, in consultation with the Trustee, appoint any custodian in order to provide custodian services, oversee the activities of the custodian, and may permit any asset (and/ or any documents pertaining thereto, as applicable) forming part of the trust fund to be and remain deposited with a custodian, subject to such deposit as authorised by the Trustee and permissible under applicable law.

(xiii) In the event of any fees or taxes (and any interest or penalty chargeable thereon) whatsoever becoming payable in any jurisdiction in respect of the Trust or in respect of the documents issued or executed in pursuance of the Investment Management Agreement and the Trust Deed in any circumstances whatsoever, the Investment Manager, shall have the power and duty to pay all such fees or taxes and any interest or penalty thereon as well as to create any reserves for future potential tax liability (and any such interest or penalty) out of the Trust's income, in accordance with applicable law. For the avoidance of doubt, it is clarified that, no Unitholder will be required to make a capital contribution (other than the issue price for Units allotted). The Investment Manager shall also have the power to file any income tax returns as such other returns as required under applicable law on behalf of the Trust, and ensure compliance with income tax provisions, as may be required under applicable law.

(xiv) If the Investment Manager engages any external advisors or experts (in accordance with the InvIT Documents), to discharge its obligations under the presents, or undertakes any work (in the interest of the Unitholders) which is not covered within the scope of work of the Investment Manager under these presents and such additional work is beyond the obligations of the Investment Manager under applicable law, the Investment Manager shall be entitled to recover such costs, charges and expenses which the Investment Manager may incur in this regard, from the funds of the Trust.

(xv) The Investment Manager shall have the power to pay expenses in relation to the Trust (as set out in the Investment Management Agreement) that are required to be paid by the Trust out of the trust fund.

(xvi) The Investment Manager shall have the power to take the opinion of legal/ tax counsel in any jurisdiction concerning any difference arising under the Investment Management Agreement or any matter in any way relating to the Agreement or to its duties in connection with the Investment Management Agreement.

(xvii) Subject to the conditions laid down in any of the InvIT Documents and objectives of the Trust and as permissible under the InvIT Regulations and other applicable law, the Investment Manager, may retain for re-investment into a potential InvIT Asset or Holdco/ SPV, any proceeds received by the Trust from any sale of any InvIT Assets or any Holdco/ SPV or any shares or interest in the Holdco or SPV or the other investments held by the Trust in accordance with the InvIT Regulations. In such circumstances, the Investment Manager shall not be required to distribute any amounts retained for re-investment to the Unitholders.

(xviii) Subject to Applicable Law, the Investment Manager shall have the power, on behalf of the Trust, to:

(a) accept any property before the time at which it is transferable or payable;

(b) accept any composition or any security movable or immovable for any equity or other property;

(c) allow time for payment of any equity or claim on any evidence that it thinks sufficient in relation to any financial obligation; and

(d) subject to such approval (if any) as may be required from the Unitholders, compromise, compound, abandon, submit to arbitration or otherwise pay and settle any equity account, claim

or thing whatsoever relating to the Trust or the Investment Management Agreement.

(xix) The Investment Manager may generally evolve, formulate and adopt from time to time such policies, rules and procedures as may be conducive for the effective administration and management of the Trust and the attainment of the objectives of the Trust, in accordance with the InvIT Documents and the InvIT Regulations. In particular, and without prejudice to the generality of such power, the Investment Manager may provide for all or any of the following matters namely:

(a) manner of maintaining of the records and particulars of Unitholders;

(b) norms of investment by the Trust in accordance with the objectives of the Trust and in accordance with the InvIT Regulations and the powers and authorities of the Trustee as set out in the Trust Deed and those delegated to the Investment Manager;

(c) matters relating to entrustment / deposit or handing over of any documents, etc. pertaining to the investments in the Holdco(s)/ SPV(s) or other assets, to one or more custodians and the procedure relating to the holding thereof by the custodian;

(d) such other administrative, procedural or other matters relating to the administration or management of the affairs of the Trust thereof and which are not by the very nature required to be included or provided for in the Trust Deed or the Investment Management Agreement;

(e) procedure for seeking approval of the Unitholders in accordance and in compliance with the InvIT Regulations; and

(f) procedure for summoning and conducting of meetings of Unitholders.

(xx) The Investment Manager shall arrange for and ensure that assets forming part of the trust fund are adequately insured. The Investment Manager shall (as applicable), out of the trust fund, pay the requisite premiums in relation to the insurances procured for the assets forming part of the trust fund directly held by the Trust and shall ensure that the Holdco(s)/ SPV(s) (as applicable) pay the requisite premiums in relation to the insurances procured for their respective assets.

(xxi) Subject to applicable law, the Trustee acknowledges that no Unitholder (acting in its capacity as a Unitholder) shall be entitled to inspect or examine the premises or properties of the Trust without the prior written permission of the Investment Manager. Further, no Unitholder (acting in its capacity as a Unitholder) shall be entitled to require discovery of any information with respect to any detail of the activities of the Trust or any matter which may be related to the conduct of the business of the Trust.

(xxii) The Investment Manager may facilitate the redemption of Units, return of capital to the Unitholders and/ or buyback of Units from the Unitholders by the Trust in any manner in accordance with applicable law.

(xxiii) Subject to applicable law and the relevant policies, the Investment Manager may (through the Trustee) cause the Trust to pay, prepay or repay any or all debt raised from any person in accordance with the terms therein and to redeem any securities, obligations or instruments issued to such person in accordance with the terms thereof and in compliance with the InvIT Regulations and applicable law.

(xxiv) Subject to the conditions laid down in any of the InvIT Documents, objectives of the Trust and as permissible under the InvIT Regulations and other applicable law, the Investment Manager shall recommend to the Trustee matters in relation to extension of loans from the Trust to the HoldCo or the SPVs and also subscription to debt securities or quasi-debt securities or any similar kind of securities issued by the Holdco or SPVs to the Trust or extension of loans from the Trust in compliance with applicable law.

(xxv) The Investment Manager shall also have the following powers and authorities, subject to the provisions of the InvIT Regulations:

(a) to pay or satisfy or to compromise or compound upon such terms which the Investment Manager may deem expedient, any debt or damages owing to or claimed by or from the Trust or for which the Trust may or may be alleged to be liable in respect of the transactions done by the Investment Manager on behalf of the Trust;

(b) to institute unit stock option schemes of the Trust, including for the benefit of the employees of the Investment Manager, SPV(s) and Holdco(s) and any other employees that the Investment Manager may determine to be eligible in accordance with applicable law and InvIT Regulations or unit stock option schemes in lieu of management fees in accordance with applicable law;

(c) to make and give receipts, releases and other discharges for monies payable to the Trust and for the claims and demands made or to be made by the Trust;

(d) to negotiate and execute contracts, and/ or terminate or modify such contracts and do all such acts, deeds and things for or on behalf of or in the name of the Trust as the Investment Manager may consider expedient for managing the Trust (including without limitation entering into sale purchase agreements for acquisition of assets or entities that are to be included as Holdco(s)/ SPV(s) under the Trust, indemnity agreements, deed of right of first offer and refusal, escrow agreements, debt documentation, underwriting agreements, any investment pooling agreement, agreement relating to strategic investments, co-investment agreements, brand licensing agreements or such other agreements as may be required to be executed by the Trust);

(e) to vary, alter, postpone, extend or cancel the terms and conditions of agreements in relation to the investments, as entered into with the relevant parties, such as the SPV(s);

(f) to ascertain, appropriate, declare and distribute or reinvest the surplus in the trust fund in compliance with the InvIT Regulations, to determine and allocate income, profits, gains and expenses in respect of the Trust to and amongst the Unitholders, to carry forward, re-invest or otherwise deal with any surplus and to transfer such sums, as it may deem fit, to one or more reserve funds which may be established by it;

(g) to open one or more bank accounts for the purposes of the Trust, to deposit and withdraw money and fully operate and manage the same;

(h) to sign, seal, execute, deliver and register according to applicable law, all deeds, documents, and assurances in respect of the Trust;

(i) in consultation with the Trustee, to initiate, prosecute and/ or defend any action or other proceedings in any court of law or through arbitration or conduct, compromise, enforce, compound, defend, answer, oppose or abandon any legal proceedings, for or on behalf of or in the name of the Trust to defend, compound or otherwise deal with any such proceedings against the Trust or its officers or concerning the affairs of the Trust, and also to compound and allow time for payment or satisfaction of any equity due and of any claims or demands by or against the Trust or in any other manner for recovery of debts or sums of money, for any claim, actions or suits in respect of and for or on behalf of Trust, right, title or interest in the assets forming part of the trust fund or any other matter in connection therewith, and to discontinue or settle any of the above, as the Investment Manager shall in its best judgment or discretion deem fit;

(j) appoint counsel or appear before the relevant authorities, submit information, seek clarifications from any governmental agency and complete, sign and submit any applications or documents for any approvals, permissions, or actions that may be necessary or desirable;

(k) to sign and verify all written statements, petitions, appeals, declarations, revisions and applications in connection with any proceedings under the Investment Management Agreement and have the power to refer any claim to arbitration and to perform, observe and challenge the awards;

(l) to submit Units for dematerialisation and to make all applications and execute all documents with the depositories and depository participants as may be necessary in this regard;

(m) to retain and pay to the relevant governmental agencies, on behalf of the Unitholders, any withheld taxes on the amounts to be distributed to the Unitholders, in accordance with the provisions of the Income-tax Act, 1961;

(n) to open and operate demat accounts for the Trust to hold the investments (where applicable);

(o) to set up such systems and procedures, and submit such reports, as may be required by the

Trustee as necessary for effective monitoring of the functioning of the Trust; and

(p) to exercise all such powers as it may be required to exercise under the InvIT Regulations for the time being in force and do all such matters and things as may promote the objectives of the Trust or as may be incidental to or consequential upon the discharge of its functions and the exercise and enforcement of all or any of the powers and rights under the Investment Management Agreement and the InvIT Regulations.

Duties of the Investment Manager

The Investment Manager shall perform its duties as required under the Investment Management Agreement in accordance with the InvIT Regulations, including but not limited to:

(i) The Investment Manager shall coordinate with the Trustee, as may be necessary, with respect to the operations of the Trust. The Investment Manager shall undertake the management of the InvIT Assets including all decisions in relation to the administration and operation of the Trust and the trust fund as may be incidental and necessary for the advancement or fulfilment of the objectives of the Trust.

(ii) The Investment Manager shall have the InvIT Assets valued by an independent valuer and submit the same to the Trustee and Unitholders, either electronically or through physical copies, or to the extent applicable, to the Stock Exchange in such form and within the timeframes as prescribed in the InvIT Regulations (including particularly Regulation 21 therein). The Investment Manager shall ensure that the computation and declaration of net asset value of the Trust is undertaken based on the valuation done by the Valuer and to the extent applicable, declared to the Stock Exchanges, in accordance with the InvIT Regulations.

(iii) The Investment Manager shall maintain adequate insurance coverage for the InvIT Assets comprised in the trust fund in accordance with the InvIT Regulations (and as may be required under the InvIT Documents or under any material contracts entered into by Holdco(s)/ SPV(s) and/or the Trust in relation to the InvIT Assets) and shall ensure that assets (including the InvIT Assets) held by the SPV(s) and the Holdco(s) are adequately insured.

(iv) The Investment Manager shall maintain (for such periods as may be prescribed under the InvIT Regulations) proper books of accounts, documents and records with respect to the Trust, in the manner set out in the Trust Deed, to give a true, fair and accurate account of the investments, expenses, earnings, profits, etc. of the Trust. The Investment Manager shall ensure that audit of the accounts of the Trust by the Auditors is undertaken in accordance with the InvIT Regulations and its report is submitted to the Trustee and Unitholders either electronically or through physical copies, or to the extent applicable, to the Stock Exchanges in such form and within the time period specified in the InvIT Regulations and the InvIT Documents.

(v) The Investment Manager shall declare distribution to Unitholders in accordance with Regulation 18 of the InvIT Regulations and the InvIT Documents. Subject to applicable law, such percentage of the Net Distributable Cash Flows of the Holdco(s)/ SPV(s) shall be distributed to the Trust / Holdco(s), as applicable, and such percentages of the Net Distributable Cash Flows of the Trust shall be distributed to the Unitholders (in the ratio of the beneficial interest of the Unitholders), and within such time periods, as may be prescribed in the InvIT Regulations. The Investment Manager shall maintain a record (for such periods as may be prescribed by the InvIT Regulations and the InvIT Documents) of the distributions declared and made to the Unitholders.

(vi) The Investment Manager shall convene meetings of the Unitholders in accordance with the InvIT Regulations (including specifically Regulation 22 therein) and maintain records pertaining to the meetings in accordance with the InvIT Regulations (including specifically Regulation 26 therein).

The Investment Manager shall convene meetings of the Unitholders at least once every year within requisite number of days from the end of a financial year (as prescribed under the InvIT Regulations) with the period between such meetings not exceeding such number of months as prescribed under the InvIT Regulations.

The Investment Manager shall be responsible for all the activities pertaining to conducting of meeting of the Unitholders, subject to overseeing by the Trustee in all cases other than where the meetings are on issues pertaining to the Trustee. Provided that, for meetings on issues related to the Investment Manager,

such as change, removal or change in control of the Investment Manager, the meetings shall be convened and conducted by the Trustee.

(vii) The Investment Manager shall intimate the Trustee prior to any change in control of the Investment Manager to enable the Trustee to seek approval from the Unitholders and SEBI (to the extent applicable) in this regard and shall ensure that no such change is given effect to until the approval of the Unitholders and SEBI has been obtained, or the Investment Management Agreement is terminated and a new investment manager has been appointed in accordance with the terms hereof, or in compliance with the provisions of the InvIT Regulations and applicable law.

(viii) The Investment Manager will monitor the Trust, including monitoring current and projected financial position of the Trust and the trust fund including the Holdco(s)/ SPV(s). The Investment Manager shall place before its board of directors (and/or any committee(s) constituted by the board of directors), a report on the activity and performance of the Trust, in accordance with and in the manner and at the frequency prescribed in the InvIT Regulations. The Investment Manager shall designate an employee from the core team as the compliance officer for monitoring of compliance with the InvIT Regulations and any circulars or guidelines issued thereunder and intimating SEBI in case of any non-compliance.

(ix) The Investment Manager shall maintain records pertaining to the activity of the Trust in terms of the InvIT Regulations (including specifically Regulation 26 of the InvIT Regulations).

(x) The Investment Manager shall manage the Trust in accordance with the InvIT Regulations and the objectives of the Trust, and shall ensure that the investments made by the Trust are in accordance with the applicable investment conditions stipulated in the InvIT Regulations, in accordance with the objectives of the Trust and the investment strategy.

(xi) The Investment Manager shall oversee activities of the Project Manager with respect to compliance with the InvIT Regulations and the Project Implementation and Management Agreement and shall obtain a compliance certificate from the Project Manager, in the form as may be specified under the InvIT Regulations, on a quarterly basis.

(xii) The Investment Manager shall review the transactions carried out between the Project Manager and its Associates and where the Project Manager has advised that there may be a conflict of interest, and shall obtain confirmation from a practicing chartered accountant or the Valuer, as applicable, that such transaction is on arm's length basis.

(xiii) The Investment Manager shall ensure adequate and timely redressal of all Unitholders' grievances pertaining to the activities of the Trust.

(xiv) The Investment Manager shall submit to the Trustee:

(a) quarterly reports on the activities of the Trust, including receipts for all funds received by it and for all payments made, status of compliance with the InvIT Regulations, specifically, to the extent applicable, Regulations 18, 19 and 20 therein, performance report, status of development of under-construction projects, within the time periods specified under the InvIT Regulations;

(b) valuation reports as required under the InvIT Regulations within the time period specified under the InvIT Regulations;

(c) decision to acquire or sell or develop or bid for any asset or project or expand existing completed assets or projects along with rationale for the same;

(d) details of complaints received from the Unitholders and their redressal of the complaints;

(e) details of any action which requires approval from the Unitholders as may be stipulated under the InvIT Regulations;

(f) details of transactions it enters into with its associates;

(g) details of any breach of the investment conditions specified under the InvIT Regulations on account of market movements of the price of the investments;

(h) details of any borrowings exceeding such percentage of the value of the InvIT Assets as may be prescribed by the InvIT Regulations on account of market movements of the price of the investments;

(i) details of any other material fact including change in its directors, change in its shareholding, any legal proceedings that may have a significant bearing on the activity of the Trust, within the time period specified under the InvIT Regulations;

(j) such other information, documents, reports and records as pertaining to the activities of the Trust, as may be reasonably necessary for the Trustee with respect to its responsibilities under the Trust Deed or for effective monitoring of the functioning of the Trust or the InvIT Regulations and as may be required by SEBI, or Stock Exchanges (as applicable) or any other governmental agency, with respect to the activities carried on by the Trust;

(k) details, including reports and any other information, in relation to eligible unitholders or unitholder nominee directors, as stipulated under the InvIT Regulations and applicable law, from time to time;

In the event the Investment Manager fails to submit to the Trustee the foregoing information within the timelines set out under the InvIT Regulations, the Trustee shall intimate SEBI of such failure. It is clarified that the Trustee shall also simultaneously send a written notice to the Investment Manager in the event any such intimation has been made to SEBI.

(xv) The Investment Manager shall be responsible for all activities pertaining to the issue of the Units and listing of the Units (to the extent applicable), in accordance with the InvIT Regulations and other applicable law, including:

(a) preparation of the draft offer document or placement memorandum (as the case may be) in compliance with the provisions of the InvIT Regulations and other applicable law;

(b) filing of the placement memorandum with SEBI and the Stock Exchanges, if so required, within the prescribed time period;

(c) filing of the offer document with SEBI and the Stock Exchanges within the prescribed time period;

(d) ensuring that the merchant bankers and all other service providers as may be appointed for listing of the Units, comply with the InvIT Regulations, as applicable;

(e) dealing with all matters up to allotment of Units to the Unitholders;

(f) obtaining in-principle approvals, and final listing and trading approvals from the designated stock exchanges;

(g) ensuring that the minimum public holding of the Units of the Trust, value of the assets of the Trust and number of Unitholders forming part of the public, is at all times after listing, in accordance with the InvIT Regulations; and

(h) dealing with all matters relating to the issue and listing of the Units (to the extent applicable) as specified under the InvIT Regulations and any guidelines as may be issued by SEBI in this regard. The Investment Manager (together with the merchant bankers, if applicable) shall be responsible to ensure that all relevant provisions of the InvIT Regulations and other applicable law have been complied with and all statements and disclosures made in the offer document or placement memorandum (as the case may be) comply with the InvIT Regulations and other applicable law, contain material, true, correct, not misleading and adequate disclosures in order to enable the investors to make an informed decision, do not provide guaranteed returns to the investors, not be misleading and not contain any untrue statements or misstatements and shall include such other disclosures as may be specified by SEBI.

(xvi) If the Units of the Trust are listed, then in case of the occurrence of any event specified in Regulation 17(1) of the InvIT Regulations, the Investment Manager shall apply for delisting of Units of the Trust to SEBI and the Stock Exchange in accordance with the InvIT Regulations and other applicable law.

(xvii) The Investment Manager shall within the time period prescribed under the InvIT Regulations, submit half yearly, annual reports and valuation report to the Trustee and all the Unitholders electronically or by physical copies, and to the extent applicable, to the Stock Exchanges, in the manner required under Applicable Law.

(xviii) The Investment Manager shall provide a compliance certificate to the Trustee on a quarterly basis in accordance with the InvIT Regulations.

(xix) To the extent applicable, the Investment Manager shall, in accordance with the requirements of the InvIT Regulations, and other applicable law, including any requirements prescribed by SEBI or the Stock Exchanges, from time to time, disclose to the Stock Exchanges any information having a bearing on the operation or performance of the Trust, as well as price sensitive information and other information that is required in terms of the InvIT Regulations and applicable law (including particularly under Regulation 23(6) of the InvIT Regulations).

(xx) The Investment Manager shall ensure that the InvIT Assets have proper legal title, if applicable, and that all the material contracts entered into on behalf of the Trust or the Holdco/ SPV are legal, valid, binding and enforceable by and on behalf of the Trust or the Holdco/ SPV.

(xxi) The Investment Manager (along with the Trustee) shall ensure that all related party transactions in relation to the Trust are on an arms' length basis as per the InvIT Regulations and are consistent with the objectives of the Trust and investment strategy and shall be disclosed to the Unitholders and the Stock Exchange (if applicable) periodically in accordance with the InvIT Regulations and to the extent applicable, the listing agreement of the Trust. Details of fees and commissions received by related parties are required to be disclosed to Unitholders and the Stock Exchange (if applicable), in accordance with the InvIT Regulations.

Transactions between the Trust and another infrastructure investment trust which has a common investment manager or sponsor shall, under the InvIT Regulations, be deemed to be related party transactions for each of the Trust and the other infrastructure investment trust. Provided that this shall also apply if the investment managers or sponsors of the infrastructure investment trusts are different entities but are associates.

(xxii) Without prejudice to any other provision of the Investment Management Agreement or the InvIT Documents, the Investment Manager will also have the following duties and obligations:

(a) maintain regular interaction with the Trustee on the performance of the Trust and providing the Trustee with any information in relation to the operations of the Trust, as may be required;

(b) keep the Unitholders updated on investment activities of the Trust in compliance with the InvIT Regulations and in accordance with the terms of the InvIT Documents;

(c) collecting all dividends, fees, property and other payments due and receivable by the Trust, and declaring distribution to the Unitholders in the manner set out in the Trust Deed and in accordance with the InvIT Regulations;

(d) ensure that no commission or rebate or any other remuneration or payment, by whatever name called, arising out of a transaction pertaining to the Trust is collected by itself or its associates, other than as specified in the offer document or placement memorandum (as the case may be) or any other document as may be specified by SEBI for the purpose of the issue of units of an infrastructure investment trust;

(e) other than to the extent disclosed in the offer document or placement memorandum (as the case may be), ensure that the InvIT Assets of the Trust or the Holdco(s)/ SPV(s) have proper legal titles, if applicable, and that all the material contracts entered into on behalf of the Trust or the SPV(s) or the Holdco(s) are legal, valid, binding and enforceable by and on behalf of the Trust or the SPV(s) or the Holdco(s), as applicable;

(f) ensure that it has and continues to have adequate infrastructure and sufficient key personnel with adequate experience and qualification to undertake management of the Trust;

(g) undertake all the compliances including signing and verifying any tax returns that the Trust may

be required to file under the applicable law;

(h) ensure that all activities of management of the Trust and the InvIT Assets and the activities of the intermediaries or agents or service providers appointed by the Investment Management for such management are in accordance with the InvIT Regulations or any guidelines or circulars issued thereunder;

(i) ensure that any possible conflict of interest involving its role as Investment Manager is reported to the Trustee;

(j) ensure that disclosures or reporting to the Unitholders, SEBI, the Trustee, and to the extent applicable, the Stock Exchanges, are in accordance with the InvIT Regulations, guidelines or circulars issued under the InvIT Regulations and any other Applicable Law;

(k) provide SEBI, the Trustee, and the Stock Exchanges where applicable, such information as may be sought by SEBI or by the Trustee or Stock Exchanges (as applicable), pertaining to the activities of the Trust;

(l) ensure the compliance with laws, as may be applicable, of the state or the local body with respect to the activity of the Trust;

(m) in consultation with the Trustee, appoint the majority of the board of directors or the governing board of the Holdco(s) and/ or SPV(s), as applicable;

(n) ensure that the Trust does not undertake lending to any person other than the Holdco(s)/ SPV(s) in which the Trust has invested in, subject to disclosures required to be made in accordance with the InvIT Regulations. Provided that, investment in debt securities shall not be considered as lending;

(o) ensure that no scheme is launched under the Trust;

(p) inform the Trustee in writing about any change in the representations and warranties under the Investment Management Agreement;

(q) ensure that it does not take or refrains from taking any measures, that will adversely impact the benefits available to the Trust, including on account of being an infrastructure investment trust registered with SEBI;

(r) take any other actions reasonably incidental to any of the foregoing or necessary or convenient in order to fully effect or evidence any action or transaction contemplated under the Investment Management Agreement;

(s) fulfil any other duty, obligation and responsibility that may be required of the Investment Manager, in accordance with, and within the timelines prescribed under (if any) the provisions of the InvIT Regulations;

(t) ensure compliance with the investor charter as may be specified by SEBI, from time to time;

(u) to formulate a policy setting out terms and conditions for the nomination and appointment of unitholder nominee directors, as well as the vacation of office by such unitholder nominee director by way of removal or resignation; and

(v) facilitate the appointment of unitholder nominee directors by eligible unitholders in the manner prescribed under the InvIT Regulations, from time to time, and shall take all actions as may be required under the InvIT Regulations and applicable law in relation to the aforesaid including the review, monitoring and reporting of the nomination rights.

(w) The Investment Manager shall provide to the Trustee such assistance as may be required by the Trustee in fulfilling its obligation towards the Trust under applicable law or as may be required by any regulatory authority with respect to the Trust.

(x) The Investment Manager shall rectify any delay or discrepancy or non-compliance of reporting

or disclosures requirements under the InvIT Regulations and applicable law on an urgent basis.

Liabilities of the Investment Manager

The liabilities of the Investment Manager in terms of the Investment Management Agreement are as follows:

(i) The Investment Manager shall not be liable on account of anything done or omitted to be done or suffered by the Investment Manager in good faith. The Investment Manager shall not be liable in respect of any action taken or damage suffered by the Unitholders on reliance upon any notice, resolution, direction, consent, certificate, affidavit, statement, certificate of stock, plan of reorganization or (without being limited in any way by the foregoing) other paper or document believed to be genuine and in good faith and to have been passed, sealed or signed by appropriate governmental agencies or authorised persons (as the case may be).

(ii) Notwithstanding anything to the contrary contained herein, the Investment Manager shall not incur any liability for any act or omission, as the case may be, which by reason of any:

(a) Force majeure;

(b) provision of applicable law or regulation made pursuant thereto;

(c) decree, order or judgment of any court; or

(d) request, announcement or similar action (whether of binding legal effect or not) which may be taken or made by any person or body acting with or purporting to exercise the authority of any governmental agency (whether legally or otherwise),

(e) the Investment Manager has been directed or requested to do or perform or to forbear from doing or performing. In such event, if for any reason it becomes impossible or impracticable to carry out any of the provisions of the Investment Management Agreement, the Investment Manager shall not be liable for the same. However, the Investment Manager shall duly inform the Trustee and the Unitholders of the same.

(iii) The Investment Manager shall only be liable or responsible for such monies, stocks, funds, shares, assets, investments, properties or securities as the Investment Manager shall have actually received and shall not be liable or responsible for any banker, broker, administrator, custodian or other person in whose hands the same may be deposited or placed, nor for the deficiency or insufficiency in the value of any Investments of the Trust nor otherwise for any involuntary loss. Any receipt signed by the Investment Manager for any monies, stocks, funds, shares, assets, securities, investments or properties, paid, delivered or transferred to the Investment Manager under or by virtue of the presents or in exercise of the duties, functions and powers of the Investment Manager shall effectively discharge the Investment Manager or the person(s) paying, delivering or transferring the same therefrom or from being bound to see to the application thereof, or being answerable for the loss or misapplication thereof, provided that the Investment Manager and such persons shall have acted in good faith, without negligence (to be finally determined by a court of competent jurisdiction) and shall have used their reasonable best efforts in connection with such dealings and matters.

(iv) If the Investment Manager is required by any governmental agency or under the InvIT Regulations or any applicable law to provide information regarding the Trust and/ or the Unitholders, the investments and income therefrom and provisions of these presents and complies with such request in good faith, whether or not the request was in fact justified, the Investment Manager shall not be liable to the Unitholder or any of them or to any other party as a result of such compliance or in connection with such compliance. However, if so required under applicable law, the Investment Manager shall duly inform the Trustee and the Unitholders about the same.

(v) The Investment Manager shall not incur any liability for any act or omission which may result in a loss to a Unitholder (by reason of any depletion in the value of the trust fund, for the non-recoverability or non-realisability of any of the investments or other assets forming part of the trust fund or otherwise), except in the event that such loss is a direct result of disabling conduct on the part of the Investment Manager.

(vi) The Investment Manager, in consultation with the Trustee shall:

(a) In case the Trust has raised funds through a public issue, cause the Trust to refund money:

(b) to all the applicants, in case the Trust fails to collect subscription of the requisite percentage of fresh issue size as specified in the offer document;

(c) to the applicants to the extent of the over subscription, in case the monies received is in excess of the permissible over subscription as specified in the offer document, such that the money shall be refunded to the extent of the oversubscription;

Provided that, the right to retain such over subscription cannot exceed the maximum permissible percentage of the issue size as prescribed under the InvIT Regulations.

Provided further, that the offer document shall contain adequate disclosures towards the utilisation of such oversubscription proceeds for purposes permitted under the InvIT Regulations (being any purpose other than general purposes); and

(d) to all the applicants, in case the number of subscribers to the initial public issue forming part of the public is less than the requisite minimum number, as prescribed by the InvIT Regulations.

(e) In case of non-receipt of listing permission or withdrawal of the observation letter issued by SEBI, wherever applicable, cause the Trust to refund the subscription monies, if any to the respective allottees of such units.

(vii) If the Investment Manager fails to allot or list the Units or refund the money (as the case may be) within the time prescribed under the InvIT Regulations, then the Investment Manager shall pay interest to the Unitholders at the rate specified under the InvIT Regulations, till such allotment or listing or refund, and such interest shall not be recovered in the form of fees or any other form payable to the Investment Manager by the Trust.

(viii) If the distributions (after being declared) are not made within the period prescribed in the InvIT Regulations, the Investment Manger shall be liable to pay interest to the Unitholders at the rate as may be prescribed in the InvIT Regulations or other applicable law, until the distribution is made, and such interest shall not be recovered by the Investment Manager in the form of fees payable to the Investment Manager by the Trust or in any other form.

(ix) The Investment Manager shall not be liable to any Unitholder for the authenticity of any signature or of any seal affixed to any endorsement or other document affecting title to or the transmission of the Units or interests in the Units or interests in the Trust or of any Investments or be in any way liable for any forged or unauthorized signature or seal affixed to such endorsement, transfer or other document or for acting upon or giving effect to any such forged or unauthorized signature or seal. The Investment Manager shall be bound to require that the signature of any Unitholder to any document required to be signed by such Unitholders, under or in connection with these presents, shall be verified to the Investment Manager's reasonable satisfaction.

(x) The Investment Manager shall not be personally liable for any losses (including indirect or consequential losses), costs, damages or expenses incurred in any way arising from anything which the Investment Manager does or fails to do during the course of discharge of its duties as an Investment Manager to the Trust. Further, the liability of the Investment Manager during each financial year shall not exceed the aggregate fees received by the Investment Manager as Investment Management Fees for the immediately preceding financial year, except in case of the Investment Manager engaging in disabling conduct.

(xi) The Investment Manager shall not be liable for any failure or delay in performing its obligations or duties under the Investment Management Agreement, if and to the extent that such failure or delay is caused by a force majeure event.

Indemnification

(i) The Investment Manager, its affiliates and their respective officers, Board of Directors, employees, advisors and agents ("**Indemnified Party(ies)**") shall be indemnified (by the Trustee), out of the trust fund against any claims, losses, costs, damages, liabilities, suits, proceedings and expenses, including legal fees ("**Losses**") incurred by them by reason of their activities on behalf of the Trust (in addition to the fees, distributions and expense reimbursements herein described), unless such Losses resulted from

disabling conduct of such Indemnified Parties.

(ii) The right of any Indemnified Party to indemnification as provided under the Investment Management Agreement shall be cumulative of, and in addition to, any and all rights to which such Indemnified Party may otherwise be entitled by contract or as a matter of law or equity and will extend to such Indemnified Party's successors, assigns and legal representatives.

Termination

(i) Subject to the other provisions of the Investment Management Agreement, the Investment Management Agreement shall continue during the term of the Trust and shall terminate upon dissolution of the Trust.

(ii) The Investment Management Agreement shall be effective from the date of execution of the Investment Management Agreement and shall terminate in accordance with the terms of the Investment Management Agreement.

(iii) The Investment Management Agreement (along with the appointment of the Investment Manager) may be terminated:

(a) by the Investment Manager, by delivery of a written notice to the Trustee at any time, subject to the approval of the Unitholders and SEBI (as applicable) in accordance with the InvIT Regulations; or

(b) by the Trustee, by delivery of a written notice to the Investment Manager,

- upon the bankruptcy of the Investment Manager; or
- if winding up or liquidation proceedings are commenced against the Investment Manager; or
- if a receiver is appointed to all or a substantial portion of the assets of the Investment Manager; or
- if SEBI does not grant a certificate of registration to the Trust, in accordance with the InvIT Regulations; or

(c) subject to receipt of approval from SEBI (if applicable), by the Trustee upon resolution of the Unitholders by requisite majority as specified in the InvIT Regulations, for removal of the Investment Manager (which resolution shall identify the grounds for removal), by delivery of a written notice to the Investment Manager (with a certified true copy of the Unitholder resolution). Further, Unitholders, other than any party related to the transactions and its associates holding not less that such percentage by value as specified under the InvIT Regulations, may apply in writing to the Trustee for removal of the Investment Manager. With or promptly after such requisition for the meeting of the Unitholders for removal of the Investment Manager, the Trustee shall notify the Investment Manager of the meeting and the grounds on which the Investment Manager's removal is proposed. The Investment Manager will be given a reasonable opportunity to refute the grounds for removal and represent the same before a meeting of the Unitholders; or

(d) subject to receipt of approval from the Unitholders and SEBI (if applicable) in accordance with the InvIT Regulations, by the Trustee if it deems it necessary, by delivery of a written notice to the Investment Manager identifying grounds for removal. Prior to seeking approval from SEBI and the Unitholders as aforesaid, the Trustee shall give reasonable opportunity to the Investment Manager (in any case with no less than a 90 (Ninety) day period calculated from the date of receipt of the aforesaid written notice by the Investment Manager) to refute the grounds for removal before the Trustee and the Unitholders at their meeting convened for this purpose.

(iv) Upon termination of the appointment of the Investment Manager in accordance with the Investment Management Agreement, the Trustee shall appoint a new investment manager within such time periods of termination of the earlier investment management agreement, as may be specified in the InvIT Regulations. The Investment Manager shall be required to remain in office and continue to discharge the role of the Investment Manger under the Investment Management Agreement, until the appointment of

a new investment manager. Notwithstanding its termination, the Trustee shall ensure that the outgoing Investment Manager continues to be liable for all its acts and omissions and commissions until the termination is effected and the outgoing Investment Manager vacates its office.

E. The Project Manager – Epic Transnet Project Management Private Limited *(formerly Chennai-Tada Tollway Private Limited)*

History and Certain Corporate Matters

Epic Transnet Project Management Private Limited (*formerly Chennai-Tada Tollway Private Limited*) is the Project Manager for the Trust. The Project Manager was originally incorporated as a private limited company, under the Companies Act, 1956, pursuant to a certificate of incorporation issued by the Registrar of Companies, Tamil Nadu at Chennai dated March 24, 2008, with the corporate identification number U45309TN2008PTC066938. Thereafter, the Project Manager was converted to a public limited company pursuant to a fresh certificate of incorporation issued by the Assistant Registrar of Companies at Tamil Nadu at Chennai, Andaman and Nicobar Islands dated December 10, 2008, with the corporate identification number U45309TN2008PLC066938. Subsequently, the Project Manager was converted to a private limited company pursuant to a fresh certificate of incorporation issued by the Central Processing Centre at Haryana dated May 28, 2025, with the corporate identification number U45309TN2008PTC066938. Further, the Project Manager changed its name from Chennai- Tada Tollway Private Limited to Epic Transnet Project Management Private Limited pursuant to certificate of incorporation issued by the Central Processing Centre at Haryana, dated October 14, 2025 with corporate identification number U71100TN2008PTC066938. Its registered office is situated at 4th Floor, Tower B, Commerzone IT Park, Mount Poonamallee Road, Porur, Kanchipuram, Sriperumbudur, Chennai 600 116, Tamil Nadu, India.

Background of the Project Manager

The principal business of the Project Manager in terms of its memorandum of association is (i) to purchase, take on lease or in exchange or otherwise acquire any lands or buildings and any estate or interest in and any rights connected with such lands and buildings and to develop and turn to account any land acquired; and (ii) to develop, build, rebuild, pull down, demolish, erect, enlarge, purchase, own, contract, take or give on lease or license or hire or hire purchase including sub-lease, sub-license, sub-hire and realise rents, license fees and charges for the same to hold, exchange, improve, alter, repair, replace, acquire, divide, consolidate, appropriate decorate, furnish, sell, mortgage and otherwise deal in and/ or dispose of, buildings, office complexes, group housing schemes, shops, townships, hotels, theatres or any other estate or immoveable property.

The Project Manager will be looking over the operation and maintenance of the entire portfolio of the projects to be transferred to the Trust. The Project Manager has 71 employees as on December 31, 2025.

Neither the Project Manager nor any of the promoters or directors of the Project Manager (i) is debarred from accessing the securities market by SEBI; (ii) is a promoter, director or person in control of any other company or a sponsor, investment manager or trustee of any other infrastructure investment trust or an infrastructure investment trust which is debarred from accessing the capital market under any order or direction made by SEBI; or (iii) is in the list of wilful defaulters published by the RBI.

Directors of the Project Manager

The directors of the Project Manager are entrusted with the overall management of the Project Manager. Please see below the details in relation to the directors of the Project Manager:

Sr. No.	Name	DIN	Designation
1.	Manish Chitkara	07746947	Non-executive director
2.	Biren Sudhirbhai Fozdar	08910016	Non-executive director
3.	Shravan Agarwal	10810916	Non-executive director

Brief profiles of the directors of the Project Manager

Manish Chitkara is the non-executive director of the Sponsor and the Project Manager. For more details, please see, "*– The Sponsor – Epic Transnet Infrastructure Private Limited- Brief profiles of the Directors of the Sponsor"* on page 123.

Biren Sudhirbhai Fozdar is a non-executive director of the Project Manager. He is a member of The Institute of Chartered Accountants of India. He has over 26 years of experience in project finance, treasury, mergers and acquisition, finance and accounts, taxation and budgeting. He was previously associated with Apraava Energy (*formerly known as CLP India*) for 20 years as the vice- president, corporate finance and treasury**.**

Shravan Agarwal is a non-executive director of the Project Manager. He holds a bachelor's degree in commerce from the University of Delhi, master's degree in business administration from the ICFAI Business School and a masters' degree of science in finance from the ICFAI University. He is a Chartered Financial Analyst from CFA Institute USA and also a member of the Council of Chartered Financial Analysts. He has over 20 years of experience in investment, asset management, mergers and acquisitions in the infrastructure and real estate space. He is currently associated with EAAA India Alternatives Limited as a director – investments and was previously associated with Shapoorji Pallonji Investment Advisors Private Limited, L&T Infra Investment Partners Advisory Private Limited, L&T Infrastructure Finance Company Limited, HSBC-Electronic Data Processing India Pvt Ltd., Nexgen Financial Solutions Private Limited and Allianz Securities Limited.

Key terms of the Project Implementation and Management Agreement

The Project Manager proposes to enter into the project implementation and management agreement ("**PIMA**") for the Initial Portfolio Assets, in terms of the InvIT Regulations, the parties to the PIMA included the Trustee, Investment Manager, Project Manager, and the Initial Portfolio Assets, the key terms of which, are provided below:

Scope of Services

The scope of services of the Project Manager is as follows:

(a) The Project Manager shall, either directly or through the appointment and supervision of appropriate agents, which may be persons directly employed or engaged by the Initial Portfolio Assets undertake the operation, maintenance and management of InvIT Assets in accordance with the scope of services as set out in the PIMA.

(b) The Investment Manager may, from time to time, request the Project Manager to provide services other than those specifically referred to in the PIMA in relation to the Initial Portfolio Assets or InvIT Assets. The Project Manager shall provide such additional services on such terms and conditions and fees as may be mutually agreed between the Investment Manager and Project Manager in writing. Any additional services so agreed upon by the Investment Manager and Project Manager shall be deemed to be part of the services and the provisions of the PIMA shall apply *mutatis mutandis* to the provision of any specifically requested services.

Duties of the Project Manager

(a) The Project Manager shall, either directly or through the appointment and supervision of agents (including through the Initial Portfolio Assets), provide services in relation to the InvIT Assets as may be necessary for the discharge of its duties under the terms of the PIMA, the Project Agreements and under the InvIT Regulations.

(b) The Project Manager shall, either directly or through agents, oversee the progress of development, approval status and other aspects of the InvIT Assets that may be under development proposed to be established until its completion in accordance with any agreement that may be entered into in this regard, and discharge all obligations in respect of achieving timely completion of the InvIT Assets, wherever applicable, including the supervision of agents appointed for such purpose.

(c) The Project Manager shall, either directly or through agents, discharge all obligations in respect of the development, maintenance, operation and management of the InvIT Assets whether operational, under construction, or otherwise, in accordance with the respective project agreements, and including the relevant provisions on development, operations and maintenance and the schedules therein, the PIMA, the InvIT Regulations and ensure compliance with the relevant provisions of the project agreements in this regard. Further, the Project Manager shall liaise with the concessioning authority for the release of the annuity payments (in case of concession agreements under the hybrid annuity model or annuity model) in accordance with the provisions of the relevant project agreements. Further, while the primary obligation under the project agreements remains with the Initial Portfolio Assets, the Project Manager shall undertake, either directly or through the appointment and supervision of agents, obligations under

and in compliance with the project agreements and applicable law in relation to the InvIT Assets, including under-construction and operational assets, in accordance with the PIMA.

(d) The Project Manager either directly or through the appointment and supervision of agents, shall ensure that the construction works forming part of the InvIT Assets which are incomplete and identified in the provisional certificate or completion certificate or any other equivalent certificate issued by the relevant independent engineer appointed by the concessioning authority or such other regulatory authority for such InvIT Assets, are completed in accordance with the provisions of the relevant project agreements. Further, in cases where the balance works are incomplete and/ or delayed due to reasons attributable to the concessioning authority or such other regulatory authority, the Project Manager shall ensure the completion of such balance works either directly or through the appointment and supervision of agents upon resolution of the issues by the concessioning authority and other regulatory authorities, as applicable. The costs for the balance works in each of the InvIT Assets and any incremental costs thereon shall be borne by the Project Manager. The Initial Portfolio Assets shall release the amounts to be utilised towards the costs for the balance works to the Project Manager upon the PIMA becoming effective in accordance with Project Implementation and Management Agreement above and such amounts are to be exclusively used for the balance works by the Project Manager. Further, the Initial Portfolio Assets shall extend complete co-operation to enable the Project Manager to complete the balance works and to fulfil any related obligations.

(e) In the event that the Trust invests in projects that are under construction or otherwise not yet achieved commercial operations, the Project Manager shall undertake the development, operations, management and supervision of such projects, either directly or through appropriate agents and oversee the progress of development, approval status and other aspects of the project up to its completion, in case of appointment of agents for the purpose of execution.

(f) The Project Manager shall ensure that, for the purpose of provision of the services, all procurement of goods (including raw materials) and award of contracts, either directly or through agents, is undertaken in accordance with procedures established and within the budget determined by the Project Manager in consultation with the Investment Manager.

(g) The Project Manager acknowledges that the Trustee and the Investment Manager will oversee the activities undertaken by the Project Manager in accordance with the InvIT Regulations and the InvIT Documents and accordingly, the Project Manager shall extend complete co-ordination to enable the Trustee and the Investment Manager to perform such obligations in accordance with the InvIT Regulations and the InvIT Documents. The Project Manager shall provide compliance certificate(s), as may be specified, to the Investment Manager and the Trustee in accordance with the InvIT Regulations, in the form prescribed by SEBI, if any.

(h) The Project Manager shall at all times ensure that the transactions or arrangements entered into by the Project Manager with a related party are on an arm's-length basis and shall provide the Investment Manager with details of transactions carried out between itself and its associates and disclose any conflict of interest in such cases to the Investment Manager, in accordance with the InvIT Regulations.

(i) The Project Manager shall provide to the Trustee and the Investment Manager or to such other Person as the Trustee and/or the Investment Manager may direct, all information that may be necessary for each of them to maintain the records of the Trust and as may be required for making submissions to SEBI or any other Governmental Agency, including with respect to relevant approvals, consents and other documents required in relation to the InvIT Assets and the reporting requirements under the InvIT Regulations, in a proper and timely manner, and in the format prescribed (if any), as required by the Trustee and/ or the Investment Manager. Further, the Project Manager shall provide reasonable assistance to the Initial Portfolio Assets to apply for, obtain and maintain all necessary approvals (and renewals of the same) that each of the Initial Portfolio Assets is required to obtain from or file relevant applications for approvals with any Governmental Agency in connection with InvIT Assets or as may be required under any third party agreement entered into by the Initial Portfolio Assets.

(j) The Project Manager shall have full authority, to receive directions and instructions from the Investment Manager in respect of each of the Initial Portfolio Assets and to take actions in relation to and ensure compliance with such directions and instructions and report back to each Initial Portfolio Asset, the Trustee and the Investment Manager.

(k) The Project Manager shall promptly inform the parties to the PIMA in writing of any act, occurrence or event, which the Project Manager believes is reasonably likely to materially change the financial viability, quality or function of any InvIT Asset or materially change the budget determined by the Project Manager in consultation with the Investment Manager in relation to the operations and maintenance of the Initial Portfolio Assets.

(l) If any defects are found in the maintenance, materials and workmanship of the services provided under the PIMA by the Project Manager and/or by the team members, the Project Manager shall promptly, in consultation and agreement with the Investment Manager, the respective SPV, and other parties, as applicable, regarding appropriate remedying of the defects, repair, replace or otherwise make good such defects as well as any damage caused by such defect at the cost of the Project Manager. It is clarified that the remedying of the defects, repair or replacement shall be undertaken by the Project Manager either directly or through the appointment and supervision of Agents in accordance with the relevant project agreements.

(m) The duties of Project Manager shall also include the following:

i. exercising diligence and vigilance in carrying out its duties and protecting the interests of the InvIT Assets;

ii. keeping the Investment Manager informed on all matters which have a material bearing on the operations of the InvIT Assets;

iii. liaising with the governmental agencies in respect of its obligations under the PIMA;

iv. taking appropriate measures to mitigate the risks which may be encountered by the Trust in respect of the InvIT Assets;

v. keeping proper records for actions taken in respect of the InvIT Assets; and

vi. complying with the instructions of the Investment Manager and the Trustee and the provisions of the InvIT Regulations.

(n) Notwithstanding anything to the contrary contained in the PIMA, nothing contained in the PIMA shall be construed to limit or restrict the performance of any duties or obligations of the Project Manager, Investment Manager or the Trustee contained in the InvIT Regulations and other applicable law.

(o) During the term of the PIMA, in the event the representations provided by the Project Manager, become untrue or incorrect or incomplete in any respect, the Project Manager shall, within a reasonable time upon becoming aware of such representation to be untrue or incorrect or incomplete, inform the Trustee and Investment Manager of such event.

(p) In case of any inconsistency or discrepancy between the PIMA and the project agreements, the Project Manager(a) for road assets forming part of the Initial Portfolio Assets, the provisions of the Concession Agreements shall prevail or (b) for all other InvIT Assets forming part of the Initial Portfolio Assets, such similar agreements executed with the relevant Governmental Agency shall prevail.

Termination

(a) The PIMA shall remain valid and effective until such time as may be mutually agreed upon between the parties or unless terminated by the parties in accordance with the provisions thereto ("**Validity Period**").

(b) Prior to the expiry of its Validity Period, the PIMA, may be terminated:

i. by the Investment Manager in consultation with the Trustee by delivery of a written notice of 45 Business Days to the Project Manager, subject to appointment of new project manager in accordance with the terms of the PIMA and the InvIT Regulations; or

ii. by the Investment Manager in consultation with the Trustee by delivery of a written notice to the Project Manager at any time, upon breach of any of the terms, covenants, conditions or provisions of the PIMA by the Project Manager and a failure of the Project Manager to remedy the said breach within the time period specified for curing such breaches under the relevant

project agreements or such other period as may be mutually agreed upon between the Investment Manager and the Project Manager for curing such breach; or

iii. by any party by delivery of a written notice to the other party upon the bankruptcy of such other party or if winding up or liquidation proceedings whether voluntary or involuntary are commenced or admitted against such other party (and such proceedings persist for a period of more than three months).

(c) Notwithstanding anything contained hereinabove, the Trustee, based on written recommendation of the Investment Manager shall appoint a new project manager and execute a new project implementation and management agreement within three months from the termination of the PIMA in accordance with Applicable Law. The Trustee and Investment Manager shall also ensure that the new project manager stands substituted as a party in all documents to which the Project Manager was a party. The Project Manager shall remain in office until the appointment of a new project manager. The Project Manager shall continue to be liable for all its acts, omissions and commissions notwithstanding its termination until the appointment of a new project manager.

(d) The termination of the PIMA shall not affect the rights and obligations of the parties accrued prior to such termination.

(e) In case of termination in accordance with the provisions of the PIMA, the fees accrued and outstanding up to the date of termination shall be treated as dues and the Project Manager shall be treated as a creditor for such amounts. In the event of a change in the project manager due to removal or otherwise, all costs and expenses in that regard shall be borne by the new project manager.

(f) In case of termination of the PIMA, the Project Manager shall be liable to refund such amounts released by the Initial Portfolio Assets to the Project Manager in accordance with the terms of the PIMA to be utilised towards the costs for the Balance Works, to the extent not utilised and outstanding as of the date of termination.

(g) Notwithstanding anything contained hereinabove, (i) in the event of cancellation of registration of the Trust by SEBI, or (ii) winding up of the Trust, then the PIMA shall automatically terminate without any liability to any party.

Indemnity

The Trustee, the Investment Manager and the Initial Portfolio Assets and their respective directors, employees, officers and the Trust ("**Indemnified Parties**") shall be indemnified by the Project Manager against any claims, losses, costs, damages, liabilities and expenses actually incurred or suffered by the Indemnified Parties in connection with the breach of any of the terms of the PIMA by the Project Manager, or arising out of gross negligence, wilful default or fraud on part of the Project Manager, in carrying out its obligations under the PIMA, the other InvIT Documents and Applicable Law. The Trustee, the Investment Manager and the Initial Portfolio Assets acknowledge and agree that the aggregate maximum liability of the Project Manager in each financial year shall be limited to an amount equivalent to fees paid to the Project Manager in the immediately preceding financial year, in accordance with the terms of the PIMA

For further details, please see "*Related Party Transactions - Present and on-going Related Party Transactions"* on page 419.

OTHER PARTIES INVOLVED IN THE TRUST

The Auditors

Background and terms of appointment

The Investment Manager, in consultation with the Trustee, pursuant to resolutions passed by the IM Board dated October 17, 2025 has appointed S R B C & CO LLP, Chartered Accountants as the Auditor of the Trust for the financial year 2025-2026, to hold office upto the conclusion of the first annual general meeting of the unitholders, subject to the InvIT Regulations. The Auditors have audited the Special Purpose Combined Financial Statements and have examined the Projections of Revenue from Operations and Cash Flow from Operating Activities in accordance with SAE 3400, and their audit report in relation to such Special Purpose Combined Financial Statements dated March 23, 2026 and examination report on Projections of Revenue from Operations and Cash Flow from Operating Activities dated April 1, 2026 have been included in this Offer Document.

Functions, Duties and Responsibilities

The functions, duties and responsibilities of the Auditor will be in accordance with the InvIT Regulations. The Investment Manager shall ensure that the Auditor carries out an audit of the accounts of the Trust, not less than once a year in accordance with the InvIT Regulations and other applicable law and such report is submitted to the Stock Exchange within the time stipulated by the stock exchange, if any, and in accordance with the InvIT Regulations. Further such report shall be submitted to the Unitholders and the Trustee, either electronically or through physical copies.

In accordance with the InvIT Regulations, the Auditor of the Trust shall:

- conduct an audit of the accounts of the Trust and draft the audit report based on the accounts examined by them, and after taking into account the relevant accounting and auditing standards, as may be specified by SEBI;
- to the best of its information and knowledge, ensure that the accounts and financial statements give a true and fair view of the state of the affairs of the Trust, including profit or loss and cash flow for the period and such other matters as may be specified;
- have a right of access at all times to the books of accounts and vouchers pertaining to activities of the Trust;
- have a right to require such information and explanation pertaining to activities of the Trust, as it may consider necessary for the performance of its duties as an auditor from the employees of Trust or Parties to the Trust or the Initial Portfolio Assets or any other person in possession of such information; and
- undertake a limited review of the audit of all the entities or companies whose accounts are to be consolidated with the accounts of the Trust as per the applicable Indian Accounting Standards and any addendum thereto as defined in Rule 2(1)(a) of the Companies (Indian Accounting Standards) Rules, 2015, in such manner as may be specified by SEBI.

The Valuer

Background and terms of appointment

The Investment Manager, in consultation with the Trustee, pursuant to a resolution passed by its Board dated October 17, 2025 has appointed Mr. S. Sundararaman, Registered Valuer, (IBBI Registration No - IBBI/RV/06/2018/10238), a registered valuer, as the Valuer of the Trust and Baker Tilly ASA India LLP for providing valuation assistance services and review of valuations reports in relation to the proposed Issue. In accordance with the InvIT Regulations, the Valuer has undertaken a full valuation of the Initial Portfolio Assets which are proposed to be acquired by the Trust pursuant to the formation transactions and their report in relation to such valuation as on March 23, 2026 has been included in this Offer Document.

The Valuer is not an Associate of the Sponsor, the Investment Manager or the Trustee, and has not less than five years of experience in the valuation of infrastructure assets.

Functions of the Valuer

The functions, duties and responsibilities of the Valuer will be in accordance with the InvIT Regulations in the manner and withing timelines as specified under the InvIT Regulations and other applicable law. Presently, in terms of the InvIT Regulations, the Valuer is required to comply with the following conditions at all times:

- the Valuer shall ensure that the valuation of the Initial Portfolio Assets is impartial, true and fair and is in accordance with Regulation 21 of the InvIT Regulations;
- the Valuer shall ensure adequate and robust internal controls to ensure the integrity of its valuation reports;
- the Valuer shall ensure that it has sufficient key personnel with adequate experience and qualification to perform valuations;
- the Valuer shall ensure that it has sufficient financial resources to enable it to conduct its business effectively and meet its liabilities;
- the Valuer and any of its employees involved in valuing of the assets of the Trust, shall not, (i) invest in Units of the Trust or in the assets being valued; and (ii) sell the assets or Units of Trust held prior to being appointed as the Valuer, till the time such person is designated as Valuer of the Trust and not less than six months after ceasing to be valuer of the Trust;
- the Valuer shall conduct valuation of the Initial Portfolio Assets with transparency and fairness and shall render, at all times, high standards of service, exercise due diligence, ensure proper care and exercise independent professional judgment;
- the Valuer shall act with independence, objectivity and impartiality in performing the valuation;
- the Valuer shall discharge its duties towards the Trust in an efficient and competent manner, utilising its knowledge, skills and experience in best possible way to complete given assignment;
- the Valuer shall not accept remuneration, in any form, for performing a valuation of the Initial Portfolio Assets from any person other than the Trust or its authorised representative;
- the Valuer shall before accepting any assignment, from any related party of the Trust, disclose to the Trust any direct or indirect consideration which the Valuer may have in respect of such assignment;
- the Valuer shall disclose to the Trust any pending business transactions, contracts under negotiation and other arrangements with the Investment Manager or any other party whom the Trust is contracting with and any other factors that may interfere with the Valuer's ability to give an independent and professional valuation of the assets;
- the Valuer shall not make false, misleading or exaggerated claims in order to secure assignments;
- the Valuer shall not provide misleading valuation, either by providing incorrect information or by withholding relevant information;
- the Valuer shall not accept an assignment which interferes with its ability to do fair valuation; and
- the Valuer shall, prior to performing a valuation, acquaint itself with all laws or regulations relevant to such valuation.

Policy on Appointment of Auditor and Valuer

The Investment Manager has adopted a policy on appointment of auditor and valuer ("**Appointment Policy**") pursuant to a resolution of its board of directors on November 19, 2025. The key terms of the Appointment Policy are as follows:

1. Appointment and Role of Auditor of The InvIT

(i) The Investment Manager, in consultation with the Trustee, shall appoint the Auditor, in a timely manner and in accordance with the InvIT Regulations.

(ii) The Investment Manager shall ensure that the appointment of the Auditor and the fees payable to the Auditor is approved by the Unitholders in accordance with the InvIT Regulations.

(iii) The Investment Manager shall ensure that the audit of the accounts of the InvIT by the Auditor is carried out in accordance with the InvIT Regulations.

(iv) the Investment Manager shall appoint an individual or a firm as the auditor, who shall hold office from the date of conclusion of the annual meeting in which the auditor has been appointed till the date of conclusion of the sixth annual meeting of the unitholders in accordance with the procedure for selection of auditors, as may be specified by SEBI.

(v) The investment manager of the InvIT shall not appoint or re-appoint:

(a) an individual as the Auditor for more than one term of five consecutive years, provided that such individual, upon completion of one term of five consecutive years, shall not be eligible for re-appointment as the auditor in the InvIT for a period of five years from the date of completion of the term; and

(b) an audit firm as the Auditor for more than two terms of five consecutive years, provided that, upon completion of two terms of five consecutive years, such audit firm shall not be eligible for re-appointment as the auditor in the InvIT for a period of five years from the date of completion of its term.

(vi) The Investment Manager, in consultation with the Trustee, shall have the right to take all necessary steps to remove the Auditor who ceases to comply with the eligibility criteria required under the InvIT Regulations and applicable law, subject to the approval of the Unitholders as may be required under the InvIT Regulations. Further, in the event the removal of the Auditor and appointment of another auditor to the Trust is requested by the Unitholders in accordance with the InvIT Regulations, it shall be taken up at a meeting of the Unitholders as may be required under the InvIT Regulations

(vii) The Investment Manager shall ensure that the audit of accounts of the InvIT by the Auditor is done not less than once in a year and such report is submitted to the stock exchanges within the timelines prescribed under the InvIT Regulations.

(viii) The Auditor shall conduct the audit of the accounts of the InvIT and draft the audit report based on the accounts examined by it after taking into account the relevant accounting and auditing standards under applicable law, including the InvIT Regulations and any guidelines, circulars, notifications and clarifications framed or issued by the SEBI, as may be specified from time to time.

(ix) The Auditor shall comply with the conditions prescribed under the InvIT Regulations at all times, including the following:

(a) the accounts of the InvIT shall be subjected to audit by the Auditors and shall be accompanied by a report of the Auditors which shall be submitted with the stock exchanges, in such manner and at such intervals as may be prescribed under applicable law, including InvIT Regulations;

(b) the Auditor shall, to the best of its information and knowledge, ensure that the accounts and financial statements give a true and fair view of the state of the affairs of the InvIT, including profit or loss and cash flow for the relevant period and such other matters as may be specified by SEBI;

(c) the Auditor shall have a right of access at all times to the books of accounts and vouchers pertaining to activities of the InvIT;

(d) the Auditor shall have a right to obtain such information and explanation pertaining to activities of the InvIT as it may consider necessary for the performance of its duties as auditor from the employees of the InvIT, parties to the InvIT, the special purpose vehicle(s) or any other person in possession of such information; and

(e) the Auditor shall undertake a limited review of the audit of all the entities or companies whose accounts are to be consolidated with the accounts of the InvIT as per the relevant auditing standards under applicable law and in accordance with the InvIT Regulations or such other manner as may be specified by SEBI.

2. Appointment and Role of Valuer of The InvIT

(i) The Investment Manager, in consultation with Trustee, shall appoint the Valuer in a timely manner

(ii) The Investment Manager shall determine the remuneration of such Valuer in accordance with the InvIT Regulations.

(iii) The Investment Manager shall ensure that the valuation of the InvIT assets is conducted by the Valuer in the manner and timelines prescribed under the InvIT Regulations.

(iv) The Investment Manager in consultation with the Trustee shall have the right to take all necessary steps to remove the Valuer who ceases to comply with the eligibility criteria required under the InvIT Regulations and applicable law, subject to the approval of the Unitholders as may be required under the InvIT Regulations. Further, in the event the removal of the Valuer and appointment of another valuer to the Trust is requested by the Unitholders in accordance with the InvIT Regulations, it shall taken up at a meeting of the Unitholders as may be required under the InvIT Regulations.

(v) The remuneration of the Valuer shall not be linked to or based on the value of the assets being valued.

(vi) The Valuer shall not be an associate of the Sponsor or the Investment Manager or Trustee. The Valuer shall have the minimum number of years of experience in valuation of infrastructure assets as may be required under the InvIT Regulations.

(vii) The Valuer shall be eligible to act as a valuer in terms of the InvIT Regulations or any clarifications, guidelines, notifications or exemptions issued by SEBI.

(viii) The Valuer shall not undertake valuation of the same project for more than four years consecutively, provided that the Valuer may be reappointed after a period of not less than two years from the date it ceases to be the Valuer of the InvIT.

(ix) The Valuer shall not undertake valuation of any assets in which it has either been involved with the acquisition or disposal within the last twelve months other than such cases where the Valuer was engaged by the InvIT for such acquisition or disposal.

(x) The Valuer shall comply with the following conditions at all times:

(a) the Valuer shall ensure that the valuation of the InvIT assets is impartial, true and fair and is in accordance with the InvIT Regulations;

(b) the Valuer shall ensure adequate and robust internal controls to ensure the integrity of its valuation reports;

(c) the Valuer shall ensure that it has sufficient key personnel with adequate experience and qualification to perform valuations;

(d) the Valuer shall ensure that it has sufficient financial resources to enable it to conduct its business effectively and meet its liabilities;

(e) the Valuer and any of its employees involved in valuing of the assets of the InvIT, shall not:

- invest in units of the InvIT or in the assets being valued; and
- sell the assets or units of the InvIT held prior to being appointed as the Valuer,

until the time such person is designated as Valuer of the InvIT and not less than six months after ceasing to be Valuer of the InvIT;

(f) the Valuer shall conduct valuation of the InvIT assets with transparency and fairness and shall render, at all times, high standards of service, exercise due diligence, ensure proper care and exercise independent professional judgment;

(g) the Valuer shall act with independence, objectivity and impartiality in performing the valuation;

(h) the Valuer shall discharge its duties towards the InvIT in an efficient and competent manner, utilizing its knowledge, skills and experience in best possible way to complete given assignment;

(i) the Valuer shall not accept remuneration, in any form, for performing a valuation of the InvIT assets from any person other than the InvIT or its authorized representative;

(j) the Valuer shall before accepting any assignment, from any related party of the InvIT, disclose to the InvIT through the Investment Manager or the Trustee, any direct or indirect consideration which the Valuer may have in respect of such assignment;

(k) the Valuer shall disclose to the InvIT, through the Investment Manager or the Trustee, any pending business transactions, contracts under negotiation and other arrangements with the Investment Manager or any other party whom the InvIT is contracting with and any other factors that may interfere with the Valuer's ability to give an independent and professional valuation of the assets, and other necessary disclosures required under the InvIT Regulations;

(l) the Valuer shall not make false, misleading or exaggerated claims in order to secure assignments;

(m) the Valuer shall not provide misleading valuation, either by providing incorrect information or by withholding relevant information;

(n) the Valuer shall not accept an assignment which interferes with its ability to do fair valuation; and

(o) the Valuer shall, prior to performing a valuation, acquaint itself with all laws or regulations relevant to such valuation.

CORPORATE GOVERNANCE

The section below is a summary of the corporate governance framework in relation to the Trust, implemented by or to be implemented by the Investment Manager and the Initial Portfolio Assets, as applicable and as specified in this section.

Investment Manager

EAAA TransInfra Managers Limited is the investment manager of the Trust. For further details on the background of the Investment Manager, please see "*Parties to the Trust – The Investment Manager*- EAAA TransInfra Managers Limited*"* on page 135.

Board of Directors

*Composition of the Board of Directors of the Investment Manager ("**IM Board**")*

In addition to the applicable provisions of the Companies Act, 2013 and Listing Regulations (as applicable), the composition of the IM Board shall adhere to the following:

(i) the IM Board shall comprise of at least six directors, and not less than one woman independent director;

(ii) Not less than 50% of the IM Board shall comprise independent directors, who are not directors or members of the governing board of an investment manager of another infrastructure investment trust registered under the InvIT Regulations;

(iii) the independence of directors shall be determined in accordance with the InvIT Regulations and other applicable law; and

(iv) collective experience of the directors should cover a broad range of commercial experience, particularly experience in infrastructure sector (including the applicable sub-sector), including investment/ fund management or advisory and financial matters.

For details of the current composition of the board of directors, please see "*Parties to the Trust – The Investment Manager – Board of Directors of the Investment Manager*" on page 136.

Quorum

The quorum shall be one-third of the total strength of the board of directors or three directors, whichever is higher, including at least one independent director.

Frequency of meetings

The IM Board should meet at least four times every year, with a maximum gap of 120 days between any two meetings. Additionally, the IM Board shall meet prior to any meeting of the Unitholders and approve the agenda for Unitholders' meetings.

Sitting fee

The remuneration, including sitting fees of the directors, will be decided by the IM Board, from time to time.

Articles of Association of the Investment Manager

The articles of association should not include any affirmative rights for the Sponsor of the Trust or the Sponsor Group.

Committees of the board of directors

Name of the committee	Composition	Present Members	Quorum	Frequency of meetings
Nomination and Remuneration Committee	The Nomination and Remuneration Committee should comprise at least three directors. All the directors of the committee shall be non-executive directors, and at least two-thirds of the directors shall be independent directors. The chairperson of this committee shall be an independent director. Provided that the chairperson of the Board, may be appointed as a member of the Nomination and Remuneration Committee and shall not chair such committee.	Vidya Basarkod (Chairperson), Suresh Gurumani, Emandi Sankara Rao, Subahoo Chordia	The quorum shall be either two members or one-third of the members of the Nomination and Remuneration Committee, whichever is greater, including at least one independent director in attendance.	The Nomination and Remuneration Committee shall meet at least once in a financial year or as necessary.
Audit Committee	The Audit Committee shall consist of at least three directors. At least two-thirds of the members of the Audit Committee shall be independent directors. The chairperson of the audit committee should be an independent director. All members of the Audit Committee should be financially literate and at least one member should have accounting or related financial management expertise, in accordance with the Listing Regulations. The Audit Committee at its discretion shall invite the finance director or head of the finance function, head of internal audit and a representative of the statutory auditor and any other such executives to be present at the meetings of the Audit Committee. Provided that occasionally the Audit Committee may meet without the presence of any Executives.	Suresh Gurumani (Chairperson), Vidya Basarkod, Emandi Sankara Rao, Bhavyang Oza	The quorum shall either be two members or one-third of the members of the Audit Committee, whichever is greater, including at least two independent directors.	The Audit Committee should meet at least four times in a financial year, with a maximum gap of 120 days between two consecutive meetings.
Stakeholders Relationship Committee	The Stakeholders' Relationship Committee should comprise at least three members. At least one member of the committee shall be an independent director. The chairperson of this committee shall be an independent director.	Emandi Sankara Rao (Chairperson), Vidya Basarkod, Suresh Gurumani, Sreekumar Chatra	The quorum shall be at least one- third of the members of the Stakeholders' Relationship Committee or two members, whichever is higher.	The Stakeholders Relationship Committee shall meet at least once in a financial year.
Risk Management Committee	The Risk Management Committee should comprise at least three members with majority of them being members of the IM Board, including at least one independent director. The chairperson of the Risk Management Committee shall be a member of the IM Board and senior executives of the Trust may be members of the Risk Management Committee.	Subahoo Chordia (Chairperson), Vidya Basarkod Suresh Gurumani, Sreekumar Chatra, Emandi Sankara Rao	The quorum shall either be two members or one-third of the members of the Risk Management Committee, whichever is greater, including at least one member of the IM Board.	The Risk Management Committee should meet at least twice in a financial year. The meetings of the Risk Management Committee shall be conducted in such a manner that on a continuous basis not more than two hundred and ten days shall elapse between any two consecutive meetings.

Name of the committee	Composition	Present Members	Quorum	Frequency of meetings
InvIT Committee	The InvIT Committee may comprise of such number of directors as may be approved by the board of directors of the Investment Manager, from time to time.	Bhavyang Oza, Sreekumar Chatra, Suresh Gurumani	The quorum for the meeting of the InvIT Committee shall be any 2 Members and the InvIT Committee shall undertake all the decisions with simple majority of members present.	The InvIT Committee shall meet at such intervals as may be deemed necessary by the members of the InvIT Committee.

For details of the scope of each committee, please see below.

Nomination and Remuneration Committee

Terms of reference of the Nomination and Remuneration Committee

The terms of reference of the Nomination and Remuneration Committee include, amongst others, the following:

(i) ensuring compliance with the requirements of the InvIT Regulations and the Companies Act, 2013 as may be applicable;

(ii) formulation of the criteria for determining qualifications, positive attributes and independence of a director and recommend to the board of directors a policy relating to, the remuneration of the directors, key managerial personnel and other employees;

(iii) for every appointment of an independent director, the nomination and remuneration committee shall evaluate the balance of skills, knowledge and experience on Board and on the basis of such evaluation, prepare a description of the role and capabilities required of an independent director. The person recommended to the Board for appointment as an independent director shall have the capabilities identified in such description. For the purpose of identifying suitable candidates, the Nomination and Remuneration Committee may:

  (a) use the services of an external agencies, if required;

  (b) consider candidates from a wide range of backgrounds, having due regard to diversity; and

  (c) consider the time commitments of the candidates.

(iv) formulation of criteria for evaluation of performance of independent directors and the board of directors;

(v) recommending to the board, all remuneration, in whatever form, payable to senior management

(vi) identifying persons who are qualified to become directors and who may be appointed in senior management in accordance with the criteria laid down, and recommend to the board of directors their appointment and removal;

(vii) making recommendations in relation to appointment or re-appointment or replacement or removal of (a) independent directors; (b) any key managerial personnel; and (c) directors on the board of directors of the Initial Portfolio Assets;

(viii) formulating the following policies:

  (a) a policy relating to, the remuneration of the directors, key managerial personnel and other employees; and

  (b) devising a policy on diversity of board of directors.

(ix) taking into account the inputs from various other committees of the board of directors in relation to their corresponding matters;

(x) whether to extend or continue the term of appointment of the independent director, on the basis of the report of performance evaluation of independent directors;

(xi) ensuring administration and superintendence of the unit based employee benefit scheme;

(xii) formulate detailed terms and conditions of the unit based employee benefit scheme which shall include the provisions laid down in the InvIT Regulations;

(xiii) frame suitable policies and procedures to ensure compliance with all securities laws as laid down in the InvIT Regulations; and

(xiv) recommend to the board, all remuneration, whatever form, payable to senior management.

Audit Committee

Terms of reference of the Audit Committee

The terms of reference of the Audit Committee include, amongst others, the following:

(i) providing recommendations to the board of directors regarding any proposed distributions, and evaluating any defaults or delay in payment of distributions to the unitholders or dividends by the Initial Portfolio Assets to the Trust and payments to any creditors or debenture holders of the Trust or the Initial Portfolio Assets, and recommending remedial measures;

(ii) oversight of the Trust's financial reporting process and the disclosure of its financial information to ensure that the financial statement is correct, sufficient and credible;

(iii) recommending to the board of directors the appointment, re-appointment and replacement, remuneration and terms of appointment of statutory auditor of the Trust and the audit fee, subject to the approval of the unitholders;

(iv) approving the payment to statutory auditors for any other services rendered by the statutory auditor;

(v) reviewing, with the management, the annual financial statements and auditor's report thereon of the Trust and the Investment Manager, before submission to the board of directors for approval, with particular reference to:

  (a) matters required to be included in the director's responsibility statement to be included in the board's report of Investment Manager in terms of clause (c) of sub-section (3) of Section 134 of Companies Act 2013;

  (b) changes, if any, in accounting policies and practices and reason for such change;

  (c) major accounting entries involving estimates based on exercise of judgment by management;

  (d) significant adjustments made in the financial statements arising out of audit findings;

  (e) compliance with listing and other legal requirements relating to financial statements;

  (f) disclosure of any related party transactions; and

  (g) modified opinion(s) in the draft audit report;

(vi) reviewing, with the management, the Trust's financial disclosure and reporting process and all periodic financial statements, including but not limited to quarterly, half-yearly and annual financial statements of the Trust, whether standalone or consolidated or in any other form as may be required under applicable law, before submission to the board of directors for approval;

(vii) reviewing, with the management, the statement of uses/application of funds raised through an issue of units by the Trust (including but not limited to public issue, rights issue, preferential issue, private placement etc.) and any issue of debt securities and the statement of funds utilised for purposes other than those stated in the offer documents/ notice, and the report submitted by the monitoring agency monitoring the utilisation of proceeds of a public issue or rights issue or preferential issue or qualified

institutions placement, and making appropriate recommendations to the board of directors for follow-up action;

(viii) reviewing and monitoring the auditor's independence and performance, and effectiveness of audit process and internal control systems, as necessary;

(ix) (a) reviewing the procedures put in place by the Investment Manager for reviewing related party transactions, the indemnification of expenses or liabilities incurred by the Investment Manager; and (b) approving any subsequently modifying transactions of the Trust with related parties, and recommending such transactions to the board of directors or the unitholders, as may be required, in terms of the InvIT Regulations;

(x) consider and comment on the rationale, cost-benefits and impact of schemes involving merger, demerger, amalgamation etc., on the Trust and its unitholders;

(xi) to review the utilization of loans and/ or advances from/investment by the Trust in the SPVs or HoldCos exceeding Rs. 100 crore or 10% of the asset size of the relevant SPV or HoldCo, whichever is lower including existing loans/advances/ investments;

(xii) scrutiny of inter-corporate loans and investments;

(xiii) evaluation of internal financial controls and risk management systems of the Trust;

(xiv) valuation of undertakings or assets of the trust, wherever it is necessary;

(xv) reviewing, with the management, performance of statutory and internal auditors, adequacy of the internal control systems and discussion on any significant findings and follow-up thereon;

(xvi) reviewing the adequacy of internal audit function, if any, including the structure of the internal audit department, staffing and seniority of the official heading the department, reporting structure coverage and frequency of internal audit;

(xvii) reviewing management letters/letters of internal control weaknesses issued by the statutory auditors and the findings of any internal investigations in relation to the Trust, into matters where there is suspected fraud or irregularity or a failure of internal control systems of a material nature, discussing such findings with internal and statutory auditors and follow ups thereon and reporting the matter to the board of directors;

(xviii) discussion with statutory auditors before the audit commences, about the nature and scope of audit as well as post-audit discussion to ascertain any area of concern;

(xix) Giving recommendations to the board of directors regarding appointment, re-appointment and replacement, remuneration and terms of appointment of the valuer of the Trust; as well as reviewing and monitoring the independence and performance of the valuer of the Trust;

(xx) to look into the reasons for substantial defaults in the payment to the depositors, debenture holders, unitholders (in case of non-payment of declared distributions) and creditors;

(xxi) to review the functioning of the whistle blower mechanism with direct access to the chairperson of the audit committee in appropriate and exceptional cases;

(xxii) approval of appointment of chief financial officer after assessing the qualifications, experience and background, etc. of the candidate;

(xxiii) consider and commenting on the rationale, cost-benefits and impact of schemes involving merger, demerger, amalgamation etc., on the Trust and its Unitholders or Investment Manager and its shareholders;

(xxiv) valuation of undertakings or assets of the Trust, wherever it is necessary;

(xxv) formulating any policy for the Investment Manager as necessary, in relation to its functions, as specified above; and

(xxvi) carrying out any other function as is mentioned in the terms of reference of the audit committee.

Stakeholders Relationship Committee

Terms of reference of the Stakeholders Relationship Committee

The terms of reference of the Stakeholders Relationship Committee shall include, amongst others, the following:

(i) consider and resolve grievances of the unitholders or debenture holders, including complaints related to the transfer/transmission of units, non-receipt of annual report, non-receipt of declared distributions and non- receipt of interest or principal repayment on debentures, general meetings etc.;

(ii) review of measures taken for effective exercise of voting rights by unitholders of the Trust;

(iii) review of adherence to the service standards adopted by the Trust in respect of various services being rendered by the registrar and share transfer agent;

(iv) review of the various measures and initiatives taken by the Trust or Investment Manager for reducing the quantum of unclaimed distributions and ensuring timely receipt of distribution warrants/annual reports/statutory notices by the unitholders of the Trust;

(v) to resolve debenture holders related to creation of charge, payment of interest/principal, maintenance of security cover and any other covenants;

(vi) take approval of Unitholders on acquisition/ sale of assets by the Trust, if required under the applicable law and any change in the capital structure of the Initial Portfolio Assets; and

(vii) review of any litigation related to Unitholders' grievances.

Risk Management Committee

Terms of reference of the Risk Management Committee

The terms of reference of the Risk Management Committee include, amongst others, the following:

(i) formulation of a detailed risk management policy, which will include:

a) a framework for identification of internal and external risk specifically faced by the Trust in particular, including financial, operational, sectoral, sustainability (particularly, ESG related risks), information, cyber security risks or any other risk as may be determined by the risk management committee;

b) measures for risk mitigation including systems and processes for internal control of identified risks; and

c) business continuity plan.

(ii) to ensure that appropriate methodology, processes and systems are in place to monitor and evaluate risks associated with the business;

(iii) to monitor and oversee implementation of the risk management policy, including evaluating the adequacy of risk management systems;

(iv) periodically reviewing the risk management policy, at least once in two years, including by considering the changing industry dynamics and evolving complexity;

(v) to keep the board of directors informed about the nature and content of its discussions, recommendations and actions to be taken;

(vi) the appointment, removal and terms of remuneration of the chief risk officer, if any, will be subject to review by the Risk Management Committee; and

(vii) to coordinate its activities with other committees, in instances where there is any overlap with activities

of such committees, as per the framework laid down by the board of directors.

InvIT Committee

Terms of reference of the InvIT Committee

The terms of reference of the InvIT Committee include, amongst others, the following:

(i) to negotiate, finalize and grant authority to execute all such agreements and arrangements, including issue agreement, escrow agreement(s), syndicate agreement, underwriting agreement, right of first offer agreement, as well as amendments, supplements, notices or corrigenda thereto in connection with the Trust and the Offer, with the investment manager, other managers, valuers, escrow agents, registrar, accountants, legal counsel, depositories, custodians, credit rating agencies, strategic investors, and all such persons or agencies as may be involved in or concerned with the Offer and to remunerate all such agencies in cash or otherwise by way of payment of commission, brokerage, fees or reimbursement for expenses incurred in relation to the Offer and the Trust;

(ii) Entering into, finalisation and authorizing the persons for execution of all contracts, agreements and all other documents, deeds and instruments as may be required or desirable in connection with the Trust and the Offer, including but not limited to the Project Implementation and Management Agreement, Escrow Agreements, Registrar Agreement, Ad Agency Agreement, the share/securities purchase agreements, offer agreement, the right of first offer agreement, trust loan agreement and the shared/transition services agreements (if any);

(iii) To approve the Issue and to decide on the timing, size, mode of issuance, pricing and all the terms and conditions of the Issue, including the pricing, allotment, etc. and to accept any amendments, modifications, variations or alterations thereto and all other matters incidental to the Issue;

(iv) To approve and adopt the valuation report, technical reports, industry report, credit ratings (if any) and all such report and documents in relation to the Issue;

(v) To make applications, where necessary, to such authorities or entities as may be required and accept on behalf of the Board and the Investment Manager such conditions and modifications as may be prescribed or imposed by any of them while granting such approvals, consents, permissions and sanctions as may be required in relation to the Trust and the Issue;

(vi) To finalise, approve and file, where applicable, the draft offer document, offer document and final offer document to be filed with SEBI, the Stock Exchanges or any other authority or agency and to make necessary amendments or alterations, therein in relation to the Issue;

(vii) To approve and adopt the necessary governance policies for the Trust as required under the InvIT regulations or other prevailing laws in relation to the Issue;

(viii) To approve the appointment of intermediaries/ service providers for the purpose of Issue and approve entering into agreements/ engagement letters;

(ix) to authorize and approve the incurring of expenditure and payment of fees, commission, remuneration and expenses in connection with the Issue;

(x) to settle all questions, difficulties or doubts that may arise in regard to the Issue including such issues or allotment and matters incidental thereto as it may, deem fit and to delegate such of its powers as may be deemed necessary to the officials of the Investment Manager;

Policies of the Board of Directors of the Investment Manager in relation to the Trust

The Investment Manager has adopted, amongst others, the following policies, in relation to management of the Trust and all assets of the Trust:

A. *Borrowing Policy of the Trust*

The Investment Manager has adopted this Borrowing Policy pursuant to a resolution of the IM Board dated November 19, 2025, in relation to the Trust. The Investment Manager shall ensure that all funds borrowed by or

in relation to the trust and the Initial Portfolio Assets are in compliance with the InvIT Regulations, and all other applicable laws. This Borrowing Policy outlines the process borrowing monies in relation to the Trust. The key terms of the Bo0rrwoing Policy include, among other things, the following:

(i) The Investment Manager shall ensure that all funds borrowed in relation to the Trust, HoldCos and SPVs, are in compliance with the InvIT Regulations and applicable law.

(ii) In the event the aggregate consolidated borrowings and deferred payments (net of cash and cash equivalents) of the Trust, HoldCos and SPVs exceed any thresholds prescribed under the InvIT Regulations, any further borrowings shall be undertaken in accordance with the requirements of the InvIT Regulations, including obtaining Unitholders' approval under Regulation 22.

(iii) The Trust may raise debt and avail borrowings and deferred payments from time to time, including through (a) availing loans (including fund-based and non-fund-based facilities) from banks, financial institutions, non-banking financial companies, insurance companies, mutual funds, AIFs, corporates; or any of its associates & any deferred payment liabilities under the securities purchase agreements and/or similar lending institutions, and (b) issuance of debt securities and/or commercial papers, in accordance with applicable law, including the InvIT Regulations and in the manner specified by SEBI and/or the Companies Act, 2013.

(iv) The Investment Manager and the Trustee (on behalf of the Trust) shall be permitted to borrow monies in relation to the Trust, subject to approval of the IM Board or a such other committee of the IM Board as may be constituted. The Investment Manager may engage intermediaries as may be necessary to facilitate such borrowings for reasonable, arm's length remuneration, as permitted by applicable law.

(v) The Trust also has the power to create mortgages, assignments, pledges, charges, hypothecations, or other security interests over its assets, or provide guarantees or subordination undertakings to borrow funds, subject to requirements of applicable law. However, the Investment Manager shall not create any obligation on the Trust that allows liabilities to extend beyond the assets held by the Trust.

B. ***Policy on Unpublished Price Sensitive Information and Dealing in Securities by the parties to the Trust ("UPSI Policy")***

The Investment Manager has adopted the UPSI Policy pursuant to a resolution of the IM Board dated November 19, 2025. The purpose of this policy is to ensure that the Trust and the Investment Manager comply with all applicable laws, including the InvIT Regulations and other laws, regulations, rules, or guidelines prohibiting insider trading and governing the disclosure of material, unpublished price sensitive information ("**UPSI**"). The key principles of the UPSI Policy are as follows:

(i) The Investment Manager shall promptly disclose to the public all UPSI that would impact price discovery, as soon as credible and concrete information comes into being, to ensure such information is made generally available. The Investment Manager shall ensure uniform and universal dissemination of UPSI to avoid selective disclosure.

(ii) The Compliance Officer shall be responsible for determining whether a public announcement is necessary for verifying or denying rumours and for making such disclosures, in accordance with the procedure specified in the policy for determining materiality of information.

(iii) The Compliance Officer shall make appropriate and fair responses to queries on news reports and requests for verification of market rumours by regulatory authorities, in accordance with the procedure specified in the Policy for determining the materiality of information for periodic disclosure. No employee or representative of the Investment Manager who receives any inquiries relating to the Trust, including from investors, shall respond directly to such inquiries. Instead, such inquiries shall be referred to the Compliance Officer or any person authorised by the IM Board to deal with such matters.

(iv) When dealing with analysts, research personnel, or large investors such as institutions, the Investment Manager shall provide only information that is already public.

(v) The Investment Manager shall handle all UPSI strictly on a "need to know" basis. UPSI may be disclosed to persons (including, but not limited to, any designated person, partners, collaborators, lenders, customers, suppliers, bankers, etc.) who require such information for legitimate purposes, performance of duties, or discharge of legal obligations in relation to the Trust.

(vi) No Insider shall undertake any trading of the Units when in possession of UPSI; except when the Insider has demonstrated that (a) such an Insider was not in possession of any UPSI; and (b) the trading decision was made by a person other than the Insider, and such decision making persons were not in possession of such UPSI and no UPSI was communicated by the Insider when such persons made the decision to undertake any trade in the Units.

C. *Policy for Determining Materiality of Information for Periodic Disclosures ("Materiality of Information Policy")*

The Investment Manager has adopted the Materiality of Information Policy pursuant to a resolution of the IM Board dated November 19, 2025, in relation to the Trust. The purpose of this policy is to outline the process and procedures for determining the materiality of information in relation to periodic disclosures on the Trust's website, to the Stock Exchanges, and all stakeholders at large. The key principles of the Materiality of Information Policy are as follows:

(i) Any information concerning the Trust is considered material to the business and affairs of the Trust if (a) it results in, or would reasonably be expected to result in, a significant change in the market price or value of the units of the Trust; (b) there is a substantial likelihood that a reasonable unitholder would consider it important in determining whether to buy, sell, or hold, or engage in other transactions concerning the Trust's units; or (c) the investor would consider it important in making an investment decision.

(ii) The Investment Manager or the Trustee shall provide to SEBI and to the Stock exchanges, wherever applicable, such information as may be sought by SEBI or by the Stock exchanges pertaining to the activities of the Trust.

(iii) The Trust shall submit such information to the Designated Stock Exchange and Unitholders on a periodical basis as may be required under the Listing Agreements. Further, the Trust shall disclose all such information as may be specified by SEBI to the Designated Stock Exchange, Unitholders, and SEBI, in the manner as may be specified by SEBI.

(iv) The Materiality of Information Policy provides that the approval process for disclosure or dissemination of any material or unpublished price sensitive information on behalf of the Trust shall be marked to the Compliance Officer or to any other person authorised by the IM Board to make the disclosures, as may be required.

D. *Document Archival Policy ("Archival Policy")*

The Investment Manager has adopted the Document Archival Policy as per applicable laws and regulations and pursuant to a resolution of the IM Board dated November 19, 2025, in relation to Trust, in accordance with applicable laws. The key principles of the Document Archival Policy are as follows:

(i) The document archival policy aims to provide a comprehensive policy on the preservation and conservation of the records and documents of the Trust. It provides guidance on the preservation and management of documents to help ensure the authenticity, reliability and accessibility of such documents.

(ii) The Trust's records and documents can be classified as physical and electronic records. Documents can also be categorised into documents to be preserved for limited life span and those to be preserved permanently. Documents preserved for a limited period shall be preserved for a period as required under the InvIT Regulations and applicable law.

(iii) All records and documents along with all the supportive documents which are physically available shall be maintained at the principal place of business of the Trust.

(iv) All the documents required to be maintained in terms of the InvIT Regulations and any applicable law, shall be preserved under the custody of the compliance officer of the Trust.

(v) All the statutory documents shall be preserved for a minimum period of eight financial years after completion of the relevant transactions and since creation of the Trust, when the Trust has been created for a period as prescribed under the applicable law. Documents shall be preserved in a chronological manner for each financial year.

(vi) Documents which are confidential in nature shall, wherever possible, be kept under lock and key and shall be shared on need-to-know basis only with persons directly involved in the transaction involving such documents and records.

(vii) If required under applicable law, some of the registers and records may be required to be kept open by the Trust for inspection by directors of the Investment Manager and unitholders of the Trust and by other persons, including creditors of the Trust.

(viii) Government and statutory authorities, including the Securities and Exchange Board of India, have the right of access to all registers and records.

(ix) Documents and records may be destroyed as provided under the applicable laws, after the expiry of the statutory period for the preservation of the documents, after the person in charge keeping a suitable record of documents destroyed.

E. ***Code of Conduct for the Trust (the "Code")***

The Investment Manager has adopted the Code pursuant to a resolution of the IM Board dated November 19, 2025, in relation to the Trust and conduct of the Trust and the Parties to the Trust. The key principles of Code of Conduct for Trust and Parties to the Trust are as follows:

(i) The Trust and the Parties to the Trust must conduct all affairs of the Trust in the interest of all the Unitholders of the Trust.

(ii) The Trust and the Parties to the Trust shall make adequate, accurate, explicit, and timely disclosures of all relevant material information to Unitholders of the Trust, Stock Exchanges, and SEBI, as per InvIT Regulations and as may be specified by the Stock Exchanges from time to time.

(iii) The Trust and the Parties to the Trust shall try to avoid conflicts of interest, as far as possible, in managing the Trust's affairs and keep the interest of all Unitholders paramount in all matters. In case such events cannot be avoided, it shall be ensured that appropriate disclosures are made to the Unitholders of the Trust and they are fairly treated.

(iv) The Trust and the Parties to the Trust shall ensure that fees charged by them with respect to activity of Trust shall be fair and reasonable.

(v) The Investment Manager to the Trust shall carry out the business of the Trust and invest in accordance with the investment objectives stated in the Offer Document, and take investment decisions solely in the interest of Unitholders of the Trust.

(vi) The Trust, the Parties to the Trust, and any third party appointed by the Investment Manager shall not use unethical means to sell, market, or induce any person to buy Units of the Trust and where a third party appointed by the Investment Manager fails to comply with this condition, the Investment Manager shall be held liable for the same.

(vii) The Trust and the Parties to the Trust shall maintain high standards of integrity and fairness in all their dealings and in the conduct of their business.

(viii) The Trust and the Parties to the Trust shall not make any exaggerated statement, whether oral or written, either about their qualifications or capabilities or experience.

(ix) The Trust and the Parties to the Trust shall render at all times high standards of service, exercise due diligence, ensure proper care and exercise independent professional judgment.

F. ***Nomination and Remuneration Policy ("NR Policy")***

The Investment Manager has adopted the NR Policy pursuant to a resolution of the IM Board on November 19, 2025. The NR Policy aims to provide a framework for nomination and remuneration of members of the IM Board, senior management personnel and key managerial personnel of the Investment Manager. The key terms of the NR Policy are set out below:

(i) The NR Policy reflects the remuneration philosophy and principles of the Investment Manager and the

Trust and considers the pay and employment conditions with peers or competitive market to ensure that pay structures are appropriately aligned.

(ii) Independent Directors may be paid remuneration by way of sitting fees, reimbursement of expenses for participation in the meeting of the IM Board and its committees and by way of commission.

(iii) The compensation of senior management will be decided on the following:

(a) industry benchmarks of remuneration;

(b) the relationship between remuneration and performance benchmarks is clear;

(c) balance between fixed and variable components reflecting short and long term performance objectives;

(d) the remuneration is divided into two components i.e., fixed components of salary, perquisites and retirement benefits and variable component of performance based incentives; and

(e) the remuneration including the annual increment and performance incentive is decided based on the criticality of the roles and responsibilities, performance vis-á-vis the annual budget achievement and individual performance of the Senior Management vis-á-vis the key performance indicators

G. ***Code of Conduct for Board of Directors and Senior Management Personnel***

The Investment Manager has adopted the code of conduct pursuant to a resolution of the IM Board November 19, 2025, for all members of board of directors and senior management personnel of the Investment Manager. The senior management personnel of the Investment Manager shall mean the officers and personnel of the Investment Manager who are members of its core management team of the Investment Management, excluding the Board, and shall include the chief executive officer, chief financial officer, compliance officer and all members of the management who are one level below the chief executive officer or managing director or whole time director or manager (including chief executive officer and manager, in case they are not part of the Board) ("**Senior Management Personnel**").

This policy enables the Investment Manager to publicly state to the external stakeholders of the Trust (suppliers, customers, consumers, Unitholders, etc.), the way in which they intend to do carry out their business and their business in relation to the Trust.

In accordance with this policy the IM Board and the Senior Management Personnel should:

a. demonstrate the highest standards of integrity, business ethics, and corporate governance;

b. perform their roles and fulfil their fiduciary duties with competence, diligence, in good faith and in the best interests of the Trust and the Unitholders of the Trust, without allowing their independence of judgement to be compromised;

c. provide expertise and experience in their areas of specialization and share learnings at the meetings of the Board with best interests of the Trust and its stakeholders along with the Unitholders in mind. They should point the Investment Manager's management in the 'right' direction based on their experience and judgement;

d. give careful and independent consideration to the affairs of the Investment Manager and the Trust and all documents placed before them to satisfy themselves with the soundness of key decisions taken by the management. They should call for additional information, where necessary, for making such judgements;

e. not engage in any business, relationship or any activity which detrimentally conflicts with the interest of the Trust or bring discredit to the Investment Manager or the Trust. Any situation that creates a conflict of interest between personal interests and the, the Trust or its Unitholders' interest must be avoided at all costs;

f. follow all the guidelines put forth in the policy for prevention of insider trading;

g. not disclose any confidential / privileged information of the Investment Manager or the Trust and should

direct any media queries or approaches to the appropriate spokesperson within the Investment Manager;

h. not achieve or attempt to achieve any undue gain or advantage either to himself or to his relatives, partners, or associates;

i. all the members of the Board and the Senior Management shall exercise good judgment, to ensure the interests, safety and welfare of customers, employees, and other stakeholders and to maintain a cooperative, efficient, positive, harmonious and productive work environment and business organization.

The policy also sets out the duties of the independent directors on the IM Board, including, amongst others, (a) undertaking appropriate induction and regularly update and refresh their skills, knowledge and familiarity with the Investment Manager and the Trust; (b) seeking appropriate clarification or amplification of information and, where necessary, take and follow appropriate professional advice and opinion of outside experts at the expense of the Trust; and (c) striving to attend all meetings of the IM Board and of the committees of the IM Board, of which the independent director(s) is a member.

H. ***Policy for Familiarisation Program for Independent Director***

The Investment Manager has adopted this policy pursuant to a resolution of its board of directors on November 19, 2025. The key terms of the policy are set out below:

a. The Investment Manager shall conduct orientation programmes/ presentations/ training sessions, periodically at regular intervals, to familiarize the independent directors with the strategy, operations and functions of the Trust.

b. Such orientation programmes/ presentations/ training sessions will provide an opportunity to the independent directors to interact with the external experts, representatives of sponsor and project manager and senior leadership team of the Investment Manager and help them to understand the Investment Manager's and Trust's strategy, business model, structure, operations, service and product offerings, markets, organization structure, finance, human resources, technology, quality, facilities, risk management strategy, governance policies, designated channels for flow of information and such other areas as deemed necessary.

c. The programmes / presentations shall also familiarize the independent directors with their roles, rights and responsibilities.

d. The Investment Manager may include such other details and information, as required, during the introductory familiarization programme / presentation, when a new independent director comes on the board of directors of the Investment Manager.

e. The Investment Manager may periodically review this Programme and make suitable revisions, as may be deemed necessary, from time to time.

f. The Programme will be conducted on an "*as needed*" basis during the year.

I. ***Policy for Evaluation of the Performance of the Board of Directors***

The Investment Manager has adopted the policy for evaluation of the performance of the IM Board pursuant to a resolution of its board of directors dated November 19, 2025, to formulate and provide a performance evaluation mechanism for the members of the IM Board. The key terms of the Policy are set out below :

(i) To enable formal evaluation by the Board of its own performance (self-appraisals), its committees and Independent Directors as per Part D of Schedule II of the Listing Regulations.

(ii) To be read with the Nomination and Remuneration Policy, Policy on Succession for the Board of Directors and Senior Management, Policy on Diversity of Board of Directors, and other applicable internal policies.

(iii) To prescribe procedures and criteria for evaluating the Board as a whole and Directors (Whole-time, Executive, Non-executive, Independent), adopt best practices to manage Trust affairs seamlessly, and ensure long term value creation for Unitholders by achieving good corporate governance.

(iv) To be conducted by the entire Board, covering performance and fulfilment of independence criteria under InvIT Regulations and Listing Regulations. The directors subject to evaluation shall not participate.

(v) Based on performance evaluation of each Director and the Chairman, the Committee shall provide ratings on each criteria and sub-criteria.

(vi) Some of the criteria include: Attendance and contribution at meetings; stature, mix of expertise, skills, behaviour, experience, leadership, independence, and business understanding; knowledge in business, finance, accounts, legal, investment, internal controls, risk management, operations and corporate governance; internal audit and controls, strategy and business plan development and effectiveness; policy and procedure implementation review; development of procedures and conduct of meetings; time and attention devoted; awareness of corporate governance, etc.

(vii) Policy will be reviewed and reassessed by the Board of the Investment Manager as required, with appropriate recommendations for updates based on regulatory amendments in the applicable law.

J. *Policy on Succession Planning for Board and Senior Management*

The Investment Manager has adopted the Succession Policy pursuant to a resolution of its board of directors on November 19, 2025. The purpose of the Succession Policy is to provide a framework for succession planning of the non-independent directors, independent directors and other members of the Board and senior management of the Investment Manager. The key terms of the Succession Policy are set out below:

The objectives of this policy are:

a. To identify and nominate suitable candidates for the approval of the Board to fill the vacancies which arises in the Board, from time to time;

b. To identify the competency requirements of critical and key positions, assess potential candidates and develop required competency through planned development and learning initiatives;

c. To identify the key job incumbents in senior managerial positions and recommend whether the concerned individual: (a) be granted an extension in term/ service; or (b) be replaced with an identified internal or external candidate or recruit other suitable candidate(s); and

d. To ensure the systematic and long-term development of individuals in the senior management level and to replace when the need arises due to deaths, disabilities, retirements, and other unexpected occurrence.

K. *Policy on Related Party Transactions*

The Investment Manager has adopted a policy in relation to related party transactions ("**RPT Policy**") pursuant to a resolution of its board of directors on November 19, 2025. For details of the RPT Policy, please see "*Related Party Transactions*" on page 417.

L. *Distribution Policy*

The Investment Manager has adopted a distribution policy in relation to Trust ("**Distribution Policy**") pursuant to a resolution of its board of directors on November 19, 2025. The distribution policy provides a structure for distribution of the net distributable cash flows of the Project SPVs to the Trust and the Trust to the Unitholders. For details of the Distribution Policy, please see "*Distribution*" on page 372.

M. *Policy on Appointment of Auditor and valuer of the Trust*

The Investment Manager has adopted a policy on appointment of auditor and valuer ("**Appointment Policy**") pursuant to a resolution of its board of directors on November 19, 2025. For details of the Appointment Policy in relation to the Trust, please see "*Other Parties Involved in the Trust –Policy on appointment of Auditor and Valuer*" on page 157.

N. *Policy on diversity of the board of directors*

The Investment Manager has adopted a policy on diversity of the board of directors ("**Diversity Policy**") pursuant to a resolution of its board of directors dated November 19, 2025. The key terms of the Diversity Policy are set out below:

a. The nomination and remuneration committee of the Board shall consider the Diversity Policy along with the Nomination and Remuneration Policy adopted by the Investment Manager and the benefits of board diversity while selecting and recommending a person for the appointment as member of the Board and while evaluating the Board and its members.

b. The Board shall have, at all times, an optimum combination of executive, non-executive directors including independent and woman directors in accordance with the articles of association of the Investment Manager, Companies Act, 2013, and the InvIT Regulations and the SEBI Listing Regulations.

c. Further, the composition of the Board shall have representation from individuals having varied skills/ expertise, qualifications, tenure, market experience, age, with an endeavor to have an appropriate mix of cultural, geographical and gender diversity to the extent feasible to the business and industry in which the Investment Manager and the Trust operate. While appointing independent directors to the Board, care should be taken as to the independence of the proposed appointee. Directorship in other companies may also be considered while determining the candidature of a person.

O. ***Policy on Qualifications and Criteria for appointment of Unitholders Nominee Directors on the Board***

The Investment Manager has adopted the Policy for Qualifications and Criteria for evaluation of the Unitholder Nominee Directors on the Board pursuant to a resolution of its board of directors dated November 19, 2025. The eligible unitholder(s) have the right, but not an obligation, to nominate only one unitholder nominee director, subject to the unitholding of such eligible unitholder, (either individually or collectively), exceeding 10% of the total outstanding Units and the proposed nominee is a "fit and proper" as per SEBI Intermediaries Regulations, not a wilful defaulter, not debarred/disqualified, etc.

If the right to nominate one or more directors on the board of the Investment Manager is available to any entity (or to an associate of such entity) in the capacity of shareholder of the Investment Manager or lender to the Investment Manager or the Trust (or its holding companies or special purpose vehicles), then such entity in its capacity as Unitholder, shall not be entitled to nominate or participate in the nomination of a Unitholder Nominee Director except in case the right to appoint a Unitholder Nominee Director is available under Regulation 15(1)(e) of the SEBI (Debenture Trustees) Regulations, 1993.

P. ***Whistle Blower Policy/ Vigil Mechansim***

The Investment Manager has adopted the Whistleblower/ Vigil Mechanism Policy pursuant to a resolution of its board of directors on November 28, 2025. The key terms of the Whistleblower Policy are set below:

a. All EAAA employees, as defined in the Whistleblower Policy (at all levels and grades, whether regular, fixed term contract or temporary), Directors, customers, agencies, contractors, vendors, suppliers and/or any of their employees deployed to EAAA, and any other person associated with EAAA (collectively 'Stakeholders'), as defined in the Whistleblower Policy can report any incident/event as detailed within the Whistleblower Policy.

b. The purpose of the policy is to encourage reporting of suspected or actual illegal, unethical or inappropriate events, violations of laws and regulations, irregularities, misconduct, fraud, misrepresentation of financial statements and reports, leak of UPSI or alleged violation of insider trading laws, or violations of EAAA's Code of Conduct; outline the mechanism for reporting and investigation; and outline safeguards against victimisation, reprisal or recriminatory action.

c. Complaints related to employment/superior-subordinate relationships (appraisals, service conditions, favouritism, sexual harassment etc.) which are covered under separate policies; and issues against EAAA employees or Directors that are unrelated to EAAA.

d. Whistleblower will include any Stakeholder who raises, reports, informs or discloses a concern of wrongdoing, unethical/illegal activity or conduct, whether actual, suspected or anticipated that may constitute a breach of applicable laws or the EAAA Code of Conduct or policies.

e. Whistleblower is not expected to prove the truth of the allegations but must demonstrate sufficient grounds and good faith; may disclose identity or remain anonymous (anonymous reports may be investigated at the Committee's discretion); reports must be in good faith with adequate facts/data; false, frivolous, fictitious, malicious, vexatious reports or those with ulterior intent may invite disciplinary action.

f. Whistleblower Committee is constituted to receive, review, investigate and redress concerns.

g. Audit Committee will oversee the Vigil Mechanism and monitors functioning of the Whistleblower Committee and it will provide Whistleblower direct access to the Chairperson in exceptional cases.

h. All Disclosures/Reports will be treated confidentially; identity and existence of the Whistleblower will not be disclosed without written consent unless required by law; information will be shared on a 'need to know' basis for investigation

Further, in terms of the InvIT Regulations and SEBI Listing Regulations, the IM Board has also adopted the following policies pursuant to a resolution dated November 19, 2025:

(i) Policy for Investor Grievance Redressal; and

(ii) Policy on filing of claims by unitholders for unclaimed amounts;

Representatives on the Board of Directors of the Initial Portfolio Assets

The Investment Manager, in consultation with the Trustee, shall appoint the majority of the members of the board of directors of the Initial Portfolio Assets, in accordance with the requirements prescribed under the InvIT Regulations.

INDUSTRY OVERVIEW

*The information in this section is extracted from an industry report titled "Connecting India: Unlocking Investment Potential in Transport Infrastructure" (the "**CRISIL Report**") dated March 23, 2026, prepared and released by Crisil Intelligence (formerly Market Intelligence & Analytics) ("**CRISIL**"). We commissioned the CRISIL Report and paid an agreed fee for the purposes of confirming our understanding of the industry exclusively in connection with the Issue. The CRISIL Report is available on our website upon filing of this Offer Document at www.citiustransnet.in. The CRISIL Report is not a recommendation to invest or disinvest in any company covered in the report. The views expressed in the CRISIL Report are that of CRISIL. Prospective investors are advised not to unduly rely on the CRISIL Report. Unless otherwise indicated, all financial, operational, industry and other related information derived from the CRISIL Report and included herein with respect to any particular year refers to such information for the relevant calendar year. Please see "**Presentation of Financial Data and Other Information**" and "**Risk Factors – We have commissioned an industry report titled 'Connecting India: Unlocking Investment Potential in Transport Infrastructure' ("CRISIL Report") from CRISIL Intelligence, a division of CRISIL Limited, which has been used for industry related data in this Offer Document and such data has not been independently verified by us.**" on pages 15 and 76, respectively.*

References to various segments in the CRISIL Report and information derived therefrom are references to industry segments and in accordance with the presentation, analysis and categorization in the CRISIL Report. Our segment reporting in our financial statements is based on the criteria set out in Ind AS 108, Operating Segments and we do not present such industry segments as operating segments. All figures should be read in conjunction with the respective footnotes/endnotes.

1. Overview of Macroeconomic scenario

1.1 Global Scenario

Review and outlook of global GDP

Global trade growth is expected to progress at a measured but steady pace in the coming years. Advanced economies are likely to expand more sustainably, while emerging markets and developing economies adjust to modest changes in their outlook.

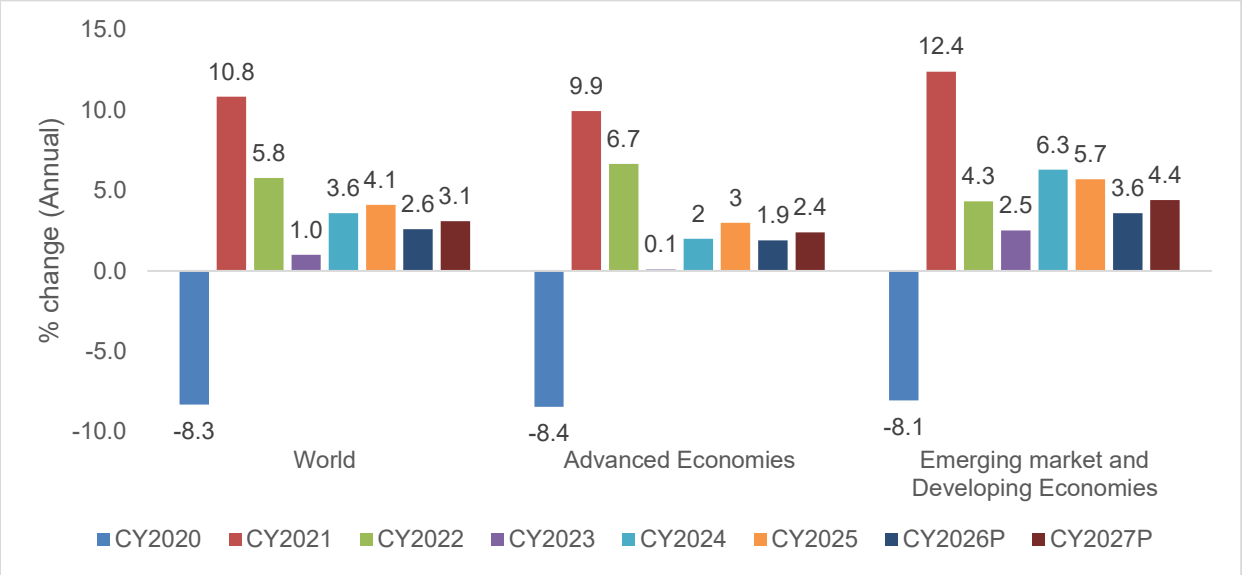
Beyond CY2025, the global economy is expected to enter a phase of steady and stable expansion, with growth broadly settling in the 3.0-3.2% range through CY2029, before moderating slightly to 3.1% in CY2030. This outlook suggests a shift from short-term cyclical fluctuations to a period of sustained global growth, supported by structural drivers such as technological progress, evolving demographics, and ongoing policy realignments.

From CY2025 onwards, global economic growth is projected to remain stable yet moderate, with the world economy expected to expand at around 3.1–3.2% annually through CY2030. The medium-term outlook suggests a phase of steady but range-bound growth, reflecting the gradual easing of inflationary pressures and a slow normalization of monetary conditions across major economies.

However, growth momentum is likely to remain constrained by structural and cyclical challenges, including relatively elevated interest rates, ongoing geopolitical uncertainties, trade and supply chain realignments, and the increasing economic impact of climate-related risks. While large economies are expected to demonstrate resilience supported by domestic demand and services sector strength, limited investment growth and subdued global trade may cap the pace of expansion.

Overall, the global economy is expected to transition into a period of stable but modest growth over the medium term, with downside risks continuing to outweigh the prospects of a strong acceleration.

IMF world trade growth projection

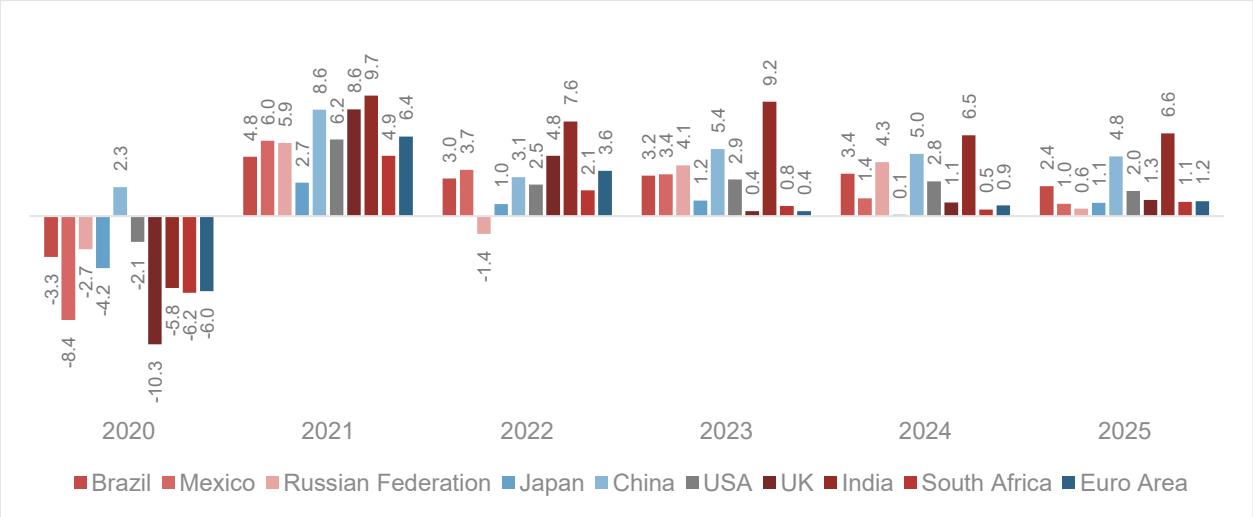


Advanced economies – US, Japan, Euro area; emerging market and developing economies – China, India, Russia, Brazil, Mexico, South Africa
Note: Average annual % change of export and import trade in goods and services has been considered
Source: IMF (World Economic Outlook - October 2025 update, January 2026 update), Crisil Intelligence

Review and outlook of GDP growth in key global economies

The following section lays out the GDP growth over the years for key global economies.

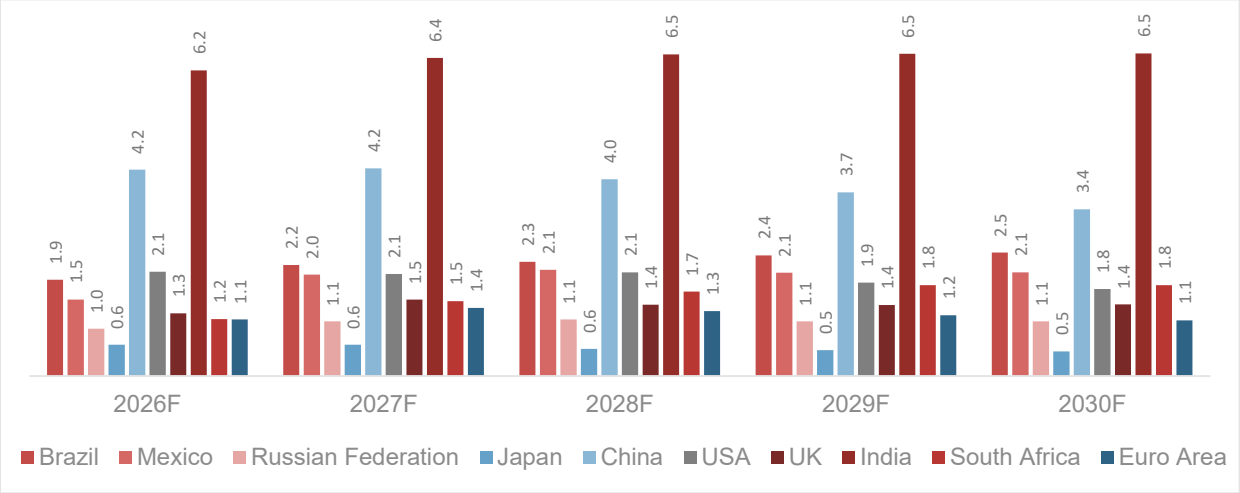
Review of GDP growth (% y-o-y) of key economies



Note: On Calendar Year (CY) basis
** Euro area comprises 20 member countries of the EU*
Source: International Monetary Fund (IMF); World Economic Outlook (WEO) - October 2025 update, Crisil Intelligence

According to IMF, the growth outlook for India, is relatively more stable at 6.2% in CY2026, supported by private consumption, particularly in rural areas.

Outlook of GDP growth (% y-o-y) of key economies



Note: On Calendar Year (CY) basis
** Euro area comprises 19 member countries of the EU*
Source: International Monetary Fund (IMF); World Economic Outlook (WEO) – October 2025 update, Crisil Intelligence

1.2 India Economy

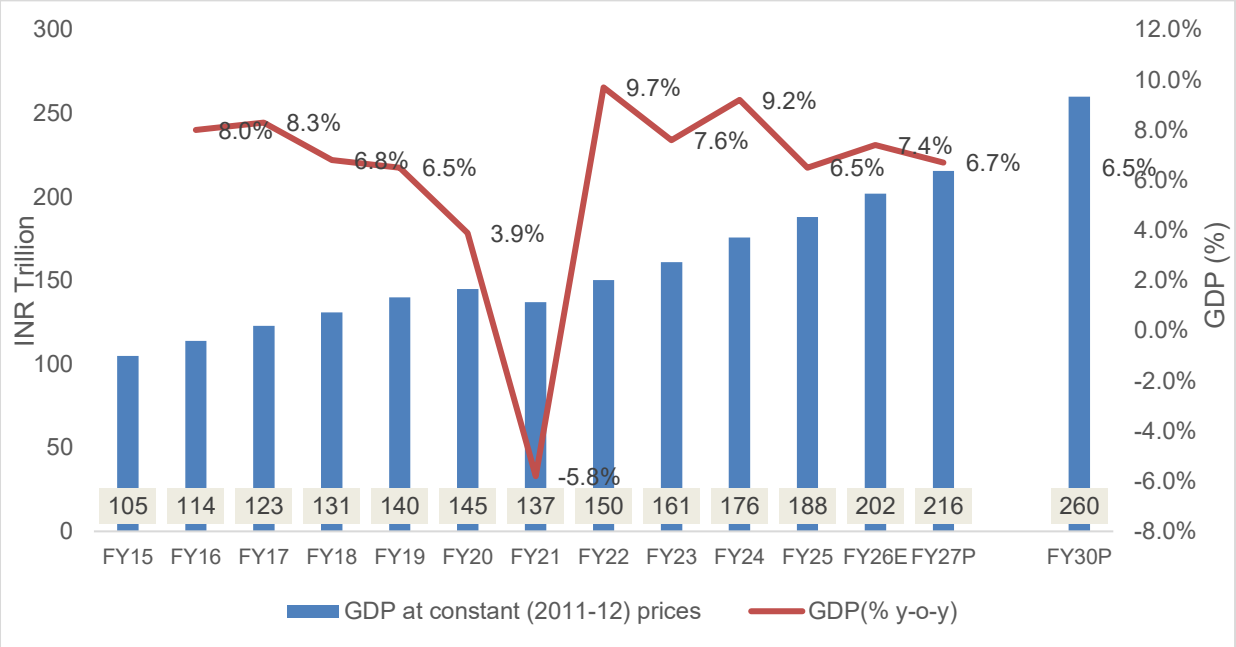
Review of real GDP growth over fiscals 2015-2025 and Outlook for fiscals 2026-2030

India ranks as the world's 4th largest economy and is the fastest growing among major economies with gross domestic product (GDP) for FY25 at 6.5%. India's economy has shown strong and steady progress over the past decade, with real GDP rising from INR 140 trillion in FY2019 to INR 188 trillion estimated in FY2025, reflecting a CAGR of around 5%. Despite periods of volatility, most notably the contraction in FY2021 due to the pandemic, the economy recovered sharply, supported by robust domestic demand, infrastructure spending, and the resilience of core sectors such as construction, manufacturing, and services.

A large part of the lower growth between fiscals 2018 and 2023 having CAGR 4.2% was because of the economy contracting 5.8% in fiscal 2021 owing to the fallout of Covid-19. The pandemic's impact was more pronounced on contact-sensitive services and social distancing norms-affected services such as entertainment, travel, and tourism, with many industries in the manufacturing sector also facing issues with shortage of raw materials/components as lockdown in various parts of the world upended supply chains.

Looking ahead, India's medium-term outlook for FY2026-30 remains broadly positive. For FY2026, GDP is projected at INR 202 trillion, reflecting growth of around 7.4%, consistent with consensus estimates from MoSPI, the Reserve Bank of India, and global institutions. Crisil projects FY2027 GDP at INR 216 trillion accounting for 6.7% y-o-y growth. This trajectory is supported by ongoing capex expansion, infrastructure development, stronger formalisation of the economy, and improving macroeconomic stability. Reforms such as the GST 2.0, focused on rate rationalisation and simplification have to boosted infrastructure and construction activity, further supporting medium-term growth.

India's GDP growth trend and outlook



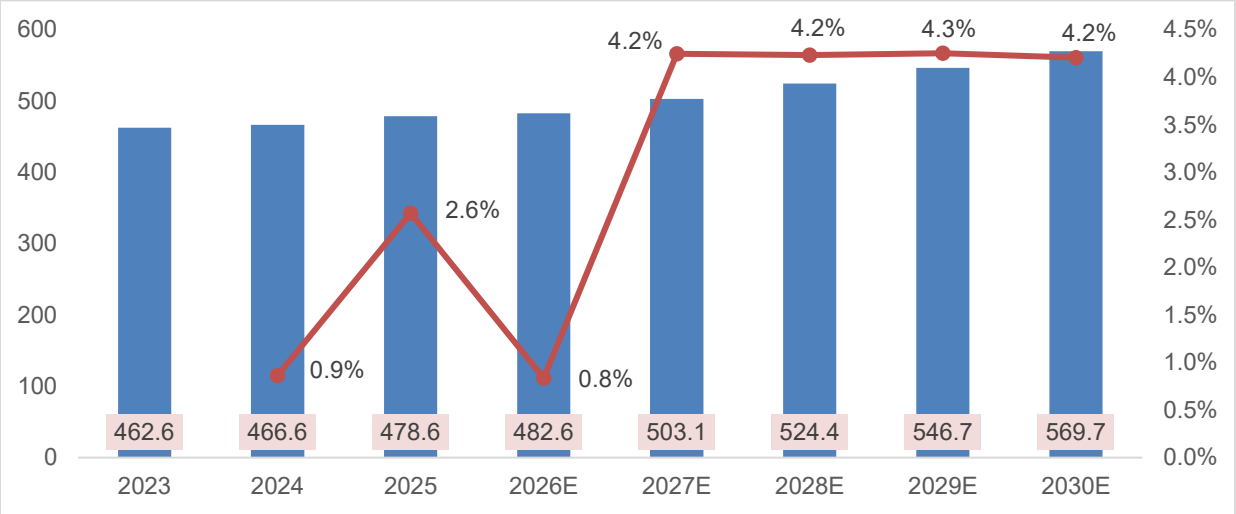
Note: P – Projected
Source: National Statistical Office (NSO), International Monetary Fund (IMF), Crisil Intelligence estimates

Trends in WPI

The Wholesale Price Index (WPI) has exhibited a steady upward trajectory, reflecting a gradual firming up of producer prices in line with improving industrial demand and input cost normalization. After witnessing subdued growth through FY2024 and FY2025, the WPI is projected to increase from 478.6 in FY2025 to 482.6 in FY2026, indicating a mild but steady pick-up in wholesale price pressures.

For FY2027, the index is expected to rise further to 503.1, driven by a combination of improving manufacturing output, moderate commodity price recovery, and strengthening domestic demand. This moderate inflation trend suggests a balanced recovery, where input costs remain contained even as capacity utilization improves across key sectors such as infrastructure, energy, and basic metals. Over the medium to long term (FY2028-FY2030), WPI is projected to maintain its upward trajectory, reaching 569.7 by FY2030. The gradual increase reflects expectations of sustained economic expansion, structural reforms boosting industrial activity, and stable commodity markets. The outlook also assumes continued fiscal support for infrastructure and manufacturing, alongside moderate imported inflation pressures. Overall, the WPI trajectory signals a moderate but durable recovery in wholesale prices, consistent with a stable inflation environment and healthy economic fundamentals over the forecast horizon.

WPI Outlook



E - estimated
Source: Ministry of Statistics and Programme Implementation (MoSPI), RBI, Crisil Intelligence

Outlook

The near-term inflation trajectory is expected to benefit from continued monetary policy transmission, favourable base effects, and softening input costs. The government's continued fiscal consolidation efforts, thrust on capital expenditure, and the implementation of GST 2.0 reforms are expected to further anchor inflation expectations over the medium term. In alignment with the Reserve Bank's medium-term inflation target of 4% (within a tolerance band of ±2%) till FY2030, policy efforts remain focused on anchoring inflation expectations while maintaining conditions conducive to growth. The trajectory over the medium term is expected to converge close to this target, supported by easing supply bottlenecks, moderation in commodity prices, and structural policy reforms. This macroeconomic backdrop of robust growth contained inflation, and a gradually easing interest rate environment translates into rising traffic volumes on roads and lower financing costs. Together, these dynamics are expected to bolster the revenue stability, cash flow visibility, and overall attractiveness of road InvITs as a resilient infrastructure investment avenue.

Risks and Uncertainties

While the overall inflation outlook remains benign, several upside risks persist. These include potential supply disruptions from adverse weather events, volatility in global commodity prices, and prolonged geopolitical conflicts. Conversely, downside risks could arise from the early resolution of geopolitical tensions, softening of global demand and commodity prices, and improvement in supply chain conditions.

Overall, headline inflation is expected to remain within the target band of 2-6% during FY2025–26, supported by prudent monetary and fiscal policies, easing cost pressures, and stable domestic demand dynamics. Over the medium term, inflation is projected to align closely with the 4% target, reinforcing macroeconomic stability and supporting sustainable growth momentum.

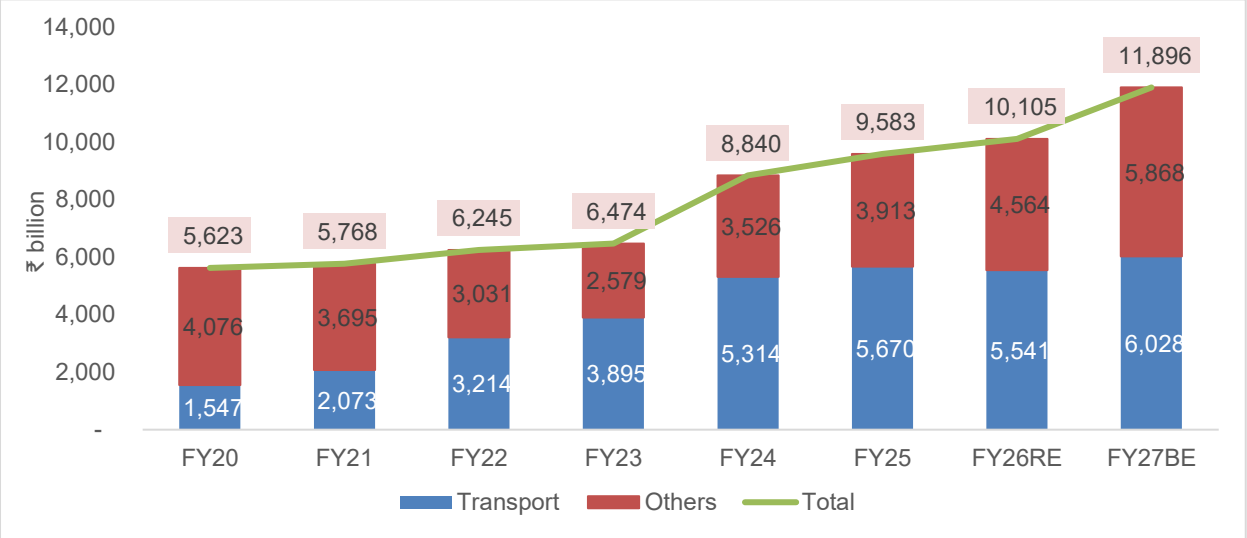
Review of budgetary support to infrastructure sector (FY2020-27)

India's infrastructure budgetary outlay has shown consistent and robust growth between FY2020 and FY2027, reflecting the government's sustained focus on capital formation and infrastructure-led development. The total allocation increased from ₹5,623 billion in FY2020 to an estimated ₹11,896 billion in FY2027, registering a compound annual growth rate (CAGR) of 11.3% over the period. The sharp rise from FY2023 to FY2024, when allocations surged from ₹6,474 billion to ₹8840 billion, highlights the government's strategic acceleration in infrastructure spending to support economic recovery and long-term capacity building.

Transport infrastructure remains the core focus of public investment, with allocations expanding more than threefold from ₹1,547 billion in FY2020 to ₹6,028 billion in FY2026. Non-transport sectors also grew steadily from ₹4,076 billion to ₹5,868 billion, underscoring balanced investment across multiple segments. This sustained rise in infrastructure outlay underpins India's commitment to improving connectivity, enhancing logistics

efficiency, and stimulating private sector participation, thereby reinforcing the sector's role as a key pillar of national economic growth.

Infrastructure budgetary capital expenditure from FY20 to FY27 (Budget Actuals)



Note: RE: Revised Estimates, BE: Budget Estimates
Source: Budget estimates, Ministry of Finance, Crisil Intelligence

Key Infrastructure sector announcements (Budget 2026-27)

- Infrastructure capital expenditure for FY27 BE is 17.7% higher than FY26 RE, this increase was largely driven by investments in logistics, power and affordable housing.
- Strong emphasis on reducing logistics costs through better connectivity and transport systems, as high logistics cost (~8% of GDP) is cited as a structural barrier to competitiveness.
- Road infrastructure remains a priority, with the National Highways Authority of India (NHAI) allocation increased; while private BOT projects have been subdued, green shoots in the pipeline suggest future participation.
- Establishment of an Infrastructure Risk Guarantee Fund, which will offer partial credit guarantees to lenders. For next fiscal, Rs 1,000 crore are allocated for this fund.
- A new Dedicated Freight Corridor (DFC) linking Dankuni (East) and Surat (West) will be designed to speed bulk freight movement and ease mixed traffic congestion.
- Seven new high-speed rail corridors have been proposed to connect key economic centres and act as economic growth connectors.
- Expansion of inland waterways and coastal shipping signals a qualitative shift to multimodal transport operationalising 20 new national waterways and promoting coastal cargo to improve freight modal share (from 6% toward 12% by 2047) and reduce cost.
- Building maritime ecosystem capabilities through ship-repair hubs and a viability gap funding scheme for seaplane manufacturing, aiming to boost connectivity and tourism via water-based transport.
- Affordable housing and rural development allocations are significantly increased (e.g., Pradhan Mantri Awas Yojana-Gramin up ~69%), showcasing a qualitative focus on social and rural infrastructure that supports economic development and living standards.

Contribution of transport to total gross value added (GVA)

The transportation sector plays a critical role in India's economic activity, with roads, railways, water, and air transport collectively contributing to 3.7% of total GVA added by economic activity in fiscal 2024. The trend over

2019-20 to 2023-24 reflects both the structural dominance of road transport and steady growth in other modes.

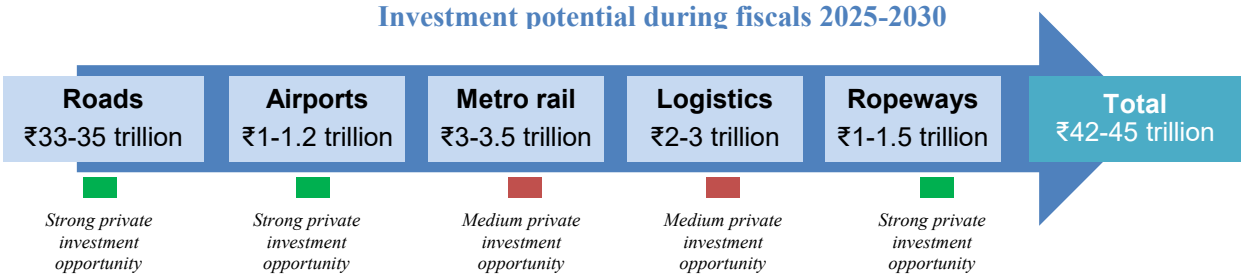
2. Transportation Sector in India

2.1 Overview

Infrastructure development is a key factor in India's long-term economic transformation, serving as a catalyst for productivity and connectivity. Over the past decade, the country has witnessed a fundamental transformation in its transport landscape, from expressways and dedicated freight corridors to modern metro systems and expanding airport networks. These developments have significantly improved connectivity, reduced logistics costs, and supported industrial growth, establishing infrastructure as a key pillar of India's growth narrative.

India's economic expansion and the government's long-term Viksit Bharat 2047 vision have placed infrastructure at the centre of policy planning. Total infrastructure investments are expected to nearly double from ₹47.8 trillion during FY2019-24 to ~₹93 trillion in FY2025-30, reflecting sustained public spending and growing private sector participation. Transport infrastructure alone is projected to attract ₹42-45 trillion over FY2025-30, underscoring its pivotal role in supporting the movement of goods, people, and services across sectors.

During FY2025-30, of the total investment potential across the transport infrastructure, roads is expected to attract the largest share at ₹33-35 trillion, followed by ₹3-3.5 trillion in metro rail, ₹2-3 trillion in logistics infrastructure, ₹1-1.5 trillion in ropeways, and ₹1-1.2 trillion in airports. These investments highlight the government's focus on multimodal transport integration, sustainable mobility, and logistics efficiency while also presenting significant opportunities for private participation.



Note: The logistics sector includes warehousing and distribution, rail freight terminals, civil aviation, ports and shipping, container freight station and inland container depot
Source: Crisil Intelligence

The funding composition of this investment pipeline reflects a balanced mix of central, state, and private participation. Public funding remains the principal driver, with the central government expected to contribute about 53% of total infrastructure investment, states accounting for 32%, and the private sector providing around 15%. The mix varies across modes: roads are predominantly financed by the central government, railways and urban transport involve larger state-level participation, and airports and logistics infrastructure attract higher private sector involvement due to their mature project structures and established concession frameworks. This diversification of funding sources demonstrates a clear policy intent, using public capital for backbone infrastructure while leveraging private capital for commercially viable assets.

2.2 Investment trends: Public expenditure on transport infrastructure as a share of GDP

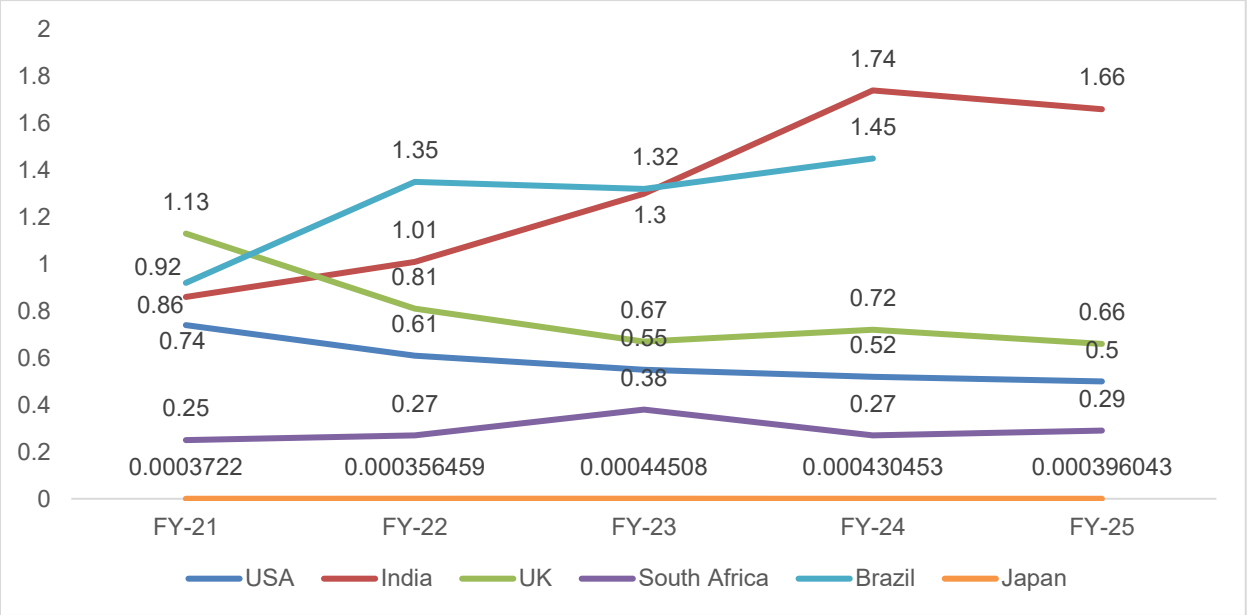
Infrastructure development and economic growth are intrinsically linked. A country's GDP growth trajectory is strongly influenced by the quality and scale of its infrastructure, which forms the backbone for productive activity. Efficient transport networks, reliable energy supply, digital connectivity, and resilient urban systems reduce transaction costs, enhance productivity, and facilitate trade, both domestically and internationally.

Measuring infrastructure investment as a percentage of GDP provides critical insight into how economies prioritize long-term capital formation relative to their overall economic output. Higher infrastructure spending, when well-targeted, generates multiplier effects by stimulating demand in sectors such as steel, cement, and construction, while simultaneously creating durable assets that improve efficiency in the medium to long term. Conversely, underinvestment in infrastructure often results in bottlenecks that constrain growth, limit competitiveness, and exacerbate regional disparities.

Cross-country comparisons of infrastructure investment as a share of GDP also highlight differences in

development strategies and fiscal priorities. Emerging economies typically allocate a higher proportion of GDP to infrastructure to bridge gaps in connectivity and basic services, while advanced economies may invest a relatively lower share, focusing instead on modernization and technological upgradation.

Public investment in Infrastructure as a percentage of GDP



Note: FY25 data point for Brazil is not available yet.
Note: Advanced economies show lower infrastructure spending as a share of GDP since much of their infrastructure is already developed and partly funded off-budget, whereas India's higher figure (~1.6% of GDP in FY24 vs. ~0.5% in the US) reflects substantial public investment in new infrastructure creation.
Source: World Bank, Office for national Statistics (UK), National Treasury Annual Report (South Africa), The Bank of Japan's Budget for expenses, India Budget, Crisil Intelligence

India's higher and rising investments reflect its aggressive infrastructure push under PM Gati Shakti, NIP, NMP and Bharatmala programmes. As already mentioned, these initiatives aim to close the infrastructure gap, improve logistics efficiency and support rapid urbanisation and economic growth. In FY2025, the collective public and private investment in infrastructure stood at around 4.6% of GDP, reflecting steady momentum in capital formation and greater private sector participation.

2.3 Key government policies in transport infrastructure

The Government's flagship initiatives ranging from Parvatmala, Bharatmala and Sagarmala to the National Logistics Policy and PM Gati Shakti are not only augmenting capacity but also reshaping the investment landscape across asset classes. Roads, railways, ports, ropeways, airports, and urban transit systems (metros) are witnessing differentiated yet complementary growth trajectories, creating significant opportunities for investors, developers, and operators over the next five years. India's economic growth, with GDP forecast to grow between 6.5%-7.0% annually over the next five years, is a primary driver for both core road assets and related sectors.

The PM Gati Shakti- National Master Plan digitally integrates planning across ministries to strengthen multimodal connectivity and reduce project delays, while the National Logistics Policy (NLP) provides the operational backbone for efficient goods movement, targeting a reduction in logistics costs to below 10% of GDP by 2030.

Together, these initiatives are fostering seamless connectivity, improving logistics efficiency, and enhancing private sector participation.

National Infrastructure Pipeline (NIP)

The Government of India launched the National Infrastructure Pipeline (NIP) in December 2019 as a landmark initiative to systematically identify and develop large-scale infrastructure projects across the country. Covering the period from FY20 to FY25, the NIP initially envisaged investments worth ₹111 trillion, spanning over 7,400 projects. The sectors included in this pipeline are energy, roads, railways, ports, airports, urban, irrigation, rural infrastructure, digital infrastructure, agricultural and food processing infrastructure, social infrastructure and industrial infrastructure. Only projects with a capital outlay exceeding ₹1 billion are included, ensuring focus on

transformative, high-impact ventures. The NIP serves as a structured framework to improve project preparation, accelerate approvals, and attract both public and private investment.

As of Feb 2026, India's National Infrastructure Pipeline (NIP) under the Gati Shakti framework has witnessed a significant expansion in both scale and scope. The NIP now comprises around 14,928 projects across 63 sub-sectors, with a total project cost of ₹216.02 trillion. Additionally, there are about 1,254 projects currently under various stages of development, reflecting steady implementation progress. Overall, the NIP has evolved into a robust platform aligning with the Gati Shakti master plan, focusing on multimodal connectivity and accelerated project execution.

National Monetization Pipeline (NMP)

NMP was announced in August 2021 on the principle of 'asset creation through monetisation' i.e., tapping private sector investment for new infrastructure creation. It aims to unlock value from existing government-owned infrastructure assets through monetization models such as PPPs, InvITs and concessions. Unlike privatisation, which involves selling ownership, the NMP allows private investors to operate and generate revenue from public assets for a fixed period, after which the assets are returned to the government.

The NMP framework employs a range of models, including Public-Private Partnerships (PPP), Infrastructure Investment Trusts (InvITs), and Toll-Operate-Transfer (TOT) concessions. These structures are designed to offer investors predictable and stable returns, while ensuring that ownership of the underlying assets remains with the public sector. This balance between private efficiency and public accountability underpins the NMP's design.

The National Monetisation Pipeline (NMP) for FY 2021-22 to FY 2024-25 envisaged a total monetisation potential of ₹6.0 lakh crore across core infrastructure sectors. Over the implementation period, the programme achieved approximately ₹5.0-5.2 lakh crore, representing about 89% of the overall target, reflecting strong execution and investor participation.

In line with this objective, National Monetisation Pipeline (NMP) 2.0 for the period FY 2025-26 to FY 2029-30 has been launched. The programme provides a medium-term roadmap for monetisation of revenue-generating infrastructure assets across key sectors, including transportation, energy, mining, and telecommunications. The framework focuses on the transfer of revenue rights for a defined concession period, while ownership of the underlying assets remains with the public authority.

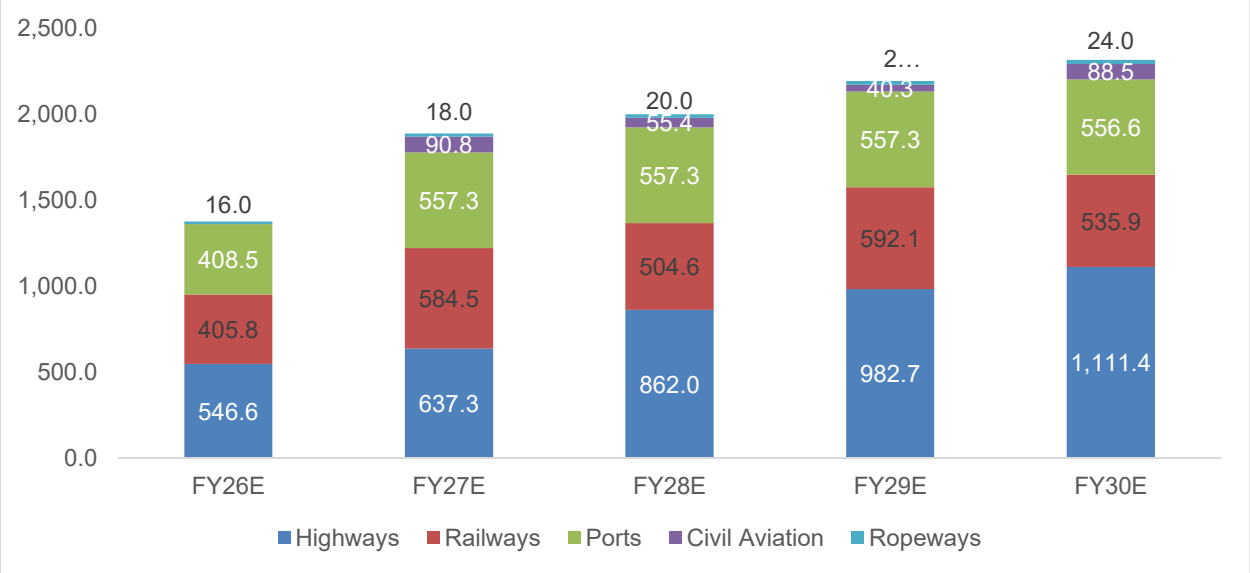
Within the transportation sector, NMP 2.0 places significant emphasis on assets with stable demand profiles and established operational performance. Monetisation is proposed across multiple modes, including:

- National highways through Toll-Operate-Transfer (TOT) and InvIT structures
- Railway assets such as freight terminals, station redevelopment projects, and commercial land development rights
- Port terminals and operational berths
- Airport assets through long-term concession models
- Ropeway projects under PPP frameworks

The monetisation process is expected to improve operational efficiency, enhance service quality through private sector expertise, and facilitate capital recycling for new infrastructure creation. The initiative also supports the development of long-term infrastructure investment platforms such as Infrastructure Investment Trusts (InvITs), thereby broadening the investor base for transportation assets.

The transportation sector constitutes a significant share of the overall monetisation pipeline, reflecting the government's focus on strengthening logistics efficiency and multimodal connectivity across the country.

Sector wise split of asset monetisation in transport infrastructure (in ₹ Billion)



Note - E: Estimates
Source: NMP2.0 document NITI Aayog, Crisil Intelligence

PM Gati Shakti - National Modal Plan for Multi Modal connectivity

Launched in October 2021, the Pradhan Mantri Gati Shakti (PMGS) initiative marks a paradigm shift in India's approach to infrastructure development and planning. It brings together 57 ministries and departments on a unified digital platform, facilitating coordinated and data-driven decision-making for infrastructure projects across sectors and regions.

PM Gati Shakti also ensures synergy among the government's flagship programmes, including Bharatmala Pariyojana (roads and highways), Sagarmala (ports and coastal infrastructure), UDAN (regional air connectivity), and Dedicated Freight Corridors (rail logistics). By aligning these initiatives under a single framework, the programme enhances last-mile connectivity, improves logistics efficiency, and supports the goal of reducing logistics costs as a share of GDP.

As of February 2026, more than 352 infrastructure projects with a combined investment value of approximately ₹16.1 trillion had been evaluated and fast-tracked under the PM Gati Shakti framework. These projects span critical sectors such as highways, ports, airports, power transmission, and industrial corridors, demonstrating the platform's role as a central enabler of integrated infrastructure delivery.

National Logistics Policy

Launched in September 2022, the National Logistics Policy (NLP) aims to build a unified, efficient, and technology-driven logistics ecosystem that enhances multimodal connectivity and strengthens India's trade competitiveness. The policy targeted reducing logistics costs below 10% by 2030, which has been achieved since logistics cost stands at 8% of GDP as of Feb 2026, bringing India closer to global benchmarks and improving supply chain resilience.

The NLP focuses on seamless multimodal integration, data-driven decision-making through the Unified Logistics Interface Platform (ULIP) and improving India's Logistics Performance Index (LPI) ranking to among the top 25 countries by 2030. It complements PM Gati Shakti by providing the operational and regulatory framework for efficient goods movement across transport modes and supports the development of Multimodal Logistics Parks (MMLPs), Private Freight Terminals (PFTs), and other logistics infrastructure.

India's progress under this policy is already visible in the World Bank's LPI 2023, India's rank improved to 38th, up from 54th in 2014, reflecting gains in connectivity, infrastructure, and supply chain digitisation.

Sagarmala Programme

The Sagarmala Programme, launched in 2015, is a flagship initiative of the Government of India aimed at fostering port-led economic growth through modernization and efficient utilization of India's 7,500 km coastline and 14,500 km of navigable waterways. Encompassing over 800 projects across port modernization, connectivity

enhancement, industrialization, and coastal community development, the programme involves a total investment of about ₹3.59 trillion. Key components include port upgrades and new port construction (₹1.6 trillion), connectivity improvements via road, rail, and waterways (₹1.2 trillion), development of 14 Coastal Economic Zones (₹550 billion), and coastal community initiatives (₹240 billion). As of 2025, more than 277 projects are completed, expanding port capacity from 1,560 MTPA in 2015 to over 2,600 MTPA, with turnaround times reduced to under 48 hours. Looking ahead, Sagarmala is expected to cut logistics costs by 10–15%, raise port capacity to over 3,500 MTPA by 2030, and generate around 10 million jobs, while complementing other national programmes like Bharatmala Pariyojana and PM Gati Shakti to strengthen India's multimodal infrastructure network.

Bharatmala Pariyojana

The Bharatmala Pariyojana, launched in 2017, is a flagship highway development initiative of the Government of India designed to optimize the movement of freight and passengers across the country through the expansion and modernization of the national highway network. The programme aims to build a seamless road network connecting economic corridors, border and coastal areas, ports, and backward regions, thereby improving connectivity between rural and urban centers. Phase I (2017–2028) targets the development of about 34,800 km of corridors, comprising 24,800 km of new construction and 10,000 km of upgrades at an estimated cost of ₹6.92 trillion (₹6,920 billion). As of Dec 2025, around 26,425 km have been awarded and over 21,783 km completed.

Looking ahead, the government plans to extend the initiative under Bharatmala Phase II and subsequent phases, covering up to 83,600 km of highways in total and connecting over 550 districts, ensuring that 80% of districts are linked by National Highways.

Parvatmala Pariyojana

Parvatmala Pariyojana is a Government of India initiative launched in 2022 to develop ropeway connectivity in hilly and difficult terrains as a sustainable alternative to conventional road transport. Implemented through the National Ropeways Development Programme under the Ministry of Road Transport and Highways, the scheme aims to enhance last-mile connectivity, promote tourism, and reduce travel time and congestion in mountainous regions. It also seeks to cut down carbon emissions and improve accessibility for remote communities by leveraging the Hybrid Annuity Model (HAM) for ropeway development and private sector participation.

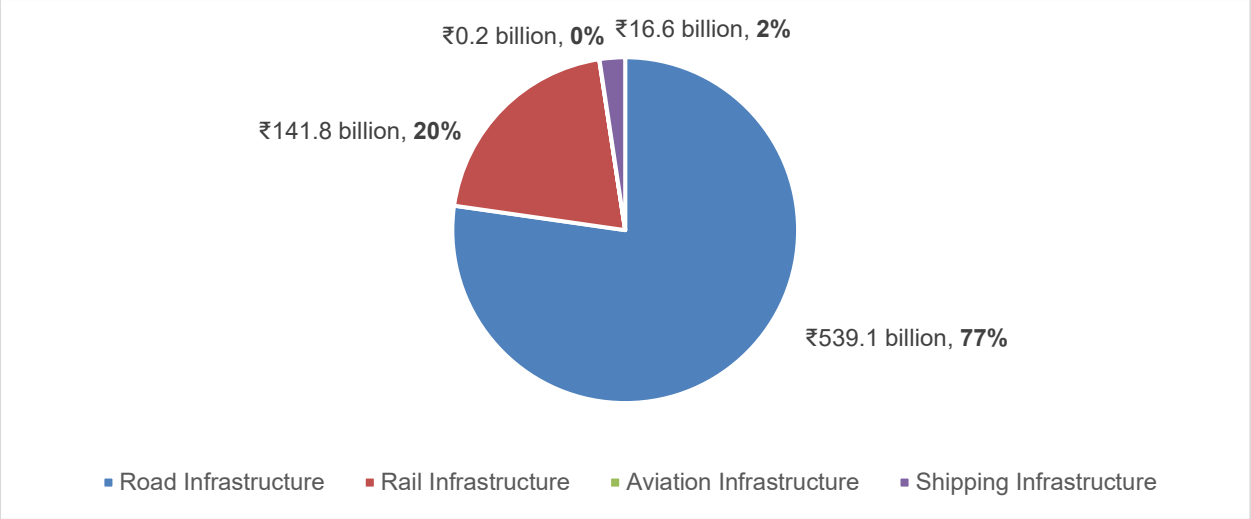
2.4 Current bid pipeline under various concession models

As of 20th February 2025, India's infrastructure industry boasts over 562 ongoing projects across various sectors and concession models, driven by increased public-private participation over the past few decades.

The current project pipeline is divided between the central government with 342 projects (61%) and state government with 220 projects (39%). The central government projects, core to the monetization pipeline cost around ₹600.72 billion while state government projects cost about ₹97.09 billion.

The road infrastructure sector dominates the project pipeline, with a substantial 77% share of the total project cost, valued at ₹539.1 billion, and 387 live tenders. The rail infrastructure sector follows, with 150 live tenders and 20% of the total project costs. 20 shipping projects are valued at ₹16.6 billion which accounts for 2% of the total projects cost, while 5 aviation projects are valued at ₹0.2 billion.

Share of various sectors in current bid pipelines (basis cost of projects)



Source: Projects Today, Crisil Intelligence

2.5 Outlook

By the close of this decade, India's transport infrastructure is set to undergo a sweeping transformation. The evolution will not merely be about expanding physical networks, but about creating a seamless, technology-driven ecosystem that connects people, goods, and markets more efficiently than ever before.

- **Roads:** The road sector continues to dominate India's transport landscape and is projected to account for nearly 80% of the total potential investment in the transport segment over the next five years. This is driven by the vast scale and reach of India's road network, the second largest in the world and its critical role in carrying over 60% of freight and 85% of passenger traffic nationwide. Government initiatives such as the Bharatmala Pariyojana, National Infrastructure Pipeline (NIP), and National Monetisation Pipeline (NMP) have significantly accelerated highway development, expressway expansion, and rural connectivity. The sector also benefits from mature and replicable PPP models, including the Hybrid Annuity Model (HAM), Build-Operate-Transfer (BOT), Toll-Operate-Transfer (TOT), and Infrastructure Investment Trusts (InvITs), which continue to attract strong institutional and global investor interest.

Overall, the roads sector is expected to sustain high growth momentum, with aggregate investments estimated at ₹33-35 trillion between FY2025 and FY2030, underscoring its central role in India's infrastructure expansion.

- **Ports:** India's port sector is projected to grow at a compound annual growth rate (CAGR) of around 5% between FY2025 and FY2030, supported by favourable trade dynamics, increased consumption, and growing containerisation. In FY2025, port traffic expanded by 4-6%, driven primarily by an 11% rise in container throughput and steady growth in petroleum, oil, and lubricants (POL) cargo. However, traffic in some bulk commodities showed mixed trends, iron ore volumes declined by 17% due to reduced demand from China, while coal imports fell by 3% as domestic production ramped up. Despite these variations, long-term prospects remain positive, aided by rising containerisation, policy support under Sagarmala, and ongoing capacity modernisation at major ports. India's ports are well-positioned to benefit from global trade realignment and continued growth in domestic manufacturing and consumption.

- **Airports:** Crisil Intelligenceprojects air passenger traffic recording a 7-10% on-year rise in fiscal 2026 to 425-450 million in fiscal 2026 aided by strong demand across travel segments viz. leisure, VFR (Visiting Friends and Relatives), corporate and MICE (Meetings, Incentives, Conferences and Exhibitions) coupled with increased capacity deployment by airlines expanding network aided by new aircraft deliveries and capacity expansion at major airports such as Delhi, Bangalore, Hyderabad, Chennai etc. Freight air traffic is projected to reach 5.1- 5.3 MT by fiscal 2030 driven by the country's accelerating economic growth post-pandemic and its emerging prominence in global supply chains. The 'China Plus One' strategy adopted by global players is likely to further boost freight demand, as India positions itself as a preferred alternative to China. As cargo-handling capabilities continue to improve,

India is poised to develop into a significant trans-shipment hub, with volumes expected to surge in the coming years.

- **Metro rail:** India's urban metro rail network, the third largest in the world, has grown rapidly, spanning over 1,000 km across 23 cities as of FY2025. The network has expanded at a compound annual growth rate (CAGR) of about 17% since 2002, reflecting sustained investments in urban mobility. An additional 1,032 km of metro corridors has been approved and is under various stages of implementation, which will expand the operational network to 27 cities by FY2030. The sector's growth is being driven by rising urbanisation, improved affordability, and strong policy push from both central and state governments. With estimated investment opportunities of ₹3-3.5 trillion by FY2030, metro systems are set to play a vital role in improving urban connectivity, reducing congestion, and cutting carbon emissions to support India's transition toward sustainable and efficient mass transit systems.

- **Logistics:** India's rank in the World Bank's Logistics Performance Index improved to 38 in 2023 from 54 in 2014, signalling structural improvements in multimodal efficiency. The Viksit Bharat 2047 vision reinforces the urgency of building a world-class logistics ecosystem that reduces costs, enhances competitiveness and strengthens the supply chain for both internal and overseas trade. India's logistics cost accounted for 13-14% of gross domestic product (GDP) and 9.09% of non-services output in fiscal 2024, as per the report titled *Assessment of Logistics Cost in India* by the National Council for Applied Economic Research that was commissioned by the Department for Promotion of Industry and Internal Trade. The logistics cost as a % of logistics has already come down to 8% in FY2026. This may be attributed to several initiatives, such as the PM Gati Shakti, dedicated freight corridors, Bharatmala Pariyojana, Sagarmala Project, integrated check posts, development of the Unified Logistics Interface Platform (ULIP) and the Logistics Efficiency Enhancement Programme (LEAP).

- **Ropeways and way-side amenities (WSAs)** are the other two areas in which significant progress is expected over the next five years. An investment target of ₹1-1.5 trillion has been set for 250+ ropeway projects and completion of more than 1,000 WSAs.

3. Road Infrastructure in India

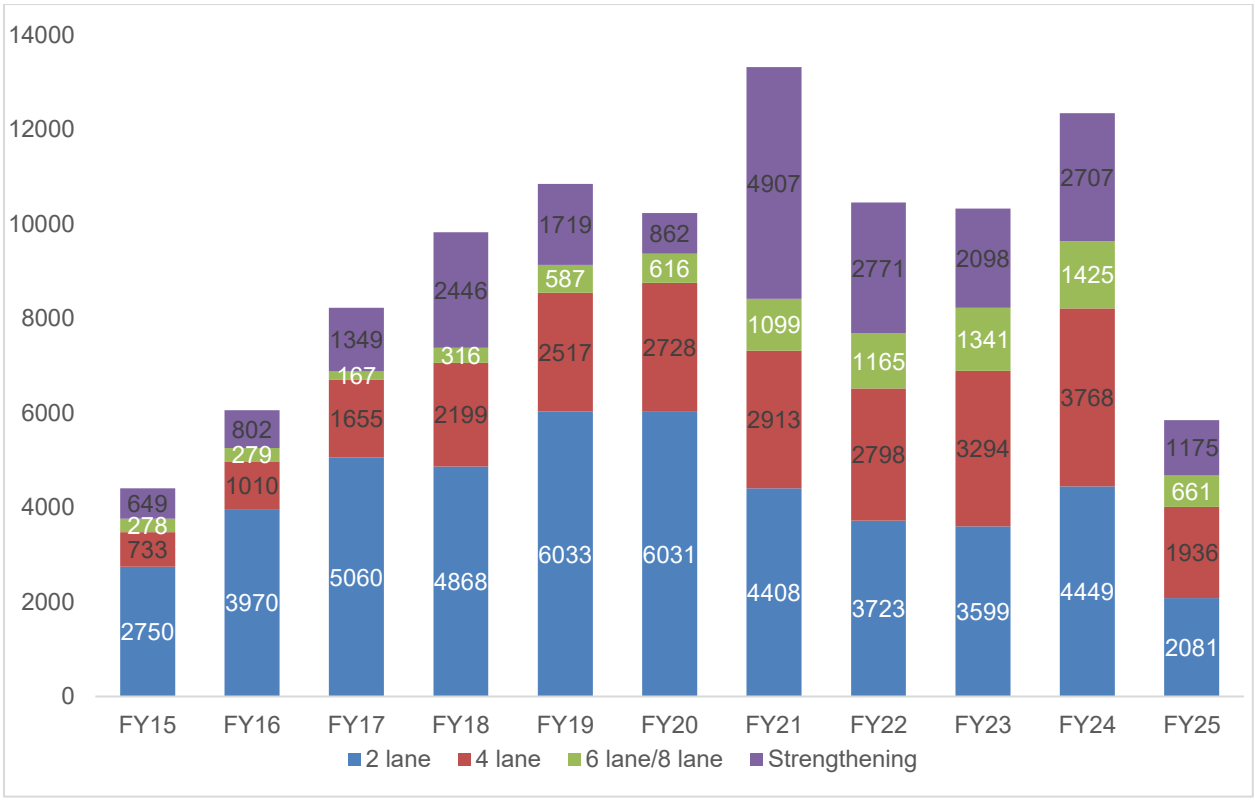
3.1 Overview

India has second largest network of roads in the world. India's logistics ecosystem is road-dominant, with roads accounting for nearly 90% of passenger traffic and close to 64.5% of freight traffic as of 2025. This makes the sector not only a facilitator of day-to-day mobility but also a central pillar in ensuring supply chain efficiency, rural connectivity, and market access.

The contribution of the road transport sector to India's Gross Value Added (GVA) has shown a relatively stable trend over the last decade, though with some fluctuations in recent years. From FY14 to FY20, the sector consistently accounted for around 3.2%-3.3% of GVA at constant prices, reflecting its steady role in supporting economic activity.

Over the past decade, India has prioritised road development through major programmes such as Bharatmala, PMGSY and the National Infrastructure Pipeline, supported by strong budgetary allocations, digital tools like FASTag, and innovative financing models such as HAM and TOT. This push has accelerated construction, expanded access in remote areas and strengthened logistics efficiency. National highways have grown rapidly from about 91,287 km in 2014 to 146,572 km in 2025 with four-lane and above stretches rising sharply, improving connectivity and reducing travel time.

Length of National Highway Lane increase (in km)



Note: Data of FY25 is till 31st December 2024
Source: MoRTH Annual Report 2024-25, Crisil Intelligence

There has been a steady rise in overall lane addition, with major growth observed in FY21 when total additions were 13,327 km. In the early years, the expansion was largely driven by 2-lane highways, which later shifted to 4 and 6-lane/ 8-lane roads. From FY15 to FY24 the share of 4-lane roads has increased by a CAGR of 20% and share of 6-lane/ 8-lane roads has increased by a CAGR of 28.5% from FY18 to FY24, reflecting a transition toward higher-capacity and better-quality road infrastructure. Strengthening of existing roads has emerged as a consistent component, pointing to a growing emphasis on maintenance and lifecycle improvement rather than only new construction. It is expected that this steady momentum with substantial contributions from 2-lane and 4-lane expansions alongside strengthening works is continued FY25 onwards, demonstrating the government's focus on both expanding connectivity and enhancing the durability of the national highway network.

Long-term Enablers to Accelerate Growth Momentum in Roads

The outlook for India's road infrastructure sector remains highly positive, supported by strong policy measures, robust investment pipelines, and structural reforms. The major demand drivers of roads infrastructure are increased preference of travel via road and freight traffic over the roads. Roads continue to be the most preferred mode of travel for freight transportation in FY25 with a modal share of 63% and this number is expected to grow by a CAGR of 5-7% till FY30. Several long-term enablers are expected to drive accelerated growth momentum over the coming years.

Awarding rebound	NHAI plans to bid out 124 road projects with total length of 6300-6400 kms in fiscal 2026, an increase of 12% from fiscal 2025. Out of these 124 projects, 9.7% (12 projects) are BOT, 25% (31 projects) are EPC and 65.3% (81 projects) are HAM projects.
6-8 lane highways	20,000 Km of high-speed corridors to be constructed in next 5 years, with a long-term goal of constructing 50,000 Km of high-speed corridors (4-6 lanes with design speed 200-250 km/hr but speed limit of 120km/hr) network in India by fiscal 2040.
Private investments	Favorable amendments in the model concession agreement (MCA) coupled with a strong pipeline of 53 projects worth Rs 2.1 trillion with will attract higher private sector investments. Policy changes include relaxed bidder eligibility criteria and modifications to HAM and BOT concession agreements. These changes aim to attract smaller players, protect developers'

	returns, and ease cash flows, thereby revitalizing interest in the sector. Further changes in MCA of EPC and HAM are in pipeline.
Toll collection	Toll collections rose from ₹0.76 billion/day in FY21 to about ₹2 billion/day in FY25 marking CAGR of 27.3% driven by growing traffic and higher toll rates, further toll collections are expected to reach ₹2.18 billion/day in FY26 . The steady growth in toll collection and the expected increase in annual toll collection provide a stable revenue stream for investors and support the financial sustainability of projects.
Monetization	Ministry of Road's transport and highways (MoRTH) successfully monetized Rs 1.5 trillion of assets by Nov 2025 in first phase of National monetization pipeline (NMP), roads target for NMP 2.0 is 3.5 Rs trillion.

Source: Crisil Intelligence

NHAI's Debt Position

A striking trend is the increase in NHAI's outstanding debt over the last decade. From just ₹234 billion in FY2014, debt levels have surged to reach approximately ₹3.48 trillion in FY2022 and then reduced to ₹2.76 trillion at the start of FY26 with the help of asset monetization pipeline (TOT and InvITs). This steep rise highlights NHAI's growing reliance on borrowings to fund highway expansion, particularly in periods when budgetary support has stabilised.

The debt build-up has significant implications. While it has enabled accelerated project execution, high repayment obligations may constrain NHAI's financial flexibility. This makes asset monetisation tools such as the Toll - Operate -Transfer (TOT) model, InvITs, and securitisation critical for sustaining investment flows into the sector while reducing dependence on debt.

Types of PPP models

Type of project	Description	Development risk	Financing risk	Traffic risk and accrual of toll fee collection	Net cash outflow for the government	Revenue for private party	Concession period	Award criteria
BOT-Toll	Private party builds the road, undertakes O&M and collects toll	Concessionaire	Concessionaire	Concessionaire	Yes (in the form of grant/equity support)	Toll	20-30 years for the NHAI** and other authorities	Highest revenue sharing bid/highest premium/ lowest equity support
BOT-Annuity	Private party builds the road, undertakes O&M* and collects annuity from the granting authority	Concessionaire	Concessionaire	Authority	Yes, net payment to be made is the difference between the toll collection and the annuity payable	Annuity payment	15-20 years for the NHAI and other authorities	Lowest annuity
BOT-HAM	Private party builds the road, undertakes O&M. Gets 40% of payment during construction and 60% as	Concessionaire	Concessionaire	Authority	40% during construction and 60% as semi-annual annuity along with interest, net	Construction grant plus annuity payments, interest on annuities, inflation-	Around 15 years of operations plus additional	Lowest project cost plus O&M cost

Type of project	Description	Development risk	Financing risk	Traffic risk and accrual of toll fee collection	Net cash outflow for the government	Revenue for private party	Concession period	Award criteria
	annuity along with interest				of toll collected	indexed O&M payments	construction period	
TOT	Private party pays an upfront bid concession fee (summation of NPV of free cash flow based on concessionaire estimates) to the authority, undertakes O&M plus certain capex and collects the toll during concession period	Authority (in case upgradation of lanes is taken up during the concession period)	Concessionaire	Concessionaire	No	Toll	15, 20, 30 years#	Highest upfront payment
Tolling (OMT)	Private party pays the estimated toll upfront to the authority and collects it during the concession period	No development by tolling contractor	Concessionaire	Concessionaire	No	Toll	One year for NHAI projects	Highest revenue-sharing bid

Note: Development risk refers to construction risk in developing a road project
**Operations and maintenance*
*** National Highways Authority of India*
Source: Crisil Intelligence, NHAI

Asset Monetisation Models

Asset monetisation has emerged as a central financing strategy for India's infrastructure development, particularly in the highways sector. It refers to the structured process of unlocking the economic value of operational public assets by transferring their rights to private entities for a defined period in return for upfront or periodic consideration. This approach enables the creation of a cycle, completed assets are monetised to generate fresh capital, which is then reinvested in new infrastructure, thereby expanding the overall asset base without exerting additional fiscal pressure The National Highways Authority of India (NHAI), under the guidance of the National Monetisation Pipeline (NMP) prepared by NITI Aayog, has institutionalised asset monetisation as a long-term strategy. The objective is to tap into private sector capital and operational efficiencies while recycling funds into greenfield projects and capacity augmentation.

3.2 Private Sector Participation in Roads sector

Private sector participation in India's road sector has evolved significantly, with distinct trends emerging across the key contract models - BOT (Toll), HAM, EPC and TOT. Each model has seen a change in risk appetite, competition, and qualification requirements as both the market and policy environment mature.

BOT (Build-Operate-Transfer)

Build operate transfer model has two types of models: BOT- Toll and BOT -Annuity.

During the early phases of highway development, the Build -Operate -Transfer (BOT) (Toll) model dominated bidding activity, with developers willing to take on traffic and revenue risks in anticipation of strong returns. However, mounting challenges such as aggressive bidding, delays in land acquisition, and traffic underperformance led to significant stress in BOT projects between FY12 and FY15. As a result, private

participation through BOT (Toll) declined sharply. In 2023-24, BOT-Toll projects accounted for a negligible share of awards, but by 2024-25 their share rose closer to 3% of NHAI's total project awards, signalling cautious market recovery.

Private bidders under BOT-Toll are becoming more risk-sensitive. They are demanding more favourable contract terms regarding traffic risk, concession duration, and protections such as "buy-out" clauses (for when traffic falls below projections) and clarity on what constitutes competing roads. The government has already amended the Model Concession Agreement (MCA) for BOT-Toll projects (in March 2024) to address some of these concerns easing performance security requirements, modifying equity holding requirements, and looking to make terms more investor-friendly.

Overall, the BOT-Toll is being revived but with an explicit effort by the government to reduce downside risks for bidders. However, the concessionaire generates revenue through fixed annuity payments received from the authority over the concession period.

HAM (Hybrid Annuity Model)

HAM remains the dominant PPP model in recent years. In the fiscal period 2024-25, HAM projects accounted for about 65% of awards by NHAI, overtaking EPC in terms of value of project awards. This dominance reflects policy preference, since HAM allocates traffic risk largely to the government while allowing private players to share construction, operations, and finance risk.

The Hybrid Annuity Model (HAM) combines elements of Engineering, Procurement, and Construction (EPC) and annuity-based approaches, aiming to balance financial responsibility between the government and the concessionaire. Under this model, the concessionaire's financial burden during the construction phase is reduced, while assured revenues are ensured during the operational phase through fixed annuity payments, interest on the diminishing balance of project cost, and inflation-linked O&M payments. The concessionaire undertakes both construction and maintenance responsibilities, while revenue risks arising from fluctuations in user fees are borne by the authority. Variability in user fee gives rise to revenue risk, which is borne by the authority. However, the concessionaire generates revenue through fixed annuity payments received from the authority over the concession period.

The Hybrid Annuity Model (HAM) has undergone significant changes, as outlined in the HAM MCA 2022

Key changes include the change in timing of premium payment, redefinition of project milestones, and interest on annuity payments linked to the average one-year MCLR of the top five scheduled commercial banks +1.25%. Additionally, lenders will receive the first charge on all receivables, and there will be deemed termination of projects prior to the appointed date. The model also includes maintenance obligations and toll fee notifications. These changes aim to improve private participation and project awards in the road sector Furthermore, given the relevant authority is the central government or its agencies, the counterparties present a low risk of default, offering assurance regarding the stability of the revenue under the concession agreements with these authorities years. The model is also expected to boost private investments in national highways over the next five years Despite initial delays in land acquisition and caution shown by lenders, the HAM has seen increased participation in awarding, with a total of 6,306 km awarded in fiscal 2022, of which ~3,468 km was under the HAM. The share of private investment is expected to increase, driven by the changes to the HAM bid eligibility and MCA changes. The HAM roads awarding in FY24 and FY25 was 654 km and 264 km respectively.

TOT (Toll Operate Transfer)

TOT has emerged as an important financing tool because it allows NHAI (and other authorities) to monetise existing operational assets and raise upfront capital. Private bidders (often infrastructure funds, financial investors, trusts) are attracted by the predictability of cash flows from already operational toll roads, especially those with vintage (age, traffic history) that reduces uncertainty.

Because many of the TOT assets now being bundled under this model are parts of the Golden Quadrilateral or similar well-established highway stretches, bidders are able to base their offers on actual toll collection data, operations cost and maintenance records making bids less speculative. This tends to reduce variance among bids and limit extreme discounting or over-optimism.

Overall, the evolution of bidding behaviour across BOT, HAM, EPC and TOT models reflects a maturing road infrastructure market in India. Private participation has shifted from aggressive, risk-heavy bidding to more balanced and risk-sensitive strategies as both developers and the government have learned from past experience.

Tightened qualification criteria, revised concession agreements and the diversification of models are improving the quality and financial sustainability of awarded projects.

In India's PPP road projects, non-EPC players such as financial investors, infrastructure funds, and institutional investors can participate directly or through SPVs, with eligibility focused on financial strength and infrastructure investment experience rather than construction credentials. Models like TOT and InvIT especially encourage such participation, emphasizing asset monetisation, creditworthiness, and long-term operational capability in line with MoRTH and NHAI guidelines.

At the same time, the continued dominance of HAM and the steady rise of TOT demonstrate that well-structured contracts with predictable cash flows can attract strong investor interest, while reforms to BOT-Toll are gradually restoring confidence in revenue-risk projects. Together, these trends signal a more stable, disciplined and diversified pipeline of private participation, which should enhance execution quality, mobilise long-term capital and support the rapid expansion of India's national and state highway networks.

Outlook on Asset Monetisation of road projects

India's road infrastructure sector is one of the largest and fastest growing in the world, forming the backbone of national connectivity and economic development. Delivering such a vast and expanding network requires substantial and sustained investment, far exceeding the capacity of public budgets alone. Over the past two decades, the financing framework for road projects has evolved from traditional government funding to a diversified mix of public, private and blended mechanisms. This evolution has allowed the government to leverage private capital and expertise, introduce innovative risk-sharing arrangements, and accelerate project execution while maintaining fiscal prudence. It has been central to achieving the scale, speed and quality of road development under flagship programmes such as the National Highways Development Project (NHDP) and Bharatmala Pariyojana.

Crisil Intelligence projects that the monetisation potential for road assets is ~₹5.9 trillion until fiscal 2030, nearly double of the ₹2.8 trillion proceeds from monetisation until fiscal 2025.

In recent years, several investors and infrastructure developers have adopted a brownfield acquisition strategy to acquire operational or near-operational HAM road projects.

Acquisition of HAM projects through a brownfield strategy exemplifies a maturing Indian road sector where operational efficiency, risk mitigation, and capital recycling converge to support sustainable infrastructure development and private sector participation in the national asset monetization agenda.

National Monetisation Pipeline Phase 2

Asset class wise monetization pipeline FY26 - FY30 (in ₹ Billion)

Asset classes	Mode of Monetization	Length (in km)	FY26	FY27	FY28	FY29	FY30	Total
Stretches where user fee is accruing to NHAI	InvIT/ TOT model	12,000	325	388	457	533	616	**2319**
Under construction stretches where user fee will accrue to NHAI	InvIT/ TOT model	4,700	-	-	128	145	163	**436**
Projects at the end of their concession periods	InvIT/ TOT model	2,500	96	108	120	132	144	**600**
Project to be awarded under DBFOT (Toll) mode	DBFOT (Toll) model	2,100	125.6	141.3	157	172.7	188.4	**785**
Total		**21,300**	**546.6**	**637.3**	**862**	**982.7**	**1111.4**	**4140**

Source: NMP2.0 document NITI Aayog, Crisil Intelligence

Cash-Flow by recipient/Private Investment from highway projects (in ₹ Billion)

Accrual Heads	FY26	FY27	FY28	FY29	FY30	Total (FY26 to FY30)	Flows for the period

							FY31 and beyond
Consolidated Fund of India	421	496	705	810	923	3,355	-
Direct investment	18.8	84	138.2	153.9	169.6	564.5	220.6

Source: NMP2.0 document NITI Aayog, Crisil Intelligence

3.3 Awarded and Upcoming Projects

Mode-wise Projects proposed to be Awarded by NHAI

The table below presents the BOT project pipeline; it is expected to support private sector participation over medium to long run. Additionally, long-term project pipeline of 53 highway projects worth ₹2.1 trillion is being prepared under the BOT model.

Projects Pipeline under HAM

	FY22	FY23	FY24	FY25
Length awarded(km)	8,781	10,989	11,537	11,269
Cost (₹ Billion)	3,295.64	4,691.07	4,454.71	4,365.22

Source: MoRTH, Crisil Intelligence

Pipeline/upcoming projects by NHAI, MoRTH

During FY26, the National Highways Authority of India (NHAI) plans to implement 124 projects with a cumulative investment of approximately ₹3.45 trillion (₹3,454.65 billion), covering a total road length of 6,378 km.

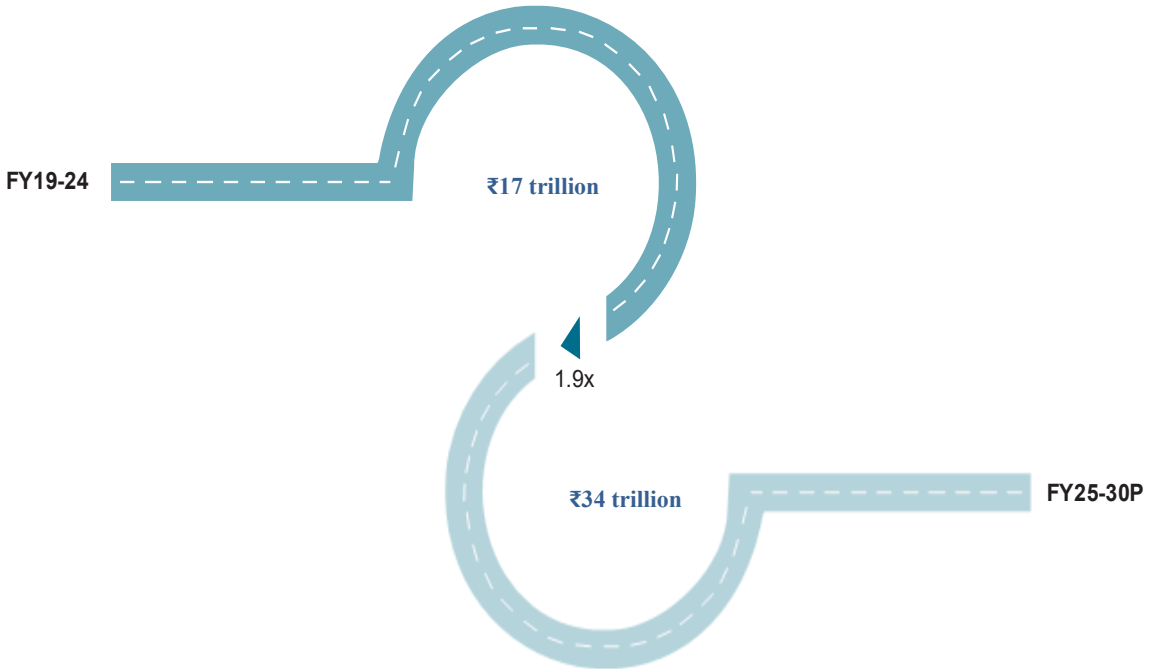
Of these, the Hybrid Annuity Model (HAM) will dominate with 81 projects spanning 4,699 km, representing an investment of about ₹2,475.09 billion. The Engineering, Procurement and Construction (EPC) mode accounts for 31 projects totaling 683 km, with an estimated cost of ₹358.31 billion. Meanwhile, the Build-Operate-Transfer (BOT) mode will see 12 projects covering 996 km, entailing an investment of around ₹621.25 billion.

The upcoming MoRTH project pipeline comprises a total of 25 PPP-based projects across three implementation models. Under the Build-Operate-Transfer (BOT) model, 4 projects are planned with a combined estimated cost of ₹185.6 billion. The Design-Build-Finance-Operate-Transfer (DBFOT) model includes 1 project valued at ₹57.3 billion. The Hybrid Annuity Model (HAM) accounts for the largest share with 18 projects, representing an investment of ₹706.9 billion. Altogether, these projects amount to a total estimated cost of ₹1,211 billion.

3.4 Outlook

India's road sector is poised to maintain strong momentum, underpinned by its central role in facilitating both freight and passenger mobility. Accounting for over 60% of total freight and nearly 85% of passenger traffic, roads form the backbone of India's transport ecosystem. The sector is expected to attract the largest share of transport investments, approximately ₹33-35 trillion between FY25-30.

Capex in roads sector (₹ billion)



Source: Crisil Intelligence

Growth Drivers and Demand Outlook

Road freight is expected to maintain a healthy growth trajectory, with volumes projected to expand by 5-7% annually in FY2026. This follows robust growth of 6-8% in FY2025, driven primarily by the sustained movement of bulk goods and the growing share of non-bulk commodities such as agricultural produce, consumer goods, and e-commerce deliveries. Rising rural connectivity, expanding industrial corridors, and increasing consumption demand are expected to sustain medium-term freight growth.

Passenger traffic will similarly benefit from continued improvements in intercity expressways and rural road connectivity. Highway expansions and new expressway developments are expected to improve travel time efficiency, safety, and service reliability-making road travel more competitive relative to other transport modes.

Investment and Policy Landscape

Capital expenditure in the road sector is projected to increase from around ₹17 trillion during FY2019-24 to about ₹33-35 trillion in the medium-term span of 5 years, nearly 1.9 times higher. This surge will be driven by a combination of public and private investments, supported by government policy thrust on network expansion, asset monetisation, and multimodal integration.

The share of private investments is anticipated to increase from 11% between FY2019-24 to 16-18% between FY2029-30, with government increasingly shifting its focus to asset monetization models which provide stable, long-term, annuity-like returns and lower risk for private investors. Financing diversification is being achieved through models such as Hybrid Annuity Model (HAM), Build-Operate-Transfer (BOT), Toll-Operate-Transfer (TOT), and Infrastructure Investment Trusts (InvITs). The success of these models has strengthened investor confidence and attracted long-term institutional and global capital.

Capacity Augmentation and Network Expansion

The next phase of highway development will focus on capacity augmentation, expressway expansion, and corridor-based planning. MoRTH aims to upgrade 25,000-30,000 km of two-lane highways into four lanes (with estimated investment of ₹8-10 trillion) and convert about 16,000 km of four-lane highways into six lanes. The upcoming FY2026-30 build programme will prioritise systematic widening of high-traffic corridors and development of new greenfield expressways and access-controlled highways.

Guided by Vision 2047 and the Viksit Bharat roadmap, India targets the development of 50,000 km of high-speed corridors by FY2037, scaling up to 200,000-230,000 km by FY2047. These initiatives are expected to enhance logistical efficiency, reduce transit times, and lower logistics costs, aligning with the government's broader target of achieving single-digit logistics costs as a percentage of GDP.

Technological Advancements and Innovation

Technology adoption is emerging as a key enabler in improving construction efficiency and network management. MoRTH is encouraging the use of advanced materials and construction techniques to reduce costs and enhance pavement quality. Research initiatives are underway on the use of bio-bitumen from agricultural waste and performance-based bituminous mixes. Additionally, digital tolling, contactless payment systems, and intelligent transport management solutions are being rolled out to improve traffic flow and reduce congestion.

Multimodal Integration and Logistics Efficiency

To strengthen last-mile connectivity and multimodal freight integration, 73 Multi-Modal Logistics Parks (MMLPs) are planned under the PM Gati Shakti initiative. These will serve as nodal hubs connecting road, rail, and air cargo networks, improving modal balance and supply chain competitiveness. The corridor-based development of MMLPs, along with expressway spines and grade-separated bypasses, is expected to enhance logistics efficiency during FY2026-30.

The road sector's medium-term outlook remains robust, supported by sustained policy push, strong investment appetite, and increasing technological sophistication. Continued government focus on improving network quality, safety, and digital integration will be critical in achieving the objectives of Vision 2047.

4. Overview of logistics

4.1 Key Components of Logistics

Overview of Key Components of Logistics

Key components of logistics

Segment	Sub-Segment	Key characteristics
Transportation modes	**Road transportation**	Roads are the most important mode of transport catering to commoditised, piecemeal cargo segments, in addition to full truck load cargo. Roads are typically most competitive for short distances (250-300 km). They are also a preferred mode for transport of non-bulk items
	Rail Transportation	Rail freight is generally preferred for medium to long distance hauls for bulk and container cargo. These services are offered either by the Indian Railways (as in case of coal, iron ore, etc) or CTOs in case of container logistics
	Air transportation	Air transportation involves the movement of goods by aircraft, including passenger and cargo planes. This mode is largely preferred for high-value time-sensitive cargo, perishable goods, and express packages.
	Sea Transportation (Coastal shipping)	Sea transportation involves the movement of goods by ships and boats on oceans, seas, and inland waterways. Preferred for Bulk commodities (e.g., oil, coal, grain), containerized cargo, project cargo, and breakbulk cargo, serving primarily international routes.
Logistics support infrastructure	**Warehousing & Distribution**	Warehousing involves the storage of goods and merchandise to protect the quality and quantity of stored product. It is an integral part of the logistics value chain, facilitating the collection, storage, sorting and dissemination of goods
	Rail linked terminals (including PFTs & GCTs)	A goods shed is a rail linked terminal that facilitates loading, unloading and in-transit storage of commercial cargo transported by the Indian Railways. Rail linked private terminals (PFT/GCTs) serves domestic cargo, facilitating access to rail transport, and providing services such as warehousing and transportation for incoming and outgoing cargo, including last mile connectivity. Some rail linked private terminals also provide value-added services such as cargo aggregation and packaging
	Container train operators (CTOs)	CTOs are licensed by the Indian Railways to provide EXIM/domestic container haulage services.

Segment	Sub-Segment	Key characteristics
	ICDs/CFSs	ICDs are dry ports located away from seaports, equipped to handle customs clearance, container storage, and multimodal cargo movement CFSs are located near seaports where cargo is consolidated, stuffed and destuffed for customs clearance, and short-term container storage
	Bulk Liquid storage	Bulk Liquid storage refers to specialised tanks or terminals designed to safely store large volumes of liquids such as Chemicals, fuels, oils or food-grade fluids for industrial use or transport.
	MMLPs	MMLPs serve as major freight aggregation and distribution hubs. They reduce traffic congestion on city roads and streamline the movement of goods, as trucks can drop off/pick up cargo at a single location for onward multimodal transport

Source: Crisil Intelligence

4.2 Market Size of Key Components of Logistics

Market Size - Logistics support Infrastructure

Performance of rail-linked sectors was relatively better vis-à-vis other sectors. CTOs and rail freight terminals registered a double-digit growth at ~12-13% each. In container logistics, higher hinterland exports and increased haulage through rail aided CTOs/ICDs to perform better vis-à-vis CFSs. Improved haulage also helped increase rail linked private terminals' penetration. While warehousing grew at 9% CAGR over fiscal 2020-25.

Review and outlook segment wise - Market Size in revenue

Segment	FY25E (Rs billion)	CAGR (FY20-25E)	CAGR (FY25E-30P)
Rail Linked Terminals	80	~12%	~13%
CTO	120	~12%	~14%
CFS/ICD	80	~9%	~10%
Industrial Warehousing	1450	~9%	~11%

Source: Industry, Crisil Intelligence

Review and outlook segment wise - Investments (Rs billion)

Segment	FY21-FY25E	FY26E-30P
Rail Linked Terminals	80-85	200-220
CTO	30-40	50-60
CFS/ICD	15-20	20-25
Industrial Warehousing	300-350	700-800

Source: Industry, Crisil Intelligence

Rail Linked Terminals Market

Rail linked private terminals are poised to gain market share from Indian Railways' goods sheds

Rail freight terminals that do not facilitate custom clearances at their site can be broadly classified into captive rail sidings, goods shed (operated by the Indian Railways) and rail linked private terminals (handles third-party cargo). Within these, goods sheds and rail linked private terminals come under commercial freight terminal market, where services on a commercial basis are provided to a wide customer base.

Captive rail sidings

Captive siding is a rail freight terminal that facilitates loading and unloading of goods directly at manufacturing plants (or strategic locations for distribution of goods). Such terminals permit receipt and dispatch of domestic as well as imported raw materials and finished goods. In some cases, the Indian Railways also permits manufacturers to allow co-users to use the siding for their respective in-house requirements. Currently, there are around 1,000 captive sidings in India.

Goods shed (Indian Railways)

A goods shed is a rail freight terminal that facilitates loading, unloading and in-transit storage of commercial cargo transported by the Indian Railways and can be owned by the Indian Railways or private parties. At present, there are around 1,000 goods sheds across India.

Rail linked private terminals

A Rail linked private terminal serves domestic cargo, primarily facilitating access to rail transport, and providing services such as warehousing and transportation for incoming and outgoing cargo, including last mile connectivity. Few terminals also provide value-added services such as cargo aggregation, packaging, etc.

Services offered by rail linked private terminals include:

Commodity handling from/to train

Warehousing

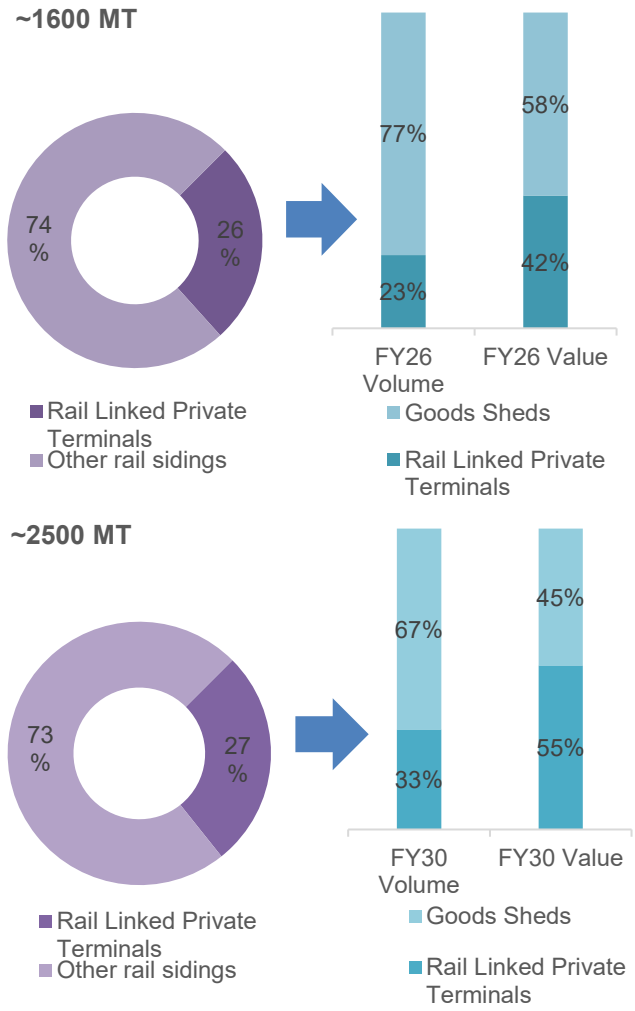
value-added services such as bagging, unitising, palletisation, etc. industrial plots and sheds for medium and small-scale enterprises, etc. On average, such services contribute less than 5% to overall revenue.

Last mile transportation

Commercial rail freight terminal market review & outlook

CRISIL Intelligence estimates that commercial freight terminals (including goods sheds and rail linked private terminals) handled ~26% of non-containerised rail traffic in India. Within commercial freight traffic, the estimated volume share of rail linked private terminals was ~21%. Volumes handled at rail linked private terminals have improved significantly in the past few years, as notified terminals have increased. The share of rail linked private terminals in commercial rail freight terminals has almost doubled from 13% to ~21%, over the last 5 years.

Commercial rail freight terminals include rail linked private terminals and goods sheds



Source: Indian Railways, Company reports, Crisil Intelligence

Rail linked terminals will experience the highest growth rate, increasing from Rs 70-80 billion to Rs 140-150 billion, with a CAGR of around 12-14%. This growth suggests strong underlying factors such as strategic investments, market demand, and supportive policies driving expansion. The upward trend reflects a robust and sustained increase in capacity and performance over the next five years.

Container Train Operators (CTO) Market

Rail containerised EXIM traffic increased at 6% CAGR between fiscals 2019 and 2025.

Domestic containers clocked 15% CAGR between fiscals 2019 and 2025.

Active CTOs and operational rakes

CTO	Operational container rakes	Licence category	Remarks/source	Routes/stations served
CONCOR	388	I	As per official website of CONCOR, it operates 388+ rakes and manages 66 terminals	They operate a vast PAN India network of 66 Inland Container Depots (63 terminals and 3 strategic tie-ups)

CTO	Operational container rakes	Licence category	Remarks/source	Routes/stations served
Adani Logistics	68	I	ALL operates 68 container rakes, 9 GPWIS rakes, 3 AFTO and 7 Agri rakes. It also operates 5,000+ containers	Patli, Tumb, Kilaraipur, Nagpur, Kishangarh, Malur, Taloja, Kanech, Mundra, Loni and Valvada
DP World	100	I	They operate a substantial fleet of over 100 owned containers and Special Freight Train Operator Scheme (SFTO) rakes. Specifically, their group companies, Container Railroad Services Private Limited and DPW Rail, cumulatively operate around 49 rakes (as of September 2023 data)	ICD Pali, Mundra, CWCNSL Navi Mumbai, Pipavav, Bhagat ki Kothi (Rajasthan), ICD Gothangaon (Surat), Reliance (Kanalus), Navkar Siding Navi Mumbai
Pristine Logistics	43	I	As per the company's website, Pristine runs 37 BLC/BLCM rakes, including 28-30 owned rakes and 13-15 leased rakes. It has 2,624 domestic end open and side open containers (for tile and white cement), and 415 dwarf 40 feet containers for the transportation of light weight cargo (polyesters and polymers). It also operates 4 ICDs & 1 PFT.	EXIM: NCR/Ludhiana to Mundra/Pipavav, Kanpur to JNPT Domestic: JK White Katni to Patna/Kanpur/Punjab/Kolkata Reliance Kanalus-NCR (dwarf containers); Patna to TISM, Rourkela & Barbil; Morbi-Siliguri; Mundra-Ludhiana
Gateway Rail	31	I	The company operates 31 rakes, of which 21 are owned. It also operates 398 road-trailers and 5 owned rail terminals	Gurgaon and Ludhiana to Mundra, JNPT (Nhava Sheva) and Pipavav
Hind Terminals	34	I	The company is a part of the UAE-based Sharaf Group of Companies, which operates in diversified sectors. Besides Dronagiri Node of CWC, HTPL has ICDs located in Palwal and Kila Raipur (Ludhiana)	HTPL now operates its own Container Freight Stations (CFSs) at Nhava Sheva (JNPT), Mundra, Hazira and Chennai. It has its own Multi-Modal Rail Linked Logistics Park at Palwal near Delhi and at Kila Raipur near Ludhiana and a Rail Linked facility at Dhanakya near Jaipur. It also has it presence across all major ports in India.
JM Baxi	25	III	JM Baxi's group company International Cargo Terminals and Rail Infrastructure Pvt. Ltd manage CTO services	JNPT, Pipavav, Mundra, Chennai/ Ennore, Vizag and Kochi ports, their hinterland and domestic services across India

Source: Indian Railways, company websites and reports, rating rationales, industry, CRISIL Intelligence

The CTO market posted 12% CAGR between fiscals 2020 and 2025 and is projected to grow at a much higher

rate of 14% CAGR over fiscal 2025-30.

Container Freight Station and Inland Container Depot Market

Overview of container freight station/ inland container depot

Container freight station (CFS) and inland container depot (ICD) are common user facilities with public authority status, equipped with fixed installations. These offer a wide range of services, including custom clearance, handling and temporary storage of import/export laden and empty containers.

Distinction between CFS and ICD

Characteristics	CFS (Container Freight Station)	ICD (Inland Container Depot)
Location	Near gateway port (off-dock facility)	In the hinterland (dry port)
Customs Status	Appendage to a parent customs station at a port	Independent customs station
Movement of Goods	Local movement within the same customs station	Movement from one customs station to another
Regulations	Covered by local procedure and bonds/bank guarantees	Covered by Goods Imported (Condition of Transshipment) Regulations, 1995

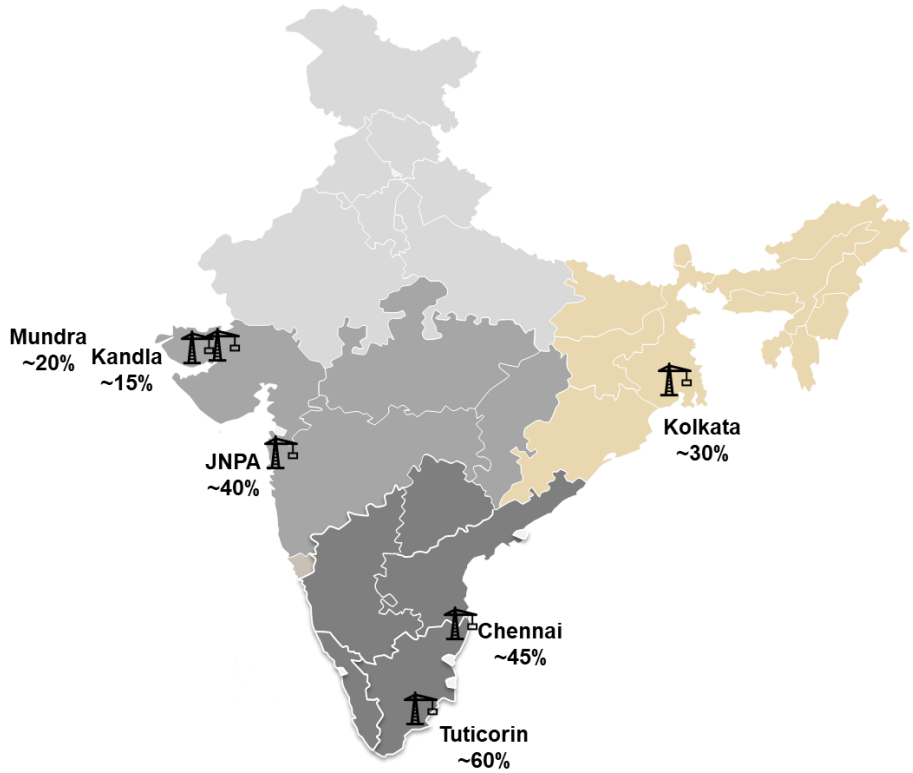
Container handling and transportation is the principal source of revenue for CFS/ICD players.

Overview of key CFS/ICD across regions

Key locations of CFS/ICD

There are ~250 operational CFSs/ICDs in the country; CFSs account for more than two-thirds of the share.

Traffic share handled by CFSs across key Indian ports (% of port traffic, excluding transhipment)



Source: Customs, DGCIS, Company reports, Crisil Intelligence

- NCR is the largest ICD cluster in North India in terms of volumes handled by ICDs in the cluster. Apart from Delhi, the districts that are considered as part of NCR are Gurgaon, Faridabad, Rewari, Palwal,

Panipat and Sonepat of Haryana and Ghaziabad and Greater Noida in Uttar Pradesh. Key players operating in the cluster are Adani Logistics, CONCOR, CWC, Gateway Rail and Hind Terminals, among others

- The Punjab/Ludhiana cluster is also among the largest clusters in North India in terms of volumes handled by ICDs in the cluster. Key players in the cluster are CONCOR, Gateway Rail, Pristine Logistics, Adani Logistics (operations of Inlogistics Kanech were acquired by Adani Logistics), and Hind Terminals
- All the terminals in the West UP/Uttarakhand cluster, except the Kashipur ICD, are operated by CONCOR. Kashipur ICD is operated by a JV of India Glycols and Apollo Logisolutions
- In Rajasthan, three ICDs are present in the Jodhpur cluster; others are located in Kota, Jaipur and Kathuwas
- In the rest of UP cluster, CONCOR and Pristine's ICD are the key terminals in UP and account for the majority of trade from the region
- In North Bengal/Bihar, Siliguri ICD in North Bengal and Bihta ICD, near Patna, have been recently commissioned by Pristine Logistics

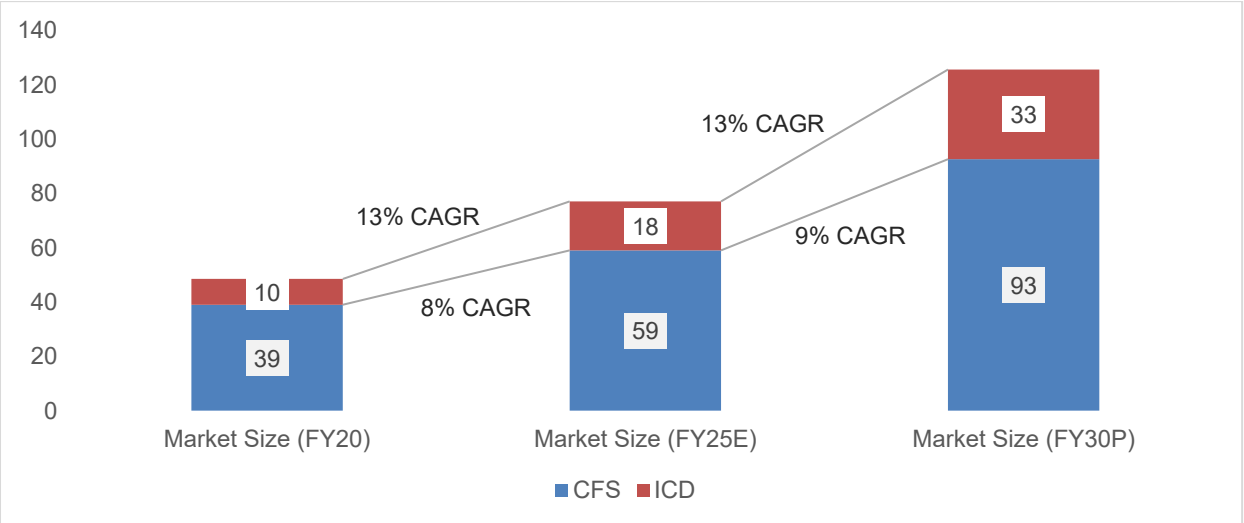
CFS/ICD market size

CFS/ICD players derive majority of their revenues from container handling and transportation, and the remaining from ground rent and auctions. The CFS/ICD industry's market size is Rs 77 billion as of fiscal 2025. The industry grew at 8% CAGR over fiscal 2020 to fiscal 2025, in line with an increase in container traffic and is expected to reach to Rs 120-130 billion by fiscal 2030, growing at 9-10% CAGR over the period.

The CFS market was on a declining trend due to the government's focus on DPD. However, the share of DPD is expected to stabilise at 55-60% of imports vis-à-vis the government's set target of 70%, as more than half of the DPD containers are resent to CFS either because of non-clearance within 48 hours or voluntarily by importers for storage and onward transportation to the hinterland.

The ICD market has been relatively upbeat. Against a declining trend observed across the CFS market, the ICD market recorded average growth of 13% in the past few fiscals. Most ICDs are located in the hinterland and generally have a rail connectivity. Thus, improvements in rail infrastructure bode well for ICDs. Growth of the ICD market remained positive during the pandemic in fiscal 2021 also since the rail-based container movement remained buoyant during the year.

CFS/ICD market size (Rs billion) FY25-30P



Source: Industry, Crisil Intelligence

Agri Warehousing Market

Agriculture warehousing in India is growing steadily with a mix of government-run, cooperative and private storage facilities. Indian government has placed a significant emphasis on improving the sector through various key initiatives like National Agriculture Market (e-NAM),

Overview and Market Assessment of Agri warehousing market in India

The industry witnessed a robust growth of 5-7% CAGR between fiscal 2020 and fiscal 2025. The growth has been supported by various factors including government initiatives, increased agriculture production, rising demand for cold storage, private sector investments, technological advancements and expansion of logistics networks, enhancing its capacity to manage and store agriculture produce more effectively.

Over fiscal 2026 to 2029, we expect agricultural warehousing demand to clock 2-5% compound annual growth rate (CAGR), reaching around 0.78-0.80 billion sq. ft from 0.77-0.79 billion sq. ft, backed by expectations of normal monsoons and sufficient reservoir levels.

Overview of PPP Models in Agriculture Silo Construction

Key PPP Models Used in Silo Construction: Comparative Table

Model	Ownership During Concession	Ownership Post-Concession	Revenue Mechanism	Land Arrangement	Major Risk Allocation
DBFOO	Private (Owns & Operates)	Private (retains ownership)	Fixed storage charges (capacity-linked), variable handling fees paid by FCI (reverse bidding for lowest charge); commercial returns from optimized operations	Acquired by Private Investor	Construction, finance, operation, market, and land-acquisition risk on private; demand/payment risk on FCI (mitigated via minimum guarantees)
DBFOT/BOOT	Private (Owns & Operates)	Public (transfers to FCI)	Fixed storage charges, handling fees from FCI; usually a Viability Gap Funding (VGF) mechanism may supplement returns	Provided by FCI/Public Authority	Construction, finance, and operation risk on private; land/procurement risk on FCI; asset reverts to FCI post concession
Hub & Spoke (Mixed)	Combines both above depending on site	Varies by node (spoke often DBFOO; hub often DBFOT)	Combination, with capacity-linked fixed charges for each silo and network-level integration	Hub land by FCI; spoke land typically by private	Follows standard model per site, but risks amplified due to network/interconnection dependencies

Source: Industry, Crisil Intelligence

Liquid Bulk Storage Market

These terminals primarily serve movement & storage of edible oils, bulk chemicals, speciality chemicals and POL products. Given the scaling up of the related manufacturing and refining capacities, the prospects of these facilities is strong.

AVTL, Ganesh Benzoplast, and IMC are key multi-location players having liquid tank farms across ports in the country. Indo Nippon, ATS, are GCPL are a few other players having presence at single locations. Among key upcoming liquid storage terminals, AVTL's JNPA terminal will be located at the largest major port in terms of container traffic. Provided below are locations of key players:

Port	Hinterland catered to	Key players	Third-party capacity (million cbm)
Kandla	Gujarat, Rajasthan, NCR, Punjab, Haryana, Himachal, Madhya Pradesh	AVTL, Indo Nippon Chemicals, IMC, Ahir Salt	1.15
Pipavav	Gujarat, Rajasthan, NCR, Punjab, Haryana, Himachal, Madhya Pradesh	AVTL, IMC, Gulf Petrochem	0.45
JNPA	Maharashtra, Hyderabad, Silvassa, Gujarat	GBL, IMC, AVTL (Upcoming)*	0.44
Dahej	Gujarat, Rajasthan, NCR, Punjab, Haryana, Himachal, Madhya Pradesh	GCPL	0.39
Haldia	West Bengal, Bihar, Northeast and Nepal	AVTL, IFB Agro, IMC	0.38
Mumbai	Maharashtra, Hyderabad, Silvassa, Gujarat	ALL	0.30
Ennore	Tamil Nadu, Karnataka, Andhra Pradesh	IMC	0.25
New Mangalore	Karnataka	AVTL, IMC, ATS	0.21
Vizag	Andhra Pradesh, Telangana, Karnataka, Odisha, Chhattigarh	IMC, HPCL, EIPPL	0.15
Cochin	Kerala	AVTL, IMC, GBL	0.08
Chennai	Tamil Nadu, Karnataka, Andhra Pradesh	IMC	0.06
Kolkata	West Bengal, Bihar, Northeast and Nepal	IMC	0.05
Mormugao	Maharashtra, Hyderabad, Karnataka	GBL, IMC	0.05
Kakinada	Andhra Pradesh, Telangana, Karnataka, Odisha, Chhattigarh	IMC	0.02

Multimodal logistics parks

Multi Modal Logistics Parks (MMLPs) represent a cornerstone in India's contemporary infrastructure development agenda. Conceptualized as part of an integrated policy initiative under the Ministry of Road Transport and Highways (MoRTH), these parks aim to overhaul India's high cost, fragmented, and inefficient logistics sector.

India's MMLPs are built fundamentally on long-tenure Public Private Partnership (PPP) models, tailored to optimize commercial risk allocation, project financing, and operational standards.

The MMLP program, as of October 2025, has progressed well beyond conceptualization, with six MMLPs formally awarded and several more at the bidding or advanced feasibility stage. 35 total locations have Cabinet approval, with detailed status varying from operational to pre-feasibility (see next section for table and further analysis). Announced and publicized MMLP locations cover India's main industrial, freight, and port-centric clusters, including Delhi-NCR, Mumbai, Gujarat (Kandla, Rajkot, Pipavav), South/North Punjab, Ambala, Jaipur, Hyderabad, Kolkata, Bhopal, Kota, Sundergarh, Solan, Raipur, Sangrur, Panaji, Valsad, Cochin, among others.

The first five awarded projects are intended to be operational by 2025-27, with full project rollout for other locations to follow in a phased, demand-responsive manner.

For most awarded parks, implementation has commenced or advanced beyond the site acquisition stages. Chennai, Bengaluru, and Nagpur are especially prominent as visible "lighthouse" projects. According to recent Parliamentary replies, ministry reports, and press releases, as of Oct 2025 over ₹3,661 crore (approx. USD 440 million) has been committed across five principal projects either under construction or close to operationalization.

Estimated Investment for MMLPs development

The scale of India's MMLP ambition is vast. The government projects an overall outlay of ₹46,000 crore (approx. USD 5.5 billion) for all 35 planned parks. For the 15 prioritized sites, the estimated requirement is ₹22,000 crore (approx. USD 2.6 billion). Per project, the minimum investment is substantial, generally ranging from ₹600 crore for smaller parks to upwards of ₹1,700 crore at mega hubs.

Gati Shakti Multi-Modal Cargo Terminals

The Gati Shakti Cargo Terminal (GCT) initiative under PM Gati Shakti National Master Plan seeks to overhaul India's logistics network with an ambitious drive for multimodal connectivity. GCTs are critical to the strategy of enhancing logistics efficiency and reducing transportation costs, thereby boosting India's global competitiveness. The Ministry of Railways and the Dedicated Freight Corridor Corporation of India Limited (DFCCIL) are principal agencies for GCT development, which spans policy innovation, corridor-based planning, public-private

partnerships (PPP), and the introduction of competitive bidding models.

Planned GCT Projects to Be Awarded

As of early October 2025, the Ministry of Finance has confirmed the identification of 434 infrastructure projects under PM Gati Shakti, of which a large proportion pertains to multimodal logistics upgrades and new GCTs. Of these, 192 are in Energy/Mineral/Cement Corridors, 200 are in High Traffic Density Corridors, and 42 are in Port Connectivity Corridors. 156 have ready detailed project reports (DPRs), 68 are sanctioned, and another 88 are being appraised at high-level inter-ministerial meetings.

The government's medium-term vision includes the construction of at least 200 new GCTs along the Eastern and Western Dedicated Freight Corridors (EDFC and WDFC).

Awarded GCT Projects

National Roll-Out and Commissioning Status

By August 2025, Indian Railways has announced the commissioning of 112 Gati Shakti Cargo Terminals, a figure surpassing the policy's target of 100 by the end of FY25.

Table 1: Expected outcome of various government policies on transportation & warehousing

Policy	B2B Road Transportation	Rail Transportation	Warehousing
National Logistics Policy (NLP)	Aims to reduce logistics costs and improve efficiency. It promotes technology adoption (e.g., FASTag), better planning, and an integrated digital system to streamline movement, thereby reducing transit times and improving vehicle utilization.	Encourages modal shift to rail by improving infrastructure, simplifying processes, and promoting a predictable rail freight system. It aims to increase rail's share in freight transport.	Promotes the development of modern, organized, and technology-driven warehouses. The policy's focus on an integrated logistics ecosystem helps in better planning of warehouse locations and improving first and last-mile connectivity.
Gati Shakti Scheme	This is a master plan for multi-modal connectivity. It will help in better planning and execution of road projects, ensuring that roads are integrated with other modes of transport. This reduces bottlenecks and improves last-mile connectivity.	Significant focus on expanding and upgrading the rail network. The scheme integrates new rail lines and freight corridors with other infrastructure projects, making rail a more viable and efficient option for long-distance transport.	Accelerates the development of integrated logistics parks and multi-modal terminals. This helps in strategic placement of warehouses near transport hubs, improving connectivity and reducing costs.
Bharatmala Pariyojana	Focuses on constructing and upgrading national highways, including economic corridors and expressways. This directly improves road transportation efficiency, reduces travel time, and enhances safety, making long-haul B2B logistics more reliable.	While primarily a road project, it is designed to complement other transport modes. The improved road network provides better first and last-mile connectivity to rail and port terminals.	The development of new highways and economic corridors opens new locations for warehousing and logistics hubs, particularly along these key routes, encouraging decentralized and more efficient storage networks.
National Rail Policy (NRP)	The policy's focus on increasing the share of rail freight puts pressure on road transporters to become more competitive. However, it also creates new opportunities for road transport in first and last-mile delivery, as rail is primarily for long-distance hauls.	Aims to modernize the Indian rail network, increase its freight capacity, and improve its speed and reliability. It focuses on developing dedicated freight corridors and increasing the share of non-bulk cargo, making rail more attractive for a wider range of goods.	Promotes the development of railway-owned warehouses and logistics parks at rail terminals. It encourages better integration of rail freight with warehouse operations, reducing handling time and costs.

Policy	B2B Road Transportation	Rail Transportation	Warehousing
Gati Shakti Multi-Modal Cargo Terminal (GCT) Policy	These terminals are designed to improve the interface between road and rail. B2B road transport benefits from a seamless and efficient transfer of goods at these terminals, reducing waiting times and improving truck turnaround time.	Aims to create new terminals and upgrade existing ones to handle a variety of cargo efficiently. This policy is a key component of the Gati Shakti master plan, facilitating the easy movement of goods between road and rail.	GCTs are essentially large-scale logistics parks. They integrate warehousing with transport infrastructure, allowing for storage, value-added services, and efficient transfer of goods. This is a game-changer for modern warehousing.
Multimodal Logistics Parks (MMLPs)	MMLPs serve as major freight aggregation and distribution hubs. They reduce traffic congestion on city roads and streamline the movement of goods, as trucks can drop off/pick up cargo at a single location for onward multimodal transport.	Rail infrastructure is a core component of MMLPs, with dedicated rail lines and sidings. The parks enable seamless and cost-effective transfer of cargo from trucks to trains and vice-versa, promoting rail as a primary transport mode.	MMLPs are a new-age warehousing solution. They offer state-of-the-art storage facilities, cold storage, customs clearance, and value-added services under one roof. They are designed to be a one-stop-shop for all logistics needs.
GST and e-Way Bill	GST: Simplifies the tax structure, eliminates state-wise taxes, and reduces the number of checkpoints. This reduces transit time and improves truck utilization. e-Way Bill: A digital permit for inter-state movement of goods. It has standardized the process, reduced harassment, and streamlined the movement of goods across states, further reducing transit time.	GST simplifies the tax structure on services, but its primary impact is on the road transport sector. However, the overall streamlining of logistics from GST and e-Way Bill also benefits rail by making the entire supply chain more efficient.	GST: Consolidates and streamlines the warehousing sector. Companies are moving from small, state-specific warehouses to large, centralized warehouses to serve multiple states, leading to economies of scale and better inventory management. e-Way Bill: The digital trail of goods movement improves inventory accuracy and compliance, linking seamlessly with warehouse management systems.
East–West Freight Corridor^	The East–West Freight Corridor will likely shift a portion of long-haul (>700–800 km) B2B cargo from road to rail, reducing highway congestion and improving delivery reliability for road operators. While line-haul volumes may moderate for bulk and containerized freight, road transport will remain dominant in first- and last-mile connectivity. Over time, trucking companies may pivot toward hub-to-spoke, feeder, and time-sensitive cargo, with improved asset utilization and slightly better turnaround times due to decongested corridors.	Rail will be the primary beneficiary, gaining modal share in long-distance freight through faster transit times, higher axle loads, better schedule reliability, and lower per-tonne costs. The corridor enhances capacity on an important industrial belt, enabling scale efficiencies, improved container movement, and greater predictability for B2B supply chains. Over the medium term, this strengthens rail's competitiveness versus road, especially for bulk commodities, industrial inputs, FMCG distribution, and EXIM-linked cargo.	The corridor will reshape warehousing demand toward multimodal logistics parks, rail-linked distribution hubs, and inland container depots along the East–West axis. Faster and more reliable line-haul movement reduces the need for buffer inventory, encouraging hub-and-spoke models, cross-docking facilities, and regional consolidation centers near rail nodes. Grade-A warehouse demand may increase around corridor junctions, while traditional storage-heavy facilities could gradually shift toward faster inventory turnover and integrated rail-road operations.
Container manufacturing assistance scheme (CMAS)^	The Container Manufacturing Assistance Scheme will increase the availability and diversity of standardized containers, enabling more freight to be containerized and reducing reliance on loose	Rail benefits significantly as increased container availability feeds directly into greater containerized traffic on rail corridors. With more standardized boxes in circulation,	Warehouses can reduce handling costs, improve inventory security, and accelerate throughput by managing containerized units instead of loose pallets. Additionally, increased

Policy	B2B Road Transportation	Rail Transportation	Warehousing
	truckload movements. For road carriers, this improves load consolidation, reduces damage and pilferage, and enhances truck utilization through easier stacking and handling. While it won't directly shift freight volumes away from road, container adoption makes road transport more efficient for intermodal and last-mile deliveries.	railways can achieve higher rake utilization, smoother terminal handling, and improved scheduling, making rail more competitive for long-haul freight. This also supports the growth of containerized block rakes, reducing dwell time at yards and encouraging a modal shift from bulk to intermodal rail freight where appropriate.	container usage encourages growth of multimodal logistics parks and cross-dock facilities where containers can be efficiently transferred between road and rail.

Source: Crisil Intelligence
^Union Budget 2026

5. Metro Rails Infrastructure in India

India's metro rail journey began in the early 2000s with the development of initial corridors in the suburban areas of Delhi. Since then, it has evolved into one of the most significant urban infrastructure transformations in the country. From a cautious entry into mass rapid transit, India has progressed to establishing a robust and rapidly expanding metro network that now operates across more than 20 cities.

5.1 Outlook

India's metro rail sector is on the threshold of significant expansion, driven by rapid urbanisation, rising population density, and the growing need for efficient, sustainable, and low-emission urban mobility solutions. The country's operational metro network spanned 1,013 km across 23 cities by May 2025, a remarkable increase from just 248 km across five cities in 2014, marking one of the fastest expansions globally. The network is projected to exceed 1,120 km by FY2026 and further expand to 27 cities by 2030, underscoring metro rail's critical role in shaping India's next phase of urban transformation.

Metro ridership has witnessed an exponential surge, increasing from 2.8 million daily passengers in FY2014 to over 7 million by FY2025 highlighting growing commuter preference for reliable and sustainable mass transit options. This rapid adoption reflects the success of India's evolving urban transport ecosystem, supported by policies that prioritise accessibility, safety, and inclusivity.

The government's policy push, through the National Urban Transport Policy, Metro Rail Policy 2017, and dedicated funding mechanisms, has created a strong foundation for continued growth. The average annual budgetary outlay for metro rail during FY2025-30 is projected at ₹3-3.5 trillion, over six times higher than the FY2013-14 allocation, reflecting the government's sustained commitment to urban mobility infrastructure.

Continued expansion through public-private partnerships (PPP), multilateral funding, and bilateral collaborations will ensure the steady flow of capital required for network development and modernisation.

Overall, the metro rail sector is expected to attract investments of ₹2.8-3 trillion by FY2030, supported by a combination of government spending, private participation, and international financing.

6. Ropeways

6.1 Overview

Ropeways, also referred to as aerial cable cars or gondolas, have undergone a transformation from being primarily tourist-oriented attractions to becoming reliable components of modern transport systems. Globally, their use has expanded in both urban and rural settings, where they provide efficient solutions for mobility challenges posed by steep terrain, congestion, or fragile ecological environments. Several cities in Latin America such as Medellín in Colombia, La Paz-El Alto in Bolivia, and Mexico City have successfully integrated ropeways into existing public transport networks. These systems connect peripheral hillside communities and densely populated informal settlements to city centers, thereby reducing travel times and providing affordable access for marginalized groups. These projects demonstrate not only cost-effectiveness but also social inclusion benefits, as ropeways deliver last-mile connectivity and reduce geographic barriers to opportunity.

In India, ropeways are now being scaled under the National Ropeways Development Programme, Parvatmala, announced in the Union Budget 2022-23. The programme is spearheaded by the Ministry of Road Transport and Highways (MoRTH) and supported by agencies such as the National Highways Authority of India (NHAI) and NHLML (National Highways Logistics Management Limited) as implementing agency. Its core aim is to expand ropeway connectivity across hilly and difficult-terrain states, using a public-private partnership (PPP) framework. At present, over 25 ropeways are operational in India, spread across 13 states and largely concentrated in Uttarakhand, Jammu and Kashmir and Gujarat. Several flagship projects under Parvatmala have already secured approvals. These include the Sonprayag-Kedarnath ropeway (12.9 km, estimated cost ₹24,300 million) and the Govindghat-Hemkund Sahib ropeway (12.4 km, estimated cost ₹22,240 million). Both are expected to significantly reduce travel time for pilgrims while easing pressure on fragile mountain roads and trekking trails. The Varanasi urban ropeway is also planned as a 3S system, making it the first major urban deployment of this technology in India. To ensure technical consistency and operational safety across this rapidly expanding sector, the Government of India has set up an Empowered Committee on Ropeways Evaluation, Certification and Safety (EC-Rope-TECS) under MoRTH. The committee is tasked with establishing uniform standards, certification protocols, and safety oversight for all new projects. Such regulatory initiatives are essential to align Indian projects with global best practices, where ropeway safety, reliability, and long-term maintenance form the foundation of public trust.

When viewed against the international landscape, India's ropeway sector is at an early but promising stage. Countries such as Colombia and Bolivia already operate large urban ropeway networks carrying tens of thousands of passengers daily, while European nations use ropeways extensively for mountain tourism and city connectivity. India, by contrast, is still building its first wave of large-scale projects. However, the country benefits from a strong policy push, a broad pipeline of projects, and explicit government support for PPP-based financing models.

Ropeway projects in India are being developed under Public-Private Partnership (PPP) frameworks, which distribute responsibilities for financing, construction, operation, and revenue management between the government and private concessionaires. Official documents under the Parvatmala Pariyojana confirm that the two primary models adopted are the Hybrid Annuity Model (HAM) and the Design-Build-Finance-Operate-Transfer (DBFOT) framework. In addition, some state-level projects are being taken up through the more traditional Build-Operate-Transfer (BOT) approach.

6.2 Key contours of operating/running ropeway projects in India

Model Concession Agreement (MCA) and RFP/RFQ for passenger ropeways

The draft Model Concession Agreement for passenger ropeways projects to be implemented under private-participation concession arrangements was published by NITI Aayog in 2019 to guide central ministries, state government, their agencies and local authorities in structuring PPP projects for passenger ropeways.

Risk Sharing between Government and Private Players

MCA publish by NITI Aayog in CY2019 for ropeway projects in India outlines a balanced framework for risk sharing between the government (Authority) and the private concessionaire to ensure efficient project implementation and long-term sustainability. It clearly defines the allocation of construction, financing, operational, and external risks through detailed contractual provisions. While the concessionaire assumes primary responsibility for project execution, financing, operation, and maintenance, the Authority supports through facilitation of land, clearances, regulatory approvals, and defined relief mechanisms.

Risk sharing comparison

Risk Category	Responsibility of Government / Authority	Responsibility of Private Concessionaire
Construction Risk	Provides land and right-of-way; issues necessary clearances and approvals as per agreement.	Bears full responsibility for design, engineering, procurement, and construction; liable for cost overruns unless due to Authority default or Change in Law.
Financing Risk	May support through Viability Gap Funding (if applicable) or revenue-shortfall loan mechanism.	Responsible for arranging full project financing, managing interest and repayment risks.
Operational & Maintenance Risk	Oversight and monitoring role may intervene in case of persistent default.	Full responsibility for operation, maintenance, and performance standards; bears O&M cost and performance risk.

Risk Category	Responsibility of Government / Authority	Responsibility of Private Concessionaire
Revenue / Demand Risk	Issues Fee Notification and allows user fee collection as per MCA.	Bears traffic/revenue fluctuation risk; collects and manages user fees through escrow; subject to periodic fee revisions as per MCA. No traffic risk under HAM model
Force Majeure Events (Article 35)	Shares part of relief/compensation depending on event type; may extend concession period or grant relief.	Entitled to relief as per clause but must mitigate impact and continue operations where possible.
Change in Law	Provides compensation/relief to maintain NPV where applicable; defines limits on cash compensation.	May bear minor regulatory changes within defined thresholds; entitled to partial relief if materially affected.
Insurance & Security Risk	Responsible for external security (terrorism, civil commotion, etc.); may approve pass-through of 80% premium increases.	Must ensure all project assets; handle internal security; maintain coverage and provide proof to Authority.
Delay / Performance Risk	Pays damages if delay in fulfilling Authority Conditions Precedent.	Liable for damages if delay in achieving its Conditions Precedent or project milestones.

Source: Crisil Intelligence

6.3 Government initiatives/ policy measures

National Ropeways Development Programme

Parvatmala, officially known as the National Ropeways Development Programme, was announced in the Union Budget 2022-23 by the Government of India. Parvatmala is designed to provide last-mile connectivity, boost tourism, improve access for local communities, and offer an environment-friendly mobility solution that reduces land use in ecologically sensitive zones. For implementation, the government has adopted the Public-Private Partnership (PPP) route, particularly the Design-Build-Finance-Operate-Transfer (DBFOT) model, in which private players take charge of design, financing, and operations. The National Highways Logistics Management Limited (NHLML), a subsidiary of NHAI, has been entrusted with project development and management. In select projects, especially in the North-East, the government has also announced viability gap funding through central schemes such as PM-DevINE and NEC to make ropeway projects commercially feasible.

MoRTH initially projected the award of eight ropeway projects covering about 60 km in 2022-23, with states like Uttarakhand, Himachal Pradesh, Jammu & Kashmir, and the North-East identified as priority areas. NHAI and NHLML have articulated an even more ambitious vision, citing a pipeline of over 250 projects spanning nearly 1,200 km to be developed in the next five years.

PM-DevINE Scheme

Prime Minister's Development Initiative for North-Eastern Region (PM-DevINE), is a Central Sector scheme, fully funded by the Government of India, launched in the Union Budget 2022-23, with the specific aim of addressing development gaps in the North-Eastern Region (NER). The scheme was approved by the Union Cabinet on 12 October 2022. The total approved outlay for PM-DevINE is ₹66 billion for the period 2022-23 to 2025-26 (i.e. the remaining years of the 15th Finance Commission).

6.4 Outlook

India's ropeway sector is poised for transformative expansion, propelled by the government's flagship Parvatmala Pariyojana, which targets an investment of ₹1.25 trillion across more than 250 ropeway projects spanning more than 1200 km by 2030. This ambitious initiative not only aims to revolutionize connectivity in hilly and underserved regions, but also opens substantial avenues for private sector participation, with investment potential under robust public-private partnership (PPP) frameworks and enhanced government support. As the sector transitions towards world-class and sustainable infrastructure, it offers a compelling landscape for both domestic and global investors seeking long-term growth opportunities in alternative mobility solutions.

7. Airport Infrastructure in India

India has become the third-largest domestic aviation market in the world. The Indian Aviation sector has witnessed rapid growth driven by rising passenger demand, regional connectivity focus, and infrastructure modernization. Beyond core airport infrastructure, there is significant opportunity in ancillary services such as ground handling,

car parking, retail spaces, and other airport-linked facilities, especially in PPP-operated airports

7.1 Airport Infrastructure and connectivity in India

India's airport infrastructure is experiencing significant expansion and modernization, with a focus on both boosting connectivity and enhancing the passenger experience. The country has seen a substantial increase in operational airports, from 74 in 2014 to 163 as of February 2026, and plans to further increase this number to 350-400 by 2047. Out of these 163 airports, 118 are domestic, 33 are international and 12 are custom airports. This growth is driven by a surge in air passenger traffic, government initiatives like the Regional Connectivity Scheme (RCS-UDAN), and a push for sustainability and technological advancements.

India is expected to overtake China and the United States as the world's third-largest air passenger market in the next ten years, by 2030, according to the International Air Transport Association (IATA). Further, the rising demand in the sector has pushed the number of airplanes operating in the sector. The number of airplanes is expected to reach 1,100 planes by 2027.

7.2 Public private partnership in airports in India

Globally airports have transformed from government-controlled public infrastructure facilities to competitive service providers over the past few decades. This was largely driven by increasing privatisation, which brought in several benefits such as improved efficiency, greater levels of customer satisfaction, access to private capital, spreading of ownership, rapid build-out of augmentation infrastructure, greater transparency in operations and more skilled workforces.

Overview of PPP in airports in India

Six international airports have been completed under the PPP framework. The sector is projected to attract investments amounting to US$ 25 billion by 2027, driven by the increasing participation of the private sector through PPP initiatives. The number of airports operating under the PPP model has risen significantly, from five in 2014 to -fourteen in 2025, further to which Ministry of Civil Aviation has proposed the operationalization of an additional 26 airports under PPP framework over next five years (FY26-FY30) as part of NMP 2.0. Furthermore, the Ministry of Civil Aviation has formulated modalities for the privatization of 25 airports under the National Monetization Pipeline (NMP) for the period 2022-2025.

Timeline of airport PPP Projects in India



Source: Crisil Intelligence

Currently, 11 of the 16 operational PPP airports fall in the non-metro category, with ongoing capital expenditure

forming the largest share of private investments.

7.3 Key government initiatives

PPP model in Airports

The Government of India has developed a clear PPP framework and schemes for airports to facilitate private sector participation, with the aim of modernizing aviation infrastructure, mobilizing private capital, and improving operational efficiency.

Under these schemes, the government has adopted multiple PPP models, including Build-Operate-Transfer (BOT) concessions, Operation and Maintenance (O&M) contracts, joint ventures, and asset monetization structures, depending on the type and scale of airport project.

Investments boost through National monetisation Pipeline (NMP)

The National Monetisation Pipeline (NMP), launched by the Government of India in 2021, has emerged as a transformative framework for accelerating private investment in the airport sector. By identifying operational brownfield airports owned by the Airports Authority of India (AAI) for long-term leasing under public private partnership (PPP) models, the NMP provides clarity, scale, and predictability to private investors.

TMV target for award of airport projects (₹ in million)

	Target					
Asset Class	FY26	FY27	FY28	FY29	FY30	Total
26 AAI Airports	-	62,830	25,870	11,340	49,460	1,49,500
Divestment of AAI holdings in subsidiaries/JVs	-	28,000	29,500	29,000	39,000	1,25,500
Total	-	**90,830**	**55,370**	**40,340**	**88,460**	**2,75,000**

Source: NITI Aayog, Crisil Intelligence

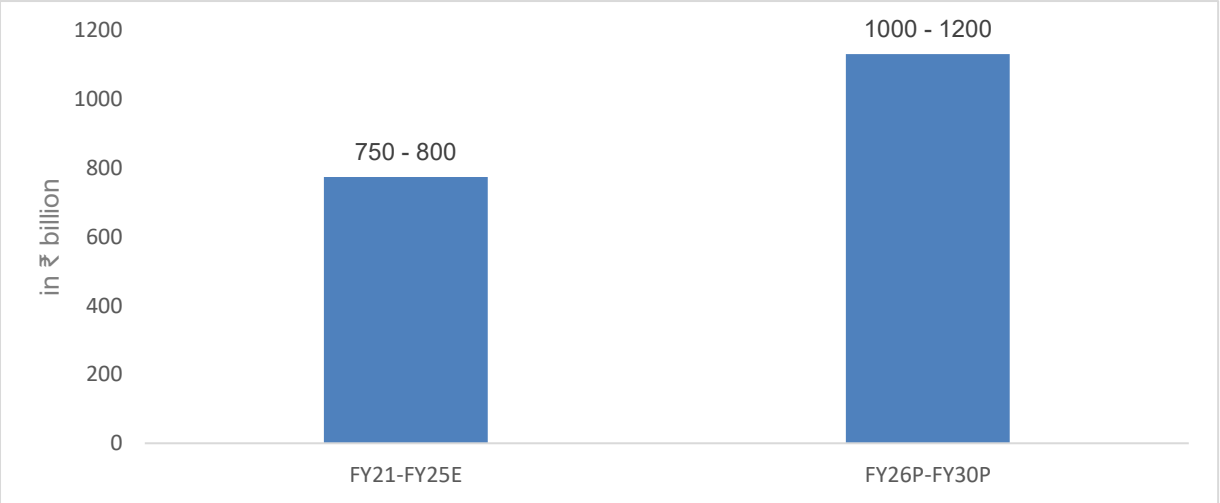
7.4 Outlook

Crisil Intelligence projects passenger traffic to expand 7-10% on-year to 425-450 million in fiscal 2026.

Passenger traffic is expected to reach 600-630 million by fiscal 2030

As per National Airports Development Plan 2047, approximately 200 new greenfield airports would be required, bringing the total number of airports to around 350 by 2047, based on the estimated annual passenger traffic of 3000 to 3500 million.

Airport capex projected to cross ₹1 trillion over fiscals 2026-30



Source: Crisil Intelligence

8. Infrastructure Trusts in India

8.1 Introduction to InvITs: Unlocking India's infrastructure potential

Infrastructure investment trusts (InvITs) are pooled-investment vehicles registered with the Securities and Exchange Board of India (SEBI) under the SEBI (Infrastructure Investment Trusts) Regulations, 2014.

These trusts raise funds by issuing units to investors and invest the proceeds primarily in infrastructure assets, either directly or through special purpose vehicles (SPVs) or holding companies (holdcos).

The income generated from the underlying assets is regularly distributed to unitholders.

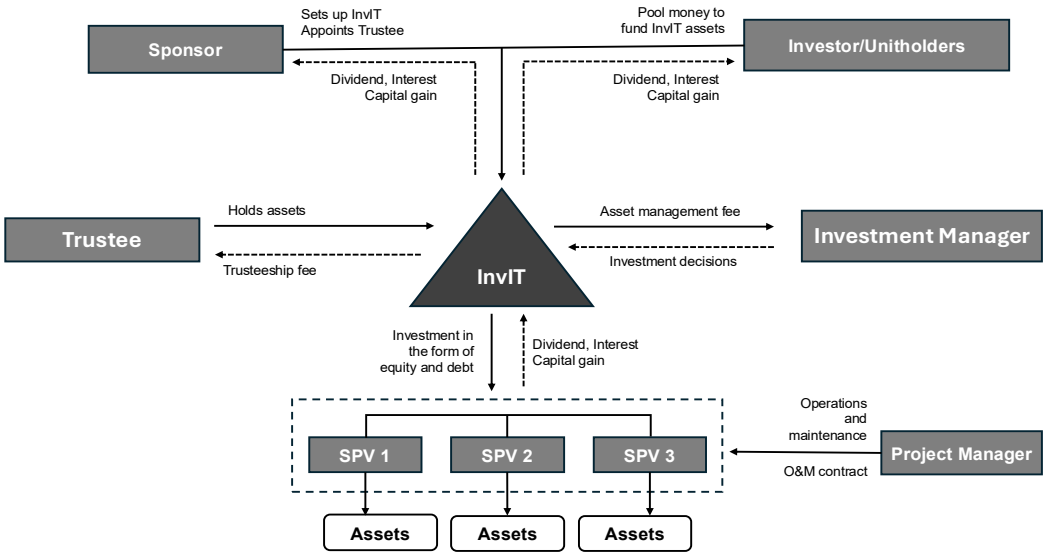
Under SEBI regulations, these trusts own assets from sub-sectors listed in the Harmonised Master List of Infrastructure Sub-sectors, notified by the Ministry of Finance. The country's infrastructure assets comprise a range of sectors, including transportation (such as roads, highways, warehouses, etc.), energy (including power generation, transmission, storage, energy product pipelines etc), and storage facilities, among others These assets contribute to the overall growth and development of the country's infrastructure.

InvITs can attract foreign direct investment without prior government approval, which gives them a wider investor base and, thereby, facilitates financing of large-scale infrastructure projects.

InvITs have become a crucial component of the domestic financial sector. By offering investors a platform to participate in infrastructure development and directing the funds towards strong, income-producing infrastructure assets, these trusts have emerged as a viable alternative to traditional financing methods. Not surprisingly, retail participation and investment from international investors have grown over the years.

8.2 Structure of domestic InvITs

InvITs have a tiered structure. A sponsor sets up the trust, which, in turn, invests in eligible infrastructure projects either directly or via special purpose vehicles (SPVs).



Source: Crisil Intelligence

8.3 Importance of InvITs in infrastructure financing in India

Priority of Infrastructure Development: Infrastructure development has consistently been a high-priority area for the Indian government, resulting in increased public investments and large-scale projects that need substantial capital.

Role of Government Policy and InvITs: The government's strong focus on infrastructure and adoption of innovative mechanisms like InvITs has ensured continuous investment in roads, highways, railways, and urban projects, which supports long-term economic growth and job creation.

InvITs as Capital Recycling Tools: InvITs act as powerful capital recycling mechanisms, allowing infrastructure developers to monetize operational assets and free up capital for new projects, while enabling developers to retain operational control.

Enhancing Project Viability and Reducing Risks: The use of InvITs helps to improve project viability through consistent funding, and reduces the risks related to project delays and cost overruns. They also drive operational excellence by linking performance-based distributions with professional oversight.

Attracting Diverse Investment and Risk Diversification: InvITs have attracted both domestic and international investors by offering diversified risk through pooled assets. These trusts allow exposure to multiple projects without direct ownership, spreading risk across sectors.

8.4 How regulations have evolved

InvITs in India operate within the regulatory framework established by the SEBI in 2014. The regulations have evolved significantly over the past decade, driven by market growth, practical learnings, and demand for enhanced governance and investor protection.

Early regulations (2014-2017)

The SEBI introduced InvITs formally in September 2014. The SEBI (Infrastructure Investment Trusts) Regulations, 2014, formed the basic framework for registration, structure and operation. Early amendments to the framework focused on practicalities, IPO and listing provisions, private placements, sponsor requirements, and enabling foreign and institutional investment. Tax incentives and exchange control relaxations soon followed, paving the way for the registration and listing of InvITs in 2016 and 2017.

Market deepening and structural flexibility (2018-2020)

In 2018, the SEBI refined IPO/ private placement processes of InvITs, introduced provisions to facilitate strategic investor participation and streamlined investment portfolio and leverage norms. The leverage limit was raised from 49% to 70%, subject to strict credit rating conditions and demonstrated distribution track, significantly augmenting borrowings for acquisition and expansion. Further, the amendments enabled rights issues and conversions between listed and unlisted InvITs, and broadened lending access for InvITs. Corporate governance prescriptions, especially for those with large outstanding debt securities, were progressively applied. They were mostly borrowed from the governance norms for listed companies.

Prescriptive governance and innovation (2021-2023)

With growing retail and institutional participation, the SEBI laid down more stringent governance rules, including Board composition standards, committee structures, induction of independent directors and stewardship responsibilities. Disclosure requirements, audit protocols and stewardship codes were formalised for greater transparency.

Notably, in 2022, the framework for unlisted InvITs was discontinued, triggering listings of the existing ones and narrowing the regulatory focus to publicly listed structures. Also, timelines for listing and conversion of InvITs from one structure to another were aligned and reduced, and rules for follow-on offerings were further clarified.

Recent reforms (2024-2025)

More recent amendments focused on sponsor lock-in flexibility, streamlining of conversion procedures from private to public InvITs, reduction of lock-ins, and simplified disclosure norms to facilitate smoother transitions and encourage broader market participation. These changes also reinforce director nomination protocols and trustee roles, and set out distinct rules for issuance and management of subordinate units to further institutionalise governance in the market. In December 2025, SEBI further required that if an InvIT's total borrowings and deferred payments exceed 49%, it must conduct quarterly asset valuations (for June, September, and December quarters) and submit these reports to the stock exchange along with quarterly financial results.

Since their introduction in 2014, almost every year SEBI has either issued a circular or notification refining InvIT

regulations to tighten standards of investor safeguards, disclosures, leverage, conversion, or governance.

8.5 Features of domestic InvITs

1.	**Taxation and pass-through benefits**	Indian InvITs operate as pass-through entities, offering significant tax benefits to investors and infrastructure companies. The trust level is exempt from income tax, dividend distribution tax, and capital gains tax on asset sales, allowing for enhanced returns and reduced tax burdens.
2.	**Regular distribution of income**	SEBI regulations require InvITs to distribute at least 90% of net distributable cash flows to unitholders, providing a predictable income stream. Publicly listed InvITs must make payouts at least every six months, ensuring a regular semi-annual cash flow to investors.
3.	**Centralised control**	InvITs function with four key constituents, each playing a distinct role. The sponsor initiates the InvIT and transfers initial assets, while the trustee, an independent SEBI-registered entity, oversees the assets on behalf of unitholders. The investment manager handles day-to-day operations and investment decisions, and the project manager, appointed by the trustee, is responsible for on-site management and maintenance of infrastructure projects. This structure is designed to ensure the efficient management and operation of InvITs, with a focus on generating cash flows from the underlying assets.
4.	**Favoured over other investment vehicles**	Compared to SPV or Holdco IPOs, InvITs offer more predictable yields via regulated minimum 90% cash distribution and reduced risk through multi-project diversification. They also provide structured governance and broader investor access. Compared to SPV IPOs, InvITs offer more predictable yields via regulated minimum 90% cash distribution and reduced risk through multi-project diversification.
5.	**Liquidity and marketability of InvITs**	InvITs offer high liquidity as they are traded on stock exchanges, unlike direct investments. Accessibility is improved through SEBI's reduced minimum subscription (Rs 10k-15k) and the ability to pledge units as collateral. InvITs offer high liquidity as they are traded on stock exchanges, unlike direct investments. Accessibility is improved through SEBI's reduced minimum subscription (Rs 10k-15k) and the ability to pledge units as collateral.
6.	**Low Cost of Debt**	An Infrastructure Investment Trust (InvIT) achieves a low cost of debt and an improved credit rating by pooling assets with predictable cash flows and adhering to regulations that limit leverage. For the infrastructure company that sets up the InvIT, this structure allows them to refinance existing, higher-cost debt, which significantly reduces their overall debt burden.
7.	**Transparency and governance**	SEBI enforces governance with requirements like minimum 50% independent Board members, quarterly Board meetings, detailed disclosures, specialized committees, mandatory disclosure of financials, regular independent audits, and related-party transaction reporting.
8.	**Diversification and risk management**	InvITs invest across projects, asset classes, geographies, and counterparties, providing significant diversification and risk reduction. SEBI requires at least 80% investment in operational assets; up to 10% in under-construction/other revenue-generating assets.
9.	**Valuation and reporting requirements**	InvITs must conduct regular half-yearly asset valuation. However, if borrowings exceed 49% of the asset value, quarterly valuation is compulsory. Only independent registered valuers must be engaged to do asset valuation. InvITs are also mandated to regularly publish their annual reports and quarterly financial statements with regular disclosures on asset performance and cash flows along with disclosures of key performance indicators (KPIs), such as revenue, profitability and cash flows. The aim is to provide investors a comprehensive understanding of the InvIT's performance.
10.	**Corporate tax optimisation through shareholder loan (SHL)**	InvITs often fund SPVs with both equity and debt, using shareholder loans (SHLs). Interest paid by SPVs on SHLs to the InvIT is tax-deductible at the SPV level.

Source: Crisil Intelligence

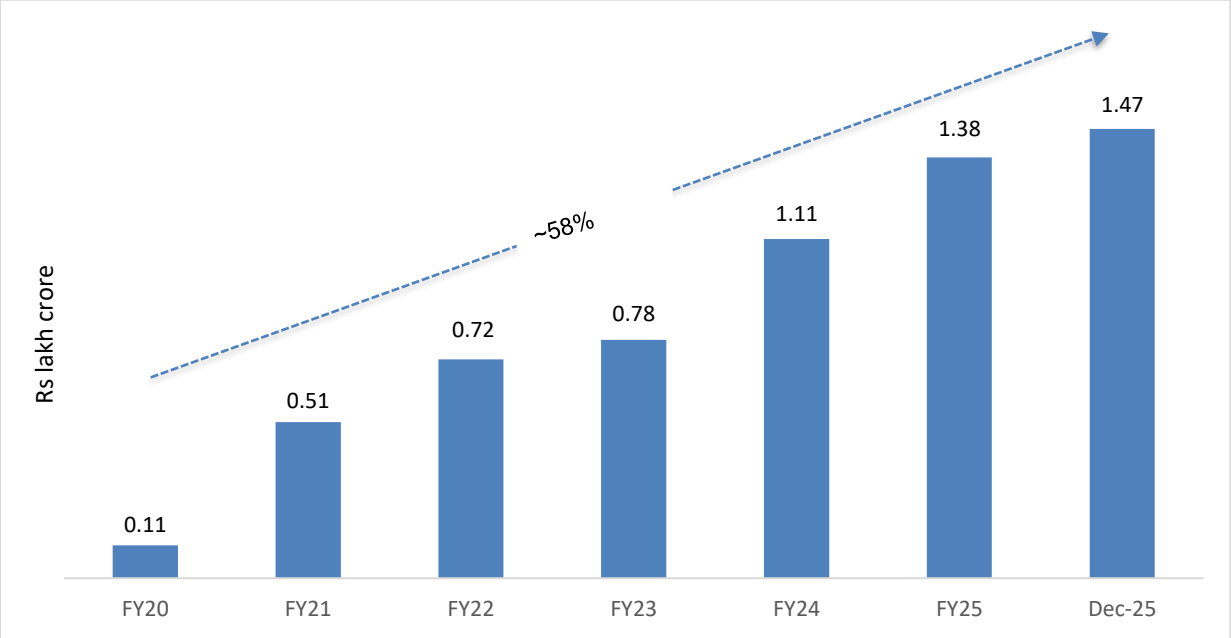
8.6 Fund mobilisation over fiscals 2020-2025

India has seen remarkable growth in the number of InvITs and their fund mobilisation over the years underscoring the strong investor uptake for this product. Between fiscals 2020 and 2026 (till December 2025), total unit funds mobilised from the market (excludes Sponsor contribution) by these investment vehicles grew from Rs 0.11 lakh crore to Rs 1.47 lakh crore.

The steady influx of funds and increasing investor confidence are testaments to the potential of InvITs as an

attractive investment avenue.

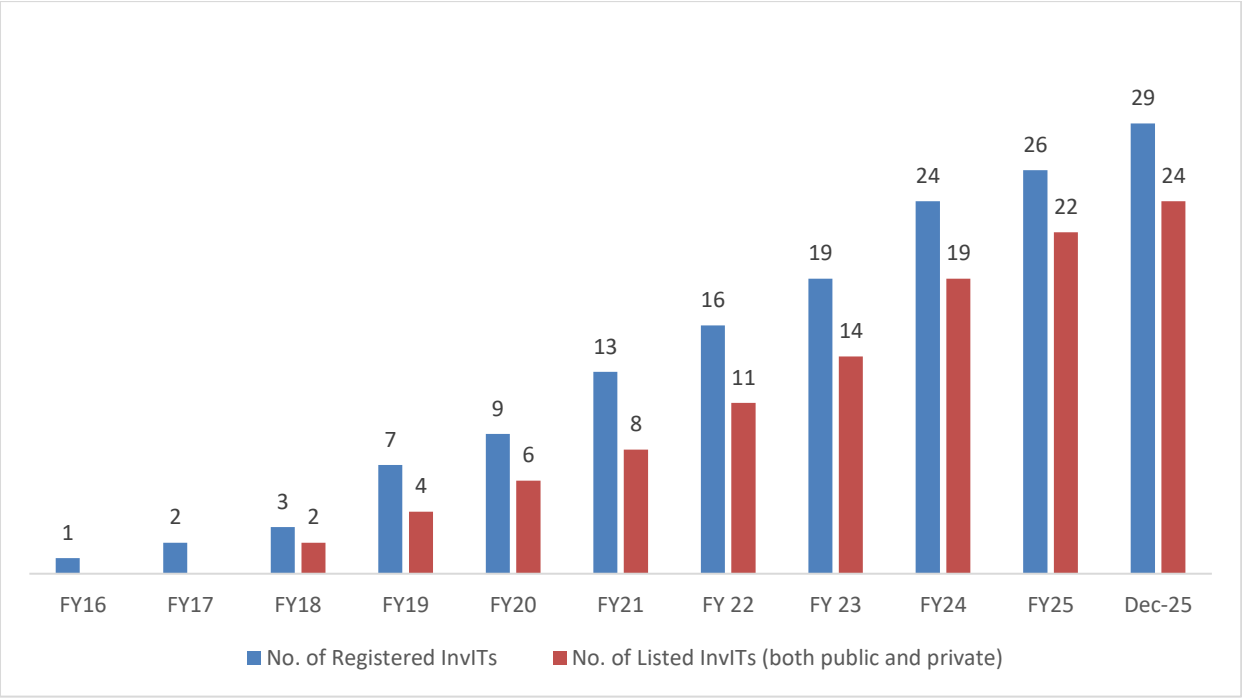
Cumulative funds mobilised by InvITs over fiscals 2020-2026 (Till December 2025)



Source: SEBI, Crisil intelligence

As of 31st December, 2025, the number of registered InvITs in India stood at 29, of which 24 are listed on the exchange. Of these 24 InvITs, six are listed publicly.

Cumulative No of InvITs registered and listed through the years with SEBI



Source: SEBI, Crisil Intelligence

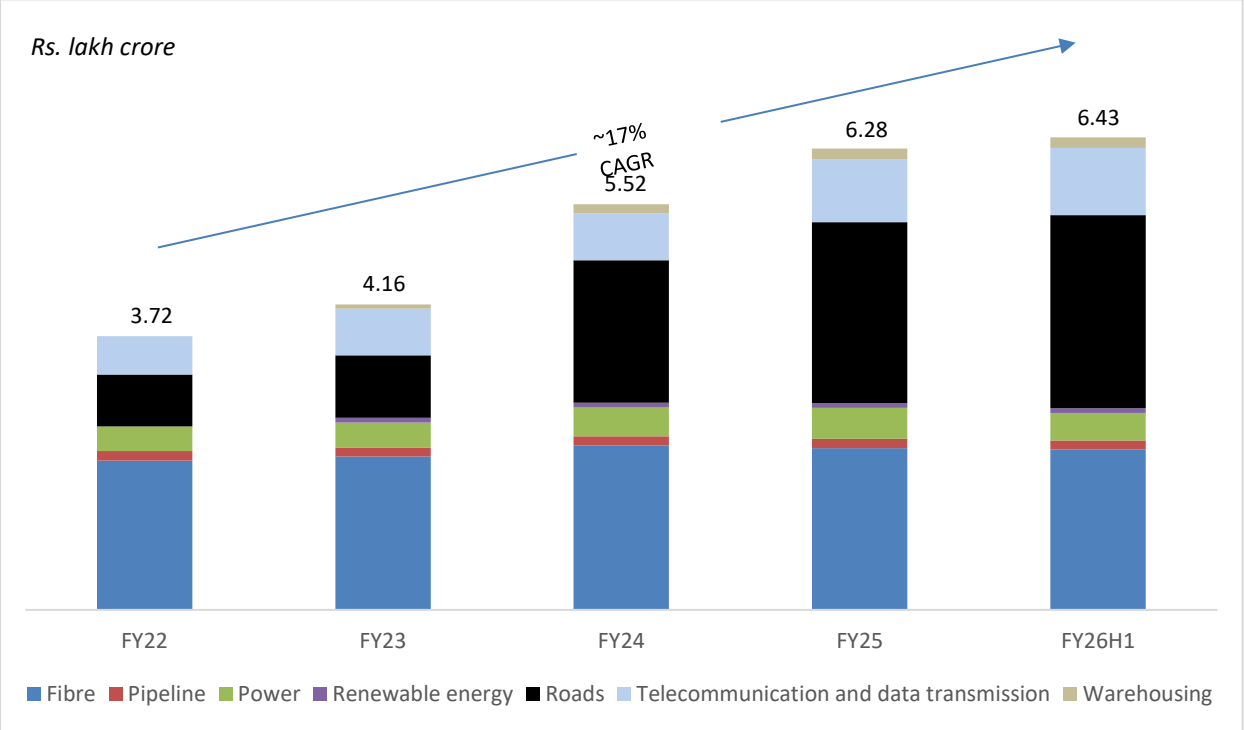
8.7 Overview of asset classes and sector-wise composition under InvITs in India

InvITs can invest in assets which fall under any of the sub-sectors included in the Harmonised Master List of

Infrastructure Sub-sectors, notified by the Ministry of Finance from time to time. However, currently InvITs manage assets in sectors such as roads, warehousing, pipeline, fibre, renewable energy, telecommunication, data transmission, and power.

Since their inception, InvITs have seen consistent expansion, with Assets Under Management (AUM) growing from Rs 3.72 lakh crore in fiscal 2022 to approximately Rs 6.43 lakh crore as of the first half of fiscal 2026, growing at a compound annual growth rate (CAGR) of ~17% between the same period. Within this overall growth, the road sector has emerged as the most significant growth driver. The AUM for road InvITs has increased to Rs 2.63 lakh crore in the first half of fiscal 2026, from Rs 0.70 lakh crore in fiscal 2022, clocking a CAGR of approximately 46%. The AUM considered is the sum of enterprise value (EV), excluding other financial assets, as disclosed in the annual report and valuation report.

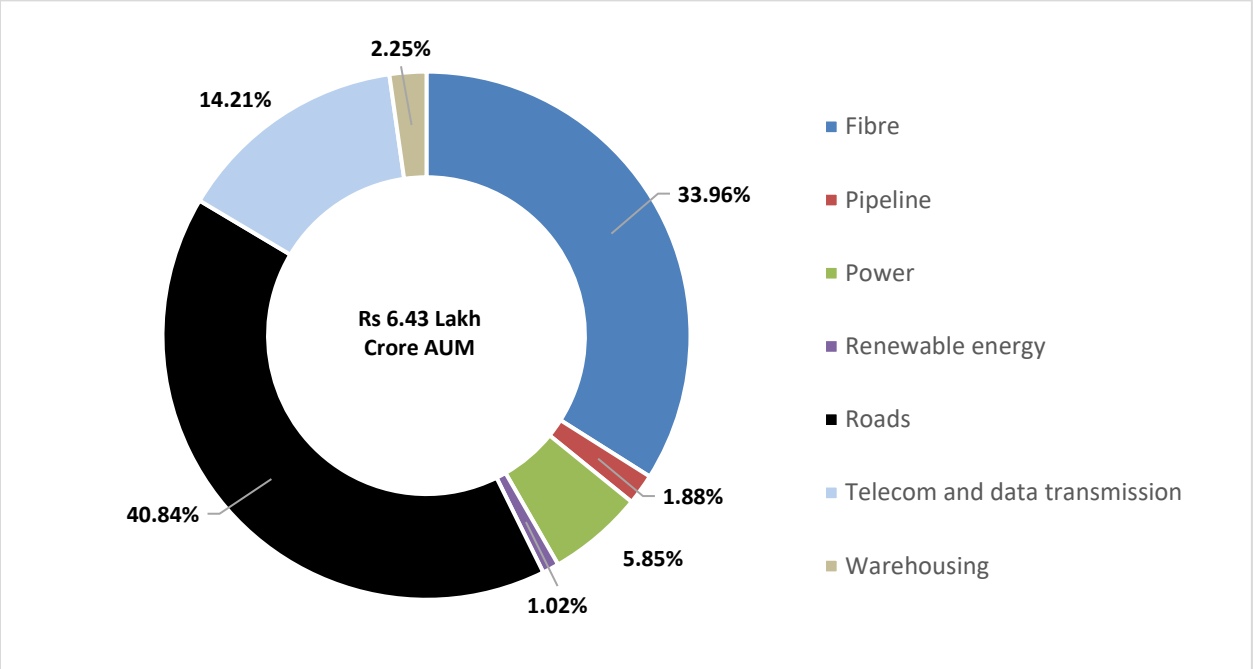
Sector-wise split of InvIT AUM



Source: Annual report, valuation report, Crisil Intelligence

As of the first half of fiscal 2026, the InvIT portfolio remained concentrated in core infrastructure sectors. The road sector accounted for ~41% of total AUM, followed by the fibre sector (~34%) and telecommunications sector (~14%). Other segments, including power, warehousing, pipeline and renewable energy assets, comprised a smaller share of the portfolio. As of first half of fiscal 2026, there are sixteen registered InvITs in the road sector, followed by three in power sector and three in warehousing sector. Other sectors like fibre, pipeline, renewable energy, telecom and data transmission etc. have only one registered InvIT each.

InvIT portfolio AUM composition (as of the first half of fiscal 2026)



Source: Annual report, valuation report, Crisil Intelligence

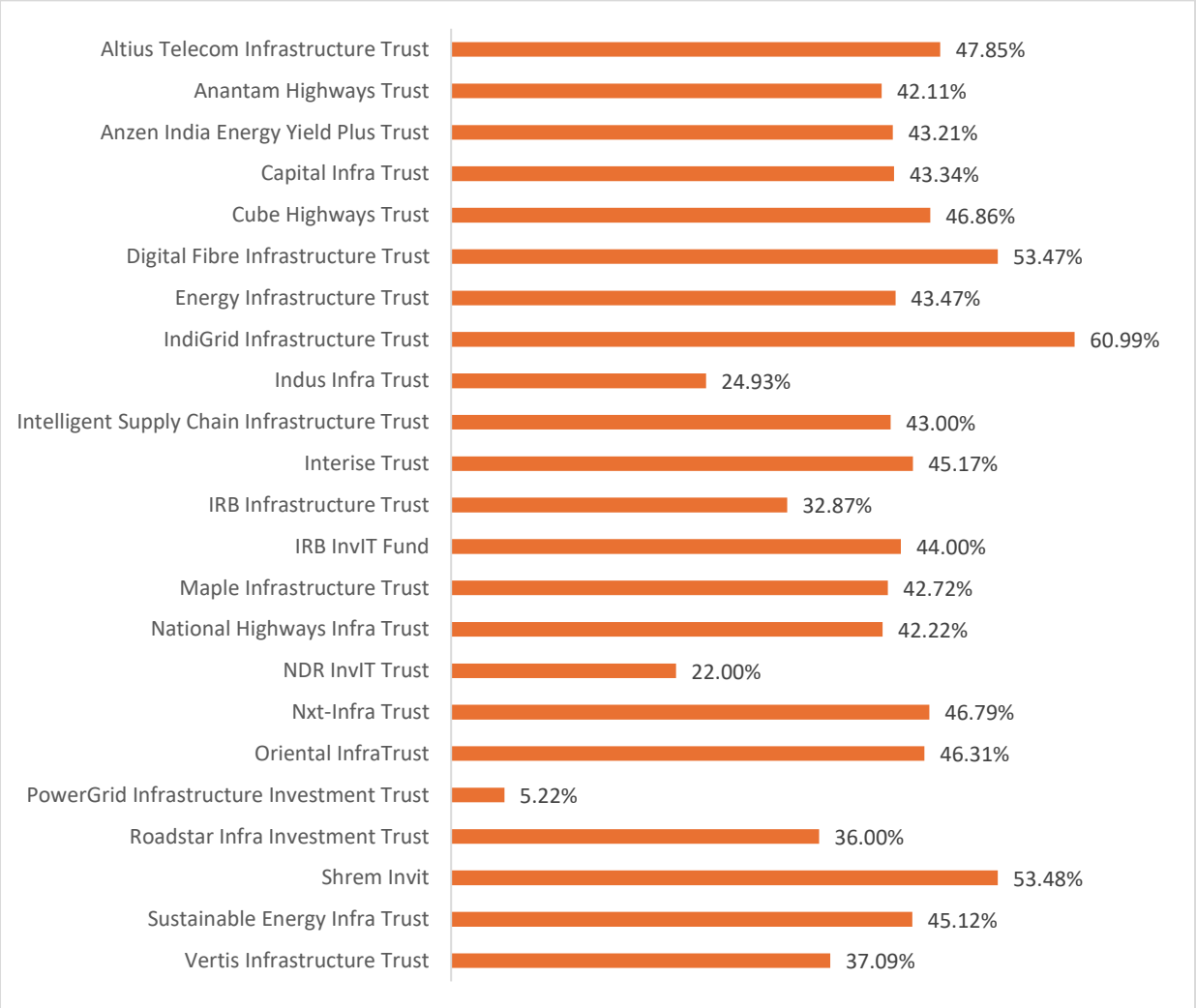
8.8 Leverage

InvITs are allowed to use prescribed levels of leverage or borrowed funds. Regulation 20(2) of the SEBI (Infrastructure Investment Trusts) Regulations, 2014, governs the aggregate consolidated borrowings and deferred payments of an InvIT, including that of the holding company and the special purpose vehicles (SPVs), net of cash and cash equivalents. To provide InvITs with greater flexibility in acquiring new assets, SEBI raised the leverage limit for publicly listed InvITs from 49% to 70% of the asset's value in 2019. In case if an InvIT's debt exceeds 49% of its asset value, it must:

- Obtain a high credit rating ("AAA" or equivalent) from a registered agency
- Use the borrowed funds only for infrastructure projects
- Have a track record of at least 6 distributions on a continuous basis to unitholders.
- Obtain approval from its unitholders.

Net debt/EV ratio ranged from 5% to 61% as on December 31, 2025. For Road InvITs, the range was 25% to 53%. The net borrowings ratio is presented as per the disclosures by the respective InvITs in respect of "the Statement of Net Borrowings Ratio" as required by SEBI Master Circular no SEBI/HO/DDHS-PoD-2/P/CIR/2025/102 dated 11 July 2025.

InvITs: Net Borrowings Ratio (December 31, 2025)



Note: The net borrowings ratio is taken from the respective InvITs "Statement of Net Borrowings Ratio" as required by SEBI Master Circular no SEBI/HO/DDHS-PoD-2/P/CIR/2025/102 dated 11 July 2025.

8.9 InvIT returns

InvIT returns are primarily based on the performance and cash flows generated by underlying infrastructure assets, but they are influenced by several key factors.

- **Project revenue and asset quality:** The primary source of returns is the net cash flow generated by underlying assets (toll roads, HAM projects and annuity assets) and other income-generating infrastructure assets. Revenue stability is dependent on the quality, scale and operational performance of these assets, as well as factors such as tariffs and project contract terms.

- **Utilisation and demand in respect of the underlying assets:** Efficient management of operating expenses, maintenance, and capital expenditure requirements can improve the net distributable cash flow available for distribution to unitholders.

- **Regulatory and tax environment:** Changes in regulation or tax policies, such as amendments to distribution tax or tariff structures, can materially alter the after-tax returns to unitholders. Tax regime of the SPV also has an impact.

- **Interest rate movements:** Changes in interest rates can impact InvIT returns, as they can affect the cost of debt.

- **Leverage and capital structure:** The extent of debt at the trust and asset level may have a bearing on the stability of returns, risk profile and the distribution quantum.

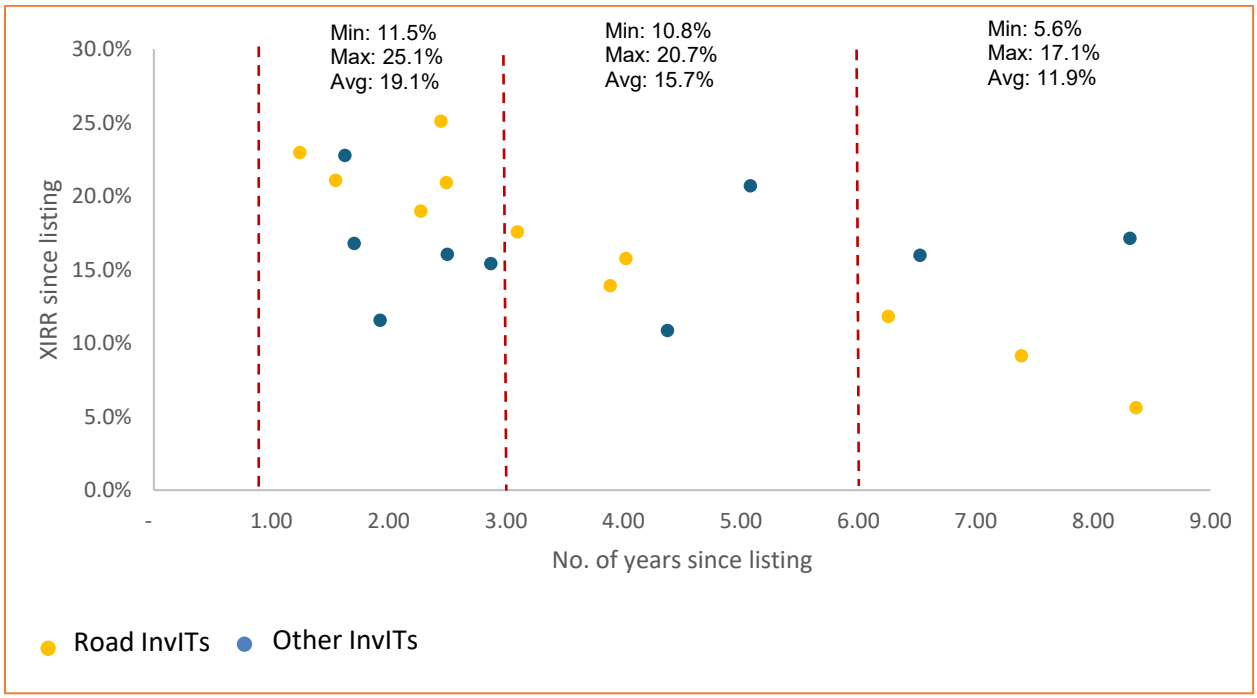
- **Sponsor and asset pipeline:** The reputation, experience, and track record of the sponsor or manager of the InvIT can impact InvIT returns, as they can affect the quality of the underlying assets and the management of the InvIT. The potential for future asset additions (via Right of First Offer arrangements) is an important consideration and would have bearing on value accretion for the unitholders.

- **Legal and macroeconomic risks:** Delays in project execution, changes in government policy (such as tariff resets) and broader economic cycles can affect returns.

To calculate the returns delivered by InvITs since their listing date, XIRR has been used as a metric. The XIRR is calculated by considering the listing price and distribution per unit made till the valuation date and NAV as on the last valuation date in case of private listed InvITs (based on data available till September 30, 2025). The distribution per unit made till the valuation date and the trading price on NSE have been considered in case of publicly listed InvITs.

InvITs tend to deliver a higher XIRR in the initial years primarily due to the timing and structure of cash distributions and investors at early stages may benefit more in terms of returns as incremental asset acquisitions kick-in and InvITs become eligible for contracting higher leverage. InvITs which have completed less than one year since listing have been excluded from this analysis. There are 5 InvITs which have been in existence for more than six years since their date of listing. They have given an XIRR in the range of 5.6% to 17.1%.

InvIT XIRR (%)



Source: Valuation reports, annual reports and stock exchange filings

**XIRR calculation based on NAV and distributions till September 30, 2025, based on record date. In the case of public listed InvITs, the traded price as on September 30, 2025, has been considered.*

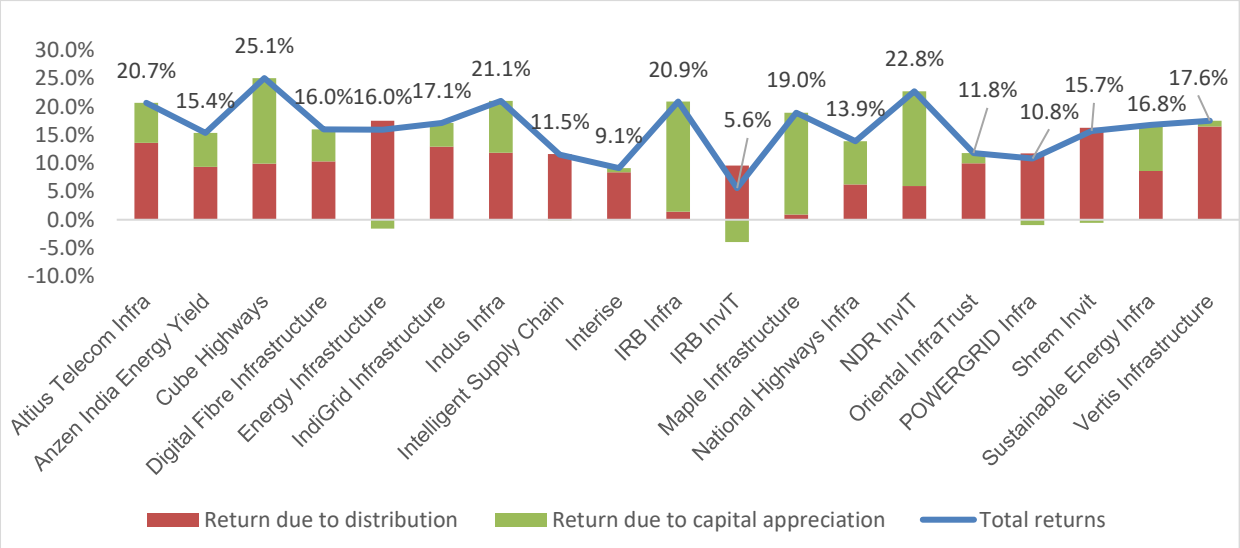
InvIT return analysis in terms of returns due to price movement and distribution

In case of InvITs, the returns are a combination of price movement and distribution yields.

To calculate the returns delivered by InvITs since their listing date, XIRR has been used as a metric. The XIRR is calculated by considering the listing price and distribution per unit made till the valuation date and NAV as on the last valuation date in case of private listed InvITs (based on data available tillSeptember 30, 2025). The trading price on NSE has been considered in case of publicly listed InvITs. Similarly, XIRR has been calculated for distributions and the differential is attributed to price change.

We see from the chart below that returns due to distribution range from 0.9% to 17.6%, while returns due to price appreciation ranges from -4.0% to 19.5%. Average returns due to distribution is approximately 10.2% while average return due to price change is 6.0%

Returns due to distribution and capital appreciation



Source: Annual report, official website of InvITs, stock exchange, Crisil Intelligence
XIRR calculation is based on NAV and distributions till September 30, 2025. In the case of public listed InvITs, the traded price has been considered. Invits which have completed less than 1 year have not been considered (Roadstar, Capital Infra and Nxt- Infra)

8.10 Complementarity of road sector with other sectors

Road transport is a fundamental pillar of the transport ecosystem, complementing and integrating seamlessly with other transport modes such as rail, air, waterways, and urban transit systems. This integration enables the efficient movement of people and goods, fostering economic growth, regional development, and social inclusion.

Multimodal Integration and Synergy

Road transport provides the essential physical links between various transport hubs, such as airports, railway stations, metro terminals, ropeway stations, and seaports, handling the critical "last mile" connectivity. This helps bridge operational gaps, ensuring that passengers and cargo transported via rail, air, or water reach their final destinations efficiently.

Project management skills:

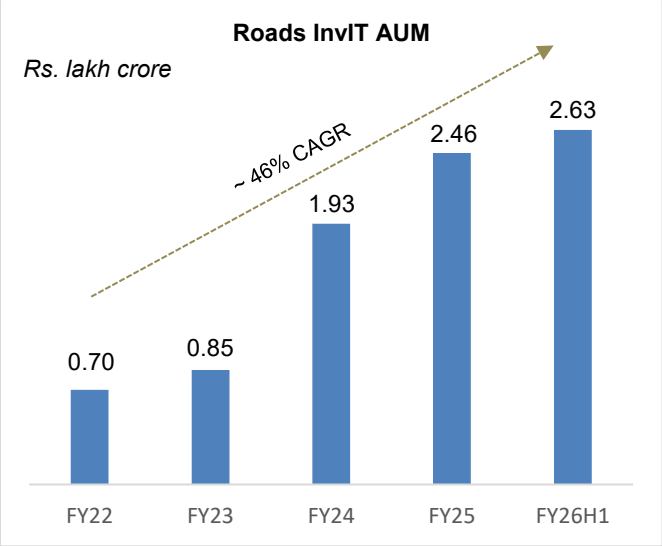
The expertise of project managers operating road assets complements other transport assets. Their skills in regulatory management, PPP concession frameworks, operations & maintenance, traffic forecasting, financial compliance and investor reporting, including use of asset monitoring & management technology tools, are equally critical in other transportation sub-sectors like airports, ropeways and metros. The strength of the operating process adopted can also be applied in these transport sector where user safety and asset reliability are of paramount importance not only in meeting the criteria laid down in relevant contracting frameworks but also in enhancing user experience.

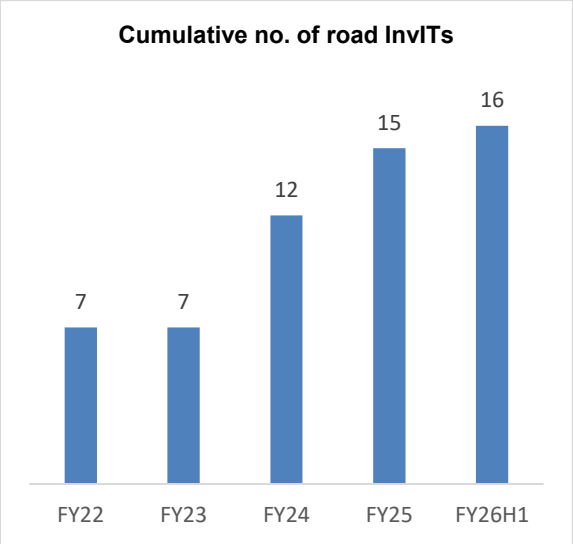
8.11 Road InvITs

The road sector has been one of the most prominent segments for InvITs in India and emerged as the largest contributor to the InvIT landscape, with approximately 41% share of AUM as of the first half of fiscal 2026.

As of the first half of fiscal 2026, there are 27 InvITs registered with SEBI, of which 16 are road InvITs. The AUM for road InvITs increased to Rs 2.63 lakh crore in the first half of fiscal 2026, clocking a CAGR of ~46% from Rs 0.70 lakh crore in fiscal 2022.The number of road InvITs have more than doubled in the past three fiscal years.

Growth in road InvIT AUM and their number (fiscal 2021 to first half of fiscal 2026)





Source: Annual report, Valuation report, Crisil Intelligence; Data as of first half of fiscal 2026

The table below presents the list of road InvITs and their respective sponsors, along with their sponsor type and listing dates.

Road InvITs: Sponsor profile and listing details

InvIT Name	Sponsor name	Sponsor type	Date of listing
Anantam Highways Trust (Anantam)	Alpha Alternatives Fund Advisors LLP	Financial	16-Oct-2025
Athaang Infrastructure Trust (Athaang)	National Investment and Infrastructure Fund (NIIF)	Financial	Yet to be listed
Citius TransNet Investment Trust (transport sector focused, with initial and ROFO assets comprising of road portfolio)	EPIC TransNet Infrastructure Private Limited, (earlier Watrak Infrastructure Private Limited)	Financial	Yet to be listed
Cube Highways Trust (Cube)	Cube Highways and Infrastructure Pte. Ltd and Group	Financial	19-Apr-2023
Interise Trust (Interise)	Interise Investment Managers Ltd (IIML) (self-sponsored)	Financial	9-May-2018
Maple Infrastructure Trust (Maple)	Maple Highways Pte. Ltd.	Financial	21-Jun-2023
Nxt - Infra Trust (Nxt-Infra)	Actis Highway Infra Ltd	Financial	2-Jul-2024
Roadstar Infra Investment Trust (Roadstar)	Roadstar Infra Private Ltd (RIPL)	Financial	11-Mar-2025

InvIT Name	Sponsor name	Sponsor type	Date of listing
Vertis Infrastructure Trust (Vertis)	Galaxy Investments II Pte. Ltd	Financial	25-Aug-2022
Raajmarg Infra Investment Trust (RIIT)	National Highways Authority of India	Infra developer	24-Mar-2026
Capital Infra Trust	Gawar Construction Ltd	Infra developer	14-Jan-2025
Indus Infra Trust	Aadharshila Infratech private Ltd	Infra developer	12-Mar-2024
IRB Infrastructure Trust	IRB Infrastructure Developers Ltd	Infra developer	8-Apr-2022
IRB InvIT Fund	IRB Infrastructure Developers Ltd	Infra developer	18-May-2017
National Highways Infra Trust	National Highways Authority of India	Infra developer	3-Nov-2021
Oriental Infra Trust	Oriental Tollways Private Ltd (OTPL)	Infra developer	27-Jun-2019
Shrem Invit	Shrem Infra Invest Private Ltd	Infra developer	22-Sep-2021

Source: Annual reports, valuation reports, NSE, BSE

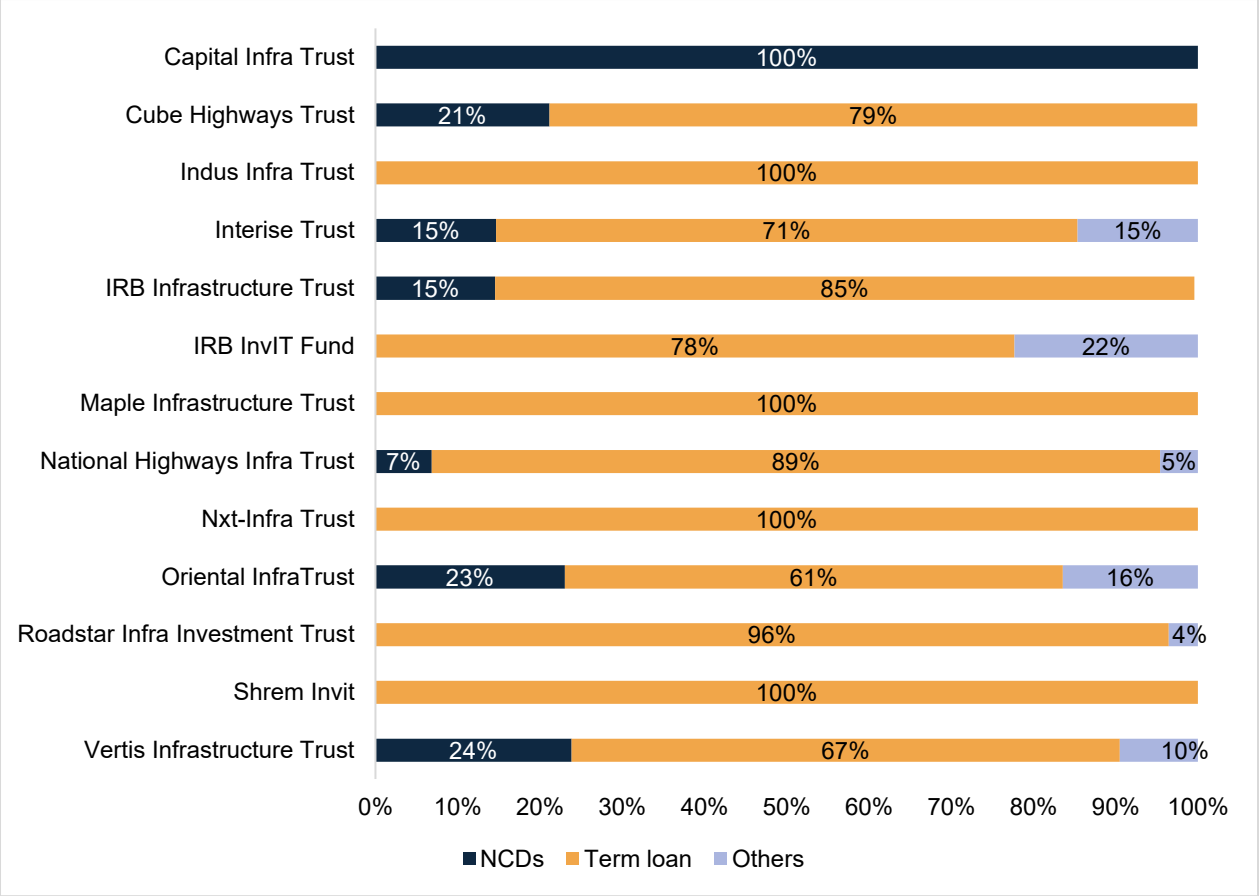
This table has total of 17 road InvITs as it includes the Citius InvIT which was registered with SEBI in August 2025 and Raajmarg Infra Investment Trust which was registered with SEBI in December 2025.

Borrowing Profile

The borrowing composition in the InvIT sector primarily consists of Non-Convertible Debentures (NCDs), term loans, and other borrowings. The category of other borrowings includes unsecured loans, commercial papers, other long-term borrowings, deferred premium obligations, and interest payable on premium deferrals.

The average borrowing distribution in the InvIT sector is predominantly weighted towards term loans, followed by non-convertible debentures and other borrowings. Capital Infra Trust has a distinct borrowing profile, relying solely on non-convertible debentures (NCDs). In contrast, Indus Infra Trust, Maple Infrastructure Trust, Nxt-Infra Trust, and Shrem InvIT utilize term loans for their entire borrowing needs.

Road InvITs: Borrowing profile



Source: Consolidated financial statements for fiscal 2025, Crisil Intelligence

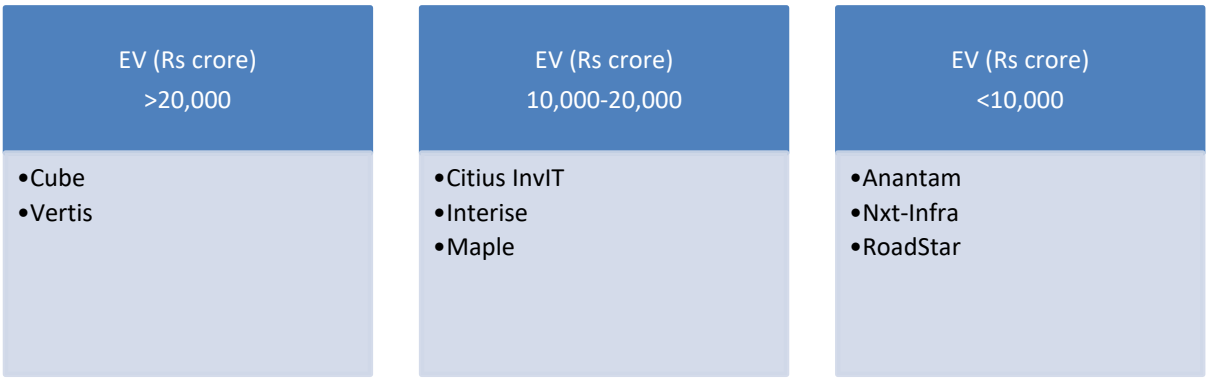
Sponsors of road InvITs can broadly be classified into two categories, infrastructure developers and financial sponsors. The sponsor type infrastructure developers are typically infrastructure development and construction companies, with core strength in asset development and execution capabilities. Financial sponsors are private equity funds, pension funds or infrastructure-focused asset managers. Their focus lies in acquiring quality assets and creating value through strong asset management strategies.

For this analysis, since Citius InvIT is financial sponsor backed InvIT, the peer set, and benchmarking have been limited to listed financial sponsor-backed InvITs. Citius is a transport sector focussed InvIT. Since the initial portfolio and proposed ROFO assets are road assets, the analysis in this section is done considering listed financial sponsor-backed road InvITs.

Landscape of financial sponsor-backed road InvITs basis Enterprise Value (EV)

The EV of financial sponsor backed road InvITs ranges from Rs 5,022 crore to Rs 35,558 crore. Citius (based on its initial portfolio) ranks fifth among the financial sponsor backed road InvITs with an EV of more than Rs 10,000 crore at the time of listing. The enterprise value considered for analysis in InvIT section is excluding financial assets.

EV of financial sponsor backed road InvITs



Note: The portfolio of Maple Infrastructure Trust includes the Ashoka assets acquired by Maple as available in Trust's disclosure.

Source: Valuation reports for various InvITs (Interise Trust, Maple Infrastructure Trust, Nxt-Infra Trust: March 2025; Citius InvIT, Cube Highways Trust, Roadstar Infra Investment Trust, Vertis Infrastructure Trust: December 2025; Anantam Highways: June 2025), Annual reports, Crisil Intelligence

Asset additions in terms of ROFO or asset acquisition in Road InvITs

Infrastructure Investment Trusts (InvITs) are investment vehicles that allow individuals and institutions to make long-term investments in infrastructure projects. With a view to increase their AUM in processing enhancing unitholder value, InvITs are focussed on asset acquisitions, which typically happens by way of - (i) purchase of assets from the sponsor groups (generally under a Right of First Offer (ROFO) arrangement, thus giving InvIT a first right to buy the identified assets; or (ii) purchase from third parties by either entering into bilateral discussions or participating in an auction process i.e. third-party Share Purchase Agreements (SPAs)

SPA

A SPA is a contract between a buyer and a seller, where the buyer agrees to purchase shares of a company from the seller. In the context of InvITs, an SPA allows the InvIT to acquire an SPV by purchasing its shares from existing shareholders. The SPA typically includes terms such as the purchase price, payment terms and conditions for the acquisition.

ROFO

ROFO is a contractual agreement that grants a party the exclusive right to acquire an identified asset(s) or project(s) before it is offered to any other potential buyer. This agreement is typically negotiated between the sponsor of the InvIT and the InvIT itself, or between the sponsor and other investors. A ROFO is a provision that requires the seller of an asset to offer it to the holder of the ROFO before selling it to any other party. This means that if the seller decides to sell the asset, it must first offer it to the holder of the ROFO (InvIT, in this context), who then has the option to purchase the asset by making an offer comprising price and / or specified terms. ROFO, especially in the earlier years of operation for an InvIT, provides a visibility to the growth runway by ensuring a steady flow of assets that meet its investment criteria to drive growth and returns for the InvIT's unitholders

Assets additions by way of ROFO/ SPA in case of financial sponsor-backed road InvITs:

- Citius: Its ROFO pipeline comprises 11 Hybrid Annuity Model HAM assets
- Similarly, some of its peers are also in the process of asset additions through bilateral acquisition agreements.

The report relies on public announcements and published data regarding these assets to analyse the impact of these acquisitions, a cutoff date of December 31, 2025 has been considered.

Assets additions by way of ROFO/ SPA in case of financial sponsor-backed road InvITs:

Citius InvIT (ROFO)	The ROFO pipeline comprises 11 Hybrid Annuity Model HAM assets from the fund schemes of EAAA India Alternatives Limited (EAAA).

	Ashoka Buildcon Ltd, and its material subsidiary Ashoka Concessions Ltd, signed agreements to sell their respective stakes aggregating to 100% in 11 road SPVs to Epic Concesiones 2 Private Ltd (EC2PL). EC2PL is owned by schemes of the Infrastructure Yield Trust managed by EAAA. EC2PL has already acquired 5 assets from ABL. A share purchase agreement is already in place between IYT and ABL for the balance 6 assets, which will be transacted subject to compliance of certain conditions precedent. With five Identified ROFO Assets that have been acquired by the EC2PL, total portfolio (i.e. Initial Portfolio Assets as well as these five Identified ROFO Assets) is anticipated to comprise 15 road assets across 12 different Indian states representing approximately 4,582.64 lane-kilometers (excluding service lane-kilometers). These five Identified ROFO Assets are operational, having an average operational history of 4.42 years and a residual life of 10.58 years as of December 31, 2025. In aggregate, the mix of the toll collection (net of revenue share) and HAM and annuity receipts without GST (including these operational ROFO Assets under the HAM framework, but excluding the operation and maintenance component of the payments under the respective contracts) for the Financial Year 2025 were 63.79% and 36.21%, respectively Out of the remaining six Identified ROFO Assets which are being acquired by the EC2PL, five are operational, having an average operational history of 2.84 years and a residual life of 12.17 years as of December 31, 2025. For the Financial Year 2025, the toll collection (net of revenue share) was 56.05%, while the HAM and annuity receipts without GST (including the operational ROFO Assets under the HAM framework, but excluding the operation and maintenance component of the payments under the respective contracts) constituting 43.95% of the combined cash revenue receipts of the Initial Portfolio Assets and all 10 operational Identified ROFO Assets.
Cube Highways (ROFO)	Cube Highways Trust has announced plans to acquire 100% equity shareholding and beneficial ownership of four "Proposed Portfolio Assets" from the "Sellers" (CH-V and CH-II). This Portfolio comprises three BOT Toll road assetsand one BOT Annuity.
Vertis Infrastructure Trust (SPA)	Vertis Infrastructure Trust has signed a SPA on Jan 15, 2024, for acquisition of 100% shareholding in one or more tranches and management control in 12 SPVs owned by sellers out of which 11 assets have been duly acquired and form a part of the portfolio. The remaining one SPV (HAM asset) will be transferred to the InvIT upon the satisfaction of certain agreed closing conditions.
Anantam Highways (ROFO)	Three ROFO Agreements (DBL, Alpha, and Pollachi) have been executed, granting the Trust the right of first offer to acquire assets from the sellers and their affiliates post-Issue. The agreements cover eleven assets from DBL, three assets from Build India Infrastructure Fund, and DPJ Pollachi HAM Project Private Limited from Terrefert Green Growth LLP and Alpha Alternatives Financial Services Private Limited. It is noted that DBL and Alpha jointly own three SPVs: Raipur-Visakhapatnam CG-2 Highways Limited, Mehgama Hansdiha Highways Limited, and Poondiyankupam Highway Limited. Hence, we have considered 12 distinct project SPVs. All of these assets are HAM in nature.

1) Source: Citius InvIT Executive version of ROFO agreement which shall be executed in due course
Cube Highways, Investor Presentation January 2026.
Vertis Infrastructure Trust- https://vertis.co.in/wp-content/uploads/2025/05/PNC-Stock-Exchange-Disclosure_21.05.2025.pdf
Anantam Highways Trust- https://www.sebi.gov.in/sebi_data/Anantam%20Highways%20Trust_foo.pdf Pg No 379
2)To calculate the operational history of the ROFO assets, we have assumed the PCOD date for these assets from (https://www.ashokabuildcon.com/files/investors/company-announcements/435_ABL_BSE_NSE_HAM_SPA_I_300925.pdf). For determining the concession end date of the assets, we have taken the lifespan of the HAM asset to be 15 years from the PCOD or FCOD date
3) To calculate the lane kilometers of ROFO assets (except for KL and TS3), we have considered (https://www.ashokabuildcon.com/files/investors/company-announcements/435_ABL_BSE_NSE_HAM_SPA_I_300925.pdf). In case of TS3, we have considered (https://www.ashokabuildcon.com/files/investors/company-announcements/329_ABL_BSE_NSE_PCOD_Banwara_bettadahalli.pdf). In case of KL, we have relied upon the information shared by the Citius Investment Manager.

Portfolio composition in terms of type of assets (HAM/ annuity/ toll)

The portfolio of road assets held by financial sponsor-backed road InvITs is diverse, comprising 107 assets that

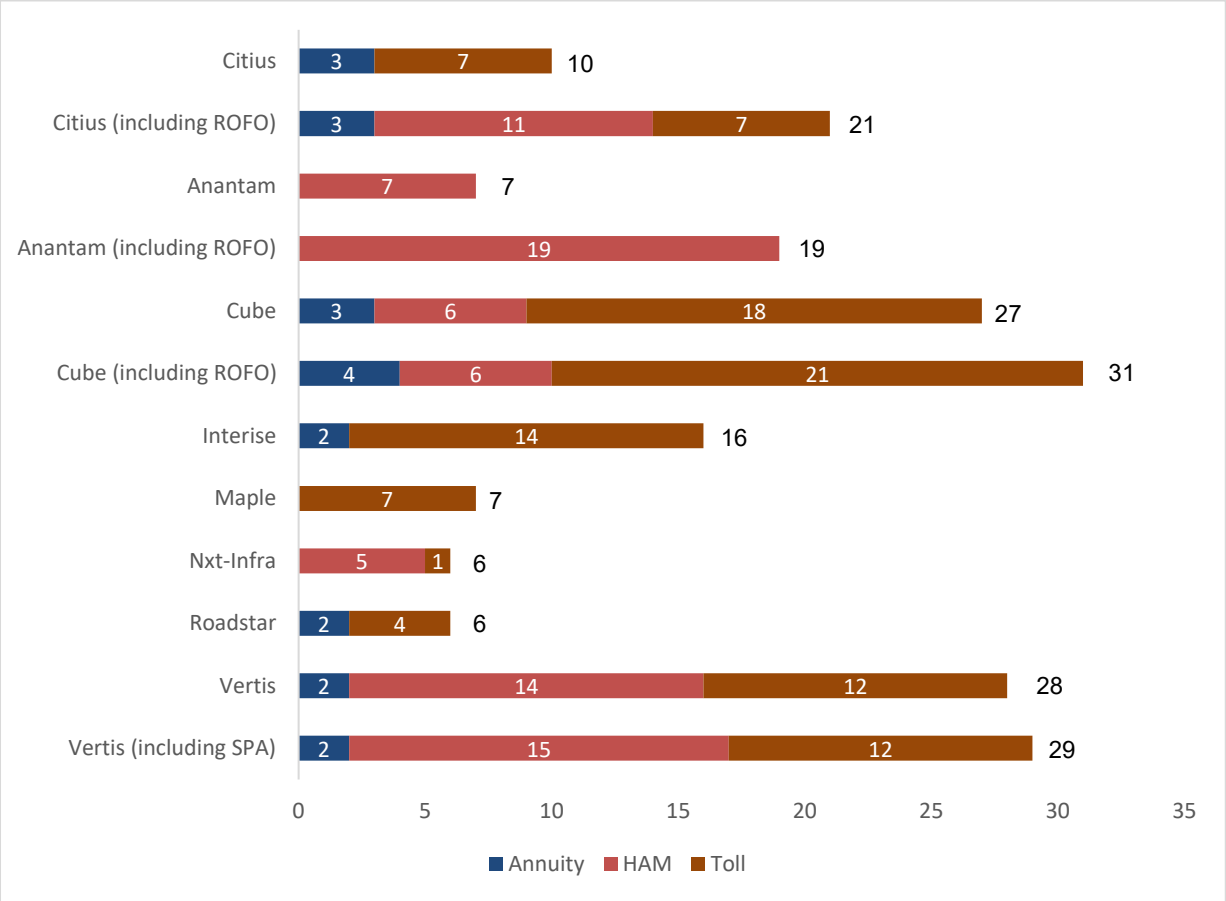
include toll, HAM and annuity projects. At present, most of these assets are toll-based, with 63 assets making up ~59% of the total. HAM assets account for ~30% of the total, with 32 assets, while the remaining assets are pure annuity projects.

Importantly, toll-based road assets provide a degree of income stability and inflation protection, as most concessions have inflation-linked toll rate revisions or periodic toll hikes. Combined with steady traffic growth on key national corridors, this structure allows InvIT cash flows to naturally adjust for inflation, thereby-offering investors a built-in hedge and stable real returns over time.

The total number of assets is expected to increase to 135 with the addition of 28 new assets through ROFO or SPA agreements. This will slightly alter the breakup, with toll-based assets still dominating the portfolio, with~49% share of the total. Share of HAM assets is expected to increase to ~41% of the total, with 56 assets.

Citius InvIT has an initial portfolio comprising of 10 assets (seven toll-based projects and three annuity projects). With the expected addition of assets under the ROFO arrangement, its portfolio is expected to grow to 21 assets, resulting in a balanced Toll: Annuity asset mix. It can be seen that larger InvITs tend to balance their portfolio in terms of toll-annuity mix.

Portfolio split in terms of number of assets (including and excluding ROFO/SPA)



Note: The portfolio of Maple Infrastructure Trust includes the Ashoka assets acquired by Maple as available in Trust's disclosure.
For Anantam Highways, DBL and Alpha jointly own three SPVs: Raipur-Visakhapatnam CG-2 Highways Limited, Mehgama Hansdiha Highways Limited, and Poondiyankupam Highway Limited. Hence 12 ROFO assets.
Source: Valuation reports for various InvITs (Interise Trust, Maple Infrastructure Trust, Nxt-Infra Trust: March 2025; Citius InvIT, Cube Highways Trust, Roadstar Infra Investment Trust, Vertis Infrastructure Trust: December 2025; Anantam Highways: June 2025), Annual reports, Crisil Intelligence

Portfolio composition in terms of concessioning authority (MoRTH, NHAI and state authorities)

Number of assets

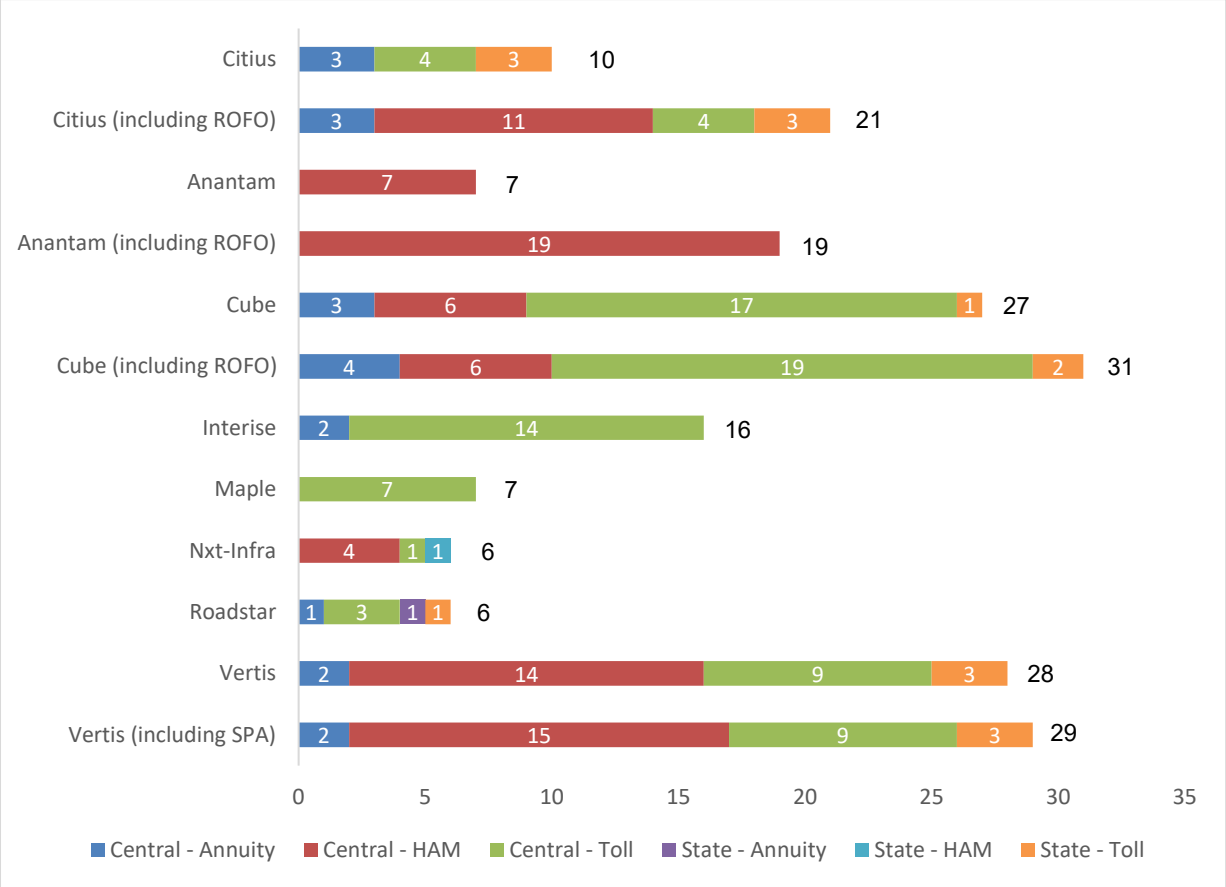
For financial sponsor backed road InvITs, the National Highways Authority of India (NHAI) is the primary

concessioning authority. Out of 107 assets 97 are concessioned by central authorities (NHAI, MoRTH). Proposed acquisitions via ROFO and SPA routes by InvITs is expected to further increase the share of NHAI/central authority-concessioned assets. We note that 27 out of 28 assets under acquisition (including ROFO and SPA) are concessioned by the NHAI.

The chart below elaborates on the concessioning authorities for each InvIT, bifurcating further into toll, HAM and annuity. This provides a detailed view of the concessioning authorities for each InvIT.

The key counterparties for Citius' annuity assets are NHAI and the Ministry of Road Transport and Highways ("**MoRTH**"). For Citius' toll assets, key counterparties are NHAI, the Government of Odisha, and the Gujarat State Road Development Corporation Limited ("**GSRDCL**"). The ROFO portfolio of Citius is entirely concessioned by the NHAI. Given the strong government backing and proven history, the counterparties present a low risk of default, offering assurance regarding the stability of the revenue under the concession agreements with these authorities.

Portfolio split for number of assets in terms of concessionaire authority – Central (MoRTH, NHAI) and State, including asset additions through ROFO and SPA



Note: The portfolio of Maple Infrastructure Trust includes the Ashoka assets acquired by Maple as available in Trust's disclosure.
For Anantam Highways, DBL and Alpha jointly own three SPVs: Raipur-Visakhapatnam CG-2 Highways Limited, Mehgama Hansdiha Highways Limited, and Poondiyankupam Highway Limited. Hence 12 ROFO assets.
Source: Valuation reports for various InvITs (Interise Trust, Maple Infrastructure Trust, Nxt-Infra Trust: March 2025; Citius InvIT, Cube Highways Trust, Roadstar Infra Investment Trust, Vertis Infrastructure Trust: December 2025; Anantam Highways: June 2025), Annual reports, Crisil Intelligence

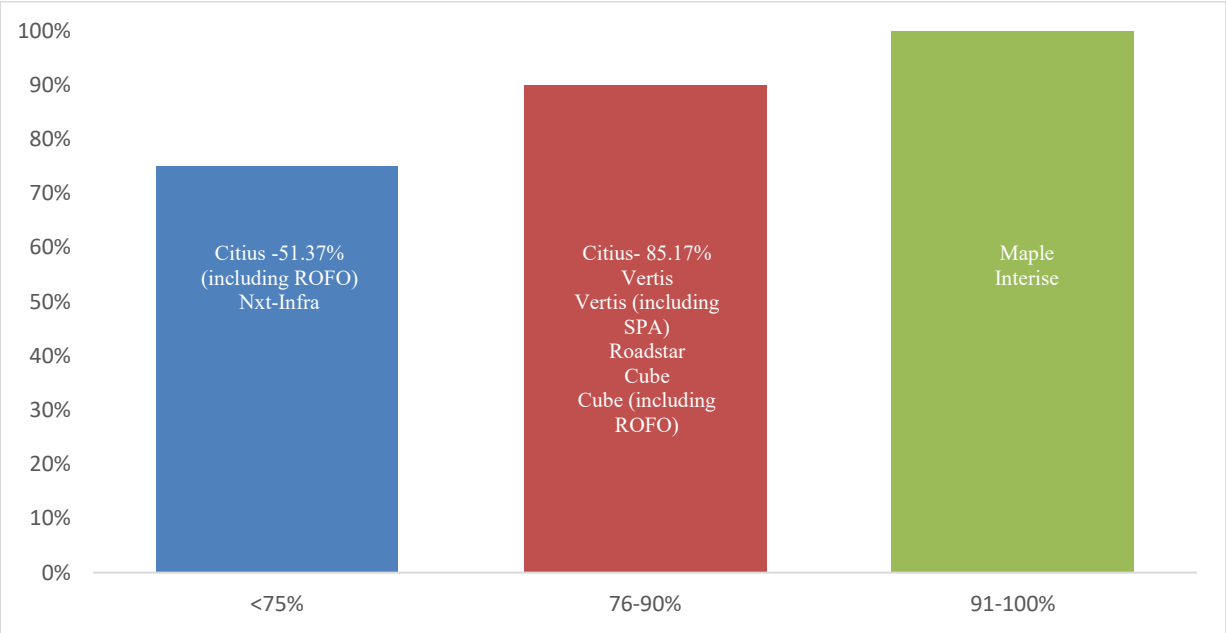
Income mix by asset type

The chart presents the FY25 revenue from operations for various InvITs and the share attributable to toll collections. A lower toll share indicates greater contribution from other sources, including HAM assets, annuity assets, construction income, and other operating revenue. Revenue profiles for certain InvITs are expected to evolve with proposed acquisitions; Citius InvIT's initial portfolio is largely toll-based (85.17%), and upon the acquisition of ROFO SPVs its revenue mix is expected to become more diversified, with the toll revenue share

changing from 85.17% to 51.37% when the ROFO portfolio is considered. For revenue from operations, toll collections are shown in line with each InvIT's revenue from operations schedule.

For cash revenue for FY 25, Citius InvIT's initial portfolio comprises 82.30% from toll assets and 17.70% from annuity assets. Including ROFO assets, the adjusted FY25 cash revenue mix is expected to be 56.05% from toll and 43.95% from HAM and annuity receipts. For cash revenue calculations, annuity receipts from HAM (excluding O&M related receipts) and annuity assets are included, and toll collections are used for toll assets.

Toll Revenue as a percentage of revenue from operation as on FY 24-25 (including asset additions through ROFO and SPA)



1) *Source: Annual report fiscal 2025, Annual reports for Citius SPVs shared by EAAA*
2) *Citius InvIT (including ROFO)*
3) *Details regarding the cash income revenue mix for Citius InvIT were sourced from NSE Filings by Ashoka Buildcon.(Ref:https://nsearchives.nseindia.com/corporate/ASHOKA_08102025184208_439_ABL_BSE_NSE_ABL_ACL_CCDs_Acquisition_081025.pdf)*
4) *Anantam Highways does not have any Toll Assets, hence not mentioned in the above chart*

Lane kilometre break-up of Road InvIT portfolio

Lane kilometres refer to the total length of roads or highways factoring in the number of lanes that are operated and maintained by the trust. Lane kilometres are an important metric because they represent the scope and scale of the trust's operations. A higher number of lane kilometres typically means the trust has a larger network of roads and highways under its management. It is essential to assess the physical scale of an InvIT's portfolio to understand its operational size and revenue-generating capacity.

Citius' initial assets have a total length of 3,407 lane-kms. The ROFO assets have a potential of increasing the same to around 5,773 lane-kms.

Similarly, after Anantam, Cube and Vertis complete their proposed acquisitions, their total lane kilometres will also increase; Cube portfolio lane-kms could increase from 8,816 to 9,865 lane-kms, Anantam could rise from 1,091 to 3,776 lane-kms and Vertis could rise from 8,302 to 8,525 lane-kms

The following chart presents a comparative analysis of the total portfolio lane-kms for each InvIT in the peer group, along with potential additions through ROFO or SPA.

Lane kilometres (including ROFO and SPA)

<3,000 lane-km	3,000-4,000 lane-km	>4,000 lane-km
• Anantam • Nxt-Infra • Roadstar	• Citius: 3,407 • Maple • Anantam (including ROFO)	• Citius (incl. ROFO): 5,773 • Cube • Cube (including ROFO) • Interise • Vertis • Vertis (including SPA)

Note: The portfolio of Maple Infrastructure Trust includes the Ashoka assets acquired by Maple as available in Trust's disclosure.
Source: Valuation reports for various InvITs (Interise Trust, Maple Infrastructure Trust, Nxt-Infra Trust: March 2025; Citius InvIT, Cube Highways Trust, Roadstar Infra Investment Trust: IL&FS website disclosure, Vertis Infrastructure Trust: December 2025; Anantam Highways: June 2025), Annual reports, Crisil Intelligence

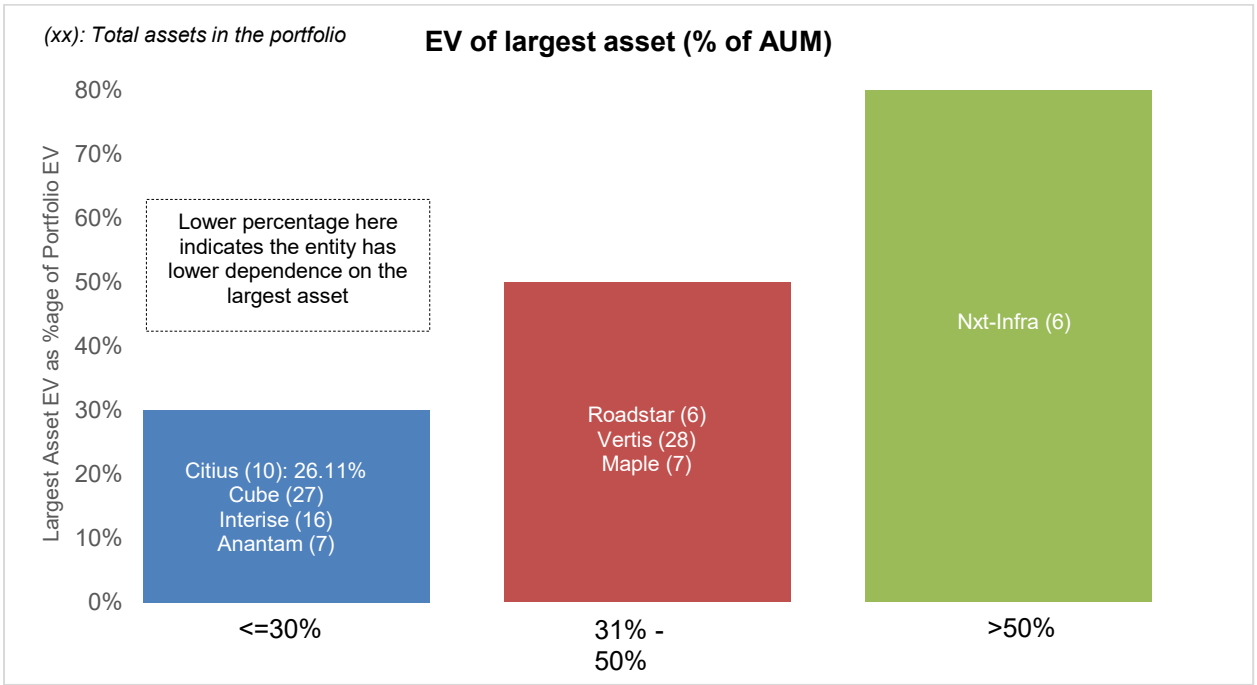
Value diversification

Evaluating the diversification of EV within an InvIT portfolio is essential for assessing its overall risk profile. To provide a quantitative measure of this characteristic, the peer universe has been analysed using the EV of the largest asset (% of total portfolio AUM) and the Herfindahl-Hirschman Index (HHI).

Largest asset as a percentage of portfolio EV

The metric expresses the EV of the single largest asset as share of its total portfolio EV, providing an immediate read on dominant-asset dependence. InvITs with a large portfolio (10 assets or more) tend to have a single large asset contributing to ~22-31% of the overall portfolio enterprise value. In case of Citius, the largest asset represents 26.11% of the portfolio value indicating that their portfolio is comparatively less concentrated, thereby limiting the impact if any single asset were to underperform or face valuation changes.

EV of the largest asset as a percentage of AUM for overall portfolio



Note: The portfolio of Maple Infrastructure Trust includes the Ashoka assets acquired by Maple as available in Trust's disclosure.
Source: Valuation reports for various InvITs (Interise Trust, Maple Infrastructure Trust, Nxt-Infra Trust: March 2025; Citius InvIT, Cube Highways Trust, Roadstar Infra Investment Trust, Vertis Infrastructure Trust: December 2025; Anantam Highways: June 2025), Annual reports, Crisil Intelligence

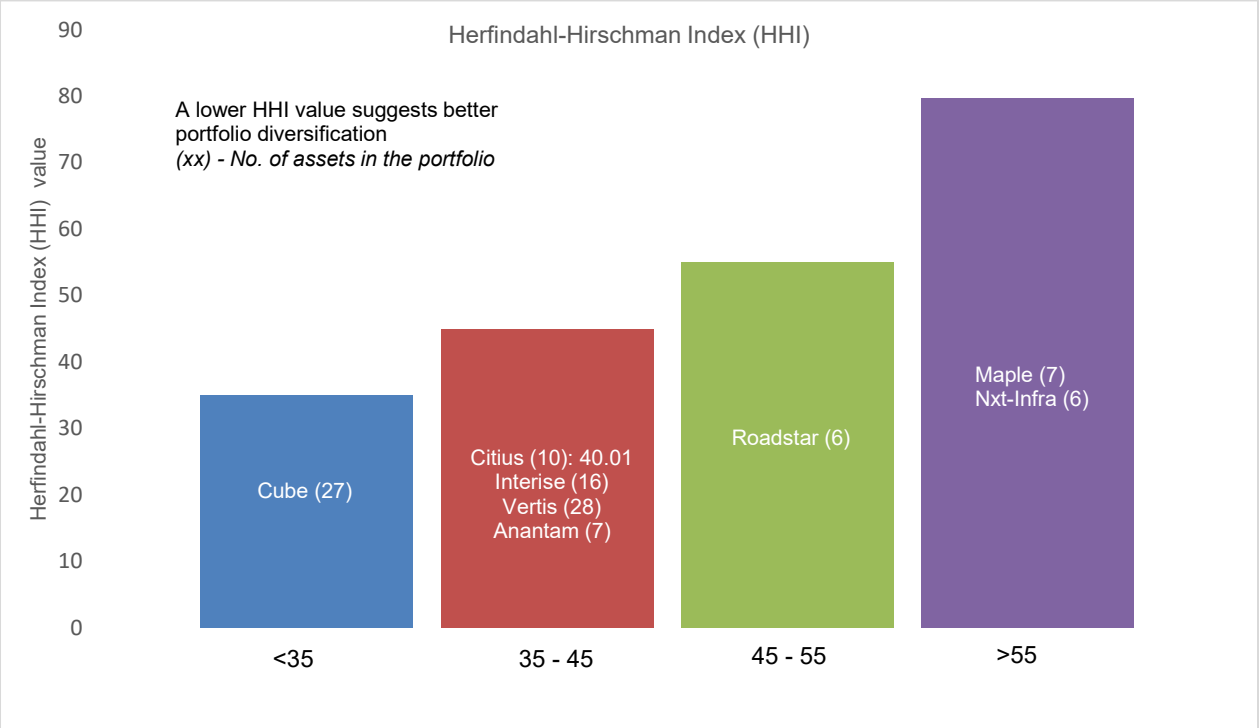
Herfindahl-Hirschman Index (HHI[10]) on EV for overall portfolio

While analysing the value of the single largest asset provides a useful first look at concentration, to gain more comprehensive understanding, a holistic measure that accounts for both the number of assets and their relative EV weight is necessary.

The HHI takes into account both the number of assets and their relative EV weights, with a lower HHI score indicating a more diversified portfolio.

The Herfindahl-Hirschman Index ("HHI") score of the initial portfolio of Citius comprising of 10 assets is lower at 40.01 compared to some of the other road InvITs, as shown in the graph below.

Portfolio diversification: HHI for overall portfolio



Note: The portfolio of Maple Infrastructure Trust includes the Ashoka assets acquired by Maple as available in Trust's disclosure.
Source: Valuation reports for various InvITs (Interise Trust, Maple Infrastructure Trust, Nxt-Infra Trust: March 2025; Citius InvIT, Cube Highways Trust, Roadstar Infra Investment Trust, Vertis Infrastructure Trust: December 2025; Anantam Highways: June 2025), Annual reports, Crisil Intelligence

State-wise dispersion of toll-based portfolio

The geographical distribution of assets is a key consideration in assessing the resilience and growth potential of road InvITs. State-wise dispersion helps evaluate exposure across regions with varying levels of economic activity, infrastructure development and fiscal strength.

The assessment of state-wise dispersion of EV and revenue exposure is relevant for toll-based assets, where revenues are directly linked to traffic volumes, which, in turn, correlate with regional economic activity and freight movement.

In instances where an asset spans across two or more states, the state-wise allocation of EV and revenue has been arrived basis the number of toll plazas located in each of the concerned states. For instance, in cases where a single SPV operates across two states with one toll plaza in each, the EV and revenue have been apportioned equally between the two states.

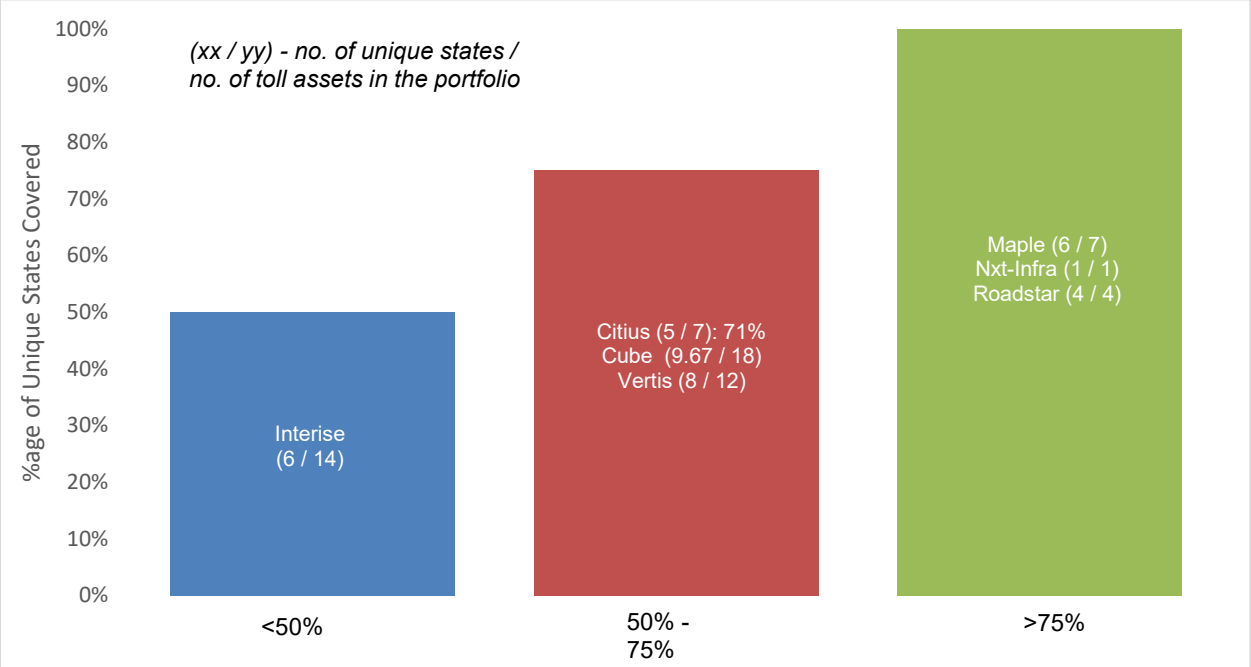
To understand how well an InvIT portfolio is spread out geographically, we look at the percentage of unique states

[10] Herfindahl-Hirschman Index (HHI) measures the overall concentration of the portfolio. A higher HHI score signifies higher concentration.

where the toll assets are located compared to the total number of toll assets in the InvIT' portfolio. A higher percentage means that the assets are distributed across more states, which means a reduced concentration in any one state. In some cases, the number of unique states in an InvIT's toll-based portfolio might be shown as a decimal value. This happens when an asset spans across multiple states. The exposure for such assets is divided between the states based on the number of toll plazas situated in each state. For example, if an asset has two toll plazas in one state and one toll plaza in another state, the exposure of that asset to the respective state would have been considered as 67% and 33%, respectively. When a state's presence comes only through such multi-state assets - and not through any other standalone asset, it results in a decimal value instead of a whole number.

With a score of 71%, Citius' portfolio exhibits strong geographic diversification with its initial portfolio of 7 toll assets relative to other larger peers.

Geographic diversification by percentage of unique states (only toll assets considered)



Note:
1) *Anantam Highways does not have any Toll Assets, hence not mentioned in the above chart*
2) *The portfolio of Maple Infrastructure Trust includes the Ashoka toll assets acquired by Maple as available in Trust's disclosure.*

Source: Valuation reports for various InvITs (Interise Trust, Maple Infrastructure Trust, Nxt-Infra Trust: March 2025; Citius InvIT, Cube Highways Trust, Roadstar Infra Investment Trust, Vertis Infrastructure Trust: December 2025; Anantam Highways: June 2025), Annual reports, Crisil Intelligence

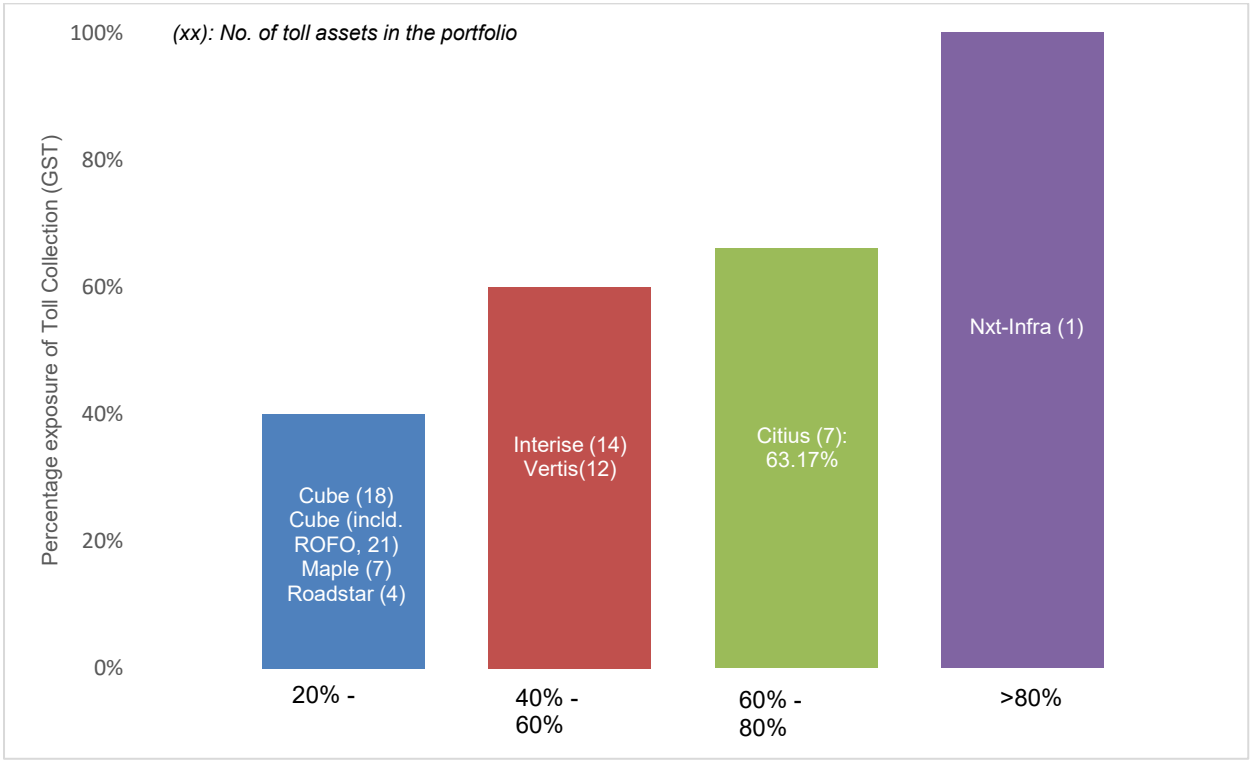
Toll Collection exposure in the top GST, NSDP per capita and GSDP states

Toll Collection exposure in the top five GST states

The same approach in relation to measuring the spread & diversification of EV across regions/states exhibiting varying levels of economic activity, has been applied to toll collection in this section.

63.17% of Citius' toll collection is from the assets located in the top five GST states which compares favourably to its peers as seen from the chart below. This suggests presence of the toll roads in regions with high economic activity, thereby indicating strong, stable and predictable long-term traffic as well as revenue growth prospects.

Percentage exposure of toll collection in the top five GST contributing states (only toll assets)

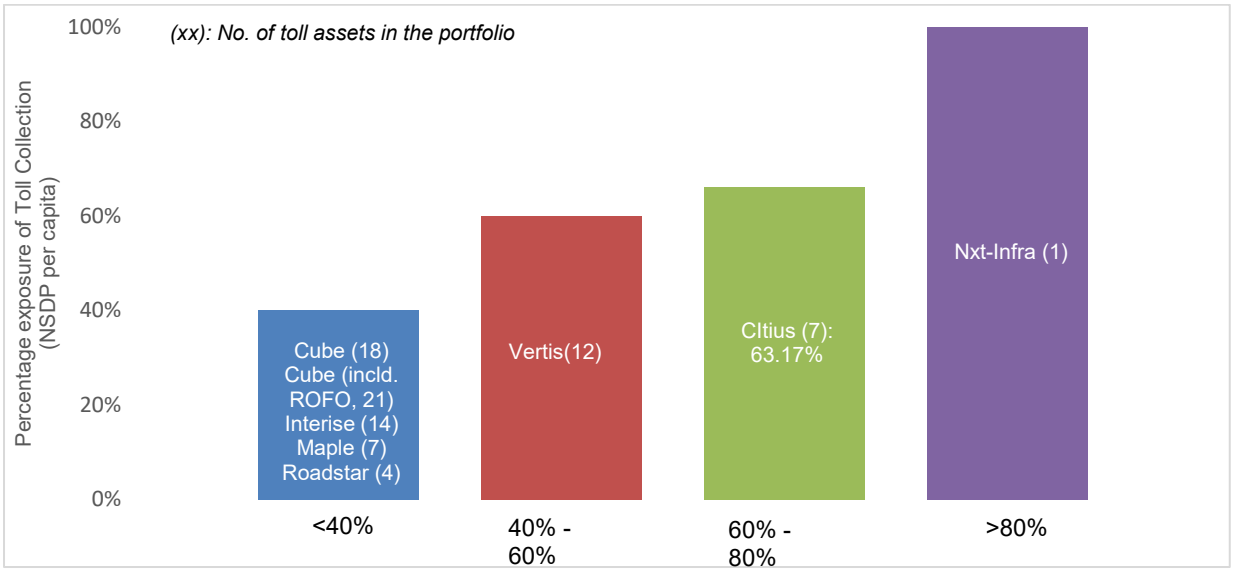


Note:
1) Anantam Highways does not have any Toll Assets, hence not mentioned in the above chart
2) The portfolio of Maple Infrastructure Trust includes the Ashoka toll assets acquired by Maple as available in Trust's disclosure.
Source: Annual reports for fiscal 2025, Valuation Report

Toll collection exposure in the top five states by per capita NSDP

63.17% of Citius' toll collection is from the top five per capita NSDP states. This compares favourably to its peers suggesting presence of the toll roads in regions deriving benefits of buoyant disposable income and consumption.

Percentage exposure of toll collection in the top five per capita NSDP states (only toll assets)

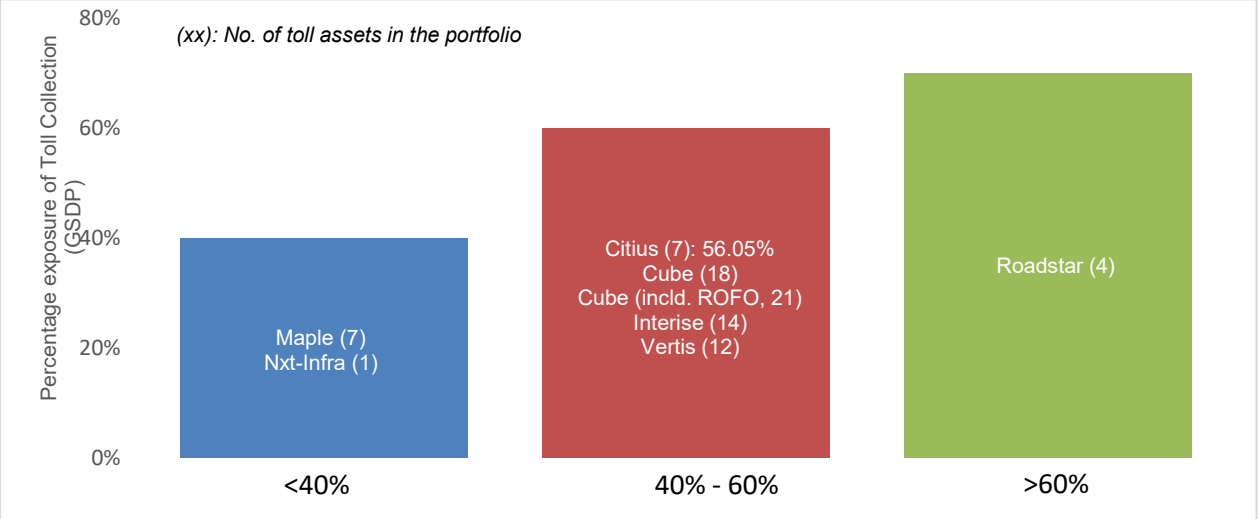


Note:
1) Anantam Highways does not have any Toll Assets, hence not mentioned in the above chart
2) The portfolio of Maple Infrastructure Trust includes the Ashoka toll assets acquired by Maple as available in Trust's disclosure.
Source: Annual reports fiscal 2025, Valuation Report

Toll collection exposure to the top five GSDP states

Similarly, Citius derives 56.05% of its toll collection from Top 5 GSDP ranked states which compares favourably with its peers. This reiterates presence of the toll roads in regions with high economic activity, thereby translating into stable and predictable traffic & revenue growth prospects.

Percentage exposure of toll collection to the top five GSDP states (only toll assets)



Note:
1) Anantam Highways does not have any Toll Assets, hence not mentioned in the above chart
2) The portfolio of Maple Infrastructure Trust includes the Ashoka toll assets acquired by Maple as available in Trust's disclosure.
Source: Annual reports fiscal 2025, Valuation Report

EV exposure in top GST, NSDP per capita and GSDP states

EV exposure in top five GST states

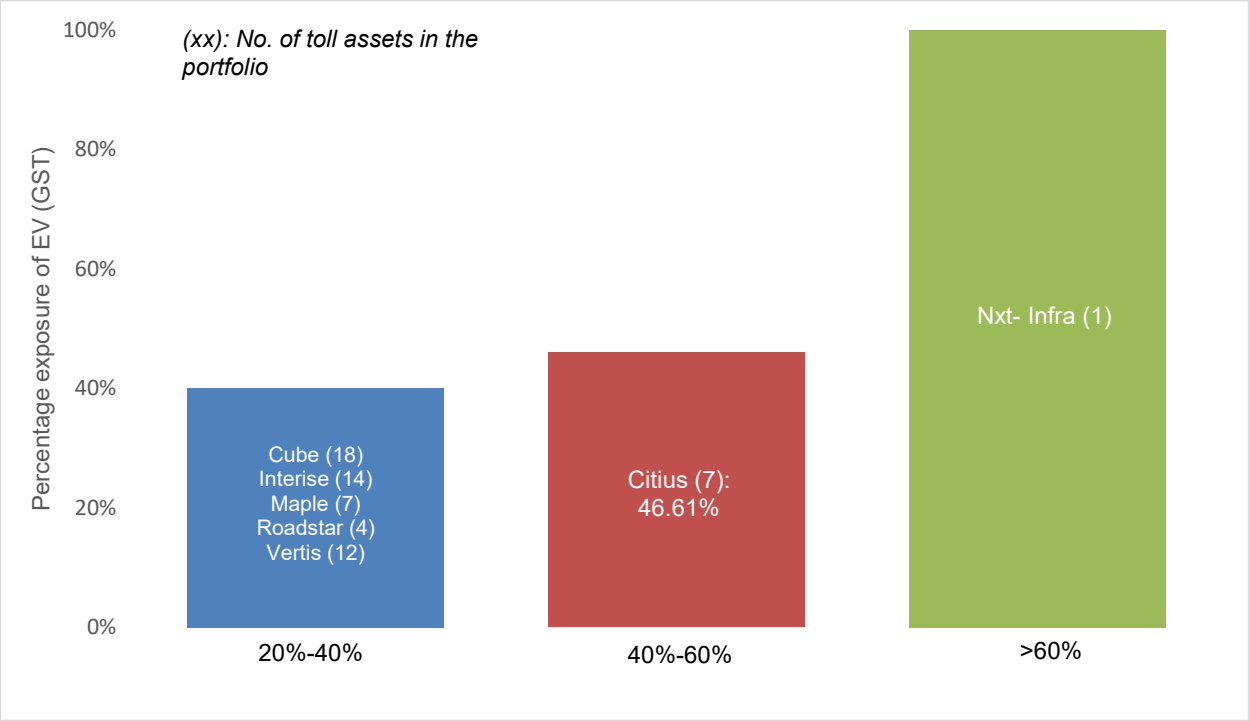
For the purpose of this analysis, the top five goods and services tax (GST) contributing states[11] have been identified based on total GST collections for fiscal 2025. These states represent the largest contributors to total GST collections and are broadly indicative of high economic activity which influence traffic volume and growth. Thus, the level of exposure to these states becomes an important parameter for portfolio diversification and can be a key aspect governing the stability & growth of tolling operations.

46.61% of the toll assets by EV of Citius' initial portfolio assets is derived from the assets located in the top 5 GST contributing states. This suggests presence in regions with high economic activity, thereby indicating strong, stable and predictable long term traffic prospects.

[11] The top five GST contributing states identified are Maharashtra, Karnataka, Gujarat, Tamil Nadu and Haryana. These states accounted for about 54.1% of total GST collections in fiscal 2025.

*Source: GST data – GoI (total GST collections taken for fiscal 2025), valuation data – respective annual and valuation reports

Percentage exposure of EV in top five GST contributing states (only toll assets)



Note:

1. *Anantam Highways does not have any Toll Assets, hence not mentioned in the above chart*
2. *The portfolio of Maple Infrastructure Trust includes the Ashoka assets acquired by Maple as available in Trust's disclosure.*

Source: Valuation reports for various InvITs (Interise Trust, Maple Infrastructure Trust, Nxt-Infra Trust: March 2025; Citius InvIT, Cube Highways Trust, Roadstar Infra Investment Trust, Vertis Infrastructure Trust: December 2025; Anantam Highways: June 2025), Annual reports, Crisil Intelligence

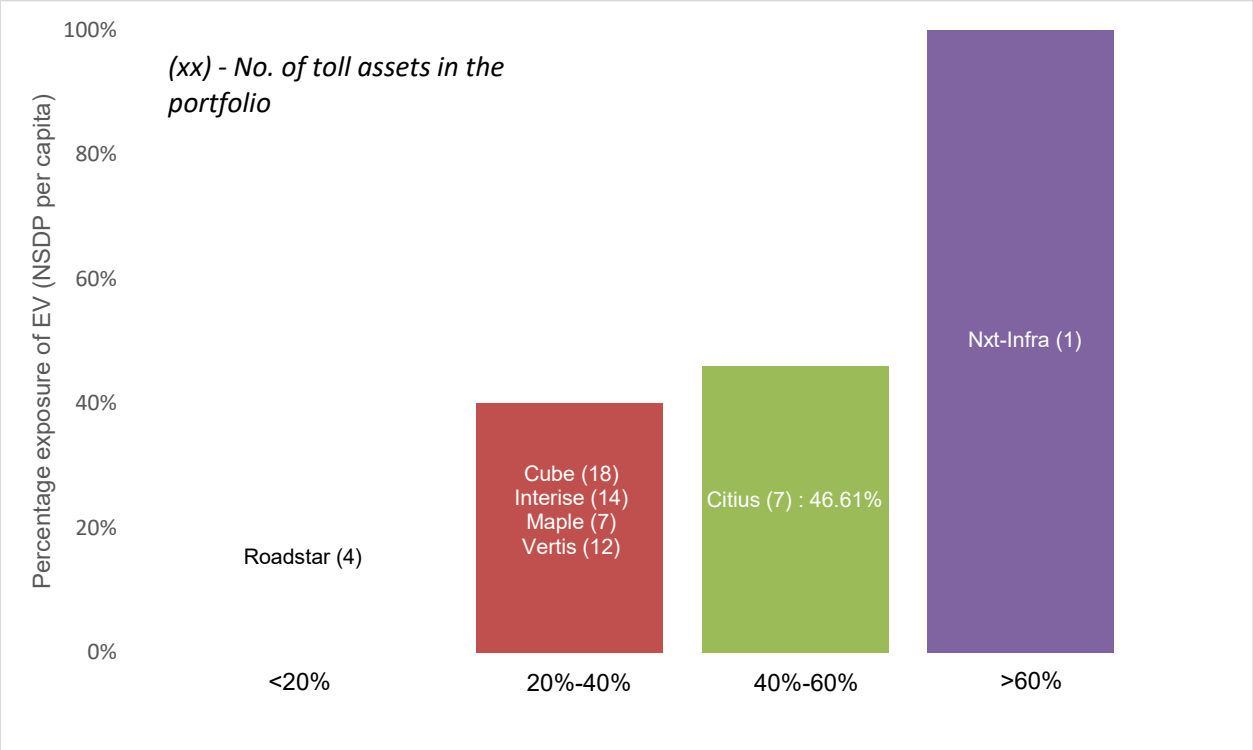
EV exposure to the top five NSDP per capita states

The distribution of the toll assets portfolio across the top five states by per capita NSDP[12] highlights exposure to states with stronger economic activity and high-income populations, which are factors that can intensify traffic volume and willingness to pay.

Citius InvIT has notable exposure, with 46.61% of its EV of toll assets linked to top 5 per capita NSDP states, underscoring a significant alignment of the portfolio with stronger economic catchments and revenue stability.

[12] The top five NSDP per capita states are Delhi, Karnataka, Tamil Nadu, Gujarat and Haryana.
The top five NSDP per capita states contribute to ~31.16% of total NSDP per capita.
*Source: Per capita NSDP data – MoSPI (fiscal 2025), Gujarat's NSDP per capita data (fiscal 2024), Government of Gujarat, valuation data - respective annual and valuation reports

Percentage exposure of EV in the top five per capita NSDP states (only toll assets)



Note:
1. *Anantam Highways does not have any Toll Assets, hence not mentioned in the above chart*
2. *The portfolio of Maple Infrastructure Trust includes the Ashoka toll assets acquired by Maple as available in Trust's disclosure.*

Source: Valuation reports for various InvITs (Interise Trust, Maple Infrastructure Trust, Nxt-Infra Trust: March 2025; Citius InvIT, Cube Highways Trust, Roadstar Infra Investment Trust, Vertis Infrastructure Trust: December 2025; Anantam Highways: June 2025), Annual reports, Crisil Intelligence

EV exposure in the top five GSDP states

The assessment of toll portfolio exposure to the top five states by GSDP[13] provides an insight into presence of the portfolio assets in states which are the largest contributors to the economic activity of the country.

45.58% of the toll assets by EV of Citius' initial portfolio assets lies in the top 5 GSDP states. This suggests presence in regions with high economic activity, thereby indicating strong, stable and predictable long term traffic prospect. Citius' 45.70% toll based EV exposure to top 5 GSDP states compares favourably against its peers as seen from the graph below.

[13] The top five GSDP states are Maharashtra, Tamil Nadu, Gujarat, Uttar Pradesh and Karnataka. These states were selected basis the highest absolute GSDP number at constant prices (base year 2011-12).
The top five GSDP states contribute to ~49% of total GSDP at constant prices.
*Source: GSDP data – MoSPI (fiscal 2025), Gujarat's GSDP data (fiscal 2024)- Government of Gujarat, valuation data - respective annual and valuation reports

Percentage exposure of EV in the top five GSDP states (only toll assets)



Note:
1. *Anantam Highways does not have any Toll Assets, hence not mentioned in the above chart*
2. *The portfolio of Maple Infrastructure Trust includes the Ashoka toll assets acquired by Maple as available in Trust's disclosure.*

Source: Valuation reports for various InvITs (Interise Trust, Maple Infrastructure Trust, Nxt-Infra Trust: March 2025; Citius InvIT, Cube Highways Trust, Roadstar Infra Investment Trust, Vertis Infrastructure Trust: December 2025; Anantam Highways: June 2025), Annual reports, Crisil Intelligence

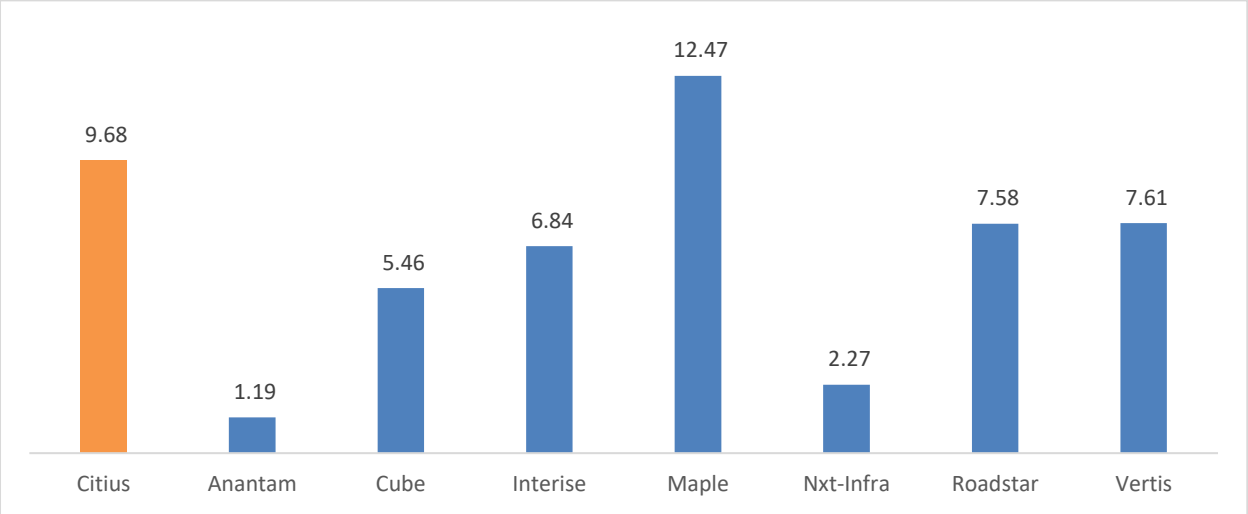
Operational history of the assets acquired by road InvITs

The metric of commercial operation date (COD) to acquisition by an InvIT measures the time period between the COD of an infrastructure asset and the date the InvIT acquires the asset.

The metric indicates the level of maturity of the asset. A longer COD to InvIT acquisition period suggests the asset is more mature, with a longer operating history, and potentially having established revenue streams and stabilised operations.

When compared with other road InvITs, whose roads on average had 1.19 to 12.47 years of operational history at the time of acquisition, Citius project SPVs are more mature at transfer, with an operating history of 9.68 years considering all the assets were acquired on December 31, 2025, as demonstrated in the chart below.

COD to acquisition by InvIT (in years)



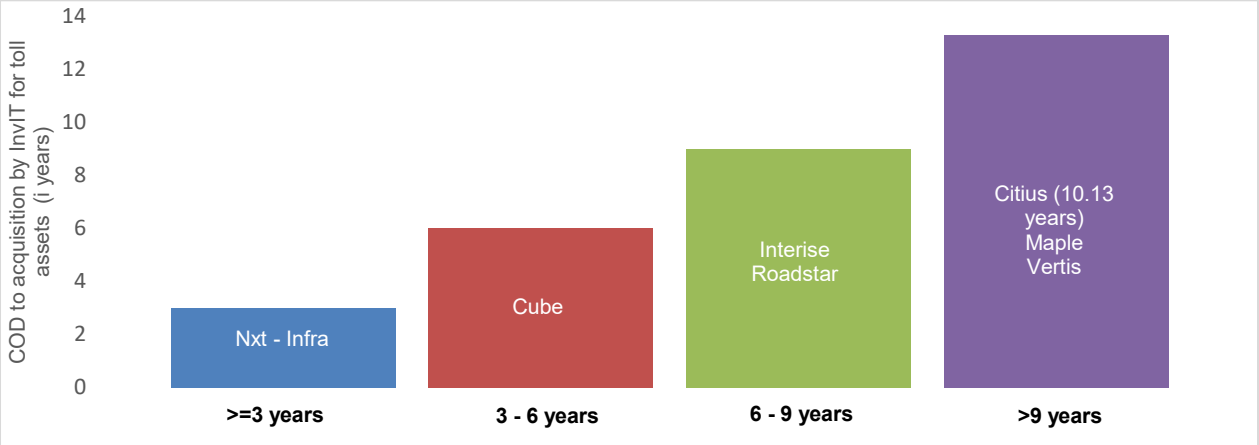
Source: Valuation reports for various InvITs (Interise Trust, Maple Infrastructure Trust, Nxt-Infra Trust: March 2025; Cube Highways Trust, Roadstar Infra Investment Trust, Vertis Infrastructure Trust: December 2025; Citius InvIT: December 2025), Crisil Intelligence

Operational history of the toll assets acquired by road InvITs

In case of toll assets, the operational history becomes an even more critical metric. The length of time that toll assets have been in operation can provide insights into their performance and characteristics.

A high average operational history of toll assets (10.13 years in case of Citius, which is one of the highest) increases confidence in assessment of their potential for future growth basis established history of toll collections, maintenance and upkeep requirements of the assets as well as their safety related aspects.

COD to acquisition by InvIT for toll assets (in years)



Source: Valuation reports for various InvITs (Interise Trust, Maple Infrastructure Trust, Nxt-Infra Trust: March 2025; Cube Highways Trust, Roadstar Infra Investment Trust, Vertis Infrastructure Trust: December 2025; Citius InvIT: December 2025), Crisil Intelligence

Residual concession period for assets

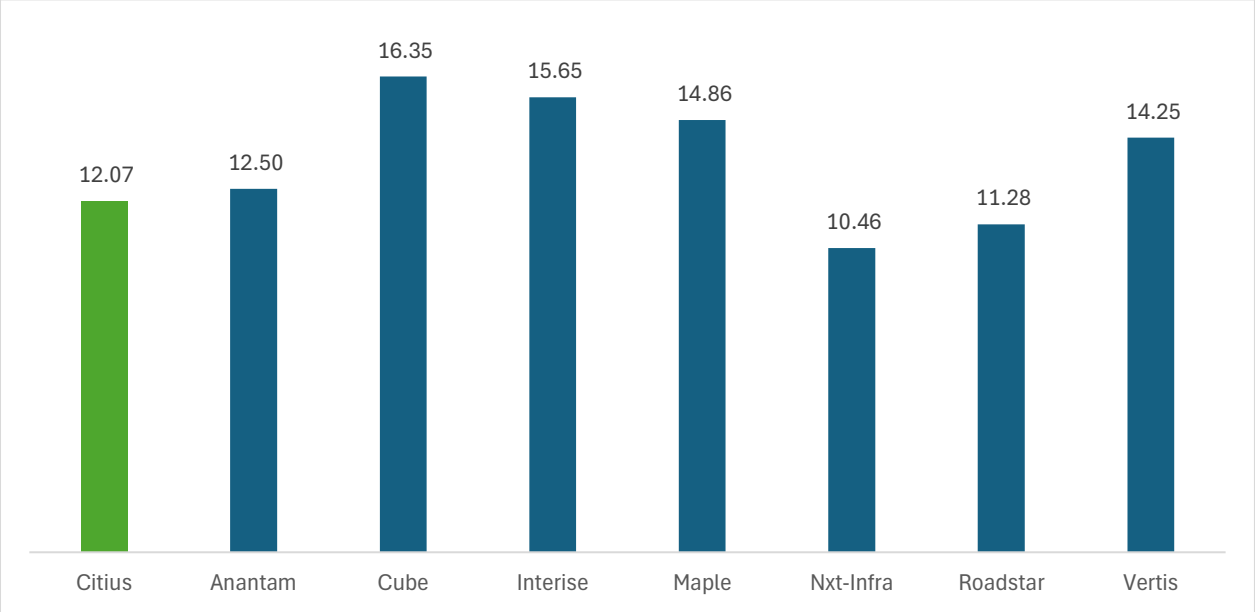
The expected residual concession period refers to the balance duration of the concession agreement for an asset from the cut-off date (December 31, 2025) for which concessionaire has the right to operate and maintain the asset and generate revenue.

The residual concession periods of the InvITs were weighted using their EV as of March 2025/December 2025 (basis availability of data) to arrive at the EV weighted residual life.

The EV-weighted residual life of the assets for all financial sponsor-backed road InvITs ranges from 10.46 to

16.35 years. All the road InvITs mentioned have a residual concession period of more than 10 years, which may be considered relatively long for road assets. Citius has a residual life (by EV weight) of 12.07years.

EV-weighted residual life (in years)



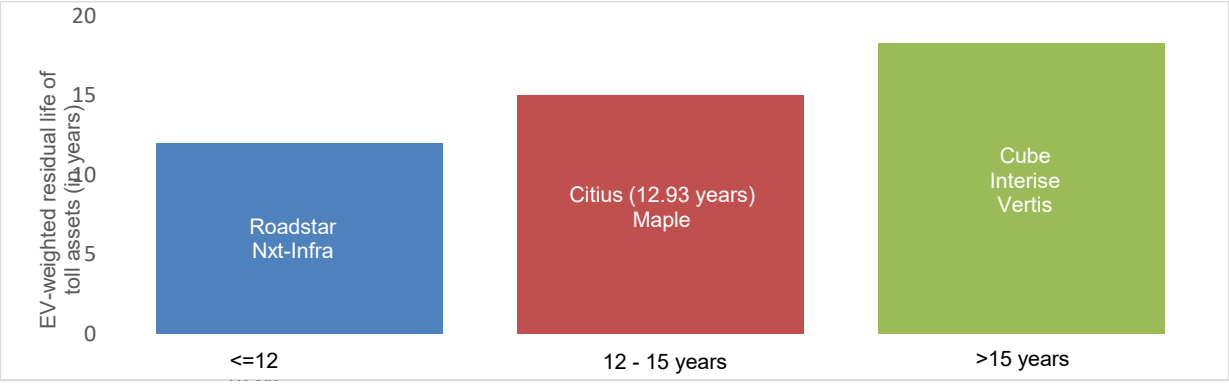
Source: Valuation reports for various InvITs (Interise Trust, Maple Infrastructure Trust, Nxt-Infra Trust: March 2025; Cube Highways Trust, Roadstar Infra Investment Trust, Vertis Infrastructure Trust: December 2025; Citius InvIT: December 2025), Crisil Intelligence

Residual concession period for toll assets

The residual concession periods of the toll assets of the InvITs were weighted using their EV as of March 2025/December 2025 as weights.

All the road InvITs mentioned below have a EV weighted residual concession period for toll road assets of more than 10 years, which may be considered a relatively long period of time for toll road assets. Citius has a residual life (by EV weight) in case of toll assets of 12.93 years.

EV-weighted residual life of toll assets (in years)

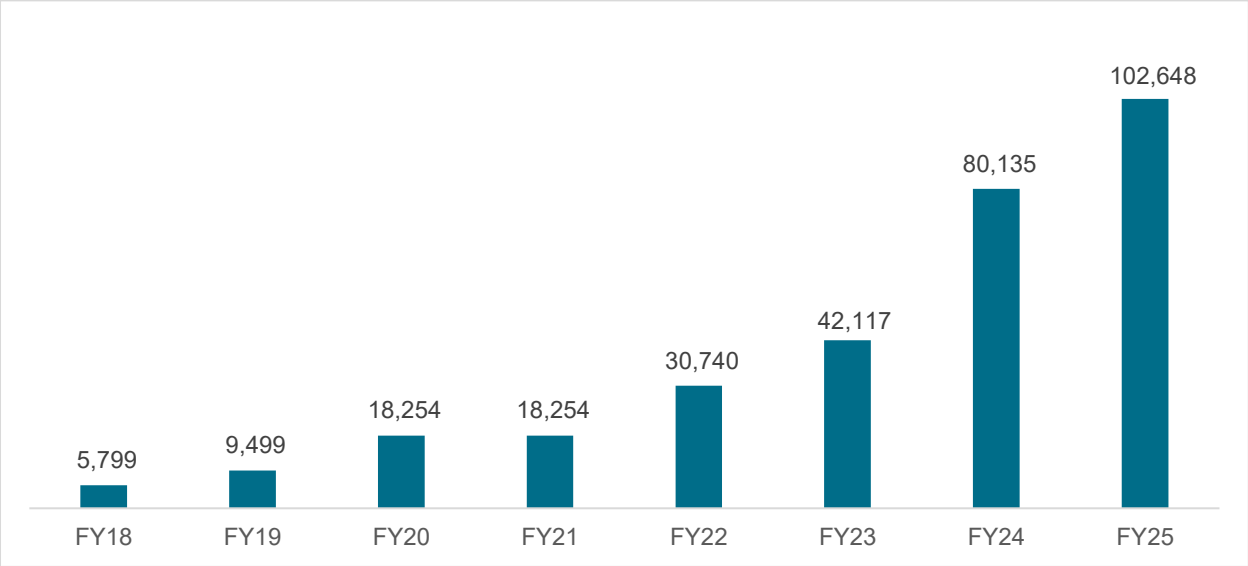


Source: Valuation reports for various InvITs (Interise Trust, Maple Infrastructure Trust, Nxt-Infra Trust: March 2025; Cube Highways Trust, Roadstar Infra Investment Trust, Vertis Infrastructure Trust: December 2025; Citius InvIT: December 2025), Crisil Intelligence

Cumulative Capital raised by road InvITs

As per the latest available data, road InvITs have collectively raised unit capital over Rs 1 lakh crore. More than 80% of the total capital raised by road InvITs has been mobilised over the past four years, with approximately 60% of the capital raised in the last two years. The chart below provides a summary of the capital raised by road InvITs over the years.

Cumulative Capital raised by road InvITs over the years (in Rs crore)



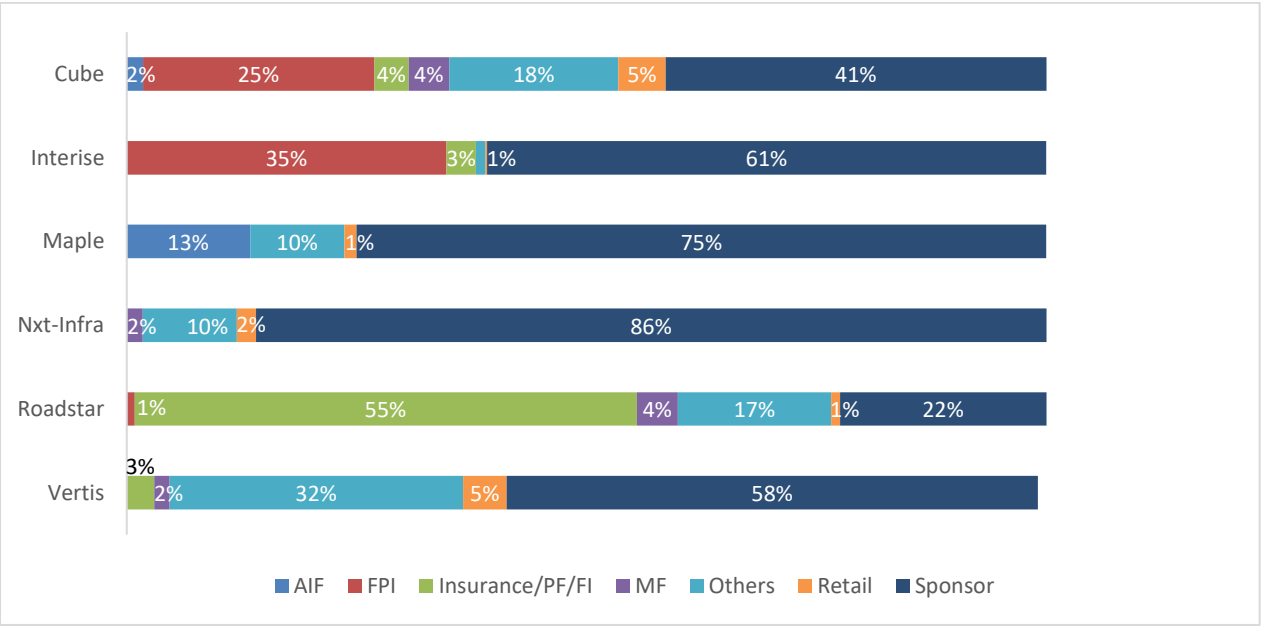
Sources: Annual report, Crisil Intelligence

Ownership pattern

The ownership structure of financial sponsor-backed road InvITs indicates participation from a diverse set of investor classes, including alternative investment funds (AIFs), foreign portfolio investors (FPIs), insurance companies, provident funds (PF), pension funds, mutual funds (MFs), retail investors and sponsors.

InvITs have become an attractive option for investors looking for stable and long-term returns. This segment has significant foreign investment, indicating global confidence in India's infrastructure sector. However, individual investors have been slow to participate in InvITs due to limited awareness and the high minimum investment requirement.

For majority of the peer group InvITs, the sponsor holds a significant majority share of the unitholding. A few Comparative unitholding pattern of peer InvITs (December 2025)



Source: Annual report, Valuation report, Unitholding pattern, Crisil intelligence

BUSINESS

Some of the information in this section, including information with respect to our plans, strengths, and strategies, contain forward-looking statements that involve risks and uncertainties. You should read "Forward-Looking Statements" on page 19 for a discussion on the risks and uncertainties related to those statements, "Risk Factors" and "Discussion and Analysis by the Directors of the Investment Manager of the Financial Condition, Results of Operations and Cash Flows of the Initial Portfolio Assets of the Trust" on pages 64, 375 and "Special Purpose Combined Financial Statements" and "Projections of Revenue From Operations and Cash Flow from Operating Activities" attached as Annexure D, and Annexure E, respectively, for a discussion of certain factors that may affect our business, financial condition, or results of operations. Our actual results may differ materially from those expressed in or implied by these forward-looking statements.

Unless otherwise stated or the context requires otherwise, the financial information included herein is based on our Special Purpose Combined Financial Statements included in this Offer Document. For further details, see the section "Special Purpose Combined Financial Statements" attached as Annexure D. Unless otherwise stated or the context requires otherwise, references in this section to "we," "our," or "us" are to the Trust along with the Initial Portfolio Assets. Furthermore, references in this section to "EAAA Platform" refers to EAAA and its affiliates, and entities or pooled vehicles directly or indirectly controlled, managed and/or advised by EAAA and/or its affiliates provided that any portfolio companies of such affiliate entities or pooled vehicles shall not be considered to be part of the EAAA Platform. We have included various operational and financial performance indicators in this section, some of which may not have been derived from our Special Purpose Combined Financial Statements. The manner in which such operational and financial indicators are calculated and presented, and the assumptions and estimates used in such calculations, may vary from that used by other entities in businesses similar to ours. Investors are accordingly cautioned against placing undue reliance on such information in making an investment decision and must evaluate such information in the context of the Special Purpose Combined Financial Statements. Certain Non-GAAP Measures relating to our operations and financial performance have been included in this Offer Document. For further information, see "Risk Factors - We have in this Offer Document included certain Non-GAAP Measures that may not be comparable with financial or industry related statistical information of similar nomenclature computed and presented by other infrastructure trusts." on page 90.

*Unless otherwise indicated, industry and market data used in this section has been derived from industry publications, in particular, the report titled "Connecting India: Unlocking Investment Potential in Transport Infrastructure" dated March 23, 2026 (the "**CRISIL Report**") prepared and issued by CRISIL Intelligence ("**CRISIL**"), appointed by us and exclusively commissioned and paid for by us in connection with the Offer. Additionally, for further details and risks in relation to CRISIL Report, please see "Risk Factors" on page 64.*

Overview

We are a transport sector-focused infrastructure investment trust (the "**Trust**"), established with an objective to acquire, manage and invest in a portfolio of transport infrastructure assets, including roads, in India. We were settled by way of the Trust Deed, by the Sponsor, and registered as an InvIT with SEBI on August 1, 2025, in accordance with the provisions of the InvIT Regulations. The sponsor of the Trust is Epic TransNet Infrastructure Private Limited (*formerly known as Watrak Infrastructure Private Limited*) (the "**Sponsor**"). Our Sponsor is wholly owned by the schemes of the Infrastructure Yield Trust (that is, Infrastructure Yield Plus II, Infrastructure Yield Plus IIA and India Infrastructure Yield Plus II), an AIF managed by EAAA India Alternatives Limited ("**EAAA**"). As of March 31, 2025, EAAA managed three out of the 16 funds focused on infrastructure investments and ranks third among infrastructure investment managers by total assets under management ("**AUM**") (*Source: CRISIL Report*). EAAA operates a diversified, multi-strategy platform, in large, under-tapped and fast-growing alternative asset classes, focusing on providing income and yield solutions to a diverse client base, including, global pension funds, insurance companies and ultra-high net worth individuals. It is supported by an asset management team of 61 members (in addition to in-house teams of our Initial Portfolio Assets comprising 279 employees), 71 employees in the Project Manager of the Trust and 80 investment professionals as of December 31, 2025. Our sponsor group comprises the Sponsor, Infrastructure Yield Trust (through its schemes Infrastructure Yield Plus II, Infrastructure Yield Plus IIA and India Infrastructure Yield Plus II), Epic Transnet Project Management Private Limited (*formerly known as Chennai-Tada Tollway Private Limited*) (the "**Project Manager**"), and Neelambur Madukkarai Tollway Private Limited (collectively, the "**Sponsor Group**").

Subject to completion of the Formation Transactions, our initial portfolio of road assets will comprise 10 toll and annuity projects, together with the relevant project special purpose vehicles (the "**Project SPVs**") through which they are held, and Epic Concesiones 3 Private Limited and SRPL Roads Private Limited, the holding companies

of all Project SPVs (the "**HoldCos**", and together with the Project SPVs, the "**Initial Portfolio Assets**"), except for one Project SPV, Thrissur Expressway Limited ("**TEL**"), which will be held directly by us. The Initial Portfolio Assets comprise a total of 3,406.71 lane-kilometers (seven toll assets spanning more than 3,043.22 lane-kilometers, and three annuity assets spanning more than 363.49 lane-kilometers) across nine different Indian states as of the date of this Offer Document. We believe the Project SPVs have a strong operational history as four of our toll assets have a tolling history of more than 12 years and two of our other toll assets have been collecting toll for over 5 years. During the Financial Year 2025, the toll collection (net of revenue share) was ₹15,632.30 million and the revenue receipts for annuity-based projects (excluding GST) was ₹3,362.00 million, contributing 82.30% and 17.70% to our total cash revenue receipts from our Project SPVs, respectively[14] (*Source: CRISIL Report*)**.** As of the date of this Offer Document, the Project SPVs are held directly or indirectly by alternate investment funds ("**AIFs**") registered with SEBI and managed by EAAA. They have, as such, prior to the completion of the Formation Transactions, benefited from the regulated management framework applicable to them as companies held by AIFs. The Trust has also entered into an agreement that grants a right of first offer for the acquisition of 11 hybrid annuity model ("**HAM**") road assets held or to be acquired by the EAAA Platform (the "**Identified ROFO Assets**", and the agreement, the "**ROFO Agreement**").

The EAAA Platform, our Sponsor and members of the Sponsor Group have experience in managing and operating road, renewable, and transmission infrastructure assets, with an established governance framework that guides investment and asset management practices. The origination efforts of the EAAA Platform are driven by an investment team, which included 80 members as of December 31, 2025, enabling access to promoters, developers, and financial institutions. We believe that, given the size of our assets, our strong track record, and the ongoing support from the EAAA Platform, we are well positioned to capitalize on the growth potential of India's transport sector, including the roads sector, and deliver consistent distributions to our Unitholders. For further details, please see "*Parties to the Trust*" on page 122. The EAAA Platform has a proven track record of acquiring, managing, and scaling infrastructure projects at various stages, and through several acquisition strategies, from various developers. The EAAA Platform is well positioned for further growth in the future, given its established asset acquisition and capital-raising capabilities, which in turn enable it to identify and pursue new opportunities in the transport sector, including the roads sector. Furthermore, the EAAA Platform has set up, and continues to manage, operate and grow the AnZen India Energy Yield Plus Trust ("**AnZen**"), an energy-focused infrastructure investment trust registered in India with SEBI demonstrating the ability of the EAAA Platform to launch and manage assets with the structure of the InvIT. For further details, please see "*Parties to the Trust*" on page 122.

The investment manager of the Trust is EAAA TransInfra Managers Limited (the "**Investment Manager**"). The Investment Manager is a wholly-owned subsidiary of EAAA. Our Project Manager is a wholly-owned subsidiary of the Sponsor and part of the Sponsor Group. The Project Manager shall, including through the in house teams of Project SPVs and HoldCos, undertake operations and management of the InvIT Assets, and ensure compliance with the respective concession agreements and project documents, making arrangements for appropriate maintenance, oversee the progress of development, status of approvals and other aspects of the projects of the Project SPVs. These in-house asset management teams of the HoldCos and Project SPVs have significant capabilities and extensive experience across all stages of the asset life cycle, including construction, operations, and asset handover at the end of a project's term. These in-house asset management capabilities are supported by the EAAA Platform, which brings in a wealth of project management expertise. The asset management capabilities are backed by technology enabled operations and maintenance ("**O&M**") processes, which helps deliver operational excellence with minimal manual intervention. Over past three Financial Years and up to the date of this Offer Document, the Project SPVs have received 28 awards, recognitions and accreditations for a wide range of achievements, including operational excellence, construction innovation, O&M practices, health and safety, environmental management and social impact. For further details on key features of our technology and AI based tools and awards, recognitions and accreditations, see "*– IT Infrastructure* " on page 294 and "*– Experienced team with full spectrum asset management and maintenance capabilities, spanning the entire asset life cycle, backed by tech-enabled operations and maintenance* " on page 257, respectively.

We are also supported by Axis Trustee Services Limited, the trustee (the "**Trustee**"), which is registered with SEBI as a debenture trustee under the Securities and Exchange Board of India (Debenture Trustees) Regulations, 1993, as amended from time to time. On behalf of our Unitholders, the Trustee is responsible for (a) ensuring that our business objectives and investment policies comply with the provisions of the InvIT Regulations and other applicable law, and (b) monitoring the activities of the Investment Manager (in terms of the Investment Management Agreement) and the Project Manager (in terms of the Project Implementation and Management

[14] Considering toll receipts (less revenue share) and actual annuity receipts for the Financial Year 2025

Agreement). For further details, please see "*Parties to the Trust – The Trustee – Axis Trustee Services Limited*" on page 124.

The details of our Project SPVs as of December 31, 2025 and our project wise revenue from operations (net of eliminations) for the year ended March 31, 2025 are provided in the table below:

Numbers ₹ in million, unless stated otherwise

Asset Name	Type	Authority	Location	Lanes *(in nos)*	Length *(kms)*	Concession period * *(years)*	PCOD	FCOD	Project wise revenue from operations (net of eliminations) (for Financial Year 2025 ₹ in million)	Operational history (in years)	Residual Life (in years)
Dibang Infra Projects Private Limited ("**Dibang**")	Annuity	MoRTH	Arunachal Pradesh	2	29.63	17	May 19, 2018	December 12, 2018	384.14	7.62	4.89
Dhola Infra Projects Private Limited ("**Dhola**")	Annuity	MoRTH	Assam	2	28.51	17	August 31, 2017	October 13, 2018	658.82	8.33	4.16
Jorabat Shillong Expressway Limited ("**JSEL**")	Annuity	NHAI	Assam and Meghalaya	4	61.80	20	January 28, 2016	August 30, 2019	1,479.25	9.92	5.25
Sub-total									**2,522.21**		
Samkhiali Bhachau Gandhidham Tollway Private Limited ("**SBGTPL**")	Toll with 1 toll plazas	NHAI	Gujarat	6	56.16	24	January 04, 2020	December 9, 2024	2,803.84	15.25	8.87
Rajkot-Vadinar Tollway Private Limited ("**RVTPL**")	Toll with 3 toll plazas	Gujarat Road State Development Corporation ("**GSRDC**")	Gujarat	4	131.65	20	January 27, 2012	June 17, 2023	2,291.56	13.91	4.14
Sambalpur-Rourkela Tollway Private Limited ("**SRTPL**")	Toll with 3 toll plazas	Works Department, Government of Odisha ("**OWD**")	Odisha	4	161.73	22	March 13, 2018 for 159.57 km [(1)] August 12, 2019 for 2.16 km	March 30, 2021	3,039.18	7.80	14.93
Ahmedabad-Maliya Tollway Private Limited ("**AMTPL**") [(3)]	Toll with 4 toll plazas	GSRDC	Gujarat	4[(2)]	180.70 [(2)]	22	Section III April 7, 2012 Section IV May 5, 2012 Section I August 27, 2012 Section II November 1, 2012	June 22, 2023	4,003.37	13.67	11.38
Deccan Tollways Private Limited ("**DTPL**")	Toll with 2 toll plazas	NHAI	Karnataka/ Telengana	4	144.95	25	October 14, 2017	September 17, 2019 for 142.786 km October	2,466.11	8.21	18.26

Numbers ₹ in million, unless stated otherwise

Asset Name	Type	Authority	Location	Lanes *(in nos)*	Length *(kms)*	Concession period * *(years)*	PCOD	FCOD	Project wise revenue from operations (net of eliminations) (for Financial Year 2025 ₹ in million)	Operational history (in years)	Residual Life (in years)
								20, 2023 for 2.164 km			
Thrissur Expressway Limited ("**TEL**")	Toll with 1 toll plazas	NHAI	Kerala	6	28.36	20	March 09, 2022	June 14, 2024	1,628.30	3.81	10.70
Panipat Elevated Corridor Private Limited ("**PECPL**")	Toll with 1 toll plazas	NHAI	Haryana	6	10.00	20	July 17, 2008	March 17, 2011	1,115.90	17.46	1.08
Sub-total									**17,348.26**		
Total project wise revenue from operations (net of eliminations)									**19,870.46**		

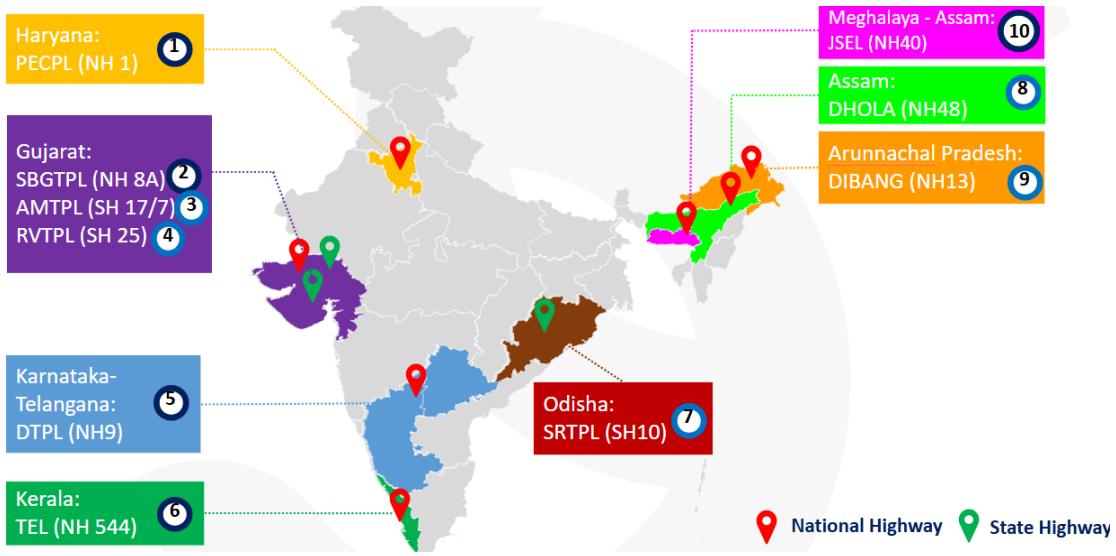
**As per the respective Concession Agreements*
(1) the PCOD certificate is dated March 12, 2018, however, SRTPL was fit for commercial entry from March 13, 2018 for a length of 159.57 kms and from August 12, 2019 for the remaining length of 2.16 km
(2) excluding 4 lane to 6 lane expansion for a stretch of approximately 28.75 km
(3) GSRDC has entered into a separate, additional concession agreement with AMTPL dated October 30, 2025 to augment a section of the highway (for a length of 28.75 km) from the existing four lanes to six lanes, on a construction, operation and maintenance to build, operate and transfer basis. We are awaiting the receipt of the appointed date to commission construction.

Our Project SPVs forming part of the Initial Portfolio Assets will include seven toll assets and three annuity assets, ensuring diversification of revenue streams. Furthermore, the Identified ROFO Assets we intend to acquire in the future are HAM assets, further diversifying our portfolio. We believe that the toll assets particularly benefit from India's economic growth, leveraging increase in GDP and serving as an effective hedge against inflation. Toll-based road assets provide a degree of income stability and inflation protection, as most concessions have inflation-linked toll rate revisions or periodic toll hikes (*Source: CRISIL Report*). Combined with steady traffic growth on key national corridors, this structure allows InvIT cash flows to naturally adjust for inflation, thereby offering investors a built-in hedge and stable real returns over time (*Source: CRISIL Report*). The annuity and HAM assets typically provide stable cash flows over the residual concession life. With respect to annuity assets, the concessionaire is responsible for the construction and maintenance of the project during the concession period. Variability in user fee gives rise to revenue risk, which is borne by the authority in annuity and HAM assets. The concessionaire generates revenue through fixed annuity payments received from the authority over the concession period (*Source: CRISIL Report*). In a HAM project, the concessioning authority grants 40% of the total project cost during the construction phase and the remaining 60% is borne by the concessionaire. HAM projects combine elements of Engineering, Procurement, and Construction ("**EPC**") and annuity-based approaches, aiming to balance financial responsibility between the government and the concessionaire (*Source: CRISIL Report*). Under this model, the concessionaire's financial burden during the construction phase is reduced, while assured revenues are ensured during the operational phase through fixed annuity payments, interest on the diminishing balance of project cost, and inflation-linked O&M payments (*Source: CRISIL Report*). The concessionaire undertakes both construction and maintenance responsibilities, while revenue risks arising from fluctuations in user fees are borne by the authority. Variability in user fee gives rise to revenue risk, which is borne by the authority. However, the concessionaire generates revenue through fixed annuity payments received from the authority over the concession period (*Source: CRISIL Report*). Furthermore, given the relevant authority is the central government or its agencies, the counterparties present a low risk of default, offering assurance regarding the stability of the revenue under the concession agreements with these authorities (*Source: CRISIL Report*). We believe that this balanced strategy results in a resilient income profile, reduces dependence on any single revenue source, and supports the delivery of stable returns.

Our toll assets are mature and also have average residual lives of more than 10 years, which may be considered relatively long for road assets (*Source: CRISIL Report*). As of December 31, 2025, our toll based Project SPVs had a simple average operational history of 10.13 years and a weighted average residual life (by enterprise value ("**EV**") weight) of 12.93 years (*Source: CRISIL Report*). Furthermore, the EV of our largest asset (as a proportion of overall EV of our Initial Portfolio Assets) standing at 26.11% is comparable to some of the other financial

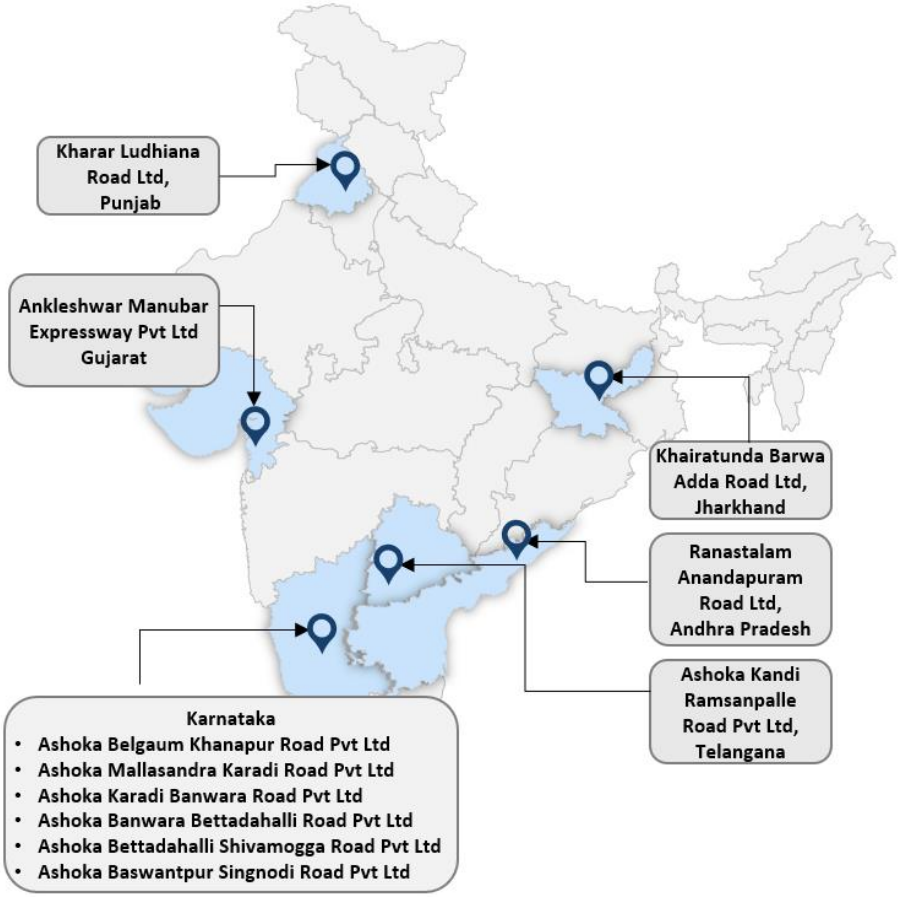
sponsor driven road InvITs, indicating that our portfolio is less concentrated, thereby limiting the impact if any single asset were to underperform or face valuation changes (*Source: CRISIL Report*). The metric expresses the EV of the single largest asset as share of its total portfolio EV, providing an immediate read on dominant-asset dependence (*Source: CRISIL Report*). Additionally, our Herfindahl-Hirschman Index ("**HHI**") score (a measure of portfolio dispersion) is lower at 40.01 compared to some of the other road InvITs (*Source: CRISIL Report*). The HHI takes into account both the number of assets and their relative EV weights, with a lower HHI score indicating a more diversified portfolio (*Source: CRISIL Report*).

The toll roads forming part of our Project SPVs are situated in regions with high economic activity, thereby indicating strong, stable and predictable long-term traffic as well as revenue growth prospects (*Source: CRISIL Report*). The locations of our toll and annuity assets forming part of the Project SPVs, as of the date of this Offer Document are indicated in the map below[15]:



Furthermore, the locations of our Identified ROFO Assets, as of the date of this Offer Document are indicated in the map below[16]:

[15] The map has not been drawn to scale
[16] The map has not been drawn to scale



The toll based Project SPVs had an AUM weighted annual average daily traffic PCU growth[17] of 7.10% between the Financial Years 2023 and 2025 (excluding PECPL[18]) and 6.46% between the Financial Years 2018 and 2025 (excluding PECPL[19] and TEL[20]), demonstrating both consistent growth and resilience. In addition to their geographic diversity, the toll assets Project SPVs also serve two key segments: passenger and commercial traffic. The overall PCU composition across all toll assets reflects a well-diversified traffic base spread across multiple regions of the country. Across all toll assets, passenger vehicles account for approximately 37.80% of the PCU mix in the Financial Year 2026, while commercial / freight vehicles contribute around 62.20%[21], indicating a healthy balance between personal and economic mobility (*Source: Traffic Reports*). In line with this, the revenue mix further highlights the strong presence of major economic and industrial corridors within the portfolio (*Source: Traffic Reports*). Freight vehicles contribute nearly 74.00% of toll collection[22], underscoring the critical role of goods movement and logistics activity in driving asset performance. The remaining 26.00% toll collection is contributed by passenger traffic, reflecting steady commuter movement across key routes. In road traffic commercial traffic is typically less volatile than passenger traffic and more resilient during economic fluctuations thereby reducing risk and allowing more efficient resource planning and utilization, and in turn improving its operational efficiency for platforms/concessionaires with a higher share of commercial traffic (*Source: Traffic Reports*).

Furthermore, the commercial traffic operating on road assets carry a variety of commodities, supporting additional stability through intra-portfolio dispersion and exposure to different industries. This approach helps mitigate the

[17] Average traffic growth is a weighted average computation of traffic PCU at respective SPVs using AUM as on 31st December 2025 as weights and further considering respective weights of tollable lengths for each toll plaza at SPV level

[18] PECPL excluded on account of short residual life; PECPL concession will end in February 2027

[19] PECPL excluded on account of short residual life; PECPL concession will end in February 2027

[20] For TEL, PCOD was achieved in March 2022 and toll collection commenced thereafter

[21] The PCU Mix for the Financial Year 2026 has been derived by applying historical seasonal correction factors to the actual traffic volumes recorded during April–July 2025, thereby estimating the base year traffic (*Source: Traffic Reports*)

[22] The PCU Mix for the Financial Year 2026 has been derived by applying historical seasonal correction factors to the actual traffic volumes recorded during April–July 2025, thereby estimating the base year traffic (*Source: Traffic Reports*)

risks that could arise from over-concentration in a single region or market sector (*Source: CRISIL Report*). Similarly, our portfolio is less concentrated in terms of value, which helps to limit the impact if any single asset underperforms or experiences a change in valuation (*Source: CRISIL Report*) .

The key counterparties for our annuity assets include NHAI and the Ministry of Road Transport and Highways ("**MoRTH**"). For our toll assets, our key counterparties are NHAI, the Government of Odisha, and the Gujarat State Road Development Corporation Limited ("**GSRDC**"). Given the strong governmental backing and proven history, our counterparties have a low risk of default, providing assurance regarding the reliability and stability of revenue under the commercial arrangements with them (*Source: CRISIL Report*)

The table below sets out our key financial and operational measures as of and/or for the nine months ended December 31, 2025, and the Financial Years 2025, 2024 and 2023:

Particulars	As at and for the nine months ended December 31, 2025	As at and for the Financial Year ended March 31,		
		2025	2024	2023
	(₹ in million, except percentages)			
Total Income (A)	15,703.89	21,656.17	20,385.30	18,852.95
Revenue from operations	14,963.64	19,870.46	18,731.73	17,735.16
Revenue from operations from toll collection (B)	13,804.48	17,179.29	16,196.21	15,259.26
Revenue from operations from toll collection as a percentage of total income (%) (B/A*100)	87.90%	79.33%	79.45%	80.94%
EBITDA	11,429.32	14,349.51	12,594.07	10,841.65
EBITDA Margin (%)	72.78%	66.26%	61.78%	57.51%
Total borrowings (current and non-current)	59,087.90	66,999.94	61,715.24	61,859.50
Net Debt	42,470.51	52,557.50	37,238.87	35,708.16
Total Expenses	17,848.06	25,811.49	27,766.71	25,191.26
Loss before tax	(2,144.17)	(4,155.32)	(7,381.41)	(6,338.31)
Loss for the period/year	(2,190.48)	(4,177.51)	(7,741.18)	(6,540.08)
Net cash flow from operating activities	7,820.15	10,449.52	9,392.51	9,079.25

Strengths

Our key strengths include:

- A large and well-dispersed portfolio of Project SPVs, with a long operating history and residual concession life, broad dispersion in terms of asset value, and proven track record of traffic growth.
- Strong pipeline of Identified ROFO Assets.
- Strategically located assets across geographically diverse clusters, situated near major economic corridors, and handling a diverse industry and commodity mix.
- De-risked portfolio providing stable cash flows from toll and annuity assets, with balanced traffic mix backed by industrial activity (commercial vehicle volume) and personal consumption activity (passenger vehicle volume) for toll assets and low counterparty risk for annuity assets.
- Experienced in-house team with full spectrum asset management and maintenance capabilities, spanning the entire asset life cycle, backed by tech-enabled operations and maintenance.
- Strong and differentiated asset acquisition and investment capabilities.
- Strong support from our Investment Manager, Project Manager and the EAAA Platform which has a proven track record in AUM growth, capital raising, and investment and asset management capabilities.
- Skilled and experienced management team with a focus on corporate governance and capital management.

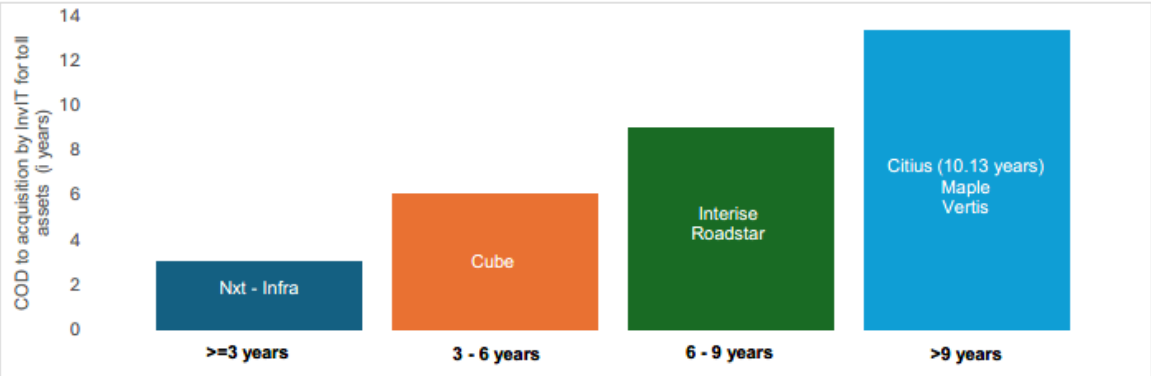
- Attractive transport sector outlook with the established regulatory environment and economic and social tailwinds.

1. A large and well-dispersed portfolio of Project SPVs, with a long operating history and residual concession life, broad dispersion in terms of asset value, and proven track record of traffic growth.

Upon completion of the Formation Transactions, we will have a large and dispersed portfolio comprising 10 Project SPVs, with a strong operational history, and managed by an operations team of 350 members (including in the Project SPVs, HoldCos and the Project Manager) as of December 31, 2025. Our Project SPVs totaling a length of 3,406.71 lane-kilometers, comprises seven toll assets spanning over 3,043.22 lane-kilometers, and three annuity assets spanning over 363.49 lane-kilometers, across nine Indian states as of the date of this Offer Document. Our Project SPVs have been acquired by the EAAA Platform between the Financial Year 2021 and the Financial Year 2025, and during the same period the size of our road assets have grown by more than nine times in terms of lane-kilometers, with toll and annuity assets contributing 82.30% and 17.70% to our total cash revenue receipts for the Financial Year 2025 from our Project SPVs, respectively[23] (*Source: CRISIL Report*)

As part of the Formation Transactions, we will primarily acquire mature toll road projects. Our Project SPVs also have a long operating history and our toll based Project SPVs have a proven track record of growth. Four of our toll assets forming part of the Project SPVs have a tolling history of more than 12 years, and two of our other toll assets forming part of the Project SPVs have a tolling history of more than 5 years as of the date of this Offer Document. In case of toll assets, the operational history is a critical metric. The length of time that toll assets have been in operation can provide insights into their performance and characteristics. A high average operational history of toll assets increases confidence in assessment of their potential for future growth basis established history of toll collections, maintenance and upkeep requirements of the assets as well as their safety related aspects (*Source: CRISIL Report*). When compared with other peer road InvITs, whose roads had, on average, 2.30 to 7.60 years of operating history at the time of acquisition, our Project SPVs are more mature at transfer, with an operating history of 9.68 years considering all the assets were acquired on December 31, 2025 (*Source: CRISIL Report*).

As of December 31, 2025, our toll assets forming part of the Project SPVs had a high average operational history of 10.13 years and a residual life (by EV weight) of 12.93 years, demonstrating a lengthy operational history and reliability of our assets[24] (*Source: CRISIL Report*).



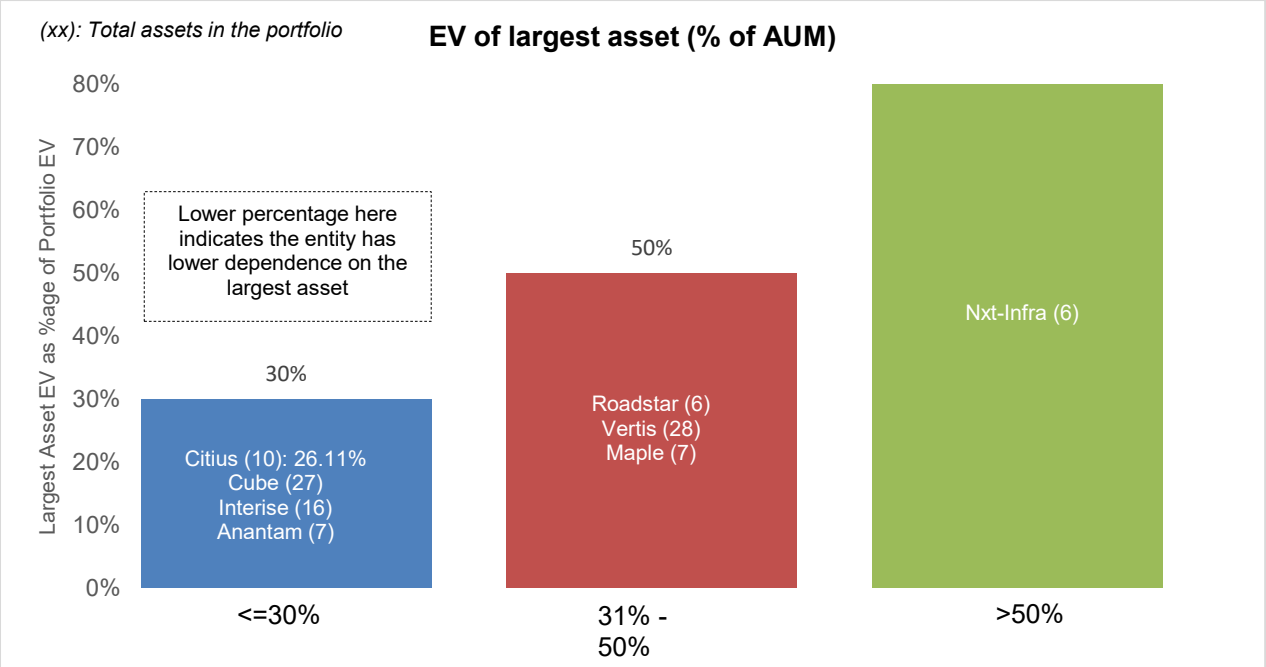
Source: Valuation reports for various InvITs (Interise Trust, Maple Infrastructure Trust, Nxt-Infra Trust: March 2025; Citius InvIT, Cube Highways Trust, Roadstar Infra Investment Trust, Vertis Infrastructure Trust: December 2025; Anantam Highways: June 2025), Annual reports, Crisil Intelligence

The concession agreements entered into with concessioning authorities with respect to our toll assets grant us the right to develop, operate, and maintain the designated toll assets for periods ranging from 20 to 25 years, starting from the respective effective dates of each agreement. Additionally, our annuity based Project SPVs provide stable cash flows. These assets carry no traffic risk and offer minimal default risk. Moreover, a mix of toll and annuity assets contributes to stable cashflows and more effective risk mitigation, as the diversity allows the portfolio to benefit from predictable, recurring revenues provided by annuity assets, while also capturing the potential for

[23] Considering toll receipts (less revenue share) and actual annuity receipts for the Financial Year 2025
[24] Considering toll receipts (less revenue share) and actual annuity receipts for the Financial Year 2025

higher income from toll assets.

We also evaluate the concentration of value of the assets in our portfolio by calculating the EV of the single largest asset as a percentage of the total portfolio EV, providing an immediate read on dominant-asset dependence. The enterprise value of our largest asset (as a proportion of overall enterprise value of our Initial Portfolio Assets) standing at 26.11% is comparable to some of the other financial sponsor driven road InvITs, indicating that our portfolio is comparatively less concentrated, thereby limiting the impact if any single asset were to underperform or face valuation changes (*Source: CRISIL Report*).

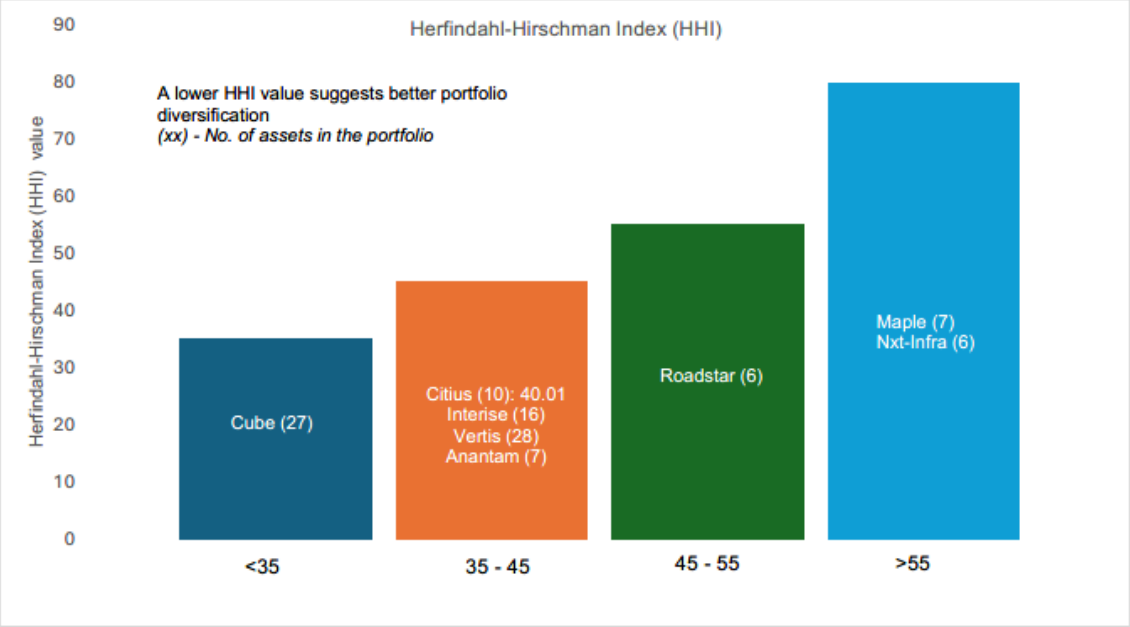


Note: The portfolio of Maple Infrastructure Trust includes the Ashoka assets acquired by Maple as available in Trust's disclosure.
Source: Valuation reports for various InvITs (Interise Trust, Maple Infrastructure Trust, Nxt-Infra Trust: March 2025; Citius InvIT, Cube Highways Trust, Roadstar Infra Investment Trust, Vertis Infrastructure Trust: December 2025; Anantam Highways: June 2025), Annual reports, Crisil Intelligence

Additionally, our HHI[25] score is lower at 40.01 compared to some of the other peer road InvITs (*Source: CRISIL Report*)

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[25] Herfindahl-Hirschman Index (HHI) measures the overall concentration of the portfolio. A higher HHI score signifies higher concentration.



Note: The portfolio of Maple Infrastructure Trust includes the Ashoka assets acquired by Maple as available in Trust's disclosure.

Source: Valuation reports for various InvITs (Interise Trust, Maple Infrastructure Trust, Nxt-Infra Trust: March 2025; Citius InvIT, Cube Highways Trust, Roadstar Infra Investment Trust, Vertis Infrastructure Trust December 2025; Anantam Highways: June 2025), Annual reports, Crisil Intelligence

Furthermore, the toll roads forming part of our Project SPVs had an AUM weighted annual average daily traffic PCU growth[26] of 7.10% between the Financial Years 2023 and 2025 (excluding PECPL[27]) and 6.46% between the Financial Years 2018 and 2025, (excluding PECPL[28] & TEL[29]), demonstrating both consistent growth and resilience. We believe this growth was primarily driven by increase in economic activities in the project influence areas, in the relevant sectors and commodities, as well as various revenue enhancement initiatives undertaken by the in-house management teams of the HoldCos and Project SPVs and supported by the EAAA Platform post-acquisition of these assets to address revenue leakages, including the implementation of FASTag (in one of the State toll roads), an electronic toll collection system in India. The toll roads are also balanced in their concentration between commercial traffic and passenger segments. For details see "- *Strengths – De-risked portfolio providing stable cash flows from toll and annuity assets, with a balanced traffic mix backed by industrial activity (commercial vehicle volume) and personal consumption activity (passenger vehicle volume) and low counterparty risk* " on page 256. We believe our long operating history and steady traffic growth demonstrate our consistent and reliable performance.

2. Strong pipeline of Identified ROFO Assets.

We have entered into a ROFO Agreement with certain entities in the EAAA Platform in relation to the future acquisition of assets which are held, or will be held, by the EAAA Platform. As of the date of this Offer Document, there are 11 HAM assets under NHAI concessions which are the Identified ROFO Assets in terms of the ROFO Agreement. While the consideration in respect of all 11 Identified ROFO Assets has been agreed with the sellers under binding documentation executed by the EAAA Platform, all of which are eligible under the InvIT Regulations, as of the date of this Offer Document, of these (i) five HAM assets are presently held by the EAAA Platform, and (ii) six HAM assets, are in the process of being acquired by the EAAA Platform, subject to all conditions precedent under the binding documentation being satisfied. The locations of our Identified ROFO Assets, as of the date of this Offer Document are indicated in the map below[30]:

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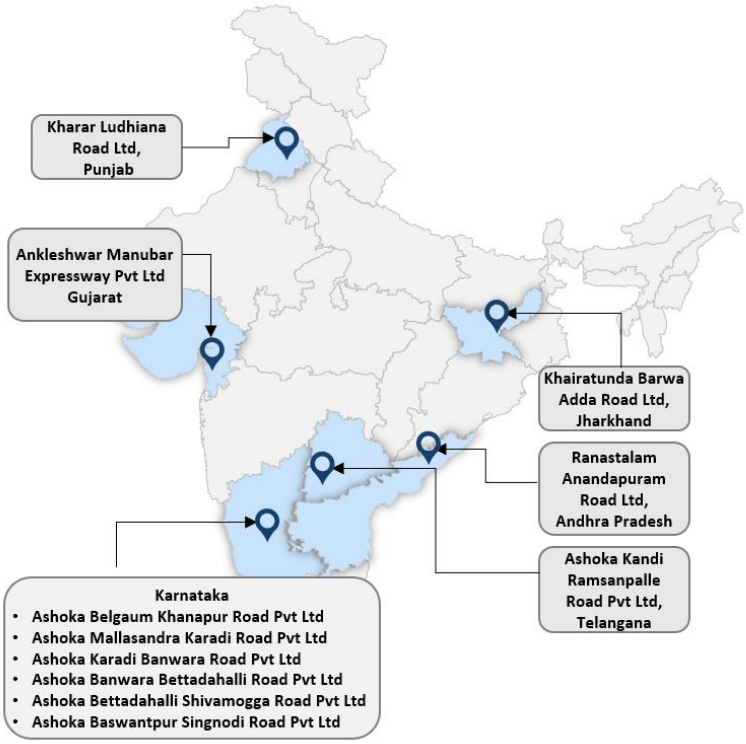
26 Average traffic growth is a weighted average computation of traffic PCU at respective SPVs using AUM as on 31st December 2025 as weights and further considering respective weights of tollable lengths for each toll plaza at SPV level

27 PECPL excluded on account of short residual life; PECPL concession will end in February 2027

28 PECPL excluded on account of short residual life; PECPL concession will end in February 2027

29 For TEL, PCOD was achieved in March 2022 and toll collection commenced thereafter

30 The map has not been drawn to scale



Pursuant to the terms of the ROFO Agreement, in the event of the proposed sale of the Identified ROFO Assets by the EAAA Platform, we will have a right of first offer over all 11 Identified ROFO Assets, and such Identified ROFO Assets may be acquired by us. These 11 Identified ROFO Assets, in the aggregate, comprise of 2,366.81 lane-kilometers (excluding service lanes) across 6 states as of the date of this Offer Document. Out of these, the five Identified ROFO Assets which are currently held by the EAAA Platform comprise 1,175.93 lane-kilometers (excluding service lanes) across 5 states. In the event that we are able to successfully acquire all five Identified ROFO Assets presently held by the EAAA Platform, our total portfolio (i.e. our Project SPVs as well as these five Identified ROFO Assets) is anticipated to comprise 15 road assets across 12 different Indian states representing approximately 4,582.64 lane-kilometers (excluding service lane-kilometers) (*Source: CRISIL Report*). These five Identified ROFO Assets presently held by the EAAA Platform are operational, having an average operational history of 4.42 years and a residual life of 10.58 years as of December 31, 2025 (*Source: CRISIL Report*). In aggregate, the mix of the toll collection (net of revenue share) and HAM and annuity receipts without GST (including these 5 operational ROFO Assets under the HAM framework but excluding the operation and maintenance component of the payments under the respective contracts) for the Financial Year 2025 were 63.79% and 36.21%, respectively (*Source: CRISIL Report*).

Furthermore, under the terms of the ROFO Agreement, we shall also have the right of first offer in respect of an additional six eligible Identified ROFO Assets which are in the process of being acquired by the EAAA Platform. Of these six Identified ROFO Assets, five are operational, having an average operational history of 2.84 years and a residual life of 12.17 years as of December 31, 2025 (*Source: CRISIL Report*). In the event that all 11 Identified ROFO Assets are successfully acquired by us in terms of the ROFO Agreement, our total portfolio shall comprise 21 road assets across 12 different Indian states representing approximately 5,773.52 lane-kilometers (excluding service lane-kilometers). For the Financial Year 2025, the 10 operational Identified ROFO Assets generated an annuity and interest on unpaid annuity of ₹8,900.00 million For the Financial Year 2025, the toll collection (net of revenue share) was 56.05%, while the HAM and annuity receipts without GST (including all operational ROFO Assets under the HAM framework, but excluding the operation and maintenance component of the payments under the respective contracts) constituting 43.95% of the combined cash revenue receipts of the Initial Portfolio Assets and all 10 operational Identified ROFO Assets (*Source: CRISIL Report*). For details in relation to the ROFO Agreement, pursuant to which the Identified ROFO Assets are proposed to be acquired by us, please see "*Related Party Transaction-Acquisition of future assets by the Trust – ROFO Agreement*" on page 424. Furthermore, for details in relation to the 11 Identified ROFO Assets, please see "-*ROFO Assets*" on page 290.

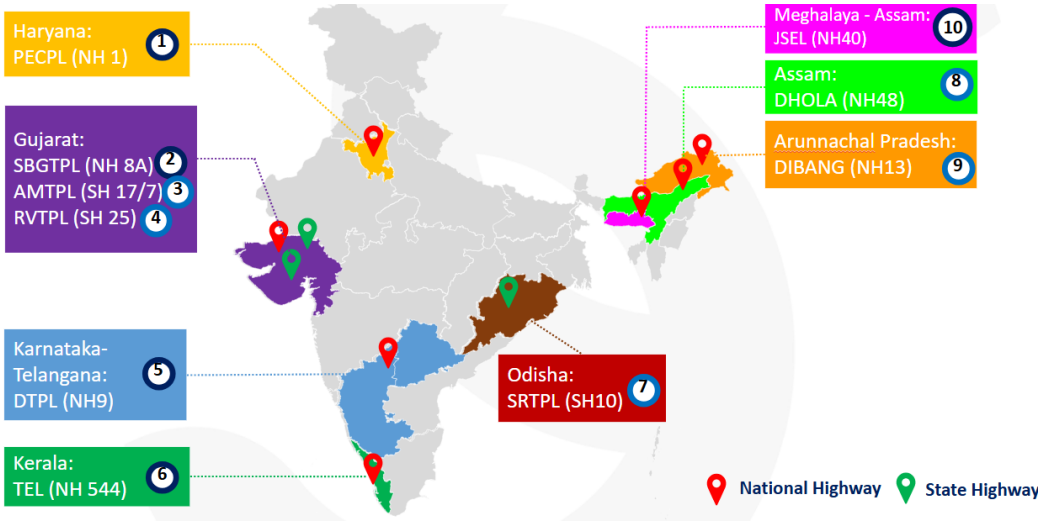
HAM assets with NHAI as the counter-party typically have a concession period of 15 years following the commercial operations date. The HAM model is expected to have a positive impact on the road sector, as it

eliminates traffic risk and provides stable cash flows to developers. This, in turn, will ensure timely debt servicing for bankers. The model shifts the traffic risk from the concessionaires to the NHAI, with developers receiving fixed annuities based on predetermined schedules. This will make debt servicing easier, especially during the initial years of the concession period. The elimination of traffic risk is a significant positive, given the past experiences of road developers where actual base traffic and traffic growth were significantly lower than estimated. This model also mitigates cost overrun risks by linking construction and maintenance costs to inflation and ensuring the timely availability of land. In the past, cost overruns had a significant impact on project returns, with a 10% increase in cost lowering project returns by approximately 100 basis points. To address this issue, the government has linked construction, operation, and maintenance costs to inflation. Additionally, projects are now awarded only after 80% of the land required is in possession of the awarding agency, reducing delays in land acquisition. The HAM model has several benefits, including lower equity contribution requirements, which will increase private players' ability to bid for projects. With the government incurring 40% of the project cost, the HAM calls for lower equity contribution from developers (approximately 15%, compared with approximately 25% for BOT-toll projects). This is beneficial, given the current weak financial position of road developers. The model also reduces developers' interest rate risk, as interest rate payments are linked to the bank rate. This significantly lowers the risk for the developer in terms of interest rate volatility. It is expected to attract private players due to its low-risk nature and lower capital requirements. The model is also expected to boost private investments in national highways over the next five years (*Source: CRISIL Report*).

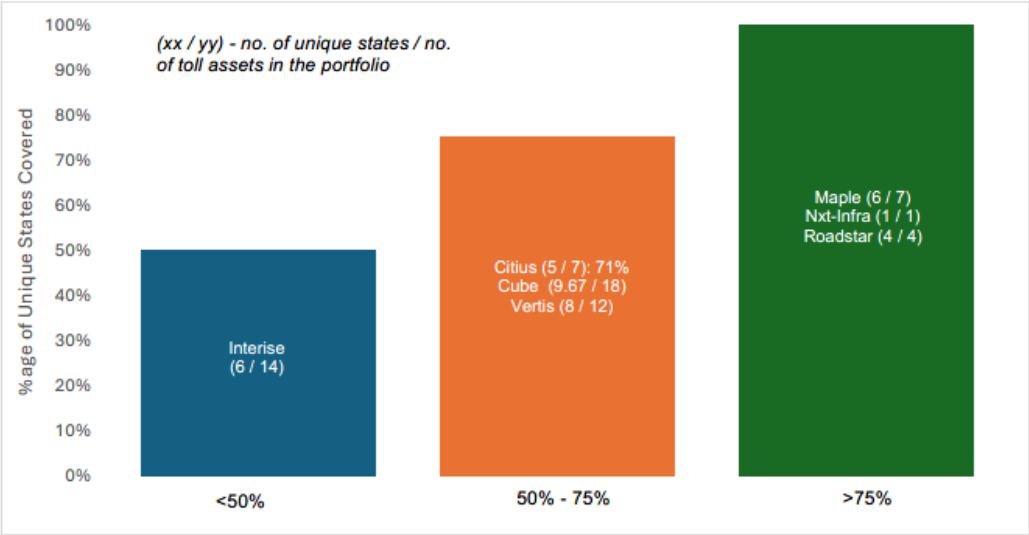
All of the Identified ROFO Assets under the ROFO Agreement are HAM assets, and in the event that we are able to acquire any or all of the Identified ROFO Assets, we will be able to benefit from the advantages associated with HAM assets.

3. Strategically located assets across geographically diverse clusters, situated near major economic corridors, and handling a diverse industry and commodity mix.

We believe our Project SPVs include high quality assets (in terms of revenue track record and stability, and quality of maintenance) located across geographically diverse clusters, in strong economic corridors offering stability and opportunities for growth. The map below indicates the location of our Project SPVs as of the date of this Offer Document:



The toll roads forming part of our Project SPVs are located in Karnataka, Telangana, Odisha, Gujarat, Kerala, and Haryana. These roads benefit from their strategic locations, either within states that have experienced strong gross state domestic product over several years, or by virtue of them being part of a key economic corridor which benefits from activities in multiple states. With a dispersion score of 71% our portfolio exhibits strong geographic diversification with the Initial Portfolio Assets (*Source: CRISIL Report*)



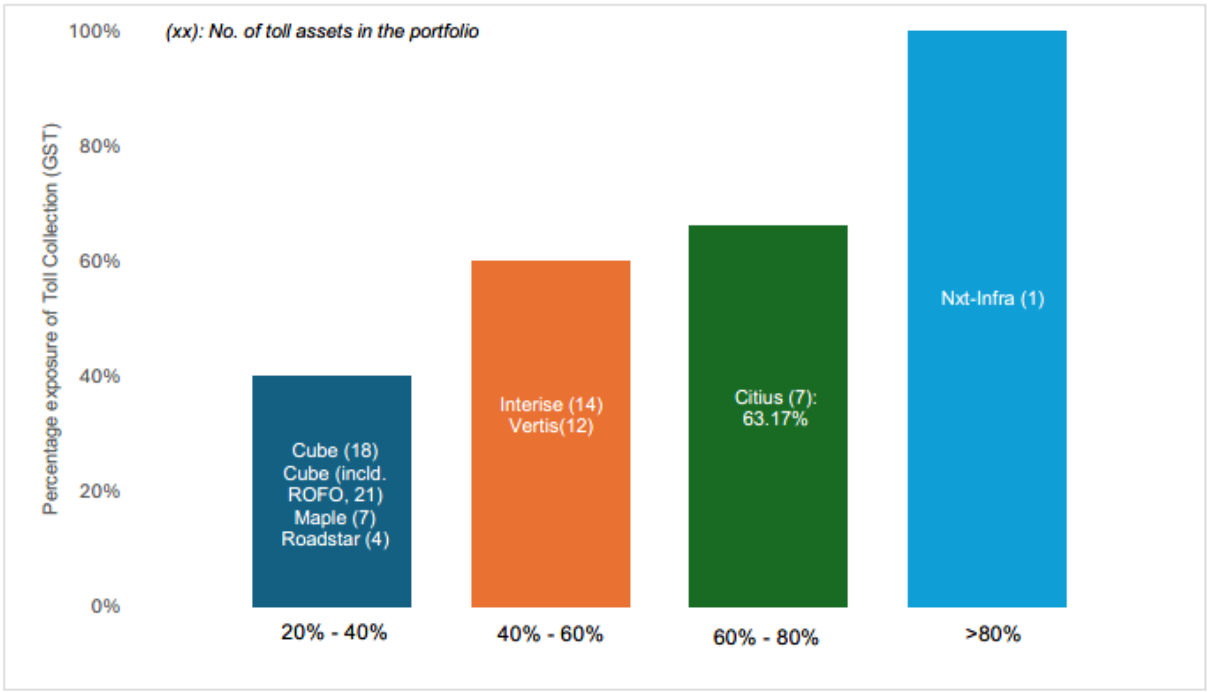
Note:

1) *Anantam Highways does not have any Toll Assets, hence not mentioned in the above chart*
2) *The portfolio of Maple Infrastructure Trust includes the Ashoka toll assets acquired by Maple as available in Trust's disclosure.*

Source: Valuation reports for various InvITs (Interise Trust, Maple Infrastructure Trust, Nxt-Infra Trust: March 2025; Citius InvIT, Cube Highways Trust, Roadstar Infra Investment Trust, Vertis Infrastructure Trust: December 2025; Anantam Highways: June 2025), Annual reports, Crisil Intelligence

We have a notable exposure, with 63.17% of our toll collection is from the assets located in the top five GST states as well as from top five per capita NSDP states, and 56.05% of our toll collection from top five GSDP ranked states, underscoring a significant alignment with stronger economic catchments (*Source: CRISIL Report*).

The chart below indicates the percentage exposure of EV in the top five GST contributing states (only toll assets) based on total GST collections for the Financial Year 2025 (*Source: CRISIL Report*)



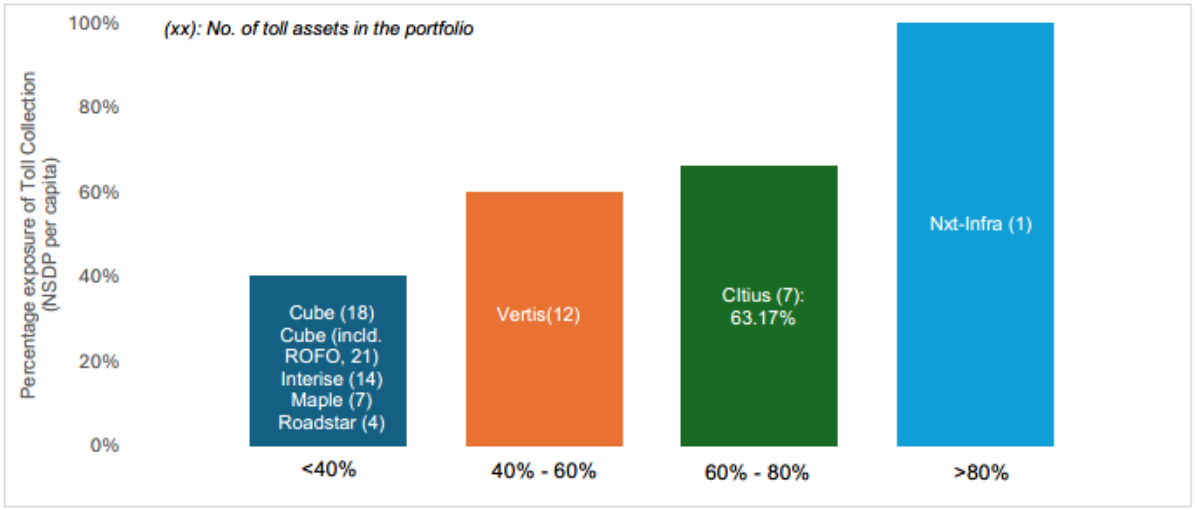
Note:

1) Anantam Highways does not have any Toll Assets, hence not mentioned in the above chart

2) The portfolio of Maple Infrastructure Trust includes the Ashoka toll assets acquired by Maple as available in Trust's disclosure.

Source: Annual reports for fiscal 2025, Valuation Report

The chart below indicates the percentage exposure of EV in the top five capita NSDP states for toll assets (*Source: CRISIL Report*):



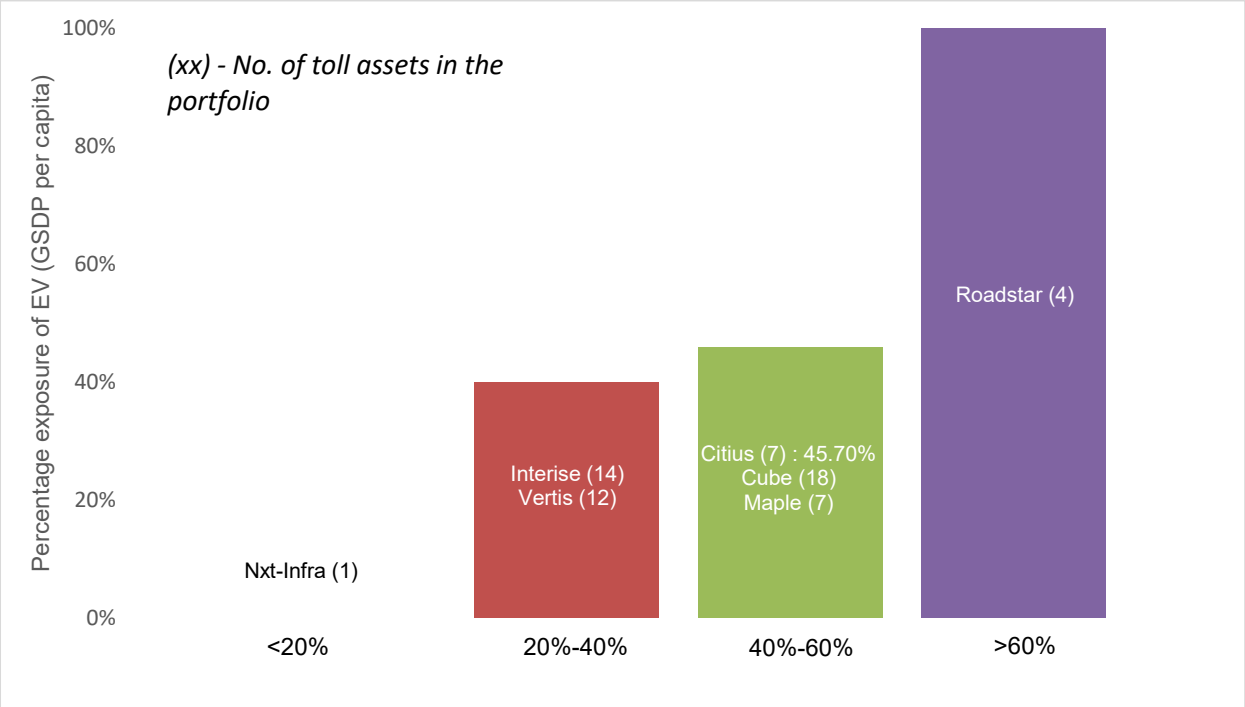
Note:

1) Anantam Highways does not have any Toll Assets, hence not mentioned in the above chart

2) The portfolio of Maple Infrastructure Trust includes the Ashoka toll assets acquired by Maple as available in Trust's disclosure.

Source: Annual reports fiscal 2025, Valuation Report

The chart below indicates the percentage exposure of EV in the top five GSDP states for toll assets (*Source: CRISIL Report*):



Note:

1. *Anantam Highways does not have any Toll Assets, hence not mentioned in the above chart*
2. *The portfolio of Maple Infrastructure Trust includes the Ashoka toll assets acquired by Maple as available in Trust's disclosure.*

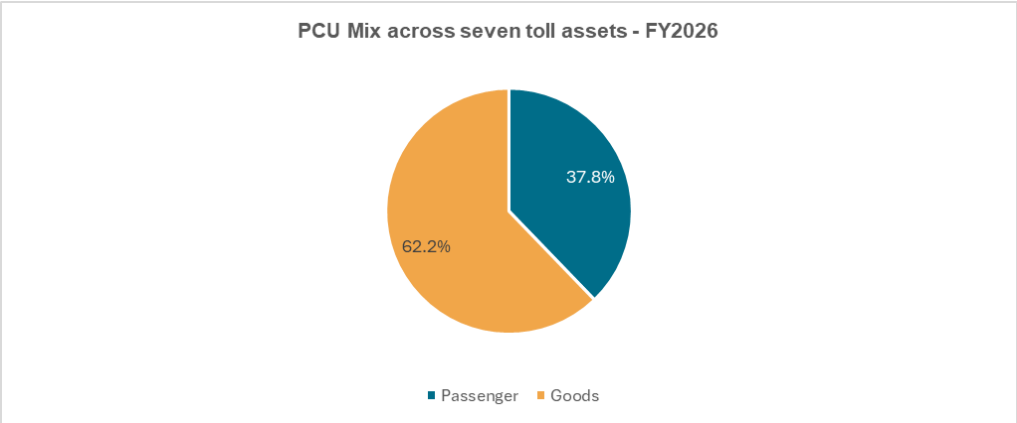
Source: Valuation reports for various InvITs (Interise Trust, Maple Infrastructure Trust, Nxt-Infra Trust: March 2025; Citius InvIT, Cube Highways Trust, Roadstar Infra Investment Trust, Vertis Infrastructure Trust: December 2025; Anantam Highways: June 2025), Annual reports, Crisil Intelligence

We believe that our geographical distribution has enabled us to achieve both regional diversification and

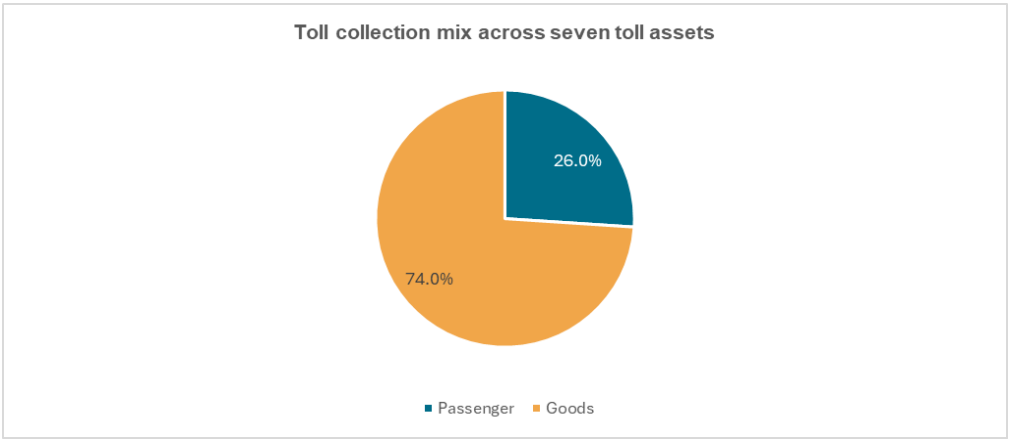
dispersion base on the commodity or industry.

Our Project SPVs are not only balanced in terms of revenue diversity, i.e. toll assets and annuity assets as discussed " - *Strengths – De-risked portfolio providing stable cash flows from toll and annuity assets, with balanced traffic mix backed by industrial activity (commercial vehicle volume) and personal consumption activity (passenger vehicle volume) for toll assets and low counterparty risk for annuity assets*" on page 256, but also between passenger and commercial traffic. This combination of maturity, track record of consistent strong growth and significant residual life balances stability from established operations with a long runway for future value generation.

The overall PCU composition across all our toll assets reflects a well-diversified traffic base spread across multiple regions of the country. Passenger vehicles account for approximately 37.80% of the PCU mix in the Financial Year 2026, while commercial / freight vehicles contribute around 62.20%, indicating a healthy balance between personal and economic mobility (*Source: Traffic Reports*). In road traffic, commercial traffic is typically less volatile than passenger traffic and more resilient during economic fluctuations thereby reducing risk and allowing more efficient resource planning and utilization, and in turn improving its operational efficiency for platforms/concessionaires with a higher share of commercial traffic (*Source: Traffic Reports*).



In line with this, the revenue mix[31] further highlights the strong presence of major economic and industrial corridors within the toll portfolio with freight vehicles nearly at 74.00% of total toll collection, underscoring the critical role of goods movement and logistics activity in driving asset performance. The remaining 26.00% toll collection by the passenger traffic, reflecting steady commuter movement across key routes as indicated in the chart below (*Source: Traffic Reports*):



Overall, the portfolio demonstrates diversified geographic coverage and robust commercial traffic potential, positioning it well to benefit from ongoing infrastructure and economic growth trends. This combination of maturity, track record of consistent strong growth and significant residual life balances stability from established operations with a long runway for future value generation (*Source: Traffic Reports*).

[31] Basis toll revenue computed for the Financial Year 2026 for the toll assets forming part of our Initial Portfolio Assets

Furthermore, our toll roads are situated in major economic and industrial corridors and include (*Source: Traffic Reports*):

- Samakhiali Bhachau Gandhidham Tollway Private Limited ("**SBGTPL**"), Gujarat which is part of the new National Highway 41 (Old NH8A), which is the traffic feeding arterial route for Kandla and Mundra Ports, connecting them to the hinterlands spread out in the interiors of Gujarat and extending to Rajasthan, Haryana, Punjab and beyond.

- Rajkot-Vadinar Tollway Private Limited ("**RVTPL**"), Gujarat, which is part of State Highway 25 ("**SH-25**") and NH-151A, which connects the industrial areas of Rajkot, Dhrol, Jamnagar.

- Sambalpur Rourkela Tollway Private Limited ("**SRTPL**"), Odisha which the project road (part of SH-10) passes through Sambalpur, Jharsuguda and Sundargarh districts in Odisha, which are among the key industrial and mining regions of the State.

- Ahmedabad Maliya Tollway Private Limited ("**AMTPL**"), Gujarat which connects the industrial areas of Sanand, Chharodi and Khoda, pharmaceutical hub at Moraiya, ceramic tiles manufacturers in Morbi and is part of the shortest route connecting the Kutch region and the nearby ports from Ahmedabad, Maharashtra, MP, and Southern India.

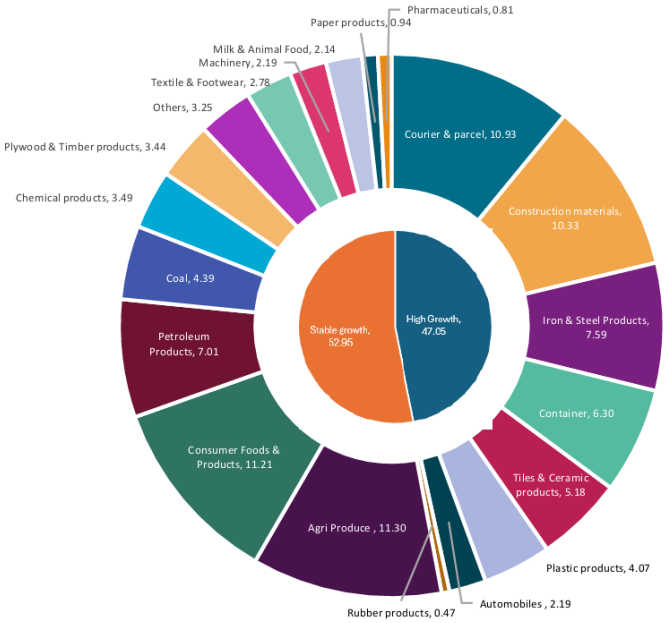
- Deccan Tollways Private Limited ("**DTPL**"), Karnataka is part of NH-65 (old NH-9) originating from Pune and ending at Machilipatnam (AP), passing through Indapur, Solapur, Omerga, Humnabad, Zaheerabad, Hyderabad, Suryapet and Vijayawada.

- Thrissur Expressway Limited ("**TEL**"), Kerala is part of NH-544, a critical corridor connecting Salem in Tamil Nadu to Kochi in Kerala and is a major arterial route linking Kerala with Tamil Nadu and the rest of India. TEL is located approximately 110.00 km from Kochi port, which is especially important for port-related traffic and commercial activity moving inland from the coast.

- Panipat Elevated Corridor Private Limited ("**PECPL**"), forms part of NH-1, which connects Delhi to Haryana and Punjab, crossing through Haryana along its route. It serves the high traffic stretch from Delhi to Sonipat, Panipat, Karnal, Ambala, and Jalandhar. The elevated section bypasses congestion within the city of Panipat.

Additionally, the commercial traffic operating on our road assets carry a variety of commodities, supporting additional stability through intra-portfolio dispersion and exposure to different industries. This approach helps mitigate the risks that could arise from over-concentration in a single region, or market sector. The portfolio is almost evenly split, based on commercial traffic, between high-growth and stable-growth sectors[32], with stable-growth sectors making up 52.95% and high-growth sectors 47.05% as of May 2025. The portfolio is further diversified, with a combined 28.85% allocated to courier & parcel, construction material, iron and steel sectors. Our diversified commodity mix split in terms of total traffic, based on the sector as of May 2025 is provided in the infographic below (*Source: Traffic Reports*):

[32] Commodities with a growth rate of more than 4.5% have been categorised as high growth sectors / commodities, whereas those with growth rate up to 4.5% have been categorised as stable growth sector / commodities (*Source: Traffic Report)*



4. De-risked portfolio providing stable cash flows from toll and annuity assets, with a balanced traffic mix backed by industrial activity (commercial vehicle volume) and personal consumption activity (passenger vehicle volume) and low counterparty risk.

Upon the completion of the Formation Transactions, our Project SPVs, with a track record of consistent baseline revenue and strong operational history will include assets across toll and annuity frameworks, ensuring diversification in revenue mechanisms. During the Financial Year 2025, the toll collection (net of revenue share) from toll-based projects was ₹15,632.30 million and revenue receipts for annuity-based projects (excluding GST) was ₹3,362.00 million, contributing 82.30% and 17.70% to our total cash revenue receipts from our Project SPVs, respectively[33].

The toll based Project SPVs are also diversified between two key segments: passenger and commercial traffic. India's passenger vehicle population grew from 32 million cars in the Financial Year 2020 (23 cars per 1,000 people) to 39 million in Financial Year 2025 (27 cars per 1,000 people), reflecting steady expansion in the automotive sector. This represents an increase of 7 million cars and an increase of four cars per 1,000 people over five years. The passenger vehicle population is estimated to reach 48 to 50 million by the Financial Year 2030, with penetration levels rising to 32 to 34 cars per 1,000 people. In the Financial Year 2021, commercial vehicles comprised only 1.5% of total car sales, while personal cars made up 98.5%. By the Financial year 2025, the commercial vehicles' share increased to 7.1%, driven by increased demand for shared mobility, logistics fleet expansion, and greater business use of vehicles after the pandemic. The domestic sales of both passenger and commercial vehicles is expected to grow at a CAGR of 4%-6% from the Financial Year 2025 to the Financial Year 2030. Across all toll assets, passenger vehicles account for approximately 37.80% of the PCU mix in the Financial Year 2026, while commercial / freight vehicles contribute around 62.20%[34], indicating a healthy balance between personal and economic mobility (*Source: Traffic Reports*). Freight vehicles contribute nearly 74.00% of toll collection[35], underscoring the critical role of goods movement and logistics activity in driving asset performance. The remaining 26.00% toll collection is contributed by passenger traffic, reflecting steady commuter movement across key routes. In road traffic commercial traffic is typically less volatile than passenger traffic and more resilient during economic fluctuations thereby reducing risk and allowing more efficient resource planning and utilization, and in turn improving its operational efficiency for platforms/concessionaires with a higher share of commercial traffic (*Source: Traffic Reports*).

Furthermore, 63.17% of our toll collection is from the assets located in the top five GST states suggesting presence of the toll roads in regions deriving benefits of buoyant disposable income and consumption and 56.05% of our toll collection from top 5 GSDP ranked states, reiterating presence of the toll roads in regions with high economic

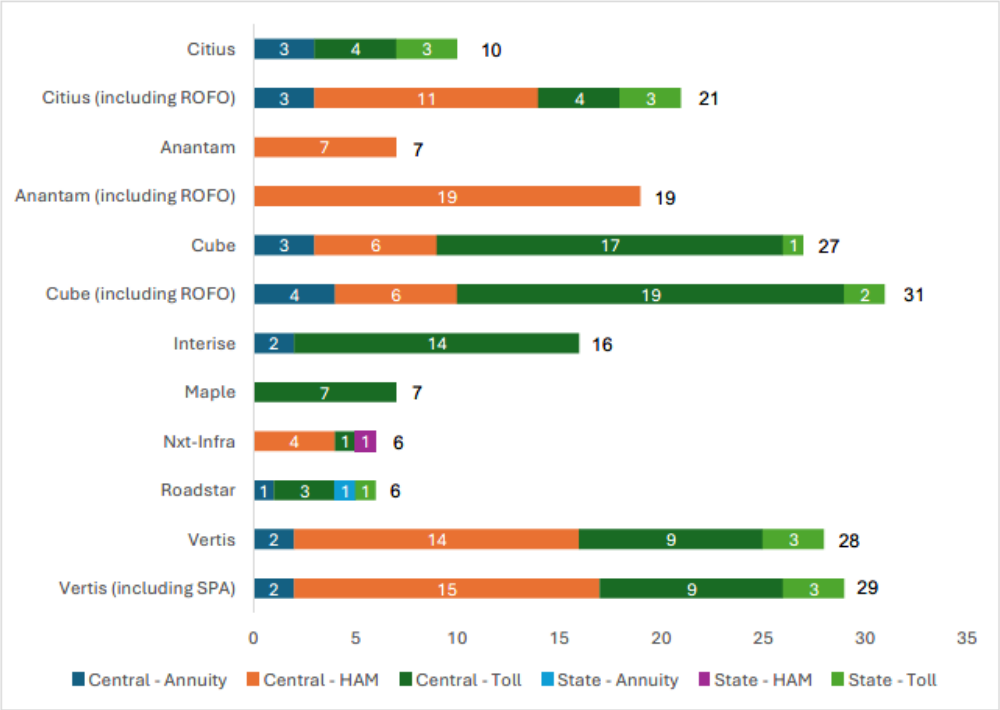
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33 Considering toll receipts (less revenue share) and actual annuity receipts for the Financial Year 2025

34 The PCU Mix for the Financial Year 2026 has been derived by applying historical seasonal correction factors to the actual traffic volumes recorded during April–July 2025, thereby estimating the base year traffic.

35 The PCU Mix for the Financial Year 2026 has been derived by applying historical seasonal correction factors to the actual traffic volumes recorded during April–July 2025, thereby estimating the base year traffic.

activity, thereby translating into stable and predictable traffic and revenue growth prospects (*Source: CRISIL Report*). The key counterparties for our annuity assets are NHAI and MoRTH. For our toll assets, our key counterparties are NHAI, the Government of Odisha, and GSRDC. Given the strong governmental backing, maturity of concession frameworks and established track records, our counterparties have a low risk of default, providing assurance regarding the reliability and stability of our commercial arrangements with them (*Source: CRISIL Report*). The portfolio split as of December 31, 2025, for the number of assets in terms of concessionaire authority is provided in the chart below (*Source: CRISIL Report*):



Note: The portfolio of Maple Infrastructure Trust includes the Ashoka assets acquired by Maple as available in Trust's disclosure.

For Anantam Highways, DBL and Alpha jointly own three SPVs: Raipur-Visakhapatnam CG-2 Highways Limited, Mehgama Hansdiha Highways Limited, and Poondiyankupam Highway Limited. Hence 12 ROFO assets.

Source: Valuation reports for various InvITs (Interise Trust, Maple Infrastructure Trust, Nxt-Infra Trust: March 2025; Citius InvIT, Cube Highways Trust, Roadstar Infra Investment Trust, Vertis Infrastructure Trust: December 2025; Anantam Highways: June 2025), Annual reports, Crisil Intelligence

Furthermore, our annuity assets have a strong track record, with timely receipt of full annuity amounts since their acquisition by the EAAA Platform. Moreover, each Initial Portfolio Asset has achieved COD, and the annuity amounts are distributed fairly across each quarter, which we believe results in stable and predictable cash flows. Timely receipt of annuity amounts helps us manage cash flows efficiently and supports ongoing financial stability.

5. Experienced team with full spectrum asset management and maintenance capabilities, spanning the entire asset life cycle, backed by tech-enabled operations and maintenance.

The in-house asset management and expertise of the Project Manager, including through the HoldCos and Project SPVs, supported by the EAAA Platform, offers significant capabilities and extensive experience in asset management. This is driven by a comprehensive "life cycle" approach, spanning every critical function required for effective asset management, from initial business development and technical planning, through to engineering, operations, client relations, financial management and handovers, across vital functions such as business development, design and planning, traffic and revenue strategies and client relations. A combination of the in-house asset management expertise of 350 professionals employed by the Project Manager, HoldCos and Project SPVs as of December 31, 2025 and support the EAAA Platform, allows us to provide holistic and reliable asset management outcomes, maintaining strict quality standards while prioritizing the health and safety of personnel and strengthening client relations throughout the life cycle of every asset we manage. The EAAA Platform applies technology and set procedures to conduct due diligence and asset management systematically, through an established governance framework that guides investment and asset management practices. Its origination efforts were driven by an investment team, which included 80 members as of December 31, 2025, organizing and

enabling access to promoters, developers, and financial institutions. We believe that these attributes enable our HoldCos and Project SPVs to manage the Initial Portfolio Assets in compliance with the stipulated O&M obligations while following comprehensive Safety, Health, and Environment ("**SHE**") standards. Our Project SPVs undertake the O&M obligations directly and pursuant to the support of our HoldCos, under the overall supervision of the Project Manager, which in-turn benefits from the expertise of the EAAA Platform. For details, please see "*Summary of the Concession Agreements*" on page 298.

We also collaborate with premier institutions, including the Indian Institutes of Technology ("**IITs**") and Central Road Research Institute to introduce new technologies and innovative solutions, strengthening operational efficiency and promoting continuous improvement in O&M practices. Furthermore, our technology-driven approach to O&M, with an emphasis on digital innovation ensures data-driven performance monitoring, and process enhancements to optimise asset life cycles and ensure high standards of quality, safety, and sustainability. The integrated digital framework is designed to enhance efficiency, safety, and proactive management. For example, the Intelligent Highway Asset Monitoring System ("**iHAMS**"), deployed for the assets, uses artificial intelligence and dashcam feeds from Route Patrolling Vehicles to automatically detect and report pavement distress and other faults, enabling timely restoration. This is complemented by an Highway Traffic Management Systems ("**HTMS**"), which includes a suite of intelligent systems for traffic management, including emergency call boxes, a meteorological station for weather monitoring, 360-degree cameras for comprehensive surveillance, variable message signs to provide timely alerts and safety information to road users. Along with this, an Automatic Traffic Counter and Classifier ("**ATCC**") is implemented to get the traffic information.

Furthermore, we also have an in-house research and development ("**R&D**") laboratory located in the industrial area of Turbhe, Navi Mumbai. This facility is equipped to conduct research on new technologies and materials prior to their usage at field. Along with this, the facility is also capable of carrying out the conventional tests on bituminous materials (emulsion, bitumen, aggregates etc.) and designing cost effective bituminous mixes, ensuring strict quality control for major maintenance across all assets. The facility can also be used for training field engineers on new technologies and materials for adoption.

Many of our assets have received various awards and recognition in respect of safety and excellence. For example, in the area of safety, our Dhola and Dibang assets (the oldest acquisitions in our portfolio) have received multiple awards in respect of highway safety including excellence in highway safety gold award in the National Highways Excellence Award in 2022 and the road safety gold award in the OHSSAI Annual HSE Excellence and ESG Global Awards 2023. Dhola was also awarded the International Safety Distinction Award in the British Safety Council 2024 awards, and TEL was awarded the Merit Award in the British Safety Council 2025 awards. DTPL received the silver award for excellence in Green Highways in the National Highways Excellence Awards 2023 by MoRTH. Furthermore, Dhola also received the impact category award in the Build India Infra Awards 2024. Epic Concesiones 3 Private Limited has received an award in women empowerment category in the National Awards for Excellence, Corporate Social Responsibility (12th Edition), along with the Excellence in CSR – Concern for Health category, the Excellence in Innovation – Promising Company of the Year awards at the Golden Star Awards, and the Excellence Award in Skilling & Employability through CSR at the 6th Bharat CSR & Sustainability Summit 2026. The Project SPVs also adhere to three of the recognised standards for benchmarking and independent assessment of the processes and practices, including ISO 14001 for Environmental Management Systems, ISO 45001 for Occupational Health and Safety Management, and ISO 27001 for Information Security Management. Furthermore, AMTPL has received the Gold Award, by scoring 7.8 out of 10, while JSEL earned the Silver Award with a score of 7.7 out of 10 at the 10th Annual HSE & ESG Excellence Global Awards 2025 organized by OHSSAI Foundation. Additionally, EAAA India Alternatives Limited was honoured with the Infrastructure Fund: Best Overall Performance of the Year award at the IVCA Alternate Capital Excellence Awards, 2026.

6. Strong and differentiated asset acquisition and investment capabilities.

The EAAA Platform offers differentiated and proven asset acquisitions expertise, supporting a disciplined and versatile approach to portfolio construction. The EAAA Platform has successfully acquired infrastructure assets, including road assets through multiple approaches, including direct bilateral transactions, distressed asset acquisitions, transactions handled through the NCLT process, and the acquisition and integration of large platforms.

The details of road asset acquisitions by the EAAA Platform are provided in the table below:

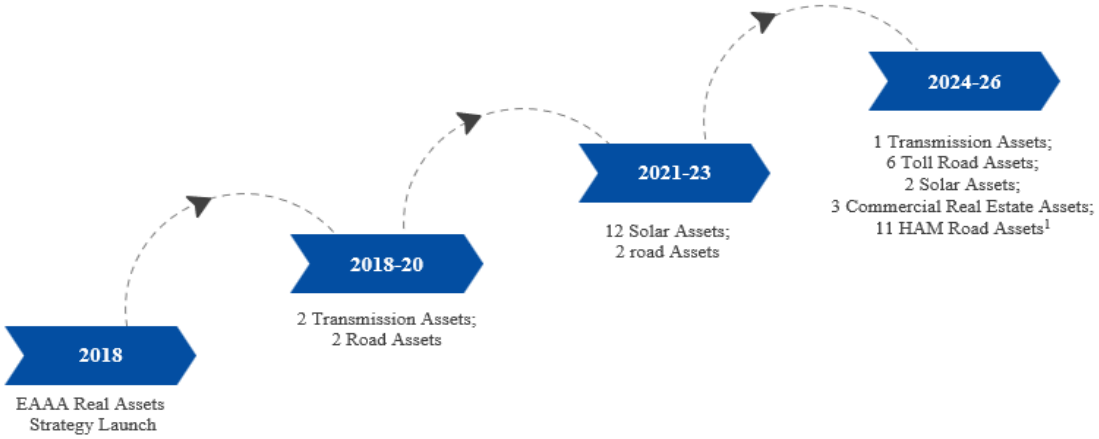
Sr. No.	Asset Name	Type	Authority	Seller	Location	Lanes	Length	Acquisition Type
1	TEL	Toll	NHAI	KMC Infratech	Kerala	6	28.36	Acquisition

Sr. No.	Asset Name	Type	Authority	Seller	Location	Lanes	Length	Acquisition Type
				Limited				through a process jointly run by an asset reconstruction company
2	SRTPL	Toll	Govt of Odisha	Held by EPIC Concesiones (erstwhile L&T IDPL), which was acquired from L&T and CPPIB	Odisha	4	161.73	Platform acquisition
3	DTPL	Toll	NHAI		Karnataka	4	144.95	
4	SBGTPL	Toll	NHAI		Gujarat	6	56.16	
5	PECPL	Toll	NHAI		Haryana	6	10	
6	AMTPL[(1)]	Toll	GSRDC		Gujarat	4	180.70	
7	RVTPL	Toll	GSRDC		Gujarat	4	131.65	
8	JSEL	Annuity	NHAI	IL&FS Transportation Networks Ltd.	Assam & Meghalaya	4	61.8	Acquisition through complex NCLT Process
9	Dhola	Annuity	MoRTH	Navayuga Road Projects Private Limited &Navayuga Engineering Company Limited	Assam	2	28.51	Bi-lateral, negotiated acquisition
10	Dibang	Annuity	MoRTH	Navayuga Road Projects Private Limited & Navayuga Engineering Company Limited	Arunachal Pradesh	2	29.63	Bi-lateral, negotiated acquisition
11	Kharar Ludhiana Road Limited	HAM	NHAI	Ashoka Buildcon Limited	Punjab	4/6	76.01	Through a sale process initiated by the seller
12	Ranastalam Anandapuram Road Limited	HAM	NHAI	Ashoka Buildcon Limited	Andhra Pradesh	6	47.00	Through a sale process initiated by the seller
13	Ankleshwar Manubar Expressway Private Limited	HAM	NHAI	Ashoka Buildcon Limited	Gujarat	8	11.25	Through a sale process initiated by the seller
14	Khairatunda Barwa Adda Private Limited	HAM	NHAI	Ashoka Buildcon Limited	Jharkhand	6	39.83	Through a sale process initiated by the seller
15	Kandi Ramsanpalle Road Private Limited	HAM	NHAI	Ashoka Buildcon Limited	Telangana	4	39.98	Through a sale process initiated by the seller

(1) GSRDC has entered into a separate, additional concession agreement with AMTPL dated October 30, 2025 to augment a section of the highway (for a length of 28.75 km) from the existing four lanes to six lanes, on a construction, operation and maintenance to build, operate and transfer basis. We are awaiting the receipt of the appointed date to commission construction.

The road acquisition strategy is underpinned by a strong track record of the EAAA Platform, evidenced by the acquisition of 15 assets from five distinct sellers. This has resulted in a carefully curated portfolio that is diversified by asset type and geography. Our growth is further secured through our ability to acquire Identified ROFO Assets and other assets in the future, reinforcing our capacity for sustained expansion.

The chart below indicates the growth of the EAAA Platform's portfolio over the years:



Note 1: 5/11 assets have already been acquired by the EAAA Platform and the remaining 6 assets are under acquisition.

Furthermore, we benefit from the EAAA Platform's expertise, demonstrated by the acquisition of 32 infrastructure assets (including road, renewables and transmission assets) and have entered into binding agreements for six Identified ROFO Assets. Taken together, the portfolio will include 1,835 circuit kilometres of transmission assets, 1,706 megawatt-peak of solar assets, and 5,773 lane-kilometres of road assets upon completion of the acquisition of all the Identified ROFO Assets. In addition, the EAAA Platform brings in relevant InvIT experience, having set up, managed and grown AnZen, an energy-focused InvIT. This specialized expertise gives us a clear advantage in managing and expanding the InvIT, enabling us to deliver consistent value to unitholders, with assets under management of AnZen was ₹40.3billion as of December 31, 2025.

Within the EAAA Platform, we also benefit from EAAA's comprehensive ecosystem and strong and established track record of AUM growth and capital raising. EAAA is one of the leading alternatives platforms in India, in terms of assets under management with more than 15 years of experience and managed an AUM of ₹ 681.75 billion as of December 31, 2025. EAAA operates a diversified, multi-strategy platform, in large, under-tapped and fast-growing alternative asset classes, focusing on providing income and yield solutions to clients. EAAA's total AUM has nearly doubled since Financial Year 2022, from ₹306.37 billion to ₹596.29 billion for Financial Year 2025. As of December 31, 2025, this AUM is diversified across private credit (63%) and real assets (36%), with a diverse client base across institutional clients, family offices and UHNIs/HNIs. As of September 30, 2025, approximately 50% of the AUM was contributed by institutional clients, including pension funds and insurance companies, which are considered long-term and patient capital, while the balance was contributed by UHNIs/HNIs and family offices. With more than 15 years of experience and as a seasoned player with significant scale, EAAA's market position helps it leverage the strong growth momentum of the Indian real assets and private credit markets.

7. Skilled and experienced management team with a focus on corporate governance and capital management.

We are led by a strong management team in our Investment Manager and Project Manager, along with the EAAA Platform which possesses extensive and diverse expertise in the infrastructure and financial services sector. For further details on the board of directors of our Investment Manager please see "*Parties to the Trust*" on page 122. Most of the senior investment management team have experience with leading infrastructure investment companies and an in-depth understanding of the markets and the requirements of our stakeholders. Furthermore, in addition to the Investment Manager's board and management team, we benefit from the experience of the Project Manager's board of directors, EAAA's board of directors as well as risk management, fund raising/capital markets teams, among others.

Our Investment Manager is also committed to corporate governance principles that promote accountability, fairness, and transparency in all our business practices. For each asset, we will maintain comprehensive enterprise risk management processes. This will include a multi-level risk monitoring and management framework, involving keeping function-specific risk registers, utilising a dedicated dashboard, and conducting quarterly risk reviews by the function head, in addition to the ongoing review and monitoring by the risk coordinator, and meetings of the risk management committee on a semi-annual basis. We also place a strong focus on data integrity and cyber security to safeguard our operations by undertaking regular graded assessments of cyber security and information technology risks. For further details, please see "*Corporate Governance*" on page 161.

Additionally, we also benefit from the strong corporate finance capabilities of the EAAA Platform, developed through long-standing relationships with infrastructure lenders, including both public and private sector banks, as well as non-banking financial companies and infrastructure debt funds. They proactively engage with credit rating agencies and have a deep understanding of relevant regulations. These capabilities enable us to create additional value by designing optimal capital structures and debt repayment profiles tailored to the cash flow profiles and improve distributions of our Project SPVs. For acquired assets, the EAAA Platform deploys a conservative debt top-up strategy, optimize capital structures to align cashflows for effective debt servicing, and maintains a diversified financing mix across lenders and investors. Our approach is complemented by active and efficient treasury management. These financial management principles have enabled us to consistently deliver strong outcomes following acquisitions. The EAAA Platform's ability to acquire, integrate, and turn around the operations of infrastructure assets is demonstrated by improved credit ratings across the Project SPVs, by up to 10 notches for annuity assets and up to seven notches for toll assets since the date of acquisition of the respective assets. As a result, the Project SPVs have been able to obtain favourable refinancing terms from lenders. In the Financial Year 2025, interest rates were reduced by 30 to 175 basis points through refinancing and renegotiations across all Project SPVs.

The experienced corporate finance team of the EAAA Platform with a cumulative experience of more than 115 years, comprising 8 members as of December 31, 2025 along with the Investment Manager supports the scaling up of our debt portfolio. The team manages over ₹112.8 billion of debt from multiple banks and financial institutions for EAAA's infrastructure assets business as of December 31, 2025. They have demonstrated strong negotiation and structuring skills, successfully refinancing eight assets and renegotiating two assets. Following the acquisitions, the credit ratings of our portfolio improved significantly. Two Project SPVs previously rated in the D category were upgraded to AA- and AAA categories by India Ratings (for TEL) and CARE & India Ratings (for JSEL). The credit ratings of two other SPVs, which were in the BBB category, were upgraded to AAA after the refinancing of existing debt by India Ratings. This resulted in a substantial reduction in interest costs. The portfolio also achieved a meaningful decrease in interest rates across the portfolio after the acquisitions, with reductions ranging from 45 basis points to 285 basis points. Additionally, the superior loan structuring and tenure extensions provided better alignment between the loan duration and concession period. Also, the adoption of a balloon repayment structure, featuring backend payments, optimised cash release and created a stronger alignment between debt repayments and cash flows.

Additionally, we maintain robust covenant and compliance management, with optimised Debt Service Reserve Account requirements facilitating cash releases and providing covenant flexibility in debt refinancing terms. Combined with active treasury management, these measures have resulted in increased cash yields from our assets. By leveraging these corporate finance capabilities, we are able to develop efficient capital structures and debt repayment strategies, resulting in lower borrowing costs and longer debt maturities. Ultimately, this enhances the overall financial sustainability and value of the project.

8. Attractive transport and road sector outlook with the established regulatory environment and economic and social tailwinds.

Unless otherwise indicated, industry and market data appearing in this strength have been derived from the CRISIL Report.

India's transport sector is entering a pivotal phase of expansion, driven by sustained public investment, rising private participation, and a policy focus on integrated connectivity. With robust economic growth, increasing urbanization, and the rapid rise of e-commerce and logistics demand, the need for modern and efficient transport infrastructure is stronger than ever. The Government's flagship initiatives ranging from *Bharatmala* and *Sagarmala* to the National Logistics Policy and PM Gati Shakti are not only augmenting capacity but also reshaping the investment landscape across asset classes. Furthermore, *Parvatmala*, officially known as the National Ropeways Development Programme, was announced in the Union Budget for the Financial Year 2023 by the Government of India with an ambitious pipeline of over 250 projects spanning 1,200 km. Roads, railways, ports, airports, and urban transit systems (metros) are witnessing differentiated yet complementary growth trajectories, creating significant opportunities for investors, developers, and operators over the next five years. India's economic growth, with GDP forecast to grow between 6.5%-7.0% annually over the next five years, is a primary driver for both core road assets and related sectors.

The Indian road network is the second largest road network in the world. There has been an almost three-fold increase in annual investments in road and highways on road infrastructure between the Financial Years 2014 to 2025. Road transport and highways contribute to the highest proportion of the overall transport infrastructure budgetary outlay. Key drivers of the road and transport sectors include:

Capacity-augmentation and expressway expansion will dominate additions: Public statements by the Minister indicate an MoRTH plan to upgrade approximately 25,000-30,000 km of two-lane highways into four lanes and to convert approximately 16,000 km of four-lane highways into six lanes. These announcements signal that the Financial Year 2026-2030 build programme will be heavily weighted toward systematic widening and lane-upgrades on high-traffic corridors, as well as new greenfield expressways and access-controlled stretches. Furthermore, guided by Vision 2047 and the Viksit Bharat roadmap, India targets the development of 50,000 km of high-speed corridors by the Financial Year 2037, scaling up to 200,000-230,000 km by the Financial Year 2047.

Financing and investment: During the Financial Years 2025-30, of the total investment potential across the transport infrastructure, roads is expected to attract the largest share at ₹33-35 trillion, followed by ₹3-3.5 trillion in metro rail, ₹2-3 trillion in logistics infrastructure, ₹1-1.5 trillion in ropeways, and ₹1-1.2 trillion in airports. The funding composition of this investment pipeline reflects a balanced mix of central, state, and private participation. Public funding remains the principal driver, with the central government expected to contribute about 53% of total infrastructure investment, states accounting for 32%, and the private sector providing around 15%. This diversified funding approach is crucial for sustaining the high pace of construction. The projected monetization potential for privately-owned road assets has been Rs. 2.8 trillion until the Financial Year 2025. It is estimated monetization potential through that private sector investments will double to Rs. 5.9 trillion by the Financial Year 2030.

Technological Advancements and Innovation: Technology adoption is emerging as a key enabler in improving construction efficiency and network management. MoRTH is encouraging the use of advanced materials and construction techniques to reduce costs and enhance pavement quality. Research initiatives are underway on the use of bio-bitumen from agricultural waste and performance-based bituminous mixes. Additionally, digital tolling, contactless payment systems, and intelligent transport management solutions are being rolled out to improve traffic flow and reduce congestion.

Logistics goals will steer project selection and design: Government messaging prioritizes lower logistics costs (targeting single-digit logistics cost metrics in public statements), and the roll-out of Multi-Modal Logistics Parks ("**MMLPs**"), corridor-node models and expressway spines will be central to achieving time-savings and modal integration. Investments are also expected in access-controlled highways, bypasses, grade-separations and last-mile connectivity through MMLPs during the Financial Years 2026-2030.

Road transport continued to grow at a 9% CAGR backed by strong GDP growth and persistent demand for this mode of transportation. Road transport will continue to be a dominant mode going forward.

Moreover, the Government of India has consistently prioritized road development as a driver of growth. Over the past decade, programmes such as *Bharatmala Pariyojana*, Pradhan Mantri Gram Sadak Yojana ("**PMGSY**"), and the National Infrastructure Pipeline ("**NIP**") have been launched to modernize highways, expand expressways, and strengthen rural connectivity. Policy emphasis has been supported by large budgetary allocations to MoRTH and innovative financing mechanisms such as the HAM and TOT framework. At the same time, the sector has witnessed the adoption of digital tools such as FASTag, which has enhanced tolling efficiency and ensured higher revenue realization for concessionaires and the government. Investment in India's road sector has risen steadily over the past decade. Total annual investments in roads and highways increased from about ₹1.2 trillion in the Financial Year 2016 to an estimated ₹4.2 trillion in the Financial Year 2025, with projections suggesting a further rise to ₹4.4 trillion in the Financial Year 2026. This more than threefold increase underscores the strategic role of roads in enhancing connectivity, facilitating trade, and supporting economic expansion.

We also benefit from positive economic and structural factors in India that support strong passenger and commercial traffic growth toll collections rose from ₹76.00 crore/day in the Financial Year 2021 to about ₹200 crore/day in the Financial Year 2025. This steady growth and expected increase in annual toll collection provide a stable revenue stream for investors and support the financial sustainability of projects (*Source: CRISIL Report*). We believe the surge in toll collections is also a testament to the increasing demand for highway infrastructure in India, driven by rapid economic growth and urbanization. We believe we are well placed to capitalize on expected increases in consumption demand, which will be driven by a young and growing workforce as well as accelerating urbanization trends.

Overall, we believe that we are well positioned to leverage attractive transport and road sector tailwinds.

Strategies

We believe that the scale of the EAAA Platform, experience, and track record in the large and growing Indian transport sector, including roads positions us well for growth and operational efficiencies. We will focus on expanding our portfolio, implementing prudent policies, active asset management and building additional capabilities in the transport sector, including roads. The key aspects of this strategy include:

- Calibrated expansion of our portfolio;
- Implement prudent capital and risk management policies;
- Active asset management to drive growth and value enhancement backed by technology enabled O&M solutions; and
- Build capabilities to tap adjacency in the transport sectors, including roads.

1. Calibrated expansion of our portfolio.

We, through our Investment Manager, intend to capitalize on opportunities in the transport sector, including roads, to acquire road and other transport related projects in India that provide attractive cash flows and yields. When evaluating acquisition opportunities, our Investment Manager focuses on a broad set of investment criteria for informed asset selection. Key considerations include concession life, operating history, strategic location, competitive alternatives, entry barriers, reliability of counterparties, risk allocation, and improved efficiency. We typically undertake acquisitions after requisite due diligence has been completed. The EAAA Platform provides distinct and established strengths in asset acquisition demonstrated through the acquisition of 15 road assets from five distinct sellers and facilitating a systematic and adaptable strategy for building portfolios. It has effectively secured assets, which the Trust may have access to.

We aim to expand our portfolio pursuant to the ROFO Agreement, in relation to 11 Identified ROFO Assets (HAM assets) located in Punjab, Gujarat, Jharkhand, Andhra Pradesh, Telangana, and Karnataka.

Furthermore, we see substantial bidding and M&A opportunities emerging from major government initiatives, increasing divestment by private equity players and developers of BOT and HAM assets, and growing interest in stressed asset acquisitions. The Government of India announced the National Monetization Pipeline ("**NMP"**) in August 2021 on the principle of 'asset creation through monetization', that is, tapping private sector investment for new infrastructure creation (*Source: CRISIL Report*). The NMP allows private investors to operate and generate revenue from public assets for a fixed period, after which the assets are returned to the government with the aim to unlock value from existing government-owned infrastructure assets through monetization models such as PPPs, InvITs and TOT concessions (*Source: CRISIL Report*). The NHAI, under the guidance of the NMP, has institutionalized asset monetization as a long-term strategy (*Source: CRISIL Report*). The objective is to tap into private sector capital and operational efficiencies while recycling funds into greenfield projects and capacity augmentation (*Source: CRISIL Report*). In recent years, several investors and infrastructure developers have adopted a brownfield acquisition strategy to acquire operational or near-operational HAM road projects (*Source: CRISIL Report*). While we intend to construct a portfolio with road assets as its core, we, through our Investment Manager, will continue to focus on developing and growing an asset portfolio, diversified across geography and other transport sub-sectors, including ropeways, airports, railways, logistics infrastructure and dense charging infrastructure, primarily by leveraging our network presence and the network presence of the EAAA Platform.

Acquisition of HAM projects through a brownfield strategy exemplifies a maturing Indian road sector where operational efficiency, risk mitigation, and capital recycling converge to support sustainable infrastructure development and private sector participation in the national asset monetization agenda (*Source: CRISIL Report*). Despite initial delays in land acquisition and caution shown by lenders, the HAM model has seen increased participation in awarding, wherein of the total 6,306 km awarded in the Financial Year 2022, approximately 3,468 km were under the HAM model (*Source: CRISIL Report*). Looking ahead, the share of private investment is expected to increase, driven by the changes to the HAM bid eligibility criteria and changes in the model concession agreements. The HAM roads awarded in the Financial Year 2024 and the Financial Year 2025 were 654 km and 264 km, respectively (*Source: CRISIL Report*)

The Investment Manager believes it can effectively leverage the experience of the EAAA Platform and their network of relationships, as well as their extensive knowledge, experience, and expertise in the Indian transport sector, including roads, to successfully implement our acquisition strategy. This strategy includes identifying and acquiring both operational road and transport projects and those requiring last-mile funding. The Investment Manager remains committed to expanding the portfolio, while maintaining high standards in the operation and

management of existing Project SPVs. When evaluating acquisition opportunities, our key considerations include stable cash flows, traffic, location, and maintenance costs. Through this approach, the Investment Manager aims to deliver attractive and sustainable cash flows and yields, and to create long-term opportunities for both income generation and capital appreciation for Unitholders.

2. Implement prudent capital and risk management policies.

The Investment Manager intends to establish and implement a capital management strategy that aligns with its objective of maximizing distributions to Unitholders, while also generating consistent total returns. Our Investment Manager intends to focus on achieving an optimal capital structure for our projects and will continue to draw upon the experience, relationship and expertise of its affiliates in sourcing funds from multiple sources. Our Investment Manager will focus on optimizing our capital structures to align our debt management with asset cash flows, and we will continue to diversify our financing mix across a broad range of lenders and investors to enhance financial stability. Our Investment Manager will seek to employ appropriate financing policies and also diversify our funding sources with an objective of minimizing our overall cost of capital. This approach is designed to build on past successes, where the external debt portfolio for the Project SPVs, of more than ₹36,608.44 million as of March 24, 2026 is being managed, while securing significant interest rate reductions and credit rating upgrades.

Enterprise risk management is central to our compliance structure. Our Investment Manager will seek to put in place risk management mechanisms including risk registers for Project SPVs, allowing us to assess and respond to emerging risks. These are proposed to be monitored through a risk dashboard and subject to detailed quarterly risk reviews. To protect our operations, we also place a high priority on data integrity and cyber security.

By embedding prudent capital allocation, strong governance, and experienced leadership into our core strategy, our Investment Manager will continue to manage risk effectively, optimize financial performance, and build sustainable, long-term value across our asset portfolio. We intend to optimize leverage to preserve the flexibility necessary for sustainable and predictable cash flows, while continuing to assess potential future acquisition opportunities. Upon completion of the Issue, we believe we will possess sufficient equity capital and the capacity to incur additional debt as needed to acquire further assets, while maintaining a healthy credit rating, ensuring the maintenance of an optimal capital structure. After utilizing the Issue Proceeds, the Trust's total consolidated borrowings are expected to be less than 49% of the total value of the Trust's consolidated assets, in compliance with the InvIT Regulations. In accordance with and subject to the InvIT Regulations, the provisions of the Trust Deed, and the borrowing policy adopted by the Investment Manager, the aggregate consolidated borrowings and deferred payments of the Trust may be up to 70% of the aggregate of the InvIT assets, subject to the conditions prescribed under Regulation 20 of the InvIT Regulations. As a result, the Trust's consolidated balance sheet will provide flexibility to incur additional debt as required, including for the acquisition of additional assets, subject to approval of the Unitholders.

3. Active asset management to drive growth and value enhancement backed by tech enabled O&M solutions.

We intend to continue to manage our assets through a proactive, technology-driven, and life-cycle focused strategy for O&M. Our approach is centered on long-term asset preservation, cost optimization, and operational efficiency, executed through a framework built on strong oversight, experienced teams, proven vendor partnerships, and technological innovation. This includes supervision by our experienced techno-commercial team, the appointment of credible O&M vendors with clear service level agreements, and collaborations with research institutes like IIT Kharagpur, and the Central Road Research Institute to develop and implement new technologies.

The transport sector, including roads is a highly competitive sector that is capital intensive and requires significant expenditure. Our Investment Manager and Project Manager's ability to manage the costs associated with our assets is critical to maintaining the profit margins. We intend to manage costs through implementing a preventive maintenance programme, investing in innovative and sustainable materials, and leveraging advanced technologies to drive efficiency and control. For example, one key innovation is the introduction of GlasGrid in major maintenance works, which, despite requiring a higher initial expenditure, results in a more than proportionate reduction in future major maintenance cycles. This is achieved by delaying the reflective cracking on the bituminous surface. Use of sustainable materials in the major maintenance works is another important development. Recycled Asphalt Pavement ("**RAP**") material in bituminous works by milling the distress bituminous pavements and Steel Slag Aggregates, which is a byproduct of steel industry reduce the reliance on natural aggregates and bitumen, reducing the material costs and contributing to emission reduction.

We will also coordinate with the MoRTH, NHAI and local authorities to make sure that the new requirements of such agencies, to the extent reasonable, are complied with within each project timeline.

4. Build capabilities to tap adjacency in the transport sector, including roads.

India ranks as the world's fourth largest economy and is the fastest growing among major economies. India's economic growth, with GDP forecast to grow between 6.5 and 7.0 per cent annually over the next five years, is a primary driver for both our core road assets and related sectors. The transportation sector plays a critical role in India's economic activity, with roads, railways, water, and air transport collectively contributing to the nation's Gross Value Added ("**GVA**"). The trend over Financial Years 2020 to 2024 reflects both the structural dominance of road transport and steady growth in other transportation modes (*Source: CRISIL Report*). We aim to capitalize on the positive effects generated by increasing urbanization, private sector capital expenditure, and consumption demand. This strategic expansion will target opportunities in areas such as logistics hubs, multi-modal parks, and warehousing facilities, which benefit from the enhanced connectivity road network provides. By diversifying our portfolio, our Investment Manager aims to create new, synergistic revenue streams and enhance long-term resilience and value.

We aim to leverage our leadership and strong financial position to expand into adjacent transport infrastructure asset classes, including ropeways, airports, railways, logistics infrastructure and dense charging infrastructure. Ropeways are emerging as an eco-friendly, electricity-driven system with lower capital and operating costs than metro rail networks. Ideal for hilly and environmentally sensitive regions, ropeways provide enhanced connectivity with minimal land use and flexible alignment. Under the National Ropeways Development Programme-Parvatmala, launched in the Union Budget 2022-23 by the Government of India spearheaded by MoRTH with NHAI support, India is expanding ropeway connectivity through the PPP model. With more than 25 operational systems across 13 States, the initiative marks a shift from sporadic tourist projects to a coordinated effort promoting sustainable mobility. Flagship projects like the Sonprayag-Kedarnath and Govindghat-Hemkund Sahib ropeways will sharply reduce travel time and environmental pressure, while the Varanasi urban ropeway underscores their growing role in decongesting Indian (*Source: CRISIL Report*)

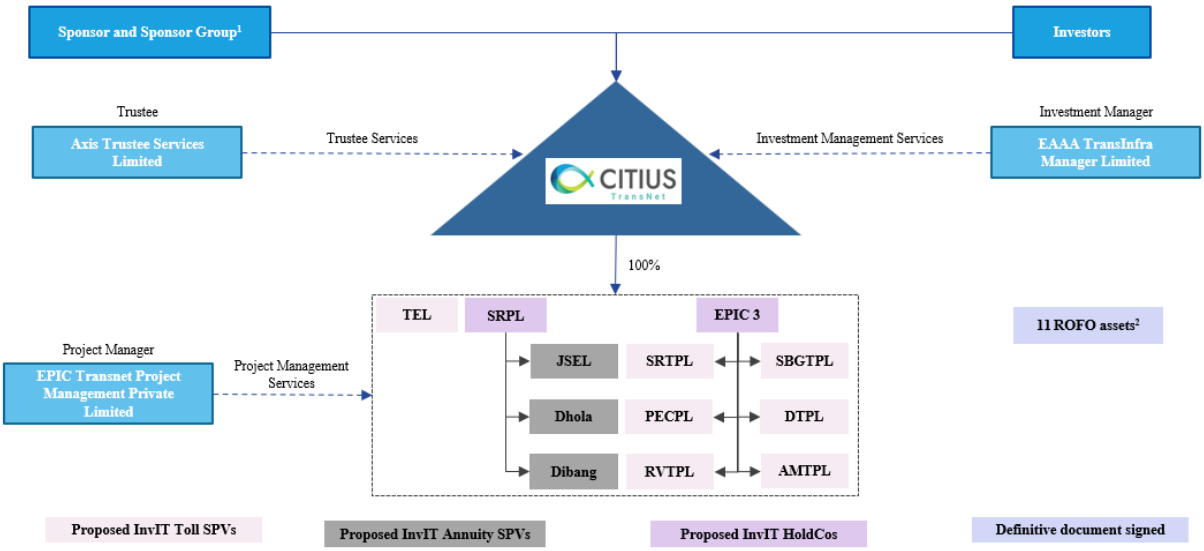
We also intend to leverage our financial management expertise and market insight. With a healthy balance sheet and sufficient headroom for additional borrowings, subject to any limitations under the InvIT Regulations, we have the capacity to pursue strategic acquisitions and investments in these new verticals. We aim to develop the necessary in-house capabilities for asset management, operations, and technical evaluation specific to these adjacencies through the Investment Manager, Project Manager and their respective affiliates. We will aim to pursue expansion to capitalize on the significant growth opportunities across the broader transport landscape while reinforcing our position as a premier infrastructure investment platform. Moreover, the expertise of project managers managing road assets complements other transport assets. Their skills in regulatory management, PPP concession frameworks, operations and maintenance, traffic forecasting, financial compliance and investor reporting, including use of asset monitoring & management technology tools, are equally critical in other transportation sub-sectors like airports, ropeways and metros. The strength of the operating processes adopted can also be applied in these transport sectors where user safety and asset reliability are of paramount importance not only in meeting the criteria laid down in relevant contracting frameworks but also in enhancing user experience (*Source: CRISIL Report*).

We believe that our ability to build a larger portfolio, combined with our experience in integrating and stabilising acquired assets, and the EAAA Platform team's ability to enhance related capabilities, enables us to expand our offering to include other transport infrastructure sectors.

The Trust

The Trust has been established with an objective to acquire, manage and invest in a portfolio of eligible transport infrastructure assets, including roads, in India. We were settled by way of the Trust Deed, by the Sponsor, and registered as an InvIT with SEBI on August 1, 2025, in accordance with the provisions of the InvIT Regulations.

The following chart illustrates our relationships and alignment with the Sponsor and the EAAA Platform following the completion of the Issue:



(1) Our Sponsor, Epic TransNet Infrastructure Private Limited was formerly known as Watrak Infrastructure Private Limited.

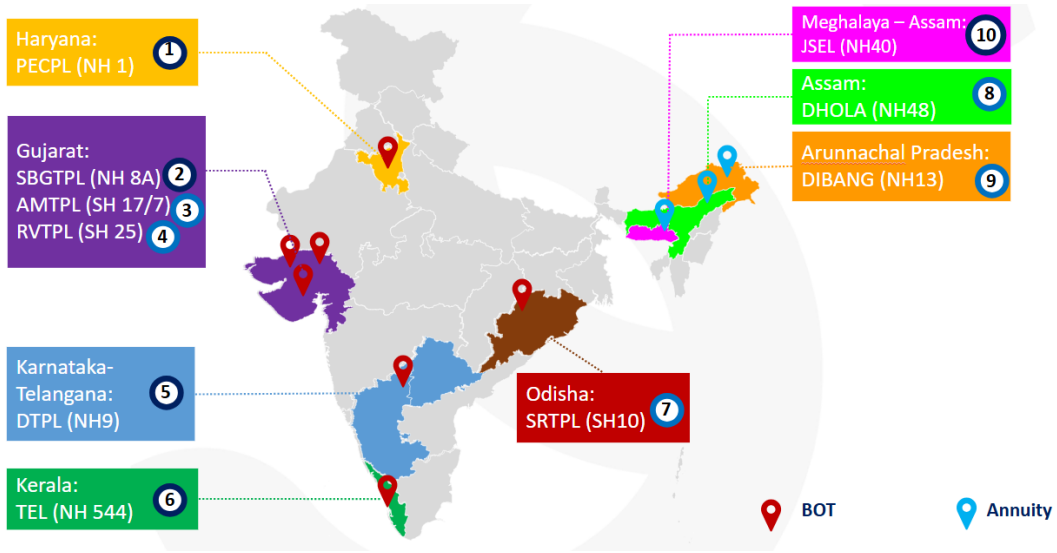
(2) The EAAA Platform has signed definitive documents to acquire ROFO assets. It has completed acquisition of five assets and is in process of completing the acquisition for balance six assets. These assets are proposed to be offered to the Trust under the ROFO Agreement.

For further details please see, "*Parties to the Trust*" on page 122.

A. The Project SPVs

Subject to completion of the Formation Transactions, our Project SPVs will include, 10 toll and annuity projects with a strong operational history and totaling 3,406.71 lane-km and comprise seven toll assets spanning over 3,043.22 lane-km, and three annuity assets spanning over 363.49 lane-km across nine Indian states as of the date of this Offer Document.

The image below provides the details of the locations of our Project SPVs:



(A) Our Toll Assets

Our seven toll assets span across six states namely, Kerala, Odisha, Karnataka, Telangana, Gujarat and Haryana, and over 3,043.22 lane-km with an average operational history of 10.13 years and a residual life (by EV weight) of 12.93 years. (*Source: CRISIL Report*)

The details of our toll project SPVs as of December 31, 2025 and their project wise revenue from operations (net of eliminations) for the year ended March 31, 2025 are provided in the table below:

Numbers ₹ in million, unless stated otherwise

Asset Name	Number of toll plazas	Authority	Location	Lanes *(in nos)*	Length *(kms)*	Concession period* *(years)*	PCOD	FCOD	Project wise revenue from operations (net of eliminations) (for Financial Year 2025 ₹ in million)
SBGTPL	1	NHAI	Gujarat	6	56.16	24	January 04, 2020	December 9, 2024	2,803.84
RVTPL	3	GSRDC	Gujarat	4	131.65	20	January 27, 2012	June 17, 2023	2,291.56
SRTPL	3	OWD	Odisha	4	161.73	22	March 13, 2018 for 159.57 km [(1)] August 12, 2019 for 2.16 km	March 30, 2021	3,039.18
AMTPL[(2)]	4	GSRDC	Gujarat	4	180.70	22	Section III April 7, 2012 Section IV May 5, 2012 Section I August 27, 2012 Section II November 1, 2012	June 22, 2023	4,003.37
DTPL	2	NHAI	Karnataka/ Maharashtra border	4	144.95	25	October 14, 2017	September 17, 2019 for 142.786 km October 20, 2023 for 2.164 km	2,466.11
TEL	1	NHAI	Kerala	6	28.36	20	March 09, 2022	June 14, 2024	1,628.30
PECPL	1	NHAI	Haryana	6	10.00	20	July 15, 2008	March 17, 2011	1,115.90
Total project wise revenue from operations (net of eliminations) for toll assets									**17,348.26**

**As per the respective Concession Agreements*

(1) the PCOD certificate is dated March 12, 2018 however, SRTPL was fit for commercial entry only from March 13, 2018 for a length of 159.57 kms and from August 12, 2019 for balance length of 2.16 km

(2) GSRDC has entered into a separate, additional concession agreement with AMTPL dated October 30, 2025 to augment a section of the highway (for a length of 28.75 km) from the existing four lanes to six lanes, on a construction, operation and maintenance to build, operate and transfer basis. We are awaiting the receipt of the appointed date to commission construction.

1. Samkhiali Bhachau Gandhidham Tollway Private Limited ("SBGTPL")

Concession agreement

On March 17, 2010 the NHAI and SBGTPL entered into a concession agreement for a 6-lane project of the Samkhiali - Gandhidham section of NH-8A from km 306.00 to km 362.16 (approximately 56.16 km) in the state of Gujarat on design, build, finance, operate and transfer on toll basis for a concession period of 24 years from the appointed date of September 11, 2010.

Asset description as per the Traffic Report

The project road of Samakhiali - Gandhidham section of NH-8A (new NH 41) with a length of 56.16 km, falls entirely in the Kutch district in the State of Gujarat. This national highway is the main traffic feeding arterial route for Kandla and Mundra Ports, connecting to the hinterlands spread out in the interiors of Gujarat and extending to Rajasthan, Haryana, Punjab and beyond. Mundra port is the largest commercial port in the country and a critical hub for container traffic. It handles a significant volume of cargo, including containers, dry bulk, liquid bulk, and

automobiles. This unique location makes the corridor an essential route for the import and export movement of goods, ensuring consistent and high-volume freight flow. Since most of the cargo entering or leaving through these ports needs to be transported inland, the project corridor plays a vital role in the national logistics chain, especially for both containerized and bulk cargo. The project road also serves a cluster of small industrial areas developed along the stretch of the road.

Asset location as per the Traffic Report

The following map illustrates the location of SBGTPL and the corridor it covers:



Network description as per the Traffic Report

NH-41 plays a crucial role in India's port-led development and export-import logistics, acting as the primary surface transport artery connecting some of the country's largest ports to the hinterland. Facilitating port connectivity, it acts as a direct link between the Kandla Port, which is a major port and the national freight grid via NH-27 and NH-48. It supports multimodal logistics, linking railheads, Inland Container Depots ("**ICDs**"), and logistics parks around Gandhidham and Anjar. The asset has a rail corridor on one side and the sea on the other side, and does not have any alternate route.

Traffic characteristics as per Traffic Report

This project has been collecting toll for almost 15 years and demonstrates a stabilised and consistent traffic pattern.

(a) **Short distance:** Short-distance traffic flows between Samakhiyali and Gandhidham-Bhuj, primarily related to the industries located along this corridor. This route supports the local movement of raw materials and finished goods within the industrial and trading hubs in the region.

(b) **Medium Distance:** Medium-distance traffic involves the movement of goods from industrial units in Morbi and Ahmedabad to Kandla and Mundra ports. This corridor handles a diverse mix of commodities, facilitating the transport of raw materials and finished products for export and import activities.

(c) **Long Distance:** Long-distance traffic to or from Mundra and Kandla ports extends to Rajasthan, Punjab, Haryana, and other northern regions, as well as to southern and western parts of India. This flow supports

the nationwide distribution of import-export cargo and industrial goods, making these ports critical gateways for trade across multiple regions.

Commodity mix as per Traffic Report

The asset supports different types of commodities, as provided below, reflecting industrial supply chains and port-based logistics.

Construction/Building Materials: Represents the largest share of commodity traffic on the corridor. This includes cement, aggregates, and related construction inputs, likely driven by regional infrastructure development and real estate growth, as well as port infrastructure expansion.

Courier & Parcel Goods: Indicates strong movement of general merchandise and packaged goods, including courier shipments and less-than-truckload cargo. Reflects the corridor's importance in logistics and e-commerce supply chains.

Empty Return Vehicles: A high percentage of empty truck movement suggests directional cargo patterns, especially after deliveries to inland locations. Common in port corridors where outbound loads are heavier than return shipments.

Manufacturing Goods: Includes transport of processed goods and machinery, highlighting the corridor's connectivity to manufacturing hubs across Gujarat and beyond.

Petroleum Products: A significant volume of petroleum, oil, and lubricants movement reflects supply operations linked to refineries and port-based fuel distribution.

Operations and maintenance

SBGTPL's 24 member in-house team, along with the Project Manager and HoldCo teams, undertakes operations and maintenance of the project. In operating and maintaining the project, SBGTPL is required to comply with detailed general and project-specific operating and maintenance standards. For further details, please see "*Summary of Concession Agreements*" on page 298.

Traffic volume as per the Traffic Report

The table below provides the details of SBGTPL's the traffic volume and growth in the traffic volume for the period indicated:

Particulars	For the year ended March 31					
	2023		2024		2025	
	Actual traffic	% increase from the previous period	Actual traffic	% increase from the previous period	Actual traffic	% increase from the previous period
CJV(1)	8,843	16.26%	9,748	10.24%	9,940	1.97%
LCV(2)	505	0.46%	519	2.84%	540	4.11%
Bus	723	18.64%	742	2.57%	745	0.48%
2AT(3)	774	15.02%	872	12.63%	924	5.97%
MAV + OSV (4)	15,560	4.06%	16,674	7.16%	17,687	6.08%
Total Vehicles	26,404	8.46%	28,554	8.14%	29,836	4.49%
Total PCU	84,110	5.81%	90,400	7.48%	95,349	5.47%

Source: Traffic Reports.

Notes:

(1) Car/ Jeep / Van
(2) Light Commercial Vehicles/ Minibus
(3) Truck with Two Axles
(4) Multi Axle Vehicle, includes truck with three axles or more and over sized vehicles

In the Financial Year 2025 the project commercial traffic contributed 87.23% of the AADT in terms of PCUs for SBGTPL.

Borrowings

As of March 24, 2026, the outstanding debt was ₹12,693.83 million. For more information, please see "*Financial Indebtedness and Deferred Payments*" on page 361.

Capital structure of the project

As of the date of this Offer Document, total equity share capital of SBGTPL was ₹805.40 million.

Ownership structure

For information about the ownership structure of SBGTPL, please see "*Formation Transactions in Relation to the Trust - Samkhiali Bhachau Gandhidham Tollway Private Limited*" on page 36.

2. Rajkot - Vadinar Tollway Private Limited ("RVTPL")

Concession agreement

On September 17, 2008, the GSRDC and RVTPL entered into a concession agreement for augmenting the existing road from km 3.00 to km 125.55, including the existing Jamnagar Bypass and Rajkot spur road (approximately 131.65 km) on the Rajkot-Jamnagar-Vadinar road, SH-25 to make it a 4-lane divided carriageway facility under the Viability Gap Funding Scheme of the Government of India on a build, operate and transfer basis, for a concession period of 20 years with the appointed date being September 12, 2009.

Asset description as per the Traffic Report

RVTPL is strategically positioned within India's largest petroleum refining zone, encompassing major players like Reliance and Nayara Energy in Jamnagar and Vadinar and, as a result, acts as a crucial freight corridor for both domestic and export-oriented fuel movement. The corridor acts as a key link between the western refinery belt and various parts of India, facilitating the flow of energy products, industrial goods, and raw materials. The project road lies within the districts of Rajkot, Jamnagar, and Devbhumi Dwarka in Gujarat, covering SH-25 from km 3.00 near Rajkot to km 125.55 near Vadinar. It serves key industrial hubs and ports including Bedi, Sikka, and Vadinar. The corridor also connects to mining areas in Khambhalia and links key urban centres and settlements such as Rajkot, Paddhari, Jamnagar, Depaliya, and Motikhavadi. It facilitates access to major tourist destinations like Dwarka, Bet Dwarka, and Porbandar.

Asset location as per the Traffic Report

The following map illustrates the location of RVTPL and the corridor it covers:



The corridor links the ports of Bedi, Sikka and Vadinar and passes along major refinery complexes of Reliance and Nayara Energy. This project also connects key tourist destinations like Nageshwar Temple, Beyt, and Somnath Temple, as well as beachside locations in Gujarat. The project road provides seamless connectivity to important industrial towns like Rajkot, Jamnagar, and Dwarka, linking them to the hinterlands in Gujarat and beyond, ensuring multimodal integration with maritime trade routes. Its close proximity to Jamnagar Airport enhances regional connectivity for business and logistics operations. It also integrates with rail freight lines serving refinery sidings and port terminals.

Network description as per the Traffic Report

RVTPL corridor serves as a critical transportation link connecting major industrial hubs in Gujarat, with distinct commodity profiles at each toll plaza reflecting regional economic activities. It handles diverse cargo ranging from petroleum products and chemicals to agricultural commodities and construction materials. The project serves Reliance Industries' and Nayara Energy's massive refinery complexes at Vadinar and Sikka. The project road provides direct connectivity to Devbhumi Dwarka, which is the second largest tourism attraction zone in Gujarat. There are no short distance alternate routes available that will impact the traffic the project.

Traffic characteristics as per the Traffic Report

(a) **Short Distance:** Short-distance traffic for RVTPL is primarily observed between Rajkot and Jamnagar, including the GIDC units located in Jamnagar and various industrial establishments along the corridor. This movement is largely driven by the exchange of raw materials and finished goods between these closely linked industrial centers.

(b) **Medium Distance:** Medium-distance traffic for RVTPL mainly flows from Jamnagar to Vadinar, encompassing the Reliance industrial units, and also extends towards Morbi. This corridor supports the movement of petroleum products, industrial goods, and raw materials, linking key production and processing centers within the region.

(c) **Long-distance:** Long distance traffic for RVTPL originates primarily from the Reliance and Nayara facilities near Jamnagar, extending towards Porbandar, Rajasthan, Punjab, Ahmedabad, and other parts of India. This movement includes a mix of petroleum products and industrial cargo, highlighting the corridor's role in supporting nationwide distribution from major refining and industrial hubs in western Gujarat.

Commodity mix as per the Traffic Report

The traffic on this corridor is predominantly freight-based, heavily skewed toward energy-related commodities, with a mix of supporting industrial and agricultural movements, and include the following:

Petroleum Products: Petroleum, oil, and lubricants form the backbone of the corridor's freight traffic. This high share reflects the intensive movement of refined products from Jamnagar and Vadinar refineries to distribution points across the country.

Empty Return Trips: A significant percentage of the traffic consists of empty vehicles returning after delivery, largely due to the directional nature of petroleum distribution logistics. The variation in percentages indicates differences in cargo flows across toll plazas and time periods.

Building Materials: Steady movement of construction materials supports ongoing development projects in the region, including industrial infrastructure and urban expansion.

Agricultural Commodities: Reflects localized farm produce movements, possibly toward processing centers or domestic markets within Gujarat or nearby States.

Manufacturing Goods: Represents transport of industrial goods such as machinery, parts, or processed materials, though limited in comparison to energy-related freight.

Traffic volume as per the Traffic Report

The table below provides the details of the traffic value and growth in the traffic volume for the period indicated:

Particulars	For the year ended March 31					
	2023		2024		2025	
	Actual traffic	% increase from the previous period	Actual traffic	% increase from the previous period	Actual traffic	% increase from the previous period
RVTPL - TP 1 (Paddhari)						
CJV(1)	11,890	13.55%	13,353	12.30%	14,675	9.90%
LCV(2)	440	(8.24)%	458	4.07%	469	2.26%
Bus	560	17.36%	566	1.07%	590	4.23%
2AT(3)	335	15.27%	372	10.96%	402	8.12%

Particulars	For the year ended March 31					
	2023		2024		2025	
	Actual traffic	% increase from the previous period	Actual traffic	% increase from the previous period	Actual traffic	% increase from the previous period
MAV(4)	2,128	(5.93)%	2,289	7.54%	2,534	10.71%
Total Vehicles	15,354	9.81%	17,038	10.96%	18,669	9.58%
Total PCU	24,815	4.80%	27,154	9.43%	29,757	9.58%
RVTPL - TP 2 (Dhroli)						
CJV(1)	11,924	14.19%	13,502	13.23%	14,897	10.33%
LCV(2)	492	3.22%	507	3.00%	520	2.65%
Bus	611	19.17%	624	2.08%	650	4.18%
2AT(3)	415	27.76%	428	3.04%	479	11.81%
MAV(4)	2,732	1.06%	2,890	5.79%	3,260	12.81%
Total Vehicles	16,175	11.86%	17,951	10.98%	19,806	10.34%
Total PCU	28,035	8.51%	30,422	8.52%	33,733	10.88%
RVTPL - TP 3 Bed						
CJV(1)	13,190	24.12%	15,178	15.07%	16,608	9.42%
LCV(2)	478	20.36%	533	11.63%	525	(1.45)%
Bus	710	27.91%	779	9.73%	840	7.79%
2AT(3)	393	54.50%	428	8.87%	447	4.47%
MAV(4)	3,503	2.60%	3,644	4.03%	3,640	(0.11)%
Total Vehicles	18,274	19.85%	20,562	12.52%	22,060	7.28%
Total PCU	32,979	13.66%	35,997	9.15%	37,637	4.55%

Source: Traffic Reports.

Notes:

(1) Car/ Jeep / Van
(2) Light Commercial Vehicles/ Minibus
(3) Truck with Two Axles
(4) Multi Axle Vehicle + Over Sized Vehicle, includes truck with three axles and more

In the Financial Year 2025, commercial traffic contributed to 47.94% of the AADT in terms of PCUs.

Operations and maintenance

RVTPL's 36 member in-house team, along with the Project Manager and the HoldCo teams, undertakes operations and maintenance of the project. In operating and maintaining the project, RVTPL is required to comply with detailed general and project-specific operating and maintenance standards. For further details, please see "*Summary of Concession Agreements*" on page 298.

Borrowings

As of March 24, 2026, the outstanding debt was ₹5,063.37 million. For more information, please see "*Financial Indebtedness and Deferred Payments*" on page 361.

Capital structure of the project

As of the date of this Offer Document, total equity share capital of RVTPL was ₹1,100.00 million.

Ownership structure

For information about the ownership structure of RVTPL, please see "*Formation Transactions in Relation to the Trust - Rajkot - Vadinar Tollway Private Limited*" on page 34.

3. Sambalpur-Rourkela Tollway Private Limited ("SRTPL")

Concession agreement

On November 8, 2013, the Governor of Odisha, represented by the Odisha Works Department and SRTPL entered into a concession agreement in relation to a 4-lane project with paved shoulders of the Sambalpur-Rourkela section

of State highway no. 10 ("**SH-10**") from km 4.90 to km 167.90 in the State of Odisha on a design, finance, build, operate and transfer basis for a concession period of 22 years with the appointed date being July 15, 2014.

Asset description as per the Traffic Report

This corridor, a strategic segment of SH-10 in Odisha, connects important districts of Sambalpur, Jharsuguda, and Sundargarh. The asset is also strategically located in a region where industrial activity and mineral resources converge, making it a critical freight corridor. The region includes prominent industrial zones and mineral-rich belts, particularly known for coal and iron ore deposits. The asset serves as a vital link between mining areas, industrial plants, and consumption centers, enabling efficient supply chain movements across Odisha and neighbouring states. This asset has been in operation for eight years. The project has demonstrated controlled violations and exemptions.

Asset location as per the Traffic Report

The SH-10 belt is among Odisha's most resource-rich and industrially active regions, hosting major public and private sector enterprises. Mining and mineral-based industries in Mahanadi Coalfields Limited, Rourkela Steel Plant, Vedanta Aluminum, Bhushan Power & Steel, Ultratech Cement, OCL India, and power utilities. Numerous thermal power plants and industrial townships are located along or near the corridor. The region contributes substantially to Odisha's industrial output and export capacity, driven by minerals, metal, and energy production. The asset serves neighbouring industrial clusters of iron, steel, aluminum, and cement. The road provides connectivity to the domestic airport in Jharsuguda. Angul and Raigarh, located in neighbouring districts, are also growing industrial cities that contribute to both passenger and goods traffic. Additionally, Coal India Limited manages significant coal mines situated in Sundargarh district, which support multiple industrial units in the region. The asset also provides direct connectivity to iron ore mines situated at Koira and Barbil. The industrial units, which include numerous SMEs in the region and mines are major contributors of traffic on the project road.

The following map illustrates the location of SRTPL and the corridor it covers:





Network description as per Traffic Report

The asset interlinks with key transport corridors, including NH-53 (Kolkata–Mumbai Corridor) at Sambalpur and NH-143 near Rourkela, connecting to Keonjhar and Jamshedpur. Proximity to Jharsuguda Airport and Rourkela Airport enhances regional accessibility. Integration with major rail freight routes of East Coast Railway and Southeastern Railway, enabling multimodal logistics. Micro alternate routes were closed during the implementation stage and even passenger vehicles prefer not to use the alternate route because of the narrow road in poor condition and long distance while compared to the project road.

Traffic characteristics as per Traffic Report

(a) **Short Distance:** Short-distance traffic for SRTPL flows primarily between Sambalpur and nearby industrial areas, including the industries in Jharsuguda and the industrial plants in Rourkela. This corridor supports local movement of raw materials and finished goods within these key industrial centers.

(b) **Medium Distance:** Medium-distance traffic involves the movement of coal from MCL mines to industries located in Sambalpur, Jharsuguda, and Rourkela, along with the transport of finished byproducts. This corridor supports the supply chain between mining and industrial processing centers in the region.

(c) **Long Distance:** Long-distance traffic primarily consists of iron ore transported from Keonjhar (Koida) to industries within the region, with finished products then moving onward to Andhra Pradesh and other parts of India. This route plays a crucial role in connecting mineral extraction centers with manufacturing hubs and broader markets across the country.

Commodity mix as per the Traffic Report

The asset predominantly handles heavy industrial and mineral commodity categories as provided below:

- **Manufacturing Goods:** A dominant category, reflecting movement of finished and semi-finished goods from local industries, steel plants, and fabrication units. The high range indicates variation across toll plazas and periods based on industrial output and demand.

- **Minerals:** Mainly includes coal and iron ore, transported from mining sites to industrial consumers such as power plants, steel units, and smelters, highlighting the asset's role as a key corridor for raw material movement.

- **Empty Vehicles:** A significant portion of vehicles return empty after delivery, typically in regions with unidirectional bulk commodity flow, especially from mines and plants to end-users. Indicates logistical imbalances common in freight corridors linked to extractive industries.

Traffic volume as per the Traffic Report

The table below provides the details of SRTPL's the traffic volume and growth in the traffic volume for the periods indicated:

Particulars	For the year ended March 31					
	2023		2024		2025	
	Actual traffic	% increase from the previous period	Actual traffic	% increase from the previous period	Actual traffic	% increase from the previous period
			TP - 1			
CJV[(1)]	4,220	9.45%	4,637	9.89%	5,071	9.36%
LCV[(2)]	204	6.06%	221	8.33%	202	(8.49)%
2AT[(3)]	432	9.35%	446	3.27%	492	10.30%
3A[(4)]	771	(0.87)%	769	(0.23)%	658	(14.49)%
MAV[(5)]	2,349	34.07%	3,135	33.48%	3,097	(1.21)%
Total Vehicles	7,976	14.38%	9,209	15.46%	9,521	3.39%
Total PCU	18,705	20.32%	22,724	21.49%	22,763	0.17%
			TP - 2			
CJV	3,192	7.28%	3,302	3.45%	3,666	11.02%
LCV	169	(29.73)%	146	(13.77)%	105	(27.80)%
2A	301	12.50%	316	4.81%	348	10.14%
3A	273	3.05%	271	(0.61)%	257	(5.20)%
MAV	3,679	37.51%	4,630	25.84%	5,049	9.06%
Total Vehicles	7,615	18.52%	8,666	13.79%	9,426	8.78%
Total PCU	21,726	27.98%	26,118	20.21%	28,362	8.59%
			TP - 3			
CJV	3,400	3.48%	3,580	5.30%	3,817	6.61%
LCV	136	(0.02)%	206	51.45%	160	(22.26)%
2A	346	4.05%	336	(3.01)%	328	(2.35)%
3A	256	13.30%	234	(8.79)%	184	(21.34)%
MAV	2,425	30.85%	3,235	33.39%	3,361	3.88%
Total Vehicles	6,564	12.51%	7,591	15.65%	7,850	3.41%
Total PCU	16,326	20.86%	20,157	23.46%	20,716	2.77%

Source: Traffic Reports.

Notes:

(1) Car/ Jeep / Van
(2) Light Commercial Vehicles/ Minibus
(3) Truck with Two Axles
(4) Truck with Three Axles
(5) Multi Axle Vehicle + Over Sized Vehicle

In the Financial Year 2025, the commercial traffic contributed to 82.12% of the AADT in terms of PCUs for SRTPL.

Operations and maintenance

SRTPL's 64 member in-house team, along with the Project Manager and the HoldCo teams, undertakes operations and maintenance of the project. For further details, please see "*Summary of Concession Agreements*" on page 298.

Borrowings

As of March 24, 2026, the outstanding debt was ₹6,589.29 million. For more information, please see "*Financial Indebtedness and Deferred Payments*" on page 361.

As of the date of this Offer Document, total equity share capital of SRTPL was ₹2,900.30 million.

Ownership Structure

For information about the ownership structure of SRTPL, please see "*Formation Transactions in Relation to the Trust - Sambalpur-Rourkela Tollway Private Limited*" on page 35.

4. Ahmedabad Maliya Tollway Private Limited ("AMTPL")

Concession agreement

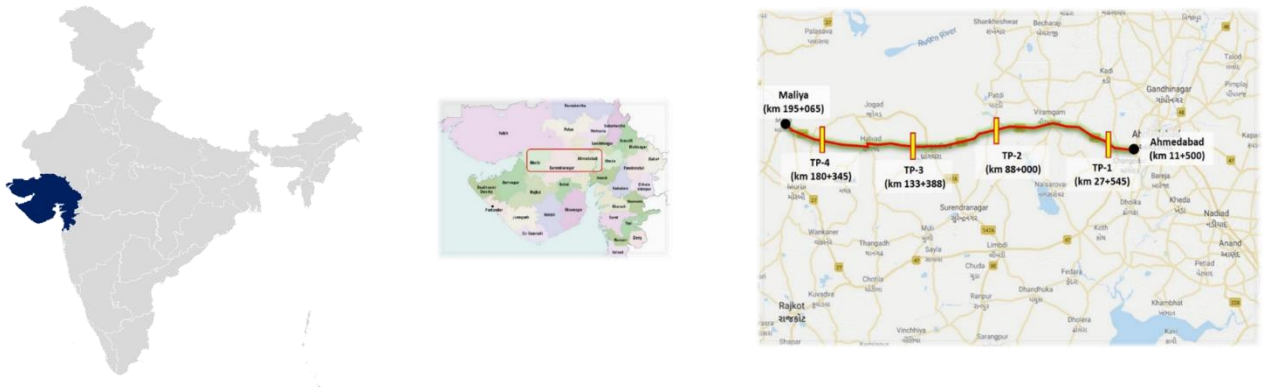
On September 17, 2008, the GSRDC and AMTPL entered into a concession agreement for additional two lanes from km 11.50 to km 195.07 (approximately 180.70 km) on the Ahmedabad-Viramgam-Halvad-Maliya section of the SH-17 for the section from Ahmedabad (Sarkhej) km 11.50 to Viramgam km 59.50 and SH-7 for the section from Viramgam km 59.50 to Maliya km 195.07 to make it a 4-lane divided carriageway facility on a build, operate and transfer basis, for a concession period of 22 years with the appointed date being October 12, 2009. The concession agreement for the project specifies the design capacity to be 60,000 PCUs for a four-lane project highway, however, the total projected traffic for the project road exceeds 60,000 PCUs in the Financial Year 2032 as per the projections based on the traffic growth rates. The base year traffic at the relevant toll plaza suggests that toll plaza is already operating at its design capacity and therefore GSRDC has recently approved the six laning of Shantipura near Ahmedabad to Khoraj near Viramgam section of the project road. This development is expected to bolster connectivity to the Sanand industrial hub, facilitating better access for businesses and encouraging further investments in the region. AMTPL has been appointed as a concessionaire for the upgradation of Shantipura Chokdi to Khoraj GIDC Chokdi forming part of this project highway SH-17 from existing a 4-lane with paved shoulder to a 6-lane and service road on BOT (toll) basis (Ch km 13+930 to km 42+683). The concession agreement for the same was executed on October 30, 2025 and the concession period for this concession will be 3 years, 11 months and 15 days following the end of ongoing concession. The construction in relation to this project under this concession agreement is yet to be commissioned, pending the appointed date under the concession agreement.

Asset description as per the Traffic Report

The Ahmedabad-Viramgam-Maliya section of SH-17 and SH-7 is one of many such critical corridors that had been 4-laned considering the future capacity constraints. The project highway connects the industrial areas of Sanand, Chharodi and Khoda, the pharmaceutical hub at Moraiya, ceramic tiles manufacturing hub in Morbi. It also provides connectivity to the important ports of Kandla and Mundra. Sanand has emerged as one of the fastest growing industrial hubs in the state and drawing investments from large domestic as well as multi-national companies. While having initial emerged as a hub for automotive, pharmaceutical and FMCG companies, Sanand is now pioneering India's semiconductor revolution. Also, the Kachchh district houses the largest sponge iron plant. The asset is also strategically positioned between Gujarat's major urban center, Ahmedabad, and key port locations. This makes it a critical link for both industrial supply chains and port-based logistics. The corridor serves as a vital transit route connecting industrial clusters in central Gujarat with western coastal ports like Kandla and Mundra, enabling efficient inland and export-bound cargo movement. Having regard to increased industrial activity around the project road, GSRDC has proposed 6-laning of a 28.75 km section of the project highway.

Asset Location as per the Traffic Report

The following map illustrates the location of AMTPL and the corridor it covers:





Network description as per the Traffic Report

The asset network is the principal transportation backbone for Asia's largest ceramic and tile manufacturing cluster, concentrated around Morbi and Wankaner, making it a vital link in Gujarat's industrial economy and for regions providing ceramic raw materials in Rajasthan. The project road connects the important cities of Ahmedabad, Vadodara, Surat in southern and eastern Gujarat to Bhuj, Gandhidham and Kutchh region in the west. The project stretch is also a key connecting route between the largest ceramic cluster of India (Morbi) and its key raw material providing regions of Rajasthan. The stretch experiences high-intensity freight movement, predominantly multi-axle heavy commercial vehicles ("**HCVs**") carrying port-bound and export-oriented cargo. It acts as the trunk feeder route for traffic originating from central Gujarat and Saurashtra's industrial clusters toward Mundra and Kandla ports. It also provides efficient access for industries in Sanand (automotive and engineering hub) and Morbi (ceramic and tile cluster) to the western export gateways. The corridor supports both inbound logistics (raw materials, fuel, packaging materials) and outbound exports (finished tiles, ceramics, and goods), ensuring balanced freight flow. This asset has an alternative route via NH-8A, which is 90 kilometres longer than the project road. NH-8A is currently being widened, and a structural toll rate will be enforced soon. As a result, traffic is unlikely to switch from the project road to the alternative route. Furthermore, the project road has been operational for more than 13 years without any recorded incidents of traffic diversion towards NH-8A. The section on NH-8A is currently mostly 6 laned but the tolling operation is for 4 lanes. As most of the 6 lane work is already complete, the traffic would have already shifted and the in-scope traffic which is almost negligible on the project road is the traffic which has been using the project road.

Traffic Characteristics as per the Traffic Report

(a) **Short Distance:** Short-distance traffic in the Ahmedabad region is primarily concentrated between Ahmedabad and nearby industrial hubs such as Sanand GIDC, Morbi's ceramic cluster units, and surrounding industries. This movement is largely driven by the flow of raw materials and finished goods between the city and these key manufacturing zones.

(b) **Medium Distance:** Medium-distance traffic from Ahmedabad extends towards industrial and logistics hubs such as Becharaji, Viramgam, Maliya, and Gandhidham. This corridor supports the movement of goods between Ahmedabad and key manufacturing, port-linked, and industrial zones, facilitating regional connectivity and trade flow.

(c) **Long distance:** Long-distance traffic in the region primarily originates from Kandla Port and the Morbi ceramic tile cluster, moving towards the southern and eastern parts of India. This flow is driven by the distribution of export-import cargo and finished ceramic products to major consumption markets across the country, highlighting the strategic importance of these industrial zones in long-haul freight movement.

Commodity mix as per the Traffic Report

This section is primarily driven by five major commodity categories, contributing significantly to its overall traffic profile, as provided below:

- **Construction Materials:** This is the leading commodity group with high volume indicating continuous infrastructure development and construction activities in the region, including residential, industrial, and port-related projects.

- **Manufacturing Goods:** Strong movement of manufactured goods indicates the corridor's role in linking production hubs to markets and ports. Key sectors include machinery, engineering goods, and fabricated textiles.

- **Courier & Parcel Commodities:** Represents logistics and courier movement, indicating rising e-commerce and SME trade along the route. The wide range shows variation in demand across different toll plazas.

- **Empty Vehicle Movements**: A significant portion of traffic comprises empty return trips, especially due to directional cargo flows from ports, reflecting the need for efficient backhaul cargo strategies to balance load utilization.

- **Petroleum, Oil and Lubricants:** Regular flow of fuel and lubricants, supporting both industrial consumption and transport sector needs.

Traffic volume as per the Traffic Report

The table below provides the details of AMTPL's the traffic volume and growth in the traffic volume for the periods indicated:

Particulars	For the year ended March 31					
	2023		2024		2025	
	Actual traffic	% increase from the previous period	Actual traffic	% increase from the previous period	Actual traffic	% increase from the previous period
Sanand (TP-1)						
CJV[(1)]	17,582	9.30%	19,596	11.46%	21,018	7.26%
LCV/Minibus [(2)]	1,340	6.13%	1,433	6.96%	1,601	11.74%
Bus	1,621	3.41%	1,718	5.96%	1,851	7.76%
Truck 2 Axle[(3)]	1,101	21.07%	1,240	12.56%	1,405	13.32%
MAV+OSV[(4)]	4,357	10.90%	4,494	3.16%	4,922	9.51%
Total Vehicles	26,000	9.46%	28,481	9.54%	30,797	8.13%
Total PCU	47,364	9.92%	50,842	7.34%	55,335	8.84%
Malvan (TP-2)						
CJV[(1)]	6,143	12.36%	6,657	8.38%	7,166	7.65%
LCV/Minibus [(2)]	412	(7.71)%	445	8.21%	479	7.59%
Bus	452	15.20%	456	0.82%	466	2.16%
Truck 2 Axle[(3)]	688	31.55%	689	0.07%	715	3.76%
MAV+OSV[(4)]	4,243	11.76%	4,100	(3.37)%	4,445	8.41%
Total Vehicles	11,938	12.35%	12,347	3.43%	13,271	7.48%
Total PCU	29,277	12.73%	29,210	(0.23)%	31,429	7.60%
Soladi (TP-3)						
CJV[(1)]	7,318	11.54%	8,073	10.32%	8,660	7.27%
LCV/Minibus [(2)]	605	2.90%	612	1.27%	656	7.16%
Bus	543	14.66%	552	1.60%	562	1.84%
Truck 2 Axle[(3)]	602	21.88%	675	12.18%	749	10.98%
MAV+OSV[(4)]	4,966	4.55%	5,416	9.05%	6,101	12.67%
Total Vehicles	14,034	9.08%	15,328	9.22%	16,729	9.14%
Total PCU	34,008	7.21%	37,043	8.92%	41,036	10.78%
Aniyari (TP -4)						
CJV[(1)]	5,192	16.43%	6,247	20.33%	6,361	1.82%
LCV/Minibus [(2)]	332	15.23%	378	13.65%	393	4.11%
Bus	287	22.74%	290	1.12%	289	(0.34)%
Truck 2 Axle[(3)]	436	23.67%	511	17.39%	551	7.66%
MAV+OSV[(4)]	4,268	9.34%	4,640	8.73%	5,088	9.66%

Particulars	For the year ended March 31					
	2023		2024		2025	
	Actual traffic	% increase from the previous period	Actual traffic	% increase from the previous period	Actual traffic	% increase from the previous period
Total Vehicles	10,514	13.83%	12,067	14.76%	12,682	5.10%
Total PCU	27,063	11.76%	30,100	11.22%	32,368	7.53%

Source: Traffic Reports.

Notes:

(1) Car/ Jeep / Van
(2) Light Commercial Vehicles/ Minibus
(3) Truck with Two Axles
(4) Multi Axle Vehicle + Over Sized Vehicle

In the Financial Year 2025,the commercial traffic contributed to 69.30% of the AADT in terms of PCUs for AMTPL.

Operations and maintenance

AMTPL's 51 member in-house team, along with the Project Manager and the HoldCo teams, undertakes operations and maintenance of the project. In operating and maintaining the project, AMTPL is required to comply with detailed general and project-specific operating and maintenance standards. For further details, please see "*Summary of Concession Agreements*" on page 298.

Borrowings

As of March 24, 2026, the outstanding debt was ₹9,389.83 million. For more information, please see "*Financial Indebtedness and Deferred Payments*" on page 361.

Capital structure

As of the date of this Offer Document, total equity share capital of AMTPL was ₹1,490.00 million.

Ownership Structure

For information about the ownership structure of AMTPL, please see "*Formation Transactions in Relation to the Trust - – Ahmedabad-Maliya Tollway Private Limited*" on page 30.

5. Deccan Tollways Private Limited ("DTPL")

Concession agreement

On February 2, 2012, the NHAI and DTPL entered into a concession agreement for a 4-lane project of the existing road from km 348.80 to km 493.00 (approximately 144.95 km) on the Maharashtra/ Karnataka border–Sangareddy section of NH-9 in the States of Karnataka and Andhra Pradesh on design, build, finance, operate and transfer on toll basis, for a concession period of 25 years with the appointed date being April 1, 2014.

Asset description as per the Traffic Report

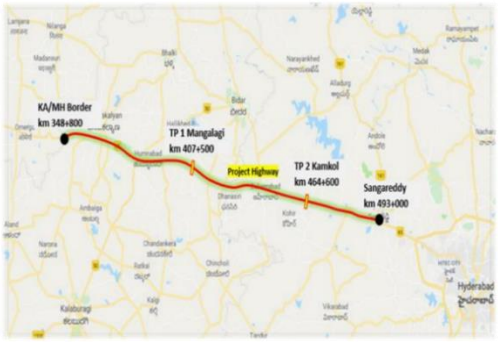
The NH- 65 (old NH-9) originates from Pune in the State of Maharashtra and ends at Machilipatnam in the state of Andhra Pradesh. The highway passes through several important cities such as Indapur, Solapur, Omerga, Humnabad, Zaheerabad, Hyderabad, Suryapet and Vijayawada with a total length of 920 km. The project road section of 144.95 km starts from the Maharashtra/Karnataka border in Karnataka and ends at Sangareddy in the State of Telangana. The asset is strategically situated on a key corridor connecting two major economic and industrial centers of India, Pune and Hyderabad. This alignment makes the assets a critical link for freight movement between Maharashtra and Telangana, serving both intra-state and inter-state logistics needs. Given its location, a significant share of commercial and industrial traffic between Pune and Hyderabad naturally passes through this corridor, ensuring steady and high-volume usage.

Asset location as per the Traffic Report

The following map illustrates the location of DTPL and the corridor it covers:









Network description as per the Traffic Report

The DTPL asset functions as a critical multi-commodity corridor, facilitating seamless freight movement between two of South India's most significant cities. The corridor intersects several major north-south routes, effectively forming feeder and distribution channels for long-haul freight. It connects with major corridors including, NH-48 (Mumbai–Chennai Corridor) near Pune and NH- 44 (Delhi–Bengaluru Corridor) near Hyderabad along with NH-16 (Kolkata–Chennai Coastal Corridor) near Vijayawada. Apart from the Chennai Surat Expressway, there are no major alternative routes at either the local or broader network level. Even minor alternate routes were identified, and potential leakages were addressed by installing check plazas.

Traffic Characteristics as per the Traffic Report

(a) **Short Distance:** Short-distance traffic for DTPL primarily flows between Humnabad, Bidar, and Zaheerabad, serving the industries located along this corridor and extending towards Hyderabad. This route facilitates local movement of raw materials and finished goods within these industrial and urban centers.

(b) **Medium Distance:** Medium-distance traffic flows between the cement hubs in Kalaburgi and key industrial centers such as Bidar, Zaheerabad's Mahindra & Mahindra plant, MRF Industries, and sugarcane processing units along the corridor. This movement primarily supports the transport of cement, industrial goods, and agricultural products within the region.

(c) **Long distance:** Long-distance traffic moves from Gujarat, Mumbai, and Pune to Zaheerabad, Hyderabad, Bangalore, and Chennai, carrying a diverse mix of commodities including tiles, agricultural products, and auto components. This corridor plays a key role in connecting major industrial and commercial centers across western and southern India.

Commodity mix as per the Traffic Report

The asset handles a wide range of commodity categories, as provided below, indicating a robust and balanced traffic base not overly reliant on a single sector:

- **Courier & Parcel Commodities**: Strong movement of parcel freight highlights the corridor's role in express logistics and e-commerce. Includes courier shipments, general merchandise, and packaged goods.

- **Construction/ Building Materials**: A key contributor to freight volume, reflecting active construction and infrastructure development in regions connected by the corridor. Likely, it includes cement, steel, sand, and aggregates.

- **Automobile/ Manufacturing Goods**: Indicates the presence of industrial and automotive supply chains, particularly between Pune's industrial hubs and Hyderabad's manufacturing zones.

- **Empty Vehicle Movements**: Reflects directional cargo flows, especially from high-consumption areas to production hubs. High percentage of empty return trips is common in corridors with uneven cargo demand.

- **Agricultural Commodities**: A substantial component of freight volume, likely comprising food grains, pulses, vegetables, and perishables. Demonstrates the corridor's importance in agri-trade and rural supply chains.

Traffic Volume as per the Traffic Report

The table below provides the details of DTPL's the traffic volume and growth in the traffic volume for the period indicated:

Particulars	**For the year ended March 31**					
	2023		**2024**		**2025**	
	Actual traffic	**% increase from the previous period**	**Actual traffic**	**% increase from the previous period**	**Actual traffic**	**% increase from the previous period**
Mangalgi (TP-1)						
CJV(1)	5,668	25.90%	5,860	3.38%	5,829	(0.53)%
LCV/Minibus (2)	523	(4.55)%	541	3.36%	554	2.42%
Bus	515	52.38%	514	(0.19)%	514	(0.09)%
Truck 2 Axle(3)	1,318	13.26%	1,332	1.05%	1,340	0.54%
Truck 3-Axle (4)	897	(1.18)%	814	(9.17)%	754	(7.36)%
MAV+OSV(5)	2,179	14.90%	2,143	(1.63)%	2,128	(0.69)%
Total Vehicles	11,101	18.65%	11,205	0.94%	11,119	(0.77)%
Total PCU	24,448	15.95%	24,298	(0.61)%	24,061	(0.98)%
Kamkole (TP-2)						
CJV(1)	11,197	21.02%	12,403	10.77%	13,203	6.45%
LCV/Minibus (2)	841	(3.76)%	859	2.10%	908	5.75%
Bus	1,009	31.12%	989	(2.01)%	950	(3.89)%
Truck 2 Axle(3)	1,548	13.92%	1,652	6.70%	1,761	6.57%
Truck 3-Axle (4)	1,071	(0.61)%	1,048	(2.15)%	993	(5.21)%
MAV+OSV(5)	2,359	16.66%	2,381	0.93%	2,399	0.74%
Total Vehicles	18,025	17.39%	19,331	7.25%	20,214	4.57%
Total PCU	33,959	15.97%	35,472	4.45%	36,472	2.82%

Source: Traffic Reports.

Notes:

(1) Car/ Jeep / Van
(2) Light Commercial Vehicles/ Minibus
(3) Truck with Two Axles
(4) Truck with three axles
(5) Multi Axle Vehicle + Over Sized Vehicle

In the Financial Year 2025, the the commercial traffic contributed to 62.68% of the AADT in terms of PCUs for DTPL.

Operations and maintenance

DTPL's 27 member in-house team, along with the Project Manager and the HoldCo teams, undertakes operations and maintenance of the project. DTPL is required to comply with detailed general and project-specific operating and maintenance standards. For further details, please see "*Summary of Concession Agreements*" on page 298.

Borrowings

As of March 24, 2026, the outstanding debt was ₹20,464.06 million. For more information, please see "*Financial Indebtedness and Deferred Payments*" on page 361.

Capital structure of the project

As of the date of this Offer Document, total equity share capital of DTPL was ₹2,853.40 million.

Ownership Structure

For information about the ownership structure of DTPL, please see "*Formation Transactions in Relation to the Trust - Deccan Tollways Private Limited*" on page 31.

6. *Thrissur Expressway Limited ("TEL")*

Concession agreement and period

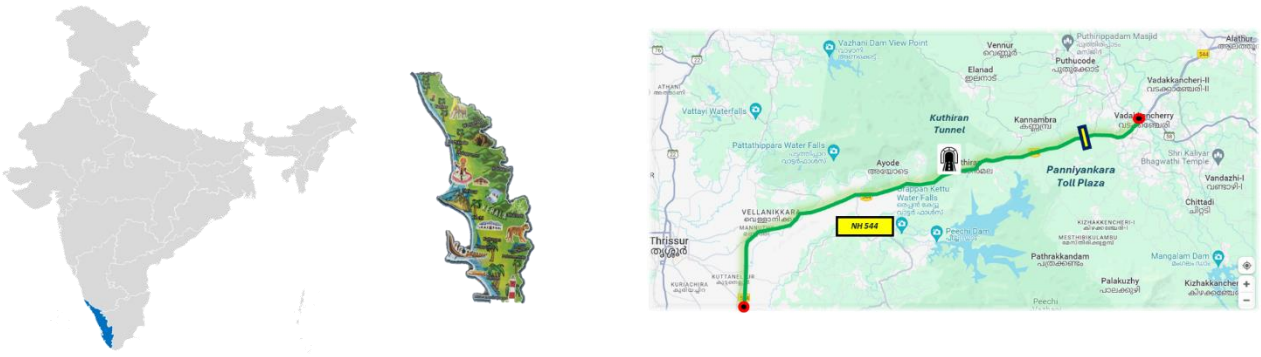
On August 24, 2009, NHAI and TEL entered into a concession agreement. TEL was engaged for the construction of a 6-lane project of the Vadakanchery-Thrissur section of NH-47 from km 240.00 to km 270.00 (approximately 28.36 km) in the state of Kerala on a design, build, finance, operate and transfer basis, for a concession period of 20 years with the appointed date being September 15, 2012.

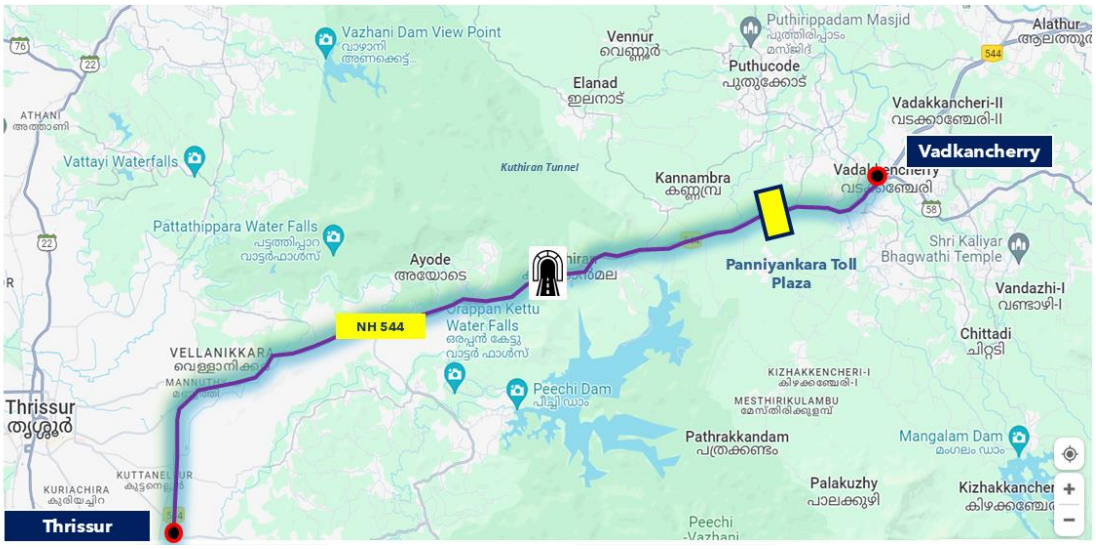
Asset description as per the Traffic Report

The asset is a 6-lane stretch of NH-544 (old NH-47), a critical corridor connecting Salem in Tamil Nadu to Kochi in Kerala. This highway serves as a major arterial route linking Kerala with Tamil Nadu and the rest of India. A key feature of this asset is the 1.60 km Kuthiran Tunnel, which is Kerala's first twin-tube tunnel with three lanes in each direction passing through the Peechi-Vazhani Wildlife Sanctuary. The tunnel significantly enhances traffic flow and safety by bypassing a previously congested and accident-prone ghat section. The route traverses several key cities including Thrissur, Palakkad, Coimbatore, and Erode.

Asset location as per the Traffic Report

The following map illustrates the location of TEL and the corridor it covers:





Network Description as per the Traffic Report

Kerala has limited access points to neighbouring states due to its terrain. Major entry routes include, NH-66 from Mangalore (Karnataka) along the coast, NH-544 via this asset from the east, NH-85 from Madurai via Munnar, and NH-766 from Kollegal (Karnataka) through Mysuru to Kozhikode. Other routes, such as NH-183 through Kottayam and the southern corridor from Tirunelveli to Kochi, have difficult terrains and are unsuitable for heavy vehicles. This makes NH-544 a crucial logistics and transport lifeline into Kerala. The asset serves as a critical connectivity link between Tamil Nadu and Kerala, facilitating seamless movement of goods across state borders. This corridor plays a major role in regional logistics, supporting trade and supply chains between the industrial hubs of Tamil Nadu and the consumption-driven markets of Kerala. Kerala has a 590 km long coastline and is home to 18 ports, including the major port at Kochi. The asset is located approximately 110.00 km from Kochi port, which is especially important for port-related traffic and commercial activity moving inland from the coast. Kochi port handled 37.75 million metric tonnes of cargo in the Financial Year 2025. Moreover, this asset does not have any significant alternate route since alternative routes, such as NH-183 through Kottayam or the Southern Corridor from Tirunelveli to Kochi, have poor geometric condition and require long detour due to hilly terrain.

Traffic Characteristics as per the Traffic Report

(a) **Short Distance:** Short-distance traffic is prominent between Panniyankara, Palakkad, Vadakancherry, Aluva, Ernakulam, and Thrissur, forming a vital intra-regional corridor within central Kerala. These locations are interconnected by dense road networks that support frequent passenger and freight movement driven by economic activities such as trade, employment, education, and services. Ernakulam, as a commercial hub, attracts significant daily traffic from nearby towns like Aluva and Vadakancherry, while Palakkad and Thrissur serve as key transit and market centres. This local connectivity plays a crucial role in sustaining regional mobility and economic integration.

(b) **Medium Distance:** Medium-distance travel between Coimbatore and Pollachi in Tamil Nadu to Thrissur in Kerala forms a significant regional transit corridor that facilitates both passenger and goods movement. This route supports a steady flow of commercial vehicles transporting agricultural produce, textiles, and industrial goods from Tamil Nadu into Kerala, while also accommodating daily commuters, traders, and tourists. Coimbatore, being a major industrial and textile hub, generates high outbound freight traffic, much of which is directed toward Thrissur's commercial markets and distribution centres. The corridor also serves as an important link for inter-state connectivity, contributing to the economic integration of western Tamil Nadu and central Kerala.

(c) **Long distance:** Long-distance freight movement along this corridor is primarily driven by 3-axle trucks and multi-axle vehicles, facilitating high-volume transport between major industrial and commercial hubs in Tamil Nadu and Karnataka, such as Coimbatore, Pollachi, Madurai, Chennai, and Bangalore, and key destinations in Kerala including Ernakulam, Kochi, and surrounding regions. These routes handle the transportation of a wide range of goods including machinery, consumer products, textiles, automotive parts, and perishable items. The corridor plays a vital role in sustaining Kerala's consumption-driven economy by ensuring a continuous supply of goods from the more industrialized neighbouring states. It

also serves as a critical logistics network for export-import activities through Kochi port, linking inland production centres with maritime trade gateways.

Commodity mix as per the Traffic Report

The asset handles a wide range of commodity categories as provided below, indicating a robust and balanced traffic base not overly reliant on a single sector.

- **Agricultural Commodities:** A major driver of traffic, reflecting the movement of perishable and non-perishable agri-products such as vegetables, spices, coconuts, and grains. The volume indicates strong farm-to-market linkages and Kerala's dependence on inflows from Tamil Nadu.

- **Empty Vehicles:** A high percentage of empty return trips, likely due to directional trade imbalance, with heavier inflows to Kerala and limited outbound cargo. Common in corridors where consumption exceeds production at one end.

- **Building Materials:** Includes cement, steel, tiles, and aggregates, driven by ongoing construction and infrastructure activities in Kerala. Reflects the asset's importance for construction logistics.

Traffic volume as per the Traffic Report

The table below provides the details of TEL's the traffic volume and growth in the traffic volume for the periods indicated:

Particulars	For the year ended March 31					
	2023		2024		2025	
	Actual traffic	% increase from the previous period	Actual traffic	% increase from the previous period	Actual traffic	% increase from the previous period
CJV[(1)]	16,019	-	17,532	9.45%	17,943	2.34%
LCV/Minibus [(2)]	1,921	-	2,004	4.32%	2,065	3.05%
Bus /Truck 2 Axle [(3)]	2720	-	2,832	4.13%	2,886	1.90%
Truck 3 Axle[(4)]	1,195	-	1,041	(12.87)%	939	(9.80)%
MAV+OSV[(5)]	3,058	-	3,499	14.41%	3,130	(10.54)%
Total Vehicles	24,914	-	26,909	8.01%	26,964	0.20%
Total PCU	44,409	-	47,906	7.87%	46,604	(2.72)%

Source: Traffic Reports.

Notes:

(1) Car/ Jeep / Van
(2) Light Commercial Vehicles/ Minibus
(3) Bus and Truck with Two Axles
(4) Truck with Three Axles
(5) Multi Axle Vehicle + Over Sized Vehicle

In the Financial Year 2025, the commercial traffic contributed to 52.75% of the AADT in terms of PCUs for TEL.

Operations and maintenance

TEL's 12 member in-house team, along with the Project Manager and the HoldCo teams, undertakes operations and maintenance of the project. For further details, please see "*Summary of Concession Agreements*" on page 298.

Borrowings

As of March 24, 2026, the outstanding debt was ₹13,636.88 million. For more information, please see "*Financial Indebtedness and Deferred Payments*" on page 361.

Capital structure of the project

As of the date of this Offer Document, total equity share capital of TEL was ₹0.77 million.

Ownership structure

For information about the ownership structure of TEL, please see "*Formation Transactions in Relation to the Trust - Thrissur Expressway Limited*" on page 36.

7. Panipat Elevated Corridor Private Limited ("PECPL")

Concession agreement

On July 27, 2005, the NHAI and PECPL entered into a concession agreement for a 6-lane project for a portion from km 86.00 to km 96.00 (approximately 10.00 km) covering Panipat city, on NH-1 in Haryana, and construction of a 6-lane elevated structure covering Panipat city, widening and construction of peripheral lanes and operation and maintenance thereof on build, operate and transfer basis, for a concession period of 20 years with the appointed date being January 23, 2006.

Asset description as per the Traffic Report

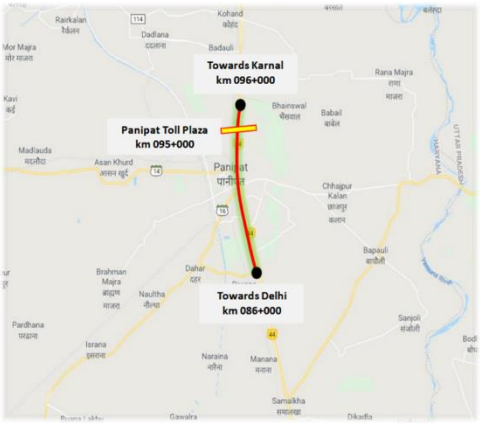
PECPL is strategically located in the state of Haryana, serving as a key link between Delhi and Chandigarh. The corridor spans approximately 10 km, including a 3.40 km, 6-lane elevated section that traverses the city of Panipat in a south-to-north direction. The entire corridor is access-controlled, meaning entry and exit are restricted to designated points located at either end of the road. Alongside the main carriageway, local service roads run parallel on both sides and are also included under the concession scope. A single toll plaza is positioned at the northern end of the corridor, north of Panipat, while a U-turn just south of the toll plaza enables toll-free movement for local traffic. The road infrastructure is of consistently high quality throughout, with access control ensuring that the main carriageway remains free from interference by non-motorized or low-speed local traffic, thereby enhancing safety and traffic efficiency. The corridor runs through a region with strong industrial presence, enabling diverse freight movement and a steady flow of both raw materials and finished goods. This asset has one of the longest operation histories in the entire portfolio. Traffic trends have seen different cycles and travel patterns are stabilized and consistent in movement.

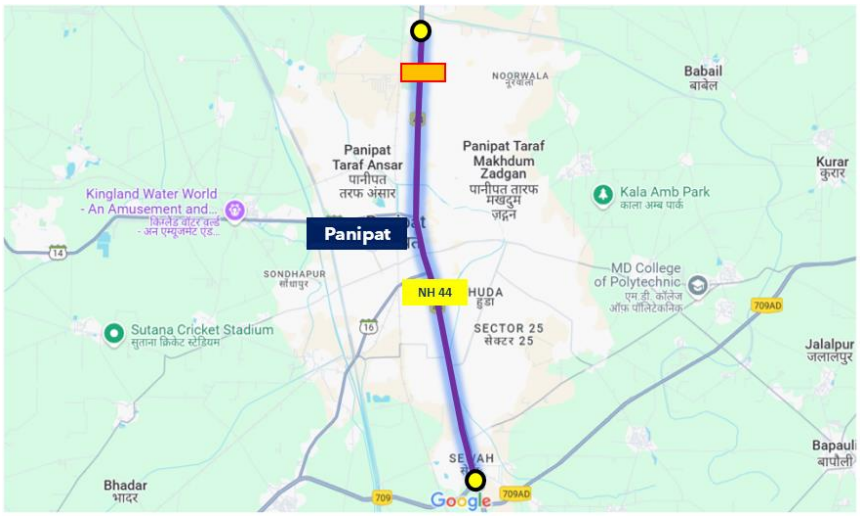
Asset location as per the Traffic Report

The following map illustrates the location of PECPL and the corridor it covers:









Network description as per the Traffic Report

The project road is part of NH-44 (old NH-1) which serves as a vital link between Delhi, Haryana, and Punjab, traversing through Haryana and eastern Punjab along its route passing through significant urban centers such as Sonipat, Panipat, Ambala, Ludhiana, Jalandhar, and Amritsar before ending at the Wagah border. The project corridor is a part of the longest national highway in India. It passes through the Union Territory of Jammu & Kashmir, in addition to the states of Punjab, Haryana, Delhi, Uttar Pradesh, Rajasthan, Madhya Pradesh, Maharashtra, Telangana, Andhra Pradesh, Karnataka, and Tamil Nadu spanning a length of 4,112 km. This highway, formed through the amalgamation of seven national highways, spans various regions, beginning with the Jammu-Srinagar National Highway (formerly NH-1A) from Srinagar in Jammu and Kashmir, extending through the former NH-1 in Punjab and Haryana, to reach Delhi. It incorporates parts of the former NH-2 from Delhi to Agra, including the former NH-3 (popularly known as Agra-Bombay National Highway) from Agra to Gwalior. The highway also comprises former NH-75 and former National Highway no. 26 to Jhansi, and former National Highway no. 7 via various cities such as Lakhnadon, Seoni, Nagpur, Adilabad, Hyderabad etc.

Traffic characteristics as per the Traffic Report

(a) **Short Distance**: Most of the traffic on the Delhi-Ambala route originates from Delhi, with Panipat and Sonipat also contributing significantly. Karnal and Ambala function as key hubs, attracting traffic from various northern regions. Additionally, Sonipat and Panipat serve as common destinations for vehicles traveling along this corridor.

(b) **Medium Distance:** The medium-distance traffic along the Delhi–Ludhiana corridor primarily originates from Delhi, with Ludhiana acting as a major destination. Along the route, key cities such as Panipat, Karnal, Kurukshetra, and Ambala contribute to both originating and terminating traffic. This corridor supports a mix of regional and intercity movement, with Ludhiana serving as a significant industrial and commercial hub drawing traffic from various points along the way.

(c) **Long Distance:** The long-distance traffic on this corridor extends beyond Ludhiana, with a notable portion heading towards Punjab and further into Jammu and Kashmir. These regions contribute to the overall traffic flow, with Punjab being a major destination due to its industrial and agricultural significance, while Jammu and Kashmir attracts long-haul movement related to trade and connectivity with northernmost parts of the country.

Commodity mix as per the Traffic Report

The asset handles a wide variety of commodities, as provided below, reflecting the economic and industrial complexity of the region it serves:

- **Agricultural Products:** Strong representation of agri-based freight indicates robust trade in food grains, produce, and related goods; common in Punjab and Haryana regions.
- **FMCG Goods:** Reflects high consumer demand and regular supply chain movements to serve urban and semi-urban markets in and around the corridor.

- **Construction Materials:** Indicates ongoing development activities, including urban expansion, infrastructure projects, and real estate growth along the corridor.

- **Manufacturing Goods:** Represents a healthy share of industrial freight, driven by active manufacturing clusters in Punjab, Haryana, and the NCR region.

- **Empty Loads**: A significant share of traffic comprises empty return trips, which is typical for high-volume corridors with directional cargo flow, especially from manufacturing hubs.

Traffic volume as per the Traffic Report

The table below provides the details of PECPL's the traffic volume and growth in the traffic volume for the periods indicated:

Particulars	For the year ended March 31					
	2023		2024		2025	
	Actual traffic	% increase from the previous period	Actual traffic	% increase from the previous period	Actual traffic	% increase from the previous period
CJV(1)	41,042	(0.39)%	42,580	3.75%	44,101	3.57%
LCV(2)	2,752	10.89%	2,419	(12.11)%	2,442	0.97%
Bus	2,062	26.81%	2,217	7.50%	2,416	8.99%
Truck*	9,715	(8.96)%	9,171	(5.60)%	9,187	0.17%
PCU	80,504	(1.61)%	80,373	(0.16)%	82,575	2.74%

Source: Traffic Reports.
Notes:
(1) Car/ Jeep / Van
(2) Light Commercial Vehicles/ Minibus
*(3) *Truck with Two Axles +Multi Axle Vehicle + Over Sized Vehicle*

In the Financial Year 2025, the commercial traffic contributed to 37.81% of the AADT in terms of PCUs for PECPL.

Operations and maintenance

PECPL's 14 member in-house team, along with the Project Manager and the HoldCO teams, undertakes operations and maintenance of the project. In operating and maintaining the project, PECPL is required to comply with detailed general and project-specific operating and maintenance standards. For further details, please see "*Summary of Concession Agreements*" on page 298.

Borrowings

As of March 24, 2026, the outstanding debt was ₹1,677.16 million. For more information, please see "*Financial Indebtedness and Deferred Payments*" on page 361.

Capital structure of the project

As of the date of this Offer Document, total equity share capital of PECPL was ₹300.47 million.

Ownership structure

For information about the ownership structure of PECPL, please see "*Formation Transactions in Relation to the Trust - Panipat Elevated Corridor Private Limited*" on page 34.

(B) Our Annuity Assets

Our three annuity assets span across three states namely, Arunachal Pradesh, Assam and Meghalaya.

The details of our annuity project SPVs as of December 31, 2025 and their project wise revenue from operations (net of eliminations) for the year ended March 31, 2025 are provided in the table below:

Numbers ₹ in million, unless stated otherwise

Asset Name	Type	Authority	Location	Lanes *(in nos)*	Length *(kms)*	Concession period* *(years)*	PCOD	FCOD	Project wise revenue from operations (net of eliminations) (for Financial Year 2025)
Dibang	Annuity	MoRTH	Arunachal Pradesh	2	29.64	17	May 19, 2018	December 12, 2018	384.14
Dhola	Annuity	MoRTH	Assam	2	28.51	17	August 31, 2017	October 13, 2018	658.82
JSEL	Annuity	NHAI	Assam and Meghalaya	4	61.80	20	January 28, 2016	August 30, 2019	1,479.25
Total project wise revenue from operations (net of eliminations) from annuity assets									**2,522.21**

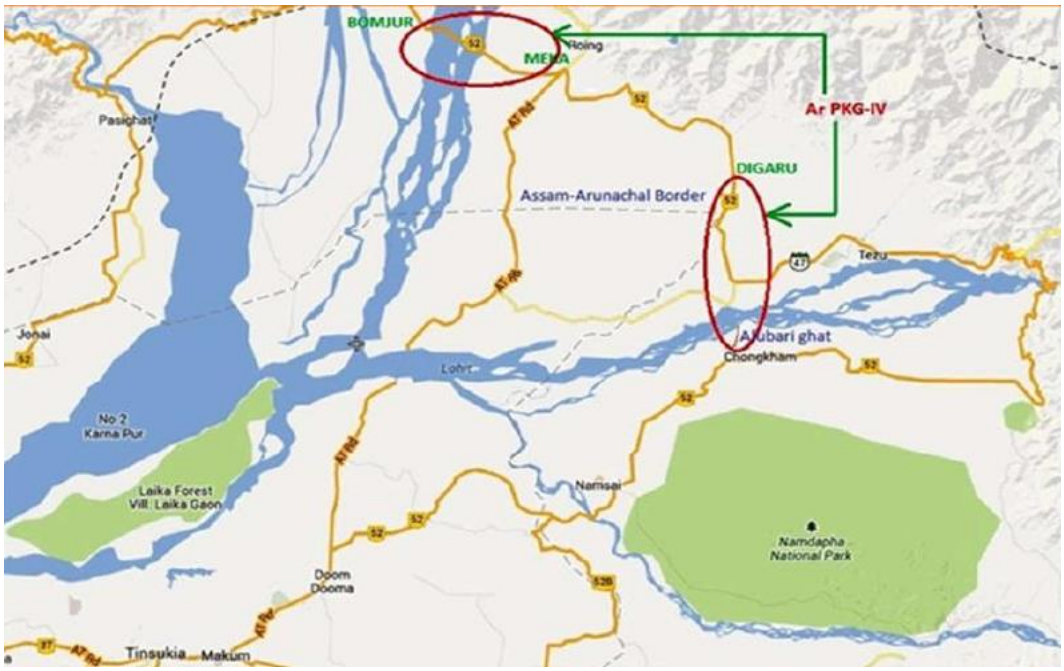
**As per the respective Concession Agreements*

(i) Dibang Infra Projects Private Limited ("Dibang")

Concession agreement

On November 3, 2010, the President of India through MoRTH and Dibang entered into a concession agreement for the construction of bridges across Dibang river system and connecting road between Bomjur-Meka (NH-52) covering a length of approximately 17.36 km and construct bridge across river Lohit at Alubari Ghat and connecting the road between Chowkham- Digaru covering a length of approximately 12.27 km in Arunachal Pradesh (total approximately 30.95 km) on a build, operate and transfer model, for a concession period of 17 years, which ends on November 12, 2030.

The following map illustrates the location of Dibang and the corridor it covers (*Source: Technical Reports*)**:**



Operations and maintenance

Dibang's 8 member in-house team, along with the Project Manager and the HoldCo teams, undertakes operations and maintenance of the project. In operating and maintaining the project, Dibang is required to comply with detailed general and project-specific operating and maintenance standards. For further details, please see "*Summary of Concession Agreements*" on page 298.

Borrowings

As of March 24, 2026, the outstanding debt was ₹2,480.27 million. For more information, please see "*Financial Indebtedness and Deferred Payments*" on page 361.

Capital structure of the project

As of the date of this Offer Document, total equity share capital of Dibang was ₹16.63 million.

Ownership structure

For information about the ownership structure of Dibang, please see "*Formation Transactions in Relation to the Trust - Dibang Infra Projects Private Limited*" on page 32.

(ii) Dhola Infra Projects Private Limited ("Dhola")

Concession agreement

On November 3, 2010, the President of India through MoRTH and Dhola entered into a concession agreement for the construction of 12.90 m wide bridge between Dhola and Sadiya Ghats along with 2 lane connecting roads from near about Dhola to Islampur Tinali in Assam (approximately 25.80 km) on build, operate and transfer annuity basis under the Arunachal Pradesh package of roads and highways for a concession period of 17 years, which ends on February 28, 2030.

The following map illustrates the location of Dhola and the corridor it covers (*Source: Technical Reports*)**:**



Operations and maintenance

Dhola's 6 member in-house team, along with the Project Manager and HoldCo teams, undertakes operations and maintenance of the project. In operating and maintaining the project, Dhola is required to comply with detailed general and project-specific operating and maintenance standards. For further details, please see "*Summary of Concession Agreements*" on page 298.

Borrowings

As of March 24, 2026, the outstanding debt was ₹2,495.83 million. For more information, please see "*Financial Indebtedness and Deferred Payments*" on page 361.

Capital structure of the project

As of the date of this Offer Document, total equity share capital of Dhola was ₹30.08 million.

Ownership structure

For information about the ownership structure of Dhola, please see "*Formation Transactions in Relation to the Trust - Dhola Infra Projects Private Limited*" on page 32.

(iii) Jorabat Shillong Expressway Limited ("JSEL")

Concession agreement

On July 16, 2010, the NHAI and JSEL entered into a concession agreement for a 4-lane project of the Jorabat-Shillong (Barapani) section of NH-40 between 0.00 km to 61.80 km (approximately 61.80 km) in the states of Assam and Meghalaya on build, operate and transfer on annuity basis for a concession period of 20 years, which ends on January 11, 2031.

The following map illustrates the location of JSEL and the corridor it covers (*Source: Technical Reports*)**:**



Operations and maintenance

JSEL's 9 member in-house team, along with the Project Manager and HoldCo teams, undertakes operations and maintenance of the project. In operating and maintaining the project, JSEL is required to comply with detailed general and project-specific operating and maintenance standards. For further details, please see "*Summary of Concession Agreements*" on page 298.

Borrowings

As of March 24, 2026, the outstanding debt was ₹6,931.97 million. For more information, please see "*Financial Indebtedness and Deferred Payments*" on page 361.

Capital structure of the project

As of the date of this Offer Document, total equity share capital of JSEL was ₹840.00 million.

Ownership Structure

For information about the ownership structure of JSEL, please see "*Formation Transactions in Relation to the Trust - Jorabat Shillong Expressway Limited*" on page 33.

B. ROFO Assets

The Trust has also entered into a ROFO Agreement for the acquisition of 11 HAM assets held or to be acquired by the EAAA Platform.

The details of the ROFO Assets (which are all HAM assets and are operated as per the Concession Agreements with NHAI) as of January 31, 2026 is provided in the table below:

Project	State	Approximate Length *(in km)*	Lanes *(in nos)*	PCOD	FCOD	Annuities received /receivable as on January 31, 2026	Annuity Due Financial Year Quarter	Annuity & Interest Annuity Receipts from the Authority (FY 2025) - Excluding O & M Annuity (*₹. in million*)
Kharar Ludhiana Road Limited	Punjab	76.0	4 and 6	March 31, 2020	September 01, 2022	11/19	Q2, Q4	1,293.8
Ranastalam Anandapuram Road Limited	Andhra Pradesh	47.0	6	September 24, 2020	June 30, 2021	10/20	Q2, Q4	970.1
Ankleshwar Manubar Expressway Private Limited	Gujarat	11.3	8	March 31, 2022	April 02, 2024	07/23	Q2, Q4	1,465.9
Khairatunda Barwa Adda Road Limited	Jharkhand	40.3	6	October 09, 2021	April 21, 2022	08/22	Q1, Q3	814.6
Kandi Ramsanpalle Road Private Limited	Telangana	39.9	4	November 19, 2022	January 31, 2024	06/24	Q1, Q3	965.9
Ashoka Belgaum Khanapur Road Private Limited	Karnataka	30.0	4	October 25, 2021	Pending	08/22	Q1, Q3	663.2
Ashoka Mallasandra Karadi Road Private Limited	Karnataka	50.6	4	October 26, 2021	Pending	08/22	Q1, Q3	565.9
Ashoka Karadi Banwara Road Private Limited	Karnataka	56.7	4	September 08, 2023	Pending	04/26	Q2, Q4	929.6
Ashoka Banwara Bettadahalli Road Private Limited	Karnataka	47.2	4	October 17, 2023	Pending	04/26	Q1, Q3	781.4
Ashoka Bettadahalli Shivamogga Road Private Limited	Karnataka	50.9	4	Pending	Pending	-	-	-
Ashoka Baswantpur Singnodi Road Private Limited	Karnataka	40.6	6	September 15, 2024	Pending	02/28	Q2, Q4	444.7

Operations and Maintenance

Toll collection

Our toll plazas for both NHAI and state concessions are FASTag enabled. Our automated toll collection system incorporates automatic vehicle identification features, such as in-road or infrared sensors, alongside FASTag readers. Each toll plaza is provided with back-up power supply to ensure uninterrupted operations. The toll plazas' servers support real-time transmission of transaction data from toll lane equipment to both the FASTag servers and the central FASTag clearance system. These servers also automatically perform regular data backups to protect against loss and enable prompt system recovery if needed. Additionally, robust security systems safeguard against data tampering and ensure that traffic and revenue information remains secure.

We also employ Toll Analytics System ("**TAS**") which efficiently converts unstructured toll data into structured data in form of analytics, providing actionable insights, with interactive visualizations. It captures, unifies and consolidates real-time data from all toll plazas with accuracy while reducing complexity, and enhancing transparency and reliability on traffic and revenue through validation between the traffic management system and application program interface traffic from the acquirer bank. The system automatically converts raw data into standardized reports, tracks equipment status, reconciles transactions, and sends automated notifications to remove manual steps. Managers use these reports to monitor toll performance, revenue collection, and operational efficiency for each asset. TAS triggers automation e-mails that eliminates manual intervention and improves operational efficiency.

For the Financial Year 2025, around 97% of the toll collections (excluding for SRTPL which adopted FASTag collection in the fourth quarter for the Financial Year 2025) were collected through FASTag.

Traffic control

We employ an HTMS to enable effective traffic management using 360-degree cameras for comprehensive surveillance and variable message signs to provide timely alerts and safety information to road users.

Traffic and motorway assistance services

Traffic assistance

Route operation services operate 24 hours a day, seven days a week on the project highway to support road users in distress and assist with disabled vehicles. This is done either directly by the route operations team or by coordinating assistance through the highway control room, as needed. To deliver effective support, the route operation vehicles, including rapid patrol vehicle, ambulance, and crane are fully equipped and staffed by well-trained personnel. Their aim is to manage road incidents efficiently, improve safety, reduce congestion, and protect the highway and its assets from theft, damage, and encroachment. Traffic and motorway assistance services include:

- Providing basic mechanical support to highway users whose vehicles have broken down, and protecting other road users by deploying traffic cones and signage to prevent further collisions.
- Responding immediately to traffic hazards, such as unauthorised parking, stalled vehicles, unauthorised pedestrian movement, stray animals, and roadway debris.
- Offering emergency assistance at accident scenes, including supporting victims and transporting injured persons to the nearest hospital.
- Continuously monitoring traffic flow on the project highway through regular patrols and surveillance systems (such as CCTV, GPS, and vehicle identification devices, where applicable), and updating road users with real-time traffic information through variable message signs or other road signage.
- Promptly reporting accidents, breakdowns, or any road hazards to relevant authorities, including police, emergency services, and road maintenance teams.
- Maintaining accurate records of all incidents, including accidents, breakdowns, and road conditions, and documenting the actions taken, response times, and solutions provided.

Assistance and recovery services

To ensure the safety and smooth operation of the project highway, we provide a comprehensive, 24/7 route operation service. This service is supported by a dedicated fleet of assets, including patrolling vehicles, ambulances for accident victims, and cranes and tow trucks for clearing obstructions and evacuating broken-down vehicles. Each vehicle is staffed by well-trained personnel equipped to manage road incidents effectively. The primary objectives of this service are to assist road users in distress, improve safety, reduce congestion, and safeguard the highway and its assets from theft, damage, and encroachment.

The traffic and motorway assistance teams perform a wide range of functions to support road users and maintain clear passage. They provide basic mechanical help for breakdowns while protecting other drivers by placing traffic cones and signage. The teams proactively attend to hazards such as unauthorized parking, stalled vehicles, debris, stray animals, and unauthorized pedestrian movement. In the event of an accident, they offer immediate emergency support and transport injured persons to the nearest hospital. Continuous monitoring is conducted through physical patrols and surveillance systems, with real-time traffic information relayed to users through variable message signs. Teams also ensure prompt reporting of all incidents to relevant authorities like the police and emergency services and maintain accurate records of all actions taken to ensure accountability and service quality.

Safety measures

Under the Concession Agreements, the concessionaires are obligated to abide by certain safety requirements, which include measures such as road signs, pavement marking, traffic control devices, roadside furniture, highway design elements, enforcement and emergency response. The concessionaires must abide by among others, applicable laws and applicable permits, the Manual for Safety in Road Design as issued by the MoRTH, relevant standards and guidelines of the Indian Roads Congress and good industry practice. NHAI also carries out safety audits of the projects from time to time, by appointing a safety consultant. These safety requirements apply to all phases of construction, operation and maintenance with emphasis on identification of factors associated with accidents and implementation of appropriate remedial measures and help us make changes required to enhance safety.

Operation and maintenance framework

Under the Concession Agreements, the operation and maintenance of the projects is the responsibility of the Project Manager and the concessionaires. Pursuant to the Project Implementation and Management Agreement and the ancillary agreements entered into amongst the Project Manager, the HoldCos and the Project SPVs, the operation and maintenance of the projects is undertaken through the Project SPVs directly, with reliance on the HoldCos and the Project Manager for certain aspects.

For details in relation to the O&M obligations under the relevant Concession Agreements, please see "*Summary of Concession Agreements*" on page 298 and for details in relation to the PIMA, please see "*Parties to the Trust - Key terms of the Project Implementation and Management Agreement*" on page 152.

Tech-driven operation and maintenance platform

We have adopted a comprehensive technology driven and pro-active approach to improve asset efficiency and optimize cost management. The health of each asset, with particular attention to pavement and the inventory installed at project sites, is closely tracked using the Intelligent Highway Asset Monitoring System ("**iHAMS**"). This system detects even minor anomalies that may go unnoticed with manual inspections alone, facilitating timely interventions and keeping defects at a manageable level. For further details please see, " – *IT Infrastructure*" on page 294.

In addition to weekly monitoring activities, a Network Survey Vehicle ("**NSV**") survey is carried out twice a year. These efforts enable early identification and management of pavement distresses. Pavement data, including roughness and distress details from NSV surveys, annual deflection records and maintenance activities, is systematically gathered and stored in Juno Viewer. This helps forecasting future preventive and periodic maintenance requirements through the Forward Works Program ("**FWP**"). These maintenance cycles are compared with those established during the pre-acquisition due diligence using the Highway Development and Management ("**HDM-4**") model, ensuring health tracking and facilitating interventions if needed.

The implementation phase of major maintenance works makes use of innovative technologies and sustainable materials. Advanced products such as polymer modified bitumen and GlasGrid are specified to enhance the

durability and performance of newly laid bituminous layers. For instance, GlasGrid is used in major maintenance works specifically to delay the reflective cracking, thereby delaying the major maintenance cycles. While this requires a higher initial cost, it results in a more than proportionate reduction in future maintenance. Similarly, the use of polymer modified bitumen enhances pavement performance, which leads to less carbon emissions and contributes to an overall lower major maintenance cost. At the same time, materials such as recycled asphalt pavement and steel slag aggregates are incorporated to decrease both the carbon footprint and the lifecycle costs associated with each asset.

Additionally, the use of RAP, which involves recycling milling material, reduces the cost of dense bituminous macadam by 10-15% and the cost of bituminous concrete by 5-10%, creating savings in bitumen and aggregates requirements while also reducing emissions and the need for milled material disposal. Other contemporary and emerging technologies and innovations include increasing RAP content in mixes, micro surfacing with fiber, using steel slag aggregates in dense bituminous macadam resulted in a cost saving of 10-15%, and using cement grouted bituminous mix with indigenously developed grout.

Furthermore, these innovations are driven through collaborations with various research institutions including the Indian Institute of Technology, Kharagpur, Central Road Research Institute, and the Indian Institute of Technology, Guwahati. This combination of real-time digital asset management, expert-driven assessment and deployment of sustainable technologies forms the backbone of our technology driven operations and maintenance strategy.

IT Infrastructure

Technology is central to our operations, supporting asset management, efficiency, and data-driven decision-making. We deploy a suite of integrated digital solutions that enable real-time monitoring, streamlined maintenance, and robust reporting across the transport infrastructure lifecycle. The following platforms form the backbone of our technology framework:

- ***iHAMS*****:** iHAMS uses artificial intelligence and machine learning to gather and analyze video footage from dashcams installed in route patrol vehicles. Video is collected weekly, even during night-time, and the system detects over one hundred different types of anomalies/defects in highway inventory and payment by comparing current visuals of the highway with its digital twin. Deviations or faults are flagged and addressed by on-ground maintenance teams and monitored from headquarters. Automated detection makes monitoring more accurate, less dependent on manual inspections, and helps maintain the road to agreed standards. This process improves asset safety and service standards.

- ***Juno Viewer*****:** Juno Viewer is a web-based repository for recording and managing pavement and asset inventory throughout all project stages that is, from initial due diligence to maintenance and handover. It stores payment survey results, inspection data, and maintenance logs lane by lane and meter by meter. Pavement engineers use Juno Viewer to compare different maintenance activities and analyze long-term performance. The platform also tracks the contract defect liability period, giving managers oversight and helping avoid extra costs. It offers a comprehensive framework that enables road managers to implement project-specific pavement deterioration modelling along with the HDM model, supporting effective budget planning and treatment optimization for improved asset management.

- ***Juno Jobs*****:** Juno Jobs is a mobile application linked to Juno Viewer that digitizes routine inspection forms, lets teams report incidents, tag inventory, assign tasks, track completion, and manage resources and time spent on each job. Together, these tools support efficient reporting and centralized management of fieldwork and asset data.

- ***HDM-4*****:** HDM-4 is a software tool for predicting pavement deterioration and planning major maintenance interventions required to meet service standards. The platform analyses data from pavement inspections, surveys, material tests, and traffic counts, combining this information with details about road geometry and maintenance criteria. The software helps engineers prioritize road repairs and forecast budgets based on current ground conditions and long-term traffic impact. It generates reports on pavement deterioration, based on traffic and environment, supporting decisions about investment and upkeep.

- ***The Toll Analytic System*****:** The Toll Analytic System centralizes and validates data from all toll plazas in one place, ensuring consistency and reliability for traffic, revenue, and electronic payments. It combines live data from various toll systems and integrates it with financial and operational APIs to

offer a single source of truth. The system automatically converts raw data into standardized reports, tracks equipment status, reconciles transactions, and sends automated notifications to remove manual steps. Managers use these reports to monitor toll performance, revenue collection, and operational efficiency for each asset.

- ***Tableau*:** Tableau is a data visualization platform that presents structured toll and traffic data in interactive dashboards and charts, making analysis straightforward for teams at headquarters and locally. Integration with other systems such as the Toll Analytic System means users can access current statistics and trends in visual format without manual data handling. Tableau automatically connects, cleans, and aggregates data from multiple sources, supports custom views and filters, and helps managers make informed decisions quickly using accurate reports.

Governance

Our governance framework is structured across two distinct levels: the platform level and the asset level. The platform-level governance sets the strategic direction and is centered on compliance-driven, stakeholder-aligned business management. This high-level oversight is ensured by a strong board with independent directors and is supported by a codified financial controls and compliance framework, robust monitoring systems, and a commitment to transparent communication and ESG focused operations.

This strategic framework is then implemented at the asset-level through detailed compliance and monitoring processes. This second tier focuses on operational integrity and rigour, translating high-level policies into specific actions. It involves the application of corporate and technical standard operating procedures, including for safety, health, and environment, along with enterprise risk management using tools like risk dashboards and quarterly reviews. Compliance is managed through a comprehensive database covering statutory laws, internal policies, and key contract covenants, ensuring that the principles established at the platform level are consistently applied and monitored across all individual assets.

Safety, Health and Environment

We have established an Environment and Social Management System ("**ESMS**") that integrates environmental, safety and health aspects of our Project SPV operations. Our portfolio operations are governed by comprehensive Environmental, Social, and Governance ("**ESG**") principles. EAAA as a signatory to the United Nations-supported Principles for Responsible Investment ("**UNPRI**") and guided by the UN Global Compact. Our commitment requires that management of assets adhere to the highest international standards. We manage our commitments through a dedicated ESG Governing Council and Task Force, with performance tracked through external diligence, KPI monitoring, and transparent annual sustainability reporting. This strategic focus is translated into tangible actions through a rigorous approach to SHE, which is accompanied by the SHE dashboard to monitor performance, track metrics, and support decision-making.

To integrate newly acquired assets, we implement a systematic 10-stage transformation process that embeds our high standards for ESG compliance and operational discipline. This process includes the following steps:

- ***Due diligence:*** We conduct comprehensive due diligence to identify system-level risks, legal non-compliances, and gaps in safety and environmental practices, benchmarking the asset against International Finance Corporation Performance Standards.

- ***Due diligence actions tracking***: All identified issues are resolved through a structured, risk-based approach, with actions categorized by priority, assigned an owner, and tracked against clear timelines.

- ***Baseline inspection and audit***: Our certified SHE professionals conduct an on-site audit to identify high risk operational deviations, leading to a robust action plan managed on our digital platform.

- ***Training and competence***: We build team capability through a blended learning approach, including advanced passport training for managers and practical sessions for frontline teams, reinforced with digital learning modules.

- ***Enabling processes and tools***: We deploy a cloud-based digital platform, to enhance SHE performance by providing integrated tools for tracking actions, reporting incidents, and managing ESG data. This includes the use of SHE dashboards which provide a transparent, visual representation of key performance metrics.

- ***Setting performance indicators***: We establish KPIs to monitor SHE performance and set meaningful reduction targets for key metrics like greenhouse gas emissions and water consumption.

- ***Supplementary sessions***: Specialized training is conducted to strengthen core operational controls, such as Contractor Safety Management, Permit to Work ("**PTW**") systems, and equipment-specific procedures.

- ***Deployment***: We ensure the full deployment of our minimum best practices across all operational areas, including specific safety controls for highway operations, electrical systems, and environmental measures.

- ***Performance monitoring***: Performance is continuously monitored through monthly site-level audits and annual internal and external audits, with progress reviewed in formal quarterly meetings with management

- ***Continual improvement*****:** We focus on systematically reducing risk and strengthening our safety culture, using the Hierarchy of Controls to drive sustained improvement, which is validated through ongoing surveillance audits.

All highways in our portfolio hold internationally recognized certifications for ISO 14001 (Environmental Management) and ISO 45001 (Occupational Health and Safety). Our commitment to robust governance is further demonstrated by certification for ISO 27001 (Information Security Management). Performance is validated through regular internal and external audits, ensuring that we not only meet but also improve upon our targets, reinforcing our commitment to safe, sustainable, and responsible asset management.

Many of our assets have received various awards and recognition in respect of safety and excellence. For further details on our awards and recognitions see "*– Experienced team with full spectrum asset management and maintenance capabilities, spanning the entire asset life cycle, backed by tech-enabled operations and maintenance.*" on page 257.

Competition

Toll revenues depend on toll receipts and are affected by changes in traffic volumes. The amount of toll revenue generated by our Project SPVs is also influenced by competition from other roads and expressways that operate in the same area, as well as from other modes of transportation.

Furthermore, we face competition from other road operators, financial investors, private equity funds and other InvITs, in acquiring lucrative concessions for existing and future projects.

Employees

The table below sets forth the employees of the HoldCos and the Project SPVs as of December 31, 2025:

Entities	Number of employees as of December 31, 2025
Epic 3	21
SRPL	7
Dhola	6
Dibang	8
JSEL	9
TEL	12
AMTPL	51
RVTPL	36
SBGTPL	24
SRTPL	64
DTPL	27
PECPL	14
Total	279

Notes:

The Project SPVs use contract labour and are therefore also partially dependent on the availability of a sufficient pool of such labour to maintain and operate their projects. The number of contract workers employed by the

Project SPVs varies from time to time based on the nature and extent of work being undertaken. The Project SPVs enter into contracts with independent contractors for specified assignments on their projects.

Toll operations comprise of teams of each of the Project SPVs to ensure the monitoring and management of toll activities at each of the toll plazas located along the project roads.

Insurance

The Project SPVs maintain various types of insurance coverages including burglary and housebreaking, fidelity guarantee, Bharat Laghu Udyam Suraksha, money insurance, industrial all risk ("**IAR**"), amongst others with various insurers in India. For further details please see "*Risk Factors - Our insurance policies may not provide adequate protection against various risks associated with our operations*" on page 87.

Intellectual Property

As of the date of this Offer Document, EAAA India Alternatives Limited our Investment Manager's holding company (including on behalf of the Trust) has made applications for the registration of the trademark "Citius TransNet" and the associated logos " " and " ". For further details please see "*Risk Factors - The Trust does not own the trademark "Citius TransNet Investment Trust" and the associated logos proposed to be used by them for their business and their ability to use their respective trademarks may be impaired.*" on page 83.

Properties

Under the terms of the Concession Agreements, title to the roads and related infrastructure such as toll plazas and monitoring posts remains with the relevant concessioning authorities for the duration of the concession period. During the concession period, the Project SPVs are licensed to use the roads and the related infrastructure which constitute the concession as-sets. Upon the expiration of a concession period, each Project SPV is required to transfer possession of its concession assets to the relevant concessioning authorities.

SUMMARY OF CONCESSION AGREEMENTS

Set out below are summaries of the concession agreements entered into by Project SPVs in relation to their respective businesses. The descriptions and summaries of the agreements below are indicative and are not and nor do they purport to be complete descriptions or summaries of all terms of such agreements. Certain terms used in this section have the meaning assigned to such terms in the respective concession agreements. Copies of these concession agreements have been made available for inspection at the office of the Trust at its registered office. For further details, please see "Material Contracts and Documents for Inspection" on page 512.

1. Jorabat Shillong Expressway Limited ("JSEL")

The concession agreement has been executed between JSEL and NHAI dated July 16, 2010 (the "**JSEL Concession Agreement**"). The scope of the project under the JSEL Concession Agreement includes the four laning of Jorabat-Shillong (Barapani) Section of NH-40 between Km 0.00 to Km 61.80 in the states of Assam and Meghalaya on build, operate and transfer on annuity basis ("**Project**") for a concession period of 20 years ("**Concession Period"** and such concession "**Concession**") with the appointed date being January 12, 2011 ("**Appointed Date**").

A summary of the key terms of the JSEL Concession Agreement has been set below:

1. *Total Project Cost and Annuity Payments*

The total project cost, as defined in the JSEL Concession Agreement ("**Total Project Cost**"), means the lowest of:

a. the capital cost of the Project. as set forth in the financial package;

b. the actual capital cost of the Project upon completion of four-laning of the Project; and

c. a sum of Rs. 5,360 million;

provided that in the event of termination, the Total Project Cost shall be deemed to be modified to the extent of variation in WPI or reference exchange rate occurring in respect of adjusted equity and debt due, as the case may be, in accordance with the provisions of the JSEL Concession Agreement.

JSEL upon achieving COD for the Project and in consideration of it accepting the Concession and undertaking to perform and discharge its obligations in accordance with the terms, conditions and covenants set forth in the JSEL Concession Agreement, NHAI agrees and undertakes to pay to JSEL, for each Annuity Payment Period, on each Annuity Payment Date, the sum of Rs. 725.10 million. NHAI shall make payment of annuity to the Concessionaire on each annuity payment date. For avoidance of doubt the number of such annuities shall not exceed 34 over the Concession Period and will commence from COD.

2. *Concession Fee*

In consideration of the grant of Concession under the JSEL Concession Agreement, the concession fee payable by JSEL to NHAI shall be Re.1.00 (Rupee One) ("**Concession Fee**") per year during the term of JSEL Concession Agreement. The Concession Fee, for each year, shall be paid in advance within 90 (ninety) days of the commencement of the accounting year for which it is due and payable.

3. *Change of Scope*

NHAI may require the provision of additional works and services which are not included in the scope of the Project as contemplated by the JSEL Concession Agreement (the "**Change of Scope**"). Within 7 days, NHAI shall make an advance payment to JSEL in a sum equal to 20% of the cost of Change of Scope, and in the event of a dispute, 20% of the cost assessed by the independent engineer, as defined in the JSEL Concession Agreement ("**Independent Engineer**"). NHAI shall disburse to JSEL such amounts as are certified by the Independent Engineer, as reasonable and after making a proportionate deduction for the advance payment made. JSEL shall be entitled to nullify any Change of Scope order if it causes the cumulative costs relating to all the Change of Scope orders to exceed 5% of the Total Project Cost in any continuous period of 3 years immediately preceding the date of

such Change of Scope order or if such cumulative costs exceed 20% of the Total Project Cost at any time during the concession period.

4. *O&M*

JSEL shall operate and maintain the Project, in accordance with the JSEL Concession Agreement either by itself, or through the O&M contractor, as defined in the JSEL Concession Agreement ("**O&M Contractor**"), and if required, modify, repair or otherwise make improvements to the Project to comply with provisions of the JSEL Concession Agreement applicable laws, applicable permits and conform to specifications, standards and good industry practice. The obligations of JSEL, among other things, shall include:

a. permitting safe, smooth and uninterrupted flow of traffic on the Project during normal operating conditions;

b. carrying out periodic preventive maintenance of the Project;

c. undertaking routine maintenance including prompt repairs of potholes, cracks, joints, drains, embankments, structures, pavement markings, lighting, road signs and other traffic control devices;

d. undertaking major maintenance such as resurfacing of pavements, repairs to structures, and repairs and refurbishment of tolling system and other equipment;

e. protection of the environment and provision of equipment and materials therefore; and

f. operation and maintenance of all communication, control and administrative systems necessary for the efficient operation of the Project.

5. *Maintenance manual*

No later than 180 days prior to the scheduled four-laning date, as defined in the JSEL Concession Agreement, JSEL shall, in consultation with the Independent Engineer, evolve a repair and maintenance manual, as defined in the JSEL Concession Agreement (the "**Maintenance Manual**"), for the regular and preventive maintenance of the Project in conformity with the maintenance requirements, safety requirements and good industry practice. The Maintenance Manual shall be revised and updated once in every three years.

6. *Maintenance programme*

Not later than 45 days prior to the beginning of each accounting year during the operation period, as defined in the JSEL Concession Agreement, JSEL shall provide to NHAI and the Independent Engineer its proposed annual programme of preventive, urgent and other scheduled maintenance (the "**Maintenance Programme**") to comply with the maintenance requirements, Maintenance Manual and safety requirements. Such Maintenance Programme, amongst other things shall include the following:

a. preventive maintenance schedule;

b. arrangements and procedures for carrying out urgent repairs;

c. criteria to be adopted for deciding maintenance needs;

d. intervals and procedures for carrying out inspection of all elements of the Project;

e. intervals at which JSEL shall carry out periodic maintenance;

f. arrangements and procedures for carrying out safety related measures; and

g. intervals for major maintenance works and the scope thereof.

7. *Obligations relating to change in ownership*

JSEL shall not undertake or permit any change in ownership, except with the prior approval of NHAI. Notwithstanding anything to the contrary contained in the JSEL Concession Agreement, JSEL agrees and acknowledges that:

a. all acquisitions of equity by an acquirer, either by himself or with any person acting in concert, directly or indirectly, including by transfer of direct or indirect legal or beneficial ownership or control of any equity, in aggregate of not less 15% of the total equity of JSEL; or

b. acquisition of any control directly or indirectly of the board of directors of JSEL by any person either by himself or together with any person or persons acting in concert with him

shall be subject prior approval of NHAI from national security and public interest perspective, the decision of NHAI in this behalf being final, conclusive and binding on JSEL, and undertakes that it shall not give effect to any such acquisition of equity or control of the board of directors of JSEL without such prior approval of NHAI. It has been expressly agreed that approval of NHAI hereunder shall be limited to national security and public interest perspective, and NHAI shall endeavor to convey its decision thereon expeditiously. It is also agreed that NHAI shall not be liable in any manner on account of grant or otherwise of such approval and that such approval or denial thereof shall not in any manner absolve JSEL from any liability or obligation under the JSEL Concession Agreement.

Further, JSEL has represented that it shall at no time undertake or permit any Change in Ownership except in accordance with the provisions of the concession agreement and that the Consortium Members, together with its Associates, hold not less than 51% (fifty-one percent) of its issued and paid-up Equity as on the date of the JSEL Concession Agreement.

8. *Indemnities*

a. JSEL shall indemnify, defend, save and hold harmless NHAI and its officers, servants, agents, government instrumentalities and government owned and/or controlled entities/enterprises, (the "**NHAI Indemnified Persons**") against any and all suits, proceedings, actions, demands and claims from third parties for any loss, damage, cost and expense of whatever kind and nature, whether arising out of any breach by JSEL of any of its obligations under the JSEL Concession Agreement or any related agreement or on account of any defect or deficiency in the provision of services by JSEL to any user except to the extent that any such suits, proceedings, actions, demands and claims have arisen due to any negligent act or omission, or breach or default of the JSEL Concession Agreement on the part of NHAI Indemnified Persons.

b. NHAI will indemnify, defend, save and hold harmless JSEL against any and all suits, proceedings, actions, demands and third party claims for any loss, damage, cost and expense of whatever kind and nature arising out of (i) defect in title and/or the rights of NHAI in the land comprised in the site, and/or (ii) breach by NHAI of any of its obligations under the JSEL Concession Agreement or any related agreement, which materially and adversely affect the performance by JSEL of its obligations under JSEL Concession Agreement, save and except that where any such claim, suit, proceeding, action, and/or demand has arisen due to a negligent act or omission, or breach of any of its obligations under any provision of JSEL Concession Agreement or any related agreement and/or breach of its statutory duty on the part of JSEL, its subsidiaries, affiliates, contractors, servants or agents, the same shall be the liability of JSEL.

c. JSEL shall fully indemnify, hold harmless and defend NHAI and NHAI Indemnified Persons from and against any and all loss and/or damages arising out of or with respect to:

i. failure of JSEL to comply with applicable laws and applicable permits, each as defined in the JSEL Concession Agreement ("**Applicable Laws**" and "**Applicable Permits**");

ii. payment of taxes required to be made by JSEL in respect of the income or other taxes of JSEL's contractors, suppliers and representatives; or

iii. non-payment of amounts due as a result of materials or services furnished to JSEL or any of its contractors which are payable by JSEL or any of its contractors.

d. JSEL shall fully indemnify, hold harmless and defend NHAI Indemnified Persons from and against any and all suits, proceedings, actions, claims, demands, liabilities and damages which NHAI Indemnified Persons may hereafter suffer, or pay by reason of any demands, claims, suits or proceedings arising out of claims of infringement of any domestic or foreign patent rights, copyrights or other intellectual property, proprietary or confidentiality rights with respect to any materials, information, design or process used by JSEL or by JSEL's contractors in performing the obligations of JSEL or in any way incorporated in or related to the Project. If in any such suit, action, claim or proceedings, a temporary restraint order or preliminary injunction is granted, JSEL shall make every reasonable effort, by giving a satisfactory bond or otherwise, to secure the revocation or suspension of the injunction or restraint order. If, in any such suit, action, claim or proceedings, the Project, or any part thereof or comprised therein, is held to constitute an infringement and its use is permanently enjoined, JSEL shall promptly make every reasonable effort to secure for NHAI a license, at no cost to NHAI, authorising continued use of the infringing work. If JSEL is unable to secure such license within a reasonable time, JSEL shall, at its own expense, and without impairing the specifications and standards, either replace the affected work, or part, or process thereof with non-infringing work or part or process, or modify the same so that it becomes non-infringing.

9. *Suspension of JSEL's rights*

Upon occurrence of a JSEL default, as defined in the JSEL Concession Agreement ("**JSEL Default**"), NHAI shall be entitled, without prejudice to its other rights and remedies under the JSEL Concession Agreement including its rights of termination, as defined in the JSEL Concession Agreement ("**Termination**"), thereunder, to (i) suspend all rights of JSEL under the JSEL Concession Agreement, and pursuant hereto, and (ii) exercise such rights itself and perform the obligations hereunder or authorise any other person to exercise or perform the same on its behalf during such suspension ("**Suspension**"). Suspension hereunder shall be effective forthwith upon issue of notice by NHAI to JSEL and may extend up to a period not exceeding 180 days from the date of issue of such notice; provided that upon written request from JSEL and the lenders' representative, as defined in the JSEL Concession Agreement ("**Lenders' Representative"),** NHAI shall extend the aforesaid period of 180 days by a further period not exceeding 90 days.

At any time during the period of Suspension, the Lenders' Representative, on behalf of senior lenders, as defined in the JSEL Concession Agreement ("**Senior Lenders**"), shall be entitled to substitute JSEL under and in accordance with the substitution agreement, as defined in the JSEL Concession Agreement ("**Substitution Agreement**"), and upon receipt of notice thereunder from the Lenders' Representative, NHAI shall withhold Termination for a period not exceeding 180 days from the date of Suspension, and any extension thereof, for enabling the Lenders' Representative to exercise its rights of substitution on behalf of Senior Lenders.

10. *Effect of force majeure event on the Concession*

Upon the occurrence of any force majeure event prior to the Appointed Date, ("**Force Majeure Event**"), the achieving financial close, as defined in the JSEL Concession Agreement shall be extended by a period equal in length to the duration of the Force Majeure Event.

11. *Allocation of costs arising out of Force Majeure*

a. Upon occurrence of any Force Majeure Event prior to the Appointed Date, the parties to the JSEL Concession Agreement shall bear their respective costs and no party shall be required to pay to the other party any costs thereof.

b. Upon occurrence of a Force Majeure Event after the Appointed Date, the costs incurred and attributable to such event and directly relating to the project ("**Force Majeure Costs**") shall be allocated and paid as follows:

i. upon occurrence of a non-political event, as defined in the JSEL Concession

Agreement, the parties shall bear their respective Force Majeure Costs and neither party shall be required to pay to the other party any costs thereof;

ii. upon occurrence of an indirect political event, as defined in the JSEL Concession Agreement, all Force Majeure Costs attributable to such indirect political event, and not exceeding the insurance cover for such indirect political event, shall be borne by JSEL, and to the extent Force Majeure Costs exceed such insurance cover, one half of such excess amount shall be reimbursed by NHAI to JSEL; and

iii. upon occurrence of a political event, as defined in the JSEL Concession Agreement, all Force Majeure Costs attributable to such political event shall be reimbursed by NHAI to JSEL.

12. *Divestment Requirements*

Upon termination of JSEL Concession Agreement, JSEL shall comply with and conform to the following divestment requirements, amongst others:

a. notify NHAI forthwith the location and particulars of all project assets, as defined in the JSEL Concession Agreement ("**Project Assets**");

b. deliver forthwith the actual or constructive possession of the Project, free and clear of all encumbrances, save and except to the extent set forth in the Substitution Agreement;

c. cure all Project Assets, including the road, bridges, structures and equipment, of all defects and deficiencies so that the Project is compliant with the maintenance requirements, provided that in the event of Termination during the construction period, all Project Assets shall be handed over on 'as is here is' basis after bringing them to a safe condition;

d. deliver relevant records and reports pertaining to the Project Highway and its design, engineering, construction, operation and maintenance, including all programmes and manuals pertaining thereto, and complete 'as built' Drawings as on the Transfer Date;

e. transfer and/or deliver all Applicable Permits to the extent permissible under Applicable Laws;

f. execute such deeds of conveyance, documents and other writings as the Authority may reasonably require for conveying, divesting and assigning all the rights, title and interest of the Concessionaire in the Project Highway, including the right to receive outstanding insurance claims to the extent due and payable to the Authority, absolutely unto the Authority or its nominee; and

g. comply with all other requirements as may be prescribed or required under Applicable Laws for completing the divestment and assignment of all rights, title and interest of JSEL in the Project, free from all encumbrances, absolutely unto NHAI or to its nominees.

13. *Termination for JSEL Default*

Subject to the provisions of the JSEL Concession Agreement, in the event that any of the defaults specified below shall have occurred, and JSEL fails to cure the default within the mentioned cure period, or where no cure period is specified, then within a cure period of 60 days, JSEL shall be deemed to be in default of the JSEL Concession Agreement (the "**JSEL Default**"), unless the default has occurred as a result of any breach of the JSEL Concession Agreement by NHAI or due to Force Majeure Event. The defaults referred to shall include, among other things, the following:

a. The performance security, as defined in the JSEL Concession Agreement ("**Performance Security**"), has been encashed and appropriated in accordance with the JSEL Concession Agreement and JSEL fails to replenish or provide fresh Performance Security within a cure period of 30 days;

b. subsequent to the replenishment or furnishing of fresh Performance Security in accordance with the JSEL Concession Agreement, JSEL fails to cure within a cure period of 90 days, the

JSEL Default for which whole or part of the performance security was appropriate;

c. JSEL does not achieve the latest outstanding project milestone due in accordance with the provisions of the JSEL Concession Agreement and continues to be in default for 90 days;

d. upon occurrence of a financial default, as defined in the JSEL Concession Agreement ("**Financial Default**"), the Lenders' Representative has by notice required NHAI to undertake Suspension in accordance with the Substitution Agreement and JSEL fails to cure the default within the cure period specified;

e. a change in ownership has occurred in breach of the provisions of the JSEL Concession Agreement.

Upon occurrence of a JSEL Default, NHAI shall be entitled to terminate the JSEL Concession Agreement by issuing a termination notice, as defined in JSEL Concession Agreement ("**Termination Notice**"), to JSEL; provided that before issuing the Termination Notice, NHAI shall by a notice inform JSEL of its intention to issue such Termination Notice and grant 15 days to JSEL to make a representation, and may, after the expiry of such 15 days, whether or not it is in receipt of such representation, issue the Termination Notice. Further, upon termination on occurrence of a JSEL Default, NHAI shall pay JSEL, by way of Termination Payment, an amount equal to the discounted value for future Annuity payments after discounting the Insurance Cover. However, no such Termination Payment shall be due or payable on account of a JSEL Default occurring prior to COD.

14. *Termination for NHAI Default*

JSEL may terminate the JSEL Concession Agreement on account of occurrence of a default by the NHAI which is not rectified within the cure period of 90 days or such longer period as has been expressly provided in this JSEL Concession Agreement (the "**NHAI Default**") and includes – (i) material default causing a material adverse effect on JSEL; (ii) the failure to make any payment due to JSEL; (iii) repudiation of the JSEL Concession Agreement etc.

JSEL may, under the JSEL Concession Agreement, upon occurrence of a NHAI Default, subject to the provisions of Substitution Agreement, terminate the JSEL Concession Agreement by issuing a Termination Notice to NHAI; provided that before issuing the Termination Notice, JSEL shall by notice inform NHAI of its intentions to issue the Termination Notice and grant 15 days to NHAI to make a representation, and may after the expiry of such 15 days, whether or not it is in receipt of such representation, issue the Termination Notice. Upon termination on account of NHAI Default, NHAI shall pay to JSEL, by way of Termination Payment, an amount equal to the discounted value for future Annuity payments after discounting the Insurance Cover.

15. *Defects liability after termination*

JSEL shall be responsible for all defects and deficiencies in the Project for a period of 120 days after Termination, and it shall have the obligation to repair or rectify, at its own cost, all defects and deficiencies observed by the Independent Engineer in the Project during this period. In the event that JSEL fails to repair or rectify such defect or deficiency within a period of 15 days from the date of notice issued by NHAI, NHAI shall be entitled to get the same repaired or rectified at the risk and cost of JSEL so as to make the Project conform to the maintenance requirements. All costs incurred by NHAI in this regard shall be reimbursed by JSEL to NHAI within 15 days of receipt of demand thereof, and in the event of default in reimbursing such costs, NHAI shall be entitled to recover the same from the funds retained in the escrow account.

2. Samkhiali Bhachau Gandhidham Tollway Private Limited ("SBGTPL")

The concession agreement has been executed between SBGTPL and NHAI dated March 17, 2010 (the "**SBGTPL Concession Agreement**"). The scope of the project under the SBGTPL Concession Agreement includes the six laning of Samakhiali - Gandhidham section of NH 8A from Km 306.00 to Km 362.16 (approximately 56.16 Km) in the state of Gujarat on design, build, finance, operate and transfer on toll basis ("**Project**") for a concession period of 24 years from the Appointed Date ("**Concession Period**" and such concession "**Concession**") with the appointed date being September 11, 2010 ("**Appointed Date**").

A summary of the key terms of the SBGTPL Concession Agreement has been set below-

1. *Total Project Cost*

The total project cost, as defined in the SBGTPL Concession Agreement ("**Total Project Cost**"), means the lowest of:

a. the capital cost of the Project. as set forth in the financial package;

b. the actual capital cost of the Project upon completion of six-laning of the Project; and

c. a sum of Rs. 8,053.90 million;

provided that in the event of termination, the Total Project Cost shall be deemed to be modified to the extent of variation in WPI or reference exchange rate occurring in respect of adjusted equity and debt due provided further that in the event WPI increases, on average, by more than six percent per annum for the period between the date thereof and COD, the parties to the SBGTPL Concession Agreement shall meet as soon as reasonably practicable, and agree upon revision of the amount hereinbefore specified such that the effect of increase in WPI, in excess of such 6%, is reflected in the Total Project Cost, in accordance with the provisions of the SBGTPL Concession Agreement.

2. *Concession Fee*

In consideration of the grant of Concession, the concession fee payable by SBGTPL to NHAI shall be Re.1.00 (Rupee One) ("**Concession Fee**") per annum and the premium as specified in the SBGTPL Concession Agreement. The Concession Fee, shall be due and payable in monthly instalments, within 7 days of the close of each month.

3. *Change of Scope*

NHAI may require the provision of additional works and services which are not included in the scope of the Project as contemplated by the SBGTPL Concession Agreement (the "**Change of Scope**"). Within 7 days, NHAI shall make an advance payment to SBGTPL in a sum equal to 20% of the cost of Change of Scope, and in the event of a dispute, 20% of the cost assessed by the independent engineer, as defined in the SBGTPL Concession Agreement ("**Independent Engineer**"). SBGTPL shall, after commencement of work, present to NHAI bills for payment in respect of the works in progress or completed works, as the case may be supported by documentation as is reasonably sufficient for NHAI to determine the accuracy thereof. Within 30 (thirty) days of receipt of such bills, NHAI shall disburse to SBGTPL such amounts as are certified by the Independent Engineer as reasonable and after making a proportionate deduction for the advance payment made hereunder, and in the event of any Dispute, as defined in the SBGTPL Concession Agreement, final adjustments thereto shall be made under and in accordance with the Dispute Resolution Procedure as defined in the SBGTPL Concession Agreement. SBGTPL shall be entitled to nullify any Change of Scope order if it causes the cumulative costs relating to all the Change of Scope orders to exceed 5% of the Total Project Cost in any continuous period of 3 years immediately preceding the date of such Change of Scope order or if such cumulative costs exceed 20% of the Total Project Cost at any time during the concession period.

4. *O&M*

SBGTPL shall operate and maintain the Project, in accordance with the SBGTPL Concession Agreement either by itself, or through the O&M contractor, as defined in the SBGTPL Concession Agreement ("**O&M Contractor**"), and if required, modify, repair or otherwise make improvements to the Project to comply with provisions of the SBGTPL Concession Agreement applicable laws, applicable permits and conform to specifications, standards and good industry practice. The obligations of SBGTPL, among other things, shall include:

a. permitting safe, smooth and uninterrupted flow of traffic on the Project during normal operating conditions;

b. carrying out periodic preventive maintenance of the Project;

c. undertaking routine maintenance including prompt repairs of potholes, cracks, joints, drains, embankments, structures, pavement markings, lighting, road signs and other traffic control

devices;

d. undertaking major maintenance such as resurfacing of pavements, repairs to structures, and repairs and refurbishment of tolling system and other equipment;

e. protection of the environment and provision of equipment and materials therefore; and

f. operation and maintenance of all communication, control and administrative systems necessary for the efficient operation of the Project.

5. *Maintenance manual*

No later than 180 days from the Appointed Date, as defined in the SBGTPL Concession Agreement, SBGTPL shall, in consultation with the Independent Engineer, evolve a repair and maintenance manual, as defined in the SBGTPL Concession Agreement (the "**Maintenance Manual**"), for the regular and preventive maintenance of the Project in conformity with the specifications and standards, maintenance requirements, safety requirements and good industry practice, as set out in the SBGTPL Concession Agreement. The Maintenance Manual shall be revised and updated once in every three years.

6. *Maintenance programme*

On or before COD and no later than 45 days prior to the beginning of each accounting year during the operation period, as defined in the SBGTPL Concession Agreement, SBGTPL shall provide to NHAI and the Independent Engineer its proposed annual programme of preventive, urgent and other scheduled maintenance (the "**Maintenance Programme**") to comply with the maintenance requirements, Maintenance Manual and safety requirements. Such Maintenance Programme, amongst other things shall include the following:

a. preventive maintenance schedule;

b. arrangements and procedures for carrying out urgent repairs;

c. criteria to be adopted for deciding maintenance needs;

d. intervals and procedures for carrying out inspection of all elements of the Project;

e. intervals at which SBGTPL shall carry out periodic maintenance;

f. arrangements and procedures for carrying out safety related measures; and

g. intervals for major maintenance works and the scope thereof.

7. *Obligations relating to change in ownership*

SBGTPL shall not undertake or permit any change in ownership, except with the prior approval of NHAI. Notwithstanding anything to the contrary contained in the SBGTPL Concession Agreement, SBGTPL agrees and acknowledges that:

a. all acquisitions of equity by an acquirer, either by himself or with any person acting in concert, directly or indirectly, including by transfer of direct or indirect legal or beneficial ownership or control of any equity, in aggregate of not less 15% of the total equity of SBGTPL; or

b. acquisition of any control directly or indirectly of the board of directors of SBGTPL by any person either by himself or together with any person or persons acting in concert with him

shall be subject prior approval of NHAI from national security and public interest perspective, the decision of NHAI in this behalf being final, conclusive and binding on SBGTPL, and undertakes that it shall not give effect to any such acquisition of equity or control of the board of directors of SBGTPL without such prior approval of NHAI. It has been expressly agreed that approval of NHAI hereunder shall be limited to national security and public interest perspective, and NHAI shall endeavor to convey its decision thereon expeditiously. It is also agreed that NHAI shall not be liable in any manner on account of grant or otherwise of such approval and that such approval or denial thereof shall not in any

manner absolve SBGTPL from any liability or obligation under the SBGTPL Concession Agreement.

8. *Indemnities*

a. SBGTPL shall indemnify, defend, save and hold harmless NHAI and its officers, servants, agents, government instrumentalities and government owned and/or controlled entities/enterprises, (the "**NHAI Indemnified Persons**") against any and all suits, proceedings, actions, demands and claims from third parties for any loss, damage, cost and expense of whatever kind and nature, whether arising out of any breach by SBGTPL of any of its obligations under the SBGTPL Concession Agreement or any related agreement or on account of any defect or deficiency in the provision of services by SBGTPL to any user except to the extent that any such suits, proceedings, actions, demands and claims have arisen due to any negligent act or omission, or breach or default of the SBGTPL Concession Agreement on the part of NHAI Indemnified Persons.

b. NHAI will indemnify, defend, save and hold harmless SBGTPL against any and all suits, proceedings, actions, demands and third party claims for any loss, damage, cost and expense of whatever kind and nature arising out of (i) defect in title and/or the rights of NHAI in the land comprised in the site, and/or (ii) breach by NHAI of any of its obligations under the SBGTPL Concession Agreement or any related agreement, which materially and adversely affect the performance by SBGTPL of its obligations under SBGTPL Concession Agreement, save and except that where any such claim, suit, proceeding, action, and/or demand has arisen due to a negligent act or omission, or breach of any of its obligations under any provision of SBGTPL Concession Agreement or any related agreement and/or breach of its statutory duty on the part of SBGTPL, its subsidiaries, affiliates, contractors, servants or agents, the same shall be the liability of SBGTPL.

c. SBGTPL shall fully indemnify, hold harmless and defend NHAI and NHAI Indemnified Persons from and against any and all loss and/or damages arising out of or with respect to:

   i. failure of SBGTPL to comply with applicable laws and applicable permits, each as defined in the SBGTPL Concession Agreement ("**Applicable Laws**" and "**Applicable Permits**");

   ii. payment of taxes required to be made by SBGTPL in respect of the income or other taxes of SBGTPL's contractors, suppliers and representatives; or

   iii. non-payment of amounts due as a result of materials or services furnished to SBGTPL or any of its contractors which are payable by SBGTPL or any of its contractors.

d. SBGTPL shall fully indemnify, hold harmless and defend NHAI Indemnified Persons from and against any and all suits, proceedings, actions, claims, demands, liabilities and damages which NHAI Indemnified Persons may hereafter suffer, or pay by reason of any demands, claims, suits or proceedings arising out of claims of infringement of any domestic or foreign patent rights, copyrights or other intellectual property, proprietary or confidentiality rights with respect to any materials, information, design or process used by SBGTPL or by SBGTPL's contractors in performing the obligations of SBGTPL or in any way incorporated in or related to the Project. If in any such suit, action, claim or proceedings, a temporary restraint order or preliminary injunction is granted, SBGTPL shall make every reasonable effort, by giving a satisfactory bond or otherwise, to secure the revocation or suspension of the injunction or restraint order. If, in any such suit, action, claim or proceedings, the Project, or any part thereof or comprised therein, is held to constitute an infringement and its use is permanently enjoined, SBGTPL shall promptly make every reasonable effort to secure for NHAI a licence, at no cost to NHAI, authorising continued use of the infringing work. If SBGTPL is unable to secure such licence within a reasonable time, SBGTPL shall, at its own expense, and without impairing the specifications and standards, either replace the affected work, or part, or process thereof with non-infringing work or part or process, or modify the same so that it becomes non-infringing.

9. *Suspension of SBGTPL's rights*

Upon occurrence of a SBGTPL default, as defined in the SBGTPL Concession Agreement ("**SBGTPL Default**"), NHAI shall be entitled, without prejudice to its other rights and remedies under the SBGTPL Concession Agreement including its rights of termination, as defined in the SBGTPL Concession Agreement ("**Termination**"), thereunder, to (i) suspend all rights of SBGTPL under the SBGTPL Concession Agreement, and pursuant hereto, and (ii) exercise such rights itself and perform the obligations hereunder or authorise any other person to exercise or perform the same on its behalf during such suspension ("**Suspension**"). Suspension hereunder shall be effective forthwith upon issue of notice by NHAI to SBGTPL and may extend up to a period not exceeding 180 days from the date of issue of such notice; provided that upon written request from SBGTPL and the lenders' representative, as defined in the SBGTPL Concession Agreement ("**Lenders' Representative"),** NHAI shall extend the aforesaid period of 180 days by a further period not exceeding 90 days.

At any time during the period of Suspension, the Lenders' Representative, on behalf of senior lenders, as defined in the SBGTPL Concession Agreement ("**Senior Lenders**"), shall be entitled to substitute SBGTPL under and in accordance with the substitution agreement, as defined in the SBGTPL Concession Agreement ("**Substitution Agreement**"), and upon receipt of notice thereunder from the Lenders' Representative, NHAI shall withhold Termination for a period not exceeding 180 days from the date of Suspension, and any extension thereof, for enabling the Lenders' Representative to exercise its rights of substitution on behalf of Senior Lenders.

10. *Effect of variation in traffic growth*

NHAI and SBGTPL acknowledge that the traffic as on March 31, 2019 (the "**Target Date**") is estimated to be 60,664 PCUs per day (the "**Target Traffic**"), and hereby agree that for determining the modifications to the Concession Period as defined in the SBGTPL Concession Agreement, the actual traffic on the Target Date shall be derived by computing the average of the traffic as determined by traffic sampling to be undertaken, in accordance with the SBGTPL Concession Agreement, on the date that falls one year prior to the Target Date, on the Target Date and on the first anniversary of the Target Date (the "**Actual Average Traffic**"). It is agreed that traffic sampling shall be undertaken for a continuous period of 7 (seven) days during any time within 15 (fifteen) days prior to the date specified herein and the average thereof shall be deemed to be the actual traffic. It is further agreed that if the Project shall have two or more Toll Plazas as defined in the SBGTPL Concession Agreement, the average traffic thereof shall be computed for determining the Actual Average Traffic hereunder.

In the event that the Actual Average Traffic shall have fallen short of the Target Traffic by more than 2.5% (two point five per cent) thereof or exceeded the Target Traffic by more than 2.5% (two point five per cent) thereof, the Concession Period shall be deemed to be modified in accordance with the SBGTPL Concession Agreement.

11. *Restriction on construction of Additional Tollway*

Notwithstanding anything to the contrary contained in the SBGTPL Concession Agreement NHAI shall not construct, and shall procure that no Government Instrumentality shall construct or cause to be constructed, any expressway or other toll road between, inter alia, Samakhiali and Gandhidham i.e. km 306.00 and km 362.16 on National Highway No. 8A (collectively the "**Additional Tollway**") for use by traffic at any time before the 12th (twelfth) anniversary of the Appointed Date as defined in the SBGTPL Concession Agreement. Additional Tollway does not include any expressway or other toll road connecting, inter alia, Samakhiali and Gandhidham i.e. km 306.00 and km 362.16 on National Highway No. 8A if the length of such expressway or toll road exceeds the length of the existing route comprising the Project by 20% (twenty per cent) thereof.

12. *Obligations relating to Competing Roads*

NHAI shall procure that during the subsistence of the SBGTPL Concession Agreement, neither NHAI nor any Government Instrumentality shall, at any time before the 10th (tenth) anniversary of the Appointed Date as defined in the SBGTPL Concession Agreement, construct or cause to be constructed any Competing Road as defined in the SBGTPL Concession Agreement; provided that the restriction herein shall not apply if the average traffic on the Project in any year exceeds 90% (ninety per cent) of its designed capacity specified in the SBGTPL Concession Agreement. Upon breach of its obligations

hereunder, NHAI shall be liable to payment of compensation to SBGTPL under and in accordance with SBGTPL Concession Agreement, and such compensation shall be the sole remedy of the SBGTPL.

13. *Effect of force majeure event on the Concession*

Upon the occurrence of any force majeure event prior to the financial close, as defined in the SBGTPL Concession Agreement ("**Force Majeure Event**"), the period set forth for achieving financial close shall be extended by a period equal in length to the duration of the Force Majeure Event. Upon occurrence of any Force Majeure Event any time after the Appointed Date, whereupon SBGTPL was unable to collect the Fees, as defined in the SBGTPL Concession Agreement, despite making best efforts or it is directed by NHAI to suspend the collection thereof during the subsistence of such Force Majeure Event, the Concession Period shall be extended by a period, equal in length to the period during which SBGTPL was prevented from collection of Fee on account thereof; provided that in the event of partial collection of Fee where the daily collection is less than 90% (ninety per cent) of the Average Daily Fee, the NHAI shall extend the Concession Period in proportion to the loss of Fee on a daily basis.

14. *Allocation of costs arising out of Force Majeure*

a. Upon occurrence of any Force Majeure Event prior to the Appointed Date, the parties to the SBGTPL Concession Agreement shall bear their respective costs and no party shall be required to pay to the other party any costs thereof.

b. Upon occurrence of a Force Majeure Event after the Appointed Date, the costs incurred and attributable to such event and directly relating to the project ("**Force Majeure Costs**") shall be allocated and paid as follows:

   i. upon occurrence of a non-political event, as defined in the SBGTPL Concession Agreement, the parties shall bear their respective Force Majeure Costs and neither party shall be required to pay to the other party any costs thereof;

   ii. upon occurrence of an indirect political event, as defined in the SBGTPL Concession Agreement, all Force Majeure Costs attributable to such indirect political event, and not exceeding the insurance cover for such indirect political event, shall be borne by SBGTPL, and to the extent Force Majeure Costs exceed such insurance cover, as set out in the SBGTPL Concession Agreement, one half of such excess amount shall be reimbursed by NHAI to SBGTPL; and

   iii. upon occurrence of a political event, as defined in the SBGTPL Concession Agreement, all Force Majeure Costs attributable to such political event shall be reimbursed by NHAI to SBGTPL.

15. *Divestment Requirements*

Upon termination of the SBGTPL Concession Agreement, SBGTPL shall comply with and conform to the following divestment requirements, amongst others:

a. notify NHAI forthwith the location and particulars of all project assets, as defined in the SBGTPL Concession Agreement ("**Project Assets**");

b. deliver forthwith the actual or constructive possession of the Project, free and clear of all encumbrances, save and except to the extent set forth in the Substitution Agreement;

c. cure all Project Assets, including the road, bridges, structures and equipment, of all defects and deficiencies so that the Project is compliant with the maintenance requirements, provided that in the event of Termination during the construction period, all Project Assets shall be handed over on 'as is where is' basis after bringing them to a safe condition;

d. comply with all other requirements as may be prescribed or required under Applicable Laws for completing the divestment and assignment of all rights, title and interest of SBGTPL in the Project, free from all encumbrances, absolutely unto NHAI or to its nominees.

16. *Termination for SBGTPL Default*

Subject to the provisions of the SBGTPL Concession Agreement, in the event that any of the defaults specified below shall have occurred, and SBGTPL fails to cure the default within the mentioned cure period, or where no cure period is specified, then within a cure period of 60 days, SBGTPL shall be deemed to be in default of the SBGTPL Concession Agreement (the "**SBGTPL Default**"), unless the default has occurred as a result of any breach of the SBGTPL Concession Agreement by NHAI or due to Force Majeure Event. The defaults referred to shall include, among other things, the following:

a. The performance security, as defined in the SBGTPL Concession Agreement ("**Performance Security**"), has been encashed and appropriated in accordance with the SBGTPL Concession Agreement and SBGTPL fails to replenish or provide fresh Performance Security within a cure period of 30 days;

b. subsequent to the replenishment or furnishing of fresh Performance Security in accordance with the SBGTPL Concession Agreement, SBGTPL fails to cure within a cure period of 90 days, the SBGTPL Default for which whole or part of the performance security was appropriate;

c. SBGTPL does not achieve the latest outstanding project milestone due in accordance with the provisions of the SBGTPL Concession Agreement and continues to be in default for 120 days;

d. upon occurrence of a financial default, as defined in the SBGTPL Concession Agreement ("**Financial Default**"), the Lenders' Representative has by notice required NHAI to undertake Suspension in accordance with the Substitution Agreement and SBGTPL fails to cure the default within the cure period specified;

e. a change in ownership has occurred in breach of the provisions of the SBGTPL Concession Agreement.

Upon occurrence of a SBGTPL Default, NHAI shall be entitled to terminate the SBGTPL Concession Agreement by issuing a termination notice, as defined in SBGTPL Concession Agreement ("**Termination Notice**"), to SBGTPL; provided that before issuing the Termination Notice, NHAI shall by a notice inform SBGTPL of its intention to issue such Termination Notice and grant 15 days to SBGTPL to make a representation, and may, after the expiry of such 15 days, whether or not it is in receipt of such representation, issue the Termination Notice.

17. *Termination for NHAI Default*

SBGTPL may terminate the SBGTPL Concession Agreement on account of occurrence of a default by the NHAI which is not rectified within the cure period of 90 days or such longer period as has been expressly provided in this SBGTPL Concession Agreement (the "**NHAI Default**") and includes – (i) material default causing a material adverse effect on SBGTPL; (ii) the failure to make any payment due to SBGTPL; (iii) repudiation of the SBGTPL Concession Agreement, etc.

SBGTPL may, under the SBGTPL Concession Agreement, upon occurrence of a NHAI Default, subject to the provisions of Substitution Agreement, terminate the SBGTPL Concession Agreement by issuing a Termination Notice to NHAI; provided that before issuing the Termination Notice, SBGTPL shall by notice inform NHAI of its intentions to issue the Termination Notice and grant 15 days to NHAI to make a representation, and may after the expiry of such 15 days, whether or not it is in receipt of such representation, issue the Termination Notice.

18. *Defects liability after termination*

SBGTPL shall be responsible for all defects and deficiencies in the Project for a period of 120 days after Termination, and it shall have the obligation to repair or rectify, at its own cost, all defects and deficiencies observed by the Independent Engineer in the Project during this period. In the event that SBGTPL fails to repair or rectify such defect or deficiency within a period of 15 days from the date of notice issued by NHAI, NHAI shall be entitled to get the same repaired or rectified at the risk and cost of SBGTPL so as to make the Project conform to the maintenance requirements. All costs incurred by NHAI in this regard shall be reimbursed by SBGTPL to NHAI within 15 days of receipt of demand thereof, and in the event of default in reimbursing such costs, NHAI shall be entitled to recover the

same from the funds retained in the escrow account.

3. Panipat Elevated Corridor Private Limited ("PECPL")

The concession agreement has been executed between PECPL and NHAI dated July 27, 2005 (the "**PECPL Concession Agreement**"). The scope of the Project under the PECPL Concession Agreement includes the six laning of portion from km 86 to km 96 covering Panipat city, on NH-1 in Haryana, and construction of a six lane elevated structure covering Gohana road, Sanauli road, Assandh road crossings, city bus stand and skylark tourist complex, widening and construction of peripheral lanes and operation and maintenance thereof on build, operate and transfer basis ("**Project**"), for a concession period of 20 years ("**Concession Period**" and such concession "**Concession**") with the appointed date being January 23, 2006 ("**Appointed Date**").

A summary of key terms of the PECPL Concession Agreement has been set below:

1. *Total Project Cost*

   The total project cost, as defined in the PECPL Concession Agreement ("**Total Project Cost**"), means the lowest of:

   a. the total project cost as set forth in the Financing Documents;

   b. the actual capital cost of the Project upon completion of the project section as certified by the statutory auditors, each as defined in the PECPL Concession Agreement; and

   c. a sum of Rs. 3,250 million;

   Provided further that if part of the Total Project Cost is funded in foreign currency, in accordance with the Financing Package, then the rate of exchange shall be determined as on the date of bid, and the Total Project Cost shall be computed as if such foreign currency were converted with reference to such exchange rate. In the event of Termination of PECPL Concession Agreement requiring NHAI to make termination payments, the liability of NHAI shall be determined on basis of the rate of exchange prevailing on the date of termination notice and the amounts payable by NHAI for debt due and subordinated debt, as the case may be, shall be computed in accordance with the PECPL Concession Agreement.

2. *Concession Fee*

   In consideration of the grant of Concession under the PECPL Concession Agreement, the concession fee payable by PECPL to NHAI shall be Re.1.00 (Rupee One) ("**Concession Fee**") per year during the term of PECPL Concession Agreement. The Concession Fee, for each year, shall be paid in advance within 90 (ninety) days of the commencement of the year for which it is due and payable.

3. *Change of Scope*

   NHAI may require the provision of addition/ deletion works and services on or about the Project which are beyond the scope of the Project as contemplated under PECPL Concession Agreement (the "**Change of Scope**") provided such changes do not require expenditure exceeding 5% of the Total Project Cost and do not adversely affect the COD. All such changes shall be made by NHAI by an order issued in accordance with the procedure set forth in the PECPL Concession Agreement.

4. *O&M*

   PECPL shall operate and maintain the Project, in accordance with the PECPL Concession Agreement either by itself, or through the O&M contractor, as defined in the PECPL Concession Agreement ("**O&M Contractor**"), and if required, modify, repair or otherwise make improvements to the Project to comply with provisions of the PECPL Concession Agreement applicable laws, applicable permits and conform to specifications, standards and good industry practice. The obligations of PECPL, among other things, shall include:

   a. permitting safe, smooth and uninterrupted flow of traffic on the Project during normal operating conditions;

b. carrying out periodic preventive maintenance of the Project;

c. undertaking routine maintenance including prompt repairs of potholes, cracks, joints, drains, embankments, structures, pavement markings, lighting, road signs and other traffic control devices;

d. undertaking major maintenance such as resurfacing of pavements, repairs to structures, and repairs and refurbishment of tolling system and other equipment;

e. charging, collecting and retaining the fees in accordance with the PECPL Concession Agreement.

5. *Obligations relating to change in ownership*

In accordance with the PECPL Concession Agreement, if the aggregate equity share holding of the consortium members (sole applicant, if applicable) and their associates in the issued and paid up equity share capital of PECPL falls below (a) 51% (fifty one percent) during the construction period and for 3 (three) years following COD, and (b) 26% (twenty six per cent) during the balance remaining operations period and PECPL does not suo moto cure such default within 90 (ninety) days of its occurrence, then it shall constitute an event of default which shall entitle NHAI to terminate the PECPL Concession Agreement, each as defined in the PECPL Concession Agreement.

6. *Indemnities*

a. PECPL shall indemnify, defend, and hold harmless NHAI against any and all proceedings, actions, and third party claims (other than a claim by NHAI or GoI) for any loss, damage and expense of whatever kind and nature, whether arising out of the design, engineering, construction, procurement, Operation and Maintenance of the Project or arising out of a breach by PECPL of any of its obligations under the PECPL Concession Agreement except to the extent that any such claim has arisen due to NHAI Event of Default as defined in the PECPL Concession Agreement.

b. NHAI will indemnify, defend, save and hold harmless PECPL against any and all proceedings, actions, third party claims for loss, damage and expense of whatever kind and nature arising out of defect in title and/or the rights of NHAI in the land comprised in the Project adversely affecting the performance of the PECPL's obligations under the PECPL Concession Agreement and/or arising out of acts done in discharge of their lawful functions by NHAI, its officers, servants, agents, subsidiaries and contractors ("**NHAI Indemnified Persons**") including NHAI events of default except to the extent that any such claim has arisen due to a negligent act or omission, breach of contract or breach of statutory duty on the part of PECPL, its Subsidiaries, affiliates, contractors, servants or agents including due to PECPL event of default as defined in the PECPL Concession Agreement.

c. PECPL shall fully indemnify, save harmless and defend NHAI and NHAI Indemnified Persons from and against any and all loss and/or damages arising out of or with respect to:

i. failure of PECPL to comply with applicable laws and applicable permits, each as defined in the PECPL Concession Agreement ("**Applicable Laws**" and "**Applicable Permits**");

ii. payment of taxes required to be made by PECPL in respect of the income or other taxes of PECPL's contractors, suppliers and representatives; or

iii. non-payment of amounts due as a result of materials or services furnished to PECPL or any of its contractors which are payable by PECPL or any of its contractors.

d. PECPL shall fully indemnify, hold harmless and defend NHAI Indemnified Persons from and against any and all suits, proceedings, actions, claims, demands, liabilities and damages which NHAI Indemnified Persons may hereafter suffer, or pay by reason of any demands, claims, suits or proceedings arising out of claims of infringement of any domestic or foreign patent rights, copyrights or other intellectual property, proprietary or confidentiality rights with respect to any materials, information, design or process used by PECPL or by PECPL's

contractors in performing the obligations of PECPL or in any way incorporated in or related to the Project. If in any such suit, action, claim or proceedings, a temporary restraint order or preliminary injunction is granted, PECPL shall make every reasonable effort, by giving a satisfactory bond or otherwise, to secure the revocation or suspension of the injunction or restraint order. If, in any such suit, action, claim or proceedings, the Project, or any part thereof or comprised therein, is held to constitute an infringement and its use is permanently enjoined, PECPL shall promptly make every reasonable effort to secure for NHAI a licence, at no cost to NHAI, authorising continued use of the infringing work. If PECPL is unable to secure such licence within a reasonable time, PECPL shall, at its own expense, and without impairing the specifications and standards, either replace the affected work, or part, or process thereof with non-infringing work or part or process, or modify the same so that it becomes non-infringing.

7. *Effect of force majeure event on the Concession*

Upon the occurrence of any force majeure event prior to the financial close, as defined in the PECPL Concession Agreement ("**Force Majeure Event**"), the following shall apply:

a. there shall be no Termination except as provided;

b. the date for achieving Financial Close shall be extended by the period for which such Force Majeure event shall subsist;

c. the parties shall bear their respective costs and no party shall be required to pay to the other party any costs arising out of such Force Majeure Event.

Upon the occurrence of any Force Majeure Event after the financial close, the following shall apply:

a. there shall be no Termination except as provided;

b. where the Force Majeure Event occurs before COD, the dates set forth in the Project Completion Schedule, and the Concession Period shall be extended by the period for which such Force Majeure Event subsist;

c. where the Force Majeure Event occurs after COD, PECPL shall continue to make all reasonable efforts to collect Fees, but if unable to collect Fees during the subsistence of such Force Majeure Event, the Concession Period shall be extended by the period for which collection of Fees remains suspended on account thereof.

8. *Allocation of costs arising out of Force Majeure*

Upon occurrence of a Force Majeure Event after the financial close, the costs arising out of such event shall be allocated as follows:

i. upon occurrence of a non-political event, as defined in the PECPL Concession Agreement, the parties shall bear their respective costs and neither party shall be required to pay to the other party any costs thereof;

ii. upon occurrence of an indirect political event, as defined in the PECPL Concession Agreement, all Force Majeure Costs shall be borne by PECPL, to the extent Force Majeure Costs exceed insurance claims, one half of such excess amount shall be reimbursed by NHAI to PECPL; and

iii. upon occurrence of a political event, as defined in the PECPL Concession Agreement, all Force Majeure Costs attributable to such political event shall be reimbursed by NHAI to PECPL.

9. *Divestment Requirements*

Upon termination of PECPL Concession Agreement, PECPL shall comply with following divestment requirements, amongst others:

a. notify NHAI forthwith the location and particulars of all project assets, as defined in the PECPL Concession Agreement ("**Project Assets**");

b. deliver forthwith the actual or constructive possession of the Project Section free and clear of all encumbrances and execute such deeds, writings and documents as may be required by the NHAI for fully and effectively divesting PECPL of all of the rights, title and interest of PECPL in the Project and conveying the Project Section free of any charge or cost to NHAI; and

c. comply with the divestment requirements as set out in the PECPL Concession Agreement.

10. *Termination for PECPL Default*

Subject to the provisions of the PECPL Concession Agreement, in the event that any of the defaults specified below occur, NHAI shall be entitled to terminate the PECPL Concession Agreement by a communication in writing to PECPL if PECPL has failed to cure such breach or default within the period provided in the PECPL Concession agreement, provided that before issuing the termination notice, NHAI shall by notice in writing inform PECPL of its intention to issue the termination notice and grant 15 days' time to PECPL to make representations if any against such intended notice and shall after expiry of the 15 days period whether or not it is receipt of such representation, in its sole discretion issue the termination notice. The defaults referred to shall include, among other things, the following:

a. PECPL is in material breach of the PECPL Concession Agreement.

b. a resolution is passed by the shareholders of PECPL for the voluntary winding up of itself;

c. PECPL has been adjudged bankrupt or insolvent;

d. PECPL fails to achieve financial close as defined in the PECPL Concession Agreement;

e. PECPL creates any encumbrance, charges or lien in favour of any person save and except as otherwise expressly permitted under the PECPL Concession Agreement

11. *Termination for NHAI Default*

PECPL may after giving 90 days notice in writing to NHAI, terminate the PECPL Concession Agreement on account of occurrence and continuation of any of the following defaults by NHAI and includes – (i) material default causing a material adverse effect, as defined in the PECPL Concession Agreement, on PECPL; (ii) the failure to make any payment due to PECPL; (iii) repudiation of the PECPL Concession Agreement etc.

12. *Defects liability after termination*

Not less than 30 to 36 months before the concession ends, PECPL and independent consultant as defined in the PECPL Concession Agreement, shall conduct an initial inspection as defined in the PECPL Concession Agreement, of the project and facilities, after which PECPL submits a report and proposed renewal works within 90 days, each as defined in the PECPL Concession Agreement. The Consultant may object and suggest alternatives within another 90 days, and if no agreement is reached within 30 days, the matter goes to dispute resolution, with PECPL ultimately responsible for carrying out the agreed works at its own cost. Further, not less than 9 to 12 months before expiry, second inspection as defined in the PECPL Concession Agreement shall be conducted to reassess the project, followed by a revised report and renewal proposals from PECPL within 30 days, which the Consultant may again object to and amend within 30 days to ensure compliance with divestment requirements. If following the second inspection, it is agreed or determined that no renewal works are required then within 14 days of such agreement, 50% of the sums retained shall be released from the escrow account to PECPL.

4. Deccan Tollways Private Limited ("DTPL")

The concession agreement has been executed between DTPL and NHAI dated February 2, 2012 (the "**DTPL Concession Agreement**"). The scope of the project under the DTPL Concession Agreement includes the four

laning of the existing road from Km. 348.800 to Km. 493.000 (approximately 145 Km. on the Maharashtra/ Karnataka border – Sangareddy section of National Highway No. 9 in the states of Karnataka and Andhra Pradesh on design, build, finance, operate and transfer on toll basis, for a concession period of 25 years ("**Concession Period**" and such concession "**Concession** ") with the appointed date being April 1, 2014 ("**Appointed Date**").

A summary of the key terms of the DTPL Concession Agreement has been set below:

1. *Total Project Cost*

   The total project cost, as defined in the DTPL Concession Agreement ("**Total Project Cost**"), means the lowest of:

   a. the capital cost of the Project. as set forth in the Financial Package;

   b. the actual capital cost of the Project upon completion of four-laning of the Project Highway; and

   c. a sum of Rs. 12,666.00 million;

   provided that in the event of termination, the Total Project Cost shall be deemed to be modified to the extent of variation in WPI or reference exchange rate occurring in respect of adjusted equity and debt due each as defined in the DTPL Concession Agreement, provided further that in the event WPI increases, on average, by more than six percent per annum for the period between the date thereof and COD, the parties to the DTPL Concession Agreement shall meet as soon as reasonably practicable, and agree upon revision of the amount hereinbefore specified such that the effect of increase in WPI, in excess of such 6%, is reflected in the Total Project Cost, in accordance with the provisions of the DTPL Concession Agreement.

2. *Concession Fee*

   In consideration of the grant of Concession, the concession fee payable by DTPL to NHAI shall be Re.1.00 (Rupee One) ("**Concession Fee**") per annum and the premium as specified in the DTPL Concession Agreement. The Concession Fee shall be due and payable in monthly instalments, within 7 days of the close of each month.

3. *Change of Scope*

   NHAI may require the provision of additional works and services which are not included in the scope of the Project as contemplated by the DTPL Concession Agreement (the "**Change of Scope**"). Within 7 days, NHAI shall make an advance payment to DTPL in a sum equal to 20% of the cost of Change of Scope, and in the event of a dispute, 20% of the cost assessed by the independent engineer, as defined in the DTPL Concession Agreement ("**Independent Engineer**"). DTPL shall, after commencement of work, present to NHAI bills for payment in respect of the works in progress or completed works, as the case may be, supported by documentation as is reasonably sufficient for NHAI to determine the accuracy thereof. Within 30 (thirty) days of receipt of such bills, NHAI shall disburse to DTPL such amounts as are certified by the independent engineer as reasonable and after making a proportionate deduction for the advance payment made hereunder, and in the event of any dispute, as defined in the DTPL Concession Agreement, final adjustments thereto shall be made under and in accordance with the dispute resolution procedure as defined in the DTPL Concession Agreement. DTPL shall be entitled to nullify any Change of Scope order if it causes the cumulative costs relating to all the Change of Scope orders to exceed 5% of the Total Project Cost in any continuous period of 3 years immediately preceding the date of such Change of Scope order or if such cumulative costs exceed 20% of the Total Project Cost at any time during the concession period.

4. *O&M*

   DTPL shall operate and maintain the Project, in accordance with the DTPL Concession Agreement either by itself, or through the O&M contractor, as defined in the DTPL Concession Agreement ("**O&M Contractor**"), and if required, modify, repair or otherwise make improvements to the Project to comply with provisions of the DTPL Concession Agreement applicable laws, applicable permits and conform to specifications, standards and good industry practice. The obligations of DTPL, among

other things, shall include:

a. permitting safe, smooth and uninterrupted flow of traffic on the Project during normal operating conditions;

b. carrying out periodic preventive maintenance of the Project;

c. undertaking routine maintenance including prompt repairs of potholes, cracks, joints, drains, embankments, structures, pavement markings, lighting, road signs and other traffic control devices;

d. undertaking major maintenance such as resurfacing of pavements, repairs to structures, and repairs and refurbishment of tolling system and other equipment;

e. protection of the environment and provision of equipment and materials therefore; and

f. operation and maintenance of all communication, control and administrative systems necessary for the efficient operation of the Project.

5. *Maintenance manual*

No later than 180 days prior to the scheduled four-lane date, as defined in the DTPL Concession Agreement, DTPL shall, in consultation with the Independent Engineer, evolve a repair and maintenance manual, as defined in the DTPL Concession Agreement (the "**Maintenance Manual**"), for the regular and preventive maintenance of the Project in conformity with the maintenance requirements, safety requirements and good industry practice. The Maintenance Manual shall be revised and updated once every three years.

6. *Maintenance programme*

On or before COD and no later than 45 days prior to the beginning of each accounting year during the operation period, as defined in the DTPL Concession Agreement, DTPL shall provide to NHAI and the independent engineer its proposed annual programme of preventive, urgent and other scheduled maintenance (the "**Maintenance Programme**") to comply with the maintenance requirements, Maintenance Manual and safety requirements. Such Maintenance Programme, amongst other things shall include the following:

a. preventive maintenance schedule;

b. arrangements and procedures for carrying out urgent repairs;

c. criteria to be adopted for deciding maintenance needs;

d. intervals and procedures for carrying out inspection of all elements of the Project;

e. intervals at which DTPL shall carry out periodic maintenance;

f. arrangements and procedures for carrying out safety related measures; and

g. intervals for major maintenance works and the scope thereof.

7. *Obligations relating to change in ownership*

DTPL shall not undertake or permit any change in ownership, except with the prior approval of NHAI. Notwithstanding anything to the contrary contained in the DTPL Concession Agreement, DTPL agrees and acknowledges that:

a. all acquisitions of equity by an acquirer, either by himself or with any person acting in concert, directly or indirectly, including by transfer of direct or indirect legal or beneficial ownership or control of any equity, in aggregate of not less 15% of the total equity of DTPL; or

b. acquisition of any control directly or indirectly of the board of directors of DTPL by any person either by himself or together with any person or persons acting in concert with him

shall be subject prior approval of NHAI from national security and public interest perspective, the decision of NHAI in this behalf being final, conclusive and binding on DTPL, and undertakes that it shall not give effect to any such acquisition of equity or control of the board of directors of DTPL without such prior approval of NHAI. It has been expressly agreed that approval of NHAI hereunder shall be limited to national security and public interest perspective, and NHAI shall endeavor to convey its decision thereon expeditiously. It is also agreed that NHAI shall not be liable in any manner on account of grant or otherwise of such approval and that such approval or denial thereof shall not in any manner absolve DTPL from any liability or obligation under the DTPL Concession Agreement.

8. *Indemnities*

a. DTPL shall indemnify, defend, save and hold harmless NHAI and its officers, servants, agents, government instrumentalities and government owned and/or controlled entities/enterprises, (the "**NHAI Indemnified Persons**") against any and all suits, proceedings, actions, demands and claims from third parties for any loss, damage, cost and expense of whatever kind and nature, whether arising out of any breach by DTPL of any of its obligations under the DTPL Concession Agreement or any related agreement or on account of any defect or deficiency in the provision of services by DTPL to any user except to the extent that any such suits, proceedings, actions, demands and claims have arisen due to any negligent act or omission, or breach or default of the DTPL Concession Agreement on the part of NHAI Indemnified Persons.

b. NHAI will indemnify, defend, save and hold harmless DTPL against any and all suits, proceedings, actions, demands and third party claims for any loss, damage, cost and expense of whatever kind and nature arising out of (i) defect in title and/or the rights of NHAI in the land comprised in the site, and/or (ii) breach by NHAI of any of its obligations under the DTPL Concession Agreement or any related agreement, which materially and adversely affect the performance by DTPL of its obligations under DTPL Concession Agreement, save and except that where any such claim, suit, proceeding, action, and/or demand has arisen due to a negligent act or omission, or breach of any of its obligations under any provision of DTPL Concession Agreement or any related agreement and/or breach of its statutory duty on the part of DTPL, its subsidiaries, affiliates, contractors, servants or agents, the same shall be the liability of DTPL.

c. DTPL shall fully indemnify, hold harmless and defend NHAI and NHAI Indemnified Persons from and against any and all loss and/or damages arising out of or with respect to:

1. failure of DTPL to comply with applicable laws and applicable permits, each as defined in the DTPL Concession Agreement ("**Applicable Laws**" and "**Applicable Permits**");

2. payment of taxes required to be made by DTPL in respect of the income or other taxes of DTPL's contractors, suppliers and representatives; or

3. non-payment of amounts due as a result of materials or services furnished to DTPL or any of its contractors which are payable by DTPL or any of its contractors.

d. DTPL shall fully indemnify, hold harmless and defend NHAI Indemnified Persons from and against any and all suits, proceedings, actions, claims, demands, liabilities and damages which NHAI Indemnified Persons may hereafter suffer, or pay by reason of any demands, claims, suits or proceedings arising out of claims of infringement of any domestic or foreign patent rights, copyrights or other intellectual property, proprietary or confidentiality rights with respect to any materials, information, design or process used by DTPL or by DTPL's contractors in performing the obligations of DTPL or in any way incorporated in or related to the Project. If in any such suit, action, claim or proceedings, a temporary restraint order or preliminary injunction is granted, DTPL shall make every reasonable effort, by giving a satisfactory bond or otherwise, to secure the revocation or suspension of the injunction or restraint order. If, in any such suit, action, claim or proceedings, the Project, or any part thereof or comprised therein, is held to constitute an infringement and its use is permanently enjoined, DTPL shall promptly make every reasonable effort to secure for NHAI a licence, at no cost to NHAI, authorising continued use of the infringing work. If DTPL is unable to

secure such licence within a reasonable time, DTPL shall, at its own expense, and without impairing the specifications and standards, either replace the affected work, or part, or process thereof with non-infringing work or part or process, or modify the same so that it becomes non-infringing.

9. *Suspension of DTPL's rights*

Upon occurrence of a DTPL default, as defined in the DTPL Concession Agreement ("**DTPL Default**"), NHAI shall be entitled, without prejudice to its other rights and remedies under the DTPL Concession Agreement including its rights of termination, as defined in the DTPL Concession Agreement ("**Termination**"), thereunder, to (i) suspend all rights of DTPL under the DTPL Concession Agreement, and pursuant hereto, and (ii) exercise such rights itself and perform the obligations hereunder or authorise any other person to exercise or perform the same on its behalf during such suspension ("**Suspension**"). Suspension hereunder shall be effective forthwith upon issue of notice by NHAI to DTPL and may extend up to a period not exceeding 180 days from the date of issue of such notice; provided that upon written request from DTPL and the lenders' representative, as defined in the DTPL Concession Agreement **("Lenders' Representative"),** NHAI shall extend the aforesaid period of 180 days by a further period not exceeding 90 days.

At any time during the period of Suspension, the Lenders' Representative, on behalf of senior lenders, as defined in the DTPL Concession Agreement ("**Senior Lenders**"), shall be entitled to substitute DTPL under and in accordance with the substitution agreement, as defined in the DTPL Concession Agreement ("**Substitution Agreement**"), and upon receipt of notice thereunder from the Lenders' Representative, NHAI shall withhold Termination for a period not exceeding 180 days from the date of Suspension, and any extension thereof, for enabling the Lenders' Representative to exercise its rights of substitution on behalf of Senior Lenders.

10. *Effect of variation in traffic growth*

NHAI and DTPL acknowledge that the traffic as on April 1, 2021 (the "**Target Date**") is estimated to be 26,331 PCUs per day (the "**Target Traffic**"), and hereby agree that for determining the modifications to the Concession Period as defined in the DTPL Concession Agreement, the actual traffic on the Target Date shall be derived by computing the average of the traffic as determined by traffic sampling to be undertaken, in accordance with the DTPL Concession Agreement, on the date that falls one year prior to the Target Date, on the Target Date and on the first anniversary of the Target Date (the "**Actual Average Traffic**"). It is agreed that traffic sampling shall be undertaken for a continuous period of 7 (seven) days during any time within 15 (fifteen) days prior to the date specified herein and the average thereof shall be deemed to be the actual traffic. It is further agreed that if the Project shall have two or more toll plazas as defined in the DTPL Concession Agreement, the average traffic thereof shall be computed for determining the Actual Average Traffic hereunder.

In the event that the Actual Average Traffic shall have fallen short of the Target Traffic by more than 2.5% (two point five per cent) thereof or exceeded the Target Traffic by more than 2.5% (two point five per cent) thereof, the Concession Period shall be deemed to be modified in accordance with the DTPL Concession Agreement.

11. *Restriction on construction of Additional Tollway*

Notwithstanding anything to the contrary contained in the DTPL Concession Agreement NHAI shall not construct, and shall procure that no Government Instrumentality shall construct or cause to be constructed, any expressway or other toll road Maharashtra/ Karnataka Border- Sangareddy, inter alia, km 348.800 and km 493.000 on National Highway No. 9 (collectively the "**Additional Tollway**") for use by traffic at any time before the 15th anniversary of the Appointed Date as defined in the DTPL Concession Agreement. Additional Tollway does not include any expressway or other toll road connecting, inter alia, Maharashtra/ Karnataka Border- Sangareddy km 348.800 and km 493.000 on National Highway No. 9 if the length of such expressway or toll road exceeds the length of the existing route comprising the Project by 20% (twenty per cent) thereof.

12. *Obligations relating to Competing Roads*

NHAI shall procure that during the subsistence of the DTPL Concession Agreement, neither NHAI nor any Government Instrumentality shall, at any time before the 10th (tenth) anniversary of the

Appointed Date as defined in the DTPL Concession Agreement, construct or cause to be constructed any Competing Road as defined in the DTPL Concession Agreement; provided that the restriction herein shall not apply if the average traffic on the Project in any year exceeds 90% (ninety per cent) of its designed capacity specified in the DTPL Concession Agreement. Upon breach of its obligations hereunder, NHAI shall be liable to payment of compensation to DTPL under and in accordance with DTPL Concession Agreement, and such compensation shall be the sole remedy of the DTPL.

13. *Effect of force majeure event on the Concession*

Upon the occurrence of any force majeure event prior to the appointed date, each as defined in the DTPL Concession Agreement ("**Force Majeure Event**" and "**Appointed Date**"), the period set forth for achieving financial close shall be extended by a period equal in length to the duration of the Force Majeure Event. Upon occurrence of any Force Majeure Event any time after the Appointed Date, but before COD, the Concession Period and the dates set forth in the Project Completion Schedule shall be extended by a period equal in length to the duration for which such Force Majeure Event subsists; if after COD, the Concession Period shall be extended by a period, equal in length to the period during which DTPL was prevented from collection of Fee on account thereof; provided that in the event of partial collection of Fee where the daily collection is less than 90% (ninety per cent) of the Average Daily Fee, the NHAI shall extend the Concession Period in proportion to the loss of Fee on a daily basis, as defined in the DTPL Concession Agreement.

14. *Allocation of costs arising out of Force Majeure*

a. Upon occurrence of any Force Majeure Event prior to the Appointed Date, the parties to the DTPL Concession Agreement shall bear their respective costs and no party shall be required to pay to the other party any costs thereof.

b. Upon occurrence of a Force Majeure Event after the Appointed Date, the costs incurred and attributable to such event and directly relating to the project ("**Force Majeure Costs**") shall be allocated and paid as follows:

i. upon occurrence of a non-political event, as defined in the DTPL Concession Agreement, the parties shall bear their respective Force Majeure Costs and neither party shall be required to pay to the other party any costs thereof;

ii. upon occurrence of an indirect political event, as defined in the DTPL Concession Agreement, all Force Majeure Costs attributable to such indirect political event, and not exceeding the insurance cover for such indirect political event, shall be borne by DTPL, and to the extent Force Majeure Costs exceed such insurance cover, one half of such excess amount shall be reimbursed by NHAI to DTPL; and

iii. upon occurrence of a political event, as defined in the DTPL Concession Agreement, all Force Majeure Costs attributable to such political event shall be reimbursed by NHAI to DTPL.

15. *Divestment Requirements*

Upon termination of the DTPL Concession Agreement, DTPL shall comply with and conform to the following divestment requirements, amongst others:

a. notify NHAI forthwith the location and particulars of all project assets, as defined in the DTPL Concession Agreement ("**Project Assets**");

b. deliver forthwith the actual or constructive possession of the Project, free and clear of all encumbrances, save and except to the extent set forth in the substitution agreement;

c. cure all Project Assets, including the road, bridges, structures and equipment, of all defects and deficiencies so that the Project is compliant with the maintenance requirements, provided that in the event of termination during the construction period, all Project Assets shall be handed over on 'as is here is' basis after bringing them to a safe condition;

d. comply with all other requirements as may be prescribed or required under applicable laws

for completing the divestment and assignment of all rights, title and interest of DTPL in the Project, free from all encumbrances, absolutely unto NHAI or to its nominees.

16. *Termination for DTPL Default*

Subject to the provisions of the DTPL Concession Agreement, in the event that any of the defaults specified below shall have occurred, and DTPL fails to cure the default within the mentioned cure period, or where no cure period is specified, then within a cure period of 60 days, DTPL shall be deemed to be in default of the DTPL Concession Agreement (the "**DTPL Default**"), unless the default has occurred as a result of any breach of the DTPL Concession Agreement by NHAI or due to Force Majeure Event. The defaults referred to shall include, among other things, the following:

a. The performance security, as defined in the DTPL Concession Agreement ("**Performance Security**"), has been encashed and appropriated in accordance with the DTPL Concession Agreement and DTPL fails to replenish or provide fresh Performance Security within a cure period of 30 days;

b. subsequent to the replenishment or furnishing of fresh Performance Security in accordance with the DTPL Concession Agreement, DTPL fails to cure within a cure period of 90 days, the DTPL Default for which whole or part of the performance security was appropriate;

c. DTPL does not achieve the latest outstanding project milestone due in accordance with the provisions of the DTPL Concession Agreement and continues to be in default for 120 days;

d. upon occurrence of a financial default, as defined in the DTPL Concession Agreement ("**Financial Default**"), the lenders' representative has by notice required NHAI to undertake Suspension in accordance with the substitution agreement and DTPL fails to cure the default within the cure period specified;

e. a change in ownership has occurred in breach of the provisions of the DTPL Concession Agreement.

Upon occurrence of a DTPL Default, NHAI shall be entitled to terminate the DTPL Concession Agreement by issuing a termination notice, as defined in DTPL Concession Agreement ("**Termination Notice**"), to DTPL; provided that before issuing the Termination Notice, NHAI shall by a notice inform DTPL of its intention to issue such Termination Notice and grant 15 days to DTPL to make a representation, and may, after the expiry of such 15 days, whether or not it is in receipt of such representation, issue the Termination Notice.

17. *Termination for NHAI Default*

DTPL may terminate the DTPL Concession Agreement on account of occurrence of a default by the NHAI which is not rectified within the cure period of 90 days or such longer period as has been expressly provided in this DTPL Concession Agreement (the "**NHAI Default**") and includes – (i) material default causing a material adverse effect, as defined in the DTPL Concession Agreement on DTPL; (ii) the failure to make any payment due to DTPL; (iii) repudiation of the DTPL Concession Agreement etc.

DTPL may, under the DTPL Concession Agreement, upon occurrence of a NHAI Default, subject to the provisions of Substitution Agreement, terminate the DTPL Concession Agreement by issuing a Termination Notice to NHAI; provided that before issuing the Termination Notice, DTPL shall by notice inform NHAI of its intentions to issue the Termination Notice and grant 15 days to NHAI to make a representation, and may after the expiry of such 15 days, whether or not it is in receipt of such representation, issue the Termination Notice.

18. *Defects liability after termination*

DTPL shall be responsible for all defects and deficiencies in the Project for a period of 120 days after termination, and it shall have the obligation to repair or rectify, at its own cost, all defects and deficiencies observed by the independent engineer in the Project during this period. In the event that DTPL fails to repair or rectify such defect or deficiency within a period of 15 days from the date of notice issued by NHAI, NHAI shall be entitled to get the same repaired or rectified at the risk and cost

of DTPL so as to make the Project conform to the maintenance requirements. All costs incurred by NHAI in this regard shall be reimbursed by DTPL to NHAI within 15 days of receipt of demand thereof, and in the event of default in reimbursing such costs, NHAI shall be entitled to recover the same from the funds retained in the escrow account.

5. Thrissur Expressway Limited ("TEL")

The concession agreement has been executed between TEL and NHAI dated August 24, 2009 (the "**TEL Concession Agreement**"). The scope of the Project under the TEL Concession Agreement includes six laning of Vadakanchery-Thrissur section of NH-47 (Km 240.000 to Km 270.000) in the state of Kerala on design, build, finance, operate and transfer basis, for a concession period of 20 years ("**Concession Period**" and such concession "**Concession** ") with the appointed date being September 15, 2012 ("**Appointed Date**").

A summary of the key terms of the TEL Concession Agreement has been set below:

1. *Total Project Cost*

The total project cost, as defined in the TEL Concession Agreement ("**Total Project Cost**"), means the lowest of:

a. the capital cost of the Project, less equity support as set forth in the financial package;

b. the actual capital cost of the Project upon completion of the Project, less equity support; and

c. a sum of Rs. 6,170.00 million;

provided that in the event of termination, the Total Project Cost shall be deemed to be modified to the extent of variation in WPI or reference exchange rate occurring in respect of adjusted equity and debt due each as defined in the TEL Concession Agreement, in accordance with the provisions of the TEL Concession Agreement.

2. *Concession Fee*

In consideration of the grant of Concession, the concession fee payable by TEL to NHAI shall be Re.1.00 (Rupee One) per annum.

3. *Change of Scope*

NHAI may require the provision of additional works and services which are not included in the scope of the Project as contemplated by the TEL Concession Agreement (the "**Change of Scope**"). Within 7 days, NHAI shall make an advance payment to TEL in a sum equal to 20% of the cost of Change of Scope, and in the event of a dispute, 20% of the cost assessed by the independent engineer, as defined in the TEL Concession Agreement ("**Independent Engineer**"). TEL shall, after commencement of work, present to NHAI bills for payment in respect of the works in progress or completed works, as the case may be, supported by documentation as is reasonably sufficient for NHAI to determine the accuracy thereof. Within 30 (thirty) days of receipt of such bills, NHAI shall disburse to TEL such amounts as are certified by the independent engineer as reasonable and after making a proportionate deduction for the advance payment made hereunder, and in the event of any dispute, as defined in the TEL Concession Agreement, final adjustments thereto shall be made under and in accordance with the dispute resolution procedure as defined in the TEL Concession Agreement.

4. *O&M*

TEL shall operate and maintain the Project, in accordance with the TEL Concession Agreement either by itself, or through the O&M contractor, as defined in the TEL Concession Agreement ("**O&M Contractor**"), and if required, modify, repair or otherwise make improvements to the Project to comply with provisions of the TEL Concession Agreement applicable laws, applicable permits and conform to specifications, standards and good industry practice. The obligations of TEL, among other things, shall include:

a. permitting safe, smooth and uninterrupted flow of traffic on the Project during normal operating conditions;

b. carrying out periodic preventive maintenance of the Project;

c. undertaking routine maintenance including prompt repairs of potholes, cracks, joints, drains, embankments, structures, pavement markings, lighting, road signs and other traffic control devices;

d. undertaking major maintenance such as resurfacing of pavements, repairs to structures, and repairs and refurbishment of tolling system and other equipment;

e. protection of the environment and provision of equipment and materials therefore; and

f. operation and maintenance of all communication, control and administrative systems necessary for the efficient operation of the Project.

5. *Maintenance manual*

No later than 180 days prior to the Scheduled Completion Date, as defined in the TEL Concession Agreement, TEL shall, in consultation with the Independent Engineer, evolve a repair and maintenance manual, as defined in the TEL Concession Agreement (the "**Maintenance Manual**"), for the regular and preventive maintenance of the Project in conformity with the maintenance requirements, safety requirements and good industry practice. The Maintenance Manual shall be revised and updated once every three years.

6. *Maintenance programme*

No later than 45 days prior to the beginning of each accounting year during the operation period, as defined in the TEL Concession Agreement, TEL shall provide to NHAI and the Independent Engineer its proposed annual programme of preventive, urgent and other scheduled maintenance (the "**Maintenance Programme**") to comply with the maintenance requirements, Maintenance Manual and safety requirements. Such Maintenance Programme, amongst other things shall include the following:

a. preventive maintenance schedule;

b. arrangements and procedures for carrying out urgent repairs;

c. criteria to be adopted for deciding maintenance needs;

d. intervals and procedures for carrying out inspection of all elements of the Project;

e. intervals at which TEL shall carry out periodic maintenance;

f. arrangements and procedures for carrying out safety related measures; and

g. intervals for major maintenance works and the scope thereof.

7. *Obligations relating to change in ownership*

TEL shall not undertake or permit any change in ownership, except with the prior written approval of NHAI. Notwithstanding anything to the contrary contained in the TEL Concession Agreement, TEL agrees and acknowledges that:

a. all acquisitions of equity by an acquirer, either by himself or with any person acting in concert, directly or indirectly, including by transfer of direct or indirect legal or beneficial ownership or control of any equity, in aggregate of not less 15% of the total equity of TEL; or

b. acquisition of any control directly or indirectly of the board of directors of TEL by any person either by himself or together with any person or persons acting in concert with him

shall be subject prior approval of NHAI from national security and public interest perspective, the decision of NHAI in this behalf being final, conclusive and binding on TEL, and undertakes that it shall not give effect to any such acquisition of equity or control of the board of directors of TEL without such prior approval of NHAI. It has been expressly agreed that approval of NHAI hereunder shall be

limited to national security and public interest perspective, and NHAI shall endeavor to convey its decision thereon expeditiously. It is also agreed that NHAI shall not be liable in any manner on account of grant or otherwise of such approval and that such approval or denial thereof shall not in any manner absolve TEL from any liability or obligation under the TEL Concession Agreement.

8. *Indemnities*

a. TEL shall indemnify, defend, save and hold harmless NHAI and its officers, servants, agents, government instrumentalities and government owned and/or controlled entities/enterprises, (the "**NHAI Indemnified Persons**") against any and all suits, proceedings, actions, demands and claims from third parties for any loss, damage, cost and expense of whatever kind and nature, whether arising out of any breach by TEL of any of its obligations under the TEL Concession Agreement or any related agreement or on account of any defect or deficiency in the provision of services by TEL to any user except to the extent that any such suits, proceedings, actions, demands and claims have arisen due to any negligent act or omission, or breach or default of the TEL Concession Agreement on the part of NHAI Indemnified Persons.

b. NHAI will indemnify, defend, save and hold harmless TEL against any and all suits, proceedings, actions, demands and third party claims for any loss, damage, cost and expense of whatever kind and nature arising out of (i) defect in title and/or the rights of NHAI in the land comprised in the site, and/or (ii) breach by NHAI of any of its obligations under the TEL Concession Agreement or any related agreement, which materially and adversely affect the performance by TEL of its obligations under TEL Concession Agreement, save and except that where any such claim, suit, proceeding, action, and/or demand has arisen due to a negligent act or omission, or breach of any of its obligations under any provision of TEL Concession Agreement or any related agreement and/or breach of its statutory duty on the part of TEL, its subsidiaries, affiliates, contractors, servants or agents, the same shall be the liability of TEL.

c. TEL shall fully indemnify, hold harmless and defend NHAI and NHAI Indemnified Persons from and against any and all loss and/or damages arising out of or with respect to:

1. failure of TEL to comply with applicable laws and applicable permits, each as defined in the TEL Concession Agreement ("**Applicable Laws**" and "**Applicable Permits**");

2. payment of taxes required to be made by TEL in respect of the income or other taxes of TEL's contractors, suppliers and representatives; or

3. non-payment of amounts due as a result of materials or services furnished to TEL or any of its contractors which are payable by TEL or any of its contractors.

9. TEL shall fully indemnify, hold harmless and defend NHAI Indemnified Persons from and against any and all suits, proceedings, actions, claims, demands, liabilities and damages which NHAI Indemnified Persons may hereafter suffer, or pay by reason of any demands, claims, suits or proceedings arising out of claims of infringement of any domestic or foreign patent rights, copyrights or other intellectual property, proprietary or confidentiality rights with respect to any materials, information, design or process used by TEL or by TEL's contractors in performing the obligations of TEL or in any way incorporated in or related to the Project. If in any such suit, action, claim or proceedings, a temporary restraint order or preliminary injunction is granted, TEL shall make every reasonable effort, by giving a satisfactory bond or otherwise, to secure the revocation or suspension of the injunction or restraint order. If, in any such suit, action, claim or proceedings, the Project, or any part thereof or comprised therein, is held to constitute an infringement and its use is permanently enjoined, TEL shall promptly make every reasonable effort to secure for NHAI a licence, at no cost to NHAI, authorising continued use of the infringing work. If TEL is unable to secure such licence within a reasonable time, TEL shall, at its own expense, and without impairing the specifications and standards, either replace the affected work, or part, or process thereof with non-infringing work or part or process, or modify the same so

that it becomes non-infringing.

10. *Suspension of TEL's rights*

Upon occurrence of a TEL default, as defined in the TEL Concession Agreement ("**TEL Default**"), NHAI shall be entitled, without prejudice to its other rights and remedies under the TEL Concession Agreement including its rights of termination, as defined in the TEL Concession Agreement ("**Termination**"), thereunder, to (i) suspend all rights of TEL under the TEL Concession Agreement, and pursuant hereto, and (ii) exercise such rights itself and perform the obligations hereunder or authorise any other person to exercise or perform the same on its behalf during such suspension ("**Suspension**"). Suspension hereunder shall be effective forthwith upon issue of notice by NHAI to TEL and may extend up to a period not exceeding 180 days from the date of issue of such notice; provided that upon written request from TEL and the lenders' representative, as defined in the TEL Concession Agreement ("**Lenders' Representative"),** NHAI shall extend the aforesaid period of 180 days by a further period not exceeding 90 days.

At any time during the period of Suspension, the Lenders' Representative, on behalf of senior lenders, as defined in the TEL Concession Agreement ("**Senior Lenders**"), shall be entitled to substitute TEL under and in accordance with the substitution agreement, as defined in the TEL Concession Agreement ("**Substitution Agreement**"), and upon receipt of notice thereunder from the Lenders' Representative, NHAI shall withhold Termination for a period not exceeding 180 days from the date of Suspension, and any extension thereof, for enabling the Lenders' Representative to exercise its rights of substitution on behalf of Senior Lenders.

11. *Effect of variation in traffic growth*

NHAI and TEL acknowledge that the traffic as on January 1, 2019 (the "**Target Dat**e") is estimated to be 50,275 PCUs per day (the "**Target Traffic**"), and hereby agree that for determining the modifications to the Concession Period as defined in the TEL Concession Agreement, the actual traffic on the Target Date shall be derived by computing the average of the traffic as determined by traffic sampling to be undertaken, in accordance with the TEL Concession Agreement, on the date that falls one year prior to the Target Date, on the Target Date and on the first anniversary of the Target Date (the "**Actual Traffic**"). It is agreed that traffic sampling shall be undertaken for a continuous period of 7 (seven) days during any time within 15 (fifteen) days prior to the date specified herein and the average thereof shall be deemed to be the actual traffic. It is further agreed that if the Project shall have two or more Toll Plazas as defined in the TEL Concession Agreement, the average traffic thereof shall be computed for determining the Actual Traffic hereunder.

In the event that the Actual Traffic shall have fallen short of the Target Traffic by more than 2.5% (two point five per cent) thereof or exceeded the Target Traffic by more than 2.5% (two point five per cent) thereof, the Concession Period shall be deemed to be modified in accordance with the TEL Concession Agreement.

12. *Restriction on construction of Additional Tollway*

Notwithstanding anything to the contrary contained in the TEL Concession Agreement but subject always to the provisions of the TEL Concession Agreement, NHAI shall not construct, and shall procure that no Government Instrumentality shall construct or cause to be constructed, any expressway or other toll road between, inter alia, km. 240.00 and km 270.00 of NH-47 (collectively the "**Additional Tollway**") for use by traffic at any time before the 10th anniversary of the Appointed Date as defined in the TEL Concession Agreement. Additional Tollway does not include any expressway or other toll road if the length of such expressway or toll road exceeds the length of the existing route comprising the Project by 20% (twenty per cent) thereof.

13. *Obligations relating to Competing Roads*

NHAI shall procure that during the subsistence of the TEL Concession Agreement, neither NHAI nor any Government Instrumentality shall, at any time before the 10th (tenth) anniversary of the Appointed Date as defined in the TEL Concession Agreement, construct or cause to be constructed any Competing Road as defined in the TEL Concession Agreement; provided that the restriction herein shall not apply if the average traffic on the Project in any year exceeds 90% (ninety per cent) of its designed capacity specified in the TEL Concession Agreement. Upon breach of its obligations hereunder, NHAI shall be

liable to payment of compensation to TEL under and in accordance with TEL Concession Agreement, and such compensation shall be the sole remedy of TEL.

14. *Effect of force majeure event on the Concession*

Upon the occurrence of any force majeure event prior to the appointed date, each as defined in the TEL Concession Agreement ("**Force Majeure Event**" and "**Appointed Date**"), the period set forth in the TEL Concession Agreement shall be extended by a period equal in length to the duration of the Force Majeure Event.

15. *Allocation of costs arising out of Force Majeure*

a. Upon occurrence of any Force Majeure Event prior to the Appointed Date, the parties to the TEL Concession Agreement shall bear their respective costs and no party shall be required to pay to the other party any costs thereof.

b. Upon occurrence of a Force Majeure Event after the Appointed Date, the costs incurred and attributable to such event and directly relating to the project ("**Force Majeure Costs**") shall be allocated and paid as follows:

i. upon occurrence of a non-political event, as defined in the TEL Concession Agreement, the parties shall bear their respective Force Majeure Costs and neither party shall be required to pay to the other party any costs thereof;

ii. upon occurrence of an indirect political event, as defined in the TEL Concession Agreement, all Force Majeure Costs attributable to such indirect political event, and not exceeding the insurance cover for such indirect political event, shall be borne by TEL, and to the extent Force Majeure Costs exceed such insurance cover, one half of such excess amount shall be reimbursed by NHAI to TEL; and

iii. upon occurrence of a political event, as defined in the TEL Concession Agreement, all Force Majeure Costs attributable to such political event shall be reimbursed by NHAI to TEL.

16. *Divestment Requirements*

Upon termination of the TEL Concession Agreement, TEL shall comply with and conform to the following divestment requirements, amongst others:

a. notify NHAI forthwith the location and particulars of all project assets, as defined in the TEL Concession Agreement ("**Project Assets**");

b. deliver forthwith the actual or constructive possession of the Project, free and clear of all encumbrances, save and except to the extent set forth in the Substitution Agreement;

c. cure all Project Assets, including the road, bridges, structures and equipment, of all defects and deficiencies so that the Project is compliant with the maintenance requirements, provided that in the event of Termination during the construction period, all Project Assets shall be handed over on 'as is here is' basis after bringing them to a safe condition;

d. comply with all other requirements as may be prescribed or required under Applicable Laws for completing the divestment and assignment of all rights, title and interest of TEL in the Project, free from all encumbrances, absolutely unto NHAI or to its nominees.

17. *Termination for TEL Default*

Subject to the provisions of the TEL Concession Agreement, in the event that any of the defaults specified below shall have occurred, and TEL fails to cure the default within the mentioned cure period, or where no cure period is specified, then within a cure period of 60 days, TEL shall be deemed to be in default of the TEL Concession Agreement (the "**TEL Default**"), unless the default has occurred as a result of any breach of the TEL Concession Agreement by NHAI or due to Force Majeure Event. The defaults referred to shall include, among other things, the following:

a. The performance security, as defined in the TEL Concession Agreement ("**Performance Security**"), has been encashed and appropriated in accordance with the TEL Concession Agreement and TEL fails to replenish or provide fresh Performance Security within a cure period of 30 days;

b. subsequent to the replenishment or furnishing of fresh Performance Security in accordance with the TEL Concession Agreement, TEL fails to cure within a cure period of 90 days, the TEL Default for which whole or part of the performance security was appropriate;

c. TEL does not achieve the latest outstanding project milestone due in accordance with the provisions of the TEL Concession Agreement and continues to be in default for 90 days;

d. upon occurrence of a financial default, as defined in the TEL Concession Agreement ("F**inancial Default**"), the Lenders' Representative has by notice required NHAI to undertake Suspension in accordance with the Substitution Agreement and TEL fails to cure the default within the cure period specified;

e. change in ownership has occurred in breach of the provisions of the TEL Concession Agreement.

Upon occurrence of a TEL Default, NHAI shall be entitled to terminate the TEL Concession Agreement by issuing a termination notice, as defined in TEL Concession Agreement ("**Termination Notice**"), to TEL; provided that before issuing the Termination Notice, NHAI shall by a notice inform TEL of its intention to issue such Termination Notice and grant 15 days to TEL to make a representation, and may, after the expiry of such 15 days, whether or not it is in receipt of such representation, issue the Termination Notice.

18. *Termination for NHAI Default*

TEL may terminate the TEL Concession Agreement on account of occurrence of a default by the NHAI which is not rectified within the cure period of 90 days or such longer period as has been expressly provided in this TEL Concession Agreement (the "**NHAI Default**") and includes – (i) material default causing a material adverse effect on TEL; (ii) the failure to make any payment due to TEL; (iii) repudiation of the TEL Concession Agreement etc.

TEL may, under the TEL Concession Agreement, upon occurrence of a NHAI Default, subject to the provisions of Substitution Agreement, terminate the TEL Concession Agreement by issuing a Termination Notice to NHAI; provided that before issuing the Termination Notice, TEL shall by notice inform NHAI of its intentions to issue the Termination Notice and grant 15 days to NHAI to make a representation, and may after the expiry of such 15 days, whether or not it is in receipt of such representation, issue the Termination Notice.

19. *Defects liability after termination*

TEL shall be responsible for all defects and deficiencies in the Project for a period of 120 days after Termination, and it shall have the obligation to repair or rectify, at its own cost, all defects and deficiencies observed by the Independent Engineer in the Project during this period. In the event that TEL fails to repair or rectify such defect or deficiency within a period of 15 days from the date of notice issued by NHAI, NHAI shall be entitled to get the same repaired or rectified at the risk and cost of TEL so as to make the Project conform to the maintenance requirements. All costs incurred by NHAI in this regard shall be reimbursed by TEL to NHAI within 15 days of receipt of demand thereof, and in the event of default in reimbursing such costs, NHAI shall be entitled to recover the same from the funds retained in the escrow account.

6. Dhola Infra Projects Private Limited ("Dhola")

The concession agreement has been executed between Dhola and The President of India through Ministry of Road Transport and Highways ("**MoRTH**") dated November 3, 2010 (the "**Dhola Concession Agreement**"). The scope of the Project under the Dhola Concession Agreement includes construction of 12.9 m wide bridge between Dhola and Sadiya Ghats along with 2 lane connecting roads from near about Dhola to Islampur Tinali in Assam (approximately 25.8 km) on build, operate and transfer annuity basis under the Arunachal Pradesh package of roads and highways("**Project**") for a concession period of 17 years from Appointed Date

("**Concession Period**" and such concession "**Concession**") with the appointed date being June 17, 2011 ("**Appointed Date**").

A summary of key terms of the Dhola Concession Agreement has been set below:

1. *Total Project Cost*

The total project cost, as defined in the Dhola Concession Agreement ("**Total Project Cost**"), means the lowest of:

a. the capital cost of the Project. as set forth in the financial package;

b. the actual capital cost of the Project upon completion of two-laning of the Project Highway; and

c. a sum of Rs. 8760 million;

provided that in the event of termination, the Total Project Cost shall be deemed to be modified to the extent of variation in WPI or reference exchange rate occurring in respect of adjusted equity and debt due each as defined in the Dhola Concession Agreement, as the case may be, in accordance with the provisions of the Dhola Concession Agreement provided further that in the event WPI increases, on average, by more than six percent per annum for the period between the date thereof and COD, the parties to the Dhola Concession Agreement shall meet as soon as reasonably practicable, and agree upon revision of the amount hereinbefore specified such that the effect of increase in WPI, in excess of such 6%, is reflected in the Total Project Cost, in accordance with the provisions of the Dhola Concession Agreement.

2. *Concession Fee*

In consideration of the grant of Concession, the concession fee payable by Dhola to MORTH shall be Re.1.00 (Rupee One) ("**Concession Fee**") per annum.

3. *Change of Scope*

MORTH may require the provision of additional works and services which are not included in the scope of the Project as contemplated by the Dhola Concession Agreement (the "**Change of Scope**"). Within 7 days, MORTH shall make an advance payment to Dhola in a sum equal to 20% of the cost of Change of Scope, and in the event of a dispute, 20% of the cost assessed by the independent engineer, as defined in the Dhola Concession Agreement ("**Independent Engineer**"). MORTH shall disburse to Dhola such amounts as are certified by the Independent Engineer, as reasonable and after making a proportionate deduction for the advance payment made. Dhola shall be entitled to nullify any Change of Scope order if it causes the cumulative costs relating to all the Change of Scope orders to exceed 5% of the Total Project Cost in any continuous period of 3 years immediately preceding the date of such Change of Scope order or if such cumulative costs exceed 20% of the Total Project Cost at any time during the concession period.

4. *O&M*

Dhola shall operate and maintain the Project, in accordance with the Dhola Concession Agreement either by itself, or through the O&M contractor, as defined in the Dhola Concession Agreement ("**O&M Contractor**"), and if required, modify, repair or otherwise make improvements to the Project to comply with provisions of the Dhola Concession Agreement applicable laws, applicable permits and conform to specifications, standards and good industry practice. The obligations of Dhola, among other things, shall include:

a. permitting safe, smooth and uninterrupted flow of traffic on the Project during normal operating conditions;

b. carrying out periodic preventive maintenance of the Project;

c. undertaking routine maintenance including prompt repairs of potholes, cracks, joints, drains, embankments, structures, pavement markings, lighting, road signs and other traffic control

devices;

d. undertaking major maintenance such as resurfacing of pavements, repairs to structures, and repairs and refurbishment of tolling system and other equipment;

e. protection of the environment and provision of equipment and materials therefore; and

f. operation and maintenance of all communication, control and administrative systems necessary for the efficient operation of the Project.

5. *Maintenance manual*

No later than 180 days prior to the scheduled two-laning date, as defined in the Dhola Concession Agreement, Dhola shall, in consultation with the Independent Engineer, evolve a repair and maintenance manual, as defined in the Dhola Concession Agreement (the "**Maintenance Manual**"), for the regular and preventive maintenance of the Project in conformity with the maintenance requirements, safety requirements and good industry practice. The Maintenance Manual shall be revised and updated once in every three years.

6. *Maintenance programme*

Not later than 45 days prior to the beginning of each accounting year during the operation period, as defined in the Dhola Concession Agreement, Dhola shall provide to MORTH and the Independent Engineer its proposed annual programme of preventive, urgent and other scheduled maintenance (the "**Maintenance Programme**") to comply with the maintenance requirements, Maintenance Manual and safety requirements. Such Maintenance Programme, amongst other things shall include the following:

a. preventive maintenance schedule;

b. arrangements and procedures for carrying out urgent repairs;

c. criteria to be adopted for deciding maintenance needs;

d. intervals and procedures for carrying out inspection of all elements of the Project;

e. intervals at which Dhola shall carry out periodic maintenance;

f. arrangements and procedures for carrying out safety related measures; and

g. intervals for major maintenance works and the scope thereof.

7. *Obligations relating to change in ownership*

Dhola shall not undertake or permit any change in ownership, except with the prior approval of MORTH. Notwithstanding anything to the contrary contained in the Dhola Concession Agreement, Dhola agrees and acknowledges that:

a. all acquisitions of equity by an acquirer, either by himself or with any person acting in concert, directly or indirectly, including by transfer of direct or indirect legal or beneficial ownership or control of any equity, in aggregate of not less 15% of the total equity of Dhola; or

b. acquisition of any control directly or indirectly of the board of directors of Dhola by any person either by himself or together with any person or persons acting in concert with him

shall be subject prior approval of MORTH from national security and public interest perspective, the decision of MORTH in this behalf being final, conclusive and binding on Dhola, and undertakes that it shall not give effect to any such acquisition of equity or control of the board of directors of Dhola without such prior approval of MORTH. It has been expressly agreed that approval of MORTH hereunder shall be limited to national security and public interest perspective, and MORTH shall endeavor to convey its decision thereon expeditiously. It is also agreed that MORTH shall not be liable in any manner on account of grant or otherwise of such approval and that such approval or denial thereof shall not in any manner absolve MORTH from any liability or obligation under the MORTH

Concession Agreement.

8. *Indemnities*

a. Dhola shall indemnify, defend, save and hold harmless MORTH and its officers, servants, agents, government instrumentalities and government owned and/or controlled entities/enterprises, (the "**MORTH Indemnified Persons**") against any and all suits, proceedings, actions, demands and claims from third parties for any loss, damage, cost and expense of whatever kind and nature, whether arising out of any breach by Dhola of any of its obligations under the Dhola Concession Agreement or any related agreement or on account of any defect or deficiency in the provision of services by Dhola to any user except to the extent that any such suits, proceedings, actions, demands and claims have arisen due to any negligent act or omission, or breach or default of the Dhola Concession Agreement on the part of MORTH Indemnified Persons.

b. MORTH will indemnify, defend, save and hold harmless Dhola against any and all suits, proceedings, actions, demands and third party claims for any loss, damage, cost and expense of whatever kind and nature arising out of (i) defect in title and/or the rights of MORTH in the land comprised in the site, and/or (ii) breach by MORTH of any of its obligations under the Dhola Concession Agreement or any related agreement, which materially and adversely affect the performance by Dhola of its obligations under Dhola Concession Agreement, save and except that where any such claim, suit, proceeding, action, and/or demand has arisen due to a negligent act or omission, or breach of any of its obligations under any provision of Dhola Concession Agreement or any related agreement and/or breach of its statutory duty on the part of Dhola, its subsidiaries, affiliates, contractors, servants or agents, the same shall be the liability of Dhola.

c. Dhola shall fully indemnify, hold harmless and defend MORTH and MORTH Indemnified Persons from and against any and all loss and/or damages arising out of or with respect to:

1. failure of Dhola to comply with applicable laws and applicable permits, each as defined in the Dhola Concession Agreement ("**Applicable Laws**" and "**Applicable Permits**");

2. payment of taxes required to be made by Dhola in respect of the income or other taxes of Dhola's contractors, suppliers and representatives; or

3. non-payment of amounts due as a result of materials or services furnished to Dhola or any of its contractors which are payable by Dhola or any of its contractors.

d. Dhola shall fully indemnify, hold harmless and defend MORTH Indemnified Persons from and against any and all suits, proceedings, actions, claims, demands, liabilities and damages which MORTH Indemnified Persons may hereafter suffer, or pay by reason of any demands, claims, suits or proceedings arising out of claims of infringement of any domestic or foreign patent rights, copyrights or other intellectual property, proprietary or confidentiality rights with respect to any materials, information, design or process used by Dhola or by Dhola's contractors in performing the obligations of Dhola or in any way incorporated in or related to the Project. If in any such suit, action, claim or proceedings, a temporary restraint order or preliminary injunction is granted, Dhola shall make every reasonable effort, by giving a satisfactory bond or otherwise, to secure the revocation or suspension of the injunction or restraint order. If, in any such suit, action, claim or proceedings, the Project, or any part thereof or comprised therein, is held to constitute an infringement and its use is permanently enjoined, Dhola shall promptly make every reasonable effort to secure for MORTH a licence, at no cost to MORTH, authorising continued use of the infringing work. If Dhola is unable to secure such licence within a reasonable time, Dhola shall, at its own expense, and without impairing the specifications and standards, either replace the affected work, or part, or process thereof with non-infringing work or part or process or modify the same so that it becomes non-infringing.

9. *Suspension of Dhola's rights*

Upon occurrence of a Dhola default, as defined in the Dhola Concession Agreement ("**Dhola**

Default"), MORTH shall be entitled, without prejudice to its other rights and remedies under the Dhola Concession Agreement including its rights of termination, as defined in the Dhola Concession Agreement ("**Termination**"), thereunder, to (i) suspend all rights of Dhola under the Dhola Concession Agreement, and pursuant hereto, and (ii) exercise such rights itself and perform the obligations hereunder or authorise any other person to exercise or perform the same on its behalf during such suspension ("**Suspension**"). Suspension hereunder shall be effective forthwith upon issue of notice by MORTH to Dhola and may extend up to a period not exceeding 180 days from the date of issue of such notice; provided that upon written request from Dhola and the lenders' representative, as defined in the Dhola Concession Agreement ("**Lenders' Representative"),** MORTH shall extend the aforesaid period of 180 days by a further period not exceeding 90 days.

At any time during the period of Suspension, the Lenders' Representative, on behalf of senior lenders, as defined in the Dhola Concession Agreement ("**Senior Lenders**"), shall be entitled to substitute Dhola under and in accordance with the substitution agreement, as defined in the Dhola Concession Agreement ("**Substitution Agreement**"), and upon receipt of notice thereunder from the Lenders' Representative, MORTH shall withhold Termination for a period not exceeding 180 days from the date of Suspension, and any extension thereof, for enabling the Lenders' Representative to exercise its rights of substitution on behalf of Senior Lenders.

10. *Effect of force majeure event on the Concession*

Upon the occurrence of any force majeure event prior to the appointed date, each as defined in the Dhola Concession Agreement ("**Force Majeure Event**" and "**Appointed Date**"), the achieving financial close, as defined in the Dhola Concession Agreement shall be extended by a period equal in length to the duration of the Force Majeure Event.

11. *Allocation of costs arising out of Force Majeure*

a. Upon occurrence of any Force Majeure Event prior to the Appointed Date, the parties to the Dhola Concession Agreement shall bear their respective costs and no party shall be required to pay to the other party any costs thereof.

b. Upon occurrence of a Force Majeure Event after the Appointed Date, the costs incurred and attributable to such event and directly relating to the project ("**Force Majeure Costs**") shall be allocated and paid as follows:

   i. upon occurrence of a non-political event, as defined in the Dhola Concession Agreement, the parties shall bear their respective Force Majeure Costs and neither party shall be required to pay to the other party any costs thereof;

   ii. upon occurrence of an indirect political event, as defined in the Dhola Concession Agreement, all Force Majeure Costs attributable to such indirect political event, and not exceeding the insurance cover for such indirect political event, shall be borne by Dhola, and to the extent Force Majeure Costs exceed such insurance cover, one half of such excess amount shall be reimbursed by MORTH to Dhola; and

   iii. upon occurrence of a political event, as defined in the Dhola Concession Agreement, all Force Majeure Costs attributable to such political event shall be reimbursed by MORTH to Dhola.

12. *Divestment Requirements*

Upon termination of Dhola Concession Agreement, Dhola shall comply with and conform to the following divestment requirements, amongst others:

a. notify MORTH forthwith the location and particulars of all project assets, as defined in the Dhola Concession Agreement ("**Project Assets**");

b. deliver forthwith the actual or constructive possession of the Project, free and clear of all encumbrances, save and except to the extent set forth in the Substitution Agreement;

c. cure all Project Assets, including the road, bridges, structures and equipment, of all defects

and deficiencies so that the Project is compliant with the maintenance requirements, provided that in the event of Termination during the construction period, all Project Assets shall be handed over on 'as is here is' basis after bringing them to a safe condition;

d. comply with all other requirements as may be prescribed or required under Applicable Laws for completing the divestment and assignment of all rights, title and interest of Dhola in the Project, free from all encumbrances, absolutely unto MORTH or to its nominees.

13. *Termination for Dhola Default*

Subject to the provisions of the Dhola Concession Agreement, in the event that any of the defaults specified below shall have occurred, and Dhola fails to cure the default within the mentioned cure period, or where no cure period is specified, then within a cure period of 60 days, Dhola shall be deemed to be in default of the Dhola Concession Agreement (the "**Dhola Default**"), unless the default has occurred as a result of any breach of the Dhola Concession Agreement by MORTH or due to Force Majeure Event. The defaults referred to shall include, among other things, the following:

a. The performance security, as defined in the Dhola Concession Agreement ("**Performance Security**"), has been encashed and appropriated in accordance with the Dhola Concession Agreement and Dhola fails to replenish or provide fresh Performance Security within a cure period of 30 days;

b. subsequent to the replenishment or furnishing of fresh Performance Security in accordance with the Dhola Concession Agreement, Dhola fails to cure within a cure period of 90 days, the Dhola Default for which whole or part of the performance security was appropriate;

c. Dhola does not achieve the latest outstanding project milestone due in accordance with the provisions of the Dhola Concession Agreement and continues to be in default for 90 days;

d. upon occurrence of a financial default, as defined in the Dhola Concession Agreement ("**Financial Default**"), the Lenders' Representative has by notice required MORTH to undertake Suspension in accordance with the Substitution Agreement and Dhola fails to cure the default within the cure period specified;

e. change in ownership has occurred in breach of the provisions of the Dhola Concession Agreement.

Upon occurrence of a Dhola Default, MORTH shall be entitled to terminate the Dhola Concession Agreement by issuing a termination notice, as defined in Dhola Concession Agreement ("**Termination Notice**"), to Dhola; provided that before issuing the Termination Notice, MORTH shall by a notice inform Dhola of its intention to issue such Termination Notice and grant 15 days to Dhola to make a representation, and may, after the expiry of such 15 days, whether or not it is in receipt of such representation, issue the Termination Notice.

14. *Termination for MORTH Default*

Dhola may terminate the Dhola Concession Agreement on account of occurrence of a default by the MORTH which is not rectified within the cure period of 90 days or such longer period as has been expressly provided in this Dhola Concession Agreement (the "**MORTH Default**") and includes – (i) material default causing a material adverse effect on Dhola; (ii) the failure to make any payment due to Dhola; (iii) repudiation of the Dhola Concession Agreement etc.

Dhola may, under the Dhola Concession Agreement, upon occurrence of a MORTH Default, subject to the provisions of Substitution Agreement, terminate the Dhola Concession Agreement by issuing a Termination Notice to MORTH; provided that before issuing the Termination Notice, Dhola shall by notice inform MORTH of its intentions to issue the Termination Notice and grant 15 days to MORTH to make a representation, and may after the expiry of such 15 days, whether or not it is in receipt of such representation, issue the Termination Notice.

15. *Defects liability after termination*

Dhola shall be responsible for all defects and deficiencies in the Project for a period of 120 days after

Termination, and it shall have the obligation to repair or rectify, at its own cost, all defects and deficiencies observed by the Independent Engineer in the Project during this period. In the event that Dhola fails to repair or rectify such defect or deficiency within a period of 15 days from the date of notice issued by MORTH, MORTH shall be entitled to get the same repaired or rectified at the risk and cost of Dhola so as to make the Project conform to the maintenance requirements. All costs incurred by MORTH in this regard shall be reimbursed by Dhola to MORTH within 15 days of receipt of demand thereof, and in the event of default in reimbursing such costs, MORTH shall be entitled to recover the same from the funds retained in the escrow account.

7. Dibang Infra Projects Private Limited ("Dibang")

The concession agreement has been executed between Dibang and The President of India through Ministry of Road Transport and Highways ("**MORTH**") dated November 3, 2010 (the "**Dibang Concession Agreement**"). The scope of the Project under the Dibang Concession Agreement includes the construction of bridges across Dibang river system and connecting road between Bomjur-Meka (NH-52) covering length of 18.950 km and construct bridge across river Lohit at Alubari Ghat and connecting road between Chowkham- Digaru covering length of 12.00 km in Arunachal Pradesh (total 30.950 km) on build, operate and transfer basis under Arunachal Pradesh package of roads and highways("**Project**"), for a concession period of 17 years from Appointed Date ("**Concession Period**" and such concession "**Concession** ") with the appointed date being June 11, 2011 ("**Appointed Date**").

A summary of key terms of the Dibang Concession Agreement has been set below:

1. *Total Project Cost and Annuity Payments*

The total project cost, as defined in the Dibang Concession Agreement ("**Total Project Cost**"), means the lowest of:

a. the capital cost of the Project. as set forth in the Financial Package;

b. the actual capital cost of the Project upon completion of two-laning of the Project Highway; and

c. a sum of Rs. 7640 million;

provided that in the event of termination, the Total Project Cost shall be deemed to be modified to the extent of variation in WPI or reference exchange rate occurring in respect of adjusted equity and debt due each as defined in the Dibang Concession Agreement, as the case may be, in accordance with the provisions of the Dibang Concession Agreement provided further that in the event WPI increases, on average, by more than six percent per annum for the period between the date thereof and COD, the parties to the Dibang Concession Agreement shall meet as soon as reasonably practicable, and agree upon revision of the amount hereinbefore specified such that the effect of increase in WPI, in excess of such 6%, is reflected in the Total Project Cost, in accordance with the provisions of the Dibang Concession Agreement.

2. *Concession Fee*

In consideration of the grant of Concession, the concession fee payable by Dibang to MORTH shall be Re.1.00 (Rupee One) per annum.

3. *Change of Scope*

MORTH may require the provision of additional works and services which are not included in the scope of the Project as contemplated by the Dibang Concession Agreement (the "**Change of Scope**"). Within 7 days, MORTH shall make an advance payment to Dibang in a sum equal to 20% of the cost of Change of Scope, and in the event of a dispute, 20% of the cost assessed by the independent engineer, as defined in the Dibang Concession Agreement ("**Independent Engineer**"). MORTH shall disburse to Dibang such amounts as are certified by the Independent Engineer, as reasonable and after making a proportionate deduction for the advance payment made. Dibang shall be entitled to nullify any Change of Scope order if it causes the cumulative costs relating to all the Change of Scope orders to exceed 5% of the Total Project Cost in any continuous period of 3 years immediately preceding the date of such Change of Scope order or if such cumulative costs exceed 20% of the Total Project Cost

at any time during the concession period.

4. *O&M*

Dibang shall operate and maintain the Project, in accordance with the Dibang Concession Agreement either by itself, or through the O&M contractor, as defined in the Dibang Concession Agreement ("**O&M Contractor**"), and if required, modify, repair or otherwise make improvements to the Project to comply with provisions of the Dibang Concession Agreement applicable laws, applicable permits and conform to specifications, standards and good industry practice. The obligations of Dibang, among other things, shall include:

a. permitting safe, smooth and uninterrupted flow of traffic on the Project during normal operating conditions;

b. carrying out periodic preventive maintenance of the Project;

c. undertaking routine maintenance including prompt repairs of potholes, cracks, joints, drains, embankments, structures, pavement markings, lighting, road signs and other traffic control devices;

d. undertaking major maintenance such as resurfacing of pavements, repairs to structures, and repairs and refurbishment of tolling system and other equipment;

e. protection of the environment and provision of equipment and materials therefore; and

f. operation and maintenance of all communication, control and administrative systems necessary for the efficient operation of the Project.

5. *Maintenance manual*

No later than 180 days prior to the scheduled two-laning date, as defined in the Dibang Concession Agreement, Dibang shall, in consultation with the independent engineer, evolve a repair and maintenance manual, as defined in the Dibang Concession Agreement (the "**Maintenance Manual**"), for the regular and preventive maintenance of the Project in conformity with the maintenance requirements, safety requirements and good industry practice. The Maintenance Manual shall be revised and updated once in every three years.

6. *Maintenance programme*

Not later than 45 days prior to the beginning of each accounting year during the operation period, as defined in the Dibang Concession Agreement, Dibang shall provide to MORTH and the Independent Engineer its proposed annual programme of preventive, urgent and other scheduled maintenance (the "**Maintenance Programme**") to comply with the maintenance requirements, Maintenance Manual and safety requirements. Such Maintenance Programme, amongst other things shall include the following:

a. preventive maintenance schedule;

b. arrangements and procedures for carrying out urgent repairs;

c. criteria to be adopted for deciding maintenance needs;

d. intervals and procedures for carrying out inspection of all elements of the Project;

e. intervals at which Dibang shall carry out periodic maintenance;

f. arrangements and procedures for carrying out safety related measures; and

g. intervals for major maintenance works and the scope thereof.

7. *Obligations relating to change in ownership*

Dibang shall not undertake or permit any change in ownership, except with the prior approval of

MORTH. Notwithstanding anything to the contrary contained in the Dibang Concession Agreement, Dibang agrees and acknowledges that:

a. all acquisitions of equity by an acquirer, either by himself or with any person acting in concert, directly or indirectly, including by transfer of direct or indirect legal or beneficial ownership or control of any equity, in aggregate of not less 15% of the total equity of Dibang; or

b. acquisition of any control directly or indirectly of the board of directors of Dibang by any person either by himself or together with any person or persons acting in concert with him

shall be subject prior approval of MORTH from national security and public interest perspective, the decision of MORTH in this behalf being final, conclusive and binding on Dibang, and undertakes that it shall not give effect to any such acquisition of equity or control of the board of directors of Dibang without such prior approval of MORTH. It has been expressly agreed that approval of MORTH hereunder shall be limited to national security and public interest perspective, and MORTH shall endeavor to convey its decision thereon expeditiously. It is also agreed that MORTH shall not be liable in any manner on account of grant or otherwise of such approval and that such approval or denial thereof shall not in any manner absolve Dibang from any liability or obligation under the Dibang Concession Agreement.

8. *Indemnities*

a. Dibang shall indemnify, defend, save and hold harmless MORTH and its officers, servants, agents, government instrumentalities and government owned and/or controlled entities/enterprises, (the "**MORTH Indemnified Persons**") against any and all suits, proceedings, actions, demands and claims from third parties for any loss, damage, cost and expense of whatever kind and nature, whether arising out of any breach by Dibang of any of its obligations under the Dibang Concession Agreement or any related agreement or on account of any defect or deficiency in the provision of services by Dibang to any user except to the extent that any such suits, proceedings, actions, demands and claims have arisen due to any negligent act or omission, or breach or default of the Dibang Concession Agreement on the part of MORTH Indemnified Persons.

b. MORTH will indemnify, defend, save and hold harmless Dibang against any and all suits, proceedings, actions, demands and third party claims for any loss, damage, cost and expense of whatever kind and nature arising out of (i) defect in title and/or the rights of MORTH in the land comprised in the site, and/or (ii) breach by MORTH of any of its obligations under the Dibang Concession Agreement or any related agreement, which materially and adversely affect the performance by Dibang of its obligations under Dibang Concession Agreement, save and except that where any such claim, suit, proceeding, action, and/or demand has arisen due to a negligent act or omission, or breach of any of its obligations under any provision of Dibang Concession Agreement or any related agreement and/or breach of its statutory duty on the part of Dibang, its subsidiaries, affiliates, contractors, servants or agents, the same shall be the liability of Dibang.

c. Dibang shall fully indemnify, hold harmless and defend MORTH and MORTH Indemnified Persons from and against any and all loss and/or damages arising out of or with respect to:

    1. failure of Dibang to comply with applicable laws and applicable permits, each as defined in the Dibang Concession Agreement ("**Applicable Laws**" and "**Applicable Permits**");

    2. payment of taxes required to be made by Dibang in respect of the income or other taxes of Dibang's contractors, suppliers and representatives; or

    3. non-payment of amounts due as a result of materials or services furnished to Dibang or any of its contractors which are payable by Dibang or any of its contractors.

d. Dibang shall fully indemnify, hold harmless and defend MORTH Indemnified Persons from and against any and all suits, proceedings, actions, claims, demands, liabilities and damages which MORTH Indemnified Persons may hereafter suffer, or pay by reason of any demands, claims, suits or proceedings arising out of claims of infringement of any domestic or foreign

patent rights, copyrights or other intellectual property, proprietary or confidentiality rights with respect to any materials, information, design or process used by Dibang or by Dibang's contractors in performing the obligations of Dibang or in any way incorporated in or related to the Project. If in any such suit, action, claim or proceedings, a temporary restraint order or preliminary injunction is granted, Dibang shall make every reasonable effort, by giving a satisfactory bond or otherwise, to secure the revocation or suspension of the injunction or restraint order. If, in any such suit, action, claim or proceedings, the Project, or any part thereof or comprised therein, is held to constitute an infringement and its use is permanently enjoined, Dibang shall promptly make every reasonable effort to secure for MORTH a licence, at no cost to MORTH, authorising continued use of the infringing work. If Dibang is unable to secure such licence within a reasonable time, Dibang shall, at its own expense, and without impairing the specifications and standards, either replace the affected work, or part, or process thereof with non-infringing work or part or process, or modify the same so that it becomes non-infringing.

9. *Suspension of Dibang's rights*

Upon occurrence of a Dibang default, as defined in the Dibang Concession Agreement ("**Dibang Default**"), MORTH shall be entitled, without prejudice to its other rights and remedies under the Dibang Concession Agreement including its rights of termination, as defined in the Dibang Concession Agreement ("**Termination**"), thereunder, to (i) suspend all rights of Dibang under the Dibang Concession Agreement, and pursuant hereto, and (ii) exercise such rights itself and perform the obligations hereunder or authorise any other person to exercise or perform the same on its behalf during such suspension ("**Suspension**"). Suspension hereunder shall be effective forthwith upon issue of notice by MORTH to Dibang and may extend up to a period not exceeding 180 days from the date of issue of such notice; provided that upon written request from Dibang and the lenders' representative, as defined in the Dibang Concession Agreement ("**Lenders' Representative"),** MORTH shall extend the aforesaid period of 180 days by a further period not exceeding 90 days.

At any time during the period of Suspension, the Lenders' Representative, on behalf of senior lenders, as defined in the Dibang Concession Agreement ("**Senior Lenders**"), shall be entitled to substitute Dibang under and in accordance with the substitution agreement, as defined in the Dibang Concession Agreement ("**Substitution Agreement**"), and upon receipt of notice thereunder from the Lenders' Representative, MORTH shall withhold Termination for a period not exceeding 180 days from the date of Suspension, and any extension thereof, for enabling the Lenders' Representative to exercise its rights of substitution on behalf of Senior Lenders.

10. *Effect of force majeure event on the Concession*

Upon the occurrence of any force majeure event prior to the appointed date, each as defined in the Dibang Concession Agreement ("**Force Majeure Event**" and "**Appointed Date**"), the achieving financial close, as defined in the Dibang Concession Agreement shall be extended by a period equal in length to the duration of the Force Majeure Event.

11. *Allocation of costs arising out of Force Majeure*

a. Upon occurrence of any Force Majeure Event prior to the Appointed Date, the parties to the Dibang Concession Agreement shall bear their respective costs and no party shall be required to pay to the other party any costs thereof.

b. Upon occurrence of a Force Majeure Event after the Appointed Date, the costs incurred and attributable to such event and directly relating to the project ("**Force Majeure Costs**") shall be allocated and paid as follows:

   i. upon occurrence of a non-political event, as defined in the Dibang Concession Agreement, the parties shall bear their respective Force Majeure Costs and neither party shall be required to pay to the other party any costs thereof;

   ii. upon occurrence of an indirect political event, as defined in the Dibang Concession Agreement, all Force Majeure Costs attributable to such indirect political event, and not exceeding the insurance cover for such indirect political event, shall be borne by Dibang, and to the extent Force Majeure Costs exceed such insurance cover, one half

of such excess amount shall be reimbursed by MORTH to Dibang; and

iii. upon occurrence of a political event, as defined in the Dibang Concession Agreement, all Force Majeure Costs attributable to such political event shall be reimbursed by MORTH to Dibang.

12. *Divestment Requirements*

Upon termination of Dibang Concession Agreement, Dibang shall comply with and conform to the following divestment requirements, amongst others:

a. notify MORTH forthwith the location and particulars of all project assets, as defined in the Dibang Concession Agreement ("**Project Assets**");

b. deliver forthwith the actual or constructive possession of the Project, free and clear of all encumbrances, save and except to the extent set forth in the Substitution Agreement;

c. cure all Project Assets, including the road, bridges, structures and equipment, of all defects and deficiencies so that the Project is compliant with the maintenance requirements, provided that in the event of Termination during the construction period, all Project Assets shall be handed over on 'as is here is' basis after bringing them to a safe condition;

d. comply with all other requirements as may be prescribed or required under Applicable Laws for completing the divestment and assignment of all rights, title and interest of Dibang in the Project, free from all encumbrances, absolutely unto MORTH or to its nominees.

13. *Termination for Dibang Default*

Subject to the provisions of the Dibang Concession Agreement, in the event that any of the defaults specified below shall have occurred, and Dibang fails to cure the default within the mentioned cure period, or where no cure period is specified, then within a cure period of 60 days, Dibang shall be deemed to be in default of the Dibang Concession Agreement (the "**Dibang Default**"), unless the default has occurred as a result of any breach of the Dibang Concession Agreement by MORTH or due to Force Majeure Event. The defaults referred to shall include, among other things, the following:

a. The performance security, as defined in the Dibang Concession Agreement ("**Performance Security**"), has been encashed and appropriated in accordance with the Dibang Concession Agreement and Dibang fails to replenish or provide fresh Performance Security within a cure period of 30 days;

b. subsequent to the replenishment or furnishing of fresh Performance Security in accordance with the Dibang Concession Agreement, Dibang fails to cure within a cure period of 90 days, the Dibang Default for which whole or part of the performance security was appropriate;

c. Dibang does not achieve the latest outstanding project milestone due in accordance with the provisions of the Dibang Concession Agreement and continues to be in default for 90 days;

d. upon occurrence of a financial default, as defined in the Dibang Concession Agreement ("**Financial Default**"), the Lenders' Representative has by notice required MORTH to undertake Suspension in accordance with the Substitution Agreement and Dibang fails to cure the default within the cure period specified;

e. a change in ownership has occurred in breach of the provisions of the Dibang Concession Agreement.

Upon occurrence of a Dibang Default, MORTH shall be entitled to terminate the Dibang Concession Agreement by issuing a termination notice, as defined in Dibang Concession Agreement ("**Termination Notice**"), to Dibang; provided that before issuing the Termination Notice, MORTH shall by a notice inform Dibang of its intention to issue such Termination Notice and grant 15 days to Dibang to make a representation, and may, after the expiry of such 15 days, whether or not it is in receipt of such representation, issue the Termination Notice.

14. *Termination for MORTH Default*

Dibang may terminate the Dibang Concession Agreement on account of occurrence of a default by the MORTH which is not rectified within the cure period of 90 days or such longer period as has been expressly provided in this Dibang Concession Agreement (the "**MORTH Default**") and includes – (i) material default causing a material adverse effect on Dibang; (ii) the failure to make any payment due to Dibang; (iii) repudiation of the Dibang Concession Agreement etc.

Dibang may, under the Dibang Concession Agreement, upon occurrence of a MORTH Default, subject to the provisions of Substitution Agreement, terminate the Dibang Concession Agreement by issuing a Termination Notice to MORTH; provided that before issuing the Termination Notice, Dibang shall by notice inform MORTH of its intentions to issue the Termination Notice and grant 15 days to MORTH to make a representation, and may after the expiry of such 15 days, whether or not it is in receipt of such representation, issue the Termination Notice.

15. *Defects liability after termination*

Dibang shall be responsible for all defects and deficiencies in the Project for a period of 120 days after Termination, and it shall have the obligation to repair or rectify, at its own cost, all defects and deficiencies observed by the Independent Engineer in the Project during this period. In the event that Dibang fails to repair or rectify such defect or deficiency within a period of 15 days from the date of notice issued by MORTH, MORTH shall be entitled to get the same repaired or rectified at the risk and cost of Dibang so as to make the Project conform to the maintenance requirements. All costs incurred by MORTH in this regard shall be reimbursed by Dibang to MORTH within 15 days of receipt of demand thereof, and in the event of default in reimbursing such costs, MORTH shall be entitled to recover the same from the funds retained in the escrow account.

8. Ahmedabad – Maliya Tollway Private Limited ("AMTPL")

The concession agreement has been executed between AMTPL and Gujarat State Road Development Corporation Limited ("**GSRDC**") dated September 17, 2008 (the "**AMTPL Concession Agreement I**"). The scope of the Project under the AMTPL Concession Agreement construction of additional two lanes from Km. 11.5 to Km. 195.065 (approximately 180 Km.) on the Ahmedabad-Viramgam – Halvad – Maliya section of the state highway no. 17 for the section from Ahmedabad (Sarkhej) Km. 11.500 to Viramgam Km. 59.500 and state highway no. 7 for the section from Viramgam Km. 59.500 to Maliya Km. 195.065 to make it a four lane divided carriageway facility under the Viability Gap Funding Scheme of the Government of India on a build, operate and transfer basis ("**Project**"), for a concession period of 22 years ("**Concession Period**" and such concession "**Concession**") with the appointed date being October 12, 2009 ("**Appointed Date**"). In order to significantly benefit the Sanand Industrial Area by enhancing connectivity and infrastructure, the government of Gujarat through GSRDC has entered into another concession agreement with AMTPL dated October 30, 2025 to augment the section of existing four lane to six lane (for a length of 28.75km) forming a part of the Project and its construction, operation and maintenance on build, operate and transfer basis ("**AMTPL Concession Agreement II**" and collectively the, "**AMTPL Concession Agreements**"). Further, the AMTPL Concession Agreement II also stipulates total project cost and the concession fee in relation to the six laning of the Project.

A summary of the key terms of the AMTPL Concession Agreements has been set below:

1. *Total Project Cost*

The total project cost, as defined in the AMTPL Concession Agreement ("**Total Project Cost**"), means the lowest of:

a. the capital cost of the Project, less equity support as set forth in the financial package;

b. the actual capital cost of the Project upon completion of four-laning of the Project, less equity support; and

c. a sum of Rs. 10153.60 million for AMTPL Concession Agreement I and a sum of Rs. 8050.00 million for AMTPL Concession Agreement II;

provided that in the event of termination, the Total Project Cost shall be deemed to be modified to the extent of variation in WPI or reference exchange rate occurring in respect of adjusted equity and debt

due each as defined in the AMTPL Concession Agreement.

2. *Concession Fee*

In consideration of the grant of Concession, the concession fee payable by AMTPL to GSRDC shall be Re.1.00 (Rupee One) per annum. Additional Concession Fee during the year of COD is 12.13% of the total Realisable Fee with an increase @ 1% for each subsequent year as compared to the immediately preceding year, which is part of Concession Fee and payable in monthly instalments within 7 days of the close of each month. Further, Additional Concession Fee is not applicable for AMTPL Concession Agreement II.

3. *Change of Scope*

GSRDC may require the provision of additional works and services which are not included in the scope of the Project as contemplated by the AMTPL Concession Agreement (the "**Change of Scope**"). AMTPL shall, after commencement of work, present to GSRDC bills for payment in respect of the works in progress or completed works, as the case may be, supported by such documentation as is reasonably sufficient for GSRDC to determine the accuracy thereof. Within 45 (forty-five) days of receipt of such bills, GSRDC shall disburse to AMTPL such amounts as are certified by the Independent Engineer, as defined in the AMTPL Concession Agreement as reasonable and in the event of any Dispute, final adjustments thereto shall be made under and in accordance with the Dispute Resolution Procedure. No advance payment shall be made by GSRDCL, as laid down in the AMTPL Concession Agreement. AMTPL shall be entitled to nullify any Change of Scope order if it causes the cumulative costs relating to all the Change of Scope orders to exceed 5% of the Total Project Cost in any continuous period of 3 years immediately preceding the date of such Change of Scope order or if such cumulative costs exceed 20% of the Total Project Cost at any time during the concession period.

4. *O&M*

AMTPL shall operate and maintain the Project, in accordance with the AMTPL Concession Agreement either by itself, or through the O&M contractor, as defined in the AMTPL Concession Agreement ("**O&M Contractor**"), and if required, modify, repair or otherwise make improvements to the Project to comply with provisions of the AMTPL Concession Agreement applicable laws, applicable permits and conform to specifications, standards and good industry practice. The obligations of AMTPL, among other things, shall include:

a. permitting safe, smooth and uninterrupted flow of traffic on the Project during normal operating conditions;

b. carrying out periodic preventive maintenance of the Project;

c. undertaking routine maintenance including prompt repairs of potholes, cracks, joints, drains, embankments, structures, pavement markings, lighting, road signs and other traffic control devices;

d. undertaking major maintenance such as resurfacing of pavements, repairs to structures, and repairs and refurbishment of tolling system and other equipment; the major maintenance for AMTPL Concession Agreement II shall be carried out on demand by GSRDC under Change of Scope (after 3 years of construction completion);

e. protection of the environment and provision of equipment and materials; and

f. operation and maintenance of all communication, control and administrative systems necessary for the efficient operation of the Project.

5. *Maintenance manual*

No later than 180 days prior to the schedule four laning date, as defined in the AMTPL Concession Agreement, AMTPL shall, in consultation with the Independent Engineer, evolve a repair and maintenance manual, as defined in the AMTPL Concession Agreement (the "**Maintenance Manual**"), for the regular and preventive maintenance of the Project in conformity with the maintenance requirements, as defined in the AMTPL Concession Agreement safety requirements and good industry

practice. The Maintenance Manual shall be revised and updated once every three years.

6. *Maintenance programme*

No later than 45 days prior to the beginning of each accounting year during the operation period, as defined in the AMTPL Concession Agreement, AMTPL shall provide to GSRDC and the Independent Engineer its proposed annual programme of preventive, urgent and other scheduled maintenance (the "**Maintenance Programme**") to comply with the maintenance requirements, Maintenance Manual and safety requirements. Such Maintenance Programme, amongst other things shall include the following:

a. preventive maintenance schedule;

b. arrangements and procedures for carrying out urgent repairs;

c. criteria to be adopted for deciding maintenance needs;

d. intervals and procedures for carrying out inspection of all elements of the Project;

e. intervals at which AMTPL shall carry out periodic maintenance;

f. arrangements and procedures for carrying out safety related measures; and

g. intervals for major maintenance works and the scope thereof.

7. *Obligations relating to change in ownership (applicable only for AMTPL Concession Agreement I)*

AMTPL shall not undertake or permit any change in ownership, except with the prior written approval of GSRDC. The criteria mentioned in the RFQ document, as defined in the AMTPL Concession Agreement I, will prevail with respect to ownership and equity holding. Notwithstanding anything to the contrary contained in the AMTPL Concession Agreement I, AMTPL agrees and acknowledges that:

a. all acquisitions of equity by an acquirer, either by himself or with any person acting in concert, directly or indirectly, including by transfer of direct or indirect legal or beneficial ownership or control of any equity, in aggregate of not less 15% of the total equity of AMTPL; or

b. acquisition of any control directly or indirectly of the board of directors of AMTPL by any person either by himself or together with any person or persons acting in concert with him shall be subject to prior approval of the appropriate Government.

Further, the term '*change in ownership*' under the AMTPL Concession Agreement I refers to a transfer of direct or indirect ownership of shares that causes the aggregate holding of the selected bidder together with its Associates to decline below the prescribed thresholds. The term "**Associate**" as provided under the AMTPL Concession Agreement I, means, in relation to either party, a person who controls, is controlled by, or is under common Control with such person (as used in this definition the expression "**control**" means, with respect to a person, which is a company or corporation, the ownership, directly or indirectly, of more than 50% (fifty percent) of voting shares of such person, and with respect to a person which is not a company or corporation, the power to direct the management and policies of such person, whether by operation of law or by contract or otherwise.

Therefore, pursuant to the Formation Transactions the transfer of AMTPL to the Trust shall constitute an Associate transfer and therefore such a transfer is in compliance with the provisions of the AMTPL Concession Agreement I.

8. *Indemnities*

a. AMTPL shall indemnify, defend, save and hold harmless GSRDC and its officers, servants, agents, government instrumentalities and government owned and/or controlled entities/enterprises, (the "**GSRDC Indemnified Persons**") against any and all suits, proceedings, actions, demands and claims from third parties for any loss, damage, cost and expense of whatever kind and nature, whether arising out of any breach by AMTPL of any of

its obligations under the AMTPL Concession Agreement or any related agreement or on account of any defect or deficiency in the provision of services by AMTPL to any user except to the extent that any such suits, proceedings, actions, demands and claims have arisen due to any negligent act or omission, or breach or default of the AMTPL Concession Agreement on the part of GSRDC Indemnified Persons.

b. GSRDC will indemnify, defend, save and hold harmless AMTPL against any and all suits, proceedings, actions, demands and third party claims for any loss, damage, cost and expense of whatever kind and nature arising out of (i) defect in title and/or the rights of GSRDC in the land comprised in the site other than the land acquired, if any, by AMTPL.

c. AMTPL shall fully indemnify, hold harmless and defend GSRDC and GSRDC Indemnified Persons from and against any and all loss and/or damages arising out of or with respect to:

1. failure of AMTPL to comply with applicable laws and applicable permits, each as defined in the AMTPL Concession Agreement ("**Applicable Laws**" and "**Applicable Permits**");

2. payment of taxes required to be made by AMTPL in respect of the income or other taxes of AMTPL's contractors, suppliers and representatives; or

3. non-payment of amounts due as a result of materials or services furnished to AMTPL or any of its contractors which are payable by AMTPL or any of its contractors.

d. AMTPL shall fully indemnify, hold harmless and defend GSRDC Indemnified Persons from and against any and all suits, proceedings, actions, claims, demands, liabilities and damages which GSRDC Indemnified Persons may hereafter suffer, or pay by reason of any demands, claims, suits or proceedings arising out of claims of infringement of any domestic or foreign patent rights, copyrights or other intellectual property, proprietary or confidentiality rights with respect to any materials, information, design or process used by AMTPL or by AMTPL's contractors in performing the obligations of AMTPL or in any way incorporated in or related to the Project. If in any such suit, action, claim or proceedings, a temporary restraint order or preliminary injunction is granted, AMTPL shall make every reasonable effort, by giving a satisfactory bond or otherwise, to secure the revocation or suspension of the injunction or restraint order. If, in any such suit, action, claim or proceedings, the Project, or any part thereof or comprised therein, is held to constitute an infringement and its use is permanently enjoined, AMTPL shall promptly make every reasonable effort to secure for GSRDC a licence, at no cost to GSRDC, authorising continued use of the infringing work. If AMTPL is unable to secure such licence within a reasonable time, AMTPL shall, at its own expense, and without impairing the specifications and standards, either replace the affected work, or part, or process thereof with non-infringing work or part or process or modify the same so that it becomes non-infringing.

9. *Suspension of AMTPL's rights*

Upon occurrence of a AMTPL default, as defined in the AMTPL Concession Agreement ("**AMTPL Default**"), GSRDC shall be entitled, without prejudice to its other rights and remedies under the AMTPL Concession Agreement including its rights of termination, as defined in the AMTPL Concession Agreement ("**Termination**"), thereunder, to (i) suspend all rights of AMTPL under the AMTPL Concession Agreement, and pursuant hereto, and (ii) exercise such rights itself and perform the obligations hereunder or authorise any other person to exercise or perform the same on its behalf during such suspension ("**Suspension**"). Suspension hereunder shall be effective forthwith upon issue of notice by GSRDC to AMTPL and may extend up to a period not exceeding 180 days from the date of issue of such notice; provided that upon written request from AMTPL and the lenders' representative, as defined in the AMTPL Concession Agreement ("**Lenders' Representative"),** GSRDC shall extend the aforesaid period of 180 days by a further period not exceeding 90 days.

At any time during the period of Suspension, the Lenders' Representative, on behalf of senior lenders, as defined in the AMTPL Concession Agreement ("**Senior Lenders**"), shall be entitled to substitute AMTPL under and in accordance with the substitution agreement, as defined in the AMTPL Concession Agreement ("**Substitution Agreement**"), and upon receipt of notice thereunder from the

Lenders' Representative, GSRDC shall withhold Termination for a period not exceeding 180 days from the date of Suspension, and any extension thereof, for enabling the Lenders' Representative to exercise its rights of substitution on behalf of Senior Lenders.

10. *Effect of variation in traffic growth (applicable only for AMTPL Concession Agreement I)*

GSRDC and AMTPL acknowledge that the traffic as on October 1, 2021 (the "**Target Date**") is estimated to be as follows for respective sections (the "**Target Traffic**"):

Road Section	Target traffic as on October 1, 2021 in PCUs per day
Ahmedabad - Viramgam	43,250
Viramgam - Dhrangadhra	21,000
Dhrangadhra - Halvad	21,000
Halvad - Maliya	21,000

GSDRCL and AMTPL hereby agree that for determining the modifications to the Concession Period as defined in the AMTPL Concession Agreement I, the actual traffic on the Target Date shall be derived by computing the average of the traffic as determined by traffic sampling to be undertaken, in accordance with the AMTPL Concession Agreement I, on the date that falls one year prior to the Target Date, on the Target Date and on the first anniversary of the Target Date (the "**Actual Traffic**"). It is agreed that traffic sampling shall be undertaken for a continuous period of 7 (seven) days during any time within 15 (fifteen) days prior to the date specified herein and the average thereof shall be deemed to be the actual traffic.

In the event that the Actual Traffic shall have fallen short of Target Traffic by more than 2.5% (two point five per cent) thereof or exceeded the Target Traffic by more than 2.5% (two point five per cent) thereof, the Concession Period shall be deemed to be modified in accordance with the AMTPL Concession Agreement I.

11. *Restriction on construction of Additional Tollway (applicable only for AMTPL Concession Agreement I)*

Notwithstanding anything to the contrary contained in the AMTPL Concession Agreement I, GSRDC shall not construct, and shall procure that no Government Instrumentality shall construct or cause to be constructed, any expressway or other toll road between, inter alia, Ahmedabad (Km 11.5 SH17), Viramgam Dhrangadbra-Halvad and Maliya (Km 195.065 SH7) (collectively the "**Additional Tollway**") for use by traffic at any time before the 13th anniversary of the Appointed Date as defined in the AMTPL Concession Agreement I. Additional Tollway does not include any expressway or other toll road connecting, inter alia, (Km 11.5 SH17), Viramgam-Dhrangadhra-Halvad and Maliya (Km 195.065 SH 7) if the length of such expressway or toll road exceeds the length of the existing route comprising the Project by 15% (fifteen per cent) thereof.

12. *Obligations relating to Competing Roads*

GSRDC shall procure that during the subsistence of the AMTPL Concession Agreement, neither GSRDC nor any Government Instrumentality shall, at any time before the 13th anniversary of the Appointed Date as defined in the AMTPL Concession Agreement, construct or cause to be constructed any Competing Road as defined in the AMTPL Concession Agreement; provided that the restriction herein shall not apply if the average traffic on the Project in any year exceeds 90% (ninety per cent) of its designed capacity specified in the AMTPL Concession Agreement. Upon breach of its obligations hereunder, GSRDC shall be liable to payment of compensation to AMTPL under and in accordance with AMTPL Concession Agreement. Under Concession Agreement II, the GSRDC undertakes that during the subsistence of the Concession Agreement II, GSRDC or any Government Instrumentality shall not construct or cause to be constructed any competing road and upon breach of its obligations, the Government shall be liable to payment of compensation to AMTPL under and in accordance with Concession Agreement II.

13. *Effect of force majeure event on the Concession*

Upon the occurrence of any force majeure event prior to the appointed date, each as defined in the AMTPL Concession Agreement ("**Force Majeure Event**" and "**Appointed Date**"), the period set forth for achieving Financial Close shall be extended by a period equal in length to the duration of the

Force Majeure Event. Upon occurrence of any Force Majeure Event after the Appointed Date, but before Project Completion Date, the Concession Period and the dates set forth in the Project Completion Schedule shall be extended by a period equal in length to the duration for which such Force Majeure Event subsists; if after Project Completion Date, the Concession Period shall be extended by a period, equal in length to the period during which AMTPL was prevented from collection of Fee on account thereof; provided that in the event of partial collection of Fee where the daily collection is less than 90% (ninety per cent) of the Average Daily Fee, the GSRDC shall extend the Concession Period in proportion to the loss of Fee on a daily basis.

14. *Allocation of costs arising out of Force Majeure*

a. Upon occurrence of any Force Majeure Event prior to the Appointed Date, the parties to the AMTPL Concession Agreement shall bear their respective costs and no party shall be required to pay to the other party any costs thereof.

b. Upon occurrence of a Force Majeure Event after the Appointed Date, the costs incurred and attributable to such event and directly relating to the project ("**Force Majeure Costs**") shall be allocated and paid as follows:

i. upon occurrence of a non-political event, as defined in the AMTPL Concession Agreement, the parties shall bear their respective Force Majeure Costs and neither party shall be required to pay to the other party any costs thereof;

ii. upon occurrence of an indirect political event, as defined in the AMTPL Concession Agreement, all Force Majeure Costs attributable to such indirect political event, and not exceeding the insurance cover for such indirect political event, shall be borne by AMTPL, and to the extent Force Majeure Costs exceed such insurance cover, one half of such excess amount shall be reimbursed by GSRDC to AMTPL; and

iii. upon occurrence of a political event, as defined in the AMTPL Concession Agreement, all Force Majeure Costs attributable to such political event shall be reimbursed by GSRDC to AMTPL.

15. *Divestment Requirements*

Upon termination of the AMTPL Concession Agreement, AMTPL shall comply with and conform to the following divestment requirements, amongst others:

a. notify GSRDC forthwith the location and particulars of all project assets, as defined in the AMTPL Concession Agreement ("**Project Assets**");

b. deliver forthwith the actual or constructive possession of the Project, free and clear of all encumbrances, save and except to the extent set forth in the Substitution Agreement;

c. cure all Project Assets, including the road, bridges, structures and equipment, of all defects and deficiencies so that the Project is compliant with the maintenance requirements, provided that in the event of Termination during the construction period, all Project Assets shall be handed over on 'as is here is' basis after bringing them to a safe condition;

d. comply with all other requirements as may be prescribed or required under Applicable Laws for completing the divestment and assignment of all rights, title and interest of AMTPL in the Project, free from all encumbrances, absolutely unto GSRDC or to its nominees.

16. *Termination for AMTPL Default*

Subject to the provisions of the AMTPL Concession Agreement, in the event that any of the defaults specified below shall have occurred, and AMTPL fails to cure the default within the mentioned cure period, or where no cure period is specified, then within a cure period of 60 days, AMTPL shall be deemed to be in default of the AMTPL Concession Agreement (the "**AMTPL Default**"), unless the default has occurred as a result of any breach of the AMTPL Concession Agreement by GSRDC or due to Force Majeure Event. The defaults referred to shall include, among other things, the following:

a. The performance security, as defined in the AMTPL Concession Agreement ("**Performance Security**"), has been encashed and appropriated in accordance with the AMTPL Concession Agreement and AMTPL fails to replenish or provide fresh Performance Security within a cure period of 30 days;

b. subsequent to the replenishment or furnishing of fresh Performance Security in accordance with the AMTPL Concession Agreement, AMTPL fails to cure within a cure period of 90 days, the AMTPL Default for which whole or part of the performance security was appropriate;

c. AMTPL does not achieve the latest outstanding project milestone due in accordance with the provisions of the AMTPL Concession Agreement and continues to be in default for 90 days;

d. upon occurrence of a financial default, as defined in the AMTPL Concession Agreement ("**Financial Default**"), the Lenders' Representative has by notice required GSRDC to undertake Suspension in accordance with the Substitution Agreement and AMTPL fails to cure the default within the cure period specified;

e. a change in ownership has occurred in breach of the provisions of the AMTPL Concession Agreement.

Upon occurrence of a AMTPL Default, GSRDC shall be entitled to terminate the AMTPL Concession Agreement by issuing a termination notice, as defined in AMTPL Concession Agreement ("**Termination Notice**"), to AMTPL; provided that before issuing the Termination Notice, GSRDC shall by a notice inform AMTPL of its intention to issue such Termination Notice and grant 15 days to AMTPL to make a representation, and may, after the expiry of such 15 days, whether or not it is in receipt of such representation, issue the Termination Notice.

17. *Termination for GSRDC Default*

AMTPL may terminate the AMTPL Concession Agreement on account of occurrence of a default by the GSRDC which is not rectified within the cure period of 90 days or such longer period as has been expressly provided in this AMTPL Concession Agreement (the "**GSRDC Default**") and includes – (i) material default causing a material adverse effect on AMTPL; (ii) the failure to make any payment due to AMTPL; (iii) repudiation of the AMTPL Concession Agreement etc.

AMTPL may, under the AMTPL Concession Agreement, upon occurrence of a GSRDC Default, subject to the provisions of Substitution Agreement, terminate the AMTPL Concession Agreement by issuing a Termination Notice to GSRDC; provided that before issuing the Termination Notice, AMTPL shall by notice inform GSRDC of its intentions to issue the Termination Notice and grant 15 days to GSRDC to make a representation, and may after the expiry of such 15 days, whether or not it is in receipt of such representation, issue the Termination Notice.

18. *Defects liability after termination*

AMTPL shall be responsible for all defects and deficiencies in the Project for a period of 120 days after Termination, and it shall have the obligation to repair or rectify, at its own cost, all defects and deficiencies observed by the Independent Engineer in the Project during this period. In the event that AMTPL fails to repair or rectify such defect or deficiency within a period of 15 days from the date of notice issued by GSRDC, GSRDC shall be entitled to get the same repaired or rectified at the risk and cost of AMTPL so as to make the Project conform to the maintenance requirements. All costs incurred by GSRDC in this regard shall be reimbursed by AMTPL to GSRDC within 15 days of receipt of demand thereof, and in the event of default in reimbursing such costs, GSRDC shall be entitled to recover the same from the funds retained in the escrow account.

9. Rajkot-Vadinar Tollway Private Limited ("RVTPL")

The concession agreement has been executed between RVTPL and Gujarat State Road Development Corporation Limited ("**GSRDC**") dated September 17, 2008 (the "**RVTPL Concession Agreement**"). The scope of the Project under the RVTPL Concession Agreement includes the augmenting of the existing road from Km 3.00 to Km 125.550 including existing Jamnagar Bypass and Rajkot spur road (approximately 131.65 Km.) on the Rajkot-Jamnagar-Vadinar road, state highway no. 25 to make it a four lane divided carriageway

facility under the Viability Gap Funding Scheme of the Government of India on a build, operate and transfer basis ("**Project**"), for a concession period of 20 years ("**Concession Period**" and such concession "**Concession**") with the appointed date being September 12, 2009 ("**Appointed Date**").

A summary of key terms of the RVTPL Concession Agreement has been set below:

1. *Total Project Cost*

The total project cost, as defined in the RVTPL Concession Agreement ("**Total Project Cost**"), means the lowest of:

a. the capital cost of the Project, less equity support as set forth in the financial package;

b. the actual capital cost of the Project upon completion of four-laning of the Project, less equity support; and

c. a sum of Rs. 7748.00 million;

provided that in the event of termination, the Total Project Cost shall be deemed to be modified to the extent of variation in WPI or reference exchange rate occurring in respect of adjusted equity and debt due each as defined in the RVTPL Concession Agreement.

2. *Concession Fee*

In consideration of the grant of Concession, the concession fee payable by RVTPL to GSRDC shall be Re.1.00 (Rupee One) per annum. Additional Concession Fee during the year of COD is 12.95% of the total Realisable Fee with an increase @ 1% for each subsequent year as compared to the immediately preceding year, which is part of Concession Fee and payable in monthly instalments within 7 days of the close of each month.

3. *Change of Scope*

GSRDC may require the provision of additional works and services which are not included in the scope of the Project as contemplated by the RVTPL Concession Agreement (the "**Change of Scope**"). RVTPL shall, after commencement of work, present to GSRDC bills for payment in respect of the works in progress or completed works, as the case may be, supported by such documentation as is reasonably sufficient for GSRDC to determine the accuracy thereof. Within 45 (forty-five) days of receipt of such bills, GSRDC shall disburse to RVTPL such amounts as are certified by the independent engineer as reasonable and in the event of any dispute, final adjustments thereto shall be made under and in accordance with the dispute resolution procedure. No advance payment shall be made by GSRDCL, as laid down in the RVTPL Concession Agreement. RVTPL shall be entitled to nullify any Change of Scope order if it causes the cumulative costs relating to all the Change of Scope orders to exceed 5% of the Total Project Cost in any continuous period of 3 years immediately preceding the date of such Change of Scope order or if such cumulative costs exceed 20% of the Total Project Cost at any time during the concession period.

4. *O&M*

RVTPL shall operate and maintain the Project, in accordance with the RVTPL Concession Agreement either by itself, or through the O&M contractor, as defined in the RVTPL Concession Agreement ("**O&M Contractor**"), and if required, modify, repair or otherwise make improvements to the Project to comply with provisions of the RVTPL Concession Agreement applicable laws, applicable permits and conform to specifications, standards and good industry practice. The obligations of RVTPL, among other things, shall include:

a. permitting safe, smooth and uninterrupted flow of traffic on the Project during normal operating conditions;

b. carrying out periodic preventive maintenance of the Project;

c. undertaking routine maintenance including prompt repairs of potholes, cracks, joints, drains, embankments, structures, pavement markings, lighting, road signs and other traffic control

devices;

d. undertaking major maintenance such as resurfacing of pavements, repairs to structures, and repairs and refurbishment of tolling system and other equipment;

e. protection of the environment and provision of equipment and materials; and

f. operation and maintenance of all communication, control and administrative systems necessary for the efficient operation of the Project.

5. *Maintenance manual*

No later than 180 days prior to the schedule four laning date, as defined in the RVTPL Concession Agreement, RVTPL shall, in consultation with the Independent Engineer, evolve a repair and maintenance manual, as defined in the RVTPL Concession Agreement (the "**Maintenance Manual**"), for the regular and preventive maintenance of the Project in conformity with the maintenance requirements, safety requirements and good industry practice. The Maintenance Manual shall be revised and updated once every three years.

6. *Maintenance programme*

No later than 45 days prior to the beginning of each accounting year during the operation period, as defined in the RVTPL Concession Agreement, RVTPL shall provide to GSRDC and the Independent Engineer its proposed annual programme of preventive, urgent and other scheduled maintenance (the "**Maintenance Programme**") to comply with the maintenance requirements, Maintenance Manual and safety requirements. Such Maintenance Programme, amongst other things shall include the following:

a. preventive maintenance schedule;

b. arrangements and procedures for carrying out urgent repairs;

c. criteria to be adopted for deciding maintenance needs;

d. intervals and procedures for carrying out inspection of all elements of the Project;

e. intervals at which RVTPL shall carry out periodic maintenance;

f. arrangements and procedures for carrying out safety related measures; and

g. intervals for major maintenance works and the scope thereof.

7. *Obligations relating to change in ownership*

RVTPL shall not undertake or permit any change in ownership, except with the prior written approval of GSRDC. The criteria mentioned in the RFQ document, as defined in the RVTPL Concession Agreement, will prevail with respect to ownership and equity holding. Notwithstanding anything to the contrary contained in the RVTPL Concession Agreement, RVTPL agrees and acknowledges that:

a. all acquisitions of equity by an acquirer, either by himself or with any person acting in concert, directly or indirectly, including by transfer of direct or indirect legal or beneficial ownership or control of any equity, in aggregate of not less 15% of the total equity of RVTPL; or

b. acquisition of any control directly or indirectly of the board of directors of RVTPL by any person either by himself or together with any person or persons acting in concert with him shall be subject to prior approval of the appropriate Government.

Further, the term '*change in ownership*' under the RVTPL Concession Agreement refers to a transfer of direct or indirect ownership of shares that causes the aggregate holding of the selected bidder together with its Associates to decline below the prescribed thresholds. The term "**Associate**" as provided under the RVTPL Concession Agreement, means, in relation to either party, a person who controls, is controlled by, or is under common Control with such person (as used in this definition the expression "**control**" means, with respect to a person, which is a company or corporation, the

ownership, directly or indirectly, of more than 50% (fifty percent) of voting shares of such person, and with respect to a person which is not a company or corporation, the power to direct the management and policies of such person, whether by operation of law or by contract or otherwise.

Therefore, pursuant to the Formation Transactions the transfer of RVTPL to the Trust shall constitute an Associate transfer and therefore such a transfer is in compliance with the provisions of the RVTPL Concession Agreement.

8. *Indemnities*

a. RVTPL shall indemnify, defend, save and hold harmless GSRDC against any and all proceedings, actions and claims from third parties (other than a claim by the GSRDC or the GOG, as defined in the RVTPL Concession Agreement) for any loss, damage and expense of whatever kind and nature, whether arising out of the design, engineering, construction, procurement, operation and maintenance of the Project or arising out of a breach by RVTPL of any of its obligations under the RVTPL Concession Agreement.

b. GSRDC will indemnify, defend, save and hold harmless RVTPL against any and all suits, proceedings, actions, demands and third party claims for any loss, damage, cost and expense of whatever kind and nature arising out of (i) defect in title and/or the rights of GSRDC in the land comprised in the site arising out of acts done in discharge of their lawful functions by GSRDC, its officers, servants, agents, subsidiaries and contractors ("**GSRDC Indemnified Parties**") including the GSRDC events of default, as defined in the RVTPL Concession Agreement, except to the extent that any such claim has arisen due to a negligent act or omission, breach of contract or breach of statutory duty on part of RVTPL, its subsidiaries, affiliates, contractors, servants or agents including due to RVTPL events of default, each as defined in the RVTPL Concession Agreement.

c. RVTPL shall fully indemnify, hold harmless and defend GSRDC and GSRDC Indemnified Persons from and against any and all loss and/or damages arising out of or with respect to:

1. failure of RVTPL to comply with applicable laws and applicable permits, each as defined in the RVTPL Concession Agreement ("**Applicable Laws**" and "**Applicable Permits**");

2. payment of taxes required to be made by RVTPL in respect of the income or other taxes of RVTPL's contractors, suppliers and representatives; or

3. non-payment of amounts due as a result of materials or services furnished to RVTPL or any of its contractors which are payable by RVTPL or any of its contractors.

d. RVTPL shall fully indemnify, hold harmless and defend GSRDC Indemnified Persons from and against any and all suits, proceedings, actions, claims, demands, liabilities and damages which GSRDC Indemnified Persons may hereafter suffer, or pay by reason of any demands, claims, suits or proceedings arising out of claims of infringement of any domestic or foreign patent rights, copyrights or other intellectual property, proprietary or confidentiality rights with respect to any materials, information, design or process used by RVTPL or by RVTPL's contractors in performing the obligations of RVTPL or in any way incorporated in or related to the Project. If in any such suit, action, claim or proceedings, a temporary restraint order or preliminary injunction is granted, RVTPL shall make every reasonable effort, by giving a satisfactory bond or otherwise, to secure the revocation or suspension of the injunction or restraint order. If, in any such suit, action, claim or proceedings, the Project, or any part thereof or comprised therein, is held to constitute an infringement and its use is permanently enjoined, RVTPL shall promptly make every reasonable effort to secure GSRDC a licence, at no cost to GSRDC, authorising continued use of the infringing work. If RVTPL is unable to secure such licence within a reasonable time, RVTPL shall, at its own expense, and without impairing the specifications and standards, either replace the affected work, or part, or process thereof with non-infringing work or part or process or modify the same so that it becomes non-infringing.

9. *Suspension of RVTPL's rights*

If RVTPL is in material breach of the RVTPL Concession Agreement, GSRDC shall be entitled, without prejudice to its other rights and remedies under the RVTPL Concession Agreement including its rights of termination, as defined in the RVTPL Concession Agreement ("**Termination**"), thereunder, to (i) suspend all rights of RVTPL under the RVTPL Concession Agreement, and pursuant hereto, and (ii) exercise such rights itself and perform the obligations hereunder or authorise any other person to exercise or perform the same on its behalf during such suspension ("**Suspension**"). Such suspension by GSRDC shall be by a communication in writing to RVTPL and shall be effective forthwith upon the issue thereof to RVTPL. Any fees or revenues collected by or on behalf of GSRDC during such suspension shall be deposited in the escrow account to the exclusion of RVTPL. Provided, however, that the period of such suspension under the RVTPL Concession Agreement shall not exceed 120 days.

10. *Effect of force majeure event on the Concession*

Upon the occurrence of any force majeure event prior to the appointed date, each as defined in the RVTPL Concession Agreement ("**Force Majeure Event**" and "**Appointed Date**"), the period set forth for achieving Financial Close shall be extended by a period equal in length to the duration of the Force Majeure Event. Upon occurrence of any Force Majeure Event after the Appointed Date, but before Project Completion Date, the Concession Period and the dates set forth in the Project Completion Schedule shall be extended by a period equal in length to the duration for which such Force Majeure Event subsists; if after Project Completion Date, the Concession Period shall be extended by a period, equal in length to the period during which RVTPL was prevented from collection of Fee on account thereof; provided that in the event of partial collection of Fee where the daily collection is less than 90% (ninety per cent) of the Average Daily Fee, the GSRDC shall extend the Concession Period in proportion to the loss of Fee on a daily basis.

11. *Allocation of costs arising out of Force Majeure*

a. Upon occurrence of any Force Majeure Event prior to the Appointed Date, the parties to the RVTPL Concession Agreement shall bear their respective costs and no party shall be required to pay to the other party any costs thereof.

b. Upon occurrence of a Force Majeure Event after the Appointed Date, the costs incurred and attributable to such event and directly relating to the project ("**Force Majeure Costs**") shall be allocated and paid as follows:

   i. upon occurrence of a non-political event, as defined in the RVTPL Concession Agreement, the parties shall bear their respective Force Majeure Costs and neither party shall be required to pay to the other party any costs thereof;

   ii. upon occurrence of an indirect political event, as defined in the RVTPL Concession Agreement, all Force Majeure Costs attributable to such indirect political event, and not exceeding the insurance cover for such indirect political event, shall be borne by RVTPL, and to the extent Force Majeure Costs exceed such insurance cover, one half of such excess amount shall be reimbursed by GSRDC to RVTPL; and

   iii. upon occurrence of a political event, as defined in the RVTPL Concession Agreement, all Force Majeure Costs attributable to such political event shall be reimbursed by GSRDC to RVTPL.

12. *Divestment Requirements*

Upon termination of the RVTPL Concession Agreement, RVTPL shall comply with and conform to the following divestment requirements, amongst others:

a. notify GSRDC forthwith the location and particulars of all project assets, as defined in the RVTPL Concession Agreement ("**Project Assets**");

b. deliver forthwith the actual or constructive possession of the Project, free and clear of all encumbrances and execute such deeds, writings and documents as may be required by

GSRDC for fully and effectively divesting all of the rights, title and interest of RVTPL in the Project and conveying the Project free of any cost to GSRDC;

c. comply with all other requirements as set out in the RVTPL Concession Agreement.

13. *Termination for RVTPL Default*

Subject to the provisions of the RVTPL Concession Agreement, in the event that any of the defaults specified below shall have occurred, and RVTPL fails to cure the default within the mentioned cure period, or where no cure period is specified, then within a cure period of 60 days, RVTPL shall be deemed to be in default of the RVTPL Concession Agreement (the "**RVTPL Default**"), unless the default has occurred as a result of any breach of the RVTPL Concession Agreement by GSRDC or due to Force Majeure Event. The defaults referred to shall include, among other things, the following:

a. RVTPL is in material breach of the RVTPL Concession Agreement.

b. A resolution is passed by the shareholders of RVTPL for the voluntary winding up of itself;

c. RVTPL has been adjudged bankrupt or insolvent;

d. RVTPL fails to achieve financial close as defined in the RVTPL Concession Agreement;

e. RVTPL creates any encumbrance, charges or lien in favour of any person save and except as otherwise expressly permitted under the RVTPL Concession Agreement

f. change in ownership has occurred in breach of the provisions of the RVTPL Concession Agreement.

14. *Termination for GSRDC Default*

RVTPL may terminate the RVTPL Concession Agreement on account of occurrence of a default by the GSRDC which is not rectified within the cure period of 90 days or such longer period as has been expressly provided in this RVTPL Concession Agreement (the "**GSRDC Default**") and includes – (i) material default causing a material adverse effect on RVTPL; (ii) repudiation of the RVTPL Concession Agreement etc.

Upon termination by RVTPL on account of a GSDRCL event of default, RVTPL shall be entitled to receive from GSRDC by way of such termination payment a sum equal to:

a. The total debt due, plus

b. 120% of the total subordinated debt, plus

c. 150% of the adjusted equity if such termination occurs at any time during three years commencing from the appointed date.

15. *Defects liability after termination*

Not less than 30 to 42 months before the concession ends, RVTPL and Independent Engineer shall conduct an Initial Inspection of the project and facilities, after which RVTPL submits a report and proposed renewal works within 45 days, each as defined in the RVTPL Concession Agreement. The Engineer may object and suggest alternatives within another 45 days, and if no agreement is reached within 30 days, the matter goes to dispute resolution, with RVTPL ultimately responsible for carrying out the agreed works at its own cost. Further, not less than 6 to 9 months before expiry, a Second Inspection shall be conducted to reassess the project, followed by a revised report and renewal proposals from RVTPL within 15 days, which the Engineer may again object to and amend within 15 days to ensure compliance with divestment requirements. If following the second inspection, it is agreed or determined that no renewal works are required then within 14 days of such agreement, 50% of the sums retained shall be released from the escrow account to RVTPL.

10. Sambalpur-Rourkela Tollway Private Limited ("SRTPL")

The concession agreement has been executed between SRTPL and the Governor of Odisha, represented by the

Odisha Works Department ("**OWD**") dated November 8, 2013 (the "**SRTPL Concession Agreement**"). The scope of the Project under the SRTPL Concession Agreement includes the four laning with paved shoulders of the Sambalpur – Rourkela Section of stat highway no. 10 from Km. 4.900 to Km. 167.900 (approximately 162.500 Km.) in the state of Odisha on a design, finance, build, operate and transfer basis ("**Project**"), for a concession period of 22 years ("**Concession Period**" and such concession "**Concession**") with the appointed date being July 15, 2014 ("**Appointed Date**").

A summary of key terms of the SRTPL Concession Agreement has been set below:

1. *Total Project Cost*

The total project cost, as defined in the SRTPL Concession Agreement ("**Total Project Cost**"), means the lowest of:

a. the capital cost of the Project, less equity support as set forth in the financial package;

b. the actual capital cost of the Project upon completion of four-laning with paved shoulders of the Project, less equity support; and

c. a sum of Rs. 12,925.60 million, less equity support;

provided that in the event of termination, the Total Project Cost shall be deemed to be modified to the extent of variation in WPI or reference exchange rate occurring in respect of adjusted equity and debt due each as defined in the SRTPL Concession Agreement, provided further that in the event WPI increases, on average, by more than six percent per annum for the period between the date thereof and COD, the parties to the SRTPL Concession Agreement shall meet as soon as reasonably practicable, and agree upon revision of the amount hereinbefore specified such that the effect of increase in WPI, in excess of such 6%, is reflected in the Total Project Cost, in accordance with the provisions of the SRTPL Concession Agreement.

2. *Concession Fee*

In consideration of the grant of Concession, the concession fee payable by SRTPL to OWD shall be Re.1.00 (Rupee One) per annum and the premium as specified in the SRTPL Concession Agreement.

3. *Change of Scope*

OWD may require the provision of additional works and services which are not included in the scope of the Project as contemplated by the SRTPL Concession Agreement (the "**Change of Scope**"). Within 7 days, OWD shall make an advance payment to SRTPL in a sum equal to 20% of the cost of Change of Scope, and in the event of a dispute, 20% of the cost assessed by the independent engineer, as defined in the SRTPL Concession Agreement ("**Independent Engineer**"). OWD shall disburse to SRTPL such amounts as are certified by the Independent Engineer, as reasonable and after making a proportionate deduction for the advance payment made and in the event of any dispute, final adjustments thereto shall be made under and in accordance with the dispute resolution procedure. SRTPL shall be entitled to nullify any Change of Scope order if it causes the cumulative costs relating to all the Change of Scope orders to exceed 5% of the Total Project Cost in any continuous period of 3 years immediately preceding the date of such Change of Scope order or if such cumulative costs exceed 20% of the Total Project Cost at any time during the concession period.

4. *O&M*

SRTPL shall operate and maintain the Project, in accordance with the SRTPL Concession Agreement either by itself, or through the O&M contractor, as defined in the SRTPL Concession Agreement ("**O&M Contractor**"), and if required, modify, repair or otherwise make improvements to the Project to comply with provisions of the SRTPL Concession Agreement applicable laws, applicable permits and conform to specifications, standards and good industry practice. The obligations of SRTPL, among other things, shall include:

a. permitting safe, smooth and uninterrupted flow of traffic on the Project during normal operating conditions;

b. carrying out periodic preventive maintenance of the Project;

c. undertaking routine maintenance including prompt repairs of potholes, cracks, joints, drains, embankments, structures, pavement markings, lighting, road signs and other traffic control devices;

d. undertaking major maintenance such as resurfacing of pavements, repairs to structures, and repairs and refurbishment of tolling system and other equipment;

e. protection of the environment and provision of equipment and materials; and

f. operation and maintenance of all communication, control and administrative systems necessary for the efficient operation of the Project.

5. *Maintenance manual*

No later than 180 days prior to the schedule four laning date, as defined in the SRTPL Concession Agreement, SRTPL shall, in consultation with the independent engineer, evolve a repair and maintenance manual, as defined in the SRTPL Concession Agreement (the "**Maintenance Manual**"), for the regular and preventive maintenance of the Project in conformity with the maintenance requirements, safety requirements and good industry practice. The Maintenance Manual shall be revised and updated once every three years.

6. *Maintenance programme*

On or before COD and no later than 45 days prior to the beginning of each accounting year during the operation period, as defined in the SRTPL Concession Agreement, SRTPL shall provide to OWD and the independent engineer its proposed annual programme of preventive, urgent and other scheduled maintenance (the "**Maintenance Programme**") to comply with the maintenance requirements, Maintenance Manual and safety requirements. Such Maintenance Programme, amongst other things shall include the following:

a. preventive maintenance schedule;

b. arrangements and procedures for carrying out urgent repairs;

c. criteria to be adopted for deciding maintenance needs;

d. intervals and procedures for carrying out inspection of all elements of the Project;

e. intervals at which SRTPL shall carry out periodic maintenance;

f. arrangements and procedures for carrying out safety related measures; and

g. intervals for major maintenance works and the scope thereof.

7. *Obligations relating to change in ownership*

SRTPL shall not undertake or permit any change in ownership, except with the prior written approval of OWD. Notwithstanding anything to the contrary contained in the SRTPL Concession Agreement, SRTPL agrees and acknowledges that:

a. all acquisitions of equity by an acquirer, either by himself or with any person acting in concert, directly or indirectly, including by transfer of direct or indirect legal or beneficial ownership or control of any equity, in aggregate of not less 15% of the total equity of SRTPL; or

b. acquisition of any control directly or indirectly of the board of directors of SRTPL by any person either by himself or together with any person or persons acting in concert with him.

Further, the term '*change in ownership*' under the SRTPL Concession Agreement refers to a transfer of direct or indirect ownership of shares that causes the aggregate holding of the selected bidder together with its Associates to decline below the prescribed thresholds. The term "**Associate**" as provided under the SRTPL Concession Agreement, means, in relation to either party, a person who

controls, is controlled by, or is under common Control with such person (as used in this definition the expression "**control**" means, with respect to a person, which is a company or corporation, the ownership, directly or indirectly, of more than 50% (fifty percent) of voting shares of such person, and with respect to a person which is not a company or corporation, the power to direct the management and policies of such person, whether by operation of law or by contract or otherwise.

Therefore, pursuant to the Formation Transactions the transfer of SRTPL to the Trust shall constitute an Associate transfer and therefore such a transfer is in compliance with the provisions of the SRTPL Concession Agreement.

8. *Indemnities*

a. SRTPL shall indemnify, defend, save and hold harmless OWD and its officers, servants, agents, government instrumentalities and government owned and/or controlled entities/enterprises, (the "**OWD Indemnified Persons**") against any and all suits, proceedings, actions, demands and claims from third parties for any loss, damage, cost and expense of whatever kind and nature, whether arising out of any breach by SRTPL of any of its obligations under the SRTPL Concession Agreement or any related agreement or on account of any defect or deficiency in the provision of services by SRTPL to any user except to the extent that any such suits, proceedings, actions, demands and claims have arisen due to any negligent act or omission, or breach or default of the SRTPL Concession Agreement on the part of OWD Indemnified Persons.

b. OWD will indemnify, defend, save and hold harmless SRTPL against any and all suits, proceedings, actions, demands and third party claims for any loss, damage, cost and expense of whatever kind and nature arising out of (i) defect in title and/or the rights of OWD in the land comprised in the site.

c. SRTPL shall fully indemnify, hold harmless and defend OWD and OWD Indemnified Persons from and against any and all loss and/or damages arising out of or with respect to:

1. failure of SRTPL to comply with applicable laws and applicable permits, each as defined in the SRTPL Concession Agreement ("**Applicable Laws**" and "**Applicable Permits**");

2. payment of taxes required to be made by SRTPL in respect of the income or other taxes of SRTPL's contractors, suppliers and representatives; or

3. non-payment of amounts due as a result of materials or services furnished to SRTPL or any of its contractors which are payable by SRTPL or any of its contractors.

d. SRTPL shall fully indemnify, hold harmless and defend OWD Indemnified Persons from and against any and all suits, proceedings, actions, claims, demands, liabilities and damages which OWD Indemnified Persons may hereafter suffer, or pay by reason of any demands, claims, suits or proceedings arising out of claims of infringement of any domestic or foreign patent rights, copyrights or other intellectual property, proprietary or confidentiality rights with respect to any materials, information, design or process used by SRTPL or by SRTPL's contractors in performing the obligations of SRTPL or in any way incorporated in or related to the Project. If in any such suit, action, claim or proceedings, a temporary restraint order or preliminary injunction is granted, SRTPL shall make every reasonable effort, by giving a satisfactory bond or otherwise, to secure the revocation or suspension of the injunction or restraint order. If, in any such suit, action, claim or proceedings, the Project, or any part thereof or comprised therein, is held to constitute an infringement and its use is permanently enjoined, SRTPL shall promptly make every reasonable effort to secure for OWD a licence, at no cost to OWD, authorising continued use of the infringing work. If SRTPL is unable to secure such licence within a reasonable time, SRTPL shall, at its own expense, and without impairing the specifications and standards, either replace the affected work, or part, or process thereof with non-infringing work or part or process or modify the same so that it becomes non-infringing.

9. *Suspension of SRTPL's rights*

Upon occurrence of a SRTPL default, as defined in the SRTPL Concession Agreement ("**SRTPL Default**"), OWD shall be entitled, without prejudice to its other rights and remedies under the SRTPL Concession Agreement including its rights of termination, as defined in the SRTPL Concession Agreement ("**Termination**"), thereunder, to (i) suspend all rights of SRTPL under the SRTPL Concession Agreement, and pursuant hereto, and (ii) exercise such rights itself and perform the obligations hereunder or authorise any other person to exercise or perform the same on its behalf during such suspension ("**Suspension**"). Suspension hereunder shall be effective forthwith upon issue of notice by OWD to SRTPL and may extend up to a period not exceeding 180 days from the date of issue of such notice; provided that upon written request from SRTPL and the lenders' representative, as defined in the SRTPL Concession Agreement ("**Lenders' Representative"),** OWD shall extend the aforesaid period of 180 days by a further period not exceeding 90 days.

At any time during the period of Suspension, the Lenders' Representative, on behalf of senior lenders, as defined in the SRTPL Concession Agreement ("**Senior Lenders**"), shall be entitled to substitute SRTPL under and in accordance with the substitution agreement, as defined in the SRTPL Concession Agreement ("**Substitution Agreement**"), and upon receipt of notice thereunder from the Lenders' Representative, OWD shall withhold Termination for a period not exceeding 180 days from the date of Suspension, and any extension thereof, for enabling the Lenders' Representative to exercise its rights of substitution on behalf of Senior Lenders.

10. *Effect of variation in traffic growth*

OWD and SRTPL acknowledge that the traffic as on October 1, 2023 (the "**Target Date**") is estimated to be 25,732 PCUs per day (the "**Target Traffic**"), and hereby agree that for determining the modifications to the Concession Period as defined in the SRTPL Concession Agreement, the actual traffic on the Target Date shall be derived by computing the average of the traffic as determined by traffic sampling to be undertaken, in accordance with the SRTPL Concession Agreement, on the date that falls one year prior to the Target Date, on the Target Date and on the first anniversary of the Target Date (the "**Actual Average Traffic**"). It is agreed that traffic sampling shall be undertaken for a continuous period of 7 (seven) days during any time within 15 (fifteen) days prior to the date specified herein and the average thereof shall be deemed to be the actual traffic. It is further agreed that if the Project shall have two or more Toll Plazas as defined in the SRTPL Concession Agreement, the average traffic thereof shall be computed for determining the Actual Average Traffic hereunder.

In the event that the Actual Average Traffic shall have fallen short of the Target Traffic by more than 2.5% (two point five per cent) thereof or exceeded the Target Traffic by more than 2.5% (two point five per cent) thereof, the Concession Period shall be deemed to be modified in accordance with the SRTPL Concession Agreement.

11. *Restriction on construction of Additional Tollway*

Notwithstanding anything to the contrary contained in the SRTPL Concession Agreement OWD shall not construct, and shall procure that no Government Instrumentality shall construct or cause to be constructed, any expressway or other toll road between, inter alia, Sambalpur and Rourkela i.e. Km 4/900 and Km 167/900 on State Highway No. 10 (collectively the "**Additional Tollway**") for use by traffic at any time before the 20th anniversary of the Appointed Date as defined in the SRTPL Concession Agreement. Additional Tollway does not include any expressway or other toll road connecting, inter alia, Sambalpur and Rourkela i.e. Km 4/900 and Km 167/900 on State Highway No. 10 if the length of such expressway or toll road exceeds the length of the existing route comprising the Project by 20% (twenty per cent) thereof.

12. *Obligations relating to Competing Roads*

OWD shall procure that during the subsistence of the SRTPL Concession Agreement, neither OWD nor any Government Instrumentality shall, at any time before the 10th anniversary of the Appointed Date as defined in the SRTPL Concession Agreement, construct or cause to be constructed any Competing Road as defined in the SRTPL Concession Agreement; provided that the restriction herein shall not apply if the average traffic on the Project in any year exceeds 90% (ninety per cent) of its designed capacity specified in the SRTPL Concession Agreement. Upon breach of its obligations

hereunder, OWD shall be liable to payment of compensation to SRTPL under and in accordance with SRTPL Concession Agreement.

13. *Effect of force majeure event on the Concession*

Upon the occurrence of any force majeure event prior to the appointed date, each as defined in the SRTPL Concession Agreement ("**Force Majeure Event**" and "**Appointed Date**"), the period set forth for achieving Financial Close shall be extended by a period equal in length to the duration of the Force Majeure Event. Upon occurrence of any Force Majeure Event any time after the Appointed Date, but before COD, the Concession Period and the dates set forth in the Project Completion Schedule shall be extended by a period equal in length to the duration for which such Force Majeure Event subsists; if after COD, the Concession Period shall be extended by a period, equal in length to the period during which SRTPL was prevented from collection of Fee on account thereof; provided that in the event of partial collection of Fee where the daily collection is less than 90% (ninety per cent) of the Average Daily Fee, the OWD shall extend the Concession Period in proportion to the loss of Fee on a daily basis.

14. *Allocation of costs arising out of Force Majeure*

a. Upon occurrence of any Force Majeure Event prior to the Appointed Date, the parties to the SRTPL Concession Agreement shall bear their respective costs and no party shall be required to pay to the other party any costs thereof.

b. Upon occurrence of a Force Majeure Event after the Appointed Date, the costs incurred and attributable to such event and directly relating to the project ("Force Majeure Costs") shall be allocated and paid as follows:

   i. upon occurrence of a non-political event, as defined in the SRTPL Concession Agreement, the parties shall bear their respective Force Majeure Costs and neither party shall be required to pay to the other party any costs thereof;

   ii. upon occurrence of an indirect political event, as defined in the SRTPL Concession Agreement, all Force Majeure Costs attributable to such indirect political event, and not exceeding the insurance cover for such indirect political event, shall be borne by SRTPL, and to the extent Force Majeure Costs exceed such insurance cover, one half of such excess amount shall be reimbursed by OWD to SRTPL; and

   iii. upon occurrence of a political event, as defined in the SRTPL Concession Agreement, all Force Majeure Costs attributable to such political event shall be reimbursed by OWD to SRTPL.

15. *Divestment Requirements*

Upon termination of the SRTPL Concession Agreement, SRTPL shall comply with and conform to the following divestment requirements, amongst others:

a. notify OWD forthwith the location and particulars of all project assets, as defined in the SRTPL Concession Agreement ("**Project Assets**");

b. deliver forthwith the actual or constructive possession of the Project, free and clear of all encumbrances, save and except to the extent set forth in the Substitution Agreement;

c. cure all Project Assets, including the road, bridges, structures and equipment, of all defects and deficiencies so that the Project is compliant with the maintenance requirements, provided that in the event of Termination during the construction period, all Project Assets shall be handed over on 'as is here is' basis after bringing them to a safe condition;

d. comply with all other requirements as may be prescribed or required under Applicable Laws for completing the divestment and assignment of all rights, title and interest of SRTPL in the Project, free from all encumbrances, absolutely unto OWD or to its nominees.

16. *Termination for SRTPL Default*

Subject to the provisions of the SRTPL Concession Agreement, in the event that any of the defaults specified below shall have occurred, and SRTPL fails to cure the default within the mentioned cure period, or where no cure period is specified, then within a cure period of 60 days, SRTPL shall be deemed to be in default of the SRTPL Concession Agreement (the "**SRTPL Default**"), unless the default has occurred as a result of any breach of the SRTPL Concession Agreement by OWD or due to Force Majeure Event. The defaults referred to shall include, among other things, the following:

a. The performance security, as defined in the SRTPL Concession Agreement ("**Performance Security**"), has been encashed and appropriated in accordance with the SRTPL Concession Agreement and SRTPL fails to replenish or provide fresh Performance Security within a cure period of 30 days;

b. subsequent to the replenishment or furnishing of fresh Performance Security in accordance with the SRTPL Concession Agreement, SRTPL fails to cure within a cure period of 90 days, the SRTPL Default for which whole or part of the performance security was appropriate;

c. SRTPL does not achieve the latest outstanding project milestone due in accordance with the provisions of the SRTPL Concession Agreement and continues to be in default for 120 days;

d. upon occurrence of a financial default, as defined in the SRTPL Concession Agreement ("**Financial Default**"), the Lenders' Representative has by notice required OWD to undertake Suspension in accordance with the Substitution Agreement and SRTPL fails to cure the default within the cure period specified;

e. change in ownership has occurred in breach of the provisions of the SRTPL Concession Agreement.

Upon occurrence of a SRTPL Default, OWD shall be entitled to terminate the SRTPL Concession Agreement by issuing a termination notice, as defined in SRTPL Concession Agreement ("**Termination Notice**"), to SRTPL; provided that before issuing the Termination Notice, OWD shall by a notice inform SRTPL of its intention to issue such Termination Notice and grant 15 days to SRTPL to make a representation, and may, after the expiry of such 15 days, whether or not it is in receipt of such representation, issue the Termination Notice.

17. *Termination for OWD Default*

SRTPL may terminate the SRTPL Concession Agreement on account of occurrence of a default by the OWD which is not rectified within the cure period of 90 days or such longer period as has been expressly provided in this SRTPL Concession Agreement (the "**OWD Default**") and includes – (i) material default causing a material adverse effect on SRTPL; (ii) the failure to make any payment due to SRTPL; (iii) repudiation of the SRTPL Concession Agreement etc.

SRTPL may, under the SRTPL Concession Agreement, upon occurrence of a OWD Default, subject to the provisions of Substitution Agreement, terminate the SRTPL Concession Agreement by issuing a Termination Notice to OWD; provided that before issuing the Termination Notice, SRTPL shall by notice inform OWD of its intentions to issue the Termination Notice and grant 15 days to OWD to make a representation, and may after the expiry of such 15 days, whether or not it is in receipt of such representation, issue the Termination Notice.

18. *Defects liability after termination*

SRTPL shall be responsible for all defects and deficiencies in the Project for a period of 120 days after Termination, and it shall have the obligation to repair or rectify, at its own cost, all defects and deficiencies observed by the Independent Engineer in the Project during this period. In the event that SRTPL fails to repair or rectify such defect or deficiency within a period of 15 days from the date of notice issued by OWD. OWD shall be entitled to get the same repaired or rectified at the risk and cost of SRTPL so as to make the Project conform to the maintenance requirements. All costs incurred by OWD in this regard shall be reimbursed by SRTPL to OWD within 15 days of receipt of demand thereof, and in the event of default in reimbursing such costs, OWD shall be entitled to recover the same from the funds retained in the escrow account.

INFORMATION CONCERNING THE UNITS

Unit holding of the Trust

Particulars	Number of Units
Units issued and outstanding prior to this Issue	Up to [●]
Units issued and outstanding after this Issue	Up to [●]*

* *To be updated in the Final Offer Document prior to filing with SEBI and the Stock Exchange.*

Unitholders holding more than 5% of the Units

Sr. No.	Name of Unit Holders*	Pre-Issue*		Post-Issue*	
		Number of Units	Percentage of holding (%)	Number of Units	Percentage of holding (%)
1.	[●]	Up to [●]	[●]	Up to [●]	[●]

* *To be updated in the Final Offer Document prior to filing with SEBI and the Stock Exchange.*

Unitholding of the Sponsor, Sponsor Group, Investment Manager, Project Manager and Trustee

The Sponsor and certain Sponsor Group entities will be allotted Units of the Trust pursuant to the Securities Purchase Agreements, Debenture Transfer Agreements (DTAs) – Swap Consideration and the Deeds of Assignment, after the Bid/Issue Closing Date and prior to Allotment of Units in the Issue, which shall be equivalent to at least 15% of the total Units of the Trust on a post-Issue basis to comply with the requirement under Regulations 12(3) and 12(3A) of the InvIT Regulations.

The Trustee, Investment Manager and Project Manager do not hold any Units and shall not acquire any Units in this Issue.

Unitholding of the directors of the Investment Manager

As on the date of this Offer Document, none of the directors of the Investment Manager hold any Units or propose to hold any Units in the Trust.

Sponsor and Sponsor Group lock-in

Under the InvIT Regulations, the Sponsor and Sponsor Group are required to, collectively, hold a minimum of 15% of our Units on a post-Issue basis, aggregating to [●] Units (being, [●]% of the unitholding), for a minimum period of three years from the date of listing of our Units.

Details of Units proposed to be locked-in is set forth:

Name	Number of post – Issue Units	% of post-Issue unitholding
Sponsor	[●]	[●]
Sponsor Group (excluding Sponsor)	[●]	[●]
Total	**[●]**	**[●]**

Note: To be updated in the Final Offer Document

Such Units required to be held in terms of the InvIT Regulation shall be locked-in and shall not be encumbered.

Additionally, the unitholding of our Sponsor and Sponsor Group, exceeding 15% on their unitholding, aggregating to [●] Units, shall be locked-in for a period of not less than one year from the date of listing of our Units.

Further, in accordance with the InvIT Regulations, post expiry of three years from the date of listing of our Units, the unitholding of our Sponsor and Sponsor Group, collectively, is required to be locked-in as follows:

From the beginning of 4th year and till the end of 5th year from the date of listing of our Units	5% of total Units on a post-Issue basis or ₹ 5,000 million, whichever is lower*
From the beginning of 6th year and till the end of 10th year from the date of listing pursuant to the initial offer	3% of total Units on a post-Issue basis or ₹ 5,000 million, whichever is lower*
From the beginning of 11th year and till the end of 20th year from the date of listing pursuant to the initial offer	2% of total Units on a post-Issue basis or ₹ 5,000 million, whichever is lower*
After completion of the 20th year from the date of listing	1% of total Units on a post-Issue basis or ₹ 5,000

pursuant to the initial offer	million, whichever is lower*

** Provided that the maximum value of Units to be held by the Sponsor and Sponsor Group for compliance with the above shall not exceed ₹ 5,000 million or such other value as may be decided by SEBI from time to time wherein such valuation shall be based on the latest available asset value of the Trust. Further, such compliance shall be assessed at the time of each fresh issuance of Units and at the beginning of change in threshold of the percentage of minimum holding requirement as mentioned above.*

The Sponsor and Sponsor Group, undertake and agree to lock-in its unitholding in the manner specified above for the period subsequent to the three years after Listing, in the manner as may be mutually agreed.

The locked-in units held by the Sponsor and Sponsor Group may be transferred amongst the Sponsor and Sponsor Group subject to the condition that lock-in on such units shall continue for the remaining period with the transferee and such transferee shall not be eligible to transfer such units till the lock-in period has expired.

Anchor Investor lock-in

Any Units Allotted to Anchor Investors in the Issue shall be locked-in for a period of 30 days from the date of Allotment.

Other Lock-In Requirements

Any person other than our Sponsor and Sponsor Group holding Units prior to the Issue, shall hold the Units for a period of not less than one year from the Listing Date.

USE OF PROCEEDS

The Issue

The gross proceeds of the Issue available to the Trust shall be up to ₹ 11,050.00 million and the net proceeds from the Issue will be up to ₹ [●] million ("**Net Proceeds**").

The Net Proceeds shall be utilised towards the following objects:

(i) partial or full acquisition (or as applicable, redemption) of securities of a) SRPL; and b) certain identified Project SPVs namely TEL, JSEL, Dhola and Dibang; and

(ii) general purposes;

The details of the Net Proceeds are set forth in the following table:

(₹ million)

S. No.	Particulars	Estimated Amount
1.	Gross proceeds of the Issue	11,050.00
2.	Expenses in relation the Issue	[●]
	Net Proceeds*	**[●]**

**To be determined upon finalization of the Issue Price*

Requirement of Funds

The Net Proceeds are proposed to be utilised in accordance with the following details:

(₹ in million)

S. No.	Particulars	Estimated Amount
1.	Partial or full acquisition (or as applicable, redemption) of securities of a) SRPL; and b) certain identified Project SPVs namely TEL, JSEL, Dhola and Dibang	10,000.00
2.	General purposes*	[●]
	TOTAL	**[●]**

***To be updated in the Final Offer Document prior to filing with SEBI and the Stock Exchange.*

The fund requirements stated above, and the proposed deployment, are based on the estimates of the Investment Manager and have not been appraised by any bank, financial institution or any other external agency. The fund requirements may vary, including due to factors beyond the control of the Investment Manager, such as market conditions, competitive environment, interest rate and exchange rate fluctuations. Consequently, the fund requirements are subject to revisions, in the future, at the discretion of the Investment Manager.

Details of Utilization of the Net Proceeds

The details of utilization of Net Proceeds are set forth below:

1. Partial or full acquisition (or as applicable, redemption) of securities of a) SRPL; and b) certain identified Project SPVs namely TEL, JSEL, Dhola and Dibang

The Net Proceeds amounting to ₹ 10,000.00 million are proposed to be utilized by the Trust to partially or fully acquire, or as applicable, redeem (in case of NCDs) the following securities issued by a) SRPL; and b) certain identified Project SPVs namely TEL, JSEL, Dhola and Dibang, comprising equity shares, compulsorily convertible preference shares, compulsorily convertible debentures, and non-convertible debentures (collectively, "**Securities**") from EIYP:

S. No.	Name of Holdco/ Project SPV	Details of Securities proposed to be acquired/ redeemed using the Net Proceeds	Amount outstanding in respect of compulsorily convertible debentures and non-convertible debentures, as applicable, as on March 24, 2026 (*₹ in million*)
1.	**SRPL**	100% of the issued, subscribed paid-up equity share capital of SRPL.	NA
		Up to all compulsorily convertible debentures issued by SRPL as of the date of filing of this Offer Document.	2,235.70
2.	**TEL***	100% of the issued, subscribed paid-up equity share capital of TEL.	NA
		100% of the issued, subscribed and paid-up compulsorily convertible preference shares of TEL	NA

S. No.	Name of Holdco/ Project SPV	Details of Securities proposed to be acquired/ redeemed using the Net Proceeds	Amount outstanding in respect of compulsorily convertible debentures and non-convertible debentures, as applicable, as on March 24, 2026 (*₹ in million*)
		Certain unsecured non-convertible debentures issued by TEL as of the date of filing of this Offer Document.	5,766.88
3.	**JSEL**[*]	Certain unsecured non-convertible debentures issued by JSEL as of the date of filing of this Offer Document.	3,947.57
4.	**Dhola**[*]	Up to all non-convertible debentures issued by Dhola as of the date of filing of this Offer Document.	671.33
5.	**Dibang**[*]	Up to all non-convertible debentures issued by Dibang as of the date of filing of this Offer Document.	554.85

[*] *The fair value of the non-convertible debentures issued by TEL, JSEL, Dhola and Dibang which are proposed to be acquired by the Trust pursuant to the utilization of the Net Proceeds is ₹ 4,765.10 million, ₹ 2,384.45 million, ₹ 807.20 million and ₹ 674.63 million, respectively, as determined by MTC & Co. LLP, Chartered Accountants, pursuant to their reports dated April 8, 2026.*

Key terms of the compulsorily convertible preference shares issued by TEL ("TEL CCPS") are as follows:

i. **Face Value:** ₹ 10
ii. **Coupon Rate:** Nil
iii. **Dividend Preference:** Each financial year, each holder of the TEL CCPS shall not be entitled to any preferential dividend as the issued shares do not carry any such dividend.
iv. **Terms:**
- Any payment (including but not limited to dividend) for TEL CCPS shall be paid only after the restricted payment conditions of the senior lenders are fulfilled.
- Subject to applicable law, the TEL CCPS shall be freely transferable to the affiliates and infrastructure investment trust where EAAA India Alternatives Limited or its affiliates are investment manager, in full or in part, at all times. Subject to the prior written consent of senior lenders (if applicable), TEL CCPS are freely transferable at all times, in full or in part to any other person.
- Terms of Subordination: The CCPS are, and shall remain at all times, fully subordinated to the senior lenders.

Key terms of the compulsorily convertible debentures issued by SRPL ("SRPL CCDs") are as follows:

i. **Face Value:** ₹ 1,000
ii. **Nature of SRPL CCDs:** Unlisted
iii. **Interest:**
a. Non-cumulative interest not exceeding 18% per annum subject to maximum of operating cashflow surplus of SRPL as allowed by the senior lenders;
b. The term operating cashflow surplus shall mean the balance in the profit and loss statement of SRPL before the payment of coupon on SRPL CCDs, all applicable taxes payable on the income of SRPL and depreciation/amortisation charges but after payment of all other expenses and interest;
c. Where in a financial year, SRPL has sufficient operating cashflow surplus, it shall pay interest at lower of operating cashflow surplus or 18% per annum on the face value of the CCDs;
d. Where in a financial year, SRPL has no operating cashflow surplus, it would not be necessary to pay interest on the SRPL CCDs;
e. The interest shall be payable on semi-annual basis within sixty days from the end of the half financial year. In the event of conversion of SRPL CCDs on or before the maturity date, the interest for the period commencing from the beginning of the half financial year till conversion date shall be payable within sixty days from the end of the half financial year in which conversion took place.
iv. **Security:** Unsecured
v. **Tenure:** Ranges from March 28, 2029 to December 6, 2030
vi. **Conversion:** The SRPL CCDs shall be convertible at the option of the holder according to the following terms:
a. At any time after a period of 3 months from date of allotment and before expiry of tenure, after giving a notice of seven working days to SRPL;
b. Remaining outstanding SRPL CCDs shall be converted into equity shares of SRPL at the end of the tenure.
c. Each SRPL CCD of ₹ 1,000 each shall be converted into 100 equity shares of ₹ 10 each of SRPL.

Key terms of the unsecured non-convertible debentures issued by TEL, JSEL, Dhola and Dibang ("NCDs") are as follows:

i. **Face Value:** ₹ 1,000
ii. **Interest:** 9% - 16%
iii. **Tenure:** Ranges from March 31, 2026 to March 31, 2032
iv. **Nature of NCDs:** Unrated, unlisted
v. **Security:** Unsecured
vi. **Transferability:** The TEL NCDs and JSEL NCDs are freely transferable. Further, the Dhola NCDs and the Dibang NCDs subject to applicable law and the other provisions as per the termsheet, shall be freely transferable to the affiliates and an infrastructure investment trust where EAAA India Alternatives Limited or its subsidiary is an investment manager, in full or in part, at all times. Subject to the prior written consent of rupee lenders (if applicable), NCDs are freely transferable at all times, in full or in part to any other person.
vii. **Redemption:** Shall be redeemable either in full or in part as per the following terms:
    a. Out of cash surplus of the issuer, upon satisfaction of the restricted payment conditions; or
    b. With prior written consent of the senior debt lender and approval of the holders of the NCDs, or
    c. For TEL, on final redemption date after satisfaction of restricted payment conditions provided under the financing documents and/or as allowed by the senior debt lender, if required.

All of the Securities as set out above, which are proposed to be acquired, or as applicable, redeemed (in case of NCDs) in full or in part by the Trust utilizing the Net Proceeds, are fully paid-up. For further details in relation to the capital structure of SRPL, TEL, JSEL, Dhola and Dibang as of the date of this Offer Document, please see "*Formation Transactions in relation to the Trust*" and "*Business*" on page 26 and 240 respectively.

The Net Proceeds are proposed to be utilized by the Trust to partially or fully acquire, or redeem (in case of NCDs) the Securities pursuant to the: (i) securities purchase agreement entered into amongst SRPL, EIYP, Investment Manager, Sponsor and Trust on April 7, 2026; (ii) securities purchase agreement entered into amongst TEL, EIYP, Investment Manager, Sponsor and Trust on April 7, 2026; (iii) debenture transfer agreement entered into amongst JSEL, EIYP, Investment Manager and Trust on April 7, 2026; (iv) debenture transfer agreement entered into amongst TEL, EIYP, Investment Manager and Trust on April 7, 2026; (v) debenture transfer agreement entered into amongst Dhola, EIYP, Investment Manager and Trust on April 7, 2026; and (vi) debenture transfer agreement entered into amongst Dibang, EIYP, Investment Manager and Trust on April 7, 2026. All Securities, shall be transferred in accordance with the terms of the Securities Purchase Agreements or the Debenture Transfer Agreements, as the case may be. For details in relation to these agreements, including key terms and consideration to be paid for the acquisition of Securities, please see "*Related Party Transactions – Present and on-going Related Party Transactions*" and "*Financial Indebtedness and Deferred Payments – Debenture Transfer Agreement(s)*" on pages 419 and 368 respectively.

The acquisition, or redemption, as applicable, of Securities as described above to the extent that is undertaken through the utilization of Net Proceeds, shall be undertaken simultaneously with the consummation of Formation Transactions and prior to the Allotment. The payment of consideration for the acquisition or redemption, as applicable, of Securities pursuant to the utilization of the Net Proceeds shall be post-Listing, in accordance with applicable law. The aforementioned equity shares, compulsorily convertible debentures and compulsorily convertible preference shares shall be acquired prior to the acquisition or redemption of the aforementioned non-convertible debentures. Further, in the event that the Trust is not able to acquire or redeem, as applicable, part of the non-convertible debentures set out above in addition to the utilization of the Net Proceeds, due to any factors including market conditions, competitive environment, interest rate and exchange rate fluctuations or shortfall in the Net Proceeds, then the non-convertible debentures shall be acquired, or redeemed, as applicable, by the Trust in a manner compliant with applicable law, including but not limited to direct acquisition of non-convertible debentures and/ or through infusion of debt by the Trust into the above identified Project SPVs, which shall be subject to the nature, quantum and terms of the external financing availed by the Trust, and the terms on which the debt is infused into the relevant Project SPVs on the basis of the external financing. The external debt proposed to be utilized in this manner shall be availed by the Trust from external sources in compliance with applicable law subsequent to the listing, and to the extent and within the limits permitted under the SEBI InvIT Regulations (*i.e.*, upto 49% of the aggregate value of the InvIT Assets, or, subject to the compliance with such conditions and receipt of such approvals, as may be required under applicable law, including the SEBI InvIT Regulations, 70% of the aggregate value of the InvIT Assets, as the case may be). For details in relation to the Trust Loan Agreement, please see "*Financial Indebtedness and Deferred Payments – Trust Loan Agreement*" on page 369. The extent of Securities to be acquired in case of each of the entities set out above which are to be acquired through the Net Proceeds in this case, shall be determined by the board of the Investment Manager, after taking into consideration all relevant factors.

2. General purposes

In terms of the InvIT Regulations, the Investment Manager shall, at its discretion, deploy the balance Net Proceeds (excluding the Issue Expenses) aggregating up to ₹ [●] million towards general expenses for the operation of the Trust, subject to such utilization not exceeding 10% of the Net Proceeds, in compliance with the InvIT Regulations. The general purposes for which the Trust proposes to utilize Net Proceeds include meeting exigencies and expenses incurred in the ordinary course of business. In addition, the Trust may utilize the Net Proceeds towards other expenditure (in the ordinary course of business) considered expedient and as approved by the Investment Manager or the Trustee, as the case may be, subject to compliance with applicable law.

In case of a shortfall in Net Proceeds, the Investment Manager may, in compliance with the InvIT Regulations, have the flexibility to meet such shortfall including, by utilizing the internal accruals of the Trust or borrowings from lenders. The Investment Manager, in accordance with the Investment Objectives of the Trust, policies of its board of directors of the Investment Manager and the InvIT Regulations, will have flexibility in utilizing any surplus amounts.

Issue Expenses

The total expenses of this Issue are estimated to be approximately ₹ [●] million ("**Issue Expenses**"). The Issue Expenses will consist of fee and commissions payable to the Lead Managers, fee payable to legal counsels, fee payable to Escrow Collection Bank and Registrar, fee payable to Trustee, Valuer, SEBI (filing of the offer documents), Technical Consultants, Auditor and such other intermediaries, printing and stationary costs, and all other incidental and miscellaneous expenses for undertaking the Formation Transactions and for listing the Units on the Stock Exchanges. The Issue Expenses shall be borne by the Trust. The break-up for the Issue Expenses is as follows:

(₹ in million)

Activity	Estimated Expenses*	As a % of the total estimated Issue Expenses*	As a % of the total Issue Size*
Fee and commission to advisors to this Issue	[●]	[●]	[●]
Fee payable to others	[●]	[●]	[●]
Total estimated Issue Expenses	[●]	[●]	[●]

**To be determined on finalization of the Issue Price and updated in the Final Offer Document prior to filing with SEBI and the Stock Exchanges.*

For ease of operations, if required, the expenses in relation to the Issue as stated above, at the outset, may be borne by the Sponsor and/or the Investment Manager and/or such other parties on behalf of the Trust, and the Investment Manager (on behalf of the Trust) agrees that it will reimburse the Sponsor and/or the Investment Manager and/ or such other parties for all such expenses as may be incurred by the Sponsor or the Investment Manager on actual basis, from the Issue Expenses or the future cash flows of the Trust. In the event the actual Issue Expenses differ from the estimated Issue Expenses, the Investment Manager will have the flexibility to utilize such a difference, subject to applicable law.

Any changes in the utilization of Net Proceeds, shall be made by the Investment Manager in accordance with applicable law and in compliance with InvIT Regulations.

Selling Commissions

Selling commission payable to the SCSBs on the portion for non-institutional bidders which are directly procured and uploaded by the SCSBs, would be as follows:

Non-Institutional Bidders*	0.50% of the Amount Allotted* (plus applicable taxes)

**Amount allotted is the product of the number of Units allotted and the Issue Price*

Selling commission payable to the SCSBs will be determined on the basis of the bidding terminal id as captured in the Bid book of BSE or NSE. No processing fees shall be payable by the Investment Manager to the SCSBs on the applications directly procured by them.

Processing fees payable to the SCSBs of ₹10 per valid application (plus applicable taxes) for processing the Bid cum Application Form for non-institutional bidders (excluding UPI Bids) which are procured by the members of the Syndicate/sub-Syndicate/Registered Broker/RTAs/CDPs and submitted to SCSB for blocking.

Brokerage, selling commission and processing/uploading charges on the portion for linked online trading, demat & bank account provided by some of the brokers which are members of Syndicate (including their sub-syndicate members) would be as follows:

Portion for Non-Institutional Bidders*	0.50% of the Amount Allotted* (plus applicable taxes)

**Amount allotted is the product of the number of Units allotted and the Issue Price*

The selling commission payable to the Syndicate/sub-Syndicate members will be determined on the basis of the application form number/series, provided that the application is also bid by the respective Syndicate/sub-Syndicate member. For clarification, if a Syndicate ASBA application on the application form number/series of a Syndicate/sub-Syndicate member, is bid by an SCSB, the selling commission will be payable to the SCSB and not the Syndicate/sub-Syndicate member.

Uploading charges payable to members of the Syndicate (including their sub-Syndicate members), RTAs and CDPs on the applications made by Bidders using 3-in-1 accounts/Syndicate ASBA mechanism which are procured by them and submitted to SCSB for blocking would be as follows:

₹10 plus applicable taxes, per valid application bid by the Syndicate (including their sub-Syndicate members), RTAs and CDPs.

The selling commission and bidding charges payable to Registered Brokers, the RTAs and CDPs will be determined on the basis of the bidding terminal id as captured in the bid book of BSE or NSE.

Selling commission/uploading charges payable to the Registered Brokers on the portion for non-institutional bidders which are directly procured by the Registered Broker and submitted to SCSB for processing, would be as follows:

Portion for Non-Institutional Bidders*	₹10 per valid application (plus applicable taxes)

**Based on valid applications*

Uploading charges/Processing fees for applications made by UPI Bidders using the UPI Mechanism would be as under:

Members of the Syndicate/RTAs/CDPs/Registered Brokers	₹30 per valid application (plus applicable taxes)
Sponsor Bank (s)	NIL per valid application (plus applicable taxes) for Axis Bank Limited and ICICI Bank Limited

Processing fees for applications made by UPI Bidders using the UPI mechanism for each valid Bid cum application form. The Sponsor Banks shall be responsible for making payments to the third parties such as remitter bank, NPCI and such other parties as required in connection with the performance of its duties under the SEBI circulars, the Syndicate Agreement and other applicable laws.

All such commissions and processing fees set out above shall be paid as per the timelines in terms of the Syndicate Agreement and the Cash Escrow and Sponsor Bank Agreement.

The total uploading charges / processing fees payable to members of the Syndicate, RTAs, CDPs, Registered Brokers will be subject to a maximum cap of ₹5.00 million (plus applicable taxes). In case the total uploading charges/processing fees payable exceeds ₹5.00 million, then the amount payable to members of the Syndicate, RTAs, CDPs, Registered Brokers would be proportionately distributed based on the number of valid applications such that the total uploading charges / processing fees payable does not exceed ₹5.00 million. All such commissions and processing fees set out above shall be paid as per the timelines in terms of the Syndicate Agreement and Cash Escrow and Sponsor Bank Agreement.

The processing fee for applications made by UPI Bidders using the UPI mechanism may be released to the remitter banks (SCSBs) only after such banks provide a written confirmation on compliance with SEBI circular no. SEBI/HO/CFD/DIL2/CIR/P/2022/51 dated April 20, 2022 read with SEBI Circular No. SEBI/ HO/CFD/DIL2/P/CIR/2021/570 dated June 2, 2021 and SEBI Circular No. SEBI/HO/CFD/DIL2/CIR/P/ 2021/2480/1/M dated March 16, 2021.

Retention of oversubscription in the Issue, if any

The Investment Manager, in consultation with the Lead Managers, reserves the right to retain oversubscription of up to 25% of the Issue Size in accordance with the InvIT Regulations. In the event that the Investment Manager, in consultation with the Lead Managers, exercises the aforesaid right, the proceeds from the Allotment pursuant to such oversubscription shall be utilized in a manner that is proportional to the proposed utilization of the Net Proceeds and towards the same objects. However, in compliance with the InvIT Regulations, proceeds from the Allotment pursuant to such oversubscription shall not be utilized towards general purposes.

FINANCIAL INDEBTEDNESS AND DEFERRED PAYMENTS

The following is a summary of the indebtedness of the Initial Portfolio Assets as on March 24, 2026, together with a brief description of certain material covenants of the relevant financing agreements. For additional details, Investors should also refer to "Use of Proceeds" on page 356.

The Project SPVs have primarily availed loans and other financing arrangements including the issue of certain non-convertible debentures, amongst others, for refinancing or take-over of the existing loans or indebtedness sanctioned and availed as on the closing date, for their respective projects to the extent outstanding, or repayment or redemption of the outstanding amounts under the existing NCDs. Certain Project SPVs have availed loans to meet the major maintenance expenditure, transaction related costs and for creation of contingency reserve account and major maintenance reserve.

The details of indebtedness of the Trust and the Initial Portfolio Assets as at March 24, 2026 together with a brief description of certain material covenants of the relevant financing agreements, are provided below:

(₹ in million)

Category of borrowing	Pre-Issue Principal Amount outstanding, as on March 24 2026*	Post-Issue Principal Amount outstanding^
Epic 3		
Secured borrowings	Nil	[●]
Unsecured borrowings	2,000.00	[●]
Total Borrowings	2,000.00	**[●]**
Dhola		
Secured borrowings	1,824.50	[●]
Unsecured borrowings	671.33	[●]
Total Borrowings	**2,495.83**	**[●]**
Dibang		
Secured borrowings	1,511.36	[●]
Unsecured borrowings	968.91	[●]
Total Borrowings	**2,480.27**	**[●]**
TEL		
Secured borrowings	6,500.00	[●]
Unsecured borrowings	7,136.88	[●]
Total Borrowings	**13,636.88**	**[●]**
JSEL		
Secured borrowings	2,984.40	[●]
Unsecured borrowings	3,947.57	[●]
Total Borrowings	**6,931.97**	**[●]**
AMTPL		
Secured borrowings	6,584.28	[●]
Unsecured borrowings	2,805.55	[●]
Total Borrowings	**9,389.83**	**[●]**
DTPL		
Secured borrowings	9,052.81	[●]
Unsecured borrowings	2,694.16	[●]
Deferred premium liability	8,717.09	[●]
Total Borrowings	**20,464.06**	**[●]**
SRTPL		
Secured borrowings	6,589.29	[●]
Unsecured borrowings	Nil	[●]
Total Borrowings	**6,589.29**	**[●]**
RVTPL		
Secured borrowings	1,561.80	[●]
Unsecured borrowings	3,501.57	[●]
Total Borrowings	**5,063.37**	**[●]**
PECPL		
Secured borrowings	Nil	[●]
Unsecured borrowings	1,677.16	[●]
Total Borrowings	**1,677.16**	**[●]**
SBGTPL		
Secured borrowings	Nil	[●]
Unsecured borrowings	1,096.87	[●]

Category of borrowing	Pre-Issue Principal Amount outstanding, as on March 24 2026[*]	Post-Issue Principal Amount outstanding[^]
Deferred premium liability	11,596.96	[●]
Total Borrowings	**12,693.83**	**[●]**
SRPL		
Secured borrowings	Nil	[●]
Unsecured borrowings	2,235.70	[●]
Total Borrowings	**2,235.70**	[●]
Total	**85,658.20**	**[●]**

[^] Will be determined upon completion of the Issue. To be updated in the Final Offer Document prior to filing with SEBI and the Stock Exchanges.

**All balances are actual outstanding balances without considering Ind AS adjustments. In addition to the above, the Initial Portfolio Assets may, from time to time, enter into financing / refinancing arrangements / draw down funds thereunder, prior to the filing of this Offer Document and within the limits prescribed under the InvIT Regulations.*

Principal terms of the borrowings availed by the Project SPVs (except JSEL and TEL) from external lenders:

1. **Interest and commissions:** The facilities availed by the Project SPVs typically have a benchmark floating rate of interest specified by the lender (MCLR) plus an applicable spread which may be altered by the lender upon occurrence of events specified in the financing agreements, interest tax and other statutory levies, payable monthly. The applicable spread varies amongst different loans and is subject to reset in a manner specified in the relevant financing agreements.

2. **Maturity and Repayment:** The maturity period of the loans availed by Project SPVs range from 5 years and 4 months to 12 years and 8 months. These loans are repayable in structured quarterly or semi-annual installments, as applicable, or in accordance with the repayment schedule specified in the relevant financing agreements.

3. **Voluntary Pre-Payment/ Repayment Terms:** Certain of the Project SPVs have the right to voluntarily prepay all or part of the outstanding amounts, subject to payment of a prepayment premium, which is typically 1% to 2% of the amount proposed to be repaid. Certain of the Project SPVs have the right to prepay all or part of the outstanding amounts without payment of a prepayment premiums on the occurrence of certain events specified in the relevant facility agreement. Further, certain facility agreements have provisions for mandatory prepayment of the entire amount outstanding, without payment of prepayment premium, on the receipt of monies pursuant to occurrence of certain mandatory prepayment events such as receipt of any insurance proceeds to the extent not applied for reinstating the project assets, proceeds resulting from arbitral or judicial award in connection with any project agreement, proceeds from sale/ transfer/ disposal of the project assets, any termination payment made by the authority in accordance with the respective Concession Agreements of the relevant Project SPVs, any liquidated damages in connection with penalties, breach of warranty or guarantee under any project documents, cancellation of any clearances which may have a material effect on the Project or change in control has occurred without prior written consent of the lenders, subject to the terms specified in the relevant financing agreements. As on date of this Offer Document, such Project SPVs have intimated its lenders about direct or indirect change of shareholding or control of the Project SPVs or the holding company/ sponsor of the Project SPVs, undertaking any permitted indebtedness and repayment, prepayment or redemption, as the case may be, of the loans availed from other lenders and such other actions as mentioned in the intimation letters.

4. **Security:** Where the security needs to be created in terms of the debt facilities availed, the Project SPVs are typically, inter alia, required to create:

   (a) first ranking *pari passu* charge by way of mortgage on all immovable properties and assets of the Project SPVs;

   (b) first ranking *pari passu* charge on all movable assets of the Project SPVs;

   (c) first ranking *pari passu* charge on all current assets of the Project SPVs;

   (d) first ranking *pari passu* charge on all the bank accounts of the Project SPVs including but not limited to the escrow account that may be opened pursuant to the transaction documents;

   (e) first ranking *pari passu* charge on all project receivables, revenues, operating cash flows, all

intangible assets of the Project SPVs;

(f) first ranking *pari passu* charge by way of hypothecation or assignment over:

1) all the rights, title, interests, benefits, claims and demands whatsoever of the Project SPVs in the project documents;

2) all the rights, title, interests, benefits, claims and demands of the Project SPVs in, to and under all the clearances, to the extent permissible by Applicable Law;

3) all the rights, title, interests, benefits, claims and demands whatsoever of the Project SPVs in any letter of credit, guarantee (including contractor guarantees), and liquidated damages and performance bond provided by any party under the Project Documents, both present and future; and

4) all the rights, title, interests, benefits, claims and demands whatsoever of the Project SPVs under all insurance contracts procured by the Project SPVs or procured by any of the contractors for the benefit of the Project SPVs;

(g) pledge over the securities of the Project SPVs as per the terms of the respective loan documents; and

(h) assignment of rights, title and interest under the Concession Agreement of the respective Project SPVs in favor of the representative of the lender.

5. Restrictive Covenants: Borrowing arrangements entered by the Project SPVs contain certain restrictive conditions and covenants restricting certain corporate actions and the respective Project SPV is required to take prior approval of the lender or their agent as the case may be, before carrying out such activities. The negative covenants in the facility documents in relation to the Project typically include:

(i) not contract, create, incur, assume or suffer to exist any indebtedness or accept deposits except for the indebtedness permitted under the transactions documents;

(ii) not make any restricted payments, including but not limited to, declaration or payment of any dividends;

(iii) not to make modifications to the memorandum of association or articles of association of the respective Project SPV except as permitted under the facility documents;

(iv) not to make a drastic change in management of the Project SPV except as permitted under the facility documents;

(v) not agree to, create, incur, assume or suffer to exist any security interest upon or with respect to any property, revenues or assets of the Project SPVs, other than the permitted security interest;

(vi) not transfer or abandon or agree to transfer or abandon the project;

(vii) shall not make or agree to amend or make any amendment of, or grant any waiver in respect of, modify any provision or grant any waiver of the financing documents, terminate any of the financing documents, or assign or otherwise dispose of any of its interests under the financing documents;

(viii) not undertake any new project, augment, modernize, expand, acquire any fixed assets if such investment results in a breach of the financial covenants or diversion of working capital funds for financing long term assets;

(ix) not change its capital structure or the shareholding pattern or dilute the controlling stake of Project SPVs; and

(x) not pledge shares of the Project SPVs.

6. **Events of Default:** The borrowing arrangements entered by the Project SPVs contain standard events of default, including but not limited to the following:

(a) Default in payment or any repayment of installments or interest payment or any sums payable to the lenders on respective due dates or;

(b) Any default under any of the financing documents and concession agreements ;

(c) Downgrade of credit rating of Project SPVs below the stipulated level in the respective facility agreements;

(d) Default in performance of covenants and conditions under the financing documents;

(e) Abandonment or cessation of title to or right to possess and use all of the project site of the respective Project SPVs;

(f) Any event occurs which could have a material adverse effect;

(g) Failure to the borrower to ensure the routing of all receivables arising from the project through the escrow account;

(h) Any order or action by the court or any governmental authority against all or any part of the property of the Project SPVs;

(i) Default in payment of amount due under any judgements or decrees entered against any Project SPVs;

(j) Cross default by Project SPVs;

(k) Default in creation or perfection of security interests within the time period as specified in the facility agreement of the respective Project SPVs;

(l) Termination or invalidation of respective financing agreements of Project SPVs;

(m) Illegality and repudiation of any obligation under any financing document or Concession Agreement by person other than the secured parties;

(n) Any event of default occurs under the respective Concession Agreement of Project SPVs;

(o) Cessation of the business of the Project SPVs other than due to a force majeure event;

(p) Breach of any applicable law by Project SPVs that may lead to occurrence of any event of default under respective facility agreement;

(q) Default in obligations under undertakings provided by the sponsor or the acquirer under any financing documents;

(r) Failure to maintain debt service reserve account according to the stipulated level in the financing documents;

(s) Failure to maintain and comply with any clearances required for completion or continuation of the project of respective Project SPVs;

(t) Supply of misleading representation or warranty or information by Project SPVs in any financing document;

(u) Failure to maintain insurance required under the insurance contract of the respective Project SPVs;

(v) Occurrence of a force majeure event which has not been reported in the stipulated time period in the facility agreement of the Project SPVs;

(w) Insolvency or winding up or bankruptcy or dissolution of the Project SPVs;

(x) Change in control or ownership of the Project SPVs;

(y) Sale, disposal and removal of project assets by Project SPVs;

(z) Inability of Project SPVs to pay debts;

(aa) Opening of any account other than specified in the facility agreement of certain Project SPVs;

(bb) Institution of any administrative, regulatory and judicial action, suit, proceeding or any other claim in relation to environmental compliance against certain Project SPVs or in relation to the Project;

(cc) Deviation from the levels stipulated in the financial covenant under the facility agreement for certain Project SPVs; and

(dd) Misutilization of proceeds of the facility.

7. **Consequences of default**: In terms of the borrowing arrangements entered into by the Project SPVs, the following, amongst others, are the consequences of default:

(i) Acceleration of repayment obligations and declaration of amounts outstanding to be forthwith due and payable;

(ii) Enforcement of security interests;

(iii) Novation and/or transfer the respective facility and/or any obligations thereunder;

(iv) Exercise of other remedies as permitted or available under the facility agreement of the respective Project SPV;

(v) Appointment of one nominee director on the board of directors of the respective Project SPV;

(vi) Conversion of whole or part of the defaulted amounts of the loan into fully paid-up shares of the relevant Project SPV;

(vii) Reconstitution of the board of directors of Project SPV RVTPL with sufficiently qualified or experienced persons and appointment of whole time directors to the board of Project SPV RVTPL, as may be satisfactory to the respective lenders; and

(viii) Substitute or restructure or review or strengthen the management set up, in relation to Project SPV RVTPL, as may be satisfactory to the respective lenders.

This is an indicative list of the terms of the borrowings availed by the Initial Portfolio Assets and there may be additional terms, conditions and requirements under the various borrowing arrangements entered into by the Initial Portfolio Assets. Given the nature of these borrowings and the terms of prepayment, the aggregate outstanding borrowing amounts may vary from time to time.

Principal terms of the non-convertible debentures issued by JSEL

Sr. No.	Parameter	Description
1.	**Issuer**	Jorabat Shillong Expressway Limited
2.	**Coupon rate**	JSEL shall pay the coupon rate ranging between 8.30% to 8.45% per annum
3.	**Mode of issuance**	Private placement
4.	**Nature of debentures**	Secured debentures
5.	**Issue amount/ issue size**	Up to ₹6,412.00 million of face value of ₹0.10 million (series I) and up to ₹2,421.6 million of face value of ₹0.10 million (series II) aggregating up to ₹ 8,833.60 million
6.	**Purpose**	To be utilized towards refinancing the existing financial debt and other general purposes.
7.	**Tenor**	Up to 12.5 years from deemed date of allotment for each series
8.	**Permitted indebtedness**	Any indebtedness pursuant to the debenture documents; including any working capital facilities availed by the issuer in connection with the project and any indebtedness availed from the sponsor or its affiliates for the

Sr. No.	Parameter	Description
		purposes specified in the debenture documents.
9.	**Events of default and consequences of events of default**	Events of default typically include: a. non-payment of monies due in respect of coupon repayment or installment; b. breach of financial covenants; c. breach of any undertaking by the sponsor; d. insolvency or winding up or dissolution; and e. misrepresentation. Consequences of events of default typically include: a. Acceleration of repayment or maturity; b. Conversion of shareholding of the sponsor in JSEL to equity; c. enforcement of security under the security documents; and d. exercise all rights and availment of such other remedies as may be available to the debenture holders under the transaction documents in relation to project.
10.	**Governing law**	Indian and jurisdiction to be Mumbai

Principal terms of the unsecured non-convertible debentures issued by AMTPL, TEL, PECPL and RVTPL

Sr. No.	Parameter	Description
1.	**Issuers**	Ahmedabad-Maliya Tollways Private Limited, Thrissur Expressway Limited, Rajkot – Vadinar Tollway Private Limited and Panipat Elevated Corridor Private Limited.
2.	**Coupon rate**	Ranging from 8.5% to 12% on the outstanding value of the NCDs payable on half yearly basis
3.	**Face value**	₹1,000/- per NCD
4.	**Nature of debentures**	Unsecured, unrated and unlisted. Subordinated to the facility granted by the senior debt lender.
5.	**Purpose**	NCDs are being issued to convert the inter-corporate deposits availed by the Company on account of financial restructuring, to create reserves as required by the senior debt lender, for repayment of loans (whole or in part), upgradation of a section of the Issuer (AMTPL) including maintenance of the above section and other general corporate purposes.
6.	**Tenor**	From March 31, 2026 to September 30, 2036 or such extended term as may be mutually agreed between the Issuers and the holder of NCDs or with the prior written consent of the debenture holder (“**Final Redemption Date**”)
7.	**Subordination**	NCDs shall be subordinated to the senior debt lender's facility, including in terms of tenor, security (where permitted by the senior debt lender in writing) and rights relating to acceleration. NCDs shall also adhere to all conditions set forth in the financing documents executed with secured lenders.
8.	**Redemption**	Redeemable at the option of the Issuers, either in full or in part: a) out of cash surplus after satisfaction of restricted payment conditions and/or as allowed by senior debt lender, subject to terms of Concession Agreement and Escrow Agreement; b) with prior written consent of senior debt Lender and approval of debenture holder; or c) on Final Redemption Date after satisfaction of restricted payment conditions and/ or as allowed by the senior debt lender, if required. The Issuers shall redeem NCDs by providing a written redemption notice to the debenture holder. Redemption shall be completed within 5 days from receipt of acknowledgement of the redemption notice.

Principal terms of the secured non-convertible debentures issued by TEL

Sr. No.	Parameter	Description
1.	**Issuers**	Thrissur Expressway Limited
2.	**Mode of Issuance**	Private placement basis, at par, in dematerialized form
3.	**Coupon rate**	7.50% per annum, payable quarterly

Sr. No.	Parameter	Description
4.	**Face value**	₹1,00,000 per debenture
5.	**Nature of debentures**	Senior, secured, unlisted, unrated and redeemable
6.	**Purpose**	The proceeds of the issue of debentures shall be utilised for repayment of existing senior debt availed by the Issuer (together with accrued interest) and meeting transaction-related expenses incurred in connection with the issuance of debentures.
7.	**Issue size**	Not exceeding 65,000 NCDs of face value of Rs. 1,00,000 each, aggregating to an amount of ₹ 650,00,00,000
8.	**Tenor**	Upto August 31, 2030 through structured quarterly installment repayment for total borrowings.
9.	**Security**	The debentures shall be secured on a first pari passu basis with other senior, secured debentures forming part of total borrowings over the following assets (subject to the Concession Agreement) but excluding project assets: (i) all movable assets (current and non-current) of the Issuer, present and future; (ii) all bank accounts (including Debt Service Reserve Account, excluding distribution account) of the Issuer; (iii) all project receivables, revenues, operating cash flows, all intangible assets including goodwill, undertaking and uncalled capital, present and future; (iv) all rights, titles, benefits, claims and demands under project documents; (v) assignment of all applicable insurance policies (other than for project assets); (vi) pledge of 51% equity shares of the Issuer held by the existing sponsor and any assignment or novation thereto till Fund Life End Date. Entire security to be created and perfected within 90 days from the deemed date of allotment.
10.	**Call option**	The Issuer shall after the expiry of two years from the deemed date of allotment have the option to redeem, the Debentures, without any penalty/premium
11	**Governing law**	Indian

Principal terms of the compulsorily convertible debentures issued by Epic 3 and TEL

Sr. No.	Parameter	Description
1.	**Issuers**	Epic Concesiones 3 Private Limited and Thrissur Expressway Limited
2.	**Mode of issuance**	Preferential basis, at par, in one or more tranches.
3.	**Nature of debentures**	Unsecured, subordinated, unrated, and shall not be listed.
4.	**Issue amount/ issue size**	***Epic 3*** Tranche I - 1,00,00,000 CCDs of face value ₹100 each, aggregating up to ₹100,00,00,000 and issued in minimum lot size of ₹25 crores. Tranche II - 1,00,00,000 CCDs of face value ₹100 each, aggregating up to ₹100,00,00,000. ***TEL*** 1,37,00,000 CCDs of face value ₹100 each, aggregating up to ₹137,00,00,000, issued in minimum lot sizes of ₹25 crores.
5.	**Purpose**	Capital structure optimization and other corporate requirements and to reduce total indebtedness of the Issuers before the stake of the Issuers is transferred by Edelweiss Infrastructure Yield Plus, existing shareholder of the Company, the Trust.
6.	**Tenor/ Conversion**	If the Trust launches its offer, the CCDs may be swapped in lieu of units of the Trust upon consummation of the formation transactions, under certain terms as mentioned in the debenture subscription agreement. Alternatively, the CCDs shall be converted into equity shares of the Issuers (unless refinanced or redeemed by the Issuers) at the end of 31st July 2028

Sr. No.	Parameter	Description
		or earlier at the option of TEL under certain terms as mentioned in the debenture subscription agreement. The outstanding accrued value will be converted into equity shares of Issuers considering the fair market value ("**FMV**") of Issuers on the date of conversion, as computed by an independent chartered accountant or registered valuer appointed by the Issuers. CCDs shall not convert into equity shares of Issuers in excess of 14% on a fully diluted basis.
7.	**Lock-in**	12 months on the Units (received in lieu of outstanding accrued value of the Instrument) from the date of listing of the Trust
8.	**Governing law**	Indian and exclusive jurisdiction to be Mumbai

Principal terms of the borrowings availed by the Initial Portfolio Assets from the Sponsor and Sponsor Group

The key terms of the SRPL CCDs include, *inter alia*, (i) face value of ₹ 1,000 each; (ii) unlisted and unsecured; (iii) non-cumulative interest not exceeding 18% per annum subject to maximum of operating cashflow surplus; (iv) tenure ranging from March 28, 2029 to September 25, 2035; (v) convertible at the option of the holder at any time after a period of three months from date of allotment and before expiry of tenure; and (vi) each CCD of ₹ 1,000 each being convertible into 100 equity shares of ₹ 10 each.

Further, certain of the Project SPVs, namely, RVTPL, SBGTL, DTPL and AMTPL have availed ICDs and unsecured borrowings from our Sponsor, Sponsor Group and in one instance, from another Initial Portfolio Asset, namely, Dibang has availed unsecured loans from SRPL, for the purposes of, *inter alia*, major maintenance expenditure, revenue share obligations and debt service obligations. The key terms of the ICDs include, *inter alia*, (i) tenure ranging from January 22, 2026 to October 12, 2031, or any other date as mutually agreed; (ii) unsecured borrowings, which are subordinated to senior debt, if any; (iii) annual coupon rate ranging from 8.5% to 16% on the outstanding value of the ICDs; (iv) ability to assign by each party subject to prior written consent of the other party. For further details in relation to the manner in which the abovementioned CCDs and ICDs are proposed to be acquired by the Trust, please see "*Related Party Transactions - Acquisition of the Initial Portfolio Assets by the Trust – Securities purchase agreements*" and "- *Debt obligations – Deed(s) of assignment*" on pages 419 and 369, respectively.

Further, there are certain NCDs issued by certain Initial Portfolio Assets to EIYP. For details, please see "*Use of Proceeds – Details of utilization of the Net Proceeds*" on page 356.

Further, PECPL, AMTPL and RVTPL have issued NCDs to the Sponsor Group, terms of which have been included above under "- *Principal terms of the non-convertible debentures issued by AMTPL, TEL, PECPL and RVTPL*" on page 367. For further details in relation to the manner in which the abovementioned NCDs are proposed to be acquired by the Trust, please see "- *Debt obligations – Debenture transfer agreement(s) – Swap consideration*" on page 370.

Proposed borrowings by the Trust

The Trust is proposing to avail certain indebtedness from an external lender pursuant to the sanction letter dated March 31, 2026 ("**External Financing**"). The key terms of such External Financing are as follows:

Sr. No.	Parameter	Description
a.	**Borrower**	Citius Transnet Investment Trust
b.	**Purpose of Facility**	Acquisition of equity shares/quasi-equity/any other instruments of the Initial Portfolio Assets/ payment to the Trust and for refinancing of existing debt, advancing loans to the Initial Portfolio Assets and any other purpose as specified in the aforementioned letter.
c.	**Security**	The Trust is, *inter alia*, required to create: a. A first pari passu charge over the current assets; b. Pledge of all equity shares/non-convertible debenture; and c. Assignment of loan and advances extended by the Trust to the Initial Portfolio Assets.
d.	**Prepayment Penalty**	The Trust can voluntarily prepay all or part of the outstanding amounts, subject to payment of a prepayment premium, as per the terms of the aforementioned letter and as mutually agreed between the parties.
e.	**Repayment schedule**	The Trust shall repay the indebtedness according to the repayment schedule

Sr. No.	Parameter	Description
	and Tenor	mentioned in the aforementioned letter within 12 years.
f.	**Interest Rate**	The External Financing shall carry an interest that may be decided by the parties.
g.	**Negative Covenants**	The Trust shall not, without the prior approval of the Lender, undertake the following activities, amongst others: i. Formulate any scheme of amalgamation. Merger, demerger or reconstruction in respect of the Trust or any of its SPVs, except as permitted under the aforementioned letter; ii. create any lien over or sell, transfer or dispose of, all or part of its assets, except as permitted under the aforementioned letter; iii. Transfer any controlling interest of Trust in the SPVs or appoint a new trustee, investment manager or project manager or change in sponsor; and iv. Trust shall obtain no objection certificate from the lender prior to dilution of holding of the Sponsor in the Trust; and v. All loans at the Initial Portfolio Assets to be liquidated and no loans to be availed by the Initial Portfolio Assets.
h.	**Events of Defaults**	Events of default include, amongst others: a. non-payment of monies due in respect of coupon repayment or installment; b. litigation which has any material adverse effect; c. breach of any undertaking by the sponsor; d. insolvency or winding up or dissolution; and e. breach of financial covenants.
i.	**Governing Laws and Jurisdiction**	Laws of India and jurisdiction to be courts of India

Debt obligations

Debenture Transfer Agreement(s)

Cash consideration

The debenture transfer agreement(s) ("**DTA(s) – Cash Consideration**") entered into with respect to the non-convertible debentures ("**NCDs**") respectively issued by JSEL, Dhola, Dibang and TEL, records the terms and conditions for the transfer of such NCDs from the existing debenture holder to the Trust, for an agreed consideration (*which shall be determined on the basis of fair value of the NCDs and in accordance with the formula set forth in the Debenture Transfer Agreements*), with all rights and benefits (*including principal, interest and redemption amounts*) vesting solely in the new debenture holder, *i.e.*, the Trust. Such consideration is to be paid out of the Issue proceeds, as detailed in, "*Use of Proceeds*" on page 356.

Swap consideration

The debenture transfer agreement(s) ("**DTA(s) – Swap Consideration**") entered into with respect to the NCDs respectively issued by AMTPL, TEL, PECPL and RVTPL, records the terms and conditions for the transfer of such NCDs from the existing debenture holder to the Trust, for issuance of such number of Units of the Trust (*determined in accordance with the formula set forth in the DTAs*), with all rights and benefits (*including principal, interest and redemption amounts*) vesting solely in the new debenture holder, *i.e.*, the Trust. For terms of such NCDs, please see "- *Principal terms of the non-convertible debentures issued by AMTPL, TEL, PECPL and RVTPL*" on page 367.

Deed(s) of Assignment

Certain specified inter-corporate loan(s)/ deposits ("**ICDs**") owed by few of our Project SPVs, namely, DTPL, AMTPL, SBGTPL and RVTPL to the Sponsor and Neelambur Madukkarai Tollway Private Limited (the "**Assignor(s)**"), as applicable, shall be assigned to the Trust through deeds(s) of assignment ("**DoA(s)**") entered into between the relevant Assignor, the Project SPV, the Trust and the Investment Manager. Pursuant to such deed of assignment, the Assignor shall assign and transfer all rights, title and interest in such ICDs owed by the relevant Project SPV to the Assignor, for issuance of such number of Units of the Trust (*determined in accordance with the formula set forth in the DoAs*) to the assignor. For details in relation to ICDs, please see "*Formation Transactions in relation to the Trust – Acquisition of the Initial Portfolio Assets by the Trust*" on

page 26.

Trust Loan Agreement

Upon the listing of the Units, the Investment Manager, acting on behalf of the Trust proposes to avail financing from external lenders in order to provide secured or unsecured loans, as the case maybe to the Project SPVs ("**Trust Loans**") through facility agreements proposed to be entered into between the Trustee (on behalf of the Trust), the Investment Manager, and the Project SPVs (the "**Trust Loan Agreements**").

The indicative terms of the proposed Trust Loan Agreements are set out below and may be subject to change and shall be finalised upon execution of such Trust Loan Agreements:

Sr. No.	Parameter	Description
a.	**Borrowers**	Project SPVs
b.	**Lender**	Citius TransNet Investment Trust
c.	**Purpose of Facility**	This facility is proposed to be utilized by the Project SPVs for full or partial pre-payment or repayment of its existing outstanding Debts and for incurring capital expenditure/ project cost, as specified in the Trust Loan Agreements.
d.	**Prepayment Penalty**	The Project SPV shall, at its discretion and at any time, during subsistence of the Trust Loan Agreement prepay all or a portion of the outstanding facility (along with accrued interest), subject to mutual agreement between the Trust and the Project SPV, without any prepayment penalty.
e.	**Repayment schedule and Tenor**	The Project SPV shall repay the principal amount of the facility to the Trust upon expiry of the term of Trust Loan Agreement, or as per the period as may be mutually agreed subject to any conditions as may be applicable on the Project SPV.
f.	**Interest Rate**	The Trust Loan shall carry an interest of upto 16% (sixteen per cent) per annum or such other rate as may be mutually agreed between the parties, which may be reset on interest reset date at the discretion of the Investment Manager (on behalf of the Lender).
g.	**Representations and Warranties**	Each relevant Project SPV has represented to the Trust that, amongst other things: i. it is a company, duly incorporated and validly existing under the laws of India and has all corporate powers and all material governmental licenses, authorizations, consents and approvals required to carry on its business; ii. it has materially complied with all Applicable Laws in relation to the conduct of its business and is not subject to any present, potential or threatened (in writing) liability by reason of non-compliance with such applicable law, which will have a material impact on the Project SPVs, its business or its obligations under the Trust Loan Agreement; and iii. each certified copy of a document provided to the Trustee or Investment Manager pursuant to the terms of the Transaction Documents (as defined in the Trust Loan Agreements) is a true, complete and accurate copy of the original document and the original document was in full force and effect, in each case as at the date any such document is provided.
h.	**Negative Covenants**	The Project SPVs shall not, without the prior approval of the Investment Manager (on behalf of the Lender): i. raise or incur any further indebtedness; ii. amend any of the Transaction Documents; and iii. create any lien over or sell, transfer or dispose of, all or part of its assets

Sr. No.	Parameter	Description
i.	**Events of Defaults**	The Trust Loan Agreement contain standard events of default affecting the Project SPVs, including: i. failure to pay any sum under the Trust Loan Agreement when the same becomes due and payable; ii. breach of covenants and undertakings set out in the Trust Loan Agreements or under the Transaction Documents; and iii. any change in ownership, control, shareholding of the borrower without the prior written approval of the Investment Manager. Upon occurrence of an event of default, the Trustee (in its capacity as trustee to the Lender) may (but not an obligation, subject to applicable law and without prejudice to any other rights it may have under applicable law) accelerate the repayment of term loan and all other amounts outstanding in relation thereto.
j.	**Governing Laws and Jurisdiction**	The Trust Loan Agreement shall in all respects be governed by and construed in accordance with Indian law. The Project SPVs agree that the courts and tribunals at Mumbai, shall have the jurisdiction to settle any disputes, legal action, suit or proceedings which may arise out of or in connection with the Trust Loan Agreement.

Leverage

In accordance with and subject to the InvIT Regulations, the provisions of the Trust Deed and the Borrowing Policy adopted by the Investment Manager, the aggregate consolidated borrowings and deferred payments of the Trust shall not exceed 70% of the aggregate value of the InvIT Assets. Further, the aggregate consolidated borrwings and deferred payments of the Trust shall not exceed 49% of the aggregate value of the InvIt Assets, unless the Trust complies or subject to compliance with such conditions and received such approvals, as may be required under applicable law, including InvIT Regulations.

Post-Issue Indebtedness of the Trust

Under the InvIT Regulations, the aggregate consolidated borrowings and deferred payments of the Trust shall not exceed 70% of the value of the InvIT Assets. If the aggregate consolidated borrowings and deferred payments of the Trust net of cash and cash equivalents exceed forty nine percent of the value of the Trust assets, for any further borrowings obtain the approval of unitholders in the manner InvIT Regulations.

Status of lender intimations

The Project SPVs have availed debt from external lenders and has intimated the respective lenders as required for and in connection with the Issue.

Borrowing Policy

The Investment Manager shall ensure that all funds borrowed by or in relation to the Trust and the Initial Portfolio Assets are in compliance with the InvIT Regulations. Accordingly, the Investment Manager has formulated a borrowing policy to outline the process for borrowing monies in relation to the Trust. For further details, please see "*Corporate Governance – Investment Manager – Policies of the Board of Directors of the Investment Manager in relation to the Trust – Borrowing Policy of the Trust*" on page 167.

DISTRIBUTION

Statements contained in this section that are not historical facts are forward-looking statements. Such statements are subject to certain risks and uncertainties that could cause actual results to differ materially from those that may be projected. Under no circumstances should the inclusion of such information herein be regarded as a representation, warranty or prediction with respect to the accuracy of the underlying assumptions by the Trustee, the Sponsor, the Investment Manager, the Lead Managers or any other person. Bidders are cautioned not to place undue reliance on these forward-looking statements that are stated only as at the date of this Offer Document. For details in relation to such forward-looking statements, please see "Forward-Looking Statements" on page 19.

The net distributable cash flows of the Trust (the "**Distributable Income**") are based on the cash flows generated from the underlying operations undertaken by the InvIT Assets. For details of the business and operations presently undertaken by the Trust Assets, please see "*Business*" on page 240. Presently, cash flows receivable by the Trust may be in the form of dividend, interest income or principal repayment received from the Trust Assets in relation to any debt sanctioned by the Trust, or a combination of all.

In terms of the InvIT Regulations, not less than 90% of the net distributable cash flows of the Initial Portfolio Assets, shall be distributed to the Trust in proportion of its holding in such Initial Portfolio Assets, subject to applicable provisions in the Companies Act, 2013, as amended, and not less than 90% of the net distributable cash flows of the Trust shall be distributed to the Unitholders.

Further, in terms of the InvIT Regulations, with regard to distribution of net distributable cash flows by any Holdcos and Project SPVs to the Trust, 100% of cash flows received by the Holdcos from underlying Project SPVs shall be distributed to the Trust (net of any expenses and applicable taxes including withholding taxes) and with respect to the cash flows generated by a Holdco on its own, not less than 90% of such net distributable cash flows shall be distributed by the Holdcos to the Trust.

Pursuant to the InvIT Regulations and the Distribution Policy, the Trust shall declare and distribute at least 90% of the Distributable Income to the Unitholders at least once every six months in every financial year and shall be made within five working days from the record date. However, if any infrastructure asset is sold by the Trust or the Project SPVs, or if the equity shares or interest in the Project SPVs are sold by the Trust; if the Trust proposes to re-invest the sale proceeds into another infrastructure asset, it shall not be required to distribute any sales proceeds to the Trust or to the Unitholders. Further, if the Trust proposes not to invest the sale proceeds into any other infrastructure asset within one year, it shall be required to distribute the same in the manner specified above. In accordance with the InvIT Regulations, distributions by the Trust shall be made within five working days from the record date, being two working days from the date of declaration of distribution, excluding the date of declaration and the record date. Any amount remaining unclaimed or unpaid out of the distributions declared by the Trust shall be transferred to the 'Investor Protection and Education Fund' constituted by SEBI, in such manner as may be specified by SEBI. For details on the risks relating to distribution, please see "*Risk Factors*" on page 64.

Distribution Policy

Method of calculation of Distributable Income

The Distributable Income of Trust shall be calculated in accordance with the InvIT Regulations and any circular, notification or guidance issued thereunder. Presently, Trust proposes to calculate distributable income in the manner provided below:

a. Calculation of net distributable cash flows at the HoldCo / SPV level:

Particulars
Cash flow from operating activities as per Cash Flow Statement of SPV
Add: Cash Flows received from SPV's which represent distributions of NDCF computed as per relevant framework (relevant in case of HoldCos)
Add: Treasury income / income from investing activities (interest income received from FD, tax refund, any other income in the nature of interest, profit on sale of Mutual funds, investments, assets etc., dividend income etc., excluding any Ind AS adjustments. Further clarified that these amounts will be considered on a cash receipt basis)
Add: Proceeds from sale of infrastructure investments, infrastructure assets or shares of SPVs or Investment Entity adjusted for the following: - Applicable capital gains and other taxes

Particulars
- Related debts settled or due to be settled from sale proceeds - Directly attributable transaction costs - Proceeds reinvested or planned to be reinvested as per Regulation 18(7) of InvIT Regulations or any other relevant provisions of the InvIT Regulations
Add: Proceeds from sale of infrastructure investments, infrastructure assets or sale of shares of SPVs or Investment Entity not distributed pursuant to an earlier plan to reinvest as per Regulation 18(7) of InvIT Regulations or any other relevant provisions of the InvIT Regulations, if such proceeds are not intended to be invested subsequently
Less: Finance cost on Borrowings as per Profit and Loss Account excluding finance cost on any shareholder debt/loan from trust. The amortization of any transaction costs can be excluded provided such transaction costs have already been deducted while computing NDCF of previous period when such transaction costs were paid
Less: Debt repayment (to include principal repayments as per scheduled EMI's except if refinanced through new debt including overdraft facilities and to exclude any debt repayments / debt refinanced through new debt, in any form or equity raise as well as repayment of any shareholder debt / loan from Trust)
Less: any reserve required to be created under the terms of, or pursuant to the obligations arising in accordance with, any: (i). loan agreement entered with banks / financial institution from whom the Trust or any of its SPVs/ HoldCos have availed debt, or terms and conditions, covenants or any other stipulations applicable to debt securities issued by the Trust or any of its SPVs/ HoldCos, or terms and conditions, covenants or any other stipulations applicable to external commercial borrowings availed by the Trust or any of its SPVs/ HoldCos, or agreement pursuant to which the SPV/ HoldCo operates or owns the infrastructure asset, or generates revenue or cashflows from such asset (such as, concession agreement, transmission services agreement, power purchase agreement, lease agreement, and any other agreement of a like nature, by whatever name called); or statutory, judicial, regulatory, or governmental stipulations;
Less: any capital expenditure on existing assets owned / leased by the SPV or Holdco, to the extent not funded by debt / equity or from reserves created in the earlier years
Net Distributable Cash Flows for HoldCo/SPV's

b. Calculation of net distributable cash flows at the Trust level:

Particulars
Cashflows from operating activities of the Trust
Add: Cash flows received from SPV's / Investment entities which represent distributions of NDCF computed as per relevant framework
Add: Treasury income / income from investing activities of the Trust (interest income received from FD, any investment entities as defined in Regulation 18(5), tax refund, any other income in the nature of interest, profit on sale of Mutual funds, investments, assets etc., dividend income etc., excluding any Ind AS adjustments. Further clarified that these amounts will be considered on a cash receipt basis)
Add: Proceeds from sale of infrastructure investments, infrastructure assets or shares of SPVs/Holdcos or Investment Entity adjusted for the following: - Applicable capital gains and other taxes - Related debts settled or due to be settled from sale proceeds - Directly attributable transaction costs - Proceeds reinvested or planned to be reinvested as per Regulation 18(7) of InvIT Regulations or any other relevant provisions of the InvIT Regulations
Add: Proceeds from sale of infrastructure investments, infrastructure assets or sale of shares of SPVs/ Hold cos or Investment Entity not distributed pursuant to an earlier plan to re-invest as per Regulation 18(7) of InvIT Regulations or any other relevant provisions of the InvIT Regulations, if such proceeds are not intended to be invested subsequently
Less: Finance cost on Borrowings as per Profit and Loss Account. However, amortization of any transaction costs can be excluded provided such transaction costs have already been deducted while computing NDCF of previous period when such transaction costs were paid
Less: Debt repayment at Trust level (to include principal repayments as per scheduled EMI's except if refinanced through new debt including overdraft facilities and to exclude any debt repayments/debt refinanced through new debt in any form or funds raised through issuance of units)
Less: any reserve required to be created under the terms of, or pursuant to the obligations arising in accordance with, any: (i). loan agreement entered with financial institution, or terms and conditions, covenants or any other stipulations applicable to debt securities issued by the Trust or any of its SPVs/ HoldCos, or terms and conditions, covenants or any other stipulations applicable to external commercial borrowings availed by the Trust or any of its SPVs/ HoldCos, or agreement pursuant to which the Trust operates or owns the infrastructure asset, or generates revenue or cashflows from such asset (such as, concession agreement, transmission services agreement, power purchase agreement, lease agreement, and any other agreement of a like nature, by whatever name called), or statutory, judicial, regulatory, or governmental stipulations.
Less: any capital expenditure on existing assets owned / leased by the InvIT, to the extent not funded by debt / equity or from contractual reserves created in the earlier years
Net Distributable Cash Flows at Trust level (Distributable Income)

Notes/Other Rules

(i) NDCF computed at SPV level for a particular period to be added under this line item, even if the actual cashflows from SPV to Trust has taken place post that particular period, but before finalization and adoption of accounts of the Trust.

(ii) The Trust retains the option to distribute any surplus amounts, unless such surplus is required to create reserves for any subsequent period. However any reserve created out of debt funds at the time of availing debt as per the terms of the financing documents shall not be reduced.

(iii) The option to retain 10% distribution under Regulation 18(6) of InvIT Regulations needs to be computed by taking together the retention done at HoldCo, SPV level and Trust level.

While computation of the NDCF, the Trust shall additionally comply with the notes and the rules as specified by the SEBI in accordance with the InvIT Regulations and circulars issued thereunder, as amended from time to time.

In terms of the InvIT Regulations, if the distribution is not made within five working days from the record date, being two working days from the date of declaration of distribution, excluding the date of declaration and the record date, the Investment Manager shall be liable to pay interest to the Unitholders at the rate of 15% (fifteen per cent) per annum till the distribution is made. Such interest shall not be recovered in the Management Fees of the Investment Manager or in the form of fee or any other form payable to the Investment Manager by the Trust.

For risks in relation to distribution, please see "*Risk Factors*" on page 64.

DISCUSSION AND ANALYSIS BY THE DIRECTORS OF THE INVESTMENT MANAGER OF THE FINANCIAL CONDITION, RESULTS OF OPERATIONS AND CASH FLOWS OF THE INITIAL PORTFOLIO ASSETS OF THE TRUST

The following discussion and analysis of our financial condition and results of operations should be read in conjunction with the sections entitled "Summary of Special Purpose Combined Financial Statements" on page 43 and "Special Purpose Combined Financial Statements" attached as Annexure D. This discussion contains forward-looking statements and involves numerous risks and uncertainties, including, but not limited to, those described in the section "Risk Factors" on page 64. Actual results could differ materially from those contained in any forward-looking statements and for further details regarding forward-looking statements, please see "Forward-Looking Statements" on page 19.

*The Special Purpose Combined Financial Statements have been prepared in accordance with the Guidance Note on Combined and Carve-out Financial Statements, Guidance note on Reports in Company Prospectus (Revised 2019) issued by the Institute of Chartered Accountants of India, to the extent not inconsistent with SEBI (Infrastructure Investment Trusts) Regulations, 2014, SEBI master circular no. SEBI/HO/DDHS-PoD-2/P/CIR/2025/102 dated July 11, 2025, and other circulars issued thereunder (the "**InvIT Regulations**"), as amended and in accordance with Indian Accounting Standards (Ind AS) notified under the Companies (Indian Accounting Standards) Rules, 2015 (as amended from time to time) and other accounting principles generally accepted in India and presentation requirements of Division II of Schedule III to the Companies Act, 2013 (as amended from time to time), with the exceptions and modifications as mentioned in InvIT Regulations.*

Our fiscal year ends on March 31 of each year, and references to a particular fiscal are to the twelve months ended March 31 of that year.

Unless otherwise stated or the context requires otherwise, references in this section to "we," "our," or "us" are to the Trust along with the Initial Portfolio Assets. Furthermore, references in this section to "EAAA Platform" refers to EAAA and its affiliates, and entities or pooled vehicles directly or indirectly controlled, managed and/or advised by EAAA and/or its affiliates.

*Unless otherwise indicated, industry and market data used in this section has been derived from industry publications, in particular, the report titled "Connecting India: Unlocking Investment Potential in Transport Infrastructure" dated March 23, 2026 (the "**CRISIL Report**") prepared and issued by CRISIL Intelligence ("**CRISIL**"), appointed by us and exclusively commissioned and paid for by us in connection with the Offer. Additionally, for further details and risks in relation to CRISIL Report, please see "Risk Factors" on page 64.*

Overview

We are a transport sector-focused infrastructure investment trust (the "**Trust**"), established with an objective to acquire, manage and invest in a portfolio of transport infrastructure assets, including roads, in India. We were settled by way of the Trust Deed, by the Sponsor, and registered as an InvIT with SEBI on August 1, 2025, in accordance with the provisions of the InvIT Regulations. The sponsor of the Trust is Epic TransNet Infrastructure Private Limited (*formerly known as Watrak Infrastructure Private Limited*) (the "**Sponsor**"). Our Sponsor is wholly owned by the schemes of the Infrastructure Yield Trust (that is, Infrastructure Yield Plus II, Infrastructure Yield Plus IIA and India Infrastructure Yield Plus II), an AIF managed by EAAA India Alternatives Limited ("**EAAA**"). As of March 31, 2025, EAAA managed three out of the 16 funds focused on infrastructure investments and ranks third among infrastructure investment managers by total assets under management ("**AUM**") (*Source: CRISIL Report*). EAAA operates a diversified, multi-strategy platform, in large, under-tapped and fast-growing alternative asset classes, focusing on providing income and yield solutions to a diverse client base, including, global pension funds, insurance companies and ultra-high net worth individuals. It is supported by an asset management team of 61 members (in addition to in-house teams of our Initial Portfolio Assets comprising 279 employees), 71 employees in the Project Manager of the Trust and 80 investment professionals as of December 31, 2025. Our sponsor group comprises the Sponsor, Infrastructure Yield Trust (through its schemes Infrastructure Yield Plus II, Infrastructure Yield Plus IIA and India Infrastructure Yield Plus II), Epic Transnet Project Management Private Limited (*formerly known as Chennai-Tada Tollway Private Limited*) (the "**Project Manager**"), and Neelambur Madukkarai Tollway Private Limited (collectively, the "**Sponsor Group**").

Subject to completion of the Formation Transactions, our initial portfolio of road assets will comprise 10 toll and annuity projects, together with the relevant project special purpose vehicles (the "**Project SPVs**") through which they are held, and Epic Concesiones 3 Private Limited and SRPL Roads Private Limited, the holding

companies of all Project SPVs (the "**HoldCos**", and together with the Project SPVs, the "**Initial Portfolio Assets**"), except for one Project SPV, Thrissur Expressway Limited ("**TEL**"), which will be held directly by us. The Initial Portfolio Assets comprise a total of 3,406.71 lane-kilometers (seven toll assets spanning more than 3,043.22 lane-kilometers, and three annuity assets spanning more than 363.49 lane-kilometers) across nine different Indian states as of the date of this Offer Document. We believe the Project SPVs have a strong operational history as four of our toll assets have a tolling history of more than 12 years and two of our other toll assets have been collecting toll for over 5 years. During the Financial Year 2025, the toll collection (net of revenue share) was ₹15,632.30 million and the revenue receipts for annuity-based projects (excluding GST) was ₹3,362.00 million, contributing 82.30% and 17.70% to our total cash revenue receipts from our Project SPVs, respectively[36] (*Source: CRISIL Report*)**.** As of the date of this Offer Document, the Project SPVs are held directly or indirectly by alternate investment funds ("**AIFs**") registered with SEBI and managed by EAAA. They have, as such, prior to the completion of the Formation Transactions, benefited from the regulated management framework applicable to them as companies held by AIFs. The Trust has also entered into an agreement that grants a right of first offer for the acquisition of 11 hybrid annuity model ("**HAM**") road assets held or to be acquired by the EAAA Platform (the "**Identified ROFO Assets**", and the agreement, the "**ROFO Agreement**").

The EAAA Platform, our Sponsor and members of the Sponsor Group have experience in managing and operating road, renewable, and transmission infrastructure assets, with an established governance framework that guides investment and asset management practices. The origination efforts of the EAAA Platform are driven by an investment team, which included 80 members as of December 31, 2025, enabling access to promoters, developers, and financial institutions. We believe that, given the size of our assets, our strong track record, and the ongoing support from the EAAA Platform, we are well positioned to capitalize on the growth potential of India's transport sector, including the roads sector, and deliver consistent distributions to our Unitholders. For further details, please see "*Parties to the Trust*" on page 122. The EAAA Platform has a proven track record of acquiring, managing, and scaling infrastructure projects at various stages, and through several acquisition strategies, from various developers. The EAAA Platform is well positioned for further growth in the future, given its established asset acquisition and capital-raising capabilities, which in turn enable it to identify and pursue new opportunities in the transport sector, including the roads sector. Furthermore, the EAAA Platform has set up, and continues to manage, operate and grow the AnZen India Energy Yield Plus Trust ("**AnZen**"), an energy-focused infrastructure investment trust registered in India with SEBI demonstrating the ability of the EAAA Platform to launch and manage assets with the structure of the InvIT. For further details, please see "*Parties to the Trust*" on page 122.

The investment manager of the Trust is EAAA TransInfra Managers Limited (the "**Investment Manager**"). The Investment Manager is a wholly-owned subsidiary of EAAA. Our Project Manager is a wholly-owned subsidiary of the Sponsor and part of the Sponsor Group. The Project Manager shall, including through the in house teams of Project SPVs and HoldCos, undertake operations and management of the InvIT Assets, and ensure compliance with the respective concession agreements and project documents, making arrangements for appropriate maintenance, oversee the progress of development, status of approvals and other aspects of the projects of the Project SPVs. These in-house asset management teams of the HoldCos and Project SPVs have significant capabilities and extensive experience across all stages of the asset life cycle, including construction, operations, and asset handover at the end of a project's term. These in-house asset management capabilities are supported by the EAAA Platform, which brings in a wealth of project management expertise. The asset management capabilities are backed by technology enabled operations and maintenance ("**O&M**") processes, which helps deliver operational excellence with minimal manual intervention. Over past three Financial Years and up to the date of this Offer Document, the Project SPVs have received 28 awards, recognitions and accreditations for a wide range of achievements, including operational excellence, construction innovation, O&M practices, health and safety, environmental management and social impact. For further details on key features of our technology and AI based tools and awards, recognitions and accreditations, see "*– IT Infrastructure* " on page 294 and "*– Experienced team with full spectrum asset management and maintenance capabilities, spanning the entire asset life cycle, backed by tech-enabled operations and maintenance* " on page 257, respectively.

We are also supported by Axis Trustee Services Limited, the trustee (the "**Trustee**"), which is registered with SEBI as a debenture trustee under the Securities and Exchange Board of India (Debenture Trustees) Regulations, 1993, as amended from time to time. On behalf of our Unitholders, the Trustee is responsible for (a) ensuring that our business objectives and investment policies comply with the provisions of the InvIT Regulations and other applicable law, and (b) monitoring the activities of the Investment Manager (in terms of

[36] Considering toll receipts (less revenue share) and actual annuity receipts for the Financial Year 2025

the Investment Management Agreement) and the Project Manager (in terms of the Project Implementation and Management Agreement). For further details, please see "*Parties to the Trust – The Trustee – Axis Trustee Services Limited*" on page 124.

The details of our Project SPVs as of December 31, 2025 and our project wise revenue from operations (net of eliminations) for the year ended March 31, 2025 are provided in the table below:

Numbers ₹ in million, unless stated otherwise

Asset Name	Type	Authority	Location	Lanes	Length	Concession period*	PCOD	FCOD	Project wise revenue from operations (net of eliminations) (for Financial Year 2025 ₹ in million)	Operational history (in years)	Residual Life (in years)
				(in nos)	*(kms)*	*(years)*					
Dibang Infra Projects Private Limited ("**Dibang**")	Annuity	MoRTH	Arunachal Pradesh	2	29.63	17	May 19, 2018	December 12, 2018	384.14	7.62	4.89
Dhola Infra Projects Private Limited ("**Dhola**")	Annuity	MoRTH	Assam	2	28.51	17	August 31, 2017	October 13, 2018	658.82	8.33	4.16
Jorabat Shillong Expressway Limited ("**JSEL**")	Annuity	NHAI	Assam and Meghalaya	4	61.80	20	January 28, 2016	August 30, 2019	1,479.25	9.92	5.25
Sub-total									**2,522.21**		
Samkhiali Bhachau Gandhidham Tollway Private Limited ("**SBGTPL**")	Toll with 1 toll plazas	NHAI	Gujarat	6	56.16	24	January 04, 2020	December 9, 2024	2,803.84	15.25	8.87
Rajkot-Vadinar Tollway Private Limited ("**RVTPL**")	Toll with 3 toll plazas	Gujarat Road State Development Corporation ("**GSRDC**")	Gujarat	4	131.65	20	January 27, 2012	June 17, 2023	2,291.56	13.91	4.14
Sambalpur-Rourkela Tollway Private Limited ("**SRTPL**")	Toll with 3 toll plazas	Works Department, Government of Odisha ("**OWD**")	Odisha	4	161.73	22	March 13, 2018 for 159.57 km [(1)] August 12, 2019 for 2.16 km	March 30, 2021	3,039.18	7.80	14.93
Ahmedabad-Maliya Tollway Private Limited ("**AMTPL**")[(3)]	Toll with 4 toll plazas	GSRDC	Gujarat	4[(2)]	180.70 [(2)]	22	Section III April 7, 2012 Section IV May 5, 2012 Section I August 27, 2012 Section II November 1,	June 22, 2023	4,003.37	13.67	11.38

Numbers ₹ in million, unless stated otherwise

Asset Name	Type	Authority	Location	Lanes *(in nos)*	Length *(kms)*	Concession period* *(years)*	PCOD	FCOD	Project wise revenue from operations (net of eliminations) (for Financial Year 2025 ₹ in million)	Operational history (in years)	Residual Life (in years)
							2012				
Deccan Tollways Private Limited ("**DTPL**")	Toll with 2 toll plazas	NHAI	Karnataka/ Telengana	4	144.95	25	October 14, 2017	September 17, 2019 for 142.786 km October 20, 2023 for 2.164 km	2,466.11	8.21	18.26
Thrissur Expressway Limited ("**TEL**")	Toll with 1 toll plazas	NHAI	Kerala	6	28.36	20	March 09, 2022	June 14, 2024	1,628.30	3.81	10.70
Panipat Elevated Corridor Private Limited ("**PECPL**")	Toll with 1 toll plazas	NHAI	Haryana	6	10.00	20	July 17, 2008	March 17, 2011	1,115.90	17.46	1.08
Sub-total									**17,348.26**		
Total project wise revenue from operations (net of eliminations)									**19,870.46**		

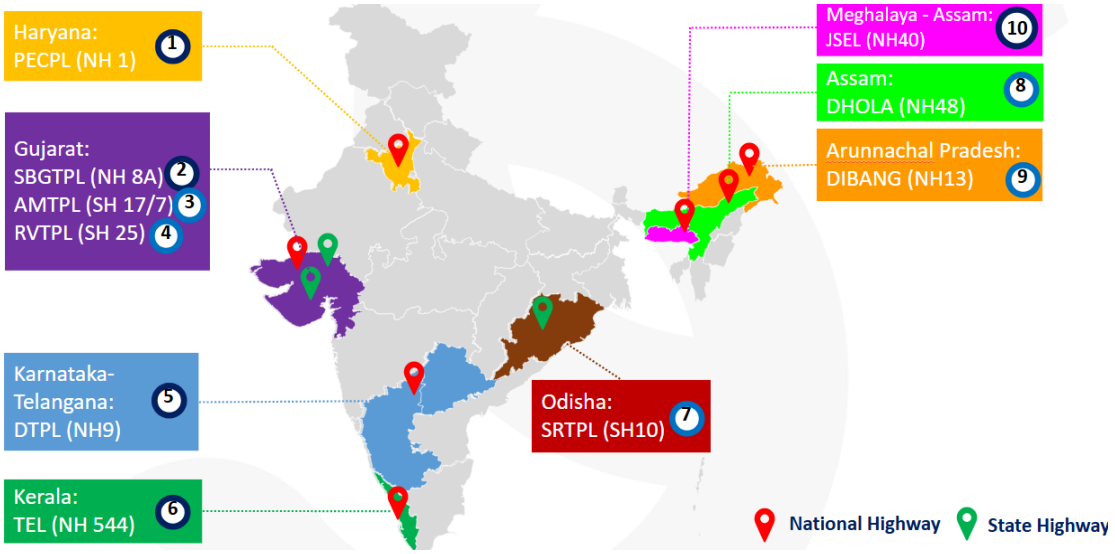
**As per the respective Concession Agreements*
(1) the PCOD certificate is dated March 12, 2018, however, SRTPL was fit for commercial entry from March 13, 2018 for a length of 159.57 kms and from August 12, 2019 for the remaining length of 2.16 km
(2) excluding 4 lane to 6 lane expansion for a stretch of approximately 28.75 km
(3) GSRDC has entered into a separate, additional concession agreement with AMTPL dated October 30, 2025 to augment a section of the highway (for a length of 28.75 km) from the existing four lanes to six lanes, on a construction, operation and maintenance to build, operate and transfer basis. We are awaiting the receipt of the appointed date to commission construction.

Our Project SPVs forming part of the Initial Portfolio Assets will include seven toll assets and three annuity assets, ensuring diversification of revenue streams. Furthermore, the Identified ROFO Assets we intend to acquire in the future are HAM assets, further diversifying our portfolio. We believe that the toll assets particularly benefit from India's economic growth, leveraging increase in GDP and serving as an effective hedge against inflation. Toll-based road assets provide a degree of income stability and inflation protection, as most concessions have inflation-linked toll rate revisions or periodic toll hikes (*Source: CRISIL Report*). Combined with steady traffic growth on key national corridors, this structure allows InvIT cash flows to naturally adjust for inflation, thereby offering investors a built-in hedge and stable real returns over time (*Source: CRISIL Report*). The annuity and HAM assets typically provide stable cash flows over the residual concession life. With respect to annuity assets, the concessionaire is responsible for the construction and maintenance of the project during the concession period. Variability in user fee gives rise to revenue risk, which is borne by the authority in annuity and HAM assets. The concessionaire generates revenue through fixed annuity payments received from the authority over the concession period (*Source: CRISIL Report*). In a HAM project, the concessioning authority grants 40% of the total project cost during the construction phase and the remaining 60% is borne by the concessionaire. HAM projects combine elements of Engineering, Procurement, and Construction ("**EPC**") and annuity-based approaches, aiming to balance financial responsibility between the government and the concessionaire (*Source: CRISIL Report*). Under this model, the concessionaire's financial burden during the construction phase is reduced, while assured revenues are ensured during the operational phase through fixed annuity payments, interest on the diminishing balance of project cost, and inflation-linked O&M payments (*Source: CRISIL Report*). The concessionaire undertakes both construction and maintenance responsibilities, while revenue risks arising from fluctuations in user fees are borne by the authority. Variability in user fee gives rise to revenue risk, which is borne by the authority. However, the concessionaire generates revenue through fixed annuity payments received from the authority over the concession period (*Source: CRISIL Report*). Furthermore, given the relevant authority is the central government or its agencies, the counterparties present a

low risk of default, offering assurance regarding the stability of the revenue under the concession agreements with these authorities (*Source: CRISIL Report*). We believe that this balanced strategy results in a resilient income profile, reduces dependence on any single revenue source, and supports the delivery of stable returns.

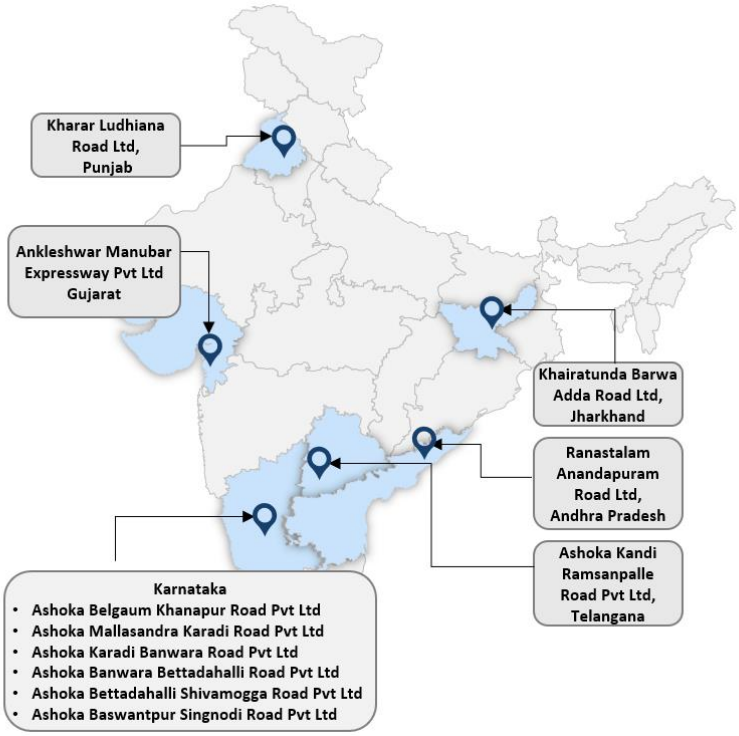
Our toll assets are mature and also have average residual lives of more than 10 years, which may be considered relatively long for road assets (*Source: CRISIL Report*). As of December 31, 2025, our toll based Project SPVs had a simple average operational history of 10.13 years and a weighted average residual life (by enterprise value ("**EV**") weight) of 12.93 years (*Source: CRISIL Report*). Furthermore, the EV of our largest asset (as a proportion of overall EV of our Initial Portfolio Assets) standing at 26.11% is comparable to some of the other financial sponsor driven road InvITs, indicating that our portfolio is less concentrated, thereby limiting the impact if any single asset were to underperform or face valuation changes (*Source: CRISIL Report*). The metric expresses the EV of the single largest asset as share of its total portfolio EV, providing an immediate read on dominant-asset dependence (*Source: CRISIL Report*). Additionally, our Herfindahl-Hirschman Index ("**HHI**") score (a measure of portfolio dispersion) is lower at 40.01 compared to some of the other road InvITs (*Source: CRISIL Report*). The HHI takes into account both the number of assets and their relative EV weights, with a lower HHI score indicating a more diversified portfolio (*Source: CRISIL Report*).

The toll roads forming part of our Project SPVs are situated in regions with high economic activity, thereby indicating strong, stable and predictable long-term traffic as well as revenue growth prospects (*Source: CRISIL Report*). The locations of our toll and annuity assets forming part of the Project SPVs, as of the date of this Offer Document are indicated in the map below[37]:



Furthermore, the locations of our Identified ROFO Assets, as of the date of this Offer Document are indicated in the map below[38]:

[37] The map has not been drawn to scale
[38] The map has not been drawn to scale



The toll based Project SPVs had an AUM weighted annual average daily traffic PCU growth[39] of 7.10% between the Financial Years 2023 and 2025 (excluding PECPL[40]) and 6.46% between the Financial Years 2018 and 2025 (excluding PECPL[41] and TEL[42]), demonstrating both consistent growth and resilience. In addition to their geographic diversity, the toll assets Project SPVs also serve two key segments: passenger and commercial traffic. The overall PCU composition across all toll assets reflects a well-diversified traffic base spread across multiple regions of the country. Across all toll assets, passenger vehicles account for approximately 37.80% of the PCU mix in the Financial Year 2026, while commercial / freight vehicles contribute around 62.20%[43], indicating a healthy balance between personal and economic mobility (*Source: Traffic Reports*). In line with this, the revenue mix further highlights the strong presence of major economic and industrial corridors within the portfolio (*Source: Traffic Reports*). Freight vehicles contribute nearly 74.00% of toll collection[44], underscoring the critical role of goods movement and logistics activity in driving asset performance. The remaining 26.00% toll collection is contributed by passenger traffic, reflecting steady commuter movement across key routes. In road traffic commercial traffic is typically less volatile than passenger traffic and more resilient during economic fluctuations thereby reducing risk and allowing more efficient resource planning and utilization, and in turn improving its operational efficiency for platforms/concessionaires with a higher share of commercial traffic (*Source: Traffic Reports*).

Furthermore, the commercial traffic operating on road assets carry a variety of commodities, supporting additional stability through intra-portfolio dispersion and exposure to different industries. This approach helps mitigate the risks that could arise from over-concentration in a single region or market sector (*Source: CRISIL*

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39 Average traffic growth is a weighted average computation of traffic PCU at respective SPVs using AUM as on 31st December 2025 as weights and further considering respective weights of tollable lengths for each toll plaza at SPV level

40 PECPL excluded on account of short residual life; PECPL concession will end in February 2027

41 PECPL excluded on account of short residual life; PECPL concession will end in February 2027

42 For TEL, PCOD was achieved in March 2022 and toll collection commenced thereafter

43 The PCU Mix for the Financial Year 2026 has been derived by applying historical seasonal correction factors to the actual traffic volumes recorded during April–July 2025, thereby estimating the base year traffic (*Source: Traffic Reports*)

44 The PCU Mix for the Financial Year 2026 has been derived by applying historical seasonal correction factors to the actual traffic volumes recorded during April–July 2025, thereby estimating the base year traffic (*Source: Traffic Reports*)

Report). Similarly, our portfolio is less concentrated in terms of value, which helps to limit the impact if any single asset underperforms or experiences a change in valuation (*Source: CRISIL Report*)**.**

The key counterparties for our annuity assets include NHAI and the Ministry of Road Transport and Highways ("**MoRTH**"). For our toll assets, our key counterparties are NHAI, the Government of Odisha, and the Gujarat State Road Development Corporation Limited ("**GSRDC**"). Given the strong governmental backing and proven history, our counterparties have a low risk of default, providing assurance regarding the reliability and stability of revenue under the commercial arrangements with them (*Source: CRISIL Report*)

The table below sets out our key financial and operational measures as of and/or for the nine months ended December 31, 2025, and the Financial Years 2025, 2024 and 2023:

Particulars	As at and for the nine months ended December 31, 2025	As at and for the Financial Year ended March 31,		
		2025	2024	2023
	(₹ in million, except percentages)			
Total Income (A)	15,703.89	21,656.17	20,385.30	18,852.95
Revenue from operations	14,963.64	19,870.46	18,731.73	17,735.16
Revenue from operations from toll collection (B)	13,804.48	17,179.29	16,196.21	15,259.26
Revenue from operations from toll collection as a percentage of total income (%) (B/A*100)	87.90%	79.33%	79.45%	80.94%
EBITDA	11,429.32	14,349.51	12,594.07	10,841.65
EBITDA Margin (%)	72.78%	66.26%	61.78%	57.51%
Total borrowings (current and non-current)	59,087.90	66,999.94	61,715.24	61,859.50
Net Debt	42,470.51	52,557.50	37,238.87	35,708.16
Total Expenses	17,848.06	25,811.49	27,766.71	25,191.26
Loss before tax	(2,144.17)	(4,155.32)	(7,381.41)	(6,338.31)
Loss for the period/year	(2,190.48)	(4,177.51)	(7,741.18)	(6,540.08)
Net cash flow from operating activities	7,820.15	10,449.52	9,392.51	9,079.25

Significant Factors affecting our Result of Operations

Toll revenue and traffic volumes

Toll revenue is determined by both the base rates set by the concessioning authority under the Concession Agreements and the actual volume of traffic on our roads. The National Highways Fee (Determination of Rates and Collection) Rules, 2008, as amended from time to time (the "**Fee Rules**") read with our Concession Agreements executed by our toll-based Project SPVs typically restrict the extent to which toll rates can fluctuate and prescribe related regulations. Usually, the relevant concessioning authority establishes the applicable user fees and outlines the methods for periodic adjustments. As a result, we may not be able to increase toll rates sufficiently to offset increases in our operating, financing, or other costs. The concessioning authority may revise user fees in accordance with the terms of the concession agreement and relevant laws. Consequently, our revenue from tolls depends on both traffic volume and user fees, neither of which we control.

The toll rate structure is laid down under the Fee Rules. The Fee Rules specify that the applicable toll rates specified thereunder shall be increased by three percent each year along with an adjustment based on an increase in the wholesale price index (the "**WPI**"). Furthermore, for certain toll roads the adjustment in toll rates on account of WPI is capped at a percentage of the increase in the WPI. As such, in the event of high consumer price index inflation or increased minimum wages, we may experience significantly higher operating costs, but there may be little variation in the WPI resulting in a muted increase in the applicable toll rate. As the determination of the applicable toll rates does not take account of changes in our operating, financing or other costs, there can be no assurance that the toll rates will be sufficient to cover any increase in such costs or that we will be able to implement any changes in the toll rates at the time or in the manner which we believe is in our best interest. Thus, while our toll rates may increase with an increase in WPI, any increase may not be adequate to offset the negative impact of increases in interest rates or O&M costs. Furthermore, our toll rates

may also decrease with a decrease in WPI.

Our toll collections may also be affected by the level of exemptions, that is, toll may not be levied during certain festive periods, the number of road users may be exempted to pay the applicable toll rates when using the toll roads beyond the provisions under the respective Concession Agreements. The Concession Agreements provide that certain users of the toll roads are exempt from paying user fees for non-commercial use of the roads, while frequent users are entitled to discounted fees to use the toll roads.

The level of toll collections may be affected by competing routes and alternative modes of transport, such as adjacent free roads, new or existing toll roads, railways, waterways, or air transport. Although the Concession Agreements restrict the NHAI, the GoI, and relevant concessioning authorities from constructing or improving competing roads in certain circumstances, there are notable exceptions. Specifically, certain agreements may prohibit the widening of an existing highway by more than two metres over at least 75% of its length after the tenth anniversary of the project, provided the length of such competing road does not exceed 20% of the project highway. Similarly, for any additional highway developed in the last ten years of the concession period, the restriction applies if its length does not exceed 20% of the project highway. However, neither NHAI nor the GoI is prohibited from constructing or improving competing free or toll roads if the average traffic on the toll road exceeds 90% of its designated designed capacity for three consecutive years. Additionally, neither the NHAI, nor the GoI or the respective concessioning authorities are restricted under the Concession Agreements from constructing alternative routes of travel which service the same areas as are serviced by the toll roads. In the event such alternative modes of travel are constructed, it may adversely impact our revenue of the toll roads.

The volumes of traffic on our toll roads, and the associated revenue, are subject to a wide array of unpredictable external influences. Factors such as fluctuations in commodity production and export, changes in vehicle ownership and operating costs, and adverse weather or natural disasters can all reduce road usage. Additionally, the state of connecting roads, construction projects nearby, toll road capacity and security, regulatory changes, and competition from other transport modes may impact both accessibility and revenue. Seasonal trends, such as reduced traffic during the monsoon and increased traffic during holidays, further add to this variability. For the nine months ended December 31, 2025, and the Financial Years 2025, 2024 and 2023 our revenue from operations from our toll collection was ₹13,804.48 million, ₹17,179.29 million, ₹16,196.21 million, ₹15,259.26 million, respectively, contributing to 92.25%, 86.46%, 86.46% and 86.04%, of our total revenue from operations, respectively.

Revenue from our annuity assets

Certain of our Project SPVs are operated on an annuity basis. Pursuant to the relevant Concession Agreements, a fixed amount as prescribed under the Concession Agreement is paid bi-annually as annuity by the respective concessioning authority. The counterparties for our annuity assets are NHAI and MoRTH. Given the strong governmental backing, maturity of concession frameworks and established track records, both NHAI and MoRTH have a low risk of default, providing assurance regarding the reliability and stability of our commercial arrangements with them. For the nine months ended December 31, 2025, and the Financial Years 2025, 2024 and 2023 our aggregate of income from operations and maintenance services and finance income on receivable under service concession arrangement were ₹1,119.58 million, ₹2,522.20 million, ₹2,351.42 million, ₹2,069.93 million, respectively, contributing to 7.48%, 12.69%, 12.55%, and 11.67%, of our revenue from operations, respectively.

However, our revenue from operations from our annuity assets are not linked to the actual costs incurred over the life of our assets. The costs related to routine operations, maintenance, and major repairs may prove to be higher than originally forecast. As the annuity payments are fixed and will not be adjusted to compensate for any additional expenditure or revenue deductions, any cost overruns or penalties will directly reduce the relevant Project SPVs profitability and lower the actual return on our investment. For further details on operating costs please see, "- *Significant Factors affecting our Result of Operations – Operating expenses*" on page 381.

Strategic expansion through acquisitions including under the ROFO Agreement

We have entered into the ROFO Agreement in relation to the future acquisition of assets which are held, or will be held by Epic 2 and certain schemes of Infrastructure Yield Trust ("**Seller Entities**"). As of the date of this Offer Document, there are 11 HAM assets under NHAI concessions which are ROFO Assets in terms of the ROFO Agreement. As of the date of this Offer Document, (i) five HAM assets are presently held by the Seller Entities, and (ii) six HAM assets are in the process of being acquired by the Seller Entities, pursuant to binding documentation entered into by the Seller Entities, subject to all conditions precedent under the binding

documentation being satisfied. For further details of the ROFO Assets please see, "*Business – Strong pipeline of Identified ROFO Assets* " on page 249.

Typically, HAM assets operate under a 15-year concession period starting from the commercial operations date, with NHAI acting as the counterparty. The revenue stream for HAM assets is contractually defined, which serves to shield the asset from traffic volume risks. Furthermore, these assets benefit from mechanisms that protect income against fluctuations in inflation and interest rates. Under the respective concession agreements, in addition to regular annuity payments and O&M payments throughout the operational phase, NHAI is required to pay interest on the reducing balance of the assets' completion cost, which is generally equal to 60% of the bid project cost. This interest is set at a margin of 3% above the Reserve Bank of India's prevailing bank rate and is paid over the duration of the operational period. Consequently, if floating loan interest rates rise as a result of an increased bank rate, the higher interest payments received from NHAI on the reducing completion cost help to partially offset the impact. This arrangement, embedded within the concession agreements, significantly reduces the exposure to interest rate risk for HAM assets, thereby enhancing their financial stability and predictability

However, there may be instances where we are unable to exercise our option for certain Identified ROFO Assets, and we may not be able to successfully acquire some or all Identified ROFO Assets, and there may still be uncertainties that are not uncovered during such an exercise including potential exposure to regulatory sanctions resulting from previous activities of the Identified ROFO Assets, potential regulatory hurdles and unforeseen financial liabilities. For further details see, "*Risk Factors - Potential challenges in acquiring and integrating the ROFO Assets under the ROFO Agreements could adversely affect our business, financial position, operating results, and cash flows. In addition, these ROFO Agreements are subject to various terms and conditions, and we cannot assure you that we will be able to complete these transactions in a timely manner, or at all*." on page 71.

Furthermore, whether we can pursue future acquisitions will depend on several factors, including our ability to identify, finance, and acquire transport sector assets, including roads in the future, cost-effectively; our ability to integrate acquired personnel, operations, products, and technologies into our organization effectively; unforeseen issues or legal liabilities connected to acquired businesses; and any tax or accounting issues relating to those businesses.

Operating expenses

The transport sector, including roads, is a highly competitive sector that is capital intensive and requires significant expenditure. Our financial performance is significantly influenced by our ability to manage the operating and maintenance costs for our assets. Under the terms of our concession agreements, we are required to maintain our road projects to ensure the safe and uninterrupted flow of traffic. These maintenance activities give rise to costs for raw materials, fuel, labour, and equipment, the prices of which are subject to fluctuation based on factors beyond our control, such as general economic conditions, transport costs, and market prices.

We have adopted a comprehensive technology-driven approach to improve asset efficiency and optimize cost management. We employ an integrated suite of digital solutions, including iHAMS for AI-powered monitoring and the Juno platform for asset management, to drive operational efficiency and data-driven decision-making. These technologies, along with our Toll Analytic System, centralize data from road inspections and toll plazas. This framework enables predictive maintenance, streamlined workflows, and robust reporting across our projects. For further details please see, "*Business – Operations and Maintenance*" on page 269.

For the nine months ended December 31, 2025, and the Financial Years 2025, 2024 and 2023 our operations and maintenance expenses were ₹2,941.39 million, ₹5,585.34 million, ₹5,947.26 million, ₹6,277.21 million, respectively, constituting to 16.48%, 21.64%, 21.42%, and 24.92%, of our total expenses, respectively.

Interest rates and restrictive covenants

As of December 31, 2025, our total borrowings (current and non-current) were ₹59,087.90 million of which aggregate secured borrowings (current and non-current) were ₹37,194.96 million. An increase in interest rates or a reduction in the availability of financing could make it more difficult to obtain fund for our operations and future acquisitions, which may adversely affect our business and financial condition. Most of our borrowings have floating interest rates, which exposes us to the risk of rising interest rates. An increase in rates or a reduction in the availability of financing could make it more difficult or expensive to service our existing debt and fund operations or future acquisitions. For the nine months ended December 31, 2025, and the Financial Years 2025,

2024 and 2023 our finance costs were ₹8,316.74 million, ₹11,506.41 million, ₹13,053.33 million, ₹10,085.06 million, respectively, constituting to 46.60%, 44.58%, 47.01%, and 40.03%, of our total expenses, respectively.

Furthermore, our financing agreements contain restrictive covenants that limit our operational and financial flexibility. These include restrictions on incurring additional debt, making certain investments, paying dividends, and making changes to our capital structure without prior lender consent. Failure to comply with these terms, or the occurrence of other specified events of default, could trigger an acceleration of our repayment obligations. These factors could adversely affect our business, financial condition, and ability to execute our growth strategy. For further details please see, "*Financial Indebtedness and Deferred Payments*" and "*Risk Factors – Certain Initial Portfolio Assets have incurred indebtedness and are subject to restrictive covenants under their financing agreements. An inability to comply with repayment and other covenants in such financing agreements could adversely affect our business and financial condition*" on pages 362 and 80, respectively.

Government schemes, policies and tax benefits

Significant shifts in government policy relating to the transport sector, including roads, can materially impact on the revenue from operations, costs, and potential for growth, particularly in relation to future developments. The performance of upcoming assets is likely to depend on budget allocations from both central and state agencies, as well as funding support from international or multilateral development finance organizations dedicated to transportation infrastructure. Any negative change in government priorities, policy framework, or regulatory focus concerning the broader infrastructure, transportation sector, or in the Trust's engagement with public authorities in India, may have an adverse effect on our business. Over the past decade, programmes such as Bharatmala Pariyojana, Pradhan Mantri Gram Sadak Yojana, and the National Infrastructure Pipeline have been launched to modernize highways, expand expressways, and strengthen rural connectivity. Policy emphasis has been supported by large budgetary allocations to MoRTH and innovative financing mechanisms such as the HAM and TOT framework. The sector's growth has been supported by measures to enhance user convenience on national highways, including the shift from traditional tolling systems to digital tolling through FASTag (*Source: CRISIL Report*).

Certain Project SPVs, namely (i) Jorabat Shillong Expressway Limited, Samkhiali Bhachau Gandhidham Tollway Private Limited, Panipat Elevated Corridor Private Limited, Thrissur Expressway Limited, Deccan Tollways Private Limited; and (ii) Dhola Infra Projects Private Limited and Dibang Infra Projects Private Limited, generate their revenue from their respective concession agreements with the NHAI and MoRTH, respectively. Furthermore, certain Project SPVs, including Ahmedabad - Maliya Tollway Private Limited, Sambalpur-Rourkela Tollway Private Limited and Rajkot-Vadinar Tollway Private Limited, have entered into concession agreements with state authorities such as Gujarat State Road Development Corporation Limited and The Chief Engineer, DPI & Roads, Odisha, respectively. Accordingly, they must maintain strong relationships with NHAI, MoRTH the Government of India, and the relevant state governments in India.

Furthermore, toll roads developed through public-private partnerships may be subject to delays, complex internal processes, policy shifts, local or national political pressures, changes in government budget allocations, and potential insufficiencies in funding. For instance, under the current policy, NHAI bears the cost of intermediaries such as banks for FASTag fee collection; however, in the future, NHAI may require concessionaires to bear these costs, as toll revenues ultimately belong to the project concessionaires. As governmental entities are involved in awarding, developing, and operating the awarded projects, our business is directly and significantly dependent on their ongoing support.

Additionally, certain Project SPVs are entitled to certain benefits, subject to conditions, under exemptions and concessions under the Income Tax Act 1961. Furthermore, taxation of distributions to Unitholders varies by the type of distribution, and their residency status, amongst other factors. However, the benefits to the Project SPVs may expire at various points of time. Any expiry, termination or GoI withdrawal of these tax benefits could result in an increase in our tax expenses, thereby adversely affecting our results of operations and cash flows.

Macro-economic environment in India and investment activity in the infrastructure and transport sectors, including roads

India's transport sector is entering a pivotal phase of expansion, driven by sustained public investment, rising private participation, and a policy focus on integrated connectivity. With robust economic growth, increasing urbanization, and the rapid rise of e-commerce and logistics demand, the need for modern and efficient transport infrastructure is stronger than ever. The Government's flagship initiatives ranging from *Bharatmala* and

Sagarmala to the National Logistics Policy and PM Gati Shakti are not only augmenting capacity but also reshaping the investment landscape across asset classes. Roads, railways, ports, airports, and urban transit systems (metros) are witnessing differentiated yet complementary growth trajectories, creating significant opportunities for investors, developers, and operators over the next five years. India's economic growth, with GDP forecast to grow between 6.5%-7.0% annually over the next five years, is a primary driver for both core road assets and related sectors (*Source: CRISIL Report*).

The Indian road network is the second largest road network in the world. There has been 6.6 times increase in ministry investment on road infrastructure between the Financial Year 2016 to 2027. Road transport and highways contribute to the highest proportion of the overall transport infrastructure budgetary outlay. (*Source: CRISIL Report*).

Investment in India's road sector has risen steadily over the past decade. Total annual investments in roads and highways increased from about ₹1.2 trillion in the Financial Year 2016 to an estimated ₹4.2 trillion in the Financial Year 2025, with projections suggesting a further rise to ₹4.4 trillion in the Financial Year 2026. This more than threefold increase underscores the strategic role of roads in enhancing connectivity, facilitating trade, and supporting economic expansion (*Source: CRISIL Report*).

However, there is no guarantee that current policies and investment levels will continue in the future. The pace of economic liberalization may slow, and laws or policies affecting foreign investment, currency exchange, and other investment-related matters in India could change. In the road sector specifically, the Government of India's collaboration with private sector participants, including us, may not persist. Any major shift in India's liberalization and deregulation policies, especially those concerning the road sector, could disrupt the broader business environment in India and affect our operations directly. Furthermore, an increased trade deficit or a decline in India's foreign exchange reserves could have a negative effect on interest rates and liquidity, thereby adversely affecting the Indian economy and our business.

Competition

The Trust faces competition from other transport sector players, including road operators, financial investors and other InvITs in acquiring profitable concessions for future projects. The competition for road projects varies depending on the size, nature and complexity of the project and on the geographical region in which the project is to be executed. Some competitors may have greater financial resources, economies of scale and operating efficiencies than the Trust.

Basis of Preparation and Material Accounting Policies

The Special Purpose Combined Financial Statements of Citius Transnet Investment Trust ("**the Trust**") comprise the Special Purpose Combined Balance Sheet as at December 31, 2025, March 31, 2025, March 31, 2024 and March 31, 2023; the Special Purpose Combined Statement of Profit and Loss (including other comprehensive income), the Special Purpose Combined Statement of Cash Flows, the Special Purpose Combined Statement of Changes in Equity for the nine months period ended December 31, 2025 and years ended March 31, 2025, March 31, 2024 and March 31, 2023, the Statement of Net Assets at Fair Value as at December 31, 2025, the Statement of Total Returns at Fair Value for the nine months period ended December 31, 2025 and year ended March 31, 2025 and a summary of material accounting policies and other explanatory information with other additional disclosures (collectively referred as the "**Special Purpose Combined Financial Statements**").

The Special Purpose Combined Financial Statements have been prepared in accordance the Guidance Note on Combined and Carve-out Financial Statements, Guidance note on Reports in Company Prospectus (Revised 2019) issued by the Institute of Chartered Accountants of India (the "**ICAI**") (the "**Guidance Notes**"), to the extent not inconsistent with SEBI (Infrastructure Investment Trusts) Regulations, 2014, SEBI master circular no. SEBI/HO/DDHS-PoD-2/P/CIR/2025/102 dated July 11, 2025, ("**SEBI Circular**") and other circulars issued thereunder ("**InvIT Regulations**"), as amended and in accordance with Indian Accounting Standards(Ind AS) notified under the Companies (Indian Accounting Standards) Rules, 2015 (as amended from time to time) and other accounting principles generally accepted in India, notes mentioned below and accounting policies described in note 2(B) and presentation requirements of Division II of Schedule III to the Companies Act, 2013 (as amended from time to time), with the exceptions and modifications as mentioned in InvIT Regulations. Specific attention is drawn to the following aspects:

In preparing these Special Purpose Combined Financial Statements, "Capital" represent shareholder's

investment in the asset SPVs.

As on date of Special Purpose Combined Financial Statements, the Trust has not issued any units and hence, the earnings per unit could not be computed.

The Special Purpose Combined Financial Statements are Special Purpose Financial Statements and have been prepared by the Investment Manager to meet the requirements of the InvIT Regulations and for inclusion in this Offer Document and the Final Offer Document prepared by the Investment Manager in connection with the proposed initial public issue of units of the Trust. As a result, the Special Purpose Combined Financial Statements may not be suitable for any other purpose.

Since the Trust was newly set up on August 1, 2025 and has been in existence for a period lesser than three completed financial years, and the historical financial statements of the Trust are not available for the entire portion of the reporting period, hence in accordance with the requirements of the InvIT Regulations, the Special Purpose Combined Financial Statements have been disclosed even for the periods when such historical financial statements were not available. Furthermore, as required by the InvIT regulations, the Special Purpose Combined Financial Statements are prepared based on an assumption that all the components were part of the Trust for such period when the Trust was not in existence. Accordingly, all the components which are proposed to be owned by the Trust have been combined for the periods presented.

Amalgamation between EPIC Concesiones Private Limited ("**EPIC**"), EPIC Concesiones 3 Private Limited ("**EPIC 3**"), Vadodara Bharuch Tollway Limited ("**VBTL**"), Rewin Infrastructure Limited ("**RIL**") and Palanpur Swaroopgunj Road Project Limited ("**PSRPL**") is approved by the National Company Law Tribunal with the appointed date of April 11, 2024 wherein EPIC, VBTL, RIL and PSRPL shall be merged with EPIC 3. However, as required by the SEBI Circular, in the preparation of these Special Purpose Combined Financial Statements, all entities acquired are individually considered as part of the Trust for all the periods presented in accordance with the guidance prescribed in the SEBI Regulations with their net assets as at April 01, 2022 being considered at book value in the preparation of the Special Purpose Combined Financial Statements. These financial statements have been combined using historical basis for all periods presented.

The difference arising, if any between carrying values of investments in subsidiary and corresponding net assets of subsidiaries has been recognized as an adjustment on account of acquisition of subsidiaries in the capital reserve under other equity.

This Special Purpose Combined Financial Statements may not be representative of the position which may prevail after the components are transferred to Citius Transnet Investment Trust.

The Special Purpose Combined Financial Statements have been prepared on a going concern basis. These Special Purpose Combined Financial Statements have been prepared on the historical cost basis except for the following assets and liabilities which have been measured at fair value or at revalued amount:

– Certain financial assets and liabilities measured at fair value (refer accounting policy regarding financial instruments)
– Defined benefit plans, plan assets measured at fair value (refer accounting policy on defined benefit plans for details).

The Special Purpose Combined Financial Statements are prepared in Indian Rupees and rounded off to nearest million (₹ '000,000), except when otherwise indicated.

Basis of Combination and Carve-out

The Special Purpose Combined Financial Statements have been prepared using uniform accounting policies for like transactions and other events in similar circumstances. The financial statements or information of all the components or assets transferred used for the purpose of combination are drawn up to the same reporting date i.e. nine months period ended December 31, 2025 and years ended on March 31, 2025, March 31, 2024, and March 31, 2023. The Special Purpose Combined Financial Statements have been prepared using the principles of consolidation as per Ind AS 110 —Consolidated Financial Statements and the Guidance Notes, to the extent applicable. However, unlike consolidated financial statements, the Special Purpose Combined Financial Statements does not have any parent company.

The procedure for preparing Special Purpose Combined Financial Statements of the Trust are stated below –

i) The financial statements of all the components were combined by combining/adding like items of assets, liabilities, equity, income, expenses and cash flows.
ii) The financial statements of all the components were combined based on the assumption that all the components were part of a single group for the entire period presented.
iii) Intragroup assets, liabilities, equity, income, expenses and cash flows relating to transactions between components of the Trust are eliminated in full.

Carve-out financial information of the carved-out assets/businesses:

The Special Purpose Combined Financial Statements have been prepared by excluding certain subsidiaries / entities from Epic 3 which are not proposed to be transferred to the Trust. Accordingly, investments in such subsidiaries as of December 31 2025, March 31, 2025, March 31, 2024, and March 31, 2023 have been carved out and excluded from these Special Purpose Combined Financial Statements (referred to as the 'Carved-out Entities'). There are no assets which have been carved in for the purpose of preparation of Special Purpose Combined Financial Statements.

For the purpose of preparation of Special Purpose Combined Financial Statements:

– the financial information of carved-out entities have been prepared using principles prescribed in the Guidance Note on Combined and Carve-out Financial Statements.
– the net assets pertaining to Investments in the wholly owned subsidiaries of EPIC 3: Neelambur Madukkarai Tollway Limited, Watrak Infrastructure Private Limited, Kudgi Transmission Limited, PNG Tollway Limited and Chennai - Tada Tollway Limited have been carved out from EPIC 3 pertaining to Carved-out-entities in accordance with the requirements of InvIT Regulations.

The following basis of allocation has been followed in preparing Carve-out Financial Information for the carved out and carved in assets for use in the preparation of Special Purpose Combined Financial Statements:

– Income and expenses, which can be directly identified to carved-out entities/assets are treated as direct operating income or expenses. Similar principle has been applied for identification of specific assets and liabilities related to the carved-out entities/assets. Accordingly, assets, liabilities, revenue and expenses directly attributable to the carved-out entities/assets have been specifically identified and excluded in the Carve-out Financial Information. Certain other expenses are allocated in the ratio of revenue.
– No specific guidance is available for allocation of common income, expenses, assets and liabilities to carve-out entities. Accordingly, in preparing historical carved out financial information, certain accounting conventions commonly accepted and deemed appropriate by the Management have been applied. The allocation basis used is appropriate and reflects the Management's best estimate of how the underlying goods and services have been consummated by the carved-out entities. However, the financial position of the carved-out entities post allocation may not accurately reflect the financial position that would have been reported had the operations of these assets been carried out in a separate standalone entity or the position which may prevail in the future.
– Income taxes have been recorded as if the carved-out were a separate legal entity filing a separate tax return in their local jurisdiction. Tax expense has been arrived at in accordance with the Guidance Note on Combined and Carve-out Financial Statements. Accordingly, current and deferred tax income/expenses have been computed using the tax rates and tax laws that have been enacted or substantively enacted by the end of the reporting period and the taxable income of the carved-out entities.
– The difference between the assets and liabilities of the carved out financial statements as on each Balance Sheet date has been disclosed as 'Carved out difference' in Retained Earnings under Capital in accordance with the requirements of Guidance Note.
–

Material Accounting Policies

Current versus Non-current classification

The SPV Group segregates assets and liabilities into current and non-current categories for presentation in the Special Purpose Combined Balance Sheet after considering its normal operating cycle and other criteria set out in Ind AS 1, "Presentation of Financial Statements". For this purpose, current assets and liabilities include the current portion of non-current assets and liabilities respectively. Deferred tax assets and liabilities are always classified as non-current.

The operating cycle is the time between the acquisition of assets for processing and their realization in cash and cash equivalents. The SPV Group has identified period up to twelve months as its operating cycle.

Fair value measurement

The SPV Group measures financial instruments, such as, investments in mutual funds, at fair value at each balance sheet date.

Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. The fair value measurement is based on the presumption that the transaction to sell the asset or transfer the liability takes place either:

- In the principal market for the asset or liability, or
- In the absence of a principal market, in the most advantageous market for the asset or liability

The principal or the most advantageous market must be accessible by the SPV Group.

The fair value of an asset or a liability is measured using the assumptions that market participants would use when pricing the asset or liability, assuming that market participants act in their economic best interest.

A fair value measurement of a non-financial asset takes into account a market participant's ability to generate economic benefits by using the asset in its highest and best use or by selling it to another market participant that would use the asset in its highest and best use.

The SPV Group uses valuation techniques that are appropriate in the circumstances and for which sufficient data are available to measure fair value, maximising the use of relevant observable inputs and minimising the use of unobservable inputs.

All assets and liabilities for which fair value is measured or disclosed in the Special Purpose Combined Financial Statements are categorised within the fair value hierarchy, described as follows, based on the lowest level input that is significant to the fair value measurement as a whole:

Level 1 - Quoted (unadjusted) market prices in active markets for identical assets or liabilities
Level 2- Valuation techniques for which the lowest level input that is significant to the fair value measurement is directly or indirectly observable
Level 3 -Valuation techniques for which the lowest level input that is significant to the fair value measurement is unobservable

For assets and liabilities that are recognised in the Special Purpose Combined Financial Statements on a recurring basis, the SPV Group determines whether transfers have occurred between levels in the hierarchy by re-assessing categorisation (based on the lowest level input that is significant to the fair value measurement as a whole) at the end of each reporting period.

At each reporting date, the Management analyses the movements in the values of assets and liabilities which are required to be remeasured or re-assessed as per the group accounting policies. For this analysis, the Management verifies the major inputs applied in the latest valuation by agreeing the information in the valuation computation to contracts and other relevant documents.

The Management also compares the change in the fair value of each asset and liability with relevant external sources to determine whether the change is reasonable.

For the purpose of fair value disclosures, the SPV Group has determined classes of assets and liabilities on the basis of the nature, characteristics and risks of the asset or liability and the level of the fair value hierarchy as explained above.

This note summarises accounting policy for fair value. Other fair value related disclosures are given in the relevant notes as below.

- Disclosures for valuation methods, significant estimates and assumptions
- Quantitative disclosures of fair value measurement hierarchy
- Investment properties
- Financial instruments (including those carried at amortised cost)

Revenue Recognition

Revenue from contract with customers
Revenue from contracts with customers is recognised upon transfer of control of the promised goods or services to the customers at an amount that reflects the consideration the SPV Group expects to be entitled in exchange

for those goods or services, net of indirect taxes, penalties, or other similar items. The SPV Group has generally concluded that it is the principal in its revenue arrangements, because it typically controls the goods or services before transferring them to the customers.

Revenue from goods and services related to construction and operation of highways primarily include (i) income arising on toll collection, (ii) Construction/operational and maintenance income and (iii) fixed annuity income under Service concession agreements. The accounting policies for the specific revenue streams of the SPV Group are summarized below:

Construction revenue
Revenue from Construction contracts are recognised over time to the extent of performance obligation satisfied and control is transferred to the Customer and revenue is recognised using the percentage completion method. The stage of completion is assessed by reference to cost incurred. Contract costs are recognised as an expense in the Statement of Profit and Loss in the accounting periods in which the work to which they relate is performed.

Change of scope services includes services performed for MoRTH/NHAI other than mentioned in a service concession arrangement. Revenue related to change of scope services, utility shifting services, its supervision and other claims (demonetisation relief, Covid relief etc.) are accounted for when there is certainty of realization and can be measured reliably.

Amounts received as advance from customer are disclosed in the Special Purpose Combined Balance Sheet as contract liability and termed as “Advances from customer”. The amounts billed on customer for work performed and are unconditionally due for payment i.e. only passage of time is required before payment falls due, are disclosed in the Special Purpose Combined Balance Sheet as “Trade Receivables”.

Operational and maintenance Income
SPV group is required to carry out operations and maintenance on the road annually with an obligation to carry out periodic maintenance in terms of the concession at regular intervals. Revenue is recognized when services are performed and contractually billable.

Income from Service Concession Arrangement (Finance Income)
SPVs having unconditional contractual right to receive cash i.e. fixed annuity recognise the considerations given by the grantor i.e. MoRTH/NHAI in accordance with the Appendix D to Ind AS 115 – Service Concession Arrangements under financial assets model. Under financial assets model, asset SPV has an unconditional contractual right to receive cash during concession period. The finance income is calculated on the basis of the effective interest rate in accordance with the Ind AS 109. Such income is duly adjusted for any variation in the amount and timing of the cash flows in the period in which such variation occurs. Finance income is accounted for as other operating income.

Income arising from Toll Collection
SPVs which are entitled to Toll collections from the users of the infrastructure facility constructed by it under the Service Concession Arrangement recognise income upon completion of the performance obligation which largely coincides with actual toll collection from the user i.e. when the traffic passes through toll plazas.

Annual toll passes provide users the right to access and use the toll road for a specified period. The SPV Group’s obligation is to provide continuous access over the validity period of the pass. Toll revenue, including revenue from passes, is recognized in the Statement of Profit and Loss as and when the right to collect toll arises in accordance with the concession arrangement. Revenue from sale of smart card is recognised as and when the cards are issued to the Users.

Variable Consideration
The nature of the SPV Group’s contracts gives rise to several types of variable consideration, including claims, award, change in law, liquidated damages and penalties. The SPV Group recognizes revenue for variable consideration when it is probable that a significant reversal in the amount of cumulative revenue recognized will not occur.

The SPV Group’s claim for extra work and escalation in rates relating to execution of contracts are recognized as revenue in the year in which said claims are finally accepted by the customers.

Contract balances

Contract assets

A contract asset is the right to consideration in exchange for goods or services transferred to the customer. If an asset SPV performs by transferring goods or services to a customer before the customer pays consideration or before payment is due, a contract asset is recognised for the earned consideration that is conditional.

Contract assets represent revenue recognized in excess of amounts billed and include unbilled receivables. Unbilled receivables, which represent an unconditional right to payment subject only to the passage of time, are reclassified to accounts receivable when they are billed under the terms of the contract.

Contract assets are subject to impairment assessment. Refer to accounting policies on impairment of financial assets in Financial instruments – initial recognition and subsequent measurement

Trade receivables

A receivable is recognised if an amount of consideration that is unconditional (i.e., only the passage of time is required before payment of the consideration is due). Refer to accounting policies of financial assets in section financial instruments – initial recognition and subsequent measurement.

Contract liabilities

A contract liability is the obligation to transfer goods or services to a customer for which SPV Group has received consideration (or an amount of consideration is due) from the customer. If a customer pays consideration before SPV Group transfers goods or services to the customer, a contract liability is recognised when the payment is received, or the payment is due (whichever is earlier). Contract liabilities are recognised as revenue when SPV Group performs under the contract (i.e., transfers control of the related goods or services to the customer).

Other income

Interest income

For all financial instruments measured at amortized cost, interest income is recorded using effective interest rate (EIR), which is the rate that exactly discounts the estimated future cash payments or receipts through the expected life of the financial instruments or a shorter period, where appropriate, to the net carrying amount of the financial asset. Interest income is included in other income in the statement of profit and loss.

Others

Other income includes gain on sale of investments, insurance proceeds and other miscellaneous income. Other Income is recognised when right to receive is established.

Government Grants

Government grants relating to construction and upgradation of infrastructure are considered as a part of total outlay of the construction project and are reduced from the cost of such project appearing under intangible assets

Taxes

Tax expense comprises current tax expense and deferred tax.

Current income tax

Current income tax assets and liabilities are measured at the amount expected to be recovered from or paid to the taxation authorities. The tax rates and tax laws used to compute the amount are those that are enacted or substantively enacted, at the reporting date in the country where the SPV Group operates and generates taxable income.

Current income tax relating to items recognised outside profit or loss is recognised outside profit or loss (either in other comprehensive income or in equity). Current tax items are recognised in correlation to the underlying transaction either in OCI or directly in equity. Management periodically evaluates positions taken in the tax returns with respect to situations in which applicable tax regulations are subject to interpretation and considers whether it is probable that a taxation authority will accept an uncertain tax treatment. The SPV Group reflects the effect of uncertainty for each uncertain tax treatment by using either most likely method or expected value method, depending on which method predicts better resolution of the treatment.

Deferred Tax
Deferred tax is provided using the balance sheet approach on temporary differences between the tax base of assets and liabilities and their carrying amounts for financial reporting purposes at the reporting date. Deferred tax assets and liabilities are measured at the tax rates that are expected to apply in the year when the asset is realised, or the liability is settled, based on tax rates (and tax laws) that have been enacted or substantively enacted at the reporting date. Deferred tax relating to items recognised outside profit or loss is recognised outside profit or loss (either in other comprehensive income or in equity). Deferred tax items are recognised in correlation to the underlying transaction either in OCI or directly in equity. Deferred tax assets are recognised to the extent that it is probable that future taxable profits will be available against which they can be used. Deferred tax liabilities are recognised for all taxable temporary differences. The existence of unused tax losses is strong evidence that future taxable profit may not be available. Therefore, in case of a history of recent losses, SPV Group recognises a deferred tax asset only to the extent that it has sufficient taxable temporary differences or there is convincing other evidence that sufficient taxable profit will be available against which such deferred tax asset can be realised. Deferred tax assets – unrecognised or recognised, are reviewed at each reporting date and are recognised/ reduced to the extent that it is probable/ no longer probable respectively that the related tax benefit will be realised.

The SPV Group offsets deferred tax assets and deferred tax liabilities if and only if it has a legally enforceable right to set off current tax assets and current tax liabilities and the deferred tax assets and deferred tax liabilities, relate to income taxes levied by the same taxation authority on either the same taxable entity or different taxable entities which intend either to settle current tax liabilities and assets on a net basis, or to realise the assets and liabilities simultaneously, in each future period in which significant amounts of deferred tax liabilities or assets are expected to be settled or recovered.

Minimum alternate tax (MAT) paid in a year is charged to the statement of profit and loss as current tax for the year. The deferred tax asset is recognised for MAT credit available only to the extent that it is probable that the concerned company will pay normal income tax during the specified period, i.e., the period for which MAT credit is allowed to be carried forward. In the year in which the company recognizes MAT credit as an asset, it is created by way of credit to the statement of profit and loss and shown as part of deferred tax asset. The SPV Group reviews the "MAT credit entitlement" asset at each reporting date and writes down the asset to the extent that it is no longer probable that it will pay normal tax during the specified period.

Goods and Services Tax (GST)
Expenses and assets are recognised net of the amount of GST paid, except:
- When the tax incurred on a purchase of assets or services is not recoverable from the taxation authority, in which case, the tax paid is recognised as part of the cost of acquisition of the asset or as part of the expense item, as applicable
- When receivables and payables are stated with the amount of tax included

The net amount of tax recoverable from, or payable to, the taxation authority is included as part of other current/non-current assets/ liabilities in the balance sheet.

Property, Plant and Equipment
Items of Property, plant and equipment are stated at cost, net of accumulated depreciation and accumulated impairment losses, if any. Such cost includes the cost of replacing part of the plant and equipment and borrowing costs for qualifying assets if the recognition criteria are met. All repair and maintenance costs are recognised in profit or loss as incurred. Freehold land is carried at historical cost.

Subsequent Cost
The cost of replacing part of an item of property, plant and equipment is recognised in the carrying amount of the item if it is probable that the future economic benefits embodied within the part will flow to the SPV Group and its cost can be measured reliably. The carrying amount of the replaced part is de-recognised. The costs of the day-to-day servicing of property, plant and equipment are recognised in the Statement of Profit and Loss.
Depreciation is calculated on a straight-line basis over the estimated useful lives of assets.
The SPV Group provides depreciation based on following useful life:

Asset Class	Estimated Useful Life	Useful life as per Schedule II of the Companies Act
Building	50 Years	60 Years
Plant and equipment	5-15 Years	5-15 Years
Vehicles	5-10 Years	8 – 10 Years
Furniture and fixtures & Electrical installation	10 Years	10 Years

Asset Class	Estimated Useful Life	Useful life as per Schedule II of the Companies Act
Office equipment	5 Years	5 Years
Computers	3 Years	3-6 Years
Leasehold improvements	3 Years	NA

The management believes that these estimated useful lives are realistic and reflect fair approximation of the period over which the assets are likely to be used.

The residual values, useful lives and methods of depreciation of property, plant and equipment are reviewed at each financial year end and adjusted prospectively, if appropriate.

An item of property, plant and equipment and any significant part initially recognised is derecognised upon disposal or when no future economic benefits are expected from its use or disposal. Any gain or loss arising on derecognition of the asset (calculated as the difference between the net disposal proceeds and the carrying amount of the asset) is included in the statement of profit and loss when the asset is derecognised.

Investment properties
Investment property comprises completed property (land or a building or part of a building or both) that is held, or to be held, to earn rentals or for capital appreciation or both. Property held under a lease is classified as investment property when it is held to earn rentals or for capital appreciation or both. It does not include property held use in the supply of goods or services or for administrative purposes, nor it includes property held for sale in the ordinary course of business.

Investment properties are measured initially at cost, including transaction costs. Subsequent to initial recognition, investment properties are stated at cost less accumulated depreciation and accumulated impairment loss, if any.

The cost includes the cost of replacing parts and borrowing costs for qualifying assets if the recognition criteria is met. When significant parts of the investment properties are required to be replaced at intervals, the SPV Group depreciates them separately based on their specific useful lives. All other repair and maintenance costs are recognised in profit or loss as incurred.

Investment properties are depreciated using the straight line method over the estimated useful lives. Investment properties have a useful life of 50 years. The management believes that these estimated useful lives are realistic and reflect fair approximation of the period over which the assets are likely to be used.

Though the SPV Group measures investment properties using cost-based measurement, the fair value of investment properties are disclosed in the notes. Fair values are determined based on an annual evaluation performed by an accredited external independent valuer applying a valuation model.

Investment properties are derecognised either when they have been disposed of or when they are permanently withdrawn from use and no future economic benefit is expected from their disposal. The difference between the net disposal proceeds and the carrying amount of the asset is recognised in profit or loss in the period of derecognition.

Transfers are made to (or from) investment properties only when there is a change in use. Transfers between investment property and owner-occupied property do not change the carrying amount of the property transferred and they do not change the cost of that property for measurement or disclosure purposes.

Intangible Assets Under Service Concession Arrangements
Toll collection rights obtained in consideration for rendering construction services, represent the right to collect toll revenue from the users of the public service (road) during the concession period in respect of Build-Operate-Transfer ("BOT") and design, build, finance, operate and transfer (DBFOT) project undertaken by the asset SPVs.

Intangible Assets i.e. Right to collect toll/tariff are recognised when the SPV Group has been granted rights to charge a toll/tariff from the users of such public services and such rights do not confer an unconditional right on the SPV Group to receive cash or another financial asset and when it is probable that future economic benefits associated with the rights will flow to the SPV Group and the cost of the asset can be measured reliably.

Under the Concession Agreements, where the SPV Group has received the right to charge users of the public service, such rights are recognised and classified as "Intangible Assets" in accordance with Appendix C- 'Service Concession Arrangements' of Ind AS 115- 'Revenue from Contracts with Customers'. Such right is not an unconditional right to receive consideration because the amounts are contingent to the extent that the public uses the service. Toll collection rights are capitalized as intangible assets upon completion of the project when the asset SPV receives the completion certificate from the MoRTH/NHAI/SRDC as specified in the Concession Agreement, at the cumulative construction costs (including related margins) plus the present value of base obligation towards negative grants and additional concession fee payable to MoRTH/NHAI/SRDC, if any. Additional concession fee payable above base obligation is recognised as other expense.

Till completion of construction of the project, such arrangements are recognised as "Intangible assets under development" and are recognised at cumulative construction cost (including related margins) and borrowing costs if the recognition criteria are met. The other income received during the construction period is reduced from the carrying amount of Intangible assets under development.

An asset carried under concession arrangements is derecognized on disposal or when no future economic benefits are expected from its future use or disposal. Extension of concession period by the authority in compensation for claims made by the asset SPV are considered by the Management while determining useful lives of the toll collection rights when it is probable that such claims will be received and can be measured reliably.

The intangible assets which are recognised in the form of right to charge users of the infrastructure asset are amortized over period of operation of the facility on a straight line basis.

Intangible assets are assessed for impairment whenever there is an indication that the intangible asset may be impaired. The amortisation period and the amortisation method for an intangible asset are reviewed at least at the end of each reporting period. Changes in the expected useful life or the expected pattern of consumption of future economic benefits embodied in the asset are considered to modify the amortisation period or method, as appropriate, and are treated as changes in accounting estimates. The amortisation expense on intangible assets is recognised in the statement of profit and loss unless such expenditure forms part of carrying value of another asset.

Other Intangible assets
Intangible assets acquired separately are measured on initial recognition at cost. Following initial recognition, intangible assets are carried at cost less any accumulated amortisation and accumulated impairment losses.

Other intangible assets comprise of cost for software and other application software acquired.

Intangible assets with finite lives are amortised over the useful economic life and assessed for impairment whenever there is an indication that the intangible asset may be impaired. The amortisation period and the amortisation method for an intangible asset with a finite useful life are reviewed at least at the end of each reporting period. Changes in the expected useful life or the expected pattern of consumption of future economic benefits embodied in the asset are considered to modify the amortisation period or method, as appropriate, and are treated as changes in accounting estimates. The amortisation expense on intangible assets with finite lives is recognised in the statement of profit and loss unless such expenditure forms part of carrying value of another asset.

An intangible asset is derecognised upon disposal (i.e., at the date the recipient obtains control) or when no future economic benefits are expected from its use or disposal. Any gain or loss arising upon derecognition of the asset (calculated as the difference between the net disposal proceeds and the carrying amount of the asset) is included in the statement of profit and loss when the asset is derecognised.

Premium Deferment
Premium Deferral (i.e., premium payable less paid after adjusting premium deferment) is aggregated under premium deferred obligation in the Combined Balance Sheet. The interest payable on the above is aggregated under premium deferral obligation. Present value of minimum/fixed deferred premium is capitalised as part of intangible assets.

Borrowing Costs

Borrowing costs directly attributable to the acquisition or construction of an asset that necessarily takes a substantial period of time to get ready for its intended use or sale (qualifying asset) are capitalised as part of the cost of the asset. All other borrowing costs are expensed in the period in which they occur. Borrowing costs consist of interest and other costs that an entity incurs in connection with the borrowing of funds.

Borrowing costs includes interest, commitment charges, brokerage, underwriting costs, discounts / premiums, financing charges and all ancillary / incidental costs incurred in connection with the arrangement of borrowing. Investment income earned on the temporary investment of specific borrowings pending their expenditure on qualifying assets is deducted from the borrowing costs eligible for capitalization.

In case of concession arrangement under intangible asset model, borrowing costs attributable to the construction of infrastructure assets are capitalized up to the date of the final completion certificate of the asset / facility received from the authority for its intended use specified in the Concession Agreement. All borrowing costs subsequent to the capitalization of the intangible assets are charged to the Statement of Profit and Loss in the period in which such costs are incurred.

Leases
The SPV Group assesses at contract inception whether a contract is, or contains, a lease. That is, if the contract conveys the right to control the use of an identified asset for a period of time in exchange for consideration

Group as a lessee
The SPV Group applies a single recognition and measurement approach for all leases, except for short-term leases and leases of low-value assets. The SPV Group recognises lease liabilities to make lease payments and right-of-use assets representing the right to use the underlying assets

Right-of-use assets
The SPV Group recognises right-of-use assets at the lease commencement date (i.e., the date the underlying asset is available for use). Right-of-use assets are measured at cost, less any accumulated depreciation and impairment losses, and adjusted for any remeasurement of lease liabilities. The cost of right-of-use assets includes the amount of lease liabilities recognised, for any lease payments made at or before the commencement date, plus any initial direct cost incurred, less any lease incentives received. Right-of-use assets are depreciated on a straight-line basis from the commencement date to the earlier of the end of the useful life or the end of the lease term, as follows:
- Buildings – 3 - 5 years

The right-of-use assets are also subject to impairment. Refer to the accounting policies in "*Impairment of non-financial assets*".

Lease Liabilities
At the commencement date of the lease, the SPV Group recognises lease liabilities measured at the present value of lease payments to be made over the lease term. The lease payments include fixed payments (including in substance fixed payments) less any lease incentives receivable, variable lease payments that depend on an index or a rate, and amounts expected to be paid under residual value guarantees., In calculating the present value of lease payments, the SPV Group uses its incremental borrowing rate at the lease commencement date because the interest rate implicit in the lease is not readily determinable. After the commencement date, the amount of lease liabilities is increased to reflect the accretion of interest and reduced for the lease payments made. In addition, the carrying amount of lease liabilities is remeasured if there is a modification, a change in the lease term, a change in the lease payments (e.g., changes to future payments resulting from a change in an index or rate used to determine such lease payments) or a change in the assessment of an option to purchase the underlying asset.

Lease payments on short-term leases and leases of low-value assets are recognised as expense on a straight-line basis over the lease term.

Impairment of non-financial assets
The SPV Group assesses, at each reporting date, whether there is an indication that an asset may be impaired. If any indication exists, or when annual impairment testing for an asset is required, the SPV Group estimates the asset's recoverable amount. An asset's recoverable amount is the higher of an assets or cash-generating unit's (CGU) fair value less costs of disposal and its value in use. The recoverable amount is determined for an individual asset, unless the asset does not generate cash inflows that are largely independent of those from other assets or group of assets. When the carrying amount of an asset or CGU exceeds its recoverable amount, the

asset is considered impaired and is written down to its recoverable amount.

In assessing value in use, the estimated future cash flows are discounted to their present value using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset. In determining fair value less costs of disposal, recent market transactions are taken into account. If no such transactions can be identified, an appropriate valuation model is used. These calculations are corroborated by valuation multiples, quoted share prices for publicly traded companies or other available fair value indicators.
Impairment losses of non-financial assets are recognised in the statement of profit and loss.

For assets excluding goodwill, an assessment is made at each reporting date to determine whether there is an indication that previously recognised impairment losses no longer exist or have decreased. If such indication exists, the SPV Group estimates the asset's or CGU's recoverable amount. A previously recognised impairment loss is reversed only if there has been a change in the assumptions used to determine the asset's recoverable amount since the last impairment loss was recognised. The reversal is limited so that the carrying amount of the asset does not exceed its recoverable amount, nor exceed the carrying amount that would have been determined, net of depreciation/amortization, had no impairment loss been recognised for the asset in prior years. Such reversal is recognised in the statement of profit or loss unless the asset is carried at a revalued amount, in which case, the reversal is treated as a revaluation increase.

Provisions and Contingent liabilities

Provisions
Provisions are recognised when the SPV Group has a present obligation (legal or constructive) as a result of past event, it is probable that an outflow of resources embodying economic benefits will be required to settle the obligation and a reliable estimate can be made of the amount of the obligation. These are reviewed at each balance sheet date and adjusted to reflect the current best estimates. The expense relating to a provision is presented in the statement of profit and loss net of any reimbursement.

If the effect of the time value of money is material, provisions are discounted using a current pre-tax rate that reflects, when appropriate, the risks specific to the liability. When discounting is used, the increase in the provision due to the passage of time is recognised as a finance cost.

Provision for Major Maintenance
As per the concession agreements, the SPV Group is obligated to carry out major maintenance of the roads under concession. The SPV Group estimates the likely provision required towards the same and accrues the cost on a straight-line basis over the period at the end of which maintenance would be required, in the Combined Statement of Profit and Loss.

The SPV Group estimates and provides for contractual obligations as per SCA with the Concessionaire to restore the infrastructure to a specified level of serviceability at periodic intervals during the SCA period or before it is handed over to the Concessionaire. These estimates are corroborated through purchase orders/ work orders placed or to be placed by the SPV Group as per the periodical maintenance estimate reports issued by an independent field expert and major maintenance strategy/ methodology approved by the Independent Consultant appointed by the Concessionaire.

As the estimated cost is based on the various assumptions such as current infrastructure (road, pavements, etc.) condition, expected timings of costs, inflation in material cost, discount rate, government policies etc., hence the management is required to apply judgement over these factors for revalidating the provision for expenses which is reviewed at each reporting date.

Contingent liability
Contingent liability is

(a) a possible obligation arising from past events and whose existence will be confirmed only by the occurrence or non-occurrence of one or more uncertain future events not wholly within the control of the entity, or
(b) a present obligation that arises from past events but is not recognised because:
- it is not probable that an outflow of resources embodying economic benefits will be required to settle the obligation, or

- the amount of the obligation cannot be measured with sufficient reliability.

The SPV Group does not recognize a contingent liability, but it discloses its existence and other required disclosures in notes to the financial statements, unless the possibility of any outflow of resources in settlement is remote.

Contingent Asset

A contingent asset is a possible asset that arises from past events and whose existence will be confirmed only by- the occurrence or non-occurrence of one or more uncertain future events not wholly within the control of the entity. The SPV Group does not recognize the contingent asset in its special purpose combined financial statements since this may result in the recognition of income that may never be realised. Where an inflow of economic benefits is probable, the SPV Group disclose a brief description of the nature of contingent assets at the end of the reporting period. However, when the realisation of income is virtually certain, then the related asset is not a contingent asset and the SPV recognize such assets.

Provisions, contingent liabilities and contingent assets are reviewed at each reporting date.

Retirement and other employee benefits:

The SPV Group provides post-employment benefits through various defined contribution and defined benefit plans.

Defined contribution plans (Provident Fund)

Retirement benefit in the form of provident fund is a defined contribution scheme. The SPV Group has no obligation, other than the contribution payable to the provident fund. The SPV Group recognizes contribution payable to the provident fund scheme as an expense, when an employee renders the related service. If the contribution payable to the scheme for service received before the balance sheet date exceeds the contribution already paid, the deficit payable to the scheme is recognized as a liability after deducting the contribution already paid.

Defined benefit plans (Gratuity)

Post-employment benefit in the form of gratuity fund scheme is a defined benefit plan. The cost of providing benefits under the defined benefit plan is determined using projected unit credit method ('PUCM').

Remeasurements, comprising of actuarial gains and losses, the effect of the asset ceiling, excluding amounts included in net interest on the net defined benefit liability and the return on plan assets (excluding amounts included in net interest on the net defined benefit liability), are recognised immediately in the balance sheet with a corresponding debit or credit to retained earnings through OCI in the period in which they occur. Remeasurements are not reclassified to the statement of profit and loss in subsequent periods.

Past service costs are recognised in statement of profit and loss on the earlier of:

- The date of the plan amendment or curtailment, and
- The date on which the SPV Group recognises related restructuring costs

Net interest is calculated by applying the discount rate to the net defined benefit liability or asset. The SPV Group recognises the following changes in the net defined benefit obligation as an expense in the Special Purpose Combined Statement of Profit and Loss:

- Service costs comprising current service costs, past-service costs, gains and losses on curtailments and non-routine settlements; and
- Net interest expense or income

Short term benefits

Short term employee benefit obligations are measured on an undiscounted basis and are expensed as a related service provided. A liability is recognized for the amount expected to be paid under short term cash bonus or profit sharing plans if the SPV Group has a present legal or constructive obligation to pay this amount as a result of past service provided by the employee and the obligation can be estimated reliably.

Provision for Compensated absences

Accumulated leave, which is expected to be utilized within the next 12 months, is treated as short-term employee benefit. The SPV Group measures the expected cost of such absences as the additional amount that it expects to pay as a result of the unused entitlement that has accumulated at the reporting date. The SPV Group recognizes expected cost of short-term employee benefit as an expense, when an employee renders the related service.

The SPV Group treats accumulated leave expected to be carried forward beyond twelve months, as long-term employee benefit for measurement purposes.

Such long-term compensated absences are provided for based on the actuarial valuation using the projected unit credit method at the reporting date. Remeasurement gains/losses are immediately taken to the statement of profit and loss and are not deferred. The obligations are presented as current liabilities in the balance sheet if the entity does not have an unconditional right to defer the settlement for at least twelve months after the reporting date.

Financial instruments
A financial instrument is any contract that gives rise to a financial asset of one entity and a financial liability or equity instrument of another entity.

Financial assets:
Initial recognition and measurement
Financial assets are classified, at initial recognition, and subsequently measured at amortised cost, fair value through other comprehensive income (OCI), and fair value through profit or loss.

The classification of financial assets at initial recognition depends on the financial asset's contractual cash flow characteristics and the SPV Group's business model for managing them. With the exception of trade receivables that do not contain a significant financing component or for which the SPV Group has applied the practical expedient, the SPV Group initially measures a financial asset at its fair value plus, in the case of a financial asset not at fair value through profit or loss, transaction costs. Trade receivables that do not contain a significant financing component or for which the SPV Group has applied the practical expedient are measured at the transaction price determined under Ind AS 115. Refer to the accounting policies in section Revenue from contracts with customers.

In order for a financial asset to be classified and measured at amortised cost or fair value through OCI, it needs to give rise to cash flows that are 'solely payments of principal and interest (SPPI)' on the principal amount outstanding. This assessment is referred to as the SPPI test and is performed at an instrument level. Financial assets with cash flows that are not SPPI are classified and measured at fair value through profit or loss, irrespective of the business model.

The SPV Group's business model for managing financial assets refers to how it manages its financial assets in order to generate cash flows. The business model determines whether cash flows will result from collecting contractual cash flows, selling the financial assets, or both. Financial assets classified and measured at amortised cost are held within a business model with the objective to hold financial assets in order to collect contractual cash flows while financial assets classified and measured at fair value through OCI are held within a business model with the objective of both holding to collect contractual cash flows and selling.

Subsequent measurement
For purposes of subsequent measurement, financial assets are classified in two categories:
- Financial assets at amortised cost (debt instruments)
- Financial assets at fair value through profit or loss

There are no financial assets designated at fair value through OCI.

Financial assets at amortised cost:
A 'financial asset' is measured at the amortised cost if both the following conditions are met:
a. The asset is held within a business model whose objective is to hold assets for collecting contractual cash flows, and
b. Contractual terms of the asset give rise on specified dates to cash flows that are solely payments of principal and interest (SPPI) and interest (SPPI) on the principal amount outstanding.

This category is the most relevant to the SPV Group. After initial measurement, such financial assets are subsequently measured at amortised cost using the effective interest rate (EIR) method and are subject to impairment as per the accounting policy applicable to 'Impairment of financial assets.' Amortised cost is calculated by taking into account any discount or premium on acquisition and fees or costs that are an integral part of the EIR. The EIR amortisation is included in other income in the profit or loss. The losses arising from impairment are recognised in the profit or loss. The SPV Group's financial assets at amortised cost includes receivables under service concession agreements, trade receivables, and security deposits.

Financial assets at fair value through profit or loss:
Financial assets in this category are those that are held for trading and have been either designated by management upon initial recognition or are mandatorily required to be measured at fair value under Ind AS 109 i.e. they do not meet the criteria for classification as measured at amortised cost or FVOCI. Management only designates an instrument at FVTPL upon initial recognition, if the designation eliminates, or significantly reduces, the inconsistent treatment that would otherwise arise from measuring the assets or liabilities or recognising gains or losses on them on a different basis. Such designation is determined on an instrument-by-instrument basis.
Financial assets at fair value through profit or loss are carried in the balance sheet at fair value with net changes in fair value recognised in the statement of profit and loss.

Derecognition
A financial asset (or, where applicable, a part of a financial asset or part of a group of similar financial assets) is primarily derecognised (i.e. removed from the SPV Group's Special Purpose Combined Balance Sheet) when:

- The rights to receive cash flows from the asset have expired, or
- The SPV Group has transferred its rights to receive cash flows from the asset or has assumed an obligation to pay the received cash flows in full without material delay to a third party under a 'pass-through' arrangement; and either (a) the SPV Group has transferred substantially all the risks and rewards of the asset, or (b) the SPV Group has neither transferred nor retained substantially all the risks and rewards of the asset, but has transferred control of the asset.

When the SPV Group has transferred its rights to receive cash flows from an asset or has entered into a pass-through arrangement, it evaluates if and to what extent it has retained the risks and rewards of ownership. When it has neither transferred nor retained substantially all of the risks and rewards of the asset, nor transferred control of the asset, the SPV Group continues to recognise the transferred asset to the extent of the SPV Group's continuing involvement. In that case, the SPV Group also recognises an associated liability. The transferred asset and the associated liability are measured on a basis that reflects the rights and obligations that the SPV Group has retained.Continuing involvement that takes the form of a guarantee over the transferred asset is measured at the lower of the original carrying amount of the asset and the maximum amount of consideration that the SPV Group could be required to repay.

Impairment of financial assets:
Further disclosures relating to impairment of financial assets are also provided in the following notes:
- Disclosures for significant assumptions –note 2(C)
- Trade receivables and contract assets – note 2.3

For trade receivables and contract assets, the SPV Group applies a simplified approach in calculating ECLs. Therefore, the SPV Group does not track changes in credit risk, but instead recognises a loss allowance based on lifetime ECLs at each reporting date.

For financial assets other than service concession receivables, as per Ind AS 109, the SPV Group considers a financial asset in default when contractual payments are past due. However, in certain cases, the SPV Group may also consider a financial asset to be in default when internal or external information indicates that the SPV Group is unlikely to receive the outstanding contractual amounts in full before taking into account any credit enhancements held by the SPV Group. A financial asset is written off when there is no reasonable expectation of recovering the contractual cash flows. The SPV Group's service concession receivables do not contain significant financing component and loss allowance on service concession receivables is measured at an amount equal to lifetime expected losses i.e. expected cash shortfall.

The impairment losses and reversals are recognised in statement of profit and loss.

Reclassification of financial assets
The SPV Group determines classification of financial assets on initial recognition. For financial assets which are debt instruments, a reclassification is made only if there is a change in the business model for managing those assets. Changes to the business model are expected to be infrequent. The SPV Group's senior management determines change in the business model as a result of external or internal changes which are significant to the SPV Group's operations. Such changes are evident to external parties. A change in the business model occurs when the SPV Group either begins or ceases to perform an activity that is significant to its operations. If the SPV Group reclassifies financial assets, it applies the reclassification prospectively from the reclassification

date which is the first day of the immediately next reporting period following the change in business model. The SPV Group does not restate any previously recognised gains, losses (including impairment gains or losses) or interest.

Modification of Cash Flows of financial assets and revision in estimates of Cash flows
When the contractual cash flows of a financial asset are renegotiated or otherwise modified and the renegotiation or modification does not result in the derecognition of that financial asset in accordance with Ind AS 109, the SPV Group recalculates the gross carrying amount of the financial asset and recognizes a modification gain or loss in profit or loss. The gross carrying amount of the financial asset is recalculated as the present value of the renegotiated or modified contractual cash flows that are discounted at the financial asset's original effective interest rate. Any costs or fees incurred are adjusted to the carrying amount of the modified financial asset and are amortized over the remaining term of the modified financial asset.

If the SPV Group revises its estimates of payments or receipts (excluding modifications and changes in estimates of expected credit losses), it adjusts the gross carrying amount of the financial asset or amortized cost of a financial liability to reflect actual and revised estimated contractual cash flows. The SPV Group recalculates the gross carrying amount of the financial asset or amortized cost of the financial liability as the present value of the estimated future contractual cash flows that are discounted at the financial instrument's original effective interest rate. The adjustment is recognized in statement of profit and loss.

Financial Liabilities:
Initial recognition, measurement and presentation
Financial liabilities are classified, at initial recognition, as financial liabilities at fair value through profit or loss, loans and borrowings, payables, as appropriate.

All financial liabilities are recognised initially at fair value and, in the case of loans and borrowings and payables, net of directly attributable transaction costs.

The SPV Group's financial liabilities include trade payables, loans and borrowings including bank overdrafts and other financial liabilities.

Subsequent measurement
For purposes of subsequent measurement, financial liabilities are classified in two categories:
- Financial liabilities at fair value through profit or loss
- Financial liabilities at amortised cost (loans and borrowings)

Financial liabilities at fair value through profit or loss
Financial liabilities at fair value through profit or loss include financial liabilities held for trading and financial liabilities designated upon initial recognition as at fair value through profit or loss.
Financial liabilities are classified as held for trading if they are incurred for the purpose of repurchasing in the near term.
Gains or losses on liabilities held for trading are recognised in the profit or loss.

Financial liabilities are designated upon initial recognition as at fair value through profit or loss only if the criteria in Ind AS 109 are satisfied. For liabilities designated as FVTPL, fair value gains/ losses attributable to changes in own credit risk are recognized in OCI. These gains/ losses are not subsequently transferred to P&L. However, the SPV Group may transfer the cumulative gain or loss within equity. All other changes in fair value of such liability are recognised in the statement of profit and loss. The SPV Group has not designated any financial liability at fair value through profit or loss.

Financial liabilities at amortised cost (Loans and borrowings)
This is the category most relevant to the SPV Group. After initial recognition, interest-bearing loans and borrowings are subsequently measured at amortised cost using the EIR method. Gains and losses are recognised in profit or loss when the liabilities are derecognised as well as through the EIR amortisation process.
Amortised cost is calculated by taking into account any discount or premium on acquisition and fees or costs that are an integral part of the EIR. The EIR amortisation is included as finance costs in the statement of profit and loss.
This category generally applies to borrowings.

Derecognition

A financial liability is derecognised when the obligation under the liability is discharged or cancelled or expires. When an existing financial liability is replaced by another from the same lender on substantially different terms, or the terms of an existing liability are substantially modified, such an exchange or modification is treated as the derecognition of the original liability and the recognition of a new liability. The difference in the respective carrying amounts is recognised in the statement of profit and loss.

Offsetting of financial instruments
Financial assets and financial liabilities are offset and the net amount is reported in the Special Purpose Combined Balance Sheet if there is a currently enforceable legal right to offset the recognised amounts and there is an intention to settle on a net basis, to realise the assets and settle the liabilities simultaneously.

Convertible preference shares:
Convertible preference shares are separated into liability and equity components based on the terms of the contract.

On issuance of the convertible preference shares, the fair value of the liability component is determined using a market rate for an equivalent non-convertible instrument. This amount is classified as a financial liability measured at amortised cost (net of transaction costs) until it is extinguished on conversion or redemption.

The remainder of the proceeds is allocated to the conversion option that is recognised and included in equity since conversion option meets Ind AS 32 criteria for fixed to fixed classification. Transaction costs are deducted from equity, net of associated income tax. The carrying amount of the conversion option is not remeasured in subsequent years.

Transaction costs are apportioned between the liability and equity components of the convertible preference shares based on the allocation of proceeds to the liability and equity components when the instruments are initially recognised.

Equity vs. financial liability classification:
An equity instrument is any contract that evidences a residual interest in the assets of an entity after deducting all of its liabilities. Equity instruments issued by the SPV Group are recognised at the proceeds received, net of direct issue costs. The SPV Group classifies a financial instrument issued by it as equity instrument only if below conditions are met:

- The instrument includes no contractual obligation to deliver cash or another financial asset to another entity. Nor it includes any obligation to exchange financial assets or financial liabilities with another entity under conditions that are potentially unfavourable to the issuer.
- If the instrument will, or may, be settled in the SPV Group's own equity instruments, it is non-derivative instrument that includes no contractual obligation for the SPV Group to deliver a variable number of its own equity instruments. If the instrument is derivative, then it should be settled only by the SPV Group exchanging a fixed amount of cash or another financial asset for a fixed number of its own equity instruments. All other instruments are classified as financial liability and accounted for using the accounting policy applicable to the Financial Liabilities.

Cash and Cash Equivalents:
Cash and cash equivalent in the balance sheet comprise cash at banks and on hand and short-term deposits with an original maturity of three months or less, that are readily convertible to a known amount of cash and subject to an insignificant risk of changes in value.

Cash flow statement
Special Purpose Combined Cash flow statement is prepared segregating the cash flows from operating, investing and financing activities. Cash flow from operating activities is reported using indirect method. Under the indirect method, the net profit/(loss) is adjusted for the effects of:
a) transactions of a non-cash nature;
b) any deferrals or accruals of past or future operating cash receipts or payments; and
c) all other items of income or expense associated with investing or financing cash flows.

The cash flows from operating, investing and financing activities of the SPVs are segregated based on the available information. Cash and cash equivalents (including bank balances) are reflected as such in the cash flow statement. Those cash and cash equivalents which are not available for general use as on the date of

Balance Sheet are also included under this category with a specific disclosure.

Earnings per unit:
Basic earnings per unit is calculated by dividing the net profit or loss for the period/year attributable to unit holders (after deducting attributable taxes) by the weighted average number of units outstanding during the period/year. For the purpose of calculating diluted earnings per unit, the net profit or loss for the period/year attributable to unit holders (after deducting attributable taxes) and the weighted average number of units outstanding during the period/year are adjusted for the effects of all dilutive potential equity units.

Segment reporting:
The SPV Group has structured its operations into one reportable segment of Construction and operation of highways. The management monitors the operating results of the activity of Construction and operation of highways for the purpose of making decisions about resource allocation and performance assessment. Segment performance is evaluated based on profit or loss and is measured consistently with profit or loss reported in the Special Purpose Combined Financial Statements. As the SPV Group's operations are structured into one reportable business segment i.e. Construction and operation of highways. Hence separate segment disclosures are not made.

Events after the reporting period
If the SPV Group receives information after the reporting period, but prior to the date of approved for issue, about conditions that existed at the end of the reporting period, it will assess whether the information affects the amounts that it recognises in its Special Purpose Combined Financial Statements. The SPV Group will adjust the amounts recognised in its Special Purpose Combined Financial Statements to reflect any adjusting events after the reporting period and update the disclosures that relate to those conditions in light of the new information. For non-adjusting events after the reporting period, the SPV Group will not change the amounts recognised in its Special Purpose Combined Financial Statements but will disclose the nature of the non-adjusting event and an estimate of its financial effect, or a statement that such an estimate cannot be made, if applicable.

Combined statement of net assets at fair value
The disclosure of Statement of Net Assets at Fair Value comprises of the fair values of the total assets and fair values of the total liabilities of individual components. The fair value of the assets are reviewed regularly by Management with reference to independent assets and market conditions existing at the reporting date, using generally accepted market practices. The independent valuers are leading independent appraisers with a recognised and relevant professional qualification and with recent experience in the location. Judgment is also applied in determining the extent and frequency of independent appraisals. Such independent appraisals and the assumptions used are reviewed at each balance sheet date.

Statement of Total Returns at Fair Value
The disclosure of total returns at fair value comprises of the total comprehensive income as per the Combined Statement of Profit and loss and other changes in fair value of investment property and intangible assets where the cost model is followed which were not recognised in total comprehensive income.

Significant accounting judgements, estimates and assumptions
The preparation of the SPV Group’s Special Purpose Combined Financial Statements requires management to make judgements, estimates and assumptions that affect the reported amounts of revenues, expenses, assets and liabilities, and the accompanying disclosures, and the disclosure of contingent liabilities. Uncertainty about these assumptions and estimates could result in outcomes that require a material adjustment to the carrying amount of assets or liabilities affected in future periods.

Other disclosures relating to the SPV Group’s exposure to risks and uncertainties includes:
- Capital management note 33
- Financial risk management objectives and policies note 29
- Sensitivity analyses disclosures note 29

In the process of applying the SPV Group’s accounting policies, management has made the following judgements and estimates, which have the most significant effect on the amounts recognised in the Special Purpose Combined Financial Statements:

Judgements

Service Concession arrangement:
The Cash flow model indicates the cash flow to be generated over the project lifecycle. The key inputs of the model comprise of annuity inflows, estimations on cost to build and maintain the asset and other operational efficiencies. These inputs are based on circumstances existing and management judgement / assumption on the future expectations based on current situations. Judgements include management view on expected earnings in future years, changes in interest rates, cost inflation, government policy changes, etc. These input assumptions could affect the reported cash flow from the related assets and accordingly these assumptions are reviewed periodically.

Defined Benefit Plan:
The cost of the defined benefit gratuity plan and the present value of the gratuity obligation are determined using actuarial valuation. An actuarial valuation involves making various assumptions that may differ from actual developments in the future. These include the determination of the discount rate, future salary increases and mortality rates. Due to the complexities involved in the valuation and its long-term nature, a defined benefit obligation is highly sensitive to changes in these assumptions. All assumptions are reviewed at each reporting date.

Estimates
Provision for Scheduled Maintenance/ Contractual obligation to restore the infrastructure to a specified level of serviceability
The SPV Group has contractual obligation to maintain the infrastructure to a specified level of serviceability or restore the infrastructure to a specified condition during the concession period and/or at the time of hand over to the grantor of the service concession agreement. Such obligations pertaining to periodic maintenance are measured at the best estimate of the expenditure that would be required to settle the obligation at the balance sheet date. In case of concession arrangements under financial asset model, such costs are recognized in the period in which such costs are actually incurred.

Impairment of Intangible assets and Service concession receivables
The SPV Group comprises entities either under Right to Toll Model or Right to Fixed Annuity Model. The SPV Group performs valuation using discounted cash flow method at each reporting date for each of such SPV which is considered as value in use for the purpose of calculation of impairment of Intangible asset (Rights under Service Concession Arrangements) or service concession receivable (as the case may be).

This valuation includes various management assumptions including revenue growth and future traffic for toll projects, expected operation and maintenance expense of highways, major maintenance of highways etc. Management has also obtained report from independent traffic consultant for revenue growth and future traffic and a report from technical consultant for estimated operation and maintenance expense/ periodic major maintenance expense for each of the SPV. These independent traffic study reports also include an assumption with respect to additional concession period over and above the present concession agreement in certain SPVs as below. These assumptions have significant implications in computation of value in use as at each reporting date.

Ahmedabad - Maliya Tollway Private Limited ("**AMTL**"): GSRDC has proposed a reduction in the concession period by 2.2 years in the First Concession Agreement on the grounds of use of different multipliers as per IRC 64 – 1990. Management is confident that classification considered by the management for computation of multiplier is appropriate and no such reduction is expected. Management has also obtained independent legal opinion in this regard. Accordingly, management has disregarded this reduction for the purpose of computation of above value in use. Theis matter is presently under arbitration. Further, an extension of 1 year period has also been considered for the purpose of computation of value in use on the basis of estimated future traffic and rights of AMTL under present Service Concession Agreement.

Samkhiali Bhachau Gandhidham Tollway Private Limited ("**SGTL**"): NHAI has proposed a reduction in the concession period by 1.89 years in the First Concession Agreement on the grounds of use of different multipliers as per IRC 64 – 1990. However, management is confident that classification considered by the management for computation of multiplier is appropriate and no such reduction is expected. Management has also obtained independent legal opinion in this regard. Accordingly, management has disregarded this reduction for the purpose of computation of above value in use. Theis matter is presently under arbitration.

Deccan Tollway Private Limited ("**DTL**"): NHAI has proposed a reduction in the concession period by 2.4 years in the First Concession Agreement on the grounds of use of different multipliers as per IRC 64 – 1990. However, management is confident that classification considered by the management for computation of

multiplier is appropriate and no such reduction is expected. Management has also obtained independent legal opinion in this regard. Accordingly, management has disregarded this reduction for the purpose of computation of above value in use. Theis matter is presently under arbitration.Further, an extension of 5 years period has also been considered for the purpose of computation of value in use on the basis of estimated future traffic and rights of DTL under present Service Concession Agreement.

All above assumptions/estimates are critical in order to assess impairment of intangible asset/service concession receivable and also for computation of total returns at fair value and changes in fair value as included in these Special Purpose Combined Financial Statements.

Recent accounting pronouncements

New and amended standards
The SPV Group applied for the first-time certain standards and amendments, which are effective for annual periods beginning on or after 1 April 2025. The SPV Group has not early adopted any standard, interpretation or amendment that has been issued but is not yet effective.

Amendments to Ind AS 21 - Lack of exchangeability
The Ministry of Corporate Affairs (MCA) notified the Companies (Indian Accounting Standards) Amendment Rules, 2025, which amend Ind AS 21, The Effects of Changes in Foreign Exchange Rates to specify how an entity should assess whether a currency is exchangeable and how it should determine a spot exchange rate when exchangeability is lacking. The amendments also require disclosure of information that enables users of its financial statements to understand how the currency not being exchangeable into the other currency affects, or is expected to affect, the entity's financial performance, financial position and cash flows.

The amendments are effective for annual reporting periods beginning on or after 1 April 2025. When applying the amendments, an entity cannot restate comparative information.

The amendments do not have a material impact on the SPV Group's special purpose combined financial statements.

Amendments to Ind AS 1 - Classification of Liabilities as Current or Non-current and Non-current Liabilities with Covenants
In August 2025, the MCA notified amendments to paragraphs 69 to 76 of Ind AS 1 to specify the requirements for classifying liabilities as current or non-current. The amendments clarify:

- What is meant by a right to defer settlement
- That a right to defer must exist at the end of the reporting period
- That classification is unaffected by the likelihood that an entity will exercise its deferral right
- That only if an embedded derivative in a convertible liability is itself an equity instrument would the terms of a liability not impact its classification.

In addition, a requirement has been introduced to require disclosure when a liability arising from a loan agreement is classified as non-current and the entity's right to defer settlement is contingent on compliance with future covenants within twelve months.

If there is a breach of a material covenant of a long term loan arrangement on or before the end of the reporting period, resulting in the liability becoming payable on demand as at the reporting date, and the lender agrees—after the reporting period but before the financial statements are approved for issue—not to demand repayment for at least 12 months as a consequence of the breach, this shall be treated as an adjusting event. Accordingly, the entity is not required to classify the liability as current.

The amendments are effective for annual reporting periods beginning on or after 1 April 2025 retrospectively in accordance with Ind AS 8.

The amendments have resulted in additional disclosures in Note 11 but have not had an impact on the classification of SPV Group's liabilities.

Amendments to Ind AS 7 and Ind AS 107 - Supplier Finance Arrangements
In August 2025, the MCA notified amendments to Ind AS 7 Statement of Cash Flows and Ind AS 107 Financial Instruments: Disclosures to clarify the characteristics of supplier finance arrangements and require additional

disclosure of such arrangements. The disclosure requirements in the amendments are intended to assist users of financial statements in understanding the effects of supplier finance arrangements on an entity's liabilities, cash flows and exposure to liquidity risk.
The amendments had no impact on the SPV Group's special purpose combined financial statements as the SPV Group does not have any supplier finance arrangements.

International Tax Reform—Pillar Two Model Rules – Amendments to Ind AS 12
In August 2025, the MCA notified amendments to Ind AS 12 Income Taxes in response to the OECD's BEPS Pillar Two rules and include:

- A mandatory temporary exception to the recognition and disclosure of deferred taxes arising from the jurisdictional implementation of the Pillar Two model rules; and
- Disclosure requirements for affected entities to help users of the financial statements better understand an entity's exposure to Pillar Two income taxes arising from that legislation, particularly before its effective date.

The mandatory temporary exception – the use of which is required to be disclosed – applies immediately. The remaining disclosure requirements apply for annual reporting periods beginning on or after April 01, 2025, but not for any interim periods ending on or before March 31, 2026.

The amendments had no impact on the SPV Group's special purpose combined financial statements as the SPV Group is not in scope of the Pillar Two model rules.

Standards issued but not yet effective

The new and amended standards that are notified by the Ministry of Corporate Affairs (MCA), but not yet effective, up to the date of issuance of the SPV Group's special purpose combined financial statements are disclosed below. The SPV Group will adopt these new and amended standards, when they become effective

Amendments to Ind AS 1 - Classification of Liabilities as Current or Non-current and Non-current liabilities with Covenants and Ind AS 10 Events after the Reporting Period
Ind AS 10 has been amended to remove the previous treatment under which a lender's post reporting date waiver granted before the financial statements were approved for issue of a breach of a material covenant in a long-term loan arrangement that occurred on or before the end of the reporting period, resulting in the liability becoming payable on demand at the reporting date, was regarded as an adjusting event.

For annual reporting periods beginning on or after April 01, 2026, any breach of a covenant whether material or immaterial occurring on or before the reporting date will, in accordance with Ind AS 1, require the related liability to be classified as current, unless the lender has granted a waiver of the breach on or before the reporting date and has agreed not to demand repayment for at least 12 months after the reporting date as a consequence of the breach. Such a waiver shall be treated as an adjusting event.

The amendments are effective for annual reporting periods beginning on or after April 01, 2026 retrospectively in accordance with Ind AS 8.

Key Components of our Statement of Profit and Loss Based on our Special Purpose Combined Financial Statements

The following descriptions set forth information with respect to the key components of our profit and loss statements.

Income

Income consists of revenue from contract with customers, other incomes and finance income.

Revenue from contracts with customers. Revenue from contracts with customers comprises of revenue generated pursuant to our concession agreements from our toll and annuity assets.

Other income. Other income primarily comprises of profit on sale of current investments (carried at fair value through profit & loss), profit on sale of property, plant and equipment, interest income, rental income fair value gain on investments, and income from insurance claims.

Expenses

Expenses consist of operation and maintenance expense, employee benefit expense, depreciation and amortization expense, finance costs and other expenses such as expenses on legal and professional fees, rent, travelling expenses, CSR expenditure, and repair and maintenance.

Operation and maintenance expense. Operation and maintenance expense comprise of operations and maintenance of carriageway, overlay and periodical maintenance, revenue share cost to service to relevant concession authorities, and electricity charges and construction cost.

Employee benefits expense. Employee benefit expense comprise of salaries and wages, contribution to provident fund and other funds, gratuity and staff welfare expenses

Depreciation and amortization. Depreciation and amortization relates to depreciation on property, plant and equipment and amortization of intangible assets.

Finance costs. Finance cost comprises of interest on borrowings, interest on deferred payments, interest on lease liabilities, unwinding of interest on borrowing cost, unwinding of interest on major maintenance and repair ("**MMR**") provision and modification loss on financial liabilities etc.

Other expenses. Other expenses primarily comprise legal and professional expense, rent, travelling expenses, and other repairs and maintenance expenses.

Tax Expense

Tax expense consists of current tax expense and deferred tax expenses, MAT credit entitlements and tax relating to earlier periods.

Non-GAAP Measures

Certain Non-GAAP Measures like EBITDA, EBITDA Margin, Net Debt and Debt Equity Ratio ("**Non-GAAP Measures**") presented in this Offer Document are a supplemental measure of our performance and liquidity that is not required by, or presented in accordance with, IndAS or Indian GAAP. Furthermore, these Non-GAAP Measures are not a measurement of our financial performance or liquidity under Ind AS or Indian GAAP and should not be considered in isolation or construed as an alternative to cash flows, profit/ (loss) for the years/ period or any other measure of financial performance or as an indicator of our operating performance, liquidity, profitability or cash flows generated by operating, investing or financing activities derived in accordance with Ind AS or Indian GAAP. In addition, Non-GAAP Measures are not standardized terms, hence a direct comparison of these Non-GAAP Measures between companies may not be possible. Other companies may calculate these Non-GAAP Measures differently from us, limiting its usefulness as a comparative measure. Although such Non-GAAP Measures are not a measure of performance calculated in accordance with applicable accounting standards, the Investment Manager believes that they are useful to an investor in evaluating us as they are widely used measures to evaluate our operating performance. Also see "*Risk Factors - We have in this Offer Document included certain Non-GAAP Measures that may not be comparable with financial or industry related statistical information of similar nomenclature computed and presented by other infrastructure trusts*." on page 90.

Reconciliation of Non-GAAP Measures

Reconciliation from loss for the period / year to EBITDA and EBITDA Margin

The table below reconciles loss for the period / year to EBITDA and EBITDA Margin. EBITDA is calculated as earnings before interest, depreciation and amortization while EBITDA Margin is the percentage of EBITDA divided by total income.

(*₹ in million, unless otherwise stated*)

Particulars	Nine months period ended December 31, 2025	Financial Year 2025	2024	2023
Total Income (A)	**15,703.89**	**21,656.17**	**20,385.30**	**18,852.95**
Loss for the period/year (B)	(2,190.48)	(4,177.51)	(7,741.18)	(6,540.08)
Tax expense (C)	46.31	22.19	359.77	201.77
Depreciation and amortization expense (D)	5,256.75	6,998.42	6,922.15	7,094.90
Finance costs (E)	8,316.74	11,506.41	13,053.33	10,085.06
EBITDA (F = B+C+D+E)	**11,429.32**	**14,349.51**	**12,594.07**	**10,841.65**
EBITDA Margin (G=F/A*100) (in %)	**72.78%**	**66.26%**	**61.78%**	**57.51%**

Reconciliation of Net Debt

The table below reconciles the net debt. Net debt represents current and non-current borrowings after deducting cash and cash equivalents, bank balances, investments and fixed deposits with banks having original maturity more than twelve months.

(₹ in million)

Particulars	As at December 31, 2025	As at March 31 2025	2024	2023
Total borrowings (current and non-current) (A)	59,087.90	66,999.94	61,715.24	61,859.50
Cash and cash equivalents (B)	1,539.86	1,857.33	13,405.18	4,273.21
Bank balances other than cash and cash equivalents (C)[(1)]	3,826.99	2,654.90	4,194.70	7,195.50
Investments (D)	8,367.57	7,548.32	4,197.95	5,582.13
Fixed deposits with banks having original maturity more than twelve months (E)	2,764.97	1,910.07	2,395.76	8,386.84
Fixed deposit having remaining maturity of more than twelve months (F)	118.00	471.82	282.78	713.66
Net Debt (G = A-B-C-D-E-F)	**42,470.51**	**52,557.50**	**37,238.87**	**35,708.16**

Notes:

(1) Bank balances other than cash and cash equivalent comprise of:

(*₹ in million*)

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Deposits with original maturity of more than three months and less than twelve months*	3,812.66	2,650.52	4,173.93	7,184.45
Earmarked balances with banks	14.33	4.38	20.77	11.05
	3,826.99	**2,654.90**	**4,194.70**	**7,195.50**

** The deposit with bank includes earmarked deposit with banks/ lenders against Debt Service Reserve Account (DSRA) and Major Maintenance Reserve Account (MMRA) which is disclosed here amounts to:*

(*₹ in million*)

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
a. Fixed deposit with lien placed for the purpose of future major maintenance and DSRA requirements	2,856.44	1,760.31	2,435.05	1,176.20
b. Amount in escrow account placed for the purpose of future major maintenance	10.00	757.40	414.00	-
c. Other liens	796.96	2.30	-	-
	3,663.40	**2,520.01**	**2,849.05**	**1,176.20**

Reconciliation of Debt to Equity Ratio

The table below reconciles the debt to equity ratio. Total debt is calculated as current borrowings plus non-current borrowings. Debt to equity is calculated as total debt divided by total equity.

(*₹ in million, unless otherwise stated*)

Particulars	As at December 31, 2025	As at March 31 2025	2024	2023
Debt				
Borrowings- Non-current (A)	36,240.04	38,671.15	42,667.76	49,060.25
Borrowings- Current (B)	22,847.86	28,328.79	19,047.49	12,799.25
Total borrowings (C = A+B)	59,087.90	66,999.94	61,715.25	61,859.50
Equity				
Total Equity (D)	(33,128.82)	(36,926.53)	(11,355.96)	(4,134.13)
Debt Equity Ratio (E= C/D) (in times)	(1.78)	(1.81)	(5.43)	(14.96)

Our Results of Operations

The following table sets forth select financial data for the nine months ended December 31, 2025 and for the Financial Years 2025, 2024 and 2023, the components of which are also expressed as a percentage of total income for such period/year:

Particulars	Nine months period ended December 31, 2025		Financial Year					
			2025		2024		2023	
	(₹ in million)	(% of Total Income)	(₹ in million)	(% of Total Income)	(₹ in million)	(% of Total Income)	(₹ in million)	(% of Total Income)
Income:								
Revenue from operations	14,963.64	95.29%	19,870.46	91.75%	18,731.73	91.89%	17,735.16	94.07%
Other income	740.25	4.71%	1,785.71	8.25%	1,653.57	8.11%	1,117.79	5.93%
Total Income	**15,703.89**	**100.00%**	**21,656.17**	**100.00%**	**20,385.30**	**100.00%**	**18,852.95**	**100.00%**
Expenses:								
Operation and maintenance expense	2,941.39	18.73%	5,585.34	25.79%	5,947.26	29.17%	6,277.21	33.30%
Employee benefit expense	373.39	2.38%	548.60	2.53%	569.84	2.80%	594.92	3.16%
Depreciation and amortization expense	5,256.75	33.47%	6,998.42	32.32%	6,922.15	33.96%	7,094.90	37.63%
Finance costs	8,316.74	52.96%	11,506.41	53.13%	13,053.33	64.03%	10,085.06	53.49%
Other expenses	959.79	6.11%	1,172.72	5.42%	1,274.13	6.25%	1,139.17	6.04%
Total expenses	**17,848.06**	**113.65%**	**25,811.49**	**119.19%**	**27,766.71**	**136.21%**	**25,191.26**	**133.62%**
Loss before tax	**(2,144.17)**	**(13.65)%**	**(4,155.32)**	**(19.19)%**	**(7,381.41)**	**(36.21)%**	**(6,338.31)**	**(33.62)%**
Tax expense:								
(1) Current tax	46.31	0.29%	42.64	0.20%	355.56	1.74%	200.32	1.06%
(2) Deferred tax	-	-	(26.75)	(0.12)%	3.80	0.02%	(4.05)	(0.02)%
(3) Tax relating to the earlier periods	-	-	6.30	0.03%	0.41	0.00%	5.50	0.03%
Loss for the period/year [A]	**(2,190.48)**	**(13.95)%**	**(4,177.51)**	**(19.29)%**	**(7,741.18)**	**(37.97)%**	**(6,540.08)**	**(34.69)%**
Other comprehensive income								
Items not to be reclassified to profit or loss in subsequent period								
Re-measurement of defined benefit plans (net of tax)	(13.17)	(0.08)%	(12.48)	(0.06)%	0.65	0.00%	(0.30)	(0.00)%
Total other comprehensive income for the period/year, net of tax [B]	**(13.17)**	**(0.08)%**	**(12.48)**	**(0.06)%**	**0.65**	**0.00%**	**(0.30)**	**0.00%**
Total comprehensive income for the period/year, net of tax [A+B]	**(2,203.65)**	**(14.03)%**	**(4,189.99)**	**(19.35)%**	**(7,740.53)**	**(37.97)%**	**(6,540.38)**	**(34.69)%**

For the nine months ended December 31, 2025

Our results of operations for nine months ended December 31, 2025 were particularly affected by the following factors:

Total income: Our total income was ₹15,703.89 million for the nine months ended December 31, 2025 primarily due to revenue from operations amounting to ₹14,963.64 million which was 95.29% of our total income.

Revenue from operations: Our revenue from operations was ₹14,963.64 million for the nine months ended December 31, 2025 which is primarily attributable to toll collection of ₹13,804.48 million during the period, and finance income on receivable under service concession arrangements of ₹821.32 million and income from operation and maintenance services amounting to ₹298.26 million.

The table below provides the revenue from operations (net of eliminations) from each of our Project SPVs for the nine months ended December 31, 2025:

(₹ in million)

Project SPV	Project wise revenue from operations (net of eliminations) for the nine months ended December 31, 2025
Toll Project SPVs	
Ahmedabad Maliya Tollway Private Limited ("**AMTPL**")	3,285.94
Sambalpur-Rourkela Tollway Private Limited ("**SRTPL**")	2,183.91
Samakhiali Bachau Gandhidham Tollway Private Limited ("**SBGTPL**")	2,262.37
Deccan Tollways Private Limited ("**DTPL**")	1,981.81
Rajkot - Vadinar Tollway Private Limited ("**RVTPL**")	1,972.73
Thirssur Expressway Limited ("**TEL**")	1,262.62
Panipat Elevated Corridor Private Limited ("**PECPL**")	894.68
Annuity Project SPVs	
Dhola Infra Projects Private Limited ("**Dhola**")	388.23
Dibang Infra Projects Private Limited ("**Dibang**")	325.04
Jorabat Shillong Expressway Limited ("**JSEL**")	406.31
Total project wise revenue from operations (net of eliminations)	**14,963.64**

Other income: Our other income were ₹740.25 million for the nine months ended December 31, 2025 primarily attributable to interest income on fixed deposits of ₹336.01 million, net gain on sale of investment in mutual funds of ₹303.60 million and net gain on investments measured at fair value through profit and loss of ₹44.77 million.

Expenses

Total expenses. Our total expenses were ₹17,848.06 million for the nine months ended December 31, 2025 primarily due to finance costs of ₹8,316.74 million, depreciation and amortization expense of ₹5,256.75 million, operations and maintenance expenses of ₹2,941.39 million, other expenses of ₹959.79 million and employee benefit expense of ₹373.39 million, the reasons are provided as below:

Finance costs: Our finance costs was ₹8,316.74 million for the nine months ended December 31, 2025 primarily due to (i) interest for financial liabilities at amortized cost on (a) additional concession fee amounting to ₹3,329.39 million; (b) term loan amounting to ₹2,430.93 million; (c) compulsorily convertible debentures amounting to ₹1,266.03 million; (d) non-convertible debentures amounting to ₹590.65 million and (ii) unwinding of interest on major maintenance provision amounting to ₹634.17 million.

Depreciation and amortization expense: The depreciation and amortization expense was ₹5,256.75 million for the nine months ended December 31, 2025 primarily due to amortization of intangible assets amounting to ₹5,202.61 million and depreciation of property, plant and equipment amounting to ₹30.59 million.

Operation and maintenance expense: Operation and maintenance expense was ₹2,941.39 million for the nine months ended December 31, 2025 primarily due to periodic major maintenance expense amounting to ₹1,727.65 million, repairs and maintenance of highways amounting to ₹598.63 million, toll management fees amounting to ₹326.18 million and security services amounting to ₹106.31 million.

Other expenses: Our other expenses were ₹959.79 million for the nine months ended December 31, 2025 primarily due to additional concession fees of ₹502.72 million, legal and professional fees of ₹301.53 million and miscellaneous expenses of ₹61.72 million.

Employee benefit expense: Employee benefit expense was ₹373.39 million for the nine months ended December 31, 2025 primarily due to salaries, wages and bonus amounting to ₹317.82 million and contribution to provident and other funds amounting to ₹26.69 million.

Loss before tax for the nine months period: As a result of the foregoing, we incurred a loss before tax of

₹2,144.17 million for the nine months ended December 31, 2025.

Total tax expense: Our total tax expense was ₹46.31 million for the nine months ended December 31, 2025 primarily due to income tax on capital gains and other incomes.

Loss for the period: We incurred a loss of ₹2,190.48 million for the nine months ended December 31, 2025.

Other comprehensive income: Other comprehensive income items that were not reclassified to profit or (loss) in subsequent period included remeasurement of defined benefit plans, net of tax, of ₹(13.17) million for the nine months ended December 31, 2025.

Total comprehensive loss for the nine months period: Total comprehensive loss was ₹2,203.65 million for the nine months ended December 31, 2025 as a result of the factors outlined above.

Financial Year 2025 compared to the Financial Year 2024

Our results of operations for the Financial Year 2025 were particularly affected by the following factors:

Total income. Our total income increased by 6.23% or ₹1,270.88 million from ₹20,385.30 million in Financial Year 2024 to ₹21,656.17 million in the Financial Year 2025, primarily due to increase in toll collection, increase in income from operations and maintenance services and increase in profit on sale of investment. This increase in income was partially offset by decrease in finance income from service concession arrangement and interest income on fixed deposits.

Revenue from operations: Our revenue from operations increased by 6.08% or ₹1,138.73 million to ₹19,870.46 million in Financial Year 2025 from ₹18,731.73 million in the Financial Year 2024, primarily due to increase in (i) toll collection from ₹16,196.21 million in the Financial Year 2024 to ₹17,179.29 million in the Financial Year 2025, and (ii) income from operations and maintenance services from ₹998.45 million in the Financial Year 2024 to ₹1,332.44 million in the Financial Year 2025 primarily due to major maintenance work undertaken by JSEL which led to significant increase in income from major maintenance work in the Financial Year 2025.

The table below provides the revenue from operations (net of eliminations) from each of our Project SPVs for the Financial Year 2024 and 2025:

(₹ in million, except as specified)

Project SPV	**Project wise revenue from operations (net of eliminations) for the Financial Year**		**Variation**
	2025	**2024**	**(%)**
	Toll Project SPVs		
AMTPL	4,003.37	3,642.64	9.90%
SRTPL	3,039.18	2,830.34	7.38%
SBGTPL	2,803.84	2,616.75	7.15%
DTPL	2,466.11	2,422.63	1.79%
RVTPL	2,291.56	2,104.68	8.88%
TEL	1,628.30	1,674.55	(2.76)%
PECPL	1,115.90	1,088.72	2.50%
	Annuity Project SPVs		
Dhola	658.82	582.34	13.13%
Dibang	384.14	428.95	(10.45)%
JSEL	1,479.25	1,183.17	25.02%
Palanpur-Swaroopgunj Road Project Limited ("**PSRPL**")	-	156.95	(100.00)%
Total project wise revenue from operations (net of eliminations)	**19,870.46**	**18,731.73**	**6.08%**

Other income: Our other income increased by 7.99% or ₹132.14 million from ₹1,653.57 million in the Financial Year 2024 to ₹1,785.71 million in the Financial Year 2025, primarily due to increase in (i) net gain on sale of investment in mutual funds from ₹397.65 million in the Financial Year 2024 to ₹424.30 million in the Financial Year 2025, (ii) net gain on investments measured at fair value through profit and loss from ₹15.04 million in the Financial Year 2024 to ₹119.41 million in the Financial Year 2025,and (iii) interest income on income tax refund from ₹7.28 million in the Financial Year 2024 to ₹83.52 million in the Financial Year 2025. This increase in income was partly offset by decrease in interest income on fixed deposits from ₹929.23 million in the Financial Year 2024 to ₹538.22 million in the Financial Year 2025. Other income also includes interest income

on account of claim settlement with authorities of ₹143.37 million in the Financial Year 2024 and ₹532.57 million in the Financial Year 2025 pursuant to settlement agreements entered into concessioning authorities.

Expenses

Total expenses: Our total expenses decreased by 7.04% or ₹1,955.22 million to ₹25,811.49 million in the Financial Year 2025 from ₹27,766.71 million in the Financial Year 2024, primarily due to decrease in maintenance expenses and finance costs, which were partially offset by an increase in depreciation and amortization expenses. The reasons are provided below:

Finance costs: Our finance costs decreased by 11.85% or ₹1,546.92 million to ₹11,506.41 million in the Financial Year 2025 from ₹13,053.33 million in the Financial Year 2024, primarily due to decrease in (i) interest on term loan from ₹4,385.63 million in the Financial Year 2024 to ₹3,902.04 million in the Financial Year 2025, (ii) interest on non-convertible debentures from ₹3,438.48 million in the Financial Year 2024 to ₹895.98 million in the Financial Year 2025 which included additional redemption premium expenses on debentures of Thrissur Expressway Limited aggregating to ₹2,258.14 million during the Financial Year 2024, (iii) other borrowing cost from ₹186.40 million in the Financial Year 2024 to ₹175.27 million in the Financial Year 2025. This decrease was partly offset by increase in (i) interest on additional concession fees from ₹4,389.31 million in the Financial Year 2024 to ₹4,439.84 million in the Financial Year 2025, and (ii) interest on compulsorily convertible debentures from ₹NIL in the Financial Year 2024 to ₹1,251.07 million in the Financial Year 2025.

Other expenses: Our other expenses decreased by 7.96% or ₹101.41 million to ₹1,172.72 million in Financial Year 2025 from ₹1,274.13 million in the Financial Year 2024, primarily on decrease in (i) bad debts written off aggregating from ₹128.17 million in the Financial Year 2024 to ₹25.26 million in the Financial Year 2025, (ii) modification loss on financial assets from ₹38.29 million in the Financial Year 2024 to ₹NIL in the Financial Year 2025, (iii) travelling expenses from ₹77.38 million in the Financial Year 2024 to ₹62.07 million in the Financial Year 2025 and (iv) office maintenance expense from ₹109.43 million in the Financial Year 2024 to ₹95.66 million in the Financial Year 2025. This decrease was partially offset by an increase in (i) additional concession fees from ₹425.55 million in the Financial Year 2024 to ₹522.19 million in the Financial Year 2025, and (ii) legal and professional fees from ₹296.73 million in the Financial Year 2024 to ₹326.44 million in the Financial Year 2025.

Operation and maintenance expense: Operation and maintenance expense incurred decreased by 6.09% or ₹361.92 million to ₹5,585.34 million in Financial Year 2025 from ₹5,947.26 million in the Financial Year 2024, primarily due to decrease in (i) period major maintenance expense from ₹3,828.97 million in the Financial Year 2024 to ₹3,661.71 million in the Financial Year 2025, (ii) repairs and maintenance of highways from ₹1,136.01 million in the Financial Year 2024 to ₹944.47 million in the Financial Year 2025.

Employee benefit expense: Employee benefit expense incurred decreased by 3.73% or ₹21.24 million to ₹548.60 million in the Financial Year 2025 from ₹569.84 million in the Financial Year 2024, primarily due to decrease in salaries, wages, and bonus from ₹499.04 million in the Financial Year 2024 to ₹484.33 million in the Financial Year 2025.

Depreciation and amortization expense: The depreciation and amortization expense increased by 1.10% or ₹76.27 million to ₹6,998.42 million in the Financial Year 2025 from ₹6,922.15 million in the Financial Year 2024, primarily due to increase in amortization on our intangible assets.

Loss before tax for the financial year: As a result of the foregoing, we incurred a loss of ₹4,155.32 million for the Financial Year 2025 as compared to a loss of ₹7,381.41 million for the Financial Year 2024.

Total tax expenses: Our total tax expenses decreased by 93.83% or ₹337.57 million to ₹22.19 million for the Financial Year 2025 from ₹359.77 million for the Financial Year 2024, primarily due to reduction in tax expenses of SRTPL from ₹184.9 million in the Financial Year 2024 to ₹nil in the Financial Year 2025. This is because of major maintenance provision by SRTPL in the Financial Year 2025 aggregating to ₹1,449.30 million which was claimed as deduction for computation of taxable income of SRTPL in Financial Year 2025. Also, reduction in tax expenses of EPIC Concession 3 Private Limited from ₹115.91 million in the Financial Year 2024 to ₹9.37 million in the Financial Year 2025 contributed to the decrease in the total tax expenses.

Loss for the year: As a result of the foregoing, we incurred a loss of ₹4,177.51 million for the Financial Year 2025 as compared to a loss of ₹7,741.18 million for the Financial Year 2024.

Other comprehensive income: Other comprehensive income items that were not reclassified to profit or (loss) included remeasurement of defined benefit plans, net of tax, of ₹(12.48) million for the Financial Year 2025 as compared to a profit of ₹0.65 million for the Financial Year 2024.

Total comprehensive loss for the financial year: Total comprehensive loss decreased by 45.87% or ₹3,550.54 million to ₹4,189.99 million in the Financial Year 2025 from ₹7,740.53 million in the Financial Year 2024.

Financial Year 2024 compared to the Financial Year 2023

Our results of operations for the Financial Year 2024 were particularly affected by the following factors:

Total income Our total income increased by 8.13% or ₹1,532.34 million to ₹20,385.30 million in the Financial Year 2024 from ₹18,852.95 million in the Financial Year 2023, primarily due to increase in toll collection, increase in revenue from operation and maintenance services, increase in interest income and increase in profit on sale of investment.

Revenue from operations: Our revenue from operations increased by 5.62% or ₹996.57 million to ₹18,731.73 million for the Financial Year 2024 from ₹17,735.16 million for the Financial Year 2023, primarily due to increase in (i) toll collection from ₹15,259.26 million in the Financial Year 2023 to ₹16,196.21 million in the Financial Year 2024, and (ii) income from operation and maintenance services from ₹543.41 million in the Financial Year 2023 to ₹998.45 million in the Financial Year 2024 primarily due to major maintenance work undertaken by JSEL which led to significant increase in income from major maintenance work in the Financial Year 2024.

The table below provides the revenue from operations (net of eliminations) from each of our Project SPVs for Financial Year 2023 and 2024:

(₹ in million, except as specified)

Project SPV	**Project wise revenue from operations (net of eliminations) for the Financial Year**		**Variation**
	2024	**2023**	**(%)**
Toll Project SPVs			
AMTPL[(1)]	3,642.64	3,709.98	(1.82)%
SRTPL	2,830.34	2,196.42	28.86%
SBGTPL	2,616.75	2,320.46	12.77%
DTPL	2,422.63	2,284.27	6.06%
RVTPL[(2)]	2,104.68	2,594.38	(18.88)%
TEL	1,674.55	1,497.82	11.80%
PECPL	1,088.72	1,053.65	3.33%
Annuity Project SPVs			
Dhola	582.34	644.54	(9.65)%
Dibang	428.95	454.73	(5.67)%
JSEL	1,183.17	789.69	49.83%
PSRPL	156.95	189.22	(17.05)%
Total project wise revenue from operations (net of eliminations)	**18,731.73**	**17,735.16**	**5.62%**

Notes:

(1) For Financial Year 2023 includes compensation claim received from GSRDC amounting to ₹481.30 million.

(2) For Financial Year 2023 includes compensation claim received from GSRDC amounting to ₹1,120.40 million.

The toll collection significantly increased for (i) SRTPL primarily due to increased traffic because of mining activities and construction activities going on in adjacent areas, and (ii) SBGTPL primarily due to increased traffic related to port activities in the corridor.

Other income: Our other income increased by 47.93% or ₹535.78 million to ₹1,653.57 million in the Financial Year 2024 from ₹1,117.79 million in the Financial Year 2023, primarily due to increase in (i) net gain on sale

of investment in mutual funds from ₹176.70 million in the Financial Year 2023 to ₹397.65 million in the Financial Year 2024, (ii) interest income on fixed deposits from ₹784.98 million in the Financial Year 2023 to ₹929.23 million in the Financial Year 2024, (iii) provisions/liabilities no longer required written back from ₹16.85 million in the Financial Year 2023 to ₹106.43 million in the Financial Year 2024, and (iv) income on account of claim settlement with authorities from ₹NIL in the Financial Year 2023 to ₹143.37 million in the Financial Year 2024 from concession authorities on account of claim settlement by way of settlement agreement executed.

Expenses

Total expenses: Our total expenses increased by 10.22% or ₹2,575.45 million to ₹27,766.71 million in the Financial Year 2024 from ₹25,191.26 million in the Financial Year 2023, primarily due to, increase in finance cost and increase in other expenses which was partially offset by decrease in operation and maintenance expenses, depreciation and amortization expense and employee benefit expense. The reasons for the same are provided below:

Operation and maintenance expense: Operation and maintenance expense incurred decreased by 5.26% or ₹329.95 million to ₹5,947.26 million in the Financial Year 2024 from ₹6,277.21 million in the Financial Year 2023, primarily due to decrease in (i) period major maintenance expenses from ₹4,014.13 million in the Financial Year 2023 to ₹3,828.97 million in the Financial Year 2024, (ii) construction expenses from ₹333.71 million in the Financial Year 2023 to ₹149.61 million in the Financial Year 2024, (iii) change of scope expenses from ₹66.64 million in the Financial Year 2023 to ₹5.57 million in the Financial Year 2024, (iv) insurance expenses from ₹172.58 million in the Financial Year 2023 to ₹150.12 million in the Financial Year 2024 and (v) power and fuel cost from ₹150.40 million in the Financial Year 2023 to ₹128.64 million in the Financial Year 2024 which was partially offset by increase in repairs and maintenance of highways from ₹1,087.43 million in the Financial Year 2023 to ₹1,136.01 million in the Financial Year 2024.

Finance costs: Our finance costs increased by 29.43% or ₹2,968.28 million to ₹13,053.33 million in the Financial Year 2024 from ₹10,085.06 million in the Financial Year 2023, primarily due to increase in (i) interest on non-convertible debentures from ₹883.01 million in the Financial Year 2023 to ₹3,438.48 million in the Financial Year 2024 which included additional redemption premium expenses on debentures in Thrissur Expressway Limited aggregating to ₹2,258.14 million, increase in interest on additional concession fees from ₹4,207.86 million in the Financial Year 2023 to ₹4,389.31 million in the Financial Year 2024 primarily due to interest accrued on outstanding negative grant payable to authority, (ii) unwinding interest on major maintenance provision from ₹364.08 million in the Financial Year 2023 to ₹651.68 million in the Financial Year 2024 primarily due to major maintenance provisions carrying in books for future obligations, (iii) other borrowing cost from ₹166.53 million in the Financial Year 2023 to ₹186.40 million in the Financial Year 2024 which was partially offset by decrease in interest on term loan from ₹4,453.40 million in the Financial Year 2023 to ₹4,385.63 million in the Financial Year 2024.

Other expenses: Our other expenses increased by 11.85% or ₹134.96 million to ₹1,274.13 million in the Financial Year 2024 from ₹1,139.17 million for the Financial Year 2023, primarily due to (i) bad debt written off amounting ₹128.17 million in the Financial Year 2024 against ₹17.84 million in the Financial Year 2023 primarily due to derecognizing of claims from authorities, (ii) modification loss on financial assets amounting ₹38.29 million in the Financial Year 2024 against NIL in the Financial Year 2023, and (iii) provision for doubtful debts amounting to ₹12.97 million in the Financial Year 2024 against ₹0.05 million amount in the Financial Year 2023. This was partly offset by decrease in (i) legal and professional fees from ₹330.26 million in the Financial Year 2023 to ₹296.73 million in the Financial Year 2024, (ii) CSR expenditure from ₹41.22 million in the Financial Year 2023 to ₹14.04 million in the Financial Year 2024 and (iii) additional concession fees from ₹460.34 million in Financial Year 2023 to ₹425.55 million in Financial Year 2024.

Employee benefit expense: Employee benefit expense incurred decreased by 4.22% or ₹25.08 million to ₹569.84 million for the Financial Year 2024 from ₹594.92 million for the Financial Year 2023, primarily due to decrease in salaries, wages and bonus from ₹525.75 million in the Financial Year 2023 to ₹499.04 million in the Financial Year 2024. This is primarily attributable to intra group relocation of resources with previous owner of in EPIC Concession 3 Private Limited in the Financial Year 2024 on the basis of business requirements.

Depreciation and amortization expense: The depreciation and amortization expenses decreased by 2.43% or ₹172.75 million to ₹6,922.15 million for the Financial Year 2024 from ₹7,094.90 million for the Financial Year 2023, primarily due to decrease in amortization of intangible assets.

Loss before tax for the financial year: As a result of the foregoing, we incurred a loss of ₹7,381.41 million for the Financial Year 2024 against ₹6,338.31 million for the Financial Year 2023.

Total tax expense: As a result of the foregoing, our total tax expense increased by 78.31% or ₹158.00 million to ₹359.77 million for the Financial Year 2024 from ₹201.77 million for the Financial Year 2023, primarily due to an increase in the current tax expense by 77.50% or ₹155.25 million to ₹355.56 million for the Financial Year 2024 from ₹200.32 million for the Financial Year 2023.

Loss for the year: As a result of the foregoing, we incurred a loss of ₹7,741.18 million for the Financial Year 2024 against ₹6,540.08 million for the Financial Year 2023.

Other comprehensive income: Other comprehensive income items that were not reclassified to profit or (loss) included a remeasurement of defined benefit plans, net of tax, of ₹0.65 million for the Financial Year 2024 as compared to loss of ₹(0.30) million for the Financial Year 2023.

Total comprehensive loss for the financial year: As a result of the foregoing, our total comprehensive loss increased by 18.35% to ₹7,740.53 million for the Financial Year 2024 from ₹6,540.38 million for the Financial Year 2023.

Liquidity and Capital Resources

Historically, our primary liquidity requirements have been to finance our capital expenditure and working capital needs for our operations. We have met these requirements through cash flows from operations and borrowings. As of December 31, 2025, we had ₹ 1,539.86 million in cash and cash equivalents and ₹3,826.99 million in bank balances other than cash and cash equivalents. We believe that, after taking into account the expected cash to be generated from operations, we will have sufficient liquidity for our present and anticipated requirements for capital expenditure and working capital for the next 12 months.

Cash Flows

The following table sets forth our cash flows for the years/period indicated:

(₹ in million)

Particulars	For the nine months ended December 31, 2025	Financial Year Ended		
		2025	2024	2023
Net cash flow from operating activities	7,820.15	10,449.52	9,392.51	9,079.25
Net cash flow from / (used in) investing activities	(2,009.58)	(23,851.74)	10,711.13	(532.25)
Net cash generated from / (used in) financing activities	(6,128.04)	1,854.37	(10,971.67)	(6,585.64)
Net increase / (decrease) in cash and cash equivalents	(317.47)	(11,547.85)	9,131.97	1,961.36

Operating Activities

Net cash flow from operating activities was ₹7,820.15 million for the nine months ended December 31, 2025. The operating profit before working capital changes was ₹11,580.50 million, and post working capital adjustments, the cash flow generated from operations was ₹7,893.16 million. Income tax paid (net of refund) for the period was ₹(73.01) million.

Net cash flow from operating activities was ₹10,449.52 million for the Financial Year 2025. The operating profit before working capital changes of ₹14,339.52 million, and post working capital adjustments, the cash flow generated from operations was ₹10,386.92 million. Income tax paid (net of refund) for the year was ₹62.60 million.

Net cash flow from operating activities was ₹9,392.51 million for the Financial Year 2024. The operating profit before working capital changes of ₹13,256.01 million, and post working capital adjustments, the cash flow generated from operations was ₹9,811.94 million. Income tax paid (net of refund) for the year was ₹(419.43) million.

Net cash flow from operating activities was ₹9,079.25 million for the Financial Year 2023. The operating profit before working capital changes of ₹12,180.16 million, and post working capital adjustments, the cash flow

generated from operations was ₹9,217.81 million. Income tax paid (net of refund) for the year was ₹(138.56) million.

Investing Activities

Net cash flow used in investing activities was ₹2,009.58 million for the nine months ended December 31, 2025 primarily on account of investment in fixed deposits with banks and which was partially offset by interest received.

Net cash flow used in investing activities was ₹23,851.74 million for the Financial Year 2025 primarily on account of merger, which was partly offset by proceeds from fixed deposits from banks.

Net cash flow from investing activities was ₹10,711.13 million for the Financial Year 2024 primarily on account of proceeds from fixed deposits with banks, sale of investments in mutual fund and interest received. This was partly offset by purchase of property, plant and equipment and intangible assets.

Net cash flow used in investing activities was ₹532.25 million for the Financial Year 2023 primarily on account of investment in fixed deposits with banks, and purchase of property, plant and equipment and intangible assets, partly offset by interest received.

Financing Activities

Net cash flow used in financing activities was ₹6,128.04 million for the nine months ended December 31, 2025 primarily due to repayment of borrowings term loan and payment of interest of interest and other finance costs, partly offset by proceeds from borrowings term loan.

Net cash flow from financing activities was ₹1,854.37 million for the Financial Year 2025 primarily due to proceeds from secured borrowings, adjustment on account of carve out, partly offset by payment of other finance costs, payment of interest on borrowings.

Net cash flow used in financing activities was ₹10,971.67 million for the Financial Year 2024 primarily due to payment of other finance costs, payment of interest on borrowings and adjustment on account of carve out.

Net cash flow used in financing activities was ₹6,585.64 million for the Financial Year 2023 primarily due to payment of other finance costs, payment of interest on borrowings, repayment of borrowings, partly offset by adjustment on account of carve out.

Indebtedness

As of December 31, 2025, we had total borrowings (consisting of current and non-current borrowings) of ₹59,087.90 million. Our debt to equity ratio was (1.78) times as of December 31, 2025. For further information on our indebtedness, please see "*Financial Indebtedness and Deferred Payments*" on page 362 of this Offer Document.

The following table sets forth certain information relating our total borrowings as of December 31, 2025, and our repayment obligations in the periods indicated:

(₹ in million)

Particulars	As at December 31, 2025
Non-current borrowings (A)	36,240.04
Current borrowings (B)	22,847.86
Total borrowings (C=A+B)	59,087.90

Capital and other Commitments

The following table sets forth certain information relating to our capital and other commitments as of December 31, 2025 in accordance with Ind AS 16–Property, Plant and Equipment:

(₹ in million)

Particulars	As at December 31, 2025
Estimate amount of EPC contract remaining to be executed (net of advances)	-
Other capital commitment	7.71

Contingent Liabilities

The following table sets forth certain information relating to our contingent liabilities which have not been provided for, as of December 31, 2025, as per IND AS-37 Provisions, Contingent Liabilities and Contingent Assets:

(₹in million)

Particulars	As at December 31, 2025
In respect of Income tax matters	1,215.19
In respect of Indirect tax matters	2,566.10
In respect of guarantee and securities offered	775.19
In respect of other matters	573.35

Notes:

1. *In respect of income tax matters, the SPV Group is contesting Income tax related demand/notices with respect to certain disallowance proposed by the Income tax authorities such as method of amortisation of intangibles, notional interest computed under IND AS etc. Management believes that it's position will likely be upheld in the appellate process. No expense has been accrued in the special purpose combined financial statements for the tax demands/notices raised. The management believes that the ultimate outcome of the proceedings will not have a material adverse effect on the SPV Group financial position and results of the operations.*
2. *In respect of indirect tax matters, the SPV Group is contesting excise, service tax and goods and services tax related demand/notices with respect to additional tax demanded by the tax authorities on certain annuity payments collected from highway authorities. Management believes that it's position will likely be upheld in the appellate process. No expense has been accrued in the special purpose combined financial statements for the tax demands/notices raised. The management believes that the ultimate outcome of the proceedings will not have a material adverse effect on the SPV Group financial position and results of the operations.*
3. *In respect of guarantee and securities offered, the guarantees include bank guarantees given against certain on going arbitrations on behalf of EPIC Transnet Infrastructure Private Limited (formerly known as Watrak Infrastructure Private Limited)/Neelambur Madukkari Tollway Private Limited (formerly known as Transportation Infrastructure Limited), DSRA (Debt Service Reserve Account) and bid bond guarantees.*
4. *In respect of other matters, the SPV Group has received communication from Accountant General, Ahmedabad, the Office of the Superintendent of Stamps and Registration, Gandhinagar alleging that the Concession Agreement ("**CA**") was not adequately stamped and has instructed to pay additional stamp duty for Ahmedabad - Maliya Tollway Private Limited ("**AMTPL**") & Rajkot-Vadinar Tollway Private Limited ("**RVTPL**"). No liability has been recognised in the special purpose combined financial statements for the demand raised. The management believes that the ultimate outcome of the proceedings will not have a material adverse effect on the SPV Group financial position and results of the operations.*

While in March 2026, bank guarantees given against certain ongoing arbitrations on behalf of EPIC Transnet Infrastructure Private Limited (formerly known as Watrak Infrastructure Private Limited) of ₹697.70 million and Neelambur Madukkari Tollway Private Limited (formerly known as Transportation Infrastructure Limited) of ₹10.00 million have been released, we cannot assure you that we will not incur similar or increased levels of contingent liabilities in the future. For details, please see "*Risk Factors - We have certain contingent liabilities as of December 31, 2025, which, if they materialize, may affect our results of operations, financial condition and cash flows*" on page 88.

Related Party Transactions

We have engaged in the past, and may engage in the future, in transactions with related parties. For details of our related party transactions, please see "*Related Party Transactions*" on page 417.

Quantitative and Qualitative Disclosures about Market Risk

Market risk

Market risk is the risk that the fair value of future cash flows of a financial instrument will fluctuate because of changes in market prices. Market risk comprises three types of risk: (i) interest rate risk, (ii) currency risk and (iii) other price risk. Financial instruments affected by market risk include loans and borrowings and deposits. However, the Trust does not have currency and other price risk as at December 31, 2025, March 31, 2025, March 31, 2024 and March 31, 2023.

Interest rate risk

Interest rate risk is the risk that the fair value of future cash flows of the financial instruments will fluctuate because of changes in market interest rates. The Trust is mainly exposed to the risk due to borrowings having variable rate of interest.

The table below provides the interest rate risk exposure for the period:

(₹ in million)

Particulars	As at	As at March 31		
	December 31, 2025	2025	2024	2023
Borrowings bearing fixed rate of interest	26,016.69	29,978.81	15,466.01	18,602.23
Borrowings bearing variable rate of interest	33,071.21	37,021.13	46,249.23	43,257.27

Unusual or Infrequent Events or Transactions

Except as described in this Offer Document, to our knowledge, there have been no unusual or infrequent events or transactions that have in the past or may in the future affect our business operations or future financial performance. There have been no other events or transactions that, to our knowledge, that may be described as "unusual" or "infrequent".

Significant Economic Changes that Materially affect or are likely to affect Income from Continuing Operations

Our business has been subject, and we expect it to continue to be subject, to significant economic changes that materially affect or are likely to affect our income from continuing operations identified above in "- *Significant Factors Affecting our Result of Operations*" and the uncertainties described in "*Risk Factors*" on pages 381 and 64, respectively.

Known Trends or Uncertainties

Our business has been subject, and we expect it to continue to be subject, to significant economic changes arising from the trends identified above in "*Significant Factors affecting our Results of Operations*" and the uncertainties described in "*Risk Factors*" on pages 381 and 64, respectively. To our knowledge, except as discussed in this Offer Document, there are no known trends or uncertainties that have or had or are expected to have a material adverse impact on revenues or income from continuing operations.

Future Relationship between Cost and Revenue

Other than as described in "*Risk Factors*", "*Business*" and "*Discussion and analysis by the Directors of the Investment Manager of the financial condition, results of operations and cash flows of the Initial Portfolio Assets of the Trust*" on pages 64, 240 and 375 respectively, to our knowledge there are no known factors that may adversely affect our business prospects, results of operations and financial condition.

New Products or Business Segments

Other than as disclosed in this section and in "*Business*" on page 240 of this Offer Document, we have not announced and do not expect to announce in the near future any new business segments.

Seasonality of Business

Our business is seasonal in nature. For further details please see, "*Risk Factors - Our business is subject to seasonal fluctuations and business and economic cycles that may affect our cash flows*" on page 88.

Suppliers or Customer Concentration

We do not have any concentration of suppliers or customers in our business.

Competitive Conditions

We operate in a competitive environment. Please see *"Business*", "*Industry Overview*" and "*Risk Factors*" on pages 240, 176 and 64, respectively for further information on our industry and competition.

Recent Accounting Pronouncements

As of the date of this Offer Document, there are no recent accounting pronouncements which would have a material effect on our financial condition or results of operations.

Summary of Reservations or Qualifications or Adverse Remarks of Auditors

There are no reservations, qualifications or adverse remarks highlighted by the Statutory Auditors in their reports to our financial statements as at and for the nine months ended December 31, 2025.

Details of operating revenue from our Project SPVs post December 31, 2025

The operating revenue from our Project SPVs for January 2026 and February 2026 is as follows:

(₹ in million)

Operating revenue for the month ended	TEL	SRTPL	DTPL	SBGTPL	PEL	AMTPL	RVTPL	JSEL	Dhola	Dibang	Total
January 2026	155.58	287.91	240.76	289.32	106.45	422.44	251.73	48.78	44.52	27.74	**1875.23**
February 2026	132.86	270.19	223.18	270.03	101.12	400.82	227.44	48.78	44.52	27.74	**1746.68**

Significant Developments subsequent to December 31, 2025

Except as disclosed in this Offer Document and more specifically in the sections "*Business*" and "*Risk Factors*" on pages 240 and 64, respectively, there are no significant developments that have occurred post December 31, 2025, that affect (a) our trading or profitability, (b) the value of our assets, or (c) our ability to pay our liabilities.

RELATED PARTY TRANSACTIONS

In terms of Regulation 2(1)(zv) of the InvIT Regulations, related party shall be as defined as under the Companies Act, 2013 or under the applicable accounting standards and shall also include: (i) Parties to the Trust; and (ii) promoters, directors, and partners of the Parties to the Trust. Further, related parties also include such persons and entities as defined in terms of the applicable accounting standards, being Ind AS 24 on "*Related Party Disclosures*" ("**Related Parties**") in relation to related party transactions. For further details in relation to related party transactions during the nine month period ended December 31, 2025 and the financial years ended March 31, 2025, March 31, 2024 and March 31, 2023 as per Ind AS 24 read with InvIT Regulations and Guidance Note on Combined and Carve-out Financial Statements, please see "*Special Purpose Combined Financial Statements*" attached as **Annexure D**. The Parties to the Trust, may, from time to time, enter into related party transactions, in accordance with applicable law.

Procedure for dealing with Related Party Transactions

1. The IM Board has adopted the policy on related party transactions ("**RPT Policy**") pursuant to its resolution dated November 19, 2025. The IM Board shall review the Policy once every three years and may amend the Policy from time to time, subject to applicable law.

2. The key terms of the RPT Policy are provided below: The Investment Manager will ensure that all future related party transactions shall be:

   (a) on an arm's length basis;

   (b) in accordance with the relevant accounting standards;

   (c) in the best interest of the Unitholders;

   (d) consistent with the strategy and investment objectives of the Trust; and

   (e) compliant with applicable law,

   (f) in the ordinary course of business.

3. Review and approval of related party transactions:

   (a) Each transaction which is identified as a related party transaction shall be pre-approved by the Audit Committee prior to entering into such transaction.

   (b) The Audit Committee may grant omnibus approval for related party transactions. Each such omnibus approval shall be valid for a period not exceeding one year from the date of such approval, and related party transactions undertaken after the expiry of such period shall require fresh approval of the Audit Committee. The Audit Committee shall review, on a quarterly basis, the details of related party transactions entered into by the Trust pursuant to the omnibus approval.

   (c) The Audit Committee shall lay down the criteria for granting the omnibus approval and such approval shall be applicable in respect of transactions which are repetitive in nature.

   (d) The Audit Committee shall satisfy itself regarding the need for such omnibus approval and that such approval is in the interest of the Trust.

4. The Investment Manager will establish an internal control system so as to ensure that all future related party transactions are compliant with the InvIT Regulations and applicable accounting standards. Further, the Investment Manager shall convene meetings of the Unitholders in accordance with Regulation 19 and Regulation 22 of the InvIT Regulations in relation to the Related Party Transactions, and maintain records pertaining to such meetings an accordance with Regulations 26 of InvIT Regulations. The Investment Manager shall also ensure compliance with any additional guidelines issued in this regard by SEBI and other relevant regulatory, statutory or governmental authorities from time to time.

5. In addition to any other requirement that may be prescribed in terms of the InvIT Regulations or other

applicable laws, all related party transactions to be entered into in the future will be decided by the IM Board after the examination of the nature of the transaction and its supporting documents or such other data as may be deemed necessary by the IM Board.

6. The Investment Manager will ensure that if the (i) value of funds borrowed from Related Parties in a financial year exceeds 5% of the total consolidated borrowings of the Trust, any holding company and the SPVs, or any other threshold prescribed by the InvIT Regulations, or (ii) total value of all the Related Party Transactions in a financial year pertaining to acquisition or sale of assets, whether directly or through a holding company or SPV, or investments into securities, is likely to exceed 5% of the value of the assets of the Trust or any other threshold prescribed by the InvIT Regulations, approval from the Unitholders shall be obtained prior to entering into any such subsequent transaction with any Related Party, in accordance with Regulation 22 of the InvIT Regulations. The Investment Manager will ensure that if the value of the funds borrowed from related parties in a financial year exceeds 5% of the total consolidated borrowings of the Trust, any holding company and the SPVs, or any other threshold prescribed by the InvIT Regulations, approval from the Unitholders shall be obtained prior to entering into any such subsequent transaction with any related party, in accordance with Regulation 22 of the InvIT Regulations.

7. As a general rule, the Investment Manager must demonstrate to the IM Board that future related party transactions satisfy the criteria set out in paragraph (i) above, at the time of recommending the same for the approval of the IM Board.

8. The Investment Manager will maintain a register to record all related party transactions entered into by the Trust and the basis on which they are entered into.

9. The IM Board shall review at least quarterly in each financial year the related party transactions entered into during such quarter to ascertain that the guidelines and procedures established to monitor the related party transactions have been complied with.

10. The Investment Manager shall ensure that the all the incomes and expenses from related party transactions have arisen from legitimate business transactions.

11. While considering a Related Party Transaction, any director on the IM Board or member of the Audit Committee, who has a potential interest in any Related Party Transaction will recuse himself or herself and abstain from discussion, review and voting on the Related Party Transaction. Further, while considering voting on a Related Party Transaction which requires approval of the Unitholders, voting by any person who is a related party in such transaction as well as Associate of such persons shall not be considered on the specific issue.

Potential Conflict of Interest

1. Subject to applicable law and the RPT Policy, all resolutions in writing of the IM Board/ Audit Committee in relation to matters concerning related party transactions of the Trust must be approved by a majority of all non-related directors of the Investment Manager.

2. Where matters concerning the Trust relate to transactions entered into or to be entered into by the Investment Manager for and on behalf of Trust with a related party, the IM Board is required to consider the terms of the transactions to satisfy itself that the transactions are conducted in accordance with the parameters set out in the RPT Policy.

3. As part of its review of the internal audit reports, the Audit Committee will review the implementation of the agreements to acquire assets from the related parties to ensure compliance. The review will include an examination of supporting documents and such other data deemed necessary to the Audit Committee.

4. Any transactions pursuant to which: (a) employees of the Investment Manager provide any advice or services to the Sponsor, associates of the Sponsor, the Sponsor Group, or the Associates of the Investment Manager; or (b) employees of the Sponsor, associates of the Sponsor, the Sponsor Group or the Associates of the Investment Manager provide any advice or services to the Trust or the Investment Manager, shall be reported to the Audit Committee, and the Audit Committee shall ensure that the interests of Trust is protected. The Sponsor, Associates of the Sponsor, the Sponsor Group, Associates of the Investment Manager or other Related Parties to the Trust may, in certain cases, be

interested in businesses which directly compete with the activities of the Trust. To the extent applicable, such persons or entities shall perform their duties in relation to the Trust, independent of their related businesses.

5. Where any of the Related Parties have an interest in a business which competes or is likely to compete, either directly or indirectly, with the activities of the Trust, the following details shall be disclosed in the offer documents issued by the Trust:

   (a) details of the such business including an explanation as to how such business shall compete with the Trust;

   (b) a declaration that the Related Party shall perform its duty in relation to the Trust independent of its related business;

   (c) declaration as to whether any acquisition of such business by the Trust is intended and if so, details of the same thereof.

Disclosure and Reporting

1. The Investment Manager shall submit to the Trustee, quarterly reports on the activities of the Trust, *inter alia* including the status of compliance with the requirements specified under the InvIT Regulations in relation to related party transactions, within such time as may be prescribed in the InvIT Regulations and applicable law.

2. Related party transactions shall be disclosed: (a) in the offer document with respect to any such transactions entered into prior to the offer of units and any such proposed transactions subsequent to the offer; and (b) to the designated stock exchanges and the Unitholders periodically, in accordance with the InvIT Regulations and the agreements to be entered into with the stock exchanges in relation to the listing of the Units. The Investment Manager shall adequately disclose the details of any fees or commissions received or to be received by such related party(ies) to the stock exchanges.

3. In accordance with the InvIT Regulations, the annual report and the half-yearly report to be submitted by the Investment Manager to all Unitholders, electronically or by physical copies, and to the stock exchanges as may be applicable within such time as may be prescribed under the InvIT Regulations, shall contain, inter alia, details of all related party transactions as included in the InvIT Regulations.

Related Party Transactions

Present and on-going Related Party Transactions

Related party transactions of the Trust in relation to the setting up of the Trust and this Issue

A number of present and on-going transactions with certain Related Parties have been, or will be, entered into in relation to the setting up of the Trust. The Trustee and the Investment Manager confirm that the following related party transactions have been, or shall be, entered into, on an arm's length basis in accordance with the relevant accounting standards, in the best interest of the Unitholders, consistent with:

(a) **Securities Purchase Agreements**

Please see "*– Acquisition of the Initial Portfolio Assets by the Trust – Securities Purchase Agreements*" on page 421 for a description of the terms of the Securities Purchase Agreements.

(b) **Trust Deed**

Please see "*Parties to the Trust – Key Terms of the Trust Deed*" on page 124 for a description of the terms of the Trust Deed.

(c) **Investment Management Agreement**

Please see "*Parties to the Trust – Key Terms of the Investment Management Agreement*" on page 137 for a description of the terms of the Investment Management Agreement.

(d) **Project Implementation and Management Agreement**

Please see "*Parties to the Trust – Key terms of the Project Implementation and Management Agreement*" on page 152 for a description of the terms of the Project Implementation and Management Agreement.

In addition to the Project Implementation and Management Agreement, the Project Manager, Holdcos and Project SPVs will enter into certain ancillary agreements in relation to shared project services and project management services for the purposes inter-alia operation and management of the Initial Portfolio Assets under the supervision of the Project Manager.

(e) **ROFO Agreement**

Please see "*– Acquisition of the future assets by the Trust – ROFO Agreement*" on page 425 for a description of the terms of the ROFO Agreement.

(f) **Trust Loan Agreement**

Please see "*Financial Indebtedness and Deferred Payments - Trust Loan Agreement"* on page 369 for a description of the proposed terms of the Trust Loan Agreement.

Related party transactions in relation to the management of the InvIT Assets

Acquisition of the Initial Portfolio Assets by the Trust

Securities Purchase Agreements

Epic 3 SPA

The Trust (acting through its Trustee) (the "**Buyer**"), has entered into a securities purchase agreement dated April 7, 2026 with Infrastructure Yield Plus II, Infrastructure Yield Plus IIA, India Infrastructure Yield Plus II, being schemes of Infrastructure Yield Trust (collectively, the "**Epic Seller Entities**"), Neelambur Madukkarai Tollway Private Limited ("**NMTPL**"), the Sponsor (together with NMTPL, the "**Epic Project SPV Seller Entities**", and collectively with the Epic Seller Entities, the "**Seller Entities**") the Investment Manager and Epic 3 ("**Epic 3 SPA**").

The Trust (acting through its Trustee), by itself or through its nominee(s) acting for and on behalf of the Trust, shall acquire from the Epic Seller Entities (i) 28,078,967 equity shares representing 100% of the total issued, subscribed and paid up equity share capital of Epic 3 on a fully diluted basis ("**Sale Equity Shares**"); and (ii) 29,545 CCPS representing 16.45% of the total issued, subscribed and paid-up preference share capital of the Epic 3 ("**Sale CCPS**" and collectively, the "**Epic Sale Securities**"), subject to and in accordance with the provisions of the Epic 3 SPA. Following the closing under the Epic 3 SPA and the listing of the Trust, 51,000 CCPS and 49,000 CCPS respectively of Epic 3 shall continue to be held by Larsen & Toubro Limited ("**L&T**") and CPPIB India Private Holdings Inc. ("**CPPIB**") respectively, in compliance with Regulation 18(3A)(b) of the InvIT Regulations pursuant to which these shareholders shall not act in any manner that prevents the Trust (acting through the Trustee), the Investment Manager or Epic 3 from complying with the provisions of the InvIT Regulations. In this regard, L&T and CPPIB have executed letter agreements confirming their respective compliance with Regulation 18(3A)(b) of the InvIT Regulations. Further, the Trust (acting through its Trustee), by itself or through its nominee(s), acting for and on behalf of the Trust, shall acquire from the Epic Project SPV Seller Entities (i) 42,000,000 equity shares of DTPL bearing face value of ₹ 10 each from NMTPL; (ii) 70,000,000 preference shares of SBGTPL bearing face value of ₹ 10 each from the Sponsor; and (iii) 268,944,604 preference shares of AMTPL bearing face value of ₹ 10 each from the Epic Seller Entities ("**Epic Project SPV Sale Securities**", and together with the Epic Sale Securities, the "**Sale Securities**"), subject to and in accordance with the provisions of the Epic 3 SPA.

Assignment of the Erstwhile Epic SPA: Subject to the terms and conditions specified in the Epic 3 SPA, all rights and obligations under the Erstwhile Epic SPA will be assigned by the sellers to the Trust, pursuant to a deed of adherence to the Erstwhile Epic SPA executed in this regard. Pursuant to such assignment, the Trust shall, *inter alia*, have the right to (i) enforce indemnification obligations against the erstwhile sellers; (ii) receive dividends; and (iii) use certain material intellectual property rights, and shall be liable to provide co-operation to the relevant sellers in relation to defense of claims in accordance with the terms of the Erstwhile Epic SPA and Epic 3 SPA. The Trust shall also be the beneficiary of the representations and warranties provided by the erstwhile sellers.

Further, the Epic Seller Entities have also executed a deed of adherence in respect of the escrow agreements entered into between Larsen & Toubro Limited, Axis Bank Limited and Epic Concesiones Private Limited (*merged into Epic 3*) in respect of making certain milestone-linked payouts to certain shareholders of CCPS in Epic 3.

Consideration: The Trust has agreed to issue such number of Units payable against the purchase of Sale Securities, as determined upon the finalisation of the Issue Price in accordance with the formula set forth in the Epic 3 SPA.

Representations and Warranties:

The representations and warranties provided by the Buyer under the Epic 3 SPA pertain to, amongst others:

(i) due incorporation and existence under the laws of India;

(ii) due authorisation for consummation of the Epic 3 SPA;

(iii) non-contravention of trust deed, applicable law and material agreements to which the Buyer is a party; and

(iv) no liquidation, dissolution, winding up, commencement of bankruptcy, insolvency, or similar proceedings, whether voluntary or involuntary, with respect to the Buyer is pending or has been pending, or to the knowledge of the Buyer, threatened.

Subject to the provisions of the Epic 3 SPA, the representations and warranties provided by the Seller Entities in respect of the Initial Portfolio Assets covered under the Epic 3 SPA, pertain to, amongst others:

(i) due incorporation and existence under the laws of India;

(ii) due authorisation for consummation of the Epic 3 SPA;

(iii) non-contravention of the charter documents, applicable law and agreements to which such entity is a party, subject to the conditions specified in the Epic 3 SPA;

(iv) no breaches by the Seller Entities of its memorandum or articles of association;

(v) legal and beneficial ownership of the Sale Securities, as applicable, free of all encumbrances (save as disclosed in the Epic 3 SPA) and right to exercise all voting and other rights over such Sale Securities, as applicable;

(vi) business warranties in relation to share capital of the respective Initial Portfolio Assets, material licenses, employees, property, insurance, corporate records and litigation involving the respective Initial Portfolio Assets, amongst others; and

(vii) warranties in relation to tax returns and notices.

Indemnity:

The Sponsor (the "**Indemnifying Party**") is required to indemnify, defend, and hold harmless each Buyer and/or the Investment Manager (each, an "**Indemnified Party**") against Losses arising from any actual breach, inaccuracy, or misrepresentation of the Seller Entities Warranties. A claim for indemnity ("**Claim**") is required to be initiated by the Indemnified Party by giving a notice of claim within the claim period, specifying in reasonable detail the circumstances, the resulting breach or default, and the amount claimed. Upon receipt, the Indemnifying Party shall have 30 working days (the "**Cure Period**") to either (a) cure the breach or default if, in the Indemnifying Party's reasonable opinion, it is capable of cure without loss to the Indemnified Party, no liability arises unless the Indemnifying Party fails to remedy within the Cure Period or any longer period agreed by the Indemnified Party or (b) object to the Claim in reasonable detail. If the breach is incapable of cure without loss to the Indemnified Party or is not cured within the Cure Period, the Indemnifying Party shall be required to pay the Claim as soon as practicable and, in any event, no later than 30 Working Days after the Cure Period expires, or by another date agreed in writing. For contingent Losses, payment is not due until the contingency results in an obligation for the Indemnified Party to make a payment. Any objection must be signed and set out as the disputed items ("**Disputed Matters**"); the parties must then negotiate in good faith to resolve them. If no agreement is reached within 30 working days after the objection is received, and the Indemnifying Party

thereafter fails to perform the mutually agreed actions within the Cure Period in accordance with Epic 3 SPA, then any Disputed Matters as to which written agreement has not been reached shall be resolved in accordance with the procedures as set forth in the Epic 3 SPA.

SRPL SPA

The Trust (acting through its Trustee) (the "**Buyer**"), has entered into a securities purchase agreement dated April 7, 2026 with Edelweiss Infrastructure Yield Plus (the "**Seller**"), the Investment Manager, SRPL and the Sponsor ("**SRPL SPA**").

The Trust (acting through its Trustee), by itself or through its nominee(s), acting for and on behalf of the Trust, shall acquire (i) 7,250,000 equity shares representing 100% of the total issued, subscribed and paid up equity share capital of SRPL on a fully diluted basis ("**Sale Equity Shares**"); and (ii) 2,235,700 CCDs ("**Sale CCDs**" and collectively, the "**Sale Securities**"), subject to and in accordance with the provisions of the SRPL SPA.

Consideration: The Trust shall purchase the Sale Securities pursuant to the utilisation of Issue Proceeds, in accordance with the formula set forth in the SRPL SPA. For further details, please see "*Use of Proceeds*" on page 356.

Representations and Warranties:

The representations and warranties provided by the Buyer under the SRPL SPA pertain to, amongst others:

(i) due incorporation and existence under the laws of India;

(ii) due authorization for consummation of the SRPL SPA;

(iii) non-contravention of trust deed, applicable law and material agreements to which the Buyer is a party; and

(iv) no liquidation, dissolution, winding up, commencement of bankruptcy, insolvency, or similar proceedings, whether voluntary or involuntary, with respect to the Buyer is pending or has been pending, or to the knowledge of the Buyer, threatened.

Subject to the provisions of the SRPL SPA, the representations and warranties provided by the Seller in respect of Dhola, Dibang and JSEL under the SRPL SPA, pertain to, amongst others:

(i) due incorporation and existence under the laws of India;

(ii) due authorisation for consummation of the SRPL SPA;

(iii) non-contravention of the charter documents, applicable law and agreements to which such entity is a party, subject to the conditions specified in the SRPL SPA;

(iv) no breaches by the Seller of its memorandum or articles of association;

(v) legal and beneficial ownership of the Sale Equity Shares and Sale CCDs, free of all encumbrances (save as disclosed in the SRPL SPA) and right to exercise all voting and other rights over such Sale Securities, as applicable;

(vi) business warranties in relation to share capital of the respective Initial Portfolio Assets, material licenses, employees, property, insurance, corporate records and litigation involving the respective Initial Portfolio Assets, amongst others; and

(vii) warranties in relation to tax returns and notices.

SRPL originally acquired the relevant Initial Portfolio Assets, namely, Dhola, Dibang and JSEL, pursuant to securities purchase agreements entered into with various third parties, and it shall continue to be a party to such securities purchase agreements following the consummation of the Formation Transactions, and post-Listing of the Trust. Accordingly, all rights of SRPL as a buyer under the relevant acquisition agreements for the relevant Initial Portfolio Assets shall continue post-Listing of the Trust including in relation to, amongst other things, being the beneficiary of the representations and warranties provided by the erstwhile seller and enforcing indemnification obligations against the erstwhile sellers.

Indemnity:

The Sponsor (the "**Indemnifying Party**") is required to indemnify, defend, and hold harmless each Buyer and/or the Investment Manager (each, an "**Indemnified Party**") against Losses arising from any actual breach, inaccuracy, or misrepresentation of the Seller Entities Warranties. A claim for indemnity ("**Claim**") is required to be initiated by the Indemnified Party by giving a notice of claim within the claim period, specifying in reasonable detail the circumstances, the resulting breach or default, and the amount claimed. Upon receipt, the Indemnifying Party shall have 30 working days (the "**Cure Period**") to either (a) cure the breach or default if, in the Indemnifying Party's reasonable opinion, it is capable of cure without loss to the Indemnified Party, no liability arises unless the Indemnifying Party fails to remedy within the Cure Period or any longer period agreed by the Indemnified Party or (b) object to the Claim in reasonable detail. If the breach is incapable of cure without loss to the Indemnified Party or is not cured within the Cure Period, the Indemnifying Party shall be required to pay the Claim as soon as practicable and, in any event, no later than 30 Working Days after the Cure Period expires, or by another date agreed in writing. For contingent Losses, payment is not due until the contingency results in an obligation for the Indemnified Party to make a payment. Any objection must be signed and set out as the disputed items ("**Disputed Matters**"); the parties must then negotiate in good faith to resolve them. If no agreement is reached within 30 working days after the objection is received, and the Indemnifying Party thereafter fails to perform the mutually agreed actions within the Cure Period in accordance with SRPL SPA, then any Disputed Matters as to which written agreement has not been reached shall be resolved in accordance with the procedures as set forth in the SRPL SPA.

TEL SPA

The Trust (acting through its Trustee) (the "**Buyer**"), has entered into a securities purchase agreement dated April 7, 2026 with Edelweiss Infrastructure Yield Plus (the "**Seller**"), the Investment Manager, TEL and the Sponsor ("**TEL SPA**").

The Trust (acting through its Trustee), by itself or through its nominee(s), acting for and on behalf of the Trust, shall acquire (i) 77,297 equity shares representing 100% of the total issued, subscribed and paid up equity share capital of TEL on a fully diluted basis ("**Sale Equity Shares**"); and (ii) 11,617,027 CCPS representing 100% of the total issued, subscribed and paid-up preference share capital of the Company ("**Sale CCPS**" and collectively, the "**Sale Securities**"), subject to and in accordance with the provisions of the TEL SPA.

Further, the Seller and the Buyer have also executed a deed of adherence in respect of the escrow agreement entered into between Seller, ICICI Bank, KMC Infratech Limited and Thrissur Expressway Limited for the operation of the escrow accounts.

Assignment of the Erstwhile TEL SPA: Subject to the terms and conditions specified in the TEL SPA, all rights and/ or obligations under the share purchase agreement entered into between the erstwhile seller of TEL (*i.e.*, KMC Infratech Limited), the Seller and TEL ("**Erstwhile TEL SPA**") will be assigned by the Seller to the Buyer, in the manner set forth in a deed of adherence executed in this regard. Pursuant to such assignment, the Trust shall, *inter alia*, have the right to enforce indemnification obligations against the erstwhile seller and shall also be the beneficiary of the representations and warranties provided by the erstwhile sellers.

Consideration: The Trust shall purchase the Sale Securities pursuant to the utilisation of Issue proceeds, in accordance with the formula set forth in the TEL SPA. For further details, please see "*Use of Proceeds"* on page 356.

Representations and Warranties:

The representations and warranties provided by the Buyer under the TEL SPA pertain to, amongst others:

(i) due incorporation and existence under the laws of India;

(ii) due authorisation for consummation of the TEL SPA;

(iii) non-contravention of trust deed, applicable law and material agreements to which the Buyer is a party; and

(iv) no liquidation, dissolution, winding up, commencement of bankruptcy, insolvency, or similar proceedings, whether voluntary or involuntary, with respect to the Buyer is pending or has been pending, or to the knowledge of the Buyer, threatened.

Subject to the provisions of the TEL SPA, the representations and warranties provided by the Seller Entities in respect of the Initial Portfolio Assets under the TEL SPA, pertain to, amongst others:

(i) due incorporation and existence under the laws of India;

(ii) due authorisation for consummation of the TEL SPA;

(iii) non-contravention of the charter documents, applicable law and agreements to which such entity is a party, subject to the conditions specified in the TEL SPA;

(iv) no breaches by the Seller of its memorandum or articles of association;

(v) legal and beneficial ownership of the Sale Equity Shares and Sale CCPS, free of all encumbrances (save as disclosed in the TEL SPA) and right to exercise all voting and other rights over such Sale Securities, as applicable;

(vi) business warranties in relation to share capital of the respective Initial Portfolio Assets, material licenses, employees, property, insurance, corporate records and litigation involving the respective Initial Portfolio Assets, amongst others; and

(vii) warranties in relation to tax returns and notices.

Indemnity:

The Sponsor (the "**Indemnifying Party**") is required to indemnify, defend, and hold harmless each Buyer and/or the Investment Manager (each, an "**Indemnified Party**") against Losses arising from any actual breach, inaccuracy, or misrepresentation of the Seller Entities Warranties. A claim for indemnity ("**Claim**") is required to be initiated by the Indemnified Party by giving a notice of claim within the claim period, specifying in reasonable detail the circumstances, the resulting breach or default, and the amount claimed. Upon receipt, the Indemnifying Party shall have 30 working days (the "**Cure Period**") to either (a) cure the breach or default if, in the Indemnifying Party's reasonable opinion, it is capable of cure without loss to the Indemnified Party, no liability arises unless the Indemnifying Party fails to remedy within the Cure Period or any longer period agreed by the Indemnified Party or (b) object to the Claim in reasonable detail. If the breach is incapable of cure without loss to the Indemnified Party or is not cured within the Cure Period, the Indemnifying Party shall be required to pay the Claim as soon as practicable and, in any event, no later than 30 Working Days after the Cure Period expires, or by another date agreed in writing. For contingent Losses, payment is not due until the contingency results in an obligation for the Indemnified Party to make a payment. Any objection must be signed and set out as the disputed items ("**Disputed Matters**"); the parties must then negotiate in good faith to resolve them. If no agreement is reached within 30 working days after the objection is received, and the Indemnifying Party thereafter fails to perform the mutually agreed actions within the Cure Period in accordance with TEL SPA, then any Disputed Matters as to which written agreement has not been reached shall be resolved in accordance with the procedures as set forth in the TEL SPA.

Matters Management Agreement

A matters management agreement dated April 7, 2026 has been entered into by the relevant Initial Portfolio Assets (*namely, SRTPL, DTPL and Dibang*) for setting out the procedure for matters management ("**Matters Management Agreement(s)**") in relation to certain current and pending claims (*as identified in the respective share purchase agreements*) ("**Identified Matters**"). Pursuant to the Matters Management Agreement(s), it is mutually agreed that the sellers (*under the respective share purchase agreements*) shall pursue the Identified Matters at their own cost and risk and all benefits or rights received or to be received from the concessioning authority in relation to the Identified Matters shall be to the account and for the benefit of such sellers, subject to the terms set out therein.

Acquisition of future assets by the Trust

ROFO Agreement

The Trust (acting through its Trustee) has entered into a right of first offer agreement dated April 7, 2026 with Epic Concesiones 2 Private Limited ("**Epic 2**"), Infrastructure Yield Plus II, Infrastructure Yield Plus IIA and India Infrastructure Yield Plus II (collectively, the "**Seller Entities**"), the Investment Manager and Sponsor ("**ROFO Agreement**"). The salient features of the ROFO Agreement are set out below:

Right of First Offer:

(i) In accordance with the ROFO Agreement, the Trust will have a right of first offer over the securities of certain special purpose vehicles holding the ROFO Assets ("**ROFO SPVs**", and such securities "**ROFO Securities**"), subject to the lock-in periods specified in the project agreements executed in relation to the HAM assets under NHAI concessions held by the ROFO SPVs.

(ii) During the period between the date which is 6 months from the date of listing of the Units ("**Trust Listing Date**") and three years from the Trust Listing Date, the Seller Entities may collectively communicate to the Trust, their interest in selling all (and not less than all) of the ROFO Securities of any or all of the ROFO SPVs, along with any pre-conditions for such sale. In this regard, the Seller Entities may make (or procure that the relevant affiliate of the Seller Entities makes) an irrevocable invitation to offer to the Trust, acting through the Trustee or the Investment Manager, for the acquisition of the ROFO Securities in relation to the relevant ROFO SPVs held by the Seller Entities at the time of making the Invitation to Offer. The Trust shall communicate its interest in such acquisition to the Seller Entities, along with a due diligence questionnaire, which shall include queries and clarifications.

(iii) Additionally, during the period between the date which is 6 months from the Trust Listing Date and two years from the Trust Listing Date, the Trust may approach the Seller Entities with an irrevocable invitation to acquire all (and not less than all) of the ROFO Securities in relation to any or all the ROFO SPVs, along with a due diligence questionnaire, which shall include queries and clarifications. In the event that the Seller Entities do not wish to transfer the ROFO Securities to the Trust, the Seller Entities shall collectively communicate such decision in writing, and all provisions of the ROFO Agreement shall continue to apply. Alternatively, if the Seller Entity is interested, it shall communicate such interest in writing to the Trust.

(iv) Such information sought for by the Trust in the due diligence questionnaire shall be provided by the Seller Entities, post which the Trust shall have the right but not the obligation to make an irrevocable offer to acquire all (and not less than all) of the ROFO Securities of the relevant ROFO SPVs at such value as determined by the Investment Manager in accordance with Applicable Law along with the detailed terms and conditions backing up such offer ("**ROFO SPV Offer Price and Terms**") by delivering an irrevocable offer letter ("**ROFO SPV Offer Letter**") to the Seller Entities holding the ROFO Securities.

Acceptance of the ROFO SPV Offer Price and Terms by the Seller Entity:

(i) The relevant Seller Entities holding the ROFO Securities shall accept, at its discretion, the ROFO SPV Offer Price and Terms, by delivering a notice of acceptance to the Trust within a specified period ("**ROFO Acceptance Period**") from the date of receipt of the ROFO SPV Offer Letter by the Seller Entities ("**ROFO Acceptance Notice**"). Further, the relevant Seller Entity may, at its discretion, accept the offer set out in the ROFO SPV Offer Letter subsequent to further discussions and negotiations with the Trust and on such terms and conditions as may be mutually agreed upon amongst the Seller Entities and the Trust.

(ii) While the Seller Entities shall be under no obligation to accept the offer set out in the ROFO SPV Offer Letter or provide a ROFO Acceptance Notice, in the event the Seller Entities do not wish to transfer the ROFO Securities pursuant to the ROFO SPV Offer Letter, the relevant Seller Entities shall communicate such decision in writing within the specified period from the date of receipt by the relevant Seller Entity of the ROFO SPV Offer Letter ("**Seller Entity ROFO Decline Notice**").

(iii) If the ROFO Acceptance Notice is received by the Trust during the ROFO Acceptance Period, the sale of the ROFO Securities shall be completed in accordance with the ROFO SPV Offer Price and Terms or such terms as mutually agreed between the Parties in writing, within the specified period from receipt of the ROFO Acceptance Notice by the Trust, or any other such period mutually decided by the Parties, subject to receipt of all consents and completion of all obligations of Seller Entities as mutually agreed.

Non-Acceptance of the ROFO SPV Offer Price and Terms by the Seller Entity:

(i) In the event that the relevant Seller Entity does not issue a (a) ROFO Acceptance Notice during the specified period; or (b) Seller Entity ROFO Decline Notice within the specified period, then the

provisions in relation to right of first offer laid down in the ROFO Agreement shall be reinstated.

(ii) In the event that the relevant Seller Entity issues the Seller Entity ROFO Decline Notice, the relevant Seller Entity shall be entitled to sell all the ROFO Securities issued by all (and not less than all) ROFO SPV for which ROFO SPV Offer Letter is received, to any person within twelve months from the expiry of the ROFO Acceptance Period at terms more favourable than ROFO SPV Offer Price and Terms, including after considering the distributions made during the aforesaid time period.

(iii) In the event that the Seller Entities do not consummate the sale of such ROFO Securities to a third person and subsequently desires to sell the ROFO Securities, the Seller Entities shall be required to follow the procedure set out in the provisions under the ROFO Agreement.

Termination: The ROFO Agreement shall be effective on and from the Trust Listing Date and continue to be valid and in full force and effect until 3 years from the Trust Listing Date, or such other period as may be mutually agreed, and unless terminated in accordance with the provisions of the ROFO Agreement.

Potential Future Related Party Transactions

Certain transactions may be entered with Related Parties in the future and the Trustee and the Investment Manager confirm that such related party transactions shall be entered into in compliance with the InvIT Regulations and the RPT Policy.

Potential Conflicts of Interest

Some of the Related Parties of the Trust may have an interest in businesses which competes or is likely to compete, either directly or indirectly, with the activities of the Trust, and accordingly this may also result in various conflicts of interest. For further details, please see "*Risk Factors - Conflicts of interest may arise out of common business objectives shared by the Investment Manager, the Sponsor, the Project Manager, EAAA Platform and us*" on page 94.

In addition, the Investment Manager has also established certain procedures to deal with conflicts of interest issues. For further details on management of potential conflicts of interest, please see " - *Procedure for dealing with Related Party Transactions*" on page 417.

Conflicts of the Investment Manager and the Sponsor

Certain related party transactions may be entered into by the Investment Manager and the Sponsor in the future which will be in compliance with applicable law.

REGULATIONS AND POLICIES

The following description is a summary of certain sector specific laws currently in force in India, which are applicable to the operations of the Trust and the Initial Portfolio Assets. The information detailed in this section has been obtained from statutes, regulations, sector-specific policies and publications available in the public domain. The description below may not be exhaustive, and is only intended to provide general information to Bidders and is neither designed as, nor intended to substitute, professional legal advice. The information in this section is based on the current provisions of applicable law that are subject to change or modification by subsequent legislative, regulatory, administrative or judicial decisions in India. For information regarding regulatory approvals obtained by the Initial Portfolio Assets, please see "Regulatory Approvals" on page 438.

Laws Relating to the Business and Operations of the Trust and the Initial Portfolio Assets

The regulatory framework in India in the highways sector, implemented on a public-private partnership ("**PPP**") basis, mainly derives its source from the primary legislations of National Highways Authority of India Act, 1988 (the "**NHAI Act**") and the National Highways Act, 1956 (the "**NH Act**") enacted by the Indian parliament, each as amended or supplemented. The Indian government, through the National Highways Authority of India (NHAI) and the Ministry of Road Transport and Highways (MORTH), is actively promoting the digitalization of highway management by using Artificial Intelligence (AI) for traffic monitoring and Geographic Information System (GIS) mapping for asset management.

The National Highways Act, 1956

The policy of the MORTH, in implementing the NH Act, is to vest the MORTH with the power to declare a national highway and for acquisition of land for this purpose. The GoI, by notification, can declare the intention to acquire any land for a 'public purpose' as envisaged by the law and such land can be used for the purposes of building, maintenance, management and operation of the declared national highways throughout the country. The NH Act prescribes the procedure for such land acquisition. The procedure includes, amongst others, a declaration of an intention to acquire, entering and inspecting such land, hearing of objections, a declaration of the acquisition and the power to take possession. The NH Act also provides for payment of compensation to owners and any other person whose right of enjoyment or ownership in the land has been affected. The NH Act vests MORTH with the power to appoint a competent authority for the effective implementation of the NH Act and its policies. The said appointed authority retains the right and power to (a) survey, make any inspection, valuation or enquiry; (b) take levels; (c) dig or bore into sub-soil; (d) set out boundaries and intended lines of work; (e) mark such levels, boundaries and lines placing marks and cutting trenches; or (f) do such other acts or things as may be laid down by rules made in this behalf by that government. All the notified national highways shall vest in the name of the Union and for the purposes, shall include all lands appurtenant thereto and all the bridges, culverts, tunnels and other enlisted constructions under the said NH Act. The Central Government shall assume the responsibility of maintaining and construction of national highways in proper condition in accordance to the law. The Central Government also retains the right to levy fee over the services and benefits rendered in relation to the use of such national highways.

The GoI is responsible for the development and maintenance of national highways. However, it may direct that such functions may also be exercised by the government of a state in which the highway is located or by any officer or authority subordinate to the GoI or to the state government. Further, the GoI has the power to enter into an agreement with any person for the development and maintenance of a part or whole of the highway. Such person would have the right to collect and retain fees at such rates as may be notified by the GoI and will also have the powers to regulate and control the traffic, for proper management of the highway, in accordance with the provisions of the Motor Vehicles Act, 1988, as amended. The GoI also has the power to make rules for carrying out the purposes of the NH Act.

The National Highways (Amendment) Act, 2017, entails the competent authority to issue reports to the Central Government in respect of any land (either acquired or proposed to be acquired) which is, either under incorrect revenue record or which is not required due to change in geometry or alignment of the construction, to issue order for the de-notification of such land from the acquisition for development and maintenance of the national highway. In pursuance of the foregoing amendment to the statute, the National Highways Rules, 1957, have been amended to ensure the exercise of the power under the NH Act. These rules provide for periodic regulatory compliance and reporting standards to be followed by the competent authority in reporting to the Central Government.

The National Highways Authority of India Act, 1988

The NHAI Act was enacted in pursuance of the powers of the Central Government for appointing a competent authority under the NH Act and provides for the constitution of an authority for the development, maintenance and management of national highways and for matters connected therewith or incidental thereto. In accordance with the NHAI Act, the GoI carries out development and maintenance of the national highways through NHAI. Subject to the provisions of the NHAI Act, the NHAI has the power to enter into and perform any contract necessary for the discharge of its functions. The NHAI has the power to acquire any land to discharge its functions, and such acquired land will be deemed to be land needed for a 'public purpose'. The NHAI Act prescribes a limit in relation to the value of the contracts that may be entered into by NHAI. However, the NHAI may enter into contracts exceeding the specified value, on obtaining prior approval of the GoI. The NHAI Act provides that the contracts for acquisition, sale, or lease of immovable property on behalf of the NHAI cannot exceed a term of 30 years unless previously approved by the GoI. NHAI's objective is to ensure that all contract awards and procurements conform to the best industry practices with regard to transparency of process, adoption of bid criteria to ensure healthy competition in award of contracts. In accordance with the NHAI Act, the NHAI shall consist of a full time chairman, not more than six full time members and not more than six part time members who are being appointed by the Central Government. Additionally, various project implementation units headed by project director have been set at various sites to oversee timely completion of the projects.

In view of the challenging task of construction, development, and management of national highways being undertaken by NHAI, the Committee on Public Undertakings selected the subject "National Highways Authority of India (NHAI)" for comprehensive examination and report. The National Highways Authority of India (Amendment) Act, 2013, received the assent of the President of India on September 10, 2013, and aimed at increasing the institutional capacity of NHAI to help execute the powers delegated to it. National Highways Development Project ("**NHDP**") was launched in 1998 with the objective of developing roads of international standards which facilitate smooth flow of traffic. The NHDP envisages creation of roads with enhanced safety features, better riding surface, grade separator and other salient features.

As per the NHAI Works Manual, 2006, NHAI's mandate is the time and cost bound implementation of the NHDP. The sources of finance available to the NHAI include fund assistance from external funding agencies like the International Bank of Reconstruction and Development and the Asian Development Bank. NHAI's role encompasses involving the private sector in provision, maintenance, and operation of the national highways.

Financing of the NHDP

The GoI, under the Central Road and Infrastructure Fund Act, 2000 created a fund which is required to be utilized for the development and maintenance of national highways (the "**Central Road Fund**"). Section 18 of the NHAI Act also provides for the creation of a separate NHAI Fund. Any capital grant or aid received, loan taken, borrowing made, or any other sum received by the NHAI is credited to the NHAI Fund. Certain sources for financing of the NHDP are through dedicated accruals under the Central Road Fund by levy of cess on fuel as well as involving the private sector and encouraging public private partnerships. The NHDP is also financed through long-term external loans from the International Bank of Reconstruction and Development, the Asian Development Bank, World Bank and the Japan Bank for International Cooperation as well as through tolling of roads for different projects undertaken by the NHAI.

Private Participation in NHDP

In an effort to attract private sector participation in the NHDP, the NHAI has issued model concession agreements ("**MCAs**") which have been formulated by Planning Commission of India or NITI Aayog and other departments of Central Government where a private entity, being the concessionaire, is, through an international competitive bidding process, awarded a concession (in form of a license) to build, own, operate and collect toll on a highway for a specified period of time, which is usually up to 30 years. The concession to develop highway projects is given by the NHAI or other governmental authorities under various models of PPP like:

(i) Build, Operate, Transfer (BOT)/ Design, Build, Finance, Operate and Transfer (DBFOT) – In this model, the entire designing, financing and construction is undertaken by the concessionaire at its own cost. The concessionaire is entitled to collect toll or receive annuity payments from the NHAI, as the case may be, during the concession period after the construction of the highway project. The bid for the project may either be selected basis the lowest grant wanted by the private developer from the NHAI or the highest premium the private developer is willing to pay to NHAI, in the form of additional concession fee. The concessionaire at the end of the concession period transfers the highway project

to the NHAI (free of charge and clear of all encumbrances). The concessionaire's investment in the highway project is recovered directly through user fees collected by way of tolls. Under the BOT model, the projects which are generally not viable based on toll revenue alone, the NHAI or the relevant governmental authority provides concessionaire with a capital grant upto certain percentage of the project cost to increase the viability of projects and the quantum of such grant is determined on a case to case basis. For certain projects with high traffic volumes, concessionaire also offers a negative grant (i.e., premium) to the NHAI.

(ii) Hybrid Annuity Model (HAM) – In this model, the NHAI or the relevant governmental authority invests 40% (forty percent) of the construction cost of the project in (five) equal instalments and the balance amount is infused by the private developer. The private developer recovers his investment in the form of annuity payments received by it over a period of 15 (fifteen) years from the date of commercial operations. Additionally, there is no revenue risk for the private developer under HAM model because the toll is collected by the NHAI or relevant governmental authorities unlike the BOT model where the private developer collects it.

(iii) Toll, Operate and Transfer (TOT) – In this model, the road projects which are in operational phase are awarded by the NHAI or relevant governmental authorities to the concessionaire. The NHAI passes on the toll collection rights and operation and maintenance obligations to the concessionaire against payment of upfront concession fees quoted by the concessionaire as a part of the bidding process.

The bidding for the projects takes place in two stages as per the process provided below:

1. in the qualification (RFQ) stage, the NHAI selects certain applicants on the basis of technical and financial expertise, prior experience in implementing similar projects and previous track record; and

2. in the proposal (RFP) stage, the NHAI invites financial bids from the applicants qualified at the RFQ stage on the basis of which the concession is awarded to the successful bidder by the NHAI for implementation of the project. In accordance with the MCAs for projects above ₹1,000 million, the concessionaire meets the upfront cost and expenditure on annual maintenance and recovers the entire cost along with the interest from toll collections during the concession period. As per the 'Guidelines for Investment in Road Sector' issued by MORTH in 2009, in order to increase the viability of projects, a capital grant of up to 40% of the project cost is provided by the NHAI or the GoI. The quantum of grant is determined on a case to case basis and typically constitutes the bid parameter in Build, Operate, Transfer ("BOT") projects which are generally not viable based on toll revenue alone. For certain projects with high traffic volumes, concessionaire also offers a negative grant (i.e., premium) to the NHAI. The concessionaire at the end of the concession period transfers the road back to the Government (free of charge and clear of all encumbrances). The concessionaire's investment in the road is recovered directly through user fees collected by way of tolls. As per the MCAs for annuity based projects, the concessionaire is required to meet the entire upfront cost (no grant is paid by the NHAI or the GoI) and the expenditure on annual maintenance for annuity based projects. The concessionaire recovers the entire investment through pre- determined annuity payments to be made by the NHAI or the GoI. Furthermore, MORTH approved certain amendments to the model concession agreement, inter-alia, in relation to deferment of premium payments.

Exit Policy

The CCEA in May 2015 approved a comprehensive exit policy framework with the objective to mobilize funds in the market. In pursuance thereto, NHAI, vide circular number NHAI/1103/CGM(FA)/4/2015 dated June 9, 2015 permitted divestment of 100% equity by concessionaires/developers after two years of completion of construction of all BOT projects to facilitate unlocking of funds for new infrastructure projects. The equity divested is required to be invested by promoters in their new projects. This comprehensive exit policy framework is expected to harmonize certain conditions across all concessions signed prior to 2009 with the policy framework for post 2009 contracts which permit divestment of equity up to 100%, two years after completion of construction. In line with the spirit of quoted circular, the NHAI issued another circular dated September 9, 2015 followed by the circular dated November 19, 2015, on the same subject, allowing the promoter to use the proceeds from the sale of divested equity of the concessionaire in one or more of the following:

(i) to reinvest in incomplete NHAI projects;

(ii) to reinvest any other highway projects;

(iii) to reinvest in any other power sector projects; or

(iv) to retire their debt to financial institutions in any other infrastructure projects.

Relaxation in the 'change in ownership' clause in Hybrid Annuity Model (HAM) projects

The MORTH, *vide* circular dated November 10, 2020 and November 27, 2020, read along with the NHAI circular dated December 31, 2020, amended the MCAs in respect of project implemented under the HAM model, and permitted the selected bidder/consortium members, for the new as well as subsisting national highways project under the HAM-model, to dilute their equity six months after COD is achieved for the respective project.

Rationalized Compensation

The CCEA in November 2015 approved a policy for rationalized compensation to concessionaires for languishing national highway projects in BOT mode for delays that are not attributable to the concessionaires. Under the policy, the NHAI is authorized to allow an extension of the concession period for BOT (Toll) projects while the tenure for the operations period as envisaged originally in the concession agreement may remain unchanged which would result in a corresponding increase in concession period. The NHAI has also been authorised to pay compensatory annuities to the concessionaire corresponding to the actual period of delay that is not attributable to the concessionaire upon successful completion of the project.

One Time Fund Infusion Scheme

The CCEA in October 2015 gave its approval to the NHAI for a one-time infusion of funds with the purpose of reviving and physically completing stalled projects in the advanced stages of completion. As per the policy, the amount of funds required in each case shall be approved by NHAI on a case to case basis.

Bidder Information

MORTH has developed the Bidder Information Management System ("**BIMS**") to streamline the process of pre- qualification of bidders for EPC mode of contracts for all national highway works, with enhanced transparency and objectivity. BIMS works as a data base of bidder information that covers basic details, civil works experience, cash accruals and network, and annual turnover so that bidders' pre-qualification can be assessed based on evaluation parameters like threshold capacity and bid capacity from already stored data and the technical evaluation can be carried out in a faster manner.

Land Acquisition

While land is acquired for national highway projects under the NH Act, the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 (the "**Land Acquisition Act**") must also be complied with. MORTH has issued comprehensive guidelines on land acquisition for national highways taking into account the applicability of the Land Acquisition Act.

Arbitral Awards

CCEA on August 31, 2016 approved various measures to revive the construction sector. An office memorandum dated September 5, 2016 was issued by the National Institute for Transforming India with certain proposals. On November 20, 2019, the CCEA approved certain proposals in relation to the arbitrations by or against government entities, for the effective implementation of the CCEA's decision on August 31, 2016 on its initiatives to revive the construction sector. Initially, the CCEA had approved the proposal that government agencies will be required to pay 75% of the arbitral award to the concessionaire against a bank guarantee, in cases where the award already announced is challenged. However, pursuant to a press release dated November 20, 2019, the CCEA approved, inter-alia, that where a government entity has challenged an arbitral award, resultant of which the amount of the arbitral award has not been paid, 75% of such award will be paid by the government entity to the contractor or the concessionaire against a bank guarantee only for the said 75% and not for its interest component. In relation to interest payable to the government entity, if a subsequent court order required the refund of 75% of the amount, the payment of such amounts will be required to be made as per the court orders.

The NHAI through policy circulars dated April 9, 2021 and May 26, 2021 and MORTH through letter dated December 18, 2019 provide for expedited mechanism for settlement of claims arising out of projects via establishment of Conciliation of Independent Experts. The Department of Expenditure, Ministry of Finance has also launched a scheme detailing a one-time settlement initiative for resolving pending contractual disputes involving the Government of India or its related entities. Disputes where the award by court/ arbitral tribunal is only for monetary value was eligible for settlement under this scheme. ‘

Control of National Highways (Land and Traffic) Act, 2002

The Control of National Highways (Land and Traffic) Act, 2002 (the “**Control of NH Act**”) provides for control of land within national highways, right of way and traffic moving on national highways and also for removal of unauthorised occupation thereon. In accordance with the provisions of the Control of NH Act, the Central Government has established highway administrations. Under the Control of NH Act, all land that forms part of a highway which vests in the Central Government, or that which does not already vest in the Central Government but has been acquired for the purpose of highways shall be deemed to be the property of the Central Government. The Control of NH Act prohibits any person from occupying any highway land or discharging any material through on such land without the permission of the highway administration. The Control of NH Act permits the grant of lease and license for use of highway land for temporary use.

Applicable Rules

As per the NH Act and the NHAI Act, the Central Government is empowered to make rules in order to further the objects of NH Act and NHAI Act. In exercise of such power, the Central Government has framed certain rules which are as follows:

- The National Highways Rules, 1957, as amended;
- National Highways Authority of India (Budget, Accounts Audit, Investment of Funds and Powers to enter Premises) Rules, 1990, as amended;
- The National Highways (Manner of Depositing the Amount by the Central Government with Competent Authority for Acquisition of Land) Rules, 1998;
- The National Highways Tribunal (Procedure for Appointment as Presiding Officer of the Tribunal) Rules, 2003, as amended;
- The Central Road Fund (State Roads) Rules, 2014;
- The National Highways Tribunal (Procedure) Rules 2003;
- National Highways Authority of India (The Term of Office and Other Conditions of Service of Members) Rules, 2003, as amended;
- The National Highways Tribunal (Financial and Administrative Powers) Rules, 2004;
- The National Highways Tribunal (Procedure for Investigation of Misbehaviour or Incapacity of Presiding Officer) Rules, 2003;
- The National Highways Fee (Determination of Rates and Collection) Rules, 2008, as amended;
- The Highway Administration Rules, 2004;
- The National Highways (Collection of Fees by any person for the use of Section of National Highways/Permanent Bridges/Temporary bridge on National Highways) Rules, 1997;
- The National Highways (Fee for the use of National Highways and Permanent Bridge public Funded Project) Rules, 1997;
- The National Highways (Rate of Fee) Rules, 1997;
- The Building and other Construction Workers (Regulation of Employment and Conditions of Services) Act, 1996 and Central Rules, 1998;

- Central Electricity Authority (Measures Relating to Safety and Electric Supply) Regulations, 2023;
- Indian Electricity Rules, 1956; and
- The Central Motor Vehicle Rules, 1989.

Other legislations relevant to the road sector

In addition to the above, there are also certain other legislations that are relevant to the road sector which include the Road Transport Corporation Act, 1950, Central Road and Infrastructure Act, 2000, Central Road and Infrastructure Fund Act, 2000, National Highways (Temporary Bridges) Rules, 1964, etc.

Environmental Compliances and Regulations

Infrastructure projects must also ensure compliance with environmental legislations such as the Water (Prevention and Control of Pollution) Act, 1974 ("**Water Pollution Act**"), the Air (Prevention and Control of Pollution) Act, 1981 ("**Air Pollution Act**") and the Environment Protection Act, 1986 ("**Environment Act**", together with the Water Pollution Act and the Air Pollution Act, the "**Environment Protection Acts**"). The Water Pollution Act aims to prevent and control water pollution. This legislation provides for the constitution of a central pollution control board ("**Central Pollution Control Board**" or "**CPCB**") at the Central level and state pollution control boards ("**State Pollution Control Boards**" or "**SPCBs**", together with the Central Pollution Control Board, the "**PCBs**") at the State levels. The functions of the CPCB includes, among other things, coordination of activities of the SPCBs, collecting data relating to water pollution and the measures devised for the prevention and control of water pollution and prescription of standards for streams or wells. The SPCBs are responsible for, among other things, the planning for programmes for prevention and control of pollution of streams and wells, collecting and disseminating information relating to water pollution and its prevention and control, inspection of sewage or trade effluents, works and plants for their treatment and to review the specifications and data relating to plants set up for treatment and purification of water, laying down or annulling the effluent standards for trade effluents and for the quality of the receiving waters, and laying down standards for treatment of trade effluents to be discharged. These authorities issue consent to establish and consent to operate which are to be required to be renewed periodically. These authorities also have the power of search, seizure and investigation if the authorities are aware of or suspect violation of such regulations. This legislation prohibits any person from establishing any industry, operation or process or any treatment and disposal system, which is likely to discharge trade effluent into a stream, well or sewer, or bring into use any new or altered outlet for discharge of sewage, or begin to make any new discharge of sewage without taking prior consent of the SPCBs.

In context of the environmental compliances and regulations, the National Green Tribunal Act, 2010 (the "**NGT Act**") is an important legislation which provides for the establishment of a National Green Tribunal ("**NGT**") for the effective and expeditious disposal of cases relating to environmental protection and conservation of forests and other natural resources including enforcement of any legal right relating to environment and giving relief and compensation for damages to persons and property and for matters connected therewith or incidental thereto. In accordance with the Forest (Conservation) Act, 1980, state governments are not permitted to make any order directing the use of forest land for a non-forest purpose, or assignment of any forest land through lease or otherwise to any private person or corporation without the approval of the GoI. The Ministry of Environment, Forest and Climate Change ("**MoEF**") mandates the Environment Impact Assessment ("**EIA**") must be conducted for specified projects. In the process, the MoEF receives proposals or the setting up of projects and assesses their impact on the environment before granting clearances to the projects. The EIA Notification S.O. 1533, issued on September 14, 2006 (the "**EIA Notification**") and amended from time to time, under the provisions of the Environment Protection Act, prescribes that new construction of specified projects require prior environmental clearance from the MoEF. The environment clearance must be obtained from MoEF according to the procedure specified in the EIA Notification. No construction work or preparation of land by the project management except for securing the land, relating to the setting up of a specified project can be undertaken until such clearance is obtained. Under the EIA Notification, the environmental clearance process for new projects consists of four stages – screening, scoping, public consultation and appraisal. After completion of public consultation, the applicant is required to make appropriate changes in the draft 'EIA Report' and the 'Environment Management Plan.' The final EIA Report has to be submitted to the concerned regulatory authority for appraisal. The regulatory authority is required to give its decision within 105 days of the receipt of the final EIA Report. The EIA Guidance Manual for Highways, 2010 explains the four stages of the environmental clearance process and the contents of the EIA Report required to be submitted by highway projects.

Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016

The Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, impose an obligation and duty on the owners and operators of any facility or industry with a capability to create hazardous materials to safely dispose of such material in transport and other means of collecting and storing. Each occupier and operator of any facility generating hazardous waste is required to obtain an approval from the relevant state pollution control board for collecting, storing and treating the hazardous waste.

Green Highways (Plantation, Transplantation, Beautification and Maintenance) Policy, 2015

In September 2015, MORTH has launched Green Highways (Plantation, Transplantation, Beautification and Maintenance) Policy, 2015, which will require road developers to earmark 1% of a project's total cost for planting of trees and shrubs along the national highways. Under this policy, the maintenance of such plantations will be outsourced through a bidding process to plantation agencies. MORTH/NHAI will appoint the authorized agency for empanelment of such plantation agencies.

Public Liability Insurance Act, 1991

The Public Liability Insurance Act, 1991 (the "**Public Liability Act**"), imposes liability on the owner or controller of hazardous substances for any damage arising out of an accident involving such hazardous substances. A list of 'hazardous substances' covered by the legislation has been enumerated by the GoI by way of a notification. The owner or handler is also required to take out an insurance policy insuring against liability under the legislation. The rules made under the Public Liability Act mandate that the employer has to contribute towards the Environment Relief Fund, a sum equal to the premium paid on the insurance policies. This amount is payable to the insurer.

Other applicable law

The Motor Vehicles Act, 1988

The development, maintenance and management as well as control of the National Highways are regulated by the NH Act and the NHAI Act. Under the Motor Vehicles Act, 1988, some powers have been delegated to the Transport Authority of the State Governments. Section 138 of the Motor Vehicles Act, 1988 further empowers the State Governments to make rules for the control of traffic, including for the purpose of the removal and the safe custody of vehicles including their loads which have broken down or which have been left standing or have been abandoned on roads; the installation and use of weighing devices; the maintenance and management of wayside amenities complexes; the exemption from all or any of the provisions of relating to fire brigade vehicles, ambulances and other special classes or descriptions of vehicle, subject to such conditions as may be prescribed; the maintenance and management of parking places and stands and the fee, if any, which may be charged for their use; prohibiting the taking hold of or mounting of a motor vehicle in motion; prohibiting the use of foot-paths or pavements by motor vehicles, generally, the prevention of danger, injury or annoyance to the public or any person, or of danger or injury to property or of obstruction to traffic. The Motor Vehicles (Amendment) Act, 2019 is targeted towards bringing changes in the transport sector to encourage safer driving practices among Indian motor vehicle drivers and imposing strict fines on the violators of traffic rules. The Act proposes to create a National Road Safety Board, which was notified by Ministry of Road Transport & Highways in 2021. The Board will advise the Central and State governments on all aspects of road safety and traffic management.

Indian Trusts Act, 1882

The Indian Trusts Act, 1882 ("**Trusts Act**") governs all private trusts in India. The Trusts Act sets out the purpose for which private trusts can be established, the manner in which they may be created, executed and extinguished. The person creating a trust under the Trusts Act is the author of such trust, the person to whom the author grants the power and authority to regulate the trust is the trustee and the persons for whose benefit such trust has been created are the beneficiaries of such trust. The Trust Act sets out the rights, duties, liabilities and powers of the trustees and the beneficiaries *vis-a-vis* the trust. The Trust has been settled in accordance with the provisions of the Trusts Act.

Control of National Highways (Land and Traffic) Act, 2002

The Control of National Highways (Land and Traffic) Act, 2002 (the "**Control of NH Act**") provides for control of land within national highways, right of way and traffic moving on national highways and also for removal

of unauthorised occupation thereon.

In accordance with the provisions of the Control of NH Act, the Central Government has established Highway Administrations. Under the Control of NH Act, all land that forms part of a highway which vests in the Central Government, or that which does not already vest in the Central Government but has been acquired for the purpose of highways shall be deemed to be the property of the Central Government. The Control of NH Act prohibits any person from occupying any highway land or discharging any material through on such land without the permission of the Highway Administration or any officer authorised by such administration. The Control of NH Act permits the grant of lease and license for use of highway land for temporary use.

Indian Tolls Act, 1851, as amended

In accordance with the Indian Tolls Act, 1851, as amended (the "**Tolls Act**"), the state governments have been vested with the power to levy tolls at such rates as they deem fit, to be levied upon any road or bridge, made or repaired at the expense of the Central or any state government. The tolls levied under the Tolls Act, are deemed to be 'public revenue' and the collection of tolls can be placed under any person the State governments' deem fit. Such persons are enjoined with the same responsibilities as if they were employed in the collection of land revenue. Further, all police officers are bound to assist the toll collectors when required in the implementation of the Tolls Act. The Tolls Act further gives power for recovery of toll and exempts certain category of people from payment of toll.

National Highways Fee (Determination of Rates and Collection) Rules, 2008, as amended

The National Highways Fee (Determination of Rates and Collection) Rules, 2008 (the "**NH Fee Rules**"), regulates the collection of fee for the use of national highways. In accordance with the NH Fee Rules, the GoI may, by a notification, levy fee for use of any section of a national highway, permanent bridge, bypass or tunnel forming part of a national highway, as the case may be. However, the GoI may, by notification, exempt any section of a national highway, permanent bridge, bypass or tunnel constructed through a public funded project from levy of such fee. The NH Fee Rules supersede the National Highways (Temporary Bridges) Rules, 1964, the National Highways (Collection of Fees by any Person for the Use of Section of National Highways/ Permanent Bridge/ Temporary Bridge on National Highways) Rules, 1997, the National Highways (Fees for the use of National Highways Section and Permanent Bridges Public Funded Project) Rules, 1997 and the National Highways (Rate of Fees) Rules, 1997 other than in respect of things done or omitted to be done under such rules prior to supersession. The NH Fee Rules do not apply to agreements and contracts executed or bids invited prior to the publication of such rules i.e. prior to December 5, 2008. The collection of fee in case of a public funded project shall commence within 45 days from the date of completion of the project. The NH Fee Rules further provide for the base rate of fee applicable for the use of a section of the national highway for different categories of vehicles and the fees collected by the executing authority shall be remitted to the GoI. However, the GoI may, by notification, allow any or all of the executing authorities to appropriate the whole, or part of such fees for purposes as may be specified.

FASTag lanes on fee plazas is an initiative of the GoI in which there is an exclusive lane in the fee plaza for movement of vehicles fitted with FASTag. The FASTag is a device which is fitted on the front windscreen of vehicles to indicate online toll payment. The amended NH Fee Rules impose a penalty equivalent to two times the fee applicable if a vehicle not fitted with FASTag enters the exclusive FASTag lane. However, in case a user is unable to pay, due to malfunctioning electronic toll collection infrastructure, the user will be permitted to pass the fee plaza without payment. The NH Fee rules were also amended to provide that the driver or owner of a mechanical vehicle which is loaded in excess of permissible load specified for its category, (i) shall be liable to pay fee at such rate which is applicable for the next higher category of mechanical vehicles, and (ii) Payment of such fee shall not entitle the driver or owner, to use the national highway until the excess load has been remove from such mechanical vehicle. However, in case no weighbridge has been installed at the toll plaza, no fee for overloading shall be levied. FASTag has been made mandatory for all vehicles under Central Motor Vehicles Rules (CMVR), 1989, with penalties for non-compliance as mentioned in the National Highways Third Amendment Rules 2025 and the National Highways Fee (Determination of Rates and Collection) Rules, 2008. The National Highways Fee (Determination of Rates and Collection) Rules, 2025, implemented from November 15, 2025, mandates that all vehicles must use FASTag or another notified digital method for toll payment. Vehicles entering a toll plaza without a valid FASTag will be subject to a higher fee like vehicles without a valid FASTag will be charged double the fee if paying in cash, and 1.25 times the fee if paying through Unified Payment Interface (UPI).

The National Highways Rules, 1957 (the "NH Rules")

The NH Rules provide that in situations where the estimate cost of the execution of any original work on a national highway exceeds ₹ 5,000,000, a detailed estimated of the cost is to be forwarded to the GoI. An application for allotment of funds for meeting expenditure on an original work on a national highway must also be made to the GoI. The executing agency of the highway is required to furnish monthly progress reports and a completion report on the conclusion of the work. The NH Rules also give the consulting engineer of the GoI the right to inspect the work while it is in progress or after completion. Provisions under the Constitution of India and other legislations in relation to collection of toll Entry 59, List II of Schedule VII read with Article 246 of the Constitution of India vests state governments with the power to levy tolls. Further, in accordance with the Tolls Act, state governments have been vested with the power to levy tolls at such rates as they deem fit.

National Monetisation Pipeline

NITI Aayog has developed the pipeline, in consultation with infrastructure line ministries, based on the mandate for 'Asset Monetisation' for roads and highways, amongst others, under Union Budget 2021-22. The framework for monetisation of core asset monetisation has three key imperatives: (i) monetization of 'rights' not 'ownership' i.e. assets will be handed back to the government at the end of transaction life; (ii) brownfield de-risked assets and stable revenue streams; and (iii) structured partnerships under defined contractual frameworks with strict performance standards. This shall include selection of de-risked and brownfield assets with stable revenue generation profile with the overall transaction structured around revenue rights. The primary ownership of the assets under these structures shall be with the government. The National Monetisation Pipeline 2.0 (NMP 2.0) was officially launched by Union Finance Minister Nirmala Sitharaman on February 23, 2026. NITI Aayog has developed this second phase with the aim to unlock ₹16.72 lakh crore from public sector assets between financial years 2026 and 2030.

Foreign Investment Regulations

Foreign investment in Indian securities is governed by the provisions of the FEMA, read with the applicable FEMA Rules, the FEMA (Mode of payment and Reporting of Non-Debt Instruments) Regulations, 2019 and the consolidated FDI Policy issued by the Department for Promotion of Industry and Internal Trade, Ministry of Commerce and Industry, Government. Foreign investment is permitted (except in the prohibited sectors) either through the automatic route or the approval route, depending upon the sector in which foreign investment is sought to be made. Under the FEMA Rules and the current consolidated FDI Policy, effective from October 15, 2020, an infrastructure investment trust registered and regulated by the SEBI under the InvIT Regulations, being an 'investment vehicle', is permitted to receive foreign investment from a person resident outside India (subject to Press Note 3 (2020 series)), including an FPI or an NRI subject to the terms and conditions specified in the FEMA Rules.

Downstream investment by an infrastructure investment trust shall be regarded as indirect foreign investment if neither the sponsor nor the investment manager of such an infrastructure investment trust is Indian 'owned and controlled' as defined in FEMA Rules.

Downstream investment by an 'investment vehicle' shall have to conform to the sectoral caps and conditions/restrictions, if any, as applicable to the company in which the downstream investment is made as per the FDI Policy. Foreign investment of up to 100% through the automatic route is permitted in the infrastructure sector in India. An infrastructure investment trust that receives foreign investment shall be required to make such report and in such format to the RBI or to the SEBI as may be prescribed by them from time to time.

The payment for the units of an infrastructure investment trust acquired by a person resident or registered/ incorporated outside India shall be made by an inward remittance from abroad through banking channels or by way of swap of shares of an SPV, or out of funds held in a Non-resident External ("**NRE**") or Foreign Currency Non-resident Bank ("**FCNR(B)"**) account maintained in accordance with the Foreign Exchange Management (Deposit) Regulations, 2016.

Further, any person who is a non-resident and holds units of an infrastructure investment trust in accordance with the FEMA Rules may pledge such units (i) in favour of a bank in India to secure the credit facilities being extended to the Indian company for bona fide purposes; (ii) in favour of an overseas bank to secure the credit facilities being extended to the person, or a person resident outside India who is the promoter of the Indian company or the overseas group company of the Indian company; (iii) in favour of a Non-Banking Financial

Company registered with the RBI to secure credit facilities being extended to the Indian company for bona fide purposes; and (iv) subject to the authorized dealer bank satisfying itself of the compliance of the conditions stipulated by the RBI in this regard.

Labour-laws and regulations

The Government has consolidated 29 separate labour laws into four comprehensive Labour Codes: the Code on Wages, 2019, the Industrial Relations Code, 2020, the Code on Social Security, 2020, and the Occupational Safety, Health and Working Conditions Code, 2020 to modernize and streamline India's labour law framework. Its objectives include improving the ease of doing business, fostering job creation, and ensuring every worker's safety, health, and social and wage security. A key reform is the move toward Single Registration, Single License, and Single Return, designed to reduce compliance burdens and support employment growth.

The four Codes took effect on November 21, 2025. During the transition, relevant provisions of existing labour Acts and their associated rules, regulations, notifications, standards, and schemes will continue to apply. In addition to the aforementioned laws and regulations, in respect of our business and operations, we are also required to obtain licenses and registrations and make timely payments as prescribed under certain labour laws as provided under the following four codes now:

i. *The Code on Wages, 2019* (enacted by the parliament of India and assented to by the President of India on August 8, 2019) seeks to simplify, consolidate, and rationalize the provisions of four existing laws- *The Payment of Wages Act, 1936; The Minimum Wages Act, 1948; The Payment of Bonus Act, 1965;* and *The Equal Remuneration Act, 1976.* Under the Code, all workers to receive a statutory right minimum wage payment. Minimum wages and timely payment will ensure financial security. It aims to strengthen workers' rights while promoting simplicity and uniformity in wage-related compliance for employers.

ii. *The Industrial Relations Code, 2020* (enacted by the Parliament of India and assented to by the President of India on September 28, 2020) has been prepared after amalgamating, simplifying and rationalizing the relevant provisions of the *Trade Unions Act, 1926, the Industrial Employment (Standing Orders) Act, 1946 and the Industrial Disputes Act, 1947.* The Code acknowledges the fact that survival of worker depends upon survival of industry. In this backdrop, it simplifies laws related to trade unions, conditions of employment in industrial establishment or undertaking, investigation and settlement of industrial disputes.

iii. *The Code on Social Security, 2020* (enacted by the Parliament of India and assented to by the President of India on September 28, 2020) incorporates existing nine Social Security Acts which are; *The Employee's Compensation Act, 1923; The Employees' State Insurance Act, 1948; The Employees' Provident Funds and Miscellaneous Provisions Act, 1952; The Employment Exchanges (Compulsory Notification of Vacancies) Act, 1959; The Maternity Benefit Act, 1961; The Payment of Gratuity Act, 1972; The Cine-Workers Welfare Fund Act, 1981; The Building and Other Construction Workers' Welfare Cess Act, 1996 and; The Unorganised Workers' Social Security Act, 2008*. The Code extends social security to all workers- including unorganized, gig, and platform workers-covering life, health, maternity, and provident fund benefits, while introducing digital systems and facilitator-based compliance for greater efficiency.

iv. *The Occupational Safety, health and Working Conditions Code 2020* (enacted by the Parliament of India and assented to by the President of India on September 28, 2020) has been drafted after amalgamation, simplification and rationalization of the relevant provisions of the 13 Central Labour Acts- *The Factories Act, 1948; The Plantations Labour Act, 1951; The Mines Act, 1952; The Working Journalists and other Newspaper Employees (Conditions of Service and Miscellaneous Provisions) Act, 1955; The Working Journalists (Fixation of Rates of Wages) Act, 1958; The Motor Transport Workers Act, 1961; The Beedi and Cigar Workers (Conditions of Employment) Act, 1966; The Contract Labour (Regulation and Abolition) Act, 1970; The Sales Promotion Employees (Conditions of Service) Act, 1976; The Inter-State Migrant Workmen (Regulation of Employment and Conditions of Service) Act, 1979; The Cine-Workers and Cinema Theatre Workers (Regulation of Employment) Act, 1981; The Dock Workers (Safety, Health and Welfare) Act, 1986 and; The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996.* The Code balances the twin objectives of safeguarding worker rights and safe working conditions, and creating a business-friendly regulatory environment. This will spur economic growth and employment thereby, making India's labour market more efficient, fair, and future-ready.

Provisions under the Constitution of India and other legislations in relation to collection of toll

Entry 59, List II of Schedule VII read with Article 246 of the Constitution of India vests state governments with the power to levy tolls. Further, in accordance with the Tolls Act, state governments have been vested with the power to levy tolls at such rates as they deem fit.

Other Laws and Regulations

In addition to the above, compliance with the provisions of various tax-related legislations, intellectual-property related legislations, Shops and Establishment Act, Companies Act, 2013, Competition Act, 2002, property laws and other applicable laws for our day-to-day operations is also required.

REGULATORY APPROVALS

Provided below are the material approvals, consents, licenses, registrations and permissions from the government, various governmental agencies and other statutory and/or regulatory authorities with which the Trust can undertake the Issue and the Trust and the Initial Portfolio Assets can undertake their respective current business activities, as applicable. Unless otherwise stated, these approvals are valid as of the date of this Offer Document. In the event that any of the approvals and licenses that are required for the Initial Portfolio Assets' business operations expire in the ordinary course of business, the relevant Initial Portfolio Asset will apply for such renewal from time to time. For details in connection with the regulatory and legal framework within which the Trust and the Initial Portfolio Assets operate, please see "Regulations and Policies" on page 427. Further, provided below are the approvals in relation to the Issue and in relation to the Trust.

A. Approvals in relation to the Issue

1. In-principle listing approval from BSE dated February 3, 2026.

2. In-principle listing approval from NSE dated February 3, 2026.

3. Resolution dated November 28, 2025 passed by the board of directors of the Investment Manager and resolution dated December 3, 2025 passed by the InvIT Committee of the IM Board in relation to the Issue and other incidental matters.

B. Approvals in relation to the Trust

1. Certificate of registration dated August 1, 2025, bearing registration number IN/InvIT/25-26/0032, issued by SEBI to the Trust pursuant to Regulation 3 of the InvIT Regulations, for registration of the Trust as an infrastructure investment trust.

C. Material Business Approvals in relation to Initial Portfolio Assets

I. Dibang Infra Projects Private Limited

1. Provisional Certificate issued on December 7, 2018, issued by M/s. AECOM Asia Company Limited in joint venture with RODIC Consultants Private Limited, Independent Engineer certifying completion of the project highway comprising construction of bridges across Dibang river system and connecting road between Bomjur - Meka (NH-52) covering length of 17.363 Km and construction of bridge across Lohit River at Alubari Ghat and connecting road between Chowkham-Digaru (Total designed length 29.635 Km) in the state of Arunachal Pradesh on BOT annuity basis under Arunachal Pradesh Package of SARDP-NE, being fit to enter into commercial operation with effect from May 19, 2018.

2. Completion Certificate dated October 10, 2019, issued by M/s. AECOM Asia Company Limited in joint venture with RODIC Consultants Private Limited, Independent Engineer certifying date completion of project highway and being fit to enter into commercial operation with effect from December 12, 2018.

3. License obtained, for Lohit, pursuant to CLRA Act issued by office of the licensing officer, District Labour & Employment Officer, Tezu, Lohit District, Arunachal Pradesh, GoI dated December 2, 2025.

4. License obtained, for Roing, pursuant to CLRA Act issued by office of the licensing officer, District Commissioner Labour & Employment Cell, Arunachal Pradesh, GoI dated November 14, 2025.

5. Certificate of registration of employer obtained pursuant to BOCW Act issued by Office of the registering officer, District Labour & Employment Officer, Tezu, Lohit District, Arunachal Pradesh, GoI dated February 11, 2021.

6. Final approval dated February 20, 2026 received from MORTH in relation to indirect transfer of 100% shareholding to the Trust.

II. Dhola Infra Projects Private Limited

1. Provisional Certificate issued on March 16, 2018, issued by TPF Engineering Private Limited in association with Voyants Solution Private Limited, Independent Engineer certifying completion of the

project highway comprising construction of 12.90 m width bridge between Dhola and Sadia ghats along with 2 lane connecting roads from near about Dhola to Islampur Tinali in Assam (approximately 25.8 km) on Build, Operate and Transfer ("BOT") annuity basis under Arunachal Pradesh package of Road & Highways, being fit to enter into commercial operation with effect from August 31, 2017

2. Completion Certificate dated August 16, 2019, issued by TPF Engineering Private Limited in association with Voyants Solution Private Limited, Independent Engineer certifying date completion of project highway and being fit to enter into commercial operation with effect from October 13, 2018, in retrospect.

3. License obtained pursuant to CLRA Act issued by office of the licensing officer, Assistant Labour Commissioner, Assam (Tinsukia), GoI dated June 28, 2025.

4. Certificate of registration of employer obtained pursuant to BOCW Act issued by office of the registering officer, Assistant Labour Commissioner, Assam (Tinsukia), GoI dated April 11, 2025 with probable date of commencement of work as August 31, 2017 and completion of work as March 28, 2030.

5. Final approval dated February 20, 2026 received from MORTH in relation to indirect transfer of 100% shareholding to the Trust.

III. Ahmedabad Maliya Tollway Private Limited

1. Provisional Certificate issued on August 27, 2012, issued by M/s. EGIS BCEOM International SA, Independent Engineer certifying completion of the project highway comprising four laning of Ahmedabad-Viramgam-Maliya (Km 13/930 to Km 194/633) of State Highway No. 17 & 7 on Build, Operate and Transfer (BOT) basis for Section I comprising Km 13/930 to Km 61.430, Ahmedabad-Viramgam including Sachana Bypass, being fit to enter into commercial operation with effect from August 27, 2012.

2. Provisional Certificate issued on November 1, 2012, issued by M/s. EGIS BCEOM International SA, Independent Engineer certifying completion of the project highway comprising four laning of Ahmedabad-Viramgam-Maliya (Km 13/930 to Km 194/633) of State Highway No. 17 & 7 on Build, Operate and Transfer (BOT) basis for Section II comprising Km 61.430 to Km 128.430, Viramgam - Dhrangadhara, being fit to enter into commercial operation with effect from November 1, 2012.

3. Provisional Certificate issued on April 7, 2012 issued by M/s. EGIS BCEOM International SA, Independent Engineer certifying completion of the project highway comprising four laning of Ahmedabad-Viramgam-Maliya (Km 13/930 to Km 194/633) of State Highway No. 17 & 7 on Build, Operate and Transfer (BOT) basis for Section III comprising Km 128/430 to Km 154/568, Dhrangadhra - Halvad, being fit to enter into commercial operation with effect from April 7, 2012.

4. Provisional Certificate issued on May 5, 2012 issued by M/s. EGIS BCEOM International SA, Independent Engineer certifying completion of the project highway comprising four laning of Ahmedabad-Viramgam-Maliya (13/930 to Km 194/633) of State Highway No. 17 & 7 on Build, Operate and Transfer (BOT) basis for Section IV comprising Km 154/568 to 194/633, being fit to enter into commercial operation with effect from May 5, 2012.

5. Completion Certificate dated June 22, 2023, issued by LEA Associates South Asia private Limited, Independent Engineer. certifying date completion of project highway and had already been declared fit for entry into commercial operation from the date of issuance of Provisional Certificates.

6. Certificate of registration obtained pursuant to CLRA Act issued by office of the licensing officer, Additional Labour Commissioner, Labor Commissioner Office, Gandhinagar, dated March 18, 2025.

7. Certificate of registration of employer obtained pursuant to BOCW Act issued by office of the registering officer, Dy. Director/ Assistant Director, Industrial Safety and Health, Gujarat (Surendranagar), GoI dated October 23, 2024 with probable date of commencement of work as October 01, 2024 and completion of work as October 31, 2031.

IV. Deccan Tollways Private Limited

1. Provisional Certificate dated October 12, 2017, issued by GETINSA – PAYMA, S.L., in association with Segmental Consulting & Infrastructure Advisory Private Limited, Independent Engineer certifying completion of the project highway comprising four laning of the Maharashtra/Karnataka Border to Sangareddy section (Km. 348.800 to Km. 493.000/ Design Ch. 349.060 to Ch. 494.046) of National Highway No. 9, new National Highway No. 65 (Old NH-9) on Design, Build, Finance, Operate and Transfer (DBFOT) basis, 142.786 Km length, being fit to enter into commercial operation with effect from October 14, 2017.

2. Completion Certificate issued on October 20, 2023, issued by MSV International Inc. in association with Sri Infotech, Independent Engineer certifying completion of the project highway comprising four laning of the Maharashtra/Karnataka Border to Sangareddy section (Km. 348.800 to Km. 493.000/ Design, Ch. 349.060 to Ch. 494.046) of National Highway No.9, New Highway No. 65 (the Project Highway), on Design, Build, Finance, Operate and Transfer (DBFOT) basis, 2.164 Km length, being fit to enter into commercial operation with effect from October 20, 2023.

3. Completion Certificate issued on September 17, 2019, issued by TPF GETINSA EUROESTUDIOS S.L. in association with Segmental Consulting & Infrastructure Advisory Private Limited, Independent Engineer certifying completion of the project highway comprising four laning of the Maharashtra/Karnataka Border to Sangareddy section (km. 348.800 to Km. 493.000/ Design Ch. 349.060 to Ch. 494.046) of new National Highway No. 9 (the Project Highway) on Design, Build, Finance, Operate and Transfer (DBFOT) basis, 142.786 Km length, being fit to enter into commercial operation with effect from September 17, 2019.

4. License obtained pursuant to CLRA Act issued by office of the licensing officer, Assistant Labour Commissioner, Gulbarga, Karnataka, GoI dated May 17, 2018. The license was renewed on May 19, 2025.

5. Certificate of registration of employer obtained pursuant to BOCW Act issued by office of the registering officer, Assistant Labour Commissioner Hyderabad II, GoI dated September 23, 2020.

6. Final approval dated February 17, 2026 received from NHAI in relation to indirect transfer of 100% shareholding to the Trust.

7. Approval dated March 18, 2026 from NHAI for refinancing of outstanding debt of DTPL through transfer of loan to the Trust.

V. Sambalpur Rourkela Tollway Private Limited

1. Provisional Certificate dated March 12, 2018, issued by Aarvee Associates Architects Engineers & Consultants Private Limited, Independent Engineer certifying completion of the project highway comprising four laning with paved shoulders of the Sambalpur-Rourkela Section (Km 4/900 to Km. 167/700) of the State Highway No. 10 on Design, Build, Finance, Operate and Transfer (DBFOT) basis, from Km 4.945 to Km 29.700, Km 30.450 to Km 49.790 and Km 51.200 to Km 166.675 for an aggregate length of 159.570 km, being fit to enter into commercial operation with effect from March 13, 2018.

2. Provisional Certificate dated August 12, 2019, issued by Aarvee Associates Architects Engineers & Consultants Private Limited, Independent Engineer certifying completion of the project highway comprising four laning with paved shoulders of the Sambalpur-Rourkela Section (Km 4/900 to Km. 167/700) of the State Highway No. 10 on Design, Build, Finance, Operate and Transfer (DBFOT) basis, from Km 29.700 to Km 30.450 and Km 49.790 to Km 51.200, being fit to enter into commercial operation with effect from August 12, 2019.

3. Completion Certificate issued on November 20, 2021, issued by Aarvee Associates Architects Engineers & Consultants Private Limited, Independent Engineer certifying completion of the project highway comprising four laning with paved shoulders of the Sambalpur-Rourkela Section (km 4.900 to km. 167.900) of the State Highway No. 10 on Design, Build, Finance, Operate and Transfer (DBFOT) basis, being fit to enter into commercial operation with effect from March 30, 2021.

4. Certificate of registration obtained pursuant to CLRA Act issued by office of the licensing officer,

District Labour Officer, Sambalpur, dated June 30, 2025.

5. License obtained pursuant to CLRA Act issued by office of the licensing officer, District Labour Officer, Jharsuguda, dated May 20, 2025.

6. License obtained pursuant to CLRA Act issued by office of the licensing officer, District Labour Officer, Sundargarh, dated June 09, 2025.

7. Certificate of registration of employer obtained pursuant to BOCW Act issued by office of the registering officer, District Labour Officer, Sundergarh (Rourkela), Odisha, GoI dated September 28, 2020.

VI. Thrissur Expressway Limited

1. Provisional Certificate dated March 8, 2022, issued by Intercontinental Consultants & Technocrats Private Limited, Independent Engineer on behalf of National Highways Authority of India certifying completion of the project highway comprising design, construction, development, finance, operation and maintenance of 6-laning of Vadakanchery -Thrissur Section of NH-47 (Km 240 to Km 270) in the state of Kerala on Design, Build, Finance, Operate and Transfer (DBFOT) basis, being fit to enter into commercial operation with effect from March 9, 2022.

2. Draft Provisional Certificate 2 dated March 29, 2022, issued by Intercontinental Consultants & Technocrats Private Limited, Independent Engineer on behalf of National Highways Authority of India certifying completion of the project highway comprising design, construction, development, finance, operation and maintenance of 1.230 Km of 6-laning of Vadakanchery -Thrissur Section of NH-47 (Km 240 to Km 270) in the state of Kerala on Design, Build, Finance, Operate and Transfer (DBFOT) basis, being fit to enter into commercial operation with effect from April 1, 2022.

3. Completion Certificate issued on June 28, 2024, issued by Pankaj Koranne, on behalf of Dhruv Consultancy Services Limited in associate with Varad Associates, Independent Engineer on behalf of National Highways Authority of India certifying completion of the project highway comprising design, construction, development, finance, operation and maintenance of 6-laning of Vadakanchery -Thrissur Section of NH-544 including Kuthira Tunnel from design Ch.236.135 to Ch. 264.490 in the state of Kerala on BOT basis, being fit to enter into commercial operation with effect from June 14, 2024.

4. Certificate of registration of employer obtained pursuant to BOCW Act issued by office of the registering officer, Assistant Labour Commissioner, Ernakulam, Kerala, GoI dated March 12, 2024.

5. Final approval dated March 2, 2026 received from NHAI in relation to direct transfer of 100% shareholding to the Trust.

6. Approval dated March 18, 2026 for approval from NHAI for refinancing of outstanding debt of TEL.

VII. Rajkot Vadinar Tollway Private Limited

1. Provisional Certificate dated January 27, 2012, issued by Stanley Consultants India Private Limited, Independent Engineer certifying completion of the project highway comprising four laning of Rajkot-Jamnagar-Vadinar (Km 3.0 to Km 125.55) of State Highway No. 25 on Build, Operate and Transfer (BOT) basis, for section I comprising Rajkot- Dhrol (3/00 to 50/000 + Spur Road of 5.3 Km) and section III comprising of Jamnagar Bypass to Vadinar Approach (78.60 to 97.80 + 94/000 to 125/550), being fit to enter into commercial operation with effect from January 27, 2012.

2. Provisional Certificate dated January 27, 2012, issued by Stanley Consultants India Private Limited, Independent Engineer certifying completion of the project highway comprising four laning of Rajkot-Jamnagar-Vadinar (Km 3.0 to Km 125.55) of State Highway No. 25 on Build, Operate and Transfer (BOT) basis, for section II comprising of Km 50+000 to Km 78+600), being fit to enter into commercial operation with effect from January 27, 2012.

3. Completion Certificate issued on June 17, 2023, issued by LEA Associates South Asia Private Limited, Independent Engineer on behalf of Ministry of Road Transport & Highways certifying completion of the project highway comprising four laning of Rajkot-Jamnagar-Vadinar (Km 3.0 to Km 125.55) of State Highway No. 25 on Build, Operate and Transfer (BOT) basis, and had already been fit for entry

into commercial operation with effect from January 27, 2012.

4. Certificate of registration obtained pursuant to CLRA Act issued by office of the licensing officer, Additional Labour Commissioner, Gandhinagar, Gujarat, dated April 23, 2025.

5. Certificate of registration of employer obtained pursuant to BOCW Act issued by office of Dy. Director Industrial Safety & Health, Jamnagar dated January 21, 2026.

VIII. Panipat Elevated Corridor Private Limited

1. Provisional Certificate dated July 15, 2008, issued by Consulting Engineering Services (India) Private Limited, Independent Engineer on behalf of National Highways Authority of India certifying completion of the project comprising widening the existing 4 lane portion from km. 86 to km.96, covering Panipat, on National Highway no. 1 (NH-1) in Haryana to 6 lanes and construction of 6 lane elevated structure Gohana Road, Sanauli Road, Assanth Road crossings, city bus stand and skylark tourist complex, Construction of peripheral lanes and operation and maintenance thereof (main facility peripheral lanes) through a Concession on Build, Operate and Transfer (BOT) basis, being fit to enter into commercial operation with effect from July 15, 2008.

2. Completion Certificate issued on March 17, 2011, issued by Project Director on behalf of National Highways Authority of India, Project Implementation Unit, Sonepat, certifying completion of the project highway comprising widening the existing 4 lane portion from km. 86 to km.96, covering Panipat, on National Highway no. 1 (NH-1) in Haryana to 6 lanes and construction of 6 lane elevated structure Gohana Road, Sanauli Road, Assanth Road crossings, city bus stand and skylark tourist complex, Construction of peripheral lanes and operation and maintenance thereof (main facility peripheral lanes) through a Concession on Build, Operate and Transfer (BOT) basis, being fit to enter into commercial operation with effect from March 17, 2011.

3. Certificate of registration of employer obtained pursuant to BOCW Act issued by office of the registering officer, Assistant Labour Commissioner, Karnal, Haryana, GoI dated December 17, 2015. The probable date of commencement of work is July 27, 2005 to January 22, 2026 as the probable date of completion of work.

4. Final approval dated March 2, 2026 received from NHAI in relation to indirect transfer of 100% shareholding to the Trust.

IX. Samkhiali Bhachau Gandhidham Tollway Private Limited

1. Provisional Certificate dated January 4, 2020, issued by MSV International Inc. in association with MSV International Tech Private Limited, Independent Engineer on behalf of certifying completion of the project comprising six laning of Samakhiali Gandhidham section (km 306.000 to km. 362.160) of National Highway No. 8A on Design, Build, Finance, Operate and Transfer (DBFOT) basis, being fit to enter into commercial operation with effect from January 4, 2020.

2. Completion Certificate issued on December 24, 2024, issued by MSV International Inc. in association with MSV International Tech Private Limited, Independent Engineer certifying completion of the project comprising six laning of Samakhiali Gandhidham section (km 306.000 to km. 362.160) of National Highway No. 41 (Old NH 8A) on Design, Build, Finance, Operate and Transfer (DBFOT) basis, being fit to enter into commercial operation with effect from December 9, 2024.

3. License obtained pursuant to CLRA Act issued by office of the licensing officer, Assistant Labour Commissioner, Adipur, Gujarat, dated June 23, 2016. The License was renewed on June 23, 2025.

4. Certificate of registration of employer obtained pursuant to BOCW Act issued by office of the registering officer, Assistant Labour Commissioner, Adipur, Gujarat, GoI dated October 13, 2024.

5. Final approval dated March 2, 2026 received from NHAI in relation to indirect transfer of 100% shareholding to the Trust.

X. Jorabat Shillong Expressway Limited

1. Provisional Certificate dated January 28, 2016, issued by Unihorn India Private Limited, Independent

Engineer on behalf of National Highways Authority of India certifying completion of the project four Laning of Jorabat - Shillong (Barapani) Section of NH-40 from Km 0.000 to Km 48.090 and from Km 53.950 to 61.800 except Umsning Bypass (Km 48.090 to 53.950) in the State of Assam and Meghalaya on DBFOT pattern under SARDP-NE on BOT (annuity), being fit to enter into commercial operation with effect from January 28, 2016.

2. Completion Certificate issued on August 30, 2019, issued by Unihorn India Private Limited, Independent Engineer on behalf of National Highways Authority of India certifying completion of the project four Laning of Jorabat - Shillong (Barapani) Section of NH-40 from Km 0.000 to Km 61.800 in the State of Assam and Meghalaya on DBFOT pattern under SARDP-NE on BOT (annuity), being fit to enter into commercial operation with effect from August 30, 2019.

3. License obtained pursuant to CLRA Act issued by office of the licensing officer, Assistant Labour Commissioner, Guwahati, Meghalaya, dated January 08, 2020. The License was renewed on March 4, 2025.

4. License obtained pursuant to CLRA Central Rules, 1971, issued by licensing officer, ALC Guwahati, dated February 26, 2026.

5. Certificate of registration of employer obtained pursuant to BOCW Act issued by office of the registering officer, Assistant Labour Commissioner, Guwahati, Meghalaya, GOI, dated January 31, 2024.

6. Final approval dated February 6, 2026 received from NHAI in relation to indirect transfer of 100% shareholding to the Trust.

7. Approval dated March 24, 2026 for approval from NHAI for refinancing of outstanding debt of JSEL.

D. Approvals applied for, but not yet received

As on the date of this Offer Document, except as provided below, there are no approvals required to be obtained by the Trust and the Initial Portfolio Assets, for which applications have been made, but approvals have not been received.

1. Application dated February 20, 2026 for registration of employment in relation to PECPL, to be obtained pursuant to BOCW (Regulation of Employment and Conditions of Service) Central Rules, 1971 with estimated date of commencement of building or other construction work on January 23, 2026.

2. Application dated March 13, 2026 for registration of establishment employing building workers, in relation to PECPL, to be obtained pursuant to BOCW (Regulation of Employment and Conditions of Service) Central Rules, 1998 with estimated date of commencement of building or other construction work on January 23, 2026 and estimated date of completion of building or other construction work on March 31, 2027.

3. Application dated January 30, 2026 for renewal of license under the CLRA Act in relation to PECPL.

4. Application dated February 2, 2026 for renewal of license under the CLRA Act in relation to TEL.

5. Application dated January 23, 2026 for amendment of license under the CLRA Rules, 1971 in relation to DTPL.

6. Application dated February 10, 2026 and February 23, 2026 for approval from MORTH for refinancing of the existing senior debt in Dhola by the Trust.

7. Application dated February 10, 2026 and February 23, 2026 for approval from MORTH for refinancing of the existing senior debt in Dibang by the Trust.

E. Approvals for which applications are yet to be made

As of the date of this Offer Document, except as provided below, there are no material approvals required to be obtained by the Trust or the Project SPVs for which applications are yet to be made.

1. Application for renewal of license (to be applied after the receipt of amendment license) to be obtained

under the CLRA Act, expired on February 18, 2026, in relation to DTPL.

LEGAL AND OTHER INFORMATION

Except as stated in this section and on the basis of the disclosures below, there are no outstanding material litigation and actions by regulatory authorities, which are not in the ordinary course of business in each case involving (i) the Trust, its associates, the Initial Portfolio Assets; (ii) the Sponsor, the Project Manager, the Investment Manager and each of their respective associates (iii) the Sponsor Group; and (iv) the Trustee, as on the date of this Offer Document.

For the purpose of this section, details of all outstanding criminal matters and actions by regulatory authorities (which includes claims and notices involving regulatory and statutory authorities which are not in the ordinary course of business), involving the Trust, its associates, the Initial Portfolio Assets, the Sponsor, the Project Manager, the Investment Manager and each of their respective associates, the Trustee and the Sponsor Group have been disclosed. Further, any civil proceedings involving an amount equivalent to, or more than, the amount as disclosed below, in respect of the Trust, its associates, the Initial Portfolio Assets, the Sponsor, the Project Manager, the Investment Manager and each of their respective associates, the Sponsor Group and the Trustee has also been disclosed.

In respect of the Trust and its associates, the Initial Portfolio Assets, all outstanding civil cases, which are quantifiable and which involve an amount equivalent to or exceeding 5% of the total combined income of the Trust, its associates, the Initial Portfolio Assets for the Financial Year ended March 31, 2025, based on the Special Purpose Combined Financial Statements, being ₹ 1,082.80 million have been disclosed. Additionally, all cases where an adverse outcome would materially and adversely affect the business, operations, financial position, prospects or reputation of each of the Trust or the Initial Portfolio Assets, irrespective of the amount involved, have been disclosed.

In respect of the Sponsor and its associates (including the Project Manager and its associates and the common associates of the Sponsor and the Project Manager) and the Sponsor Group, all outstanding civil cases , which involve an amount equivalent to ₹100 million or exceeding 1% of the net worth of the Sponsor as on March 31, 2025, based on the audited financial statements of the Sponsor whichever is lower, being ₹ 9.66 million have been considered material. All outstanding cases where the amount is not ascertainable, but considered material, have also been disclosed.

In respect of the Investment Manager and its associates, all outstanding civil cases, which are quantifiable, and involve an amount equivalent to or exceeding ₹ 1,000 million or 1% of the net worth of the Edelweiss Financial Services Limited as of March 31, 2025 (being the ultimate holding company of the Investment Manager), whichever is lower, being ₹ 591.82 million have been considered material. All outstanding cases where the amount is not ascertainable, but considered material, have also been disclosed.

In respect of the Trustee, all outstanding cases, which are quantifiable, and which involve an amount equivalent to or exceeding 5% of the total consolidated income of the Trustee as of March 31, 2025, being ₹ 10.78 million have been considered material. All outstanding cases where the amount is not ascertainable, but considered material, have also been disclosed.

Further, in cases where outcome of one litigation impacts one or more other litigation, which individually are below materiality threshold, but collectively are above the threshold, such cases have also been disclosed.

All direct and indirect tax litigation against (i) the Trust, its associates, the Initial Portfolio Assets; (ii) the Sponsor and its associates; (iii) the Sponsor Group; (iv) the Investment Manager and its associates; and (v) the Project Manager and its associates, have been disclosed in a consolidated manner setting out the number of cases and the amount involved.

A. Litigation and regulatory actions involving the Trust, its Initial Portfolio Assets and its associates

(i) Litigation and regulatory actions involving the Trust and its associates

As on the date of this Offer Document there are no outstanding criminal litigation, regulatory actions or material civil litigation involving the Trust and its associates

(ii) Litigation and regulatory actions involving the Holdcos

Criminal litigation involving the Holdcos

As of the date of this Offer Document, there are no outstanding criminal litigation involving the Holdcos.

Outstanding civil litigation involving the Holdcos

Except as stated below, there are no outstanding material civil litigation involving the Holdcos as on the date of this Offer Document.

(a) Epic 3

(i) Epic 3 (*previously known as "L&T Infrastructure Development Projects Limited"*) had filed a commercial civil suit bearing No. 170 of 2017 before the commercial city civil court at Ahmedabad on August 18, 2017, titled as "*L&T Infrastructure Development Projects Limited v. Gujarat Maritime Board*" against Gujarat Maritime Board ("**GMB**"), in relation to a dispute concerning the development of a port project in Gujarat. The case was subsequently transferred to the Gandhinagar Civil Court bearing No. Commercial Civil Suit 75 of 2021. The issue traces back to May 2007, when GMB invited bids for the development of a port at Sutrapada, Junagadh, under a build-own-operate-transfer model. ("**Project**") Epic 3 was selected as the successful bidder and was issued a letter of intent dated February 6, 2008 ("**LOI**"), requiring it to submit a detailed Project report and obtain environmental clearances within stipulated timelines. However, Epic 3 was unable to complete the said study as GMB had failed to acquire and allocate the requisite land at Sutrapada, Junagadh. Subsequently, Epic 3 suggested to shift the Project location to Kachhigarh, Jamnagar, in 2010 ("**New Site**") which was approved by GMB and the Government of Gujarat.

At the New Site, Epic 3 undertook various technical and environmental studies, including engaging third parties for the review of the site, which revealed the presence of sensitive ecological features such as coral reefs, which made it difficult for Epic 3 to obtain the requisite environmental clearances for port development at Kachhigarh. Further, GMB contented that despite multiple extensions of the LOI and the performance bank guarantee ("**PBG**"), Epic 3 was unable to proceed with the completion of the Project. Consequently, the LOI was cancelled, and PBG was invoked. On March 19, 2015, Epic 3 challenged this action before the High Court of Gujarat, by way of a special civil application bearing no. 4870 of 2015, which was ruled in its favour. Thereafter, on March 15, 2016, GMB appealed to the Supreme Court *vide* civil appeal no. 9821 of 2016, and the Supreme Court vide its order dated September 28, 2016 set aside the High Court's decision, holding that the bank was bound to honour payments under the PBG. Epic 3 has sought recovery of expenses incurred and damages for loss of profits for ₹ 5,187.30 million, while GMB has filed a counterclaim towards waterfront royalty allegedly payable by Epic 3 which amounts to ₹ 2184.80 million, contending that Epic 3 failed to fulfil its contractual obligations. The matter is currently pending.

Regulatory proceedings involving the Holdcos

As of the date of this Offer Document, there are no outstanding regulatory actions involving the Holdcos.

(iii) Litigation and regulatory actions involving the Project SPVs

Criminal litigation involving the Project SPVs

As of the date of this Offer Document, there are no outstanding criminal litigation involving the Project SPVs.

Outstanding civil litigation involving the Project SPVs

Except as stated below, there are no outstanding material civil litigation involving the Project SPVs as on the date of this Offer Document:

The Kerala State Private Bus Operators Coordination Committee ("**Petitioners**") has filed a writ petition before the High Court of Kerala ("**High Court**") against Union of India, NHAI, TEL and others ("**Respondents**") on June 21, 2025 alleging *inter alia* the adverse conditions of roads due to poor maintenance, and have prayed to suspend the levy and collection of toll charges at the Panniyankara toll plaza, Kerala. NHAI along with certain Respondents *vide* the counter affidavit dated October 3, 2025 has denied all allegations, and has clarified that there are certain sections of the disputed stretch of road that are classified as "blackspots", which have been entrusted by the NHAI to a third-party contractor for rectification. NHAI has further clarified that the said rectification of such "blackspots" is not connected with TEL, and TEL has the legal right to collect toll until the end of the concession period. The matter is currently pending.

Regulatory proceedings involving the Project SPVs

Except as stated below, there are no regulatory actions involving the Project SPVs as on the date of this Offer Document.

(a) AMTPL

(i) Pursuant to the terms of the concession agreement dated September 17, 2008 entered between AMTPL and Gujarat State Road Development Corporation Limited (the "**GSRDC**") ("**AMTPL CA**") , in order to determine modifications to the term of the concession period ("**Concession Period**"), AMTPL is required to determine the actual traffic volume ("**ATV**") by traffic sampling on specific target dates. Further, as per the AMTPL CA, if the ATV differs from the target traffic volume ("**TTV**"), the Concession Period may be deemed to be extended or reduced, as the case may be. An independent engineer ("**IE**") was engaged to conduct the traffic sampling and had submitted the report to the GSRDC. Subsequent to the examination of the reports submitted by the IE, GSRDC noted that the ATV had exceeded the TTV as mentioned in the AMTPL CA. Thereafter, GSRDC *vide* its letter dated July 19, 2024 reduced the Concession Period by 2.2 years, in accordance with the terms of the AMTPL CA. AMTPL submitted a response letter dated August 2, 2024 to GSRDC, stating that, inter alia, the methodology adopted by IE for calculation of ATV is not in line with the provisions of AMTPL CA. AMTPL has also requested for a joint meeting with GSRDC and IE. The matter is currently pending.

(ii) Pursuant to the terms of the AMTPL CA, AMTPL is responsible for submitting a monthly O&M report ("**Report**") to GSRDC. On March 16, 2024, GSRDC instructed an independent engineer ("**IE**") to examine the Report submitted for the month of February 2024 and furnish their comments on the same. IE *vide* its letter dated March 22, 2024 had submitted its views on the Report for February 2024 and has also recommended that AMTPL was entitled to recovery of damages aggregating to ₹ 947.70 million (calculated for the period May 2023 – November 2023), due to delays in rectifying deficiencies identified in the Report. AMTPL, *vide* its letter dated March 29, 2024 had clarified that the IE had erred in its calculation as it had taken into consideration the period prior to the settlement agreement dated April 27, 2023 entered into between GSDRC and AMTPL. AMPTL has also clarified that the methodology adopted by the IE was erroneous. The matter is currently pending.

(iii) Pursuant to information received from the Accountant General, Ahmedabad, the Office of the Superintendent of Stamps and Registration, Gandhinagar *vide* its letter dated May 15, 2025 has alleged that the AMTPL CA was not adequately stamped and has instructed AMTPL to pay ₹ 281.80 million. AMTPL *vide* its letter dated July 8, 2025 has denied the allegations. The matter is currently pending.

(b) Dhola

Dhola entered into a concession agreement dated November 3, 2010 ("**Dhola CA**") with the Ministry of Road Transport and Highways ("**MORTH**") for development of a bridge between Dhola and Sadia Ghats along with 2 lane connecting roads from near about Dhola to Islampur Tinali in Assam on build, operate and transfer ("**BOT**") annuity basis ("**Project**"). Dhola *vide* its letter dated March 19, 2020 informed MORTH about the delays in completion of the Project due to various factors, including delay in handing over the land by MORTH, force majeure events, change of scope etc. Owing to the delays in completion of the Project, Dhola had requested for extension of time and shifting of milestones and was granted an extension of 746 days. On account of prolongation of the construction period for reasons not attributable to Dhola, it claimed it suffered significant losses in terms of idling of manpower, plant and equipment, increased interest on loan amount during construction, amongst other. Further, Dhola summited a claim amount of ₹ 6,483.50 million from MORTH for the losses suffered by it. Dhola requested for the settlement of the claim through various letters and also made an attempt for a conciliation meeting to be arranged for the settlement of such claim. On June 3, 2021, Dhola initiated arbitration proceedings in accordance with the terms of the Dhola CA. The matter is currently pending.

(c) Dibang

(i) Dibang entered into a concession agreement dated November 3, 2010 ("**Dibang CA**") with MORTH for the construction of bridges across Dibang river system and connecting road between Bomjur-Meka and construction of bridge across river Lohit at Alubari Ghat and connecting road between Chowkham-Digaru in Arunachal Pradesh on a BOT basis ("**Dibang Project**"). MORTH failed to provide the

vacant access and right of way to the land as per the terms of Dibang CA which resulted in delays in completion of the Dibang Project. Further, there were other delays not attributable to Dibang pursuant to which Dibang submitted requests for extension of time and shifting of milestones. Subsequently, Dibang was granted an extension of 870 days for completion of the Dibang Project leading to substantial additional costs, including idling of resources, increased interest on borrowings, and escalation in material and labor costs, amongst others. Consequently, Dibang submitted a claim of ₹ 7,711.50 million from MORTH for the losses suffered by it. On June 15, 2021, Dibang and MORTH agreed to settle the matter amicably. The matter is currently pending and awaiting response from MORTH.

(ii) Dibang has raised claims regarding the cost estimate for a change of scope for construction of additional river protection works not originally included in the scope of the Dibang Project, as per the Dibang CA, which included construction of 9 repelling spurs to safeguard the major bridge and project highway as recommended by the appointed independent engineer. Dibang has submitted claims amounting to ₹ 1188.49 million for the cost already incurred by Dibang. Additionally, Dibang has also sought change of scope approval for further river protection measures on the upstream of existing works. The matter is currently pending and awaiting response from MORTH.

(d) DTPL

(i) DTPL submitted a letter dated July 30, 2024 to the National Highways Authority of India ("**NHAI**") requesting an extension of the concession period for the project, which includes the four laning of certain existing road on the Maharashtra and Karnataka border. As per the terms of the concession agreement dated February 2, 2012 entered into between DTPL and NHAI ("**DTPL CA**") DTPL and NHAI agreed to modify the term of the concession period ("**Concession Period**") based on variation in traffic growth. As per the report by DTPL, the ATV fell short by 17.24% than the TTV mentioned in the DTPL CA and subsequently DTPL requested an extension of five years to the Concession Period. Conversely, NHAI vide its letter dated October 16, 2024 reduced the concession period by 1.89 years as per the decision of its executive committee. Thereafter, DTPL submitted a letter dated October 22, 2024 to NHAI, requesting NHAI to provide the details of the calculation used for reduction of the concession period. The matter is currently pending and awaiting response from NHAI.

(ii) The Assistant Director of Mines & Geology, Sangareddy district, issued a temporary permit to L&T Construction Infrastructure, the EPC contractor of DTPL (*previously known as "L&T Deccan Tollways Limited"*) for excavation of specified area in Mella Kunta, in the village Veltoor, for the construction of a project. The construction was completed in October 2017.The NHAI vide its letter dated August 4, 2023 and June 24, 2025, raised concerns regarding, inter alia, alleged illegal excavation of gravel from Mella Kunta Tank by DTPL, which was alleged to be in excess of the permitted quantity and non-maintenance of proper slopes violating the terms and conditions of the accorded permission. NHAI had clarified that DTPL was also responsible for the said extraction. DTPL was instructed to undertake remedial measures, including back-filling and slope restoration, and to obtain no objection certificates from the irrigation department and mines department. This matter is currently pending.

(iii) DTPL *vide* letter dated June 13, 2024 requested compensation from NHAI for the loss of revenue amounting to approximately ₹ 11.17 million due to the non-implementation of revised user fees for the period between April 1, 2024 to June 2, 2024, along with detailed calculations and supporting documents, in accordance with the terms of the DTPL CA. NHAI *vide* its letter dated August 27, 2024 had communicated that the request for claims by DTPL could not be completed due to various reasons cited in the said letter. DTPL *vide* its letter dated September 6, 2024 had communicated that it was entitled to receive compensation due to loss of revenue as per the terms of the DTPL CA and requested NHAI to reconsider its view. This matter is pending.

(iv) NHAI issued a show cause notice dated November 13, 2025 to DTPL, alleging *inter alia*, non-fulfillment of certain O&M obligations. The IE *vide* its letters dated November 8, 2025 and November 10, 2025 highlighted certain discrepancies in relation to the non-fulfillment of such O&M obligations. DTPL *vide* its letters dated November 14, 2025 and November 20, 2025 updated the IE and NHAI in relation to the work undertaken for fulfillment of the O&M obligations. This matter is currently pending.

(e) RVTPL

(i) RVTPL and GSRDC entered into a settlement agreement dated April 27, 2023 ("**SA**") wherein the parties had agreed to settle all outstanding and pending claims and counter claims as on the date of the SA and per its terms. Pursuant to review of the monthly O&M report ("**Report**") for March 2024, the independent engineer ("**IE**") determined that RVTPL was liable for recovery of damages aggregating to ₹733.39 million for the period from May 2023 to January 2024, due to delays in rectifying deficiencies identified in the Report. RVTPL *vide* letter dated March 26, 2024 ("**Letter**") has disputed the calculations provided by the IE and alleged that the Report covered the period prior to the execution of the SA and therefore had requested the IE to review the Report and rectify the calculations basis the observations made in the Letter. The matter is currently pending.

(ii) Pursuant to information received from the Accountant General, Ahmedabad, the Office of the Superintendent of Stamps and Registration, Gandhinagar *vide* its letter dated May 15, 2025 has alleged that the concession agreement dated September 17, 2008 entered into between RVTPL and GSRDCL ("**RVTPL CA**") was not adequately stamped and has instructed RVTPL to pay ₹ 281.80 million. RVTPL *vide* its letter dated July 8, 2025 has denied the allegations. The matter is currently pending.

(f) SBGTPL

(i) Pursuant to terms of the concession agreement entered between SBGTPL and NHAI dated March 17, 2010 ("**SBGTPL CA**"), in order to determine modifications to the term of the concession period, ("**Concession Period**"), SBGTPL is required to determine the ATV by traffic sampling on specific target dates. Further, as per the SBGTPL CA, if the ATV differs from the TTV, the Concession Period may be deemed to be extended or reduced, as the case may be. An IE was engaged to conduct the traffic sampling and had submitted the report. Subsequent to the examination of the reports submitted by the IE, NHAI noted that the ATV had exceeded the TTV as mentioned in the SBGTPL CA. Thereafter, NHAI *vide* its letter dated December 07, 2024, reduced the Concession Period by 2.4 years in accordance with the terms of the SBGTPL CA. SBGTPL initiated arbitration proceedings on August 28, 2025, before the Society for Affordable Redressal of Disputes, alleging incorrect computation of the ATV. The High Court of Delhi *vide* its order dated December 16, 2025 had appointed a presiding arbitrator and the first meeting of the arbitral tribunal was held on February 3, 2026. The matter is currently pending.

(ii) Pursuant to the letter dated May 27, 2025, the NHAI imposed damages aggregating to ₹ 2.14 million on SBGTPL, based on the recommendation by the independent engineer vide letter dated April 7, 2025, alleging *inter* alia, non-fulfillment of certain O&M obligations for the month of December 2024 and January 2025 as per the terms of the SBGTPL CA. The independent engineer ("**IE**") issued O&M inspection reports for December 2024 and January 2025 and highlighted certain discrepancies. SBGTPL submitted a letter dated April 23, 2025 wherein it provided clarifications for the observations issued by the IE. Subsequently, the IE *vide* its letter dated June 25, 2025 did not agree with the clarifications provided by SBGTPL and has reaffirmed the damages levied on SBGTPL amounting to approximately ₹ 2.14 million, which was reimposed by NHAI *vide* letter dated July 4, 2025. SBGTPL *vide* its letter dated July 11, 2025 has denied the discrepancies raised by NHAI. SBGTPL *vide* its letter dated February 17, 2026 has applied to settle the matter through conciliation before the Conciliation Committee of Independent Experts ("**CCIE**"). This matter is currently pending.

(iii) NHAI *vide* its letter dated March 22, 2024 notified SBGTPL about the revision of rates of user fee which came into effect on April 1, 2024. SBGTPL was instructed to publicize the revised rates in newspapers and update the toll plaza displays before implementation, as per the SBGTPL CA and user fee notification. However, NHAI *vide* its letter dated April 1, 2024 instructed not to implement the revised user fee. Subsequently, NHAI *vide* its notification dated May 30, 2024 directed the implementation of revised rates of user fee from June 3, 2024. SBGTPL *vide* letters dated April 23, 2024 and May 30, 2024 requested compensation from NHAI for the loss of revenue amounting to approximately ₹ 10.89 million due to the non-implementation of revised user fees for the period between April 1, 2024 to June 2, 2024, along with justifications, in accordance with the terms of the SBGTPL CA. SBGTPL vide its letter dated February 17, 2026 has applied to settle the matter through conciliation before the CCIE. This matter is pending.

(iv) The independent engineer *vide* its letter dated July 28, 2025 recommended the imposition of damages aggregating to ₹ 1.21 million on SBGTPL, alleging breach of the O&M obligations as per the SBGTPL

CA due to failure to rectify non-functional weigh-in-motion ("**WIM**") systems at the Samakhiali toll plaza for the period from June 20, 2025, to July 19, 2025. SBGTPL has submitted its response dated July 16, 2025, clarifying that the issue is industry-wide and has requested a change of scope for the WIM replacement. However, the independent engineer in its letter dated July 28, 2025 specified that the WIM maintenance forms an integral part of SBGTPL's obligations under SBGTPL CA. Thereafter, NHAI *vide* its letter dated August 4, 2025 imposed damages as recommended by the independent engineer. SBGTPL *vide* its letter dated September 4, 2025 has requested NHAI to disregard the recommendations made by the independent engineer based on the justifications provided in the said letter. SBGTPL *vide* its letter dated February 17, 2026 has applied to settle the matter through conciliation before the CCIE. The matter is currently pending.

(v) Pursuant to the letter dated September 27, 2025, the NHAI imposed damages aggregating to ₹ 25.3 million on SBGTPL, alleging inter alia, non-fulfillment of certain O&M obligations for the period between March 1, 2025 to June 19, 2025. The IE *vide* its letter dated September 19, 2025 had recommended damages citing non-fulfillment of O&M obligations for the period between March 1, 2025 to June 19, 2025 and highlighted certain discrepancies, based on which NHAI has imposed damages. SBGTPL submitted a letter dated October 14, 2025 wherein it noted that the damages were imposed without considering the clarifications provided by SBGTPL and therefore, it reiterated clarifications for the observations issued by the IE and requested the IE to withdraw its recommendations. SBGTPL has submitted its responses to NHAI *vide* its letter dated November 5, 2025. SBGTPL *vide* its letter dated February 17, 2026 has applied to settle the matter through conciliation before the CCIE. This matter is currently pending.

(vi) Pursuant to the letter dated August 26, 2025, the NHAI imposed damages aggregating to ₹ 1.37 million on SBGTPL, alleging inter alia, non-fulfillment of certain O&M obligations for the period between July 20, 2025 to August 22, 2025 as per the terms of the SBGTPL CA. The IE has recommended damages citing non-fulfillment of O&M obligations for the period between July 20, 2025 to August 22, 2025 and highlighted certain discrepancies. SBGTPL submitted a letter dated September 4, 2025 wherein it provided clarifications for the observations issued by the IE. SBGTPL *vide* its letter dated February 17, 2026 has applied to settle the matter through conciliation before the CCIE. This matter is currently pending.

(vii) Pursuant to the letter dated September 24, 2025, the NHAI imposed damages aggregating to ₹ 1.00 million on SBGTPL, based on independent engineer's recommendation *vide* its letter dated September 17, 2025, alleging inter alia, non-fulfillment of certain O&M obligations for the period between August 23, 2025 to September 16, 2025 as per the terms of the SBGTPL CA. The IE has recommended damages citing non-fulfillment of O&M obligations for the period between August 23, 2025 to September 16, 2025 and highlighted certain discrepancies. SBGTPL submitted a letter dated September 25, 2025 wherein it provided clarifications for the observations issued by the IE. SBGTPL *vide* its letter dated February 17, 2026 has applied to settle the matter through conciliation before the CCIE. This matter is currently pending.

(viii) Pursuant to the letter dated October 13, 2025, the NHAI imposed damages aggregating to ₹ 0.56 million on SBGTPL, alleging *inter alia*, non-fulfillment of certain O&M obligations for the period between September 17, 2025 to September 30, 2025 as per the terms of the SBGTPL CA based on recommendation of the independent engineer ("**IE**") *vide* its letter dated October 4, 2025. The IE issued O&M inspection report for September 2025 and highlighted certain discrepancies. SBGTPL submitted a letter dated November 6, 2025, wherein it provided clarifications for the observations issued by the IE. SBGTPL *vide* its letter dated February 17, 2026 has applied to settle the matter through conciliation before the CCIE. This matter is currently pending.

(ix) Pursuant to the letter dated December 10, 2025, the NHAI imposed damages aggregating to ₹ 1.56 million on SBGTPL, alleging *inter alia*, non-fulfillment of certain O&M obligations for the period between October 1, 2025 to October 31, 2025 as per the terms of the SBGTPL CA based on recommendation of the independent engineer ("**IE**") vide its letter dated December 5, 2025. The IE issued O&M inspection report for October 2025 and highlighted certain discrepancies. SBGTPL submitted a letter dated December 22, 2025 to NHAI, wherein it provided clarifications for the observations issued by the IE. This matter is proposed to be resolved through CCIE. SBGTPL vide its letter dated February 17, 2026 has applied to settle the matter through conciliation before the CCIE. This matter is currently pending.

(g) SRTPL

(i) SRTPL submitted consolidated claims amounting to ₹6315 million and sought an extension of the concession period by 593.42 days, owing to the loss of revenue during the O&M period due to various reasons, *inter alia*, delay in land handover, change in law, change in scope and occurrence of force majeure events. The independent engineer examined the claims and recommended the payment of ₹ 1117 million and the extension of concession period by 299.96 days. SRTPL had accepted the recommendation of the independent engineer for an amicable settlement. The Office of the Engineer-in-Chief (Civil), Odisha, *vide* its letter dated March 18, 2023, has submitted these claims of SRTPL for approval of the Government of Odisha. The matter is currently pending.

(h) TEL

(i) TEL *vide* letter dated June 7, 2024 requested compensation from NHAI for the loss of revenue incurred due to the non-implementation of revised user fees for the period between April 1, 2024 to June 2, 2024, along with detailed calculations and supporting documents, in accordance with the terms of the concession agreement dated August 24, 2009 entered into between TEL and NHAI ("**TEL CA**"). TEL *vide* its letter dated August 8, 2025 modified the loss of revenue to ₹ 7.48 million This matter is currently pending.

(ii) The Office of the Director General, Corporate Affairs, Ministry of Corporate Affairs ("**MCA**") issued a show cause notice under Section 204 of the Companies Act, 2013 ("**SCN**") to TEL, alleging failure to annex the secretarial audit report with its board report for financial year 2016–17. TEL submitted a written response dated November 15, 2019 denying any violation on the basis that Section 204 was not applicable to them. The response was filed on the compliance monitoring system of MCA on November 18, 2019. Thereafter, the Registrar of Companies, Hyderabad, issued a letter dated March 7, 2022 referring to the SCN and asking the company to confirm filing of a compounding application; the company replied on March 16, 2022, reiterating there was no violation and enclosing its previous reply and evidence of the portal submission. The matter is currently pending.

B. Litigation and regulatory actions involving the Sponsor, its associates and the Sponsor Group

a. Sponsor

As of the date of this Offer Document, there are no outstanding criminal litigation, regulatory actions or civil litigation involving the Sponsor.

b. Sponsor – Associates

Criminal litigation involving the associates of the Sponsor

NIL

Outstanding civil litigation involving the associates of the Sponsor

Several persons ("**Petitioners**") have filed petitions against Kudgi Transmission Limited pertaining to enhanced compensation in respect of right of way granted for transmission lines, which are pending before various forums of adjudication. These matters are currently pending.

Regulatory proceedings involving the associates of the Sponsor

Except as stated below, there are no outstanding regulatory proceedings involving the associates of the Sponsor as on the date of this Offer Document.

(i) Kudgi Transmission Limited ("**KTL**") filed a petition dated August 31, 2017 before the Central Electricity Regulatory Commission ("**CERC**") and sought the revision of transmission tariff payable to it in terms of transmission service agreement for the additional expenditure incurred because of various force majeure and change in law events after bid due date and during project construction and affected the project progress. CERC vide its order dated July 25, 2022 ordered for the revision of scheduled commercial operation date ("**SCOD**") and the return of the bank guarantee by Bangalore

Electricity Supply Company Limited ("**BESCOM**"). KTL filed an appeal dated Sept 07, 2022 against this order of CERC before the Appellate Tribunal for Electricity ("**APTEL**"). The matter is currently pending.

(ii) KTL filed a petition dated December 22, 2016 before the CERC after BESCOM demanded liquidated damages for the alleged delay in commissioning KTL "Element II" and "Element III" within the SCOD. KTL contended that the delay was attributable to force majeure events, including the non-availability of interconnection facilities to be provided by Power Grid Corporation of India Limited ("**PGCIL**"), law and order issues in various villages in the districts of Tumkur, Ramanagara and Bellary, and denial of approval by the Karnataka Industrial Areas Development Board ("**KIADB**") to undertake works on lands notified by KIADB. CERC, vide its order dated January 24, 2019, held that the aforesaid events constitute force majeure, extended the SCOD to the actual COD, and quashed BESCOM's demand for liquidated damages, including setting aside BESCOM's letter dated December 5, 2016. CERC further directed BESCOM to return the bank guarantee of ₹ 40.30 million to KTL and ordered revision in tariffs consistent with the findings. Aggrieved, BESCOM filed an appeal before the APTEL against CERC's order dated January 24, 2019, including the direction to return the performance bank guarantee. The matter is currently pending.

(iii) KTL filed petition dated March 20, 2018 before the CERC seeking approval of transmission tariff for "Element 2" and "Element 3" for the period between the dates of commissioning and the dates of actual charging. KTL submitted that it had completed the works for Element 2 and Element 3 and declared commercial operation; however, tariff payments could not commence from the commercial operation date ("**COD**") because the elements could not be charged due to delays attributable to PGCIL in completing its scope of works. KTL also placed reliance on a separate matter in which CERC had granted tariff from COD to KTL, payable by PGCIL, on account of similar delays. CERC, *vide* its order dated November 24, 2022 denied the relief sought by KTL. KTL has filed an appeal dated February 24, 2023 against the CERC order before the APTEL. The matter is currently pending.

c. *Sponsor Group*

Except as disclosed in the section *"-Litigation and regulatory actions involving the Sponsor, its associates and the Sponsor Group"* on page 452, there are no outstanding criminal litigation, regulatory actions or material civil litigation involving the Sponsor Group.

C. Litigation and regulatory proceedings involving the Project Manager and its associates

Except as disclosed in in the section *"Legal and Other Information - Litigation and regulatory actions involving the Sponsor, its associates and the Sponsor Group"* on page 452, there are no outstanding criminal litigation, regulatory actions or material civil litigation involving the Project Manager and its Associates.

D. Litigation and regulatory proceedings involving the Investment Manager and its associates

a. Investment Manager

As of the date of this Offer Document, there are no outstanding criminal litigation, regulatory actions or material civil litigation involving the Investment Manager.

b. Associates of Investment Manager

Except as disclosed below there are no outstanding criminal litigation, regulatory actions or material civil litigation involving the Associates of Investment Manager.

Criminal litigation involving the Associates of Investment Manager

(i) Ecstasy Realty Private Limited ("**Ecstasy**") had filed a complaint before the Economic Offences Wing ("**EOW**") of the Mumbai Police Department on December 26, 2023 and subsequently, a first information report dated February 8, 2025 (FIR No. 0154 of 2025) was registered at Amboli Police Station, Mumbai, under various sections of the Indian Penal Code, 1860, against EAAA India Alternatives Limited, Edelweiss Financial Services Limited ("**EFSL**"), Edel Finance Company Limited ("**EFCL**") and others including certain directors and key managerial personnel of the companies alleging *inter-alia*, breach of contractual obligations resulting in financial loss to Ecstasy. A petition bearing number WP 2165/2025 has been filed by the EAAA India Alternatives Limited,

EFSL, EFCL and others before the Bombay High Court seeking quashing of the aforesaid first information report. The matter is currently pending.

(ii) EFSL has filed a criminal complaint bearing number SS500699/2012 dated April 13, 2012 before the Additional Chief Metropolitan Magistrate, Mumbai ("**Court**"), against MIC Electronics Limited ("**MIC**") and others for alleged violations of Section 138 of the Negotiable Instruments Act, 188, pursuant to the dishonor of cheques issued by MIC aggregating to ₹18.30 million. The matter is currently pending.

(iii) Edelweiss Global Wealth Management Limited ("**EGWML**") received notice dated September 4, 2020, from EOW, Gurugram in regard to the complaint dated August 20, 2020 filed by one of it's the client Parinidhi Minda against EGWML officials Anshul Kapoor, Amit Saxena and Ashish Gopal and directed to attend personally along with necessary papers and documents to record statements. Subsequently, the complaint stands transferred to Police Station, namely, SEC-7, IMT, MSR, Manesar, District –Gurugram. EGWML and its officials thereafter received a notice dated October 27, 2020 from said police station to appear before investigating officer along with supporting documents for the purpose of recording statements. The inquiry is currently pending.

(iv) Two criminal cases bearing numbers SS2301087/2019 and SS2301086/2019, respectively have been filed by EFCL (*previously known as "Edelweiss Finance and Investments Limited"*) against Ramsarup Industries Limited ("**RIL**") along with its directors and officers under Section 138 of Negotiable Instruments Act, 1881 pursuant to the dishonour of cheque of issued by RIL, aggregating to ₹100 million. The matter is currently pending

(v) EFCL has filed a complaint dated January 31, 2026 before Additional Metropolitan Magistrate Bandra against Vital Developers Private Limited and others for alleged violations of Section 138 of the Negotiable Instruments Act, 1881 pursuant to dishonour of a cheque aggregating to ₹72 million. The matter is currently pending.

Outstanding civil litigation involving the Associates of Investment Manager

(i) EFSL has filed a suit for defamation, injunction and damages ("**Suit**") against Palak Shah & Ors. ("**Defendants**") before the High Court of Bombay, among others, seeking directions to pass an interim and permanent injunction restraining the Defendants from continuing their illegal, mala fide and motivated conduct of making baseless and defamatory allegations and/or innuendo against EFSL and its director by way of publication of certain articles. EFSL has also sought damages of ₹ 1,000 million in the Suit in relation to, among others, loss arising from damage to the goodwill of EFSL due to the conduct of the Defendants. EFSL also submitted a criminal complaint ("**Complaint**") against the Defendants before the Bandra Kurla Complex police station on July 20, 2024 for initiation of criminal proceedings against the Defendants in connection with the publication of articles and other acts of the Defendants. The matters are currently pending.

(ii) EFSL filed a suit for defamation, injunction and damages ("**Suit**") against Bennet Coleman & Ors. ("**Defendants**") before the High Court of Bombay *inter alia*, seeking directions to pass an interim and permanent injunction restraining the Defendants from continuing their illegal, mala fide and motivated conduct of making baseless and defamatory allegations and/or innuendo against EFSL and its director by way of publication of certain articles. EFSL has also sought damages of ₹ 1,000 million in the Suit due to, *inter-alia*, loss arising from damage to the goodwill of EFSL due to the conduct of the Defendants. The matter is currently pending.

(iii) EFSL filed a suit for defamation, injunction and damages ("**Suit**") against Furquan Moharkan and Ors. ("**Defendants**") before the High Court of Bombay *inter alia*, seeking directions to pass an interim and permanent injunction restraining the Defendants from continuing their illegal, mala fide and motivated conduct of making baseless and defamatory allegations and/or innuendo against EFSL and its director by way of publication of certain articles. EFSL has also sought damages of ₹ 1,000 million in the Suit due to, inter-alia, loss arising from damage to the goodwill of EFSL due to the conduct of the Defendants. The matter is currently pending.

Regulatory proceedings involving the Associates of Investment Manager

(i) EFSL received a letter dated February 9, 2024 from SEBI ("**SEBI Letter**") alleging in connection with payment of additional interest to existing holders of the non-convertible debentures issued by EFSL

and certain of its group companies as well as the shareholders of EFSL. Subsequently, EFSL received a notice dated June 14, 2024 for summary settlement in the aforesaid matter under the SEBI (Settlement Proceedings) Regulations, 2018. EFSL has filed the settlement application on July 11, 2024, along with the payment of processing fees for the settlement application and remitted the settlement amount of ₹ 0.97 million. The settlement order is awaited.

(ii) EFSL, in its capacity as the merchant banker, has received a notice dated February 9, 2024 from SEBI ("**SEBI Letter**") in connection with certain additional interest payments made to existing holders of the Non-convertible Debentures issued by the issuers. EFSL received a Notice dated June 14, 2024 for summary settlement under the SEBI (Settlement Proceedings) Regulations, 2018. EFSL had filed the settlement application on July 18, 2024, along with the payment of processing fees for the settlement application and remitted the settlement amount of ₹ 0.97 million. The settlement order is awaited.

(iii) A thematic inspection was conducted by SEBI under Regulation 30 of SEBI AIF Regulations. The Inspection Report made observations regarding certain provisions of the SEBI AIF Regulations *inter alia* inadequate disclosures related to potential conflict of interest (including implementation of the relevant policies) for the funds and inaccurate disclosure in the annual compliance test reports. EAAA India Alternatives Limited submitted its detailed written response to SEBI on April 16, 2025, and has thereafter provided additional clarifications and supporting submissions as sought. The matter has since remained pending SEBI's further action. Without admission of any observation or conclusion in the inspection report, EAAA India Alternatives Limited has filed a settlement application dated December 2, 2025 under the SEBI (Settlement Proceedings) Regulations, 2018, which is currently pending before SEBI.

E. Litigation and regulatory proceedings involving the Trustee

Criminal litigation involving the Trustee

Except as stated below, there are no outstanding criminal litigation involving the Trustee as on the date of this Offer Document:

(i) There are no criminal litigations against the Trustee in its corporate capacity. However, a criminal application has been filed by Ganesh Benzoplast Limited, the security provider to certain NCDs praying for quashing of an FIR filed by the Axis Trustee Services Limited, on behalf of the debenture holders. The FIR was filed by the Trustee in its capacity as a debenture trustee, upon default and on instruction and on behalf debenture holders, before the DCP, Economic Offence Wing, New Delhi for alleged fraud and forgery by promoter, security provider and issuer of NCDs. The matter is currently pending.

(ii) The Trustee in its various capacities acting as a trustee, debenture trustee, security trustee, among others, has initiated several proceedings against certain parties based on instructions received from its clients, as follows:

a. Applications under Section 138 of Negotiable Instruments Act, 1881, based on the instructions of debenture holders/ lenders, in relation to dishonour of cheques. These matters are pending before various forums.

b. The Trustee, upon instructions of their client has filed an appeal under Section 26(1) of Prevention of Money Laundering Act, 2002 before the appellate tribunal against the order of the adjudicating authority in the matter OC No.2470 of 2024. The matter is currently pending.

Outstanding civil litigation and regulatory proceedings involving the Trustee

Except as stated below, there are no outstanding civil litigation and regulatory proceedings involving the Trustee as on the date of this Offer Document:

Show cause notice dated May 30, 2025, issued by SEBI under rule 4(1) of SEBI (Procedure for Holding Inquiry and Imposing Penalties) Rules, 1995 with respect of role of the Trustee in the matter of fit and proper criteria in relation to key managerial personnel of a real estate infrastructure trust.

F. Taxation Proceedings

Details of all outstanding direct tax and indirect tax matters against the Trust, the Initial Portfolio Assets, the Sponsor, the Project Manager, the Investment Manager, their respective associates and the Sponsor Group as of the date of this Offer Document, are as follows:

Sr. No.	Nature of Case	Number of cases	Amount involved (₹ in million)
Trust, its associates and Initial Portfolio Assets			
Trust			
1.	Direct Tax	*NIL*	*NIL*
2.	Indirect Tax	*NIL*	*NIL*
Epic 3			
1.	Direct Tax	15	613.20
2.	Indirect Tax	5	123
SRPL			
1.	Direct Tax	*NIL*	*NIL*
2.	Indirect Tax	*NIL*	*NIL*
AMTPL			
1.	Direct Tax	5	57.40
2.	Indirect Tax	1	18.70
Dhola			
1.	Direct Tax	*NIL*	*NIL*
2.	Indirect Tax	4	478.7
Dibang			
1.	Direct Tax	2	8.34
2.	Indirect Tax	3	330.85
DTPL			
1.	Direct Tax	1	1.90
2.	Indirect Tax	3	4.70
JSEL			
1.	Direct Tax	7	907.81
2.	Indirect Tax	2	2,248.30
PECPL			
1.	Direct Tax	3	189.00
2.	Indirect Tax	*NIL*	*NIL*
RVTPL			
1.	Direct Tax	7	90.70
2.	Indirect Tax	1	3.0
SBGTPL			
1.	Direct Tax	3	52.60
2.	Indirect Tax	*NIL*	*NIL*
SRTPL			
1.	Direct Tax	3	45.80
2.	Indirect Tax	3	161.00
TEL			
1.	Direct Tax	*NIL*	*NIL*
2.	Indirect Tax	1	559
Sponsor			
1.	Direct Tax	*NIL*	*NIL*
2.	Indirect Tax	*NIL*	*NIL*
Associates of the Sponsor (apart from the Project SPVs)* **			
1.	Direct Tax	17	160.90
2.	Indirect Tax	2	9.30
Project Manager and its associates			
1.	Direct Tax	3	6.30
2.	Indirect Tax	*NIL*	*NIL*
Investment Manager and its associates			
1.	Direct Tax	26	1,284.43*
2.	Indirect Tax	5	558.44*
Sponsor Group**			
1.	Direct Tax	11	160.80
2.	Indirect Tax	*NIL*	*NIL*
Trustee			

Sr. No.	Nature of Case	Number of cases	Amount involved (₹ in million)
1.	Direct Tax	*NIL*	*NIL*
2.	Indirect Tax	*NIL*	*NIL*

**To the extent quantifiable and excluding interest*
*** Includes cases for Project Manager and its associates*
**** Includes cases for Sponsor Group*

SECURITIES MARKET OF INDIA

The information in this section has been extracted from documents available on the website of SEBI and the Stock Exchanges and has not been prepared or independently verified by the Parties to the Trust or the Lead Managers or any of their respective affiliates or advisors. The information below is given for the benefit of investors in the Issue. Investors are advised to make their independent investigations and ensure that they are eligible to subscribe to, purchase or otherwise acquire the Units they Bid for under Indian laws or regulations.

The Indian Securities Market

India has a long history of organized securities trading. In 1875, the first stock exchange was established in Mumbai. The BSE and the NSE, together hold a dominant position among the stock exchanges in terms of the number of listed companies, market capitalisation and trading activity.

Stock Exchange Regulation

Indian stock exchanges are regulated primarily by SEBI, as well as by the Government acting through the Ministry of Finance, Capital Markets Division, under the Securities Contracts (Regulation) Act, 1956 ("**SCRA**") and the Securities Contracts (Regulation) Rules, 1957 ("**SCRR**"). SEBI, in exercise of its powers under the SCRA and the SEBI Act, notified the SCR (SECC) Regulations, which regulate *inter alia* the recognition, ownership and internal governance of stock exchanges and clearing corporations in India together with providing for minimum capitalisation requirements for stock exchanges. The SCRA, the SCRR and the SCR (SECC) Regulations along with various rules, bye-laws and regulations of the respective stock exchanges, regulate the recognition of stock exchanges, the qualifications for membership thereof and the manner, in which contracts are entered into, settled and enforced between members of the stock exchanges.

The SEBI Act empowers SEBI to regulate the Indian securities markets, including stock exchanges and intermediaries in the capital markets, promote and monitor self-regulatory organisations and prohibit fraudulent and unfair trade practices. Regulations concerning minimum disclosure requirements by public companies, rules and regulations concerning investor protection, insider trading, substantial acquisitions of shares and takeover of companies, buy-backs of securities, employee stock option schemes, stockbrokers, merchant bankers, underwriters, mutual funds, foreign portfolio investors, credit rating agencies and other capital market participants have been notified by the relevant regulatory authority.

Listing and Delisting of Units

The InvIT Regulations provide for listing and delisting of units of infrastructure investment trusts on the stock exchanges.

BSE

Established in 1875, it is the oldest stock exchange in India. In 1957, it became the first stock exchange in India to obtain permanent recognition from the Government under the SCRA. It has evolved over the years into its present status as one of the premier stock exchanges of India. The BSE provides a market for trading in equity. Currencies, debt instruments, derivatives and mutual funds. Pursuant to the BSE (Corporatization and Demutualization) Scheme 2005 of SEBI, with effect from August 19, 2005, BSE was incorporated as a company under the Companies Act, 1956. The equity shares of BSE were listed on NSE on February 3, 2017.

NSE

NSE was established by financial institutions and banks to provide nationwide online, satellite-linked, screen-based trading facilities with market-makers and electronic clearing and settlement for securities including government securities, debentures, public sector bonds and units. It has evolved over the years into its present status as one of the premier stock exchanges of India. NSE was recognised as a stock exchange under the SCRA in April 1993 and commenced operations in the wholesale debt market segment in June 1994. The capital market (equities) segment commenced operations in November 1994 and operations in the derivatives segment commenced in June 2000. Presently, the products on the exchange are organized into three assets classes for trading, namely (i) equity and equity-linked products such as stocks, IDRs, ETFs and units of closed ended mutual fund schemes, (ii) derivates and (iii) fixed income securities and debt products, including corporate bonds, sovereign gold bonds and other debt securities.

Internet-based Securities Trading and Services

Internet trading takes place through order routing systems, which route client orders to exchange trading systems for execution. Stockbrokers interested in providing this service are required to apply for permission to the relevant stock exchange and also have to comply with certain minimum conditions stipulated by SEBI. The NSE became the first exchange to grant approval to its members for providing internet-based trading services. Internet trading is possible on both the "equities" as well as the "derivatives" segments of the NSE.

Trading Hours

Trading on both the NSE and the BSE occurs from Monday to Friday, between 9:15 a.m. and 3:30 p.m. 1ST (excluding the 15 minutes pre-open session from 9:00 a.m. to 9:15 a.m. that has been introduced recently). The NSE and the BSE are closed on public holidays. The recognised stock exchanges have been permitted to set their own trading hours (in the cash and derivatives segments) subject to the condition that (i) the trading hours are between 9.00 a.m. and 5.00 p.m.; and (ii) the stock exchange has in place a risk management system and infrastructure commensurate to the trading hours.

Trading Procedure

In order to facilitate smooth transactions, the BSE replaced its open outcry system with BSE On-line Trading facility in 1995. This totally automated screen-based trading in securities and was put into practice nationwide. This has enhanced transparency in dealings and has assisted considerably in smoothening settlement cycles and improving efficiency in back-office work.

NSE has introduced a fully automated trading system called NEAT, which operates on strict time/price priority besides enabling efficient trade. NEAT has provided depth in the market by enabling large number of members all over India to trade simultaneously, narrowing the spreads.

Depositories

The Depositories Act provides a legal framework for the establishment of depositories to record ownership details and effect transfer in book-entry form. Further, SEBI framed regulations in relation to the registration of such depositories, the registration of participants as well as the rights and obligations of the depositories, participants, companies and beneficial owners. The depository system has significantly improved the operation of the Indian securities markets.

SELLING AND TRANSFER RESTRICTIONS

The distribution of this Offer Document and the offer, sale or delivery of the Units is restricted by law in certain jurisdictions. Persons who may come into possession of this Offer Document are advised to consult with their own legal advisors as to what restrictions may be applicable to them and to observe such restrictions. This Offer Document may not be used for the purpose of an offer or invitation in any circumstances. Due to the following restrictions, investors are advised to consult legal counsel prior to purchasing or subscribing to the Units or making any resale, pledge or transfer of the Units.

Republic of India

This Offer Document may not be distributed directly or indirectly in India or to residents of India and any Units may not be offered or sold directly or indirectly in India to, or for the account or benefit of, any resident of India except as permitted by applicable Indian laws and regulations.

The Units may not be offered or sold, directly or indirectly, and this Offer Document, any offering materials and any advertisements in connection with the offering of the Units may be distributed or published in or from any country or jurisdiction except under circumstances that will result in compliance with any applicable rules and regulations of any such country or jurisdiction. The Issue will be made in compliance with the applicable InvIT Regulations.

Bahrain

All applications for investment should be received, and any allotments should be made, in each case from outside Bahrain. This Offer Document has been prepared for private information purposes of intended investors only who will be high net worth individuals and institutions. The Trust has not made and will not make any invitation to the public in the Kingdom of Bahrain and this Offer Document will not be issued, passed to, or made available to the public generally. The Bahrain Monetary Agency ("**BMA**") has not reviewed, nor has it approved, this Offer Document or the marketing of Units in the Kingdom of Bahrain. Accordingly, Units may not be offered or sold in Bahrain or to residents thereof except as permitted by Bahrain law.

British Virgin Islands

The Units are not being, and may not be offered to the public or to any person in the British Virgin Islands for purchase or subscription by or on the behalf. The Units may be offered to companies incorporated under the BVI Business Companies Act, 2004 (British Virgin Islands) (each a "**BVI Company**"), but only where the offer will be made to, and received by, the relevant BVI Company entirely outside of the British Virgin Islands.

This Offer Document has not been, and will not be, registered with the Financial Services Commission of the British Virgin Islands. No registered prospectus has been or will be prepared in respect of the Units for the purposes of the Securities and Investment Business Act, 2010 or the Public Issuers Code of the British Virgin Islands.

Cayman Islands

No offer or invitation to subscribe for Units may be made to the public in the Cayman Islands to subscribe for any of the Units but an invitation or offer may be made to sophisticated persons (as defined in the Cayman Islands Securities Investment Business Law (the "**SIBL**"), high net worth persons (as defined in the SIBL) or otherwise in accordance with the SIBL.

Dubai International Financial Centre

This Offer Document relates to an Exempt Offer in accordance with the Markets Rules Module of the Dubai Financial Services Authority ("**DFSA**") Rulebook. This Offer Document is intended for distribution only to persons of a type specified in the Markets Rules Module. It must not be delivered to, or relied on by, any other person. The DFSA has no responsibility for reviewing or verifying any documents in connection with Exempt Offers. The DFSA has not approved this Offer Document nor taken steps to verify the information set forth herein and has no responsibility for this Offer Document. The Units to which this Offer Document relates may be illiquid and/or subject to restrictions on their resale. Prospective purchasers of the Units offered should conduct their own due diligence on the Units. If you do not understand the contents of this Offer Document, you should consult an authorized financial advisor.

In relation to its use in the Dubai International Financial Centre, this Offer Document is strictly private and confidential and is being distributed to a limited number of investors and must not be provided to any person other than the original recipient and may not be reproduced or used for any other purpose. The interests in the securities may not be offered or sold directly or indirectly to the public in the Dubai International Financial Centre.

Hong Kong

Each Lead Manager has represented, warranted and agreed that:

(i) it has not offered or sold and will not offer or sell in Hong Kong, by means of any document, any Units other than (a) to "professional investors" as defined in the Securities and Futures Ordinance (Cap. 571) of Hong Kong (the "**SFO**") and any rules made under the SFO; or (b) in other circumstances which do not result in the document being a "prospectus" as defined in the Companies (Winding Up and Miscellaneous Provisions) Ordinance (Cap. 32) of Hong Kong (the "**CWUMPO**") or which do not constitute an offer to the public within the meaning of the CWUMPO; and

(ii) it has not issued or had in its possession for the purposes of issue, and will not issue or have in its possession for the purposes of issue, whether in Hong Kong or elsewhere any advertisement, invitation or document relating to the Units, which is directed at, or the contents of which are likely to be accessed or read by, the public of Hong Kong (except if permitted to do so under the securities laws of Hong Kong), other than with respect to Units which are or are intended to be disposed of only to persons outside Hong Kong or only to "professional investors" as defined in the SFO and any rules made under the SFO.

Indonesia

The Units have not been, and will not be, registered with the Indonesia Financial Service Authority (Otoritas Jasa Keuangan or OJK) in Indonesia, and therefore, the Units may not be offered and/or sold within the territory of Indonesia or to Indonesian citizens or entities, wherever domiciled, or to Indonesian residents, in a manner which constitutes a public offering under Law No. 8 of 1995 on Capital Markets and the implementing regulations or private placement under OJK Regulation No. 30/POJK.04/2019 on the Privately Issued Debt-Linked Securities and/or Sukuk.

Japan

No registration pursuant to Article 4, paragraph 1 of the Financial Instruments and Exchange Act of Japan (Act No. 25 of 1948, as amended) (the "**FIEA**") has been made or will be made with respect to the solicitation of the application for the acquisition of the Units as such solicitation falls within a Solicitation for Small Number Investors (as defined in Article 23-13, paragraph 4 of the FIEA).

Accordingly, the Units have not been, directly or indirectly, offered or sold and will not be, directly or indirectly, offered or sold in Japan or to, or for the benefit of, any resident of Japan or to others for re-offering or re-sale, directly or indirectly, in Japan or to, or for the benefit of, any resident of Japan except in compliance with the requirements for the application of the exemption for a private placement to a small number of people under Article 2, paragraph 3, item 2(c) of the FIEA and the other applicable laws and regulations of Japan (the "**Small Number Private Placement Exemption**").

Pursuant to the Small Number Private Placement Exemption, the Units may not be transferred other than by way of transfer of all of its notes in a lump sum.

Kuwait

This Offer Document is not for general circulation to the public in Kuwait. The Units have not been licensed for offering in Kuwait by the Kuwait Capital Markets Authority or any other relevant Kuwaiti government agency. The offering of the Units in Kuwait on the basis a private placement or public offering is, therefore, restricted in accordance with Law No. 7 of 2010 and the bylaws thereto (as amended). No private or public offering of the Units is being made in Kuwait, and no agreement relating to the sale of the Units will be concluded in Kuwait. No marketing or solicitation or inducement activities are being used to offer or market the Units in Kuwait.

Malaysia

No prospectus or other offering material or document in connection with the offer and sale of the Units has been or will be registered with the Securities Commission of Malaysia ("**Commission**") for the Commission's

approval pursuant to the Capital Markets and Services Act 2007. Accordingly, this Offer Document, and any other document or material in connection with the offer or sale, or invitation for subscription or purchase, of the Units may not be circulated or distributed, nor may the Units be offered or sold, or be made the subject of an invitation for subscription or purchase, whether directly or indirectly, to persons in Malaysia other than (i) a closed end fund approved by the Commission; (ii) a holder of a Capital Markets Services Licence; (iii) a person who acquires the Units, as principal, if the offer is on terms that the Units may only be acquired at a consideration of not less than RM250,000 (or its equivalent in foreign currencies) for each transaction; (iv) an individual whose total net personal assets or total net joint assets with his or her spouse exceeds RM3 million (or its equivalent in foreign currencies), excluding the value of the primary residence of the individual; (v) an individual who has a gross annual income exceeding RM300,000 (or its equivalent in foreign currencies) per annum in the preceding twelve months; (vi) an individual who, jointly with his or her spouse, has a gross annual income of RM400,000 (or its equivalent in foreign currencies), per annum in the preceding twelve months; (vii) a corporation with total net assets exceeding RM10 million (or its equivalent in a foreign currencies) based on the last audited accounts; (viii) a partnership with total net assets exceeding RM10 million (or its equivalent in foreign currencies); (ix) a bank licensee or insurance licensee as defined in the Labuan Financial Services and Securities Act 2010; (x) an Islamic bank licensee or takaful licensee as defined in the Labuan Financial Services and Securities Act 2010; and (xi) any other person as may be specified by the Commission; provided that, in the each of the preceding categories (i) to (xi), the distribution of the Units is made by a holder of a Capital Markets Services Licence who carries on the business of dealing in securities. The distribution in Malaysia of this Offer Document is subject to Malaysian laws. This Offer Document does not constitute and may not be used for the purpose of public offering or an issue, offer for subscription or purchase, invitation to subscribe for or purchase any securities requiring the registration of a prospectus with the Commission under the Capital Markets and Services Act 2007.

Mauritius

The Units may not be offered or sold, directly or indirectly, to the public in Mauritius. Neither this Offer Document nor any offering material or information contained herein relating to the offer of the Units may be released or issued to the public in Mauritius or used in connection with any such offer. This Offer Document does not constitute an offer to sell the Units to the public in Mauritius and is not a prospectus as defined under the Companies Act 2001.

New Zealand

This Offer Document is not a prospectus. It has not been prepared or registered in accordance with the Securities Act 1978 of New Zealand (the "**New Zealand Securities Act**"). This Offer Document is being distributed in New Zealand only to persons whose principal business is the investment of money or who, in the course of and for the purposes of their business, habitually invest money, within the meaning of section 3(2)(a)(ii) of the New Zealand Securities Act ("**Habitual Investors**"). By accepting this Offer Document, each investor represents and warrants that if they receive this Offer Document in New Zealand they are a Habitual Investor and they will not disclose this Offer Document to any person who is not also a Habitual Investor.

Sultanate of Oman

This Offer Document and the Units to which it relates may not be advertised, marketed, distributed or otherwise made available to any person in Oman without the prior consent of the Capital Market Authority ("**CMA**") and then only in accordance with any terms and conditions of such consent. In connection with the offering of Units, no prospectus has been filed with the CMA. The offering and sale of Units described in this Offer Document will not take place inside Oman. This Offer Document is strictly private and confidential and is being issued to a limited number of sophisticated investors, and may neither be reproduced, used for any other purpose, nor provided to any other person than the intended recipient hereof.

Qatar (excluding the Qatar Financial Centre)

The Units have not been offered, sold or delivered, and will not be offered, sold or delivered at any time, directly or indirectly, in the State of Qatar in a manner that would constitute a public offering. This Offer Document has not been reviewed or registered with Qatari Government Authorities, whether under Law No. 25 (2002) concerning investment funds, Central Bank resolution No. 15 (1997), as amended, or any associated regulations. Therefore, this Offer Document is strictly private and confidential, and is being issued to a limited number of sophisticated investors, and may not be reproduced or used for any other purposes, nor provided to any person other than the recipient thereof.

The Capital Market Authority does not make any representation as to the accuracy or completeness of this Offer Document, and expressly disclaims any liability whatsoever for any loss arising from, or incurred in reliance upon, any part of this Offer Document. Prospective purchasers of the Units offered hereby should conduct their own due diligence on the accuracy of the information relating to this Offer Document. If you do not understand the contents of this Offer Document, you should consult an authorized financial adviser.

Qatar Financial Centre

This Offer Document does not, and is not intended to, constitute an invitation or offer of securities from or within the Qatar Financial Center ("**QFC**"), and accordingly should not be construed as such. This Offer Document has not been reviewed or approved by or registered with the Qatar Financial Centre Authority, the Qatar Financial Centre Regulatory Authority or any other competent legal body in the QFC. This Offer Document is strictly private and confidential and may not be reproduced or used for any other purpose, nor provided to any person other than the recipient thereof. The Trust has not been approved or licensed by or registered with any licensing authorities within the QFC.

Saudi Arabia

This Offer Document may not be distributed in the Kingdom of Saudi Arabia except to such persons as are permitted under the Offers of Securities Regulations as issued by the board of the Saudi Arabian Capital Market Authority ("**CMA**") pursuant to resolution number 2-11-2004 dated October 4, 2004 as amended by resolution number 1-28-2008, as amended (the "**CMA Regulations**"). The CMA does not make any representation as to the accuracy or completeness of this Offer Document and expressly disclaims any liability whatsoever for any loss arising from, or incurred in reliance upon, any part of this Offer Document. Prospective purchasers of the Units offered hereby should conduct their own due diligence on the accuracy of the information relating to the Units. If you do not understand the contents of this Offer Document, you should consult an authorized financial adviser.

Singapore

This Offer Document has not been and will not be registered as a prospectus in Singapore with the Monetary Authority of Singapore. Accordingly, this Offer Document and any other document or material in connection with the offer or sale, or invitation for subscription or purchase, of the Units may not be circulated or distributed, nor may the Units be offered or sold, or be made the subject of an invitation for subscription or purchase, whether directly or indirectly, to any person in Singapore other than (i) to an institutional investor (as defined in Section 4A of the Securities and Futures Act, (Chapter 289), of Singapore as modified and amended from time to time (the "**Securities and Futures Act**")) pursuant to Section 274 of the Securities and Futures Act, (ii) to a relevant person (as defined in Section 275(2) of the Securities and Futures Act) pursuant to Section 275(1) of the Securities and Futures Act, or any person pursuant to Section 275(1A) of the Securities and Futures Act, and in accordance with the conditions specified in Section 275 of the Securities and Futures Act, or (iii) otherwise pursuant to, and in accordance with the conditions of, any other applicable provision of the Securities and Futures Act.

Where the Units are subscribed or purchased under Section 275 of the Securities and Futures Act by a relevant person which is:

(a) a corporation (which is not an accredited investor (as defined in Section 4A of the Securities and Futures Act)) the sole business of which is to hold investments and the entire share capital of which is owned by one or more individuals, each of whom is an accredited investor; or
(b) a trust (where the trustee is not an accredited investor) whose sole purpose is to hold investments and each beneficiary of the trust is an individual who is an accredited investor,

securities or securities-based derivatives contracts (each as defined in Section 239(1) of the Securities and Futures Act) of that corporation or the beneficiaries' rights and interest (howsoever described) in that trust shall not be transferred within six months after that corporation or that trust has acquired the Units pursuant to an offer made under Section 275 of the Securities and Futures Act except:

(1) to an institutional investor or to a relevant person, or to any person arising from an offer referred to in Section 275(1A) or Section 276(4)(i)(B) of the Securities and Futures Act;
(2) where no consideration is or will be given for the transfer;
(3) where the transfer is by operation of law;
(4) as specified in Section 276(7) of the Securities and Futures Act; or

(5) as specified in Regulation 37A of the Securities and Futures (Offers of Investments) (Securities and Securities-based Derivatives Contracts) Regulations 2018 of Singapore.

Notification under Sections 309B(1)(a) and 309B(1)(c) of the SFA: The Trust determined, and hereby notifies all relevant persons (as defined in Section 309A of the SFA) that the Units are: (A) prescribed capital markets products (as defined in the Securities and Futures (Capital Markets Products) Regulations 2018) and (B) Excluded Investment Products (as defined in MAS Notice SFA 04-N12: Notice on the Sale of Investment Products and MAS Notice FAAN16: Notice on Recommendations on Investment Products).

South Korea

We are not making any representation with respect to the eligibility of any recipients of this document to acquire the Units therein under the laws of Korea, including, but without limitation, the Foreign Exchange Transaction Law and Regulations thereunder. The Units have not been and will not be registered under the Financial Investment Services and Capital Markets Act of Korea (the "**FSCMA**"). Accordingly, the Units may not be offered, sold or delivered, or offered or sold to any person for re-offering or resale, directly or indirectly, in Korea or to, or for the account or benefit of, any resident of Korea (as such term is defined under the Foreign Exchange Transaction Law of Korea and its Enforcement Decree), for a period of one year from the date of issuance of the Units, except (i) where relevant requirements are satisfied, the Units may be offered, sold or delivered to or for the account or benefit of a Korean resident which falls within certain categories of qualified professional investors as specified in the FSCMA, its Enforcement Decree and the Regulation on Securities Issuance and Disclosure promulgated thereunder, or (ii) as otherwise permitted under applicable Korean laws and regulations.

Furthermore, the Units may not be re-sold to Korea residents unless the purchaser of the Units complies with all applicable regulatory requirements (including, but not limited to, governmental approval requirements under the Foreign Exchange Transaction Law and its subordinate decrees and regulations) in connection with purchase of the Units.

Taiwan

The Units have not and will not be registered with the Financial Supervisory Commission of Taiwan pursuant to relevant securities laws and regulations and may not be sold, issued or offered within Taiwan through a public offering or in circumstances which constitutes an offer within the meaning of the Securities and Exchange Act of Taiwan that requires a registration or approval of the Financial Supervisory Commission of Taiwan. No person or entity in Taiwan has been authorized to offer, sell, give advice regarding or otherwise intermediate the offering and sale of the Units in Taiwan.

United Arab Emirates (excluding the Dubai International Financial Centre)

This document does not constitute or contain an offer of securities to the general public in the United Arab Emirates ("**UAE**"). No offering, marketing, promotion, advertising or distribution (together, "**Promotion**") of this document or the Units may be made to the general public in the UAE unless: (a) such Promotion has been approved by the UAE Securities and Commodities Authority (the "**SCA**") and is made in accordance with the laws and regulations of the UAE, including SCA Board of Directors' Chairman Decision no. (3/R.M.) of 2017 (the "**Promotion and Introduction Regulations**"), and is made by an entity duly licensed to conduct such Promotion activities in the UAE; or (b) such Promotion is conducted by way of private placement made: (i) only to non-natural persons "Qualified Investors" (as such term is defined in the Promotion and Introduction Regulations); or (ii) otherwise in accordance with the laws and regulations of the UAE; or (c) such Promotion is carried out by way of reverse solicitation only upon an initiative made in writing by an investor in the UAE. None of the SCA, the UAE Central Bank, the UAE Ministry of Economy or any other regulatory authority in the UAE has reviewed or approved the contents of this document nor does any such entity accept any liability for the contents of this document.

Other Jurisdictions

The distribution of Offer Document and the offer and sale of the Units may be restricted by law in certain jurisdictions. Persons into whose possession this Offer Document comes are required to inform themselves about, and to observe, any such restrictions to the extent applicable.

RIGHTS OF UNITHOLDERS

The rights and interests of Unitholders are included in this Offer Document and the InvIT Regulations. Under the Trust Deed and the Investment Management Agreement, these rights and interests are safeguarded by the Trustee and the Investment Manager, respectively. Any rights and interests of Unitholders as specified in this Offer Document would stand qualified by and deemed to be amended to the extent of any amendment to the InvIT Regulations.

Beneficial Interest

Each Unit represents an undivided beneficial interest in the Trust. The beneficial interest of each Unitholder shall be equal and limited to the proportion of the number of Units held by the Unitholder to the total number of Units. A Unitholder has no equitable or proprietary interest in the InvIT Assets and is not entitled to transfer of the InvIT Assets (or any part thereof) or any interest in the InvIT Assets (or any part thereof) of the Trust. A Unitholder's right is limited to the right to require due administration of the Trust in accordance with the provisions of the Trust Deed and the Investment Management Agreement.

Ranking

No Unitholder of the Trust shall enjoy superior voting or any other rights over another Unitholder. Further, the Units shall not have multiple classes. However, subordinate Units may be issued only to the Sponsor, its Associates and the Sponsor Group entities, where such subordinate units carry only such rights as mentioned under Regulation 4(2)(h) and Chapter IVA of the InvIT Regulations.

Redressal of grievances

The Investment Manager shall ensure adequate and timely redressal of all Unitholders' grievances pertaining to the activities of the Trust and the Trustee shall periodically review the status of Unitholders' complaints and their redressal undertaken by the Investment Manager. The Investment Manager shall maintain records of the Unitholders' grievances and the actions taken thereon, including copies of correspondences made with the Unitholders and SEBI. The Trust has obtained authentication on the SCORES and shall comply with the SEBI circular (CIR/OIAE/1/2014) dated December 18, 2014, (SEBI/HO/OIAE/IGRD/P/CIR/202) dated November 7, 2022, (SEBI/HO/OIAE/IGRD/CIR/P/2023/156) dated September 20, 2023 and (SEBI/HO/OIAE/IGRD/CIR/P/2023/183) dated December 1, 2023 in relation to redressal of investor grievances through SCORES. For details, please see "*Corporate Governance*" on page 161.

Distribution

The Unitholders shall have the right to receive distributions in accordance with the InvIT Regulations and in the manner provided in this Offer Document. For details, please see "*Distribution*" on page 372.

Meeting of Unitholders

Meetings of Unitholders will be conducted in accordance with the InvIT Regulations.

Passing of resolutions

1. With respect to any matter requiring approval of the Unitholders:

   (i) a resolution shall be considered as passed when the votes cast by Unitholders, so entitled and voting, in favour of the resolution exceed a certain percentage as specified in the InvIT Regulations, of total votes cast;

   (ii) the voting threshold specified under the InvIT Regulations shall be calculated on the basis of Unitholders present and voting. Further, The Unitholders voting through the electronic voting facility and postal ballot shall be counted for the determination of Unitholders present and voting;

   (iii) the voting may be done by postal ballot or electronic mode;

   (iv) a notice of not less than 21 days shall be provided to the Unitholders. However, a meeting of Unitholders may be called after giving shorter notice than 21 days, if consent, in writing or

by electronic mode, is accorded thereto, (a) in case of an annual meeting, by not less than 95% of the Unitholders entitled to vote thereat, and (b) in case of any other meeting, by majority of the Unitholders in number entitled to vote thereat and who represent not less than 95% of such part of the units by value as gives a right to vote at the meeting;

(v) voting by any Unitholder (including, the Sponsor in its capacity as a Unitholder), who is a related party in such transaction, as well as associates of such Unitholder(s) shall not be considered on the specific issue;

(vi) the Investment Manager shall be responsible for all the activities pertaining to conducting of meeting of the Unitholder, subject to oversight by the Trustee. However, for issues pertaining to the Investment Manager, including a change in the Investment Manager, removal of Investment Manager or change in control of Investment Manager; the Trustee shall convene and handle all activities pertaining to conduct of the meetings. Additionally, for issues pertaining to the Trustee, including change in Trustee, the Trustee shall not be involved in any manner in the conduct of the meeting; and

(vii) for all Unitholder meetings, the investment manager shall provide an option to the Unitholders to attend the meeting through video conferencing or other audio visual means and the option of remote electronic voting in the manner as may be specified by SEBI.

2. For the Trust:

(i) an annual meeting of all Unitholders shall be held not less than once a year within 120 days from the end of each financial year and the time between two meetings shall not exceed 15 months;

(ii) with respect to the annual meeting of Unitholders,

- any information that is required to be disclosed to the Unitholders and any issue that, in the ordinary course of business, may require approval of the Unitholders may be taken up in the meeting including:
- latest annual accounts and performance of the Trust;
- approval of auditors and fee of such auditors, as may be required;
- latest valuation reports;
- appointment of valuer, as may be required; and
- any other issue;

(iii) for any issue taken up in such meetings which require approval from the Unitholders, votes cast in favour of the resolution shall be more than 50% of the total votes cast for the resolution unless otherwise specified under the InvIT Regulations.

3. Notwithstanding generally of the foregoing, in case of the following, approval from the Unitholders shall be required for the following matters where the votes cast in favour of the resolution shall be more than 50% of the total votes cast for the resolution:

(i) any approval from the Unitholders required in terms of Regulation 18 (*Investment conditions and dividend policy)*, Regulation 19 (*Related Party Transactions*) and Regulation 21 *(Valuation of assets*) of the InvIT Regulations to the extent applicable;

(ii) any borrowings, in excess of the limits specified under clause (a) of Regulation 20(3) of the InvIT Regulations;

(iii) any transaction, other than any borrowing, the value of which is equal to or greater than 25% of the InvIT assets;

(iv) any issue of units after initial public offer by the Trust, in whatever form, other than any issue

of units which may be considered by SEBI under Regulation 22(5).

(v) increasing period for compliance with investment conditions to one year in accordance with Regulation 18(5)(c) of the InvIT Regulations;

(vi) any issue, in the ordinary course of business, which in the opinion of the Sponsor or the Trust or the Investment Manager, is material and requires approval of the Unitholders, if any; and

(vii) any issue for which SEBI or the designated stock exchange requires approval.

4. In case of the following, approval from the Unitholders shall be required where the votes cast in favour of the resolution shall be at least 60% of total votes cast for the resolution:

(i) any change in the Investment Manager including removal of the investment manager or change in control of the Investment Manager;

(ii) any material change in investment strategy or any change in the management fees of the Trust;

(iii) the Trustee and Investment Manager proposing to seek delisting of units of the Trust as per the InvIT Regulations;

(iv) any issue, not in the ordinary course of business, which in the opinion of the Sponsor(s) or the Investment Manager or the Trustee of the Trust requires approval of the Unitholders;

(v) any issue for which SEBI or the designated stock exchange requires approval;

(vi) any issue taken up on request of the Unitholders including:

a) removal of the Investment Manager and appointment of another Investment Manager to the Trust;

b) removal of the Auditors and appointment of another Auditor to the Trust;

c) removal of the Valuer and appointment of another Valuer to the Trust;

d) delisting of the Trust, if the Unitholders have sufficient reason to believe that such delisting would act in the interest of the Unitholders;

e) any issue which the Unitholders have sufficient reason to believe that is detrimental to the interest of the Unitholders; and

f) change in the Trustee, if Unitholders have sufficient reason to believe that acts of the Trustee are detrimental to the interest of Unitholders.

(vii) introduction of unit based employee benefit scheme after an initial offer in the manner and form set out under the InvIT Regulations.

5. With respect to the rights of the Unitholders under clause 4(vi) above:

(i) save as set out in (iii) below, not less than 25% of the Unitholders by value, other than any party related to the transactions and its associates, shall apply, in writing, to the Trust for the purpose;

(ii) on receipt of such application, the Trustee shall require, the issue with the Investment Manager to place the issue for voting in the manner as specified in the InvIT Regulations; and

(iii) with respect to clause 4(vi)(f) above, not less than 60% of the Unitholders by value shall apply, in writing, to the Trustee for the purpose.

6. In case of any borrowing by an InvIT in terms of the limit specified Regulation 20(3)(b), the approval from 75% of the unit holders by value shall be obtained.

7. No person, other than sponsor(s), its related parties and its associates, shall acquire units of an InvIT

which are taken together with units held by such person and by persons acting in concert with such person in such InvIT, exceeds 25% of the value of outstanding InvIT units unless approval from 75%. of the unit holders by value excluding the value of units held by parties related to the transaction, is obtained. If the required approval is not received, the person acquiring the units shall provide an exit option to the dissenting unit holders to the extent and in the manner as may be specified by SEBI.

8. In case of any change in sponsor or inducted sponsor or change in control of sponsor or inducted sponsor or conversion to Self-Sponsored Investment Manager –

(i) prior to such change, approval from 75% per cent. of the unit holders by value excluding the value of units held by parties related to the transaction shall be obtained.

(ii) if the required approval is not received-

a) in case of change of sponsor or inducted sponsor, the proposed inducted sponsor shall provide the dissenting unit holders an option to exit by buying their units in the manner specified by SEBI;

b) in case of change in control of the sponsor or inducted sponsor, the said sponsor or inducted sponsor shall provide the dissenting unitholders an option to exit by buying their units in the manner specified by SEBI;

c) in case of conversion to Self-Sponsored Investment Manager, the Investment Manager shall provide the dissenting unit holders an option to exit by buying their units in the manner specified by the Board. It is to be noted change in sponsor or inducted sponsor shall mean any change due to entry of a new sponsor or exit of an existing sponsor.

Information rights

The Investment Manager, on behalf of the Trust, shall also submit such information to Stock Exchange and the Unitholders, on a periodical basis as may be required under the InvIT Regulations and the Listing Agreement to be entered into with Stock Exchange. The Investment Manager (on behalf of the Trust) shall disclose to Stock Exchange, the Unitholders and SEBI, all such information and in such manner as specified under the InvIT Regulations and such other requirements as may be specified by SEBI. The Investment Manager, on behalf of the Trust, shall also provide disclosures or reports specific to the sector or sub-sector in which the Trust has invested or proposes to invest, in the manner as may be specified by SEBI.

Nomination Rights

Unitholder(s), holding not less than 10% of the total outstanding Units, either individually or collectively, shall be entitled to nominate one director on the board of directors of the Investment Manager in accordance with the InvIT Regulations and Trust Deed, and in the manner specified by SEBI.

Buyback of Units

Any buyback of Units shall be in accordance with the Trust Deed and the InvIT Regulations.

De-listing of Units

Any delisting of Units shall be in accordance with the Trust Deed and the InvIT Regulations.

DILUTION

Dilution is the amount by which the Issue Price exceeds the net asset value ("**NAV**") per Unit, immediately after the completion of this Issue. NAV per Unit is determined by subtracting the total liabilities of the Trust from the total assets of the Trust and dividing by the number of Units issued and outstanding immediately before this Issue. There was no *pro forma* NAV before this Issue for the Units.

The Trust will issue [●] Units at an Issue Price of ₹ [●] for each Unit, resulting in a combined NAV of the Trust of approximately ₹ [●] million or ₹ [●] per Unit based on the total number of Units outstanding after the completion of this Issue. This represents an immediate dilution in combined NAV of approximately ₹ [●] per Unit to the Unitholders, subscribing in this Issue.

The following provides the per Unit dilution as on [●]:

Combined NAV per Unit before this Issue	[●]
Combined NAV per Unit after this Issue	₹ [●]
Dilution in NAV per Unit to Unitholders	₹ [●]
Dilution to Unitholders as a percentage of the Issue Price	[●]%

ISSUE STRUCTURE

Initial public offer of up to [●] Units by the Trust for cash at price of ₹ [●] per Unit aggregating up to ₹ 11,050 million.

This Issue is being made through the Book Building Process. This Issue shall constitute at least [●]% of the total outstanding Units on a post-Issue basis.

Particulars	Institutional Investors[(1)]	Non-Institutional Investors
Number of Units available for Allotment/Allocation[(2)]	Not more than [●] Units	Not less than [●] Units
Percentage of Issue Size available for Allotment/Allocation	Not more than 75% of the Issue Size [(1)]	Not less than 25% of the Issue Size
Basis of Allotment/ Allocation if respective category is oversubscribed	Proportionate	Proportionate
Minimum Bid	Such number of Units that the Bid Amount exceeds ₹ [●] and in multiples of [●] Units thereafter	Such number of Units that the Bid Amount exceeds ₹ [●] and in multiples of [●] Units thereafter
Maximum Bid	Such number of Units (in multiples of [●] Units) not exceeding the size of the Issue, subject to applicable limits	Such number of Units (in multiples of [●] Units) not exceeding the size of the Issue, subject to applicable limits
Mode of Allotment	Compulsorily in dematerialised form	Compulsorily in dematerialised form
Bid Lot	[●] Units and in multiples of [●] Units thereafter	[●] Units and in multiples of [●] Units thereafter
Allotment Lot	[●] Units and in multiples of [●] Units thereafter	[●] Units and in multiples of [●] Units thereafter
Trading Lot	One Unit	One Unit
Who can apply[(3)]	(i) QIBs; or (ii) family trusts or intermediaries registered with SEBI, with net-worth of more than ₹ 5,000 million, as per their last audited financial statements	Bidders other than Institutional Investors, eligible to apply in this Issue
Terms of Payment	Full Bid Amount shall be blocked by the SCSBs in the bank account of the ASBA Bidder that is specified in the Bid cum Application Form (including for Anchor Investors)[(4)(5)]	For individual Non-Institutional Investors Bidding with a Bid Amount of up to ₹ 0.50 million or less and Bidding through the UPI Mechanism: Full Bid Amount shall be blocked by the Sponsor Bank in the bank account of the Non-Institutional Investor that is specified in the Bid cum Application Form; Full Bid Amount shall be blocked by the SCSBs in the bank account of the ASBA Bidder that is specified in the Bid cum Application Form

[(1)] *The Investment Manager in consultation with the Lead Managers may allocate up to 60% of the Institutional Investor Portion to Anchor Investors on a discretionary basis.*

[(2)] *Subject to valid Bids being received at or above the Issue Price. This Issue will be made through the Book Building Process wherein not more than 75% of the Issue Size will be available for allocation on a proportionate basis to Institutional Investors, provided that the Investment Manager, in consultation with the Lead Managers may allocate up to 60% of the Institutional Investor Portion to*

Anchor Investors on a discretionary basis.

(3) In case of joint Bids, the Bid cum Application Form should contain only the name of the First Bidder whose name should also appear as the first holder of the beneficiary account held in joint names. The signature of only the First Bidder would be required in the Bid cum Application Form and such First Bidder would be deemed to have signed on behalf of the joint holders. Bidders are advised to consult their own advisors with respect to any restrictions or limitations that may be applicable to them, including any restrictions or limitations in relation to their ability to invest in the Units. By making a Bid (including any revision thereof), the Bidder will be deemed to have represented to the Investment Manager, the Trustee, the Lead Managers and the Syndicate Members that it is eligible to participate in the Issue and be Allotted Units under applicable law.

(4) Bid Amount shall be payable by the Anchor Investors at the time of submission of the Bid cum Application Forms. The balance, if any, shall be paid within the pay-in date specified in the CAN.

(5) In case of ASBA Investors, the SCSBs shall be authorized to block such funds in the bank account of the Investor that are specified in the Bid cum Application Form

In case of under-subscription in any investor category, the unsubscribed portion in either the Institutional Investor Portion or the Non-Institutional Investor Portion may be Allotted to Applicants in the other category at the discretion of the Investment Manager, in consultation with the Lead Managers and the Designated Stock Exchange.

Indicative Issue Timeline

Event	Indicative Date
Bid/ Issue Opening Date	Friday, April 17, 2026 (1)
Bid/ Issue Closing Date	Tuesday, April 21, 2026 (2)
Finalisation of the Basis of Allotment	On or about Friday, April 24, 2026
Closing Date	On or about Friday, April 24, 2026
Designated Date	On or about Monday, April 27, 2026
Initiation of refunds	On or about Monday, April 27, 2026
Listing Date	On or about Wednesday, April 29, 2026

(1) The Investment Manager may, in consultation with the Lead Managers, consider participation by Anchor Investors in accordance with the InvIT Regulations. The Anchor Investor Bidding Date shall be one Working Day prior to the Bid/ Issue Opening Date.

(2) The Investment Manager may in consultation with the Lead Managers, consider closing the Bid/ Issue Period for QIBs one Working Day prior to the Bid/ Issue Closing Date in accordance with the InvIT Regulations.

The above timetable is indicative and does not constitute any obligation or liability on the Trust, the Investment Manager, the Sponsor, the Trustee or the Lead Managers.

While the Investment Manager shall ensure that all steps for the completion of the necessary formalities for the listing and the commencement of trading of the Units on the Stock Exchanges are taken within six Working Days of the Bid/ Issue Closing Date, the timetable may change due to various factors, including any extension of the Bid/ Issue Period by the Investment Manager due to any revision(s) of the Price Band or any delay in receiving the final listing and trading approval from the Stock Exchanges. The commencement of trading of the Units will be entirely at the discretion of the Stock Exchanges and in accordance with the applicable laws.

Except in relation to the Bids received from the Anchor Investors, Bids and any revision in Bids shall be accepted only between 10.00 a.m. and 5.00 p.m. (Indian Standard Time) during the Bid/ Issue Period (except the Bid/ Issue Closing Date) at the Bidding Centres and the Designated Branches mentioned on the Bid cum Application Form. Investors are not allowed to withdraw or lower their Bid (in terms of number of Units or the Bid Amount) at any stage. Bidders can make upward revisions in their Bids, subject to applicable law. It is clarified that Bids not uploaded on the electronic bidding system would be rejected. Due to limitation of the time available for uploading the Bids on the Bid/ Issue Closing Date, Bidders are advised to submit their Bids one day prior to the Bid/ Issue Closing Date and, in any case, no later than 1.00 p.m. IST on the Bid/ Issue Closing Date. Any time mentioned in this Offer Document is IST. Investors are cautioned that, in the event a large number of Bids are received on the Bid/ Issue Closing Date, some Bids may not get uploaded due to lack of sufficient time. Such Bids that cannot be uploaded will not be considered for allocation under the Issue. Bids will be accepted only on Business Days *i.e.*, Monday to Friday (excluding any public holiday). None among the Trust, the Investment Manager, the Trustee or any member of the Syndicate is liable for any failure in uploading the Bids due to faults in any software/hardware system or otherwise.

In case of any discrepancy in the data entered in the electronic book *vis-à-vis* the data contained in the physical Bid cum Application Form, for a particular Investor, the details as per the Bid file received from the Stock Exchanges may be taken as the final data for the purpose of Allotment.

The Investment Manager, in consultation with the Lead Managers, reserves the right to revise the Price Band during the Bid/ Issue Period. In case the Price Band is revised, the Issue Period shall be extended for a minimum period of one Working Day, subject to the total Bid/ Issue Period not exceeding 30 days. The revised Price

Band and Issue Period will be widely disseminated by notification to the SCSBs and Stock Exchanges, and also by indicating the change on the websites of the Trust, the Lead Managers, the Sponsor, the Investment Manager and the Stock Exchanges, as may be applicable, and at the terminals of the members of the Syndicate. In accordance with the InvIT Regulations, the Price Band cannot be revised more than two times during the Bid/ Issue Period.

ISSUE INFORMATION

Below is a summary, intended to provide a general outline of the procedures for bidding, application, payment, Allocation and Allotment of the Units to be issued pursuant to the Issue. The procedure followed in this Issue may differ from the process provided below, and investors are presumed to have apprised themselves of the same from the Investment Manager and/or the Lead Managers.

Bidders are advised to inform themselves of any restrictions or limitations that may be applicable to them and are required to consult their respective advisers in this regard. Bidders that apply in the Issue will be required to confirm and will be deemed to have represented to the Trustee, the Investment Manager, the Lead Managers and their respective directors, officers, agents, affiliates and representatives that they are eligible under all applicable laws, rules, regulations, guidelines and approvals to acquire the Units. Bidders are also advised to make their independent investigations submitted in accordance with applicable laws and do not exceed the investment limits or maximum number of Units that can be held by them under applicable law or as specified herein. The Investment Manager, the Trustee, the Lead Managers, the Syndicate Members and their respective directors, officers, agents, affiliates and representatives accept no responsibility or liability for advising any Bidder on whether such Bidder is eligible to acquire the Units. The Investment Manager, the Trustee, the Lead Managers and Syndicate Members do not accept any responsibility for the completeness and accuracy of the information stated in this chapter and are not liable for any amendment, modification or change in the applicable law which may occur after the date hereof.

Authority for the Issue

The Trust is eligible for the Issue in accordance with Regulation 14(4) of the InvIT Regulations. The Issue was authorised and approved by the IM Board on November 28, 2025.

The Investment Manager has received the in-principle approvals each dated February 3, 2026 of BSE and NSE for the listing of the Units. The Investment Manager has filed a copy of the Draft Offer Document and this Offer Document and will file a copy of the Final Offer Document with SEBI and the Stock Exchanges.

The Units have not been and will not be registered, listed or otherwise qualified in any other jurisdiction outside India and may not be offered or sold, and Bids may not be made by persons in any such jurisdiction, except in compliance with the applicable laws of such jurisdiction. The Units shall not be offered or sold where such offer or sale would require registration, qualification or listing.

Bidders should note that Allotment to successful Bidders will only be in the dematerialized form. Application Forms which do not have the details of the Bidders' demat accounts including DP ID, PAN and Client ID will be treated as incomplete and rejected. Bidders will not have the option of receiving Units in physical form. On Allotment, the Units will be traded only on the dematerialized segment of BSE and NSE.

Issue Procedure

This section applies to all Bidders. All Bidders other than Anchor Investors shall mandatorily participate in the Issue through the ASBA process. Individual Investors with a Bid Amount of₹0.50 million or less may Bid using the UPI Mechanism Bidders applying in this Issue should carefully read the provisions applicable to them before submitting a Bid through the ASBA process. All Bidders are required to pay the full Bid Amount at the time of Bidding, by way of instructing the relevant SCSB or Sponsor Bank (in case of Bids through the UPI Mechanism) to block the full Bid Amount at the time of Bidding, or in the case of Anchor Investors, by making payment by electronic methods.

By making a Bid (including any revision thereof), the Bidder will be deemed to have represented to the Investment Manager, the Trustee, the Lead Managers and the Syndicate Members that it is eligible to participate in the Issue and be Allotted Units under applicable law. Bidders are also advised to make their independent investigations and ensure that their Bids are submitted in accordance with applicable laws and do not exceed the investment limits or maximum number of Units that can be held by them under applicable law or as specified herein.

Book Building Procedure

This Issue is being made through the Book Building Process, wherein not more than 75% of the Issue Size shall be available for allocation to Institutional Investors on a proportionate basis, provided that the Investment

Manager may, in consultation with the Lead Managers, allocate up to 60% of the Institutional Investor Portion to Anchor Investors on a discretionary basis, in accordance with the InvIT Regulations. Further, not less than 25% of the Issue Size shall be available for allocation on a proportionate basis to Non-Institutional Investors, subject to valid Bids being received at or above the Issue Price. In case of under-subscription in any category, the unsubscribed portion in any category may be Allotted to Bidders in the other category at the discretion of the Investment Manager in consultation with the Lead Managers and the Designated Stock Exchange.

Bidders do not have the right to withdraw or lower their Bid (in terms of number of Units or the Bid Amount) at any stage. Bidders can only make upward revisions in their Bids, subject to applicable law.

Bidders should note that Allotment to successful Bidders will be only in the dematerialized form. Bid cum Application Forms which do not have the details of the Bidders' depository accounts including DP ID, PAN ID, UPI ID (for individual Non-Institutional Investors Bidding for a Bid Amount of ₹0.50 million or less using the UPI Mechanism) and Client ID will be treated as incomplete and rejected. Bidders will not have the option of receiving Allotment in physical form. On Allotment, the Units will be traded only on the dematerialized segment of the Stock Exchanges only.

Bid cum Application Form

Copies of the Bid cum Application Form and the abridged offer document will be available at the offices of the Lead Managers, the Syndicate Members, if any, the principal place of business of the Trust and the Designated Intermediaries at the Bidding Centres. An electronic copy of the Bid cum Application Form will also be available on the websites of the SCSBs, NSE (www.nseindia.com) and BSE (www.bseindia.com). The Anchor Investor Application Forms will be made available at the principal place of business of the Trust and the registered office of the Investment Manager and each of the Lead Managers.

Bidders should use only the specified Bid cum Application Form bearing the stamp of a Designated Intermediary submitted at Bidding Centres (except in case of electronic Bid cum Application Forms), for the purpose of making a Bid in terms of this Offer Document. Bid cum Application Forms not bearing such specified stamp are liable to be rejected. Before being issued to Bidders, the Bid cum Application Form will be serially numbered.

All Bidders other than Anchor Investors shall mandatorily participate in the Issue only through the ASBA process. Anchor Investors are not permitted to participate in the Issue through the ASBA process. All Bidders (other than Anchor Investors) must provide bank account details and authorization to block funds in the relevant space provided in the Bid cum Application Form and Bid cum Application Forms that do not contain such details will be rejected. ASBA Bidders, are required to submit their Bids through the Designated Intermediaries including the SCSBs with whom the ASBA Account is maintained.

UPI Bidders using the UPI Mechanism must provide the UPI ID in the relevant space provided in the ASBA Form. ASBA Forms for such UPI Bidders, that do not contain the UPI ID are liable to be rejected. UPI Bidders using the UPI Mechanism may also apply through the SCSBs and mobile applications using the UPI handles as provided on the website of SEBI. UPI Bidders using the UPI Mechanism may submit the Bid cum Application with SCSBs, Syndicate Members, Registered Stock Brokers, RTAs and Depository Participants along with details of their bank account for blocking of funds. The relevant intermediary is required to the upload the Bid on the Stock Exchange bidding platform and forward the Bid cum application Form to an SCSB for blocking of funds.

An ASBA Bidder shall use the ASBA Form obtained from the Designated Intermediaries for the purpose of making a Bid. In case an ASBA Bidder makes an application in physical form, the ASBA Bidder shall submit the ASBA Form with the relevant Designated Intermediary. In case an ASBA Bidder makes an application in electronic form, the ASBA Bidder shall submit the ASBA Form either through the internet banking facility available with the SCSB, or such other electronically enabled mechanism for bidding and blocking funds in the ASBA Account held with SCSB, and accordingly registering such Bids. The SCSB shall block an amount in the ASBA Account equal to the Bid Amount specified in the ASBA Form.

For individual Non-Institutional Investors using UPI Mechanism, the Stock Exchanges shall share the bid details (including UPI ID) with Sponsor Bank(s) on a continuous basis to enable the Sponsor Bank(s) to initiate UPI Mandate Request to individual Non-Institutional Investors for blocking of funds. The Sponsor Bank(s) shall initiate request for blocking of funds through NPCI to individual Non-Institutional Investors, who shall accept the UPI Mandate Request for blocking of funds on their respective mobile applications associated with

UPI ID linked bank account. The NPCI shall maintain an audit trail for every Bid entered in the Stock Exchanges bidding platform, and the liability to compensate the individual Non-Institutional Investors (Bidding through UPI Mechanism) in case of failed transactions shall be with the concerned entity (i.e., the Sponsor Bank, NPCI or the issuer bank) at whose end the lifecycle of the transaction has come to a halt. The NPCI shall share the audit trail of all disputed transactions/investor complaints to the Sponsor Bank(s) and the issuer bank. The Sponsor Bank(s) shall provide the audit trail to the Lead Managers to analyze the same and fix liability. To ensure that timely information is disseminated to investors, SCSBs shall send SMS alerts for mandate block and unblock.

The Sponsor Bank(s) will undertake a reconciliation of Bid responses received from Stock Exchanges and sent to NPCI and will also ensure that all the responses received from NPCI are sent to the Stock Exchanges platform with detailed error code and description, if any. Further, the Sponsor Bank(s) will undertake reconciliation of all Bid requests and responses throughout their lifecycle on daily basis and share reports with the Lead Managers. Sponsor Bank(s) and issuer banks shall download UPI settlement files and raw data files from the NPCI portal after every settlement cycle and do a three-way reconciliation with UPI switch data and UPI raw data. NPCI shall coordinate with issuer banks and Sponsor Bank(s) on a continuous basis.

The Bid cum Application form will contain information about the Bidder and the price and number of Units that the Bidder wishes to Bid for. Bidders will have the option to make a maximum of three Bids in the Bid cum Application Form and such options will not be considered multiple Bids.

On filing of the Final Offer Document with SEBI and the Stock Exchanges, the Bid cum Application Form will be treated as a valid application form for Allotment of the Units. On submission of the completed Bid cum Application Form to a Designated Intermediary or the Lead Managers (in case of Anchor Investors), the Bidder is deemed to have authorized the Investment Manager to make the necessary changes in this Offer Document as may be required under the InvIT Regulations, and other applicable laws, for filing the Final Offer Document with SEBI and the Stock Exchanges without prior or subsequent notice of such changes to the Bidder.

The prescribed colour of the Bid cum Application Forms for various categories is as follows:

Category	Colour of Bid cum Application Form, including Bid cum Application Form*
Resident Indians	White
Non-Residents including Eligible NRIs and FPIs and multilateral and bilateral development financial institutions, excluding Anchor Investors	Blue
Anchor Investors *	White

* *Bid cum Application Forms for Anchor Investors will be made available at the principal place of business of the Trust and the registered office of the Investment Manager and each of the Lead Managers.*

Designated Intermediaries shall submit/deliver the Bid cum Application Forms of Bidders (other than Anchor Investors) to the respective SCSBs where the Bidder has a bank account and shall not submit it to any non-SCSB Bank or Escrow Collection Bank (unless such Escrow Collection Bank is also an SCSB). For UPI Bidders using the UPI Mechanism, the Stock Exchanges shall share the Bid details (including UPI ID) with the Sponsor Bank(s) on a continuous basis to enable the Sponsor Bank(s) to initiate a UPI Mandate Request to such UPI Bidders for blocking of funds. Designated Intermediaries (other than SCSBs) shall not accept any ASBA Form from a UPI Bidder who is not Bidding using the UPI Mechanism.

Who can Bid?

Each Bidder should check if it is eligible to Bid under applicable law. Furthermore, certain categories of Bidders may not be permitted to Bid in the Issue or hold Units in excess of the limits specified under applicable law. Each Bidder (other than Anchor Investor) is required to Bid for a Minimum Bid Size in the range of ₹ 10,000 and ₹ 15,000.

The maximum subscription in the Issue from any investor other than the Sponsor, its related parties and its associates shall not exceed 25% of the total post-Issue outstanding Units.

The Parties to the Trust, and the Lead Managers are not liable for any amendment or modification or change to applicable laws, which may occur after the date of this Offer Document. Bidders are advised to make their independent investigations and satisfy themselves that they are eligible to apply. Bidders are advised to ensure that any single application from them does not exceed the investment limits or

maximum number of Units that can be held by them under applicable law.

The Trustee, the Valuer and the employees of the Valuer who were involved in the valuation of the InvIT Assets are not permitted to Bid in this Issue.

The Units have not been and will not be registered under the Securities Act or any state securities laws in the United States and may not be offered or sold within the United States, except pursuant to an exemption from, or in a transaction not subject to, the registration requirements of the Securities Act and applicable state securities laws. The Units are only being offered and sold outside the United States in "offshore transactions" as defined in and in reliance on Regulation S under the Securities Act ("Regulation S") and the applicable law of the jurisdictions where such offers and sales are made.

Units Issued and Sold in this Issue

Each purchaser that acquires the Units offered pursuant to this Issue, by its acceptance of this Offer Document and of the Units offered pursuant to this Issue, will be deemed to have acknowledged, represented to and agreed with the Trust, Sponsor and the Lead Managers that it has received a copy of this Offer Document and such other information as it deems necessary to make an informed investment decision and that:

1. the purchaser is authorized to consummate the purchase of the Units offered pursuant to this Issue in compliance with all applicable laws and regulations;

2. the purchaser acknowledges that the Units offered pursuant to this Issue have not been and will not be registered under the Securities Act or with any securities regulatory authority of any state of or other jurisdiction of the United States and accordingly, may not be offered, resold, pledged or transferred within the United States, except pursuant to an exemption from, or in a transaction not subject to, the registration requirements of the Securities Act;

3. the purchaser is purchasing the Units offered pursuant to this Issue in an offshore transaction meeting the requirements of Rule 903 of Regulation S under the Securities Act;

4. the purchaser and the person, if any, for whose account or benefit the purchaser is acquiring the Units offered pursuant to this Issue and was located outside the United States at each time (i) the offer for such Units was made to it and (ii) when the buy order for such Units was originated and continues to be located outside the United States and has not purchased such Units for the account or benefit of any any person in the United States or entered into any arrangement for the transfer of such Units or any economic interest therein to any person in the United States;

5. the purchaser is not an affiliate of the Trust or a person acting on behalf of an affiliate;

6. The Trust will not recognize any offer, sale, pledge or other transfer of such Units made other than in compliance with the above-stated restriction and in accordance with the restrictions described under the section "*Selling and Transfer Restrictions*" on page 459 of this Offer Document;

7. neither the purchaser, nor any of its affiliates (as defined in Rule 405 of the Securities Act), nor any person acting on behalf of the purchaser or any of its affiliates (as defined in Rule 405 of the Securities Act), is acquiring the Units as a result of any "directed selling efforts" as defined in Regulation S under the Securities Act in the United States with respect to the Units; and

8. the purchaser acknowledges that the Trust, Sponsor, the Lead Managers, their respective affiliates and others will rely upon the truth and accuracy of the foregoing acknowledgements, representations and agreements and agrees that, if any of such acknowledgements, representations and agreements deemed to have been made by virtue of its purchase of such Units are no longer accurate, it will promptly notify the Trust, and if it is acquiring any of such Units as a fiduciary or agent for one or more accounts, it represents that it has sole investment discretion with respect to each such account and that it has full power to make the foregoing acknowledgements, representations and agreements on behalf of such account.

Participation by Associates and affiliates of the Lead Managers and Syndicate Members

The Lead Managers and the Syndicate Members are not entitled to Bid for Units in this Issue in any manner except towards fulfilling their underwriting obligations. However, associates and affiliates of the Lead

Managers and Syndicate Members may Bid for Units in the Issue, either in the Institutional Investor Portion (excluding the Anchor Investor Portion) or in the Non- Institutional Investor Portion, where allocation will be on a proportionate basis, either on their own account or on behalf of their clients. All categories of investors, including associates or affiliates of the Lead Managers shall be treated equally for the purpose of allocation to be made on a proportionate basis. Neither the Lead Managers nor any associate of the Lead Managers and Syndicate Members, other than mutual funds sponsored by entities which are associate of the Lead Managers or insurance companies promoted by entities which are associate of the Lead Managers or pension funds of entities which are associate of the Lead Managers or Alternate Investment Funds (AIFs) sponsored by the entities which are associate of the Lead Managers or FPIs other than Category III FPIs sponsored by the entities which are associate of the Lead Managers can apply in the Issue under the Anchor Investor Portion.

Bids by Anchor Investors

The Investment Manager, in consultation with the Lead Managers may allocate up to 60% of the Institutional Investor Portion on a discretionary basis to the Anchor Investors, in accordance with the InvIT Regulations. The Institutional Investor Portion will be reduced in proportion to the allocation under the Anchor Investor Portion. Only Institutional Investors are eligible to invest in the Anchor Investor Portion. Only Institutional Investors are eligible to invest in the Anchor Investor Portion. In the event of under-subscription in the Anchor Investor Portion, the balance Units will be added to the Institutional Investor Portion. In accordance with the InvIT Regulations, the key terms for participation in the Anchor Investor Portion are provided below.

(i) Anchor Investors are not permitted to participate in the Issue through the ASBA process. Anchor Investor Application Forms will be made available for the Anchor Investor Portion at the principal place of business of the Trust, and the registered offices of the Investment Manager and the Lead Managers.

(ii) A Bid by an Anchor Investor must be for a minimum of such number of Units so that the Bid Amount is at least ₹100 million. A Bid cannot be submitted for more than 60% of the Institutional Investor Portion.

(iii) The Bidding for Anchor Investors will open one Working Day before the Bid/ Issue Opening Date and Allocation to Anchor Investors will be completed on the same day.

(iv) The Investment Manager, in consultation with the Lead Managers, will finalize allocation to the Anchor Investors on a discretionary basis, provided that the minimum number of Allottees in the Anchor Investor Portion will not be less than:

- two, where the allocation under Anchor Investor Portion is up to ₹ 2,500 million; and
- five, where the allocation under Anchor Investor Portion is over ₹ 2,500 million.

(v) Allocation to Anchor Investors will be completed on the same day as the Anchor Investor Bidding Date. The number of Units allocated to Anchor Investors and the Anchor Investor Allocation Price, will be made available on the websites of the Stock Exchanges, the Sponsor, the Investment Manager and the Lead Managers, as may be applicable, prior to the Bid/ Issue Opening Date.

(vi) If the Issue Price is higher than the Anchor Investor Allocation Price, the additional amount being the difference between the Issue Price and the Anchor Investor Allocation Price will be payable by the Anchor Investors within two Working Days of the Bid/ Issue Closing Date. If the Issue Price is lower than the Anchor Investor Allocation Price, Allotment to successful Anchor Investors will be at the higher price, *i.e.*, the Anchor Investor Allocation Price and the amount in excess of the Issue Price paid by Anchor Investors will not be refunded to them.

(vii) The Units Allotted in the Anchor Investor Portion will be locked in for a period of 30 days from the date of Allotment.

(viii) Bids made by Institutional Investors bidding under both the Anchor Investor Portion and the Institutional Investor Portion will not be considered as multiple Bids.

(ix) The Investment Manager, in consultation with the Lead Managers, reserves the right to reject any Bid received from Anchor Investors without assigning any reasons in accordance with the InvIT Regulations.

(x) Neither the Lead Managers nor any their associates, other than mutual funds sponsored by entities which are associates of the Lead Managers, insurance companies promoted by entities which are associates of the Lead Managers or pension funds of entities which are associates of the Lead Managers or AIFs sponsored by the entities which are associates of the Lead Managers or FPIs other than category III sponsored by the entities which are associates of the Lead Managers, shall apply under the Anchor Investors Portion. The parameters for selection of Anchor Investors will be clearly identified by the Lead Managers

All Non-Resident Investors including Eligible NRIs and FPIs should note that refunds, dividends and other distributions, if any, will be payable in Indian Rupees only and net of bank charges and / or commission. **There is no reservation for NRIs, FPIs and FVCIs and all Bidders will be treated on the same basis with other categories for the purpose of allocation.**

Anchor Investors cannot withdraw or lower the size of their Bids (in terms of number of Units or the Bid Amount) at any stage after submission of the Bid.

Bids by SEBI registered VCFs and AIFs

The SEBI VCF Regulations prescribe, amongst others, the investment restrictions on VCFs registered with SEBI under the said regulations. Further, the SEBI AIF Regulations prescribe, amongst others, the investment restrictions on AIFs. Further, VCFs which have not re-registered as an AIF under the SEBI AIF Regulations shall continue to be regulated by the SEBI VCF Regulations until the existing fund or scheme managed by the fund is wound up and such funds shall not launch any new scheme after the notification of the SEBI AIF Regulations. Additionally, VCFs and AIFs are subject to certain investment restrictions, including with respect to the percentage of investible funds held in each investee entity. Under the SEBI AIF Regulations, Category I and II AIFs are permitted to invest not more than 25% of the investable funds in one "investee company" (which includes the Trust) and Category III AIFs are permitted to invest not more than 10% of the investable funds in one "Investee company". Allotments made to VCFs and AIFs in the Issue are subject to the rules and regulations that are applicable to each of them respectively.

Bids by Banking Companies

Bids may be made by banks as permitted by the RBI and are subject to conditions specified in the Prudential Guidelines – Banks' investment in units of REITs and InvITs dated April 18, 2017. In case of Bids made by banking companies registered with the RBI, certified copies of (i) the certificate of registration issued by the RBI, and (ii) the approval of such banking company's investment committee are required to be attached to the Application Form. Banks may participate in public issuances by Trusts within the overall ceiling of 20% of their net worth permitted for direct investments in shares, convertible bonds/ debentures, units of equity-oriented mutual funds and exposures to VCFs, subject to the following conditions: (i) Banks should put in place a board approved policy on exposures to the Trust which lays down an internal limit on such investments within the overall exposure limits in respect of the real estate sector and infrastructure sector; (ii) Banks shall not invest more than 10% of the unit capital of the Trust; (iii) Banks should ensure adherence to the prudential guidelines issued by RBI from time to time on Equity investments by Banks, Classification and Valuation of Investment Portfolio, Basel III Capital requirements for Commercial Real Estate Exposures and Large Exposure Framework, as applicable. Failing this, the Investment Manager, in consultation with the Lead Managers, reserves the right to reject the Bid.

Bids by LLPs

In case of Bids made by limited liability partnerships registered under the Limited Liability Partnership Act, 2008, a certified copy of certificate of registration issued under the Limited Liability Partnership Act, 2008, must be attached to the Bid cum Application Form. Failing this, the Bid(s) may be rejected.

Bids by Provident Funds/Pension Funds

On March 2, 2015, the Ministry of Finance issued a notification allowing investments by non-government provident funds, superannuation funds and gratuity funds up to 5% in infrastructure investment trusts, as specified. On May 29, 2015, the Ministry of Labour and Employment issued a notification allowing investments by provident funds up to 5% in infrastructure investment trusts, as specified. The Pension Fund Regulatory and Development Authority issued circulars dated June 3, 2015 and September 2, 2015, respectively, allowing investments by national pension funds up to 5% in infrastructure investment trusts, as specified. However, such investments by provident funds and pension funds will be subject to, amongst others, the sponsor having a

minimum of AA or equivalent rating from at least two credit rating agencies registered with SEBI. In case of Bids made by provident funds/ pension funds (registered with the Pension Fund Regulatory and Development Authority established under section 3(1) of the Pension Fund Regulatory and Development Authority Act, 2013), subject to applicable laws, with minimum corpus of ₹ 250 million, a certified copy of certificate from a chartered accountant certifying the corpus of the provident fund/pension fund must be attached to the Bid cum Application Form. Failing this, the Bid(s) may be rejected.

Bids by NPS Schemes

The Pension Fund Regulatory and Development Authority issued circulars dated June 3, 2015 and September 2, 2015, respectively, allowing investments by national pension fund schemes ("**NPS Schemes**") up to 5% in infrastructure investment trusts, as specified. However, in accordance with the circular dated May 4, 2017 (effective from May 8, 2017), as amended by the circular dated May 8, 2018, issued by PFRDA, such investments by NPS Schemes will be subject to, amongst others, such securities having a minimum of AA or equivalent rating in the applicable rating scale from at least two credit rating agencies registered with SEBI. In case of Bids made by NPS Schemes, subject to applicable laws, with minimum corpus of ₹250 million, a certified copy of certificate from a chartered accountant certifying the corpus of the provident fund/pension fund must be attached to the Bid cum Application Form. Failing this, the Investment Manager, in consultation with the Lead Managers, reserves the right to reject the Bid.

Bids by Insurance Companies

Bids may be made by insurance companies as permitted by the Insurance Regulatory and Development Authority of India in terms of the Master Circular – Investments, 2016 and the circular issued by the IRDAI titled 'Investment in Units of Real Estate Investment Trusts (REIT) & Infrastructure Investment Trusts (InvIT)' and dated March 14, 2017 and the circular issued by the IRDAI entitled Investments in Debt Securities of InvITs and REITs dated April 22, 2021. In case of Bids made by insurance companies registered with the IRDAI, a certified copy of the certificate of registration issued by IRDAI must be attached to the Bid cum Application Form. Failing this, the Investment Manager, in consultation with the Lead Managers, reserves the right to reject the Bid. An insurer can invest not more than 3% of respective fund size of the insurer or not more than 5% of the units issued by a single InvIT, whichever is lower.

Bids by Mutual Funds

Bids may be made by mutual funds under all its schemes, existing and future, subject to the investment conditions and other restrictions prescribed under the Securities and Exchange Board of India (Mutual Funds) Regulations, 2026. A mutual fund may invest in the Units subject to the following:

(a) No mutual fund under all its schemes shall own more than 10% of the units; and

(b) A mutual fund scheme shall not invest:

  (i) more than 10% of its net asset value in the units issued by InvIT; and

  (ii) More than 5% of its net asset value in the units,

provided that the limits mentioned in sub-clauses (i) and (ii) above shall not be applicable for investments in case of index fund or sector or industry specific scheme pertaining to Trusts.

Bids by Eligible NRIs

In accordance with Schedule IV of the FEMA Rules, Eligible NRIs, including companies, trusts and partnership firms incorporated outside India which are owned and controlled by NRIs, are permitted to purchase units issued by an 'investment vehicle' without any limit, either on the stock exchange or outside it. The FEMA Rules define an 'investment vehicle' to mean an entity registered and regulated under the regulations framed by the SEBI or any other authority designated for that purpose, including an InvIT governed by the SEBI.

Investments by Eligible NRIs in the Units shall be on a non-repatriation basis and shall be deemed to be domestic investment at par with investments made by residents of India.

Only Bids accompanied by payment in freely convertible foreign exchange will be considered for Allotment. Eligible NRIs bidding on a repatriation basis by using the Bid cum Application Form for Non-Residents should

authorize their respective SCSB (if they are Bidding directly through the SCSB) or confirm or accept the UPI Mandate Request (in case of Bidding through the UPI Mechanism) to block their Non-Resident External ("**NRE**") accounts, or Foreign Currency Non-Resident ("**FCNR**") accounts, and eligible NRIs bidding on a non-repatriation basis by using the Bid cum Application Form for residents should authorize their respective SCSB (if they are Bidding directly through SCSB) or confirm or accept the UPI Mandate Request (in case of Bidding through the UPI Mechanism) to block their Non-Resident Ordinary ("**NRO**") accounts for the full Bid Amount, at the time of the submission of the Bid cum Application Form.

Bids by FPIs

Foreign Portfolio Investors are permitted to participate in the Issue subject to compliance with Schedule II and Schedule VIII of FEMA Rules read with the applicable provisions of the Foreign Exchange Management (Mode of Payment and Reporting of Non-Debt Instruments) Regulations, 2019, as amended, and such other terms and conditions as may be prescribed by SEBI from time to time. In case of Bids by FPIs the payment should be paid as inward remittance from abroad through banking channels or out of funds held in NRE, SNRR or FCNR(B) account maintained in accordance with the Foreign Exchange Management (Deposit) Regulations, 2016, along with documentary evidence in support of the remittance. In case of Bids made by FPIs, a verified true copy of the certificate of registration issued by the designated depository participant under the SEBI FPI Regulations is required to be attached along with the Application Form, failing which the Investment Manager, in consultation with the Lead Managers, reserves the right to reject the Bid.

It is hereby clarified that bids received from FPIs bearing the same PAN shall be treated as multiple Bids and are liable to be rejected, except for Bids from FPIs that utilize the multiple investment manager structure in accordance with the operational guidelines for FPIs and designated Depository Participants issued to facilitate implementation of SEBI FPI Regulations (such structure referred to as "**MIM Structure**"), provided such Bids have been made with different beneficiary account numbers, Client IDs and DP IDs. Accordingly, it should be noted that multiple Bids received from FPIs, who do not utilize the MIM Structure, and bear the same PAN, are liable to be rejected. In order to ensure valid Bids, FPIs making multiple Bids using the same PAN, and with different beneficiary account numbers, Client IDs and DP IDs, are required to provide a confirmation in the Bid cum Application Forms that the relevant FPIs making multiple Bids utilize the MIM Structure. In the absence of such confirmation from the relevant FPIs, such multiple Bids shall be rejected.

Please note that, the maximum Bid by any Bidder including a QIB Bidder should not exceed the investment limits prescribed for them under applicable laws. Further, multiple Bids by a FPI Bidder utilising the MIM Structure shall be aggregated for determining the permissible maximum Bid. Further, please note that, Bid cum Application Forms are liable to be rejected in the event that the Bid in the Bid cum Application Form exceeds the Issue size and/or investment limit or maximum number of Units that can be held under applicable laws or regulations or maximum amount permissible under applicable laws or regulations, or under the terms of this Offer Document.

Bids by SCSBs

SCSBs participating in the Issue are required to comply with the terms of the SEBI circulars dated September 13, 2012 (CIR/CFD/DIL/12/2012) and January 2, 2013 (CIR/CFD/DIL/1/2013). Such SCSBs are required to ensure that for making applications on their own account using ASBA, they should have a separate account in their own name with any other SCSBs. Further, such account shall be used solely for the purpose of making application in public issues and clear demarcated funds should be available in such account for such applications.

Bids under Power of Attorney

In case of Bids made pursuant to a power of attorney by Institutional Investors or bodies corporate, registered societies, etc, a certified copy of the power of attorney or the relevant resolution or authority, as the case may be, along with a certified copy of the memorandum of association and articles of association and/or bye laws must be submitted along with the Bid cum Application Form. Failing this, the Bid is liable to be rejected.

The Investment Manager, in consultation with the Lead Managers, in its absolute discretion, reserves the right to relax the above condition of simultaneous lodging of the power of attorney along with the Bid cum Application Form.

Allotments, if any, made to FVCIs in the Issue are subject to the respective rules and regulations that are applicable to each of them.

The above information is given for the benefit of the Bidders. Each Bidder should check whether it is eligible to apply under applicable law and ensure that any prospective Allotment to it in the Issue is in compliance with the investment restrictions under applicable law. Certain categories of Bidders may not be allowed to Bid in the Issue or hold Units exceeding certain limits specified under applicable law.

The Parties to the Trust, and the Lead Managers are not liable for any amendments or modification or changes in applicable laws or regulations, which may occur after the date of this Offer Document. Bidders are advised to make their independent investigations and ensure that any single Bid from them does not exceed the applicable investment limits or maximum number of the Units that can be held by them under applicable law or regulation or as specified herein.

Maximum and Minimum Bid Size

Each Bidder (other than an Anchor Investor) is required to Bid for a Minimum Bid Size in the range of ₹ 10,000 and ₹ 15,000 and in multiples of [●] Units thereafter.

(i) No Bidder shall Bid for such number of Units which exceeds the Issue Size, subject to applicable investment limits or maximum number of Units that may be held by them under applicable laws.

(ii) The maximum Bid by any Bidder including Institutional Investors should not exceed the investment limits prescribed for them under the applicable law.

The price and quantity options submitted by a Bidder in the Bid cum Application Form may be treated as optional bids from the Bidder and may not be cumulated. After determination of the Issue Price, the highest number of Units Bid for by a Bidder at or above the Issue Price may be considered for Allotment and the rest of the Bid(s), irrespective of the Bid Amount may automatically become invalid.

Information for the Bidders:

(i) This Offer Document will be filed by the Investment Manager with SEBI and the Stock Exchanges at least five Working Days before the Bid/Issue Opening Date.

(ii) After the filing of this Offer Document with SEBI and the Stock Exchanges, the Lead Manager/ Investment Manager shall make a Pre-Issue advertisement on the websites of the Trust, the Sponsor, the Investment Manager and the Stock Exchanges, as may be applicable. Further, such Pre-Issue advertisement will also be published in all editions of Financial Express (a widely circulated English national daily newspaper), in all editions of Navshakti (a widely circulated Marathi daily newspaper in Maharashtra) and in all editions of Jansatta (a widely circulated Hindi national daily newspaper).

(iii) Any Bidder (who is eligible to invest in the Units) may obtain the Bid cum Application Form or both from the principal place of business of the Trust, the registered office of the Investment Manager or from any Designated Intermediary at the Bidding Centres. Anchor Investor Application Forms will be made available at the principal place of business of the Trust and the registered office of the Investment Manager and the Lead Managers.

(iv) The Bid/Issue Period shall be for a minimum of three Working Days. In case the Price Band is revised, the Bid/Issue Period shall be extended for a minimum period of one Working Day, subject to the total Bid/Issue Period not exceeding 30 Working Days. In case of *force majeure*, banking strike or similar circumstances, the Bid/Issue Period may be extended for a minimum period of three Working Days, subject to the total Bid/Issue Period not exceeding 30 Working Days. The revised Price Band and Bid/Issue Period will be widely disseminated by notification to the SCSBs and Stock Exchanges, and also by indicating the change on the websites of the Trust, the Lead Managers, the Sponsor, the Investment Manager and the Stock Exchanges, as may be applicable, and at the terminals of the members of the Syndicate. In accordance with the InvIT Regulations, the Price Band cannot be revised more than two times and differential price shall not be offered to any Bidder.

(v) The Designated Intermediaries will accept Bids during the Bid/Issue Period in accordance with the terms of this Offer Document, provided that the Lead Managers will accept the Bids from Anchor Investors only on the Anchor Investor Bidding Date.

(vi) The Bids should be submitted on the prescribed Bid cum Application Form only. Bids by ASBA Bidders will be accepted by the Designated Intermediaries at the Bidding Centres in accordance with

applicable law and any circulars issued by SEBI in this regard. Bid cum Application Forms should bear the stamp of a Designated Intermediary. Bid cum Application Forms (except electronic Bid cum Application Forms) which do not bear the stamp of a Designated Intermediary are liable to be rejected.

(vii) The Bidding Centres will acknowledge the receipt of the Bid cum Application Forms by stamping and returning to the Bidder the Acknowledgement Slip. This Acknowledgement Slip will serve as the duplicate of the Bid cum Application Form for the records of the Bidder.

Instructions for completing the Bid Cum Application Form

Bidders may note that Bid cum Application Forms not filled completely or correctly as per instructions provided in this Offer Document and the Bid cum Application Form are liable to be rejected.

Bids must be:

(i) made only in the prescribed Bid cum Application Form or Revision Form, as applicable;

(ii) completed in full, in BLOCK LETTERS in ENGLISH and in accordance with the instructions contained here and in the Bid cum Application Form. Incomplete Bid cum Application Forms or Revision Forms are liable to be rejected. Bidders must provide details of valid and active DP ID, Client ID and PAN, UPI ID (for individual Non-Institutional Investors Bidding for a Bid Amount of Rs. 0.50 million or less using the UPI Mechanism clearly and without error. Invalid accounts, suspended accounts or where such account is classified as invalid or suspended shall not be considered for Allotment. Bidders should note that the members of the Syndicate and/or the SCSBs (as appropriate) will not be liable for errors in data entry due to incomplete or illegible Bid cum Application Forms; and in a single name or in joint names (not more than three, and in the same order as their Depository Participant details).

Bidders should also note that:

(i) information provided by Bidders will be uploaded in the online system by the Designated Intermediaries and the electronic data will be used to make allocation/Allotment. Bidders are advised to ensure that the details are correct and legible;

(ii) only the First Bidder is required to sign the Bid cum Application Form. Bidders should ensure that thumb impressions and signatures other than in the languages specified in the Eighth Schedule to the Constitution of India are attested by a Magistrate or a Notary Public or a Special Executive Magistrate under official seal; and

(iii) if the ASBA Account holder is different from the ASBA Bidder, the Bid cum Application Form should also be signed by the account holder as provided in the Bid cum Application Form.

General Instructions

Dos:

(i) Check if you are eligible to apply as per the terms of this Offer Document and under Applicable Laws and approvals;

(ii) Ensure that you have Bid within the Price Band;

(iii) Read all the instructions carefully and complete the relevant Bid cum Application Form;

(iv) Ensure that the details about the PAN, DP ID, Client ID and UPI ID (where applicable) are correct, and the Beneficiary Account is activated, as Allotment will be in dematerialized form only;

(v) Ensure that the Bids are submitted at the Bidding Centres only on the Bid cum Application Forms bearing the stamp of a Designated Intermediary;

(vi) Ensure that if you are the Bidder you have mentioned the correct ASBA Account number (for all Bidders other than UPI Bidders using the UPI Mechanism) in the Bid cum Application Form (with a maximum length of 45 characters) and such ASBA account belongs to you and no one else. Further, UPI Bidders using the UPI Mechanism must also mention their UPI ID and shall use only his/her own

bank account which is linked to his/her UPI ID;

(vii) Individual Non-Institutional Investors Bidding for a Bid Amount of Rs. 0.50 million or less using the UPI Mechanism through the SCSBs and mobile applications shall ensure that the name of the bank appears in the list of SCSBs which are live on UPI, as displayed on the SEBI website. UPI Bidders shall ensure that the name of the app and the UPI handle which is used for making the application appears on the list displayed on the SEBI website. An application made using incorrect UPI handle or using a bank account of an SCSB or bank which is not mentioned on the SEBI website is liable to be rejected;

(viii) Ensure that your Bid is submitted at a Bidding Centre of a Designated Intermediary. Further, ensure that the Bid cum Application Form is signed by the ASBA Account holder if the Bidder is not the ASBA Account holder;

(ix) Ensure that the full Bid Amount is paid for Bids submitted by Anchor Investors a funds equivalent to the Bid Amount are blocked by the SCSBs in case of Bids submitted through the ASBA process;

(x) Ensure that you have correctly checked the authorization/undertaking box in the Bid cum Application Form, or have otherwise provided an authorization to the SCSB via the electronic mode for the Designated Branch to block funds in the ASBA Account equivalent to the Bid Amount mentioned in the Bid cum Application Form at the time of submission of the Bid;

(xi) Instruct your respective banks to not release the funds other than in relation to the Issue, blocked in the ASBA Accounts;

(xii) Ensure that you request for and have received an Acknowledgement Slip for all your Bid options;

(xiii) Ensure that you receive an Acknowledgement Slip from the Designated Intermediary for the submission of your Bid cum Application Form;

(xiv) Submit revised Bids at the same Bidding Centre of a Designated Intermediary, through which the original Bid was placed and obtain a revised Acknowledgement Slip, as the case may be;

(xv) Except for Bids (i) on behalf of the Central or State Governments and the officials appointed by the courts, who, in terms of the SEBI circular dated June 30, 2008, may be exempt from specifying their PAN for transacting in the securities market, and (ii) Bids by persons resident in Sikkim, who, in terms of a SEBI circular dated July 20, 2006, may be exempted from specifying their PAN for transacting in the securities market, all Bidders should mention their PAN allotted under the IT Act. The exemption for the Central or the State Government and officials appointed by the courts and for Bidders residing in Sikkim is subject to (a) the Demographic Details received from the respective depositories confirming the exemption granted to the beneficiary owner by a suitable description in the PAN field and the beneficiary account remaining in "active status"; and (b) in the case of residents of Sikkim, the address as per the Demographic Details evidencing the same. All other applications in which the PAN is not mentioned will be rejected;

(xvi) In cases where the PAN is same, such Bids will be treated as multiple applications. Bidders should not submit the GIR number instead of the PAN as the Bid is liable to be rejected on this ground. With effect from August 16, 2010, the demat accounts of Bidders for whom PAN details have not been verified shall be "suspended for credit" and no credit of Units pursuant to the Issue will be made into the accounts of such Bidders;

(xvii) Ensure that your PAN is linked with Aadhaar and are in compliance with Central Board of Direct Taxes notification dated February 13, 2020 and press release dated June 25, 2021;

(xviii) Ensure that the Demographic Details (as defined below) are updated, true and correct in all respects;

(xix) Ensure that thumb impressions and signatures other than in the languages specified in the Eighth Schedule to the Constitution of India are attested by a Magistrate or a Notary Public or a Special Executive Magistrate under official seal;

(xx) In case of joint Bids, the Bid cum Application Form should contain the name of only the First Bidder whose name should also appear as the first holder of the beneficiary account held in joint names.

Ensure that the signature of the First Bidder in case of joint Bids, is included in the Bid cum Application Forms;

(xxi) Ensure that the name(s) given in the Bid cum Application Form is exactly the same as the name(s) in which the beneficiary account is held with the Depository Participant;

(xxii) Ensure that the category and the Bidder status is indicated;

(xxiii) Bidders (except UPI Bidders using the UPI Mechanism) should instruct their respective banks to release the funds blocked in the ASBA Account under the ASBA process. UPI Bidders using the UPI Mechanism, should ensure that they approve the UPI Mandate Request generated by the Sponsor Bank(s) to authorise blocking of funds equivalent to Bid Amount and subsequent debit of funds in case of Allotment, in a timely manner;

(xxiv) Ensure that in case of Bids under power of attorney or by limited companies, corporates, trusts, etc., relevant documents are submitted;

(xxv) UPI Bidders using the UPI Mechanism shall ensure that details of the Bid are reviewed and verified by opening the attachment in the UPI Mandate Request and then proceed to authorize the UPI Mandate Request using his/her UPI PIN. Upon the authorization of the mandate using his/her UPI PIN, the UPI Bidders may be deemed to have verified the attachment containing the application details of the UPI Bidders using the UPI Mechanism in the UPI Mandate Request and have agreed to block the entire Bid Amount and authorized the Sponsor Bank(s) to offer a request to block the Bid Amount mentioned in the ASBA Form in his/her ASBA Account;

(xxvi) UPI Bidders using the UPI Mechanism should mention valid UPI ID of only the Bidder (in case of single account) and of the first Bidder (in case of joint account) in the ASBA Form;

(xxvii) UPI Bidders using the UPI Mechanism, who have revised their Bids subsequent to making the initial Bid, should also approve the revised UPI Mandate Request generated by the Sponsor Bank(s) to authorise blocking of funds equivalent to the revised Bid Amount in their account and subsequent debit of funds in case of allotment in a timely manner;

(xxviii) Ensure that Bids submitted by any person outside India are in compliance with applicable foreign and Indian laws; and

(xxix) With respect to Bids by SCSBs, ensure that you have a separate account in your own name with any other SCSB having clear demarcated funds for applying under the ASBA process and that such separate account (with any other SCSB) is used as the ASBA Account with respect to your Bid.

The Bid cum Application Form is liable to be rejected if the above instructions, as applicable, are not complied with.

Dont's:

(i) Do not Bid for lower than the Minimum Bid Size;

(ii) Do not submit a Bid without payment of the entire Bid Amount;

(iii) Do not Bid less than the Floor Price or higher than the Cap Price;

(iv) Do not Bid on another Bid cum Application Form after you have submitted a Bid;

(v) Do not pay the Bid Amount in cash, by money order or postal order and in relation to ABSA Bidders, in any other mode other than blocked amounts in the ASBA Accounts;

(vi) Do not send Bid cum Application Forms by post and only submit the same to a Designated Intermediary at a Bidding Centre;

(vii) Do not fill up the Bid cum Application Form such that the Units Bid for exceed, the Issue Size or investment limits, or the maximum number of Units that can be held or the maximum amount permissible under applicable laws or under the terms of this Offer Document;

(viii) Do not submit more than five Bid cum Application Forms per ASBA Account;

(ix) Do not submit the GIR number instead of the PAN as the Bid is liable to be rejected on this ground;

(x) Do not submit incorrect details of DP ID, Client ID and PAN or give details for which demat account is suspended or for which such details cannot be verified by the Registrar;

(xi) Do not instruct your respective banks to release the funds blocked in the ASBA Account under the ASBA process, other than in relation to the Issue;

(xii) Do not submit the Bid for an amount more than funds available in your ASBA Account;

(xiii) Do not submit Bids on plain paper or on incomplete or illegible Bid cum Application Forms or on Bid cum Application Forms in a colour prescribed for another category of Bidders;

(xiv) Do not submit a Bid in case you are not eligible to acquire Units under applicable law or your relevant constitutional documents or otherwise;

(xv) Do not Bid if you are not competent to contract under the Indian Contract Act, 1872 (other than minors having valid depository accounts as per demographic details provided by the Depository);

(xvi) Anchor Investors should not Bid through the ASBA process; and

(xvii) Do not withdraw your Bid or lower the size of your Bid (in terms of quantity of the Units or the Bid Amount) at any stage.

Method and Process of Bidding

(i) The Investment Manager and the Lead Managers will declare the Bid/Issue Opening Date and Bid/Issue Closing Date at the time of filing this Offer Document with SEBI and the Stock Exchanges.

(ii) Post filing of this Offer Document with SEBI and the Stock Exchanges, the Lead Manager/ Investment Manager shall make a Pre-Issue advertisement on the websites of the Sponsor, the Investment Manager and the Stock Exchanges, as may be applicable. Further, such Pre-Issue will also be published in all editions of Financial Express (a widely circulated English national daily newspaper), in all editions of Jansatta (a widely circulated Hindi national daily newspaper and Navshakti (a widely circulated Marathi daily newspaper in Maharashtra).

(iii) The Price Band will be decided by the Investment Manager in consultation with the Lead Managers and shall be disclosed at least two Working Days prior to the Bid/Issue Opening Date on the websites of the Trust, the Sponsor, the Investment Managers and the Stock Exchanges, as may be applicable and in the newspapers where the Pre-Issue advertisement was published.

(iv) The Lead Managers will accept Bids from the Anchor Investors on the Anchor Investor Bidding Date, *i.e.* one Working Day prior to the Bid/Issue Opening Date. Bidders, except Anchor Investors, who are interested in subscribing to the Units should approach any of the Designated Intermediaries at Bidding Centres to register their Bids during the Bid/Issue Period. The Designated Intermediaries will accept Bids from all Bidders and will have the right to vet the Bids during the Bid/Issue Period in accordance with the terms of the Syndicate Agreement and/or this Offer Document. The Bid/Issue Period will be for at least three Working Days and not exceeding 30 Working Days (*including* the days for which the Issue is open in case of revision in Price Band). If the Price Band is revised, the revised Price Band and the Bid/Issue Period will disclosed on the websites of the Trust, the Sponsor, the Investment Managers, Lead Managers, Syndicate Members, SCSBs and the Stock Exchanges, as may be applicable, and in the newspapers where the Pre-Issue advertisement will be published.

(v) UPI Bidders may submit the Bid cum Application form with the Designated Intermediaries and use their bank account linked with UPI ID for the purpose of blocking funds. The Designated Intermediaries shall upload the Bid on the Stock Exchange bidding platform and the application amount would be blocked through the UPI Mechanism.

(vi) Each Bid cum Application Form will give the Bidder the choice to Bid for up to three optional prices within the Price Band and specify the demand (*i.e.*, the number of Units Bid for) in each option. The

price and demand options submitted by the Bidder in the Bid cum Application Form will be treated as optional demands from the Bidder and will not be cumulated. In case of an upward revision in the Price Band, in the event the Bidder does not either revise the Bid or make additional payment and the Issue Price is higher than the Cap Price prior to revision, the number of Units Bid for will be adjusted downwards for the purpose of Allotment, such that no additional payment will be required from the Bidder and the Bidder shall be deemed to have approved such revised Bid. The Bidder can Bid at any price within the Price Band. The Bidder has to Bid for the desired number of Units at a specific price.

(vii) No Bidder shall either withdraw or lower its Bid at any stage.

(viii) After determination of the Issue Price, the maximum number of Units Bid for by a Bidder at or above the Issue Price will be considered for allocation/Allotment and the rest of the Bid(s), irrespective of the Bid Amount, will become automatically invalid.

(ix) Except in relation to the Bids received from the Anchor Investors, the Designated Intermediary will enter each Bid option into the electronic bidding system as a separate Bid and generate an Acknowledgement Slip, and SCSBs will generate an Acknowledgement Slip for each price and demand option and will, on demand, give the same to the Bidder. Therefore, a Bidder can receive up to three Acknowledgement Slips for each Bid cum Application Form.

(x) On receipt of the Bid cum Application Form (whether in physical or electronic mode) the Designated Branch of the SCSB will verify if sufficient funds equal to the Bid Amount are available in the ASBA Account, as mentioned in the ASBA Bid cum Application Form, prior to uploading such Bids with the Stock Exchanges. If sufficient funds are not available in the ASBA Account, the Designated Branch of the SCSB will reject such Bids and will not upload such Bids with the Stock Exchanges. If sufficient funds are available in the ASBA Account, the SCSB will block an amount equivalent to the Bid Amount mentioned in the ASBA Bid cum Application Form and will enter each Bid option into the electronic bidding system as a separate Bid.

(xi) Along with the Bid cum Application Form, all Bidders will make payment in the manner described under the paragraph titled "– *Payment Instructions*".

Bidders' Depository Account and Bank Account Details

Bidders should note that on the basis of Bidders' PAN, DP ID and Client ID provided by them in the Bid cum Application Form and as entered into the electronic bidding system of the Stock Exchanges by the Members of the Syndicate and the SCSBs as the case may be, the Registrar will obtain from the Depository the demographic details including the Bidders' address, occupation and bank account details (including the nine-digit Magnetic Ink Character Recognition ("**MICR**") code as appearing on a cheque leaf (the "**Demographic Details**")), from the Depository. The Demographic Details will be used for giving refunds and allocation advice (including through physical refund warrants, direct credit, NACH, NEFT and RTGS) to Anchor Investors. Hence, Bidders are advised to immediately update their bank account details, PAN and Demographic Details as appearing on the records of the Depository Participant and ensure that they are true and correct. Failure to do so could result in delays in dispatch/credit of refunds to Bidders at the Bidders sole risk and none of the Lead Managers, the Registrar, the Escrow Collection Banks, the Sponsor Bank(s), the SCSBs, the Investment Manager or the Trustee will have any responsibility or undertake any liability for this. Accordingly, Bidders should carefully fill in their depository account details in the Bid cum Application Form.

By signing the Bid cum Application Form, the Bidder is deemed to have authorized the Depositories to provide to the Registrar, on request, the required Demographic Details as available in their records.

Bids with no corresponding record available with the Depositories matching the three parameters (namely, PAN (in case of joint Bids, PAN of First Bidder), the DP ID and Client ID), are liable to be rejected.

Payment mechanism for ASBA Bidders

The ASBA Bidders will specify the ASBA Account in the Bid cum Application Form and the SCSB (or the Sponsor Bank in case of individual Non-Institutional Investors using UPI Mechanism) will block an amount equivalent to the Bid Amount in the ASBA Account so specified. The SCSB (or the Sponsor Bank in case of individual Non-Institutional Investors using UPI Mechanism) will keep the Bid Amount in the relevant ASBA Account blocked until finalization of the Basis of Allotment and consequent transfer of the Bid Amount to the Public Issue Account, or until withdrawal/failure of the Issue or until rejection of the Bid, as the case may be.

In the event of rejection of the Bid cum Application Form, failure of the Issue or for unsuccessful Bid cum Application Forms, the Registrar will give instructions to the SCSB (or the Sponsor Bank in case of individual Non-Institutional Investors using UPI Mechanism) to unblock the Bid Amount in the relevant ASBA Account and the SCSBs will unblock the Bid Amount on receipt of such instruction.

Payment Instructions

The Investment Manager and the Syndicate will open Escrow Accounts with one or more Escrow Collection Bank(s) in whose favour Anchor Investors will offer payment instruments. The payment instruments for payment into the Escrow Accounts should be drawn in favour of:

In case of resident Anchor Investors: "Escrow Account - CITIUS TRANSNET INVESTMENT TRUST ANCHOR R ACCOUNT"

In case of non-resident Anchor Investors: "Escrow Account - CITIUS TRANSNET INVESTMENT TRUST ANCHOR NR ACCOUNT "

The Bidders should note that the escrow mechanism is not prescribed by SEBI and has been established as an arrangement amongst the Investment Manager, the Trustee (acting on behalf of the Trust), the Syndicate, the Escrow Collection Banks and the Registrar to facilitate collections from Investors.

The Escrow Collection Banks will act in terms of this Offer Document and the Cash Escrow and Sponsor Bank Agreement. The monies deposited in the Escrow Accounts will be held for the benefit of the Anchor Investors until the Designated Date. On the Designated Date, the Escrow Collection Banks will transfer the funds from the Escrow Accounts as per the terms of the Cash Escrow and Sponsor Bank Agreement into the Public Issue Account with the Escrow Collection Banks and the Refund Account. The Escrow Collection Banks will not exercise any lien whatsoever over the monies deposited therein and will hold the monies therein in trust for the Anchor Investors. The balance amount after transfer to the Public Issue Account will be transferred to the Refund Account. Payments of refund to the Anchor Investors will be made from the Refund Account as per the terms of the Cash Escrow and Sponsor Bank Agreement and this Offer Document. Payments should be made by Anchor Investors only in electronic mode through direct credit/NEFT/NACH/RTGS. Cheques or bank drafts, cash, money orders or postal orders will not be accepted and is liable to be rejected.

Payment Mechanism for UPI Bidders

In relation to UPI Bidders, the Sponsor Bank shall initiate a UPI Mandate Request on the UPI Bidder, i.e., request the UPI Bidder to authorize blocking of funds equivalent to application amount and subsequent debit of funds in case of Allotment. The request raised by the Sponsor Bank would be electronically received by the UPI Bidder as an SMS / intimation on their mobile number / mobile application associated with the UPI ID linked bank account. The UPI Bidder shall be able to view the details of the request in their UPI application and authorize the transaction. In UPI, the SCSBs / UPI applications eligible for public issues shall send SMS alerts to UPI Bidders for all ASBA applications and may also provide invoices in the inbox as an additional feature to verify the UPI mandate details. After reviewing the details properly, the UPI Bidder shall be required to authorize the mandate, which shall be a one-time mandate for each application in the Issue. The payment accompanied with any upward revision of the Bid shall be adjusted against the payment made at the time of the original Bid or previously revised Bid.

Other Instructions

Joint Bids in case of Individuals

Bids may be made in single or joint names (not more than three). In the case of joint Bids, all payments will be made out in favour of the Bidder whose name appears first in the Bid cum Application Form or Revision Form. All communications will be addressed to the First Bidder and will be dispatched to his or her address as per the Demographic Details received from the Depository.

Multiple Bids

A Bidder should submit only one Bid for the total number of the Units required. Two or more Bids will be deemed to be multiple Bids if the sole or First Bidder is the same. However, a Bidder can revise the Bid through the Revision Form.

In case of a mutual fund, subject to investment conditions as per applicable law, a separate Bid can be made in respect of each scheme of the mutual fund registered with SEBI and such Bids in respect of more than one scheme of the mutual fund will not be treated as multiple Bids, provided that the Bids clearly indicate the scheme concerned for which the Bid is made. Bids by QIBs under the Anchor Investor Portion and Institutional Investor Portion (excluding Anchor Investor Portion) will not be considered as multiple Bids.

After Bidding on an ASBA Form either in physical or electronic mode, where such ASBA Bid is submitted to the Designated Intermediaries and uploaded with the Stock Exchanges, an ASBA Bidder cannot Bid, either in physical or electronic mode, on another ASBA Form or a non-ASBA Form. Submission of a second Bid cum Application Form, whether an ASBA Form, to either the same or to another Designated Intermediary, or a non-ASBA Form, will be treated as multiple Bids and will be liable to be rejected either before entering the Bid into the electronic bidding system, or at any point of time prior to the allocation or Allotment of Units in this Issue. However, the ASBA Bidder can revise the Bid through the Revision Form.

More than one ASBA Bidder may Bid for Units using the same ASBA Account, provided that the SCSBs will not accept a total of more than five Bid cum Application Forms from ASBA Bidders with respect to any single ASBA Account.

The Investment Manager, in consultation with the Lead Managers, reserves the right to reject, in its absolute discretion, all or any multiple Bids in any or all categories. A check will be carried out for the same PAN. In cases where the PAN is same, such Bids will be treated as multiple applications.

Right to Reject Bids

In case of QIBs Bidding in the Institutional Investor Portion and Anchor Investors, the members of the Syndicate may reject Bids provided that such rejection will be made at the time of acceptance of the Bid and the reasons for rejecting such Bids will be provided to such Bidder in writing. The Members of the Syndicate may also reject Bids if all information required is not provided and the Bid cum Application Form is incomplete in any respect.

Grounds for Technical Rejections

Bidders are advised that incomplete or illegible Bid cum Application Forms will be rejected by Designated Intermediaries. Bidders are advised to note that Bids are liable to be rejected on technical grounds including the following:

(i) The amounts mentioned in the Bid cum Application Form does not tally with the amount payable for the value of the Units Bid for;

(ii) Application on plain paper;

(iii) In case of partnership firms (excluding LLPs), Units may be registered in the names of the individual partners and no firm as such will be entitled to apply;

(iv) Bid by persons not competent to contract under the Indian Contract Act, 1872, as amended, including minors. However, minors can Bid through their guardians;

(v) PAN not stated (except for Bids on behalf of the Central or State Government, residents of Sikkim and the officials appointed by the courts);

(vi) GIR number furnished instead of PAN;

(vii) Where PAN details are not verified by demat accounts, *i.e.*, where the demat account is "suspended for credit";

(viii) Bids for lower value of Units than specified for that category of Bidders;

(ix) Bids at a price less than the Floor Price;

(x) Bids at a price over the Cap Price;

(xi) Submission of more than five Bid cum Application Forms per ASBA Account;

(xii) Bids for a value of less than ₹0.01 million and Bids by UPI Bidders for a value of more than ₹ 0.50 million;

(xiii) Individual Non-Institutional Investors Bidding for a Bid Amount of ₹ 0.50 million or less using the UPI Mechanism have not provided the valid UPI ID in the relevant space provided in the Bid cum Application Form;

(xiv) Bidder category not specified;

(xv) Multiple Bids as described in this Offer Document;

(xvi) In case of Bids under power of attorney or by limited companies, corporate, trust etc., relevant documents not being submitted;

(xvii) Bids accompanied by cash, stock invest, money order or postal order, as applicable;

(xviii) Signature of sole and/or the First Bidder (in case of joint Bids) is missing, as applicable;

(xix) The Bid cum Application form not being signed by the ASBA Account holder, if the ASBA Account holder is different from the Bidder;

(xx) Bid cum Application Form does not have the stamp of a Designated Intermediary (except for electronic ASBA Bids), as the case may be;

(xxi) Bid cum Application Forms are not submitted within the time prescribed as per the Bid cum Application Form, Bid/Issue Opening Date advertisement and this Offer Document and as per the instructions in this Offer Document and the Bid cum Application Forms;

(xxii) Inadequate funds in the ASBA Account to block the Bid Amount specified in the Bid cum Application Form at the time of blocking such Bid Amount in the ASBA Account;

(xxiii) Authorisation for blocking funds in the ASBA Account not provided;

(xxiv) Bids for amounts greater than the maximum permissible amounts prescribed by Applicable Law;

(xxv) Bids by OCBs;

(xxvi) Bank account details for the refund not given, as applicable;

(xxvii) Bids by persons in the United States;

(xxviii) Bids by persons prohibited from buying, selling or dealing in the Units directly or indirectly by SEBI or any other regulatory authority;

(xxix) Bids by persons who are not eligible to acquire Units under applicable law or their relevant constitutional documents or otherwise; and

(xxx) Bids that do not comply with the securities laws of their respective jurisdictions.

IN CASE THE DP ID, CLIENT ID, PAN AND UPI ID (WHERE APPLICABLE) MENTIONED IN THE BID CUM APPLICATION FORM AND ENTERED INTO THE ELECTRONIC BIDDING SYSTEM OF THE STOCK EXCHANGES BY THE LEAD MANAGER/THE DESIGNATED INTERMEDIARIES DO NOT MATCH WITH THE DP ID, CLIENT UPI ID (FOR INDIVIDUAL NON-INSTITUTIONAL INVESTORS BIDDING FOR A BID AMOUNT OF ₹0.50 MILLION OR LESS USING THE UPI MECHANISM) AND PAN AVAILABLE IN THE RECORDS WITH THE DEPOSITORIES THE APPLICATION IS LIABLE TO BE REJECTED.

Electronic Registration of Bids

(i) The Designated Intermediaries will register the Bids received, except Bids received from Anchor Bidders, using the online facilities of the Stock Exchanges. Details of Bids in the Anchor Investor Portion will not be registered on the online facilities of the Stock Exchanges. The Lead Managers, the Investment Manager and the Registrar are not responsible for any acts, mistakes or errors or omission and commissions in relation to (i) the Bids accepted by Designated Intermediaries, (ii) the Bids uploaded by Designated Intermediaries, (iii) the Bids accepted but not uploaded by the Designated Intermediaries or (iv) Bids accepted and uploaded without blocking funds in the ASBA Accounts. It will be presumed that for the Bids uploaded by the SCSBs, the Bid Amount has been blocked in the relevant ASBA Account.

(ii) The Stock Exchanges will offer a screen-based facility for registering such Bids for the Issue. This facility will be available on the terminals of the Designated Intermediaries during the Bid/Issue Period. The Designated Intermediaries can also set up facilities for offline electronic registration of Bids subject to the condition that it will upload the offline data file into the on-line facilities for book building on a regular basis.

(iii) On the Bid/Issue Closing Date, the Designated Intermediaries will upload the Bids until such time as may be permitted by the Stock Exchanges. This information will be available with the Lead Managers on a regular basis. In order to ensure that the data uploaded is accurate, the Syndicate or Designated Intermediaries may be permitted one Working Day after the Bid/Issue Closing Date to amend some of the data fields (currently DP ID, Client ID, UPI ID and PAN) entered by them in the electronic bidding system, after which the Registrar will proceed with the Allotment of the Units. Bidders are cautioned that a high inflow of Bids is typically experienced on the last Working Day of the Bidding, which may lead to some Bids received on the last Working Day not being uploaded due to lack of sufficient uploading time. Such Bids that could not uploaded will not be considered for allocation. Bids will only be accepted on Working Days (excluding any public holiday).

(iv) Based on the aggregate demand and price for Bids registered on the electronic facilities of the Stock Exchanges a graphical representation of consolidated demand and price will be made available at the Bidding Centres and on the websites of each of the Stock Exchanges during the Bid/Issue Period or regular intervals as per applicable law.

(v) At the time of registering each Bid, the Designated Intermediaries will enter the following details of the Bidder in the electronic system:

- Name of the infrastructure investment trust;
- Bid cum Application Form number/ ASBA Form number;
- Bidder Category – QIB, Eligible NRI, FPI, etc;
- PAN of the first applicant;
- DP ID;
- UPI ID (for UPI Bidders);
- Client ID;
- Number of Units Bid for; and
- Price option.

(vi) A system generated Acknowledgement Slip will be given to the Bidder (only on demand) as a proof of the registration of each of the Bidding options. It is the Bidders' responsibility to obtain the Acknowledgement Slip from Designated Intermediaries. The registration of the Bid by Designated Intermediaries does not guarantee that the Units will be allocated/Allotted. Such Acknowledgement Slip will be non-negotiable and by itself will not create any obligation of any kind.

(vii) In relation to Bids by UPI Bidders, once the Bid details are entered on the Stock Exchange platform,

the Stock Exchange shall validate the PAN and demat account combination details of the Bidder with the Depository. The Depository shall validate the PAN and demat account details on a near real time basis and send responses to the Stock Exchanges which would be shared by the Stock Exchanges with the Designated Intermediaries through its platforms for corrections, if any. Once Bid details are uploaded on the platforms of the Stock Exchanges, the Stock Exchanges shall send an SMS to the UPI Bidder on their mobile number associated with demat account regarding submission of their Bid cum Application Form at the end of the day during the Bidding period. For the last day of Bidding, the SMS may be sent the next Working Day.

(viii) The permission given by the Stock Exchanges to use their network and software of the online IPO system should not in any way be deemed or construed to mean that the compliance with various statutory and other requirements by the Investment Manager and/or the Lead Managers are cleared or approved by the Stock Exchanges; nor does it in any manner warrant, certify or endorse the correctness or completeness of any of the compliance with the statutory and other requirements nor does it take any responsibility for the financial or other soundness of the Trust, the management of the Investment Manager or the Trustee or any project of the Trust nor does it in any manner warrant, certify or endorse the correctness or completeness of any of the contents of this Offer Document; nor does it warrant that the Units will be listed or will continue to be listed on the Stock Exchanges.

Build-up of the book and revision of Bids

(i) Bids received from various Bidders through the Designated Intermediaries will be electronically uploaded to the Stock Exchanges mainframe on a regular basis.

(ii) The book gets built up at various price levels. This information will be available with the Lead Managers at the end of the Bid/Issue Period.

(iii) During the Bid/Issue Period, any Bidder who has registered his or her interest in the Units at a particular price level is free to revise the Bid upwards within the Price Band using the printed Revision Form, which is a part of the Bid cum Application Form.

(iv) Upward revisions can be made in both the desired number of Units and the Bid Amount by using the Revision Form. Apart from mentioning the revised options in the Revision Form, the Bidder must also mention the details of all the options in his or her Bid cum Application Form or its previous Revision Form. For example, if a Bidder has Bid for three options in the Bid cum Application Form and such Bidder is changing only one of the options in the Revision Form, he must still fill the details of the other two options that are not being revised, in the Revision Form. The Members of the Syndicate and the Designated Branches will not accept incomplete or inaccurate Revision Forms.

(v) The Bidder can make this upward revision any number of times during the Bid/Issue Period. However, for any revision(s) in the Bid, the Bidders will have to use the services of the same Designated Intermediary through which such Bidder had placed the original Bid. Bidders are advised to retain copies of the blank Revision Form and the revised Bid must be made only in such Revision Form or copies thereof.

(vi) If revision of the Bids results in an incremental amount, the relevant SCSB will block the additional Bid Amount. The Registrar will reconcile the Bid data and consider the revised Bid data for preparing the Basis of Allotment.

(vii) When a Bidder revises his or her Bid, he or she will surrender the earlier Acknowledgement Slip and will, on demand, receive a revised Acknowledgement Slip from the Designated Intermediary. It is the responsibility of the Bidder to request for and obtain the revised Acknowledgement Slip, which will act as proof of his or her having revised the previous Bid.

Price Discovery and Allocation

(i) Based on the Bids received and demand generated at various price levels, the Investment Manager, in consultation with the Lead Managers, will finalize the Issue Price and the Anchor Investor Issue Price.

(ii) Allocation to Anchor Investors will be at the discretion of the Investment Manager in consultation with the Lead Managers, subject to compliance with the InvIT Regulations, and other Applicable Laws. In the event of under-subscription in the Anchor Investor Portion, the balance Units will be added to the Institutional Investor Portion. The number of Units allocated to Anchor Investors and the Anchor Investor Allocation Price, will be made available in public domain by the Lead Managers before the Bid/Issue Opening Date.

(iii) In case of under-subscription in any category, the unsubscribed portion in either the Institutional Investor category or the Non-Institutional Investor Portion may be allotted to applicants in the other categories.

(iv) Allocation to Non-Residents, including Eligible NRIs and FPIs will be subject to applicable law.

(v) The Investment Manager in consultation with the Lead Managers reserves the right to withdraw the Issue any time after the Bid/Issue Opening Date but before the Allotment, without assigning any reasons whatsoever.

(vi) No Bidders can withdraw or lower their Bids at any time.

Signing of Underwriting Agreement

(i) the Trust (acting through the Trustee), the Sponsor, the Investment Manager, the Lead Managers and the Syndicate Members may enter into an Underwriting Agreement on or immediately after the finalization of the Issue Price.

(ii) After signing the Underwriting Agreement, the Investment Manager and the Sponsor will update and file the updated Offer Document with SEBI and the Stock Exchanges in terms of the InvIT Regulations, which then will be termed the "Final Offer Document". The Final Offer Document will contain details of the Issue Price and Issue Size if any, underwriting arrangements and will be complete in all material respects.

Advertisement regarding Issue Price

The Investment Manager will offer an advertisement after the filing of the Final Offer Document with SEBI and the Stock Exchanges. This advertisement will indicate the Issue Price.

Issuance of Allotment Advice

(i) Upon approval of the Basis of Allotment by the Designated Stock Exchange, the Registrar shall send to the Syndicate a list of the Bidders who have been Allotted Units in the Issue.

(ii) The Registrar will then dispatch an Allotment Advice to the Bidders who have been Allotted Units in the Issue. The dispatch of an Allotment Advice shall be deemed a valid, binding and irrevocable contract for the Bidder.

(iii) The issuance of Allotment Advice is subject to "Notice to Anchor Investors: Allotment Reconciliation and Confirmation of Allocation Note" below.

Notice to Anchor Investors: Allotment Reconciliation and Confirmation of Allocation Note ("CAN")

(i) A physical book will be prepared by the Registrar on the basis of the Bid cum Application Forms received from Anchor Investors. Based on the physical book and at the discretion of the Investment Manager in consultation with the Lead Managers, selected Anchor Investors will be sent a CAN or, if required, the revised CAN.

(ii) **In the event that the Issue Price is higher than the Anchor Investor Allocation Price**:

Anchor Investors will be sent a revised CAN within one day of the Pricing Date indicating the number of Units allocated to such Anchor Investor and the pay-in date for payment of the balance amount. Anchor Investors are then required to pay any additional amounts, being the difference between the Issue Price and the Anchor Investor Allocation Price, as indicated in the revised CAN within the pay-in date referred to in the revised CAN. Thereafter, the Allotment Advice will be issued to such Anchor Investors.

(iii) **In the event the Issue Price is lower than the Anchor Investor Allocation Price:**

Anchor Investors who have been Allotted Units will directly receive Allotment Advice and will not receive a refund for the difference between the Issue Price and the Anchor Investor Allocation Price, as applicable.

Designated Date and Allotment

On the Designated Date, the Registrar to the Issue shall instruct the SCSBs or Sponsor Bank for individual Non-Institutional Investors using UPI Mechanism to transfer funds represented by allocation of Units from ASBA Accounts into Public Issue Account. The balance amount after transfer to the Public Issue Account shall be unblocked by the relevant SCSB or Sponsor Bank for individual Non- Institutional Investors using UPI Mechanism. Whilst the Investment Manager shall ensure all steps for the completion of the necessary formalities for the listing and the commencement of trading of the Units on the Stock Exchanges are completed within 6 Working Days of the Bid/Issue Closing Date, the timetable may be extended due to various factors, such as extension of the Bid/Issue Period by the Investment Manager, revision of the Price Band or any delay in receiving the final listing and trading approval from the Stock Exchanges. The commencement of trading of the Units will be entirely at the discretion of the Stock Exchanges and in accordance with the Applicable Laws.

Bidders are advised to instruct their Depository Participant to accept the Units that may be Allotted to them in this Issue.

Basis of Allotment for other than Anchor Investors

(i) The Allotment to Bidders other than Anchor Investors shall be on proportionate basis within the specified investor categories and the number of Units Allotted shall be rounded off to the nearest integer, subject to minimum Allotment per successful Bidder in case of oversubscription as per the InvIT Regulations.

(ii) In case of under-subscription in any investor category, the unsubscribed portion in either the Institutional Investor category or the Non-Institutional Investor category may be allotted to applicants in the other category.

(iii) The aggregate allocation to Institutional Investors will not be more than 75% of the Issue Size.

(iv) The aggregate allocation to Non-Institutional Investors shall not be less than 25% of the Issue Size.

(v) The identity of Institutional Investors other than strategic investors shall not be made public.

(vi) In relation to UPI Bidders, the RTA shall prepare the basis of Allotment based on information of Bidding and blocking received from the Stock Exchange and after undertaking reconciliation of the Bid data and block confirmations corresponding to the Bids by all Investor category applications (with and without the use if UPI). Upon approval of the basis of Allotment, the RTA shall share the 'debit' file with the Sponsor Bank and SCSBs, as applicable, for credit of funds in the Public Issue Account and unblocking of excess funds in the UPI Bidder's account. The Sponsor Bank, based on the mandate approved by the Bidder at the time of blocking of funds, shall raise the debit/ collect request from the Bidder's bank account, whereupon funds will be transferred from investor's account to the public offer account and remaining funds, if any, will be unblocked without any manual intervention by investor or their bank.

For Anchor Investor Portion

Allocation to Anchor Investors at the Anchor Investor Allocation Price will be at the discretion of the Investment Manager, in consultation with the Lead Managers, subject to compliance with the following requirements:

- not more than 60% of the Institutional Investor Portion will be available for allocation to Anchor Investors;
- allocation to Anchor Investors will be on a discretionary basis and subject to a minimum number of two Anchor Investors for allocation up to ₹ 2,500 million and minimum number of five Anchor Investors for allocation more than ₹ 2,500 million. The identity of the Anchor Investors shall be made public.
- The number of Units Allocated to Anchor Investors and the Anchor Investor Allocation Price will be made available on the websites of the Stock Exchanges, the Sponsor, the Investment Manager and the Lead Managers, as may be applicable, prior to the Bid/Issue Opening Date.

Method of Proportionate Basis of Allotment in the Issue

Except in relation to Anchor Investors, in the event of the Issue being over-subscribed, the Investment Manager, the Lead Managers and Registrar will finalize the Basis of Allotment in consultation with the Designated Stock Exchange. The Designated Stock Exchange along with the Lead Managers and the Registrar will be responsible for ensuring that the Basis of Allotment is finalized in a fair and proper manner.

Except in relation to Anchor Investors, the Allotment will be made on a proportionate basis as explained below, subject to minimum Allotment per successful Bidder in case of oversubscription in accordance with the InvIT Regulations:

Bidders will be categorized according to the number of Units applied for.

The total number of Units to be allotted to each category as a whole will be arrived at on a proportionate basis, which is the total number of Units applied for in that category (number of Investors in the category multiplied by the number of Units applied for) multiplied by the inverse of the over-subscription ratio.

Number of Units to be allotted to the successful Bidders will be arrived at on a proportionate basis, which is total number of Units applied for by each Bidder in that category multiplied by the inverse of the over-subscription ratio.

Units in Dematerialized Form with NSDL or CDSL

As per the InvIT Regulations, the Allotment will be only in dematerialized form.

In this context, two agreements have been signed amongst the Trustee (on behalf of the Trust), the respective Depositories and the Registrar:

(i) Agreement dated January 23, 2026, between NSDL, the Trust (acting through Investment Manager) and the Registrar.

(ii) Agreement dated November 27, 2025, between CDSL, the Trust (acting through Investment Manager) and the Registrar.

(iii) Bids from any Bidder without relevant details of his or her depository account are liable to be rejected.

(iv) A Bidder applying for Units must have at least one valid beneficiary account with either of the Depository Participants of either NSDL or CDSL prior to making the Bid.

(v) Allotment to a successful Bidder will be credited in electronic form directly to the beneficiary account

(with the Depository Participant) of the Bidder.

(vi) Bid cum Application Forms or Revision Forms containing incomplete or incorrect details under the heading "Bidder's Depository Account Details" are liable to be rejected.

(vii) Units in electronic form can be traded only on the stock exchanges having electronic connectivity with NSDL and CDSL. The Stock Exchanges where the Units are proposed to be listed have electronic connectivity with CDSL and NSDL.

Communications

All future communications in connection with Bids made in this Issue should be addressed to the Registrar quoting the full name of the sole or First Bidder, Bid cum Application Form number, PAN, Bidders depository account details, number of Units applied for, date of Bid cum Application Form, name and address of the member of the Syndicate where the Bid was submitted and cheque or draft number and issuing bank thereof or with respect to ASBA Bids, the bank account number in which an amount equivalent to the Bid Amount was blocked.

Bidders can contact the Compliance Officer or the Registrar in case of any Pre-Issue or post-Issue related problems such as non- receipt of letters of allotment, credit of allotted Units in the respective beneficiary accounts, refund orders etc. In case of ASBA Bids submitted with the Designated Intermediaries, Bidders can contact the relevant Designated Intermediary.

We estimate that the average time required by the Registrar to the Issue, the SCSBs or us for redressal of routine investor grievances shall be 10 Working Days from the date of receipt of the complaint. In case of non-routine complaints and complaints where external agencies are involved, we will seek to redress complaints as expeditiously as possible. The Trust has obtained authentication on the SCORES and shall comply with the SEBI circular (CIR/OIAE/1/2014) dated December 18, 2014, (SEBI/HO/OIAE/IGRD/P/CIR/202) dated November 7, 2022, (SEBI/HO/OIAE/IGRD/CIR/P/2023/156) dated September 20, 2023 and (SEBI/HO/OIAE/IGRD/CIR/P/2023/183) dated December 1, 2023 in relation to redressal of investor grievances through SCORES.

Payment of Refunds

In the case of Bidders other than ASBA Bidders, the Registrar will obtain from the Depositories the Bidders' bank account details, including the MICR code, on the basis of the DP ID and the Client ID provided by the Bidders in their Bid cum Application Forms.

In the case of Bids from Eligible NRIs and FPIs, any refunds, and other distributions, will normally be payable in Indian Rupees only and net of bank charges and/or commission. Where desired, such payments in Indian Rupees will be converted into US Dollars or any other freely convertible currency as may be permitted by the RBI at the rate of exchange prevailing at the time of remittance and will be dispatched by registered post. Neither the Investment Manager nor the Trustee will be responsible for any loss incurred by Bidders on account of conversion of foreign currency. Payment of refunds will be made in the manner described below.

Mode of Refunds

For Anchor Investors

For Anchor Investors, any payment of refund will be made electronically through NACH, Direct Credit, RTGS or NEFT. For all other Anchor Investors, including those who have not updated their bank particulars with the MICR code, refund orders through speed or registered post for refund orders of ₹ 1,500 and above. Such refunds will be made by cheques, pay orders or demand drafts drawn on the Refund Bank and payable at par at places

where Bids are received. Any bank charges for cashing such cheques, pay orders or demand drafts at other centres will be payable by the respective Investors. Please note that refunds through the abovementioned modes shall be credited only to the bank account from which the Bid Amount was remitted.

Refunds for ASBA Bidders

In the case of ASBA Bidders, the Registrar will instruct the relevant SCSBs and in case of Non-Institutional Investors Bidding through the UPI Mechanism, the Registrar will instruct the Sponsor Bank to unblock the funds in the relevant ASBA Accounts to the extent of the Bid Amounts specified in the Bid cum Application Forms for withdrawn, rejected or unsuccessful or partially successful ASBA Bids, within six Working Days of the Bid/Issue Closing Date.

Refunds for UPI Bidders

For UPI Bidders, Units would be credited to the Bidder's account after confirmation of receipt of funds in the Public Issue Account. The Bidder will be notified for full / partial Allotment. For partial Allotment, the remaining funds shall be unblocked. For no Allotment, the UPI mandate would be revoked and application amount would be unblocked for the Bidder. The Registrar shall ensure refund of application amount or excess application amount in the bank account of the Bidder as stated in its demat account.

Disposal of Applications and Application Moneys

With respect to Bidders other than ASBA Bidders, the Investment Manager will ensure dispatch of Allotment Advice, refund orders (except for Anchor Investors who receive refunds through electronic transfer of funds) and give benefit to the beneficiary account with Depository Participants and submit the documents pertaining to the Allotment to the Stock Exchanges after the Allotment.

In case of Anchor Investors who receive refunds through NACH, NEFT, direct credit or RTGS, the refund instructions will be given to the clearing system within six Working Days from the Bid/Issue Closing Date. A suitable communication will be sent to the Anchor Investors receiving refunds through this mode within 6 Working Days from the Bid/Issue Closing Date, giving details of the bank where refunds will be credited along with amount and expected date of electronic credit of refund.

Refund Orders or instructions to the SCSBs

With respect to Anchor Investors, the Investment Manager will ensure dispatch of Allotment Advice and refund orders (except for Anchor Investors who receive refunds through electronic transfer of funds), give benefit to the beneficiary account with the Depository Participants and submit documents pertaining to the Allotment to the Stock Exchanges after the Allotment.

In the case of ASBA Bidders, the Registrar will instruct the relevant SCSBs to unblock the funds in the relevant ASBA Accounts to the extent of the Bid Amounts specified in the Bid cum Application Forms for withdrawn, rejected or unsuccessful or partially successful ASBA Bids, within 6 Working Days of the Bid Closing Date.

Interest in case of delay in dispatch of Allotment Letters or Refund Orders/instruction to SCSB by the Registrar

Allotment, including the credit of Allotted Units to the beneficiary accounts of the Depository Participants, will be made not later than six Working Days of the Bid/Issue Closing Date. If Allotment letters/refund orders have not been dispatched to the Bidders or if, in a case where the refund or portion thereof is made in electronic manner through direct credit, NEFT, RTGS or NACH, or unblocking of ASBA Accounts or the refund instructions have not been issued to the clearing system in the disclosed manner and/or demat credits are not made to Bidders within six Working Days from the Bid/ Issue Closing Date, the Investment Manager will be liable to pay interest at 15% per annum, as prescribed under the InvIT Regulations and other applicable law.

The Trust, and the Investment Manager shall not have recourse to the Net Proceeds until the final approval for listing and trading of the Units from all the Stock Exchanges where listing is sought has been received.

Withdrawal of the Issue

The Investment Manager in consultation with the Trustee and the Lead Managers, reserves the right not to proceed with the Issue at any time after the Bid/Issue Opening Date but before Allotment. If the Investment Manager, in consultation with the Lead Managers, withdraw the Issue, they will offer a public notice within two days or such other time as may be prescribed by SEBI in this regard, providing reasons for not proceeding with the Issue. The Lead Managers, through the Registrar, will notify the SCSBs to unblock the ASBA Accounts within one Working Day or such other time as may be prescribed by SEBI, from the day of receipt of such notification. The notice of withdrawal will be made available on the websites of the Stock Exchanges, the Trust, the Sponsor, the Investment Manager, as may be applicable, and will also be issued in the same newspapers where the Pre-Issue advertisements have appeared.

If the Investment Manager withdraws the Issue after the Bid/Issue Closing Date and thereafter determine that they will proceed with a further public offering of Units, they will file a fresh draft offer document with SEBI or the Stock Exchanges, as the case may be.

Notwithstanding the foregoing, the Issue is also subject to obtaining (i) the final listing and trading approvals of the Stock Exchanges, which the Investment Manager will apply for only after Allotment; and (ii) the final approval of the Final Offer Document after it is filed with SEBI and the Stock Exchanges.

In the event the Trust does not receive listing permission from the Stock Exchanges or in the event of withdrawal of the observation letter issued by SEBI, the Units shall not be eligible for listing and the Trust shall be liable to refund the subscription monies, if any, to the respective Bidders immediately, along with interest at the rate of 15% per annum, from the date of Allotment.

Minimum Subscription and Minimum Allotment

In case the Trust does not receive (i) the minimum subscription of at least 90% of the Issue; or (ii) subscription for at least 10% of the total outstanding Units by public Unitholders, on a post-Issue basis or in accordance with InvIT Regulation; or (iii) if the number of prospective Allottees (other than the Sponsor, its related parties and Associates) is less than 20, the entire subscription money shall be refunded.

Undertakings of Investment Manager

The Investment Manager hereby undertakes on behalf of the Trust that at any given time, there shall be only one denomination for the Units and that it shall comply with such disclosure and accounting norms specified

by the SEBI from time to time.

The Investment Manager further undertakes that no person connected with this Issue, including a person connected with the distribution of this Issue, shall offer any incentive, whether direct or indirect, in any manner, whether in cash or kind or services or otherwise to any person for making an application for allotment of Units, except for any fees or commission for services rendered in relation to this Issue.

STATEMENT OF POSSIBLE TAX BENEFITS AVAILABLE TO THE CITIUS TRANSNET INVESTMENT TRUST ("THE TRUST") AND ITS UNIT-HOLDERS UNDER THE APPLICABLE LAWS IN INDIA

To,
The Board of Directors,
EAAA Transinfra Managers Limited (the "Investment Manager") in its capacity as the Investment Manager of **Citius Transnet Investment Trust** (the "Trust")
Plot 294/3, Edelweiss House,
Off CST Road, Kalina, Santacruz East,
Mumbai, Maharashtra 400098

Dear Sirs,

Statement of Possible Tax Benefits available to Citius Transnet Investment Trust ("the Trust" or "issuer" or "InvIT") and its unit-holders under the applicable laws in India

1. We hereby confirm that the enclosed Annexure, prepared by management of EAAA Transinfra Managers Limited (hereinafter referred to as the "**Investment Manager**"), which states the possible tax benefits available to the Citius Transnet Investment Trust (the "**Trust**") and its unit-holders under the Income-tax Act, 2025 (the "**Act**") as amended by the Finance Act, 2026 read with applicable rules, i.e. applicable to the Financial Year 2026-27 relevant to the assessment year 2027-28 (referred to as the **"Direct Tax Law"**), presently in force in India. Several of these benefits are dependent on the Trust or its unit-holders fulfilling the conditions prescribed under the relevant provisions of the Direct Tax Law. Hence, the ability of the Trust or its unit-holders to derive the tax benefits is dependent upon their fulfilling such conditions which, based on business imperatives the Trust faces in the future, the Trust or its unit-holders may or may not choose to fulfil.

2. The benefits discussed in the enclosed Annexure are not exhaustive and the preparation of the contents stated is the responsibility of the Investment Manager. We are informed that this statement is only intended to provide general information to the investors and is neither designed nor intended to be a substitute for professional tax advice. In view of the individual nature of the tax consequences and the changing tax laws, each investor is advised to consult his or her own tax consultant with respect to the specific tax implications arising out of their participation in the proposed initial public offering of the units of the Trust (the "**Offer**") in accordance with the provisions of Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014, as amended and the guidelines and circulars issued thereunder (the "**InvIT Regulations**"). We are neither suggesting nor advising the investors to invest in the Offer relying on this statement.

3. We do not express any opinion or provide any assurance as to whether:

   i) the Trust or its unit-holders will continue to obtain these benefits in future;
   ii) the conditions prescribed for availing the benefits have been / would be met with; and
   iii) the revenue authorities/courts will concur with the views expressed herein.

4. The contents of the enclosed Annexure are based on information, explanations and representations obtained from the Investment Manager and on the basis of their understanding of the business activities and operations of the Trust.

5. This Statement is prepared solely for the purpose of inclusion in the offer document and final offer document and any other material prepared solely in connection with the Offer, and is not to be used, referred to or distributed for any other purpose.

We have no responsibility to update this Statement for events and circumstances occurring after the date of this Statement.

For **S R B C & CO LLP**

Chartered Accountants
ICAI Firm Registration Number: 324982E/E300003

per Paul Alvares
Partner
Membership Number: 105754
UDIN: 26105754GQJASG1563
Place: Pune
Date: April 01, 2026

ANNEXURE TO STATEMENT OF POSSIBLE TAX BENEFITS AVAILABLE TO CITIUS TRANSNET INFRASTRUCTURE TRUST ('CITIUS TRUST' or 'BUSINESS TRUST') AND ITS UNITHOLDERS UNDER THE APPLICABLE LAWS IN INDIA

The information provided below sets out the possible tax benefits available to the Citius Trust and its unitholders for the Financial Year 2026-27 in a summary manner only and is not a complete analysis or listing of all potential tax consequences of purchase, ownership and disposal of equity shares or units, under the Tax Laws presently in force in India. It is not exhaustive or comprehensive analysis and is not intended to be a substitute for professional tax advice.

Unitholders should consult their own tax advisors concerning the India tax implications and consequences of purchase, owning and disposing of units, including tax implications on any distributions by/receipts from Citius Trust, in their particular situation.

(I) UNDER THE INCOME-TAX ACT, 2025 (hereinafter referred to as 'the Act')

1. TAX BENEFITS AVAILABLE TO CITIUS TRUST UNDER THE ACT

Citius Trust is an **Infrastructure Investment Trust** in accordance with the Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014, as amended ('SEBI Regulations').

The following benefits are available to the Business Trust after fulfilling conditions as per the applicable provisions of the Act and the guidelines prescribed by the Securities and Exchange Board of India ('SEBI') [including the Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014, as amended] ('SEBI Regulations').

Business Trust is defined under section 2(21) of the Act to include a trust registered as an Infrastructure Investment Trust under the Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014.

1.1. Tax benefit in the hands of Citius Trust in respect of interest and dividend income received from the Special Purpose Vehicle(s) ('SPVs'):

Interest and dividend received or receivable by Citius Trust from the Project SPVs shall be exempt from tax, subject to satisfaction of conditions given under Schedule V (Table: Sl. No. 3) of the Act. For the purposes of this section, SPV means an Indian company in which the Business trust holds controlling interest and specified percentage of shareholding or interest, as may be required by the law under which such trust is granted registration.

Further, in view of the provisions of section 14 of the Act, any expenditure incurred in relation to earning the above exempt income shall not be tax deductible. In case the Tax Authorities are not satisfied by the disallowance considered by Citius, the quantum of disallowance shall be computed in accordance with the provisions of section 14 read with applicable rules.

1.2. Taxability of Capital Gains

In terms of section 223(2) of the Act, the total income of Citius Trust shall be chargeable to tax at the maximum marginal rates in force except for

(a) Income chargeable to tax on transfer of Short-term Capital assets under section 196 of the Act;

(b) Income chargeable to tax on transfer of Long-terms Capital assets under section 197 of the Act; and

(c) Income chargeable to tax on transfer of Long-term Capital assets under section 198 of the Act, w.e.f 1 April 2026

As per provisions of section 2(101), the nature of capital asset (whether long term or short term) is determined as basis the holding period.

- If the period of holding of a security (including units of business trust) listed on a recognised stock exchange in India or a unit of the Unit Trust of India or a unit of an equity-oriented fund or a zero-coupon bond is more than 12 months, it will be considered a long-term capital asset as per section 2(67) read with section 2(101) of the Act.

- In case of asset other than assets listed above the determinative period of holding shall be more than 24 months for it to be regarded as long-term capital asset.

Assets not considered as long-term capital asset shall be regarded as short-term capital assets.

As per the provisions of section 196, any income arising from transfer of short-term capital asset, being an equity share in a company or a unit of an equity- oriented fund or a unit of an eligible Business trust, transacted through a recognized stock exchange and subject to securities transaction tax, shall be taxable at 20% (plus applicable surcharge and cess if any).

As per the provisions of section 197(1) of the Act, gains arising on the transfer of long-term capital assets shall be chargeable to tax in the hands of Citius Trust at the rate of 12.5% (plus applicable surcharge and cess).

As per the provisions of section 198 of the Act, gains arising on the transfer of long-term capital asset being an equity share in a company or a unit of an equity-oriented fund or a unit of business trust shall be chargeable to tax at the rate of 12.5%, in case the long-term capital gains exceeds Rs 1,25,000 in a financial year and in case securities transaction tax has been paid –

(a) on acquisition and transfer of an equity share in a company

(b) on transfer of unit of an equity oriented fund or unit of a business trust

As per section 108 read with section 111 of the Act, short-term capital loss arising during a year is allowed to be set-off against short-term capital gains as well as long-term capital gains. Balance loss, if any, shall be carried forward and set-off against any capital gains arising during subsequent eight tax years. Also, as per section 108 of the Act, long-term capital loss arising during a year is allowed to be set-off only against long-term capital gains. Balance loss, if any, shall be carried forward and set-off against long-term capital gains arising during subsequent eight tax years.

1.3. Taxability of income received by Trust from investments other than investments made in SPVs

Any income of Citius trust other than the following shall be taxable at maximum marginal rate:

a. Income in the nature of interest and dividend received from SPV's by Citius Trust;
b. Income chargeable to tax on transfer of Short-term Capital assets under section 196 of the Act;
c. Income chargeable to tax on transfer of Long-terms Capital assets under section 197 of the Act; and
d. Income chargeable to tax on transfer of Long-term Capital assets under section 198 of the Act,

Further, pursuant to amendment in section 93 of the Act by Finance Act, 2026, no deduction of interest expenditure shall be allowable against dividend income.

2. TAX BENEFITS AVAILABLE TO UNIT-HOLDERS OF Citius Trust

2.1 Possible Benefits available to the Unitholders of Citius Trust:

Following tax benefit is specifically available to the unitholders of Citius Trust subject to the fulfilment of the conditions specified in the Act and SEBI Regulations:

2.1.1 Schedule V (Table: Sl. No. 5) of the Act - Tax exemption in respect of income distributed by Citius Trust

As per the provisions of section 223(1) of the Act, the income distributed by Citius Trust shall be deemed to be of the same nature and in the same proportion in the hands of the Unit-holder as if such income was received by or accrued to Citius Trust.

As per the provisions of Schedule V (Table: Sl. No. 5) , any income referred to in section 223 of the Act and distributed by the Business trust shall not be included in the total income of the unitholders except for the following nature of income:

(a) Interest received or receivable by Citius Trust from SPV

(b) Specified dividend i.e. dividend income received or receivable by Citius Trust from SPV in cases where SPV has exercised the option under section 200 of the Act

(c) Income referred in section 92(2)(k) of the Act

Further, in view of the provisions of section 14 of the Act, any expenditure incurred in relation to earning the exempt income under Schedule V shall not be tax deductible. In case the Tax Authorities are not satisfied by the disallowance considered by unitholders, the quantum of disallowance shall be computed in accordance with the provisions of section 14 read with applicable rules.

Interest income from loan given to SPVs [referred to Schedule V (Table: Sl. No. 3)] received by the unitholders from Citius Trust shall be taxable as follows:

(a) at the applicable tax rates, in case of resident unitholders; and

(b) at 5% (plus applicable surcharge and cess) in case of non-resident Unitholders.

Further, in case the SPVs of Citius Trust are opting for the concessional tax rate under section 200 of the Act, the dividend received by the unit holders shall be taxable in their hands as follows:

(c) at the applicable tax rates, in case of resident unitholders; and

(d) at 20% (plus applicable surcharge and cess) in case of non-resident Unitholders.

As per section 93 of the Act (amended by Finance Act, 2026), no deduction shall be allowable against the taxable dividend income.

Under the provisions of section 159(4) of the Act, a non-resident will be governed by the provisions of the Agreement for Avoidance of Double Taxation ('DTAA') between India and the country of tax residence of the non-resident, and the provisions of the Act apply to the extent they are more beneficial to the non-resident assessee.

2.1.2 Distribution in the form of loan repayment by SPV to Citius Trust and taxability in hands of unitholders of Citius Trust:

The Act has specific provisions for taxation of the income of Business trust such as dividend, interest and capital gains. However, there are certain distributions such as debts repayment by SPV to Citius Trust which are further distributed by Citius Trust

to its unitholders and the debts repayments are not covered in the tax regime for Business trust. Accordingly, the Finance Act, 2023 had introduced a new provision whereby any other distributions (such as repayment of debt) by Business trusts that presently do not suffer taxation either in the hands of Business trust or in the hands of unit holders, will henceforth be taxed as "other income" in the hands of unit holders under section 92(2)(k) of the Act.

Section 92(2)(k) of the Act provides the manner of computing the distribution which is taxable as "Other Income" in the hands of unit holders referred to as "Specified sum" which shall be the result of 'A – B - C', where:

A = aggregate of sum distributed by the business trust with respect to such unit, during the previous year or during any earlier previous year or years, to such unit holder, who holds such unit on the date of distribution of sum or to any other unit holder who held such unit at any time prior to the date of such distribution, which is,—

(a) not in the nature of income referred to in Schedule V (Table: Sl. No. 3 or 4); and

(b) not chargeable to tax under section 223(2) in the hands of Business Trust

B = amount at which such unit was issued by the business trust

C = amount charged to tax under this clause in any earlier previous year

Where B + C > A, the specified sum shall be deemed to be NIL.

- In a situation where, the cost of acquisition in the hands of the unitholder in respect of units held and distributions made in the nature of return of capital post 1 April 2023 is to be determined, the distribution received in respect of a unit in the nature of return of capital which does not result in an actual tax outflow under section 92(2)(k) should be reduced from the cost of acquisition of a unit. Otherwise, when the computation under section 92(2)(k) results in an actual tax liability, such distribution in the nature of return of capital should not be reduced from the cost of acquisition.

- The rate of tax on income from other sources is the tax rate (plus applicable surcharge and cess) applicable for residents and non-residents subject to the beneficial rate provided in the tax treaty.

- Other income (income other than interest or dividend income received by Citius Trust from SPV or income chargeable to tax under section 92(2)(k) of the Act) such as treasury income earned by the Business trust and distributed to unitholder shall be exempt in hands of unitholders as the same shall be taxable in the hands of Business trust. Further, there shall be no withholding on distribution of such other income by the Business trust to the unitholders.

2.1.3 Schedule V (Table: Sl. No. 7) of the Act - Tax exemption in respect of specified income earned by notified Sovereign Wealth Funds and Provident Funds

Exemption to 'Specified Persons' with respect to the income in the nature of **dividend or interest or long-term capital gains or other income as specified in section 92(2)(k) of the Act** arising from direct India investments made on or after 1 April 2020 but on or before 31 March 2030, inter alia, in units of an Infrastructure Investment Trust, if such investment is:

(a) made on or after the 01 April 2020 but on or before the 31 March 2030; and
(b) is held for at least 3 years

For the purposes of the above exemption, following investors are considered as 'Specified Persons':

(a) Wholly owned subsidiaries of Abu Dhabi Investment Authority which is a resident of the United Arab Emirates and makes investment, directly or indirectly, out of the fund owned by the Government of the Abu Dhabi;

(b) notified foreign Sovereign Wealth Fund ('SWF');

(c) notified foreign pension Fund ('PF');

(d) Public Investment fund of the Government of the Kingdom of Saudi Arabia; and

(e) Wholly owned subsidiary of the Public Investment Fund of the Government of the Kingdom of Saudi Arabia which-

(i) is a resident of Saudi Arabia; and

(ii) makes investment, directly or indirectly, out of the fund owned by the said Government.

For the purpose of claiming the aforesaid exemption, the aforesaid 'Specified Persons' need to be specifically notified under Schedule V (Table: SI. No. 7) and need to satisfy the conditions specified in the notification.

In this regard, please note that there are no amendments in the withholding tax provisions under the Act for providing exemption from withholding taxes on above mentioned income accruing to specified persons, however, they are eligible to apply for a lower/ nil withholding certificate.

2.2 General Benefits available to all the Unitholders of Citius Trust:

2.2.1 For resident Unitholder:

For the purpose of computation of capital gains on sale of units of Citius Trust, consideration received on sale of units of the Business trust shall be reduced by cost of acquisition of such units and expenditure incurred wholly and exclusively in connection with such sale.

The amount of distribution to the extent not chargeable to tax u/s 92(2)(k) of the Act and not covered under Schedule V (Table: SI. No. 3 and 4) or section 223(2) of the Act, shall be reduced from the cost of units, for the purpose of computation of capital gains.

Income arising from transfer of listed units held for more than 12 months and subject to securities transaction tax, shall be considered as long term capital assets. Assets not considered as long term capital assets shall be considered as short term capital assets.

Long term capital gain exceeding Rs. 1,25,000 on transfer of units shall be taxable at 12.5% as per the provisions of section 198 of the Act provided STT has been paid on transfer of the unit. The limit of Rs 1,25,000 is for whole financial year. Where such transaction is not subject to STT, long term capital gain shall be taxable at 12.5% (plus applicable surcharge and cess) as per the provisions of section 197 of the Act. In case of a Unitholder being an individual or HUF, where the total taxable income as reduced by long-term capital gains is below the basic exemption limit, the long-term capital gains will be reduced to the extent of the shortfall and only the balance long-term capital gains will be subjected to such tax in accordance with the section 198(3) or 197 of the Act.

Short-term capital gains arising on transfer of the units of Citius Trust will be chargeable to tax at the rate of 20% as per the provisions of section 196 of the Act

provided such transaction is subject to STT and through a recognized stock exchange. Where such transaction is not subject to STT, short term capital gain shall be taxable at applicable rates. In case of a Unitholder being an individual or HUF, where the total taxable income as reduced by short-term capital gains is below the basic exemption limit, the short-term capital gains will be reduced to the extent of the shortfall and only the balance short-term capital gains will be subjected to such tax in accordance with the section 196(2)of the Act.

Short-term Capital Loss computed for the given year is allowed to be set-off against Short-term/ Long-term Capital Gains computed for the said year under section 108 of the Act. Balance loss, if any, shall be carried forward and set-off against any capital gains arising during subsequent eight tax years. Also, as per section 108 of the Act, long-term capital loss arising during a year is allowed to be set-off only against long-term capital gains. Balance loss, if any, shall be carried forward and set-off against long-term capital gains arising during subsequent eight tax years.

Where the gains arising on the transfer of the units of Citius Trust are included in the business income of an assessee assessable under the head "Profits and Gains from Business or Profession" and on which securities transaction tax has been charged, such securities transaction tax shall be a deductible expense from business income as per the provisions of section 32(k) of the Act. In such case the income tax rates mentioned above for capital gains shall not apply and such business income shall be taxable at applicable rates. The characterisation of gains/ losses, arising from sale of shares, as capital gains or business income would depend on the nature of holding in the hands of the unitholder and various other factors

2.2.2 For unitholders who are Foreign Portfolio Investors ('FPIs')/ Foreign Institutional Investors ('FIIs'):

As per section 2(22) of the Act, any gain on transfer of any shares/ securities held by FII/FPI (other than those held as stock in trade) being invested in accordance with the regulations made under the Securities and Exchange Board of India Act, 1992 shall be deemed to be treated as Capital Gains. Income arising from transfer of units of Citius Trust held for more than 12 months and subject to securities transaction tax, shall be considered as long-term capital assets. Assets not considered as long-term capital assets shall be considered as short-term capital assets.

Section 210 read with section 198 of the Act provides for concessional rate of 12.5% (plus applicable surcharge and cess) on long term capital gains (exceeding Rs. 1,25,000 in a Financial Year) arising from transfer of units of Citius Trust, if such transfer is subject to STT.

As per section 210 of the Act, the tax on long term capital gains arising to the FPI/FII on transfer of listed units of Citius Trust (other than those covered under section 198) shall be at 12.5% (plus applicable surcharge and cess) without indexation benefit.

Under section 210 (Table: SI. No. 3) read with section 196 of the Act, income by way of short term capital gains arising to the FPI/ FII on transfer of units of Citius Trust shall be chargeable at the rate of 20% (plus applicable surcharge and cess) if such transaction of sale is entered on a recognised stock exchange in India and is chargeable to STT. In any other case, such gain shall be taxable at 30% (plus applicable surcharge and cess) as per section210 (Table: SI. No. 2).

As per section 108 read with section 111 of the Act, short term capital loss arising during a year is allowed to be set-off against short term capital gains as well as long term capital gains. Balance loss, if any, shall be carried forward and set-off against any capital gains arising during subsequent eight tax years. Long term capital loss arising during a year is allowed to be set-off only against long term capital gains. Balance loss, if any, shall be carried forward and set-off against long term capital gains arising during subsequent eight tax years.

In respect of non-residents, the tax rates and consequent taxation mentioned above will be further subject to any benefits available under the DTAA, if any, between India and the country in which the FII has Fiscal domicile. As per the provisions of section 159(4) of the Act, the provisions of the Act would prevail over the provisions of the DTAA to the extent they are more beneficial to the FII.

As per section 206(1)(l) of the Act, the Minimum Alternate Tax ("MAT") provisions are not applicable to foreign company, if—

(i) it is a resident of a country or a specified territory with which India has an agreement referred to in section 159(1) or the Central Government has adopted any agreement under section 159(2) and it does not have a permanent establishment in India in accordance with the provisions of such agreement; or

(ii) it is a resident of a country with which India does not have an agreement of the nature referred to in clause (i) and the assessee is not required to seek registration under any law for the time being in force relating to companies.

(iii) The total income of the company comprises solely of profits and gains from business referred to in section 61(2) (Table: Sl. Nos. 1, 3, 4 and 5) i.e. companies opting for presumptive taxation, and such income has been offered to tax at the rates specified in the respective sections.

2.2.3 For non-resident Unitholder (other than FIIs/ FPIs):

Income arising from transfer of units of Citius Trust held for more than 12 months and subject to securities transaction tax, shall be considered as long term capital assets. Assets not considered as long term capital assets shall be considered as short term capital assets.

Section 198 of the Act provides for concessional rate of 12.5% (plus applicable surcharge and cess) on long term capital gains (exceeding Rs. 1,25,000 in a financial year) arising from the units of Citius Trust, if such transaction is subjected to STT. The benefit of indexation shall not be applicable for computing long term capital gains taxable under section 198 of the Act.

As per the provisions of section 196 of the Act , short term capital gain on transfer of units shall be taxable at rate of 20% (plus applicable surcharge and cess if any), if such transaction is subjected to STT. As per section 108 read with section 111 of the Act, short term capital loss arising during a year is allowed to be set-off against short term capital gains as well as long term capital gains. Balance loss, if any, shall be carried forward and set-off against any capital gains arising during subsequent eight tax years. Long term capital loss arising during a year is allowed to be set-off only against long term capital gains. Balance loss, if any, shall be carried forward and set-off against long term capital gains arising during subsequent eight tax years.

Where the gains arising on the transfer of units of Citius Trust are included in the business income of an assessee assessable under the head "Profits and Gains from Business or Profession" and on which securities transaction tax has been charged, such securities transaction tax shall be a deductible expense from business income as per the provisions of section 32(k) of the Act. In such case the income tax rates mentioned above for capital gains shall not apply and such business income shall be taxable at applicable rates. The characterisation of gains/ losses, arising from sale of shares, as capital gains or business income would depend on the nature of holding in the hands of the unitholder and various other factors.

Under the provisions of section 159(4)of the Act, a non-resident will be governed by the provisions of the DTAA between India and the country of tax residence of the non-resident and the provisions of the Act apply to the extent they are more beneficial to the non-resident assessee.

As per section 206(1)(l), the provisions of section 206 relating to MAT shall not be applicable to a foreign company if the foreign company is a resident of a country having DTAA with India and such foreign company does not have a permanent establishment within the definition of the term in the relevant DTAA, or the foreign company is a resident of a country which does not have a DTAA with India and such foreign company is not required to seek registration under any law for the time being in force relating to companies.

Investors are advised to consult their tax advisor for computation of capital gains including cost of acquisition of units as per Indian tax laws in each case.

2.2.4 For unitholders who are Mutual Funds:

Under Schedule VII (Table: Sl. Nos. 20 and 21) of the Act, any income earned by a Mutual Fund registered under the Securities and Exchange Board of India Act, 1992, or a Mutual Fund set up by a public sector bank or a public financial institution, or a Mutual Fund authorised by the Reserve Bank of India would be exempt from income-tax, subject to such conditions as the Central Government may by notification in the Official Gazette specify in this behalf.

(II) TAX DEDUCTION AT SOURCE

Interest on securities distributed/ paid by SPVs to Citius Trust:

As per section 393(4)(Table Sl. No. 6) of the Act, interest income distributed/ paid by an SPV in respect of any securities to Citius Trust shall not be subject to withholding tax.

Dividend distribution by the SPVs to Citius Trust:

As per section **393(4)** (Table: Sl. Nos. 10) of the Act, dividend income distributed/ paid by an SPV to Citius Trust shall not be subject to withholding tax.

Interest paid by the SPVs to Citius Trust on loans:

As per section 393(4) (Table: Sl. No. 7) of the Act, interest income paid by the SPVs to Citius Trust in respect of the loans shall not be subjected to any withholding tax.

Section 393(1) (Table: Sl. Nos. 4(ii)) and 393(2) (Table: Sl. Nos. 6) – Certain income from units of Citius Trust:

Where any distributed income payable by Citius Trust referred to in section 223, is in the nature referred to in Schedule V (Table: Sl. Nos. 3) i.e., interest, to its unit holder being a resident, Citius Trust shall at the time of credit or payment of such sum, whichever is earlier, deduct tax at the rate of 10%.

In case payment referred to above is made to a non-resident unit holder, then the same shall be subjected to the tax deduction at the rate of 5% (plus applicable surcharge and cess).

Where any distributed income payable by Citius Trust referred to in section 223, is in the nature referred to in Schedule V (Table: Sl. Nos. 4) i.e. any dividend is received from SPV which has exercised the option under section 200 of the Act, shall at the time of credit of such payment to the account of the payee or at the time of payment, whichever is earlier, deduct tax at the rate of 10%. In case of payments to non-resident unit holders, the rate of 10% shall be further increased by applicable surcharge and cess.

No tax is required to be deducted on dividend income distributed by Citius Trust to the unit holders, in case such dividend is received from an SPV which has not opted for the option under section 200.

Section 393(5) – Distribution by Citius Trust to Mutual Funds:

As per section 393(5) of the Act, no tax is to be deducted from income distributed/ paid by Citius Trust to a Mutual Fund specified at Schedule VII (Table: SI. No. 20 or 21) of the Act.

Applicability of other provisions

No income tax is deductible at source from income by way of capital gains arising to a resident unitholder under the present provisions of the Act. However, as per the provisions of Section 393(2) (Table: Sl. Nos. 17) of the Act, any income by way of capital gains payable to non-residents may be subject to withholding of tax at the rate under the domestic tax laws or under DTAA, whichever is beneficial to the assessee, unless a lower withholding tax certificate is obtained by non-resident from the tax authorities. However, the non-resident investor will have to furnish a certificate of him being a tax resident in a country outside India and a suitable declaration for not having a fixed base/ permanent establishment in India, to get the benefit of the applicable DTAA and such other document as may be prescribed as per the provision of section 159(8)of Act.

As per rule 217 of Income tax Rules, 2026, requirement of quoting permanent account number (PAN) in case of certain specified income of non-residents is eliminated by maintaining specified documents as mentioned in the said notification. In any other case, the tax needs to be deducted at applicable rate or 20%, whichever is higher, if unitholder doesn't have valid PAN.

Notes:

1. The income-tax rates specified in this note are as applicable for the financial year 2026-27, and are exclusive of surcharge and education cess, if any. Rate of surcharge and cess are provided below:

   Surcharge:

   Domestic companies / Co-operative Societies (not opting for Section 200/ 201/203):

   If the net income does not exceed INR 10 million – Nil

   If the net income exceeds INR 10 million but does not exceed INR 100 million - 7 per cent

   If the net income exceeds INR 100 million - 12 per cent

   Domestic companies / Co-operative Societies (opting for Section 200/ 201/203): 10%

   Foreign companies:

   If the net income does not exceed INR 10 million - Nil

   If the net income exceeds INR 10 million but does not exceed INR 100 million - 2 per cent

   If the net income exceeds INR 100 million - 5 per cent

   Individuals, HUF, AOP and BOI:

   If the net income does not exceed INR 5 million – Nil

   If the net income exceeds INR 5 million but does not exceed INR 10 million – 10 per cent

   If the net income exceeds INR 10 million but does not exceed INR 20 million – 15 per cent

   If the net income exceeds INR 20 million but does not exceed INR 50 million – 25 per cent

   If the net income exceeds INR 50 million – 37 per cent

   The enhanced surcharge of 25% and 37%, is not levied on dividend income and income chargeable to tax under sections 196, 197, 198 and 210(1) (Table: SI. No. 2, 3, 4 and 5). The maximum rate of surcharge on tax payable on such incomes shall be 15 per cent. Further, the rate of surcharge cannot exceed 25 per cent if such assessee had opted for new regime u/s 202.

   For other assessees, surcharge at the rate of 12% shall be applicable if the total income exceeds INR 10 million.

   Health and Education cess:

   In all cases, health and education cess will be levied at the rate of 4 per cent of income-tax and surcharge.

3. The above annexure to statement of possible direct tax benefits sets out the provisions of law in a summary manner only and is not a complete analysis or listing of all potential tax consequences of the purchase, ownership and disposal of Shares, units and other securities.

4. The above annexure covers only certain relevant direct tax law benefits and does not cover any indirect tax law benefits or benefit under any other law.

5. The stated benefits will be available only to the sole/ first named holder in case the units are held by joint holders.

6. In respect of non-residents, the tax rates and the consequent taxation mentioned above shall be further subject to any benefits available under the applicable tax treaty, if any, between India and the country in which the non-resident has fiscal domicile.

7. This annexure is intended only to provide general information to the investors and is neither designed nor intended to be substituted for professional tax advice. In view of the individual nature of tax consequences, each investor is advised to consult his/her own tax advisor with respect to specific tax consequences of his/her participation in the scheme.

8. No assurance is given that the revenue authorities/courts will concur with the views expressed herein. Our views are based on the existing provisions of law and its interpretation, which are subject to changes from time to time. We do not assume responsibility to update the views consequent to such changes. We shall not be liable to any person in respect of this annexure.

9. This annexure to statement of possible direct tax benefits enumerated above is as per the Act as amended by the Finance Act, 2026. The above statement of possible direct-tax benefits sets out the possible tax benefits available to the Business Trust and its unitholders under the current tax laws presently in force in India. Several of these benefits available are dependent on the taxpayer's parties to the transaction fulfilling the conditions prescribed under the relevant tax laws.

10. The information provided above sets out the possible tax benefits available to the investors in a summary manner only and is not a complete analysis or listing of all potential tax consequences of the purchase, ownership and disposal of units and other securities, under the current tax laws presently in force in India. It is not exhaustive or comprehensive and is not intended to be a substitute for professional advice. Investors are advised to consult their own tax consultant with respect to the tax implications of an investment in the units particularly in view of the fact that certain recently enacted legislation may not have a direct legal precedent or may have a different interpretation impacting the benefits, which an investor can avail.

Note: With effect from 1 April 2026, The Income-tax Act, 2025 ('ITA 2025') will become effective replacing existing Income-tax Act, 1961 ('ITA 1961'). Accordingly, we have captured the references to the sections of ITA 2025. Further, please note that the Finance Bill, 2026 is currently pending presidential assent.

LEGAL MATTERS

Each of Shardul Amarchand Mangaldas & Co., Linklaters Singapore Pte. Ltd. and AZB & Partners, severally and not jointly, do not make, or purport to make, any statement in this Offer Document and is not aware of any statement in this Offer Document which purports to be based on a statement made by each of them, and it makes no representation, express or implied, regarding, and to the extent permitted by law takes no responsibility for, any statement in or omission from this Offer Document.

INDEPENDENT ACCOUNTANTS

The Special Purpose Combined Financial Statements have been prepared in accordance with the Guidance Note on Combined and Carve-out Financial Statements, Guidance Note on Reports in Company Prospectus (Revised 2019) issued by the ICAI, to the extent not inconsistent with the InvIT Regulations and InvIT Master Circular, as amended and in accordance with Ind AS notified under the Companies (Indian Accounting Standards) Rules, 2015 (as amended from time to time) and other accounting principles generally accepted in India and presentation requirements of Division II of Schedule III to the Companies Act, 2013 (as amended from time to time), with the exceptions and modifications as mentioned in InvIT Regulations. The Special Purpose Combined Financial Statements included in this Offer Document have been audited by S R B C & CO LLP, Chartered Accountants, the statutory auditors of the Trust, as stated in their audit report dated March 23, 2026 included in this Offer Document.

MATERIAL CONTRACTS AND DOCUMENTS FOR INSPECTION

The following contracts, which are or may be deemed material have been entered or are to be entered into in due course. These contracts and also the documents for inspection referred to hereunder, may be inspected at the principal place of business of the Trust, from 10:00 A.M. to 5:00 P.M., on all Working Days from the date of filing this Offer Document until the Bid/Issue Closing Date. Any of the contracts or documents mentioned in this Offer Document may be amended or modified at any time if so required in the interest of the Trust or if required by the other parties, without reference to the Unitholder, subject to compliance with applicable law.

1. Trust Deed entered into among the Sponsor and the Trustee dated July 21, 2025.

2. Investment management agreement entered into among the Trustee (acting on behalf of the Trust) and the Investment Manager dated July 22, 2025.

3. SEBI registration certificate for the Trust bearing number IN/InvIT/25-26/0032 dated August 1, 2025 as an infrastructure investment trust.

4. Issue agreement entered into among the Trust (acting through its Trustee), the Investment Manager, the Trustee, the Sponsor, the Project Manager, and the Lead Managers, dated December 3, 2025.

5. Cash escrow and sponsor bank agreement dated April 7, 2026 entered into among the Trust (acting through its Trustee), the Investment Manager, the Trustee, the Sponsor, the Lead Managers and the Sponsor Banks.

6. Tripartite agreement dated January 23, 2026 among NSDL, the Trust, and the Registrar.

7. Tripartite agreement dated November 27, 2025 among CDSL, the Trust and the Registrar.

8. Certified copies of the updated Memorandum and Articles of Association of the Investment Manager as amended from time to time.

9. Resolution of the IM Board dated November 28, 2025, authorising this Issue.

10. Resolution of the IM Board dated November 28, 2025 and InvIT Committee dated December 3, 2025, approving the Draft Offer Document.

11. Resolution of the IM Board dated April 7, 2026 approving this Offer Document and ratification of any changes to the Offer Document by way of a circular resolution dated April 8, 2026.

12. Consents from the (i) Lead Managers; (ii) Legal counsel to the Trust, the Investment Manager and to the Sponsor as to Indian law; (iii) Legal counsel to the Lead Managers as to Indian Law; (v) Valuer; (vi) Registrar; (vii) Compliance Officer of the Trust; (viii) Technical Consultants; (ix) Traffic Consultant; (x) Industry Report Provider; and (xi) Internation Legal counsel to the Lead Managers.

13. Special Purpose Combined Financial Statements for nine months ended December 31, 2025, Financial Years ended March 31, 2025, March 1, 2024 and March 31, 2023, and the report dated March 23, 2026 thereon.

14. Projections of Revenue from Operations and Cash Flow from Operating Activities and the report dated April 1, 2026 thereon.

15. Report on the Statement of Possible Special Tax Benefits available to Citius TransNet Investment Trust and its unitholders under the applicable laws in India dated April 1, 2026 issued by the Auditor.

16. Corporate governance policies adopted by the Investment Manager on behalf of the Trust.

17. In-principle listing approval each dated February 3, 2026 issued by BSE and NSE.

18. SEBI observation letter bearing number HO/17/22/11(1)2026-DDHS-RAC I/5219/2026 dated February 18, 2026.

19. NSE undertaking dated January 30, 2026.

20. Due diligence certificate dated December 3, 2025 addressed to SEBI from the Lead Managers.

21. Syndicate agreement dated April 7, 2026 entered into among the Lead Managers, the Syndicate Members, the Trust (acting through the Trustee), the Investment Manager and the Registrar to the Issue.

22. Underwriting agreement dated [●] entered into among the Underwriters, the Trust (acting through the Trustee), the Investment Manager, the Trustee, the Sponsor and the Project Manager.

23. Registrar agreement dated December 3, 2025, entered into among the Trustee (acting on behalf of the Trust), Investment Manager, and the Registrar to the Issue.

24. Securities purchase agreements dated April 7, 2026 entered into among the Trustee (acting on behalf of the Trust), the Investment Manager, the relevant Initial Portfolio Assets, and other shareholders of the relevant Initial Portfolio Assets.

25. Securities swap agreement dated March 24, 2026 entered into among the Trust (acting through its Trustee), Investment Manager, Sponsor, Epic 3, Munjal Mavjibhai Lakhani, Ashta Liners Private Limited, and MVS Ventures Private Limited.

26. Securities swap agreement dated March 23, 2026 entered into among the Trust (acting through its Trustee), Investment Manager, Sponsor, Epic 3, Unifi Financial Pvt Ltd, Hindustan Composites Limited, and Biostadt India Limited.

27. Securities swap agreement dated March 24, 2026 entered into among the Trust, Investment Manager, Sponsor, Thrissur Expressway Limited, Svastha Consulting LLP, SJPM Enterprise Private Limited, Malpani Retails Private Limited, KRBL Limited, Famy Finance Private Limited, and Global Aluminium/ Grow 5.

28. ROFO agreement dated April 7, 2026 entered into among the Trust (acting through its Trustee), the Investment Manager, Sponsor, EPIC Concesiones 2 Private Limited, Infrastructure Yield Plus II, Infrastructure Yield Plus IIA and India Infrastructure Yield Plus II.

29. Trust loan agreement to be entered into among the Trustee (acting on behalf of the Trust), the Investment Manager and certain Project SPVs.

30. DTAs – Cash Consideration each dated April 8, 2026 entered into with respect to the non-convertible debentures respectively issued by JSEL, Dhola, Dibang and TEL.

31. DTAs – Swap Consideration each dated April 8, 2026 entered into with respect to the non-convertible debentures respectively issued by AMTPL, PECPL and RVTPL.

32. DTAs – Swap Consideration dated March 23, 2026 entered into with respect to the non-convertible debentures issued by TEL.

33. Deed(s) of assignment each dated April 7, 2026 entered into amongst the relevant Initial Portfolio Assets and the Trust.

34. Matters management agreements each dated April 7, 2026 entered into by SRTPL, DTPL and Dibang with the Trust.

35. Project implementation and management agreement dated April 7, 2026 entered into among the Trustee (acting on behalf of the Trust), the Investment Manager, the Project Manager and the Initial Portfolio Assets.

36. Concession agreement entered into between Jorabat Shillong Expressway Limited and National Highways Authority of India dated July 16, 2010.

37. Concession agreement entered into between Samkhiali Bhachau Gandhidham Tollway Private Limited and National Highways Authority of India dated March 17, 2010.

38. Concession agreement entered into between Panipat Elevated Corridor Private Limited and National Highways Authority of India dated July 27, 2005.

39. Concession agreement entered into between Deccan Tollway Private Limited and National Highways Authority of India dated February 2, 2012.

40. Concession agreement entered into between Thrissur Expressway Limited and National Highways Authority of India dated August 24, 2009.

41. Concession agreement entered into between Dhola Infra Projects Private Limited and Ministry of Road Transport and Highways dated November 3, 2010.

42. Concession agreement entered into between Dibang Infra Projects Private Limited and Ministry of Road Transport and Highways dated November 3, 2010.

43. Concession agreement entered into between Ahmedabad – Maliya Tollway Private Limited and Gujarat State Road Development Corporation Limited dated September 17, 2008.

44. Concession agreement entered into between Ahmedabad – Maliya Tollway Private Limited and Gujarat State Road Development Corporation Limited dated October 30, 2025.

45. Concession agreement entered into between Rajkot-Vadinar Tollway Private Limited and Gujarat State Road Development Corporation Limited dated September 17, 2008.

46. Concession agreement entered into between Sambalpur-Rourkela Tollway Private Limited and Orissa Works Department dated November 8, 2013.

Any of the contracts or documents mentioned in this Offer Document may be amended or modified at any time if so required in the interest of the Trust or if required by the other parties, without reference to the Unitholders, subject to compliance with applicable law.

DECLARATION

The Investment Manager hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Offer Document is contrary to the applicable provisions of the InvIT Regulations, the SCRA, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be). The Investment Manager further certifies that all the statements and disclosures in this Offer Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

For **EAAA TransInfra Managers Limited**

Bhavyang Oza
Whole time Director
Date: April 8, 2026
Place: Mumbai

DECLARATION

The Investment Manager hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Offer Document is contrary to the applicable provisions of the InvIT Regulations, the SCRA, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be). The Investment Manager further certifies that all the statements and disclosures in this Offer Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

For **EAAA TransInfra Managers Limited**

Sreekumar Chatra
Non-executive Director
Date: April 8, 2026
Place: Mumbai

DECLARATION

The Investment Manager hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Offer Document is contrary to the applicable provisions of the InvIT Regulations, the SCRA, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be). The Investment Manager further certifies that all the statements and disclosures in this Offer Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

For **EAAA TransInfra Managers Limited**

Vidya Basarkod
Independent Director
Date: April 8, 2026
Place: New Delhi

DECLARATION

The Investment Manager hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Offer Document is contrary to the applicable provisions of the InvIT Regulations, the SCRA, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be). The Investment Manager further certifies that all the statements and disclosures in this Offer Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

For **EAAA TransInfra Managers Limited**

Suresh Gurumani
Independent Director
Date: April 8, 2026
Place: Kanchipuram

DECLARATION

The Investment Manager hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Offer Document is contrary to the applicable provisions of the InvIT Regulations, the SCRA, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be). The Investment Manager further certifies that all the statements and disclosures in this Offer Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

For **EAAA TransInfra Managers Limited**

Emandi Sankara Rao
Independent Director
Date: April 8, 2026
Place: Visakhapatnam

DECLARATION

The Investment Manager hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Offer Document is contrary to the applicable provisions of the InvIT Regulations, the SCRA, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be). The Investment Manager further certifies that all the statements and disclosures in this Offer Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

For **EAAA TransInfra Managers Limited**

Subahoo Chordia
Non-executive Director
Date: April 8, 2026
Place: Mumbai

DECLARATION

The Sponsor hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Offer Document is contrary to the applicable provisions of the InvIT Regulations, the SCRA, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be). The Sponsor further certifies that all the statements and disclosures in this Offer Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

For **Epic Transnet Infrastructure Private Limited** (*formerly known as Watrak Infrastructure Private Limited*)

Manish Chitkara
Non- executive Director
Date: April 8, 2026
Place: Mumbai

DECLARATION

The Sponsor hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Offer Document is contrary to the applicable provisions of the InvIT Regulations, the SCRA, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be). The Sponsor further certifies that all the statements and disclosures in this Offer Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

For **Epic Transnet Infrastructure Private Limited** (*formerly known as Watrak Infrastructure Private Limited*)

Sreekumar Chatra
Non-executive director
Date: April 8, 2026
Place: Mumbai

DECLARATION

The Sponsor hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Offer Document is contrary to the applicable provisions of the InvIT Regulations, the SCRA, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be). The Sponsor further certifies that all the statements and disclosures in this Offer Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

For **Epic Transnet Infrastructure Private Limited** (*formerly known as Watrak Infrastructure Private Limited*)

Jimmy Jain
Non-executive Director
Date: April 8, 2026
Place: Mumbai

DECLARATION

The Sponsor hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Offer Document is contrary to the applicable provisions of the InvIT Regulations, the SCRA, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be). The Sponsor further certifies that all the statements and disclosures in this Offer Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

For **Epic Transnet Infrastructure Private Limited** (*formerly known as Watrak Infrastructure Private Limited*)

Tharuvai Venugopal Rangaswami
Non - executive Director
Date: April 8, 2026
Place: Mumbai

DECLARATION

The Trustee hereby declares and certifies that all relevant provisions of the InvIT Regulations, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Offer Document is contrary to the applicable provisions of the InvIT Regulations, the SCRA, SEBI Act and all rules, regulations and guidelines issued by the GoI or SEBI (as the case may be). The Trustee further certifies that all the statements and disclosures in this Offer Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make an informed decision.

For **Axis Trustee Services Limited**

_____

Authorised Signatory
Date: April 8, 2026
Place: Mumbai

ANNEXURE A – VALUATION REPORT

(The remainder of this page is intentionally kept blank)

Prepared for:
Citius TransNet Investment Trust (**"the Trust"**)

EAAA TransInfra Managers Limited (**"the Investment Manager"**)

Valuation as per SEBI (Infrastructure Investment Trusts) Regulations, 2014 as amended

Fair Enterprise Valuation

Valuation Date: 31st December 2025

Report Date: 23rd March 2026

Mr. S Sundararaman,
Registered Valuer,
IBBI Registration No - IBBI/RV/06/2018/10238
Email: chennaissr@gmail.com
Phone no: +91 97909 28047
GST No: 33AHUPS0102L1Z85B

RV/SSR/F/01/R01 **Date: 23rd March,2026**

Citius TransNet Investment Trust
(acting through Axis Trustee Services Limited [in its capacity as "the Trustee" of the Trust])
Plot 294/3, Edelweiss House, Off CST Road,
Kalina, Santacruz East, Mumbai 400098,
Maharashtra, India

EAAA TransInfra Managers Limited
(acting as the Investment Manager to Citius TransNet Investment Trust)
Plot 294/3, Edelweiss House, Off CST Road,
Kalina, Santacruz East, Mumbai 400098,
Maharashtra, India

Sub: Financial Valuation of InvIT assets as per SEBI (Infrastructure Investment Trusts) Regulations, 2014, as amended ("the SEBI InvIT Regulations")

Dear Sir(s)/ Madam(s),

I, Mr. S. Sundararaman ("**Registered Valuer**" or "**RV**" or "**I**" or "**My**" or "**Me**") bearing IBBI registration number IBBI/RV/06/2018/10238, have been appointed vide letter dated 10th February, 2026 (EL reference no: RV/SSR/EL/F/01) as an independent valuer, as defined under Regulation 2(zzf) of the SEBI InvIT Regulations, by **EAAA TransInfra Managers Limited** ("**ETML**" or "**the Investment Manager"**) acting as the Investment manager for **Citius Transnet Investment Trust** ("**the Trust**" or "**Citius**"), an infrastructure investment trust, registered with the **Securities Exchange Board of India** (**"SEBI"**) with effect from 1st August 2025, bearing registration number IN/InvIT/25-26/0032 and Axis Trustee Services Limited ("**the Trustee**") acting on behalf of the Trust for the purpose of the fair enterprise valuation of the 10 special purpose vehicles (defined below and hereinafter together referred as "**the SPVs**") forming part of the formation transaction of the InvIT as per the requirements of the Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014, as amended from time to time ("**SEBI InvIT Regulations**").

The SPVs will be forming part of the Initial Portfolio Assets and are proposed to be transferred to the Trust as per the extant provisions of the SEBI InvIT Regulations, where ETML is acting as the Investment Manager and Epic Transnet Infrastructure Private Limited (formerly known as Watrak Infrastructures Private Limited) ("**the Sponsor**" or "**ETIPL**") is acting as the Sponsor within the meaning of SEBI InvIT Regulations.

The following Special Purpose Vehicle are proposed to be transferred to Trust:

Sr No	Name of the SPVs	Abbreviations	FCOD	Asset Type
1	Ahmedabad - Maliya Tollway Private Limited	AMTPL	22-Jun-23	State Toll
2	Deccan Tollways Private Limited	DTPL	17-Sep-19; 20-Oct-23	NHAI Toll
3	Panipat Elevated Corridor Private Limited	PECPL	17-Mar-11	NHAI Toll
4	Rajkot - Vadinar Tollway Private Limited	RVTPL	17-Jun-23	State Toll
5	Samkhiali Bhachau Gandhidham Tollway Private Limited	SBGTPL	09-Dec-24	NHAI Toll
6	Sambalpur-Rourkela Tollway Private Limited	SRTPL	30-Mar-21	State Toll
7	Thrissur Expressway Limited	TEL	14-Jun-24	NHAI Toll
8	Dhola Infra Projects Private Limited	Dhola	13-Oct-18	MoRTH Annuity
9	Dibang Infra Projects Private Limited	Dibang	12-Dec-18	MoRTH Annuity
10	Jorabat Shillong Expressway Limited	JSEL	30-Aug-19	NHAI Annuity

*(Hereinafter referred to as "**the SPVs"**)*

I understand that the InvIT, acting through the Trustee, shall acquire two HoldCos namely; EPIC3 and SRPL (along with their subsidiaries, including the SPVs listed above) and one SPV namely; TEL. The Trust shall either pay cash consideration or swap units for consideration payable for the above mentioned acquisitions. The units of Trust are to be listed on BSE and NSE consequent to the proposed Initial Public Offer ("**The Proposed Transaction**")

In this regard, the Investment Manager intends to undertake the fair enterprise valuation of the SPVs as on 31st December 2025 ("**Valuation Date**") as per the provisions of the SEBI InvIT Regulations. I am enclosing the independent valuation Report providing opinion on the fair enterprise value of the SPVs as defined above on a going concern basis as at 31st December 2025.

Enterprise Value ("**EV**") is described as the total value of the equity in a business plus the value of its debt and debt related liabilities, minus any cash and cash equivalents to meet those liabilities. The attached Report details the valuation methodologies used, calculations performed, and the conclusion reached with respect to this valuation.

I was further requested by the Investment Manager to provide the adjusted enterprise value of the SPVs as at 31st December 2025, where the adjusted enterprise value ("**Adjusted EV**") is derived as EV as defined above plus cash and cash equivalents (including Investments and FD with Banks) of the SPVs as at 31st December 2025.

This Report has been prepared solely for the purpose of inclusion as part of the Draft Offer Document ("**DOD**") and Final Offer Document ("**FOD**") and such other documents as may be required in accordance with the independent valuation required as per the SEBI InvIT Regulations.

I have relied on explanations and information provided by the Investment Manager. Although I have reviewed such data for consistency, those are not independently investigated or otherwise verified. My team and I have no present or planned future interest in the Trust, the HoldCos, the SPVs or the Investment Manager except to the extent of this appointment as an independent valuer and the fee for this Valuation Report ("**Report**") which is not contingent upon the values reported herein. The valuation analysis should not be construed as investment advice, specifically, I do not express any opinion on the suitability or otherwise of entering into any financial or other transaction with the Trust.

The analysis must be considered as a whole. Selecting portions of any analysis or the factors that are considered in this Report, without considering all factors and analysis together could create a misleading view of the process underlying the valuation conclusions. The preparation of a valuation is a complex process and is not necessarily susceptible to partial analysis or summary description. Any attempt to do so could lead to undue emphasis on any particular factor or analysis.

The information provided to me by the Investment Manager in relation to the HoldCos and SPVs included but not limited to historical financial statements, forecasts/projections, other statements and assumptions about future matters like forward-looking financial information prepared by the Investment Manager. The forecasts and projections as supplied to me are based upon assumptions about events and circumstances which are yet to occur.

I have not tested individual assumptions or attempted to substantiate the veracity or integrity of such assumptions in relation to the forward-looking financial information, however, I have made sufficient enquiry to satisfy myself that such information has been prepared on a reasonable basis.

Notwithstanding anything above, I cannot provide any assurance that the forward-looking financial information will be representative of the results which will actually be achieved during the cash flow forecast period.

The valuation provided by me and the valuation conclusion are included herein and the Report complies with the SEBI InvIT Regulations and guidelines, circular or notification issued by Securities and Exchange Board of India **("SEBI")** thereunder.

Please note that all comments in the Report must be read in conjunction with the caveats to the Report, which are contained in Section 10 of this Report. This letter, the Report and the summary of valuation included herein can be provided to Trust's advisors and may be made available for the inspection to the public and with the SEBI, the stock exchanges and any other regulatory and supervisory authority, as may be required.

I draw your attention to the limitation of liability clauses in Section 10 of this Report. This letter should be read in conjunction with the attached Report.

Yours faithfully,



S. Sundararaman
Registered Valuer
IBBI Registration No.: IBBI/RV/06/2018/10238
Asset Class: Securities or Financial Assets
Place: Chennai
UDIN: 26028423AHSLKR5398

Definition, abbreviation & glossary of terms

Abbreviations	Meaning
AMTPL	Ahmedabad - Maliya Tollway Private Limited
BOT	Build, Operate and Transfer
CAF	Cash Accrual Factor
Capex	Capital Expenditure
CCIL	Clearing Corporation of India Limited
CCM	Comparable Companies Multiples
COD	Commercial Operation Date
Cr	Crores
CTM	Comparable Transactions Multiples
DBFOT	Design, Build, Finance, Operate and Transfer
DCF	Discounted Cash Flow
DF	Discounting Factor
Dhola	Dhola Infra Projects Private
Dibang	Dibang Infra Projects Private Limited
DTPL	Deccan Tollways Private Limited
EAAA	EAAA India Alternatives Limited
EBITDA	Earnings Before Interest, Taxes, Depreciation and Amortization
EIYP	Edelweiss Infrastructure Yield Plus Fund
EPIC3	Epic Concesiones 3 Private Limited
ERP	Equity Risk Premium
ETC	Electronic Toll Collection
EV	Enterprise Value
FCFF	Free Cash Flow to the Firm
FDI	Foreign Direct Investment
FCOD	Final Commercial Operation Date
FPM	Final Placement Memorandum
FY	Financial Year Ended 31st March
GSRDC	Gujarat State Road Development Corporation
GQ	Golden Quadrilateral
HAM	Hybrid Annuity Model
Holdco(s)	Holding Company(ies)- Collectively, (i) Epic 3; and (ii) SRPL
ICDS	Income Computation and Disclosure Standards
Ind AS	Indian Accounting Standards
Initial Portfolio Assets	Unless the context otherwise requires, collectively, (i) Epic 3; (ii) SRPL; (iii) AMTPL; (iv) SBGTPL; (v) PECPL; (vi) SRTPL; (vii) DTPL; (viii) RVTPL; (ix) JSEL; (x) Dhola; (xi) Dibang; and (xii) TEL
INR	Indian Rupees
Investment Manager/ETML	EAAA TransInfra Managers Limited

Abbreviations	Meaning
IVS	ICAI Valuation Standards 2018
IYT	Infrastructure Yield Trust and its schemes; Infrastructure Yield Plus II, Infrastructure Yield Plus IIA and India Infrastructure Yield Plus II
JSEL	Jorabat Shillong Expressway Limited
Kms	Kilometers
MMR	Major Maintenance and Repairs
Mn	Million
MoRTH	Ministry of Road Transport and Highways
NAV	Net Asset Value Method
NCA	Net Current Assets Excluding Cash and Bank Balances
NH	National Highway
NHAI	National Highways Authority of India
NHDP	National Highways Development Project
NMTL	Neelambur Madukkarai Tollway Private Limited
NS-EW	North- South and East-West Corridors
O&M	Operation & Maintenance
PECPL	Panipat Elevated Corridor Private Limited
PM/ ETPMPL	Project Manager/ Epic Transnet Project Management Private Limited (formerly known as Chennai-Tada Tollway Private Limited)
PPP	Public Private Partnership
PVFCFF	Present value of Free Cash Flow to the Firm
RV	Registered Valuer
RVTPL	Rajkot - Vadinar Tollway Private Limited
SEBI	Securities and Exchange Board of India
SEBI InvIT Regulations	SEBI (Infrastructure Investment Trusts) Regulations, 2014, as amended
SBGTPL	Samkhiali Bhachau Gandhidham Tollway Private Limited
SH	State Highway
Sponsor/ ETIPL	Epic Transnet Infrastructure Private Limited (formerly known as Watrak Infrastructures Private Limited)
SPV	Special Purpose Vehicle
SRPL	SRPL Roads Private Limited
SRTPL	Sambalpur-Rourkela Tollway Private Limited
TEL	Thrissur Expressway Limited
Trust	Citius TransNet Investment Trust
Trustee	Axis Trustee Services Limited
Wcap	Incremental Working Capital
WD(O)	Works Department, Government of Odisha

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1. Executive Summary

Background

1.1. The Trust

(i) Citius TransNet Investment Trust ("**the Trust**" or "**InvIT**") was established on 21st July 2025 as an irrevocable trust pursuant to the trust deed under the provisions of the Indian Trusts Act, 1882. The Trust is registered as an Indian infrastructure investment trust with the Securities and Exchange Board of India ("**SEBI**") with effect from 1st August 2025, bearing registration number IN/InvIT/25-26/0032, pursuant to the SEBI (Infrastructure Investment Trusts) Regulations, 2014, as amended from time to time ("**the SEBI InvIT Regulations**").

(ii) The Trust is an infrastructure investment trust established to acquire, manage and invest in a portfolio of infrastructure assets across sectors and/or securities of companies engaged in the infrastructure sector. The Trust has proposed to acquire the SPVs and would be responsible for holding the SPVs in trust and for the benefit of the unitholders, undertaking the activities and other duties specified as per the SEBI InvIT Regulations. Axis Trustee Services Limited ("**the Trustee**") has been appointed as the Trustee of the Trust.

(iii) The Initial Portfolio Assets is proposed to include 10 road SPVs (7 Toll Assets, and 3 Annuity Assets having a total length of 3,411 kms) and two HoldCos (EPIC3 and SRPL) in the Indian states of Gujarat, Odisha, Telangana, Karnataka, Kerala, Haryana, Assam, Meghalaya and Arunachal pursuant to the concessions granted by the National Highways Authority of India ("NHAI"), Ministry of Road Transport and Highways ("MoRTH"), Gujarat State Road Development Corporation ("GSRDC") and the Works Department, Government of Odisha ("WD(O)").

1.2. The Sponsor

(i) Epic Transnet Infrastructure Private Limited (**"the Sponsor"** or "**ETIPL**") is the Sponsor of the Trust. The Sponsor is a private company limited by shares and was originally incorporated as 'Watrak Infrastructure Private Limited' in India under the Companies Act, 2013, pursuant to a certificate of incorporation issued by the Registrar of Companies, Central Registration Centre dated 18th November 2001. Subsequently, a fresh certificate of incorporation dated 18th September 2025 was issued by the Registrar of Companies, Central Registration Centre, pursuant to the change in the name of the Sponsor from 'Watrak Infrastructure Private Limited' to 'Epic Transnet Infrastructure Private Limited'.

(ii) The Sponsor has also entered into engineering, procurement and construction contract/supply and installation agreements.

(iii) The Sponsor, in its capacity as the settlor set up the Trust, namely, Citius TransNet Infrastructure Trust on 21st July, 2025, as a contributory, determinate, irrevocable infrastructure investment trust under the provisions of the Indian Trusts Act, 1882, pursuant to the Trust Deed. The Trust was registered as an infrastructure investment trust with the SEBI under the Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014 on 1st August, 2025 having registration number IN/InvIT/25-26/0032.

(iv) Axis Trustee Services Limited ("**the Trustee**") has been appointed as the Trustee of the InvIT.

(v) The Sponsor is wholly owned by Infrastructure Yield Trust (through its schemes Infrastructure Yield Plus II, Infrastructure Yield Plus IIA and India Infrastructure Yield Plus II), an AIF managed by EAAA India Alternatives Limited ("EAAA").

The Equity Shareholding Pattern of the Sponsor as on 31st December 2025 is as under:

Sr. No	Particulars	No. of shares	%
1	Infrastructure Yield Trust (along with its schemes)	31,287,294	100.00%
	Total	**31,287,294**	**100.00%**

Source: Investment Manager

1.3. The Investment Manager

(i) EAAA TransInfra Managers Limited ("**ETML**" or "**the Investment Manager**") has been appointed as the Investment Manager to the Trust by the Trustee and will be responsible to carry out the duties of such person as mentioned under the SEBI InvIT Regulations. The Investment Manager is a 100% subsidiary of EAAA India Alternatives Limited.

(ii) The Equity Shareholding Pattern of the Investment Manager as on 31st December 2025 is as under:

Sr. No	Particulars	No. of Shares	%
1	EAAA India Alternatives Limited	71,844	100.00%
2	Subahoo Chordia*	1	0.00%
3	Hemal Mehta*	1	0.00%
4	Vinit Agrawal*	1	0.00%
5	Deepak Mukhija*	1	0.00%
6	Niranjan Risbood*	1	0.00%
7	Bhanudas Jadhav*	1	0.00%
	Total	**71,850**	**100.00%**

**as a Nominee of EAAA India Alternatives Limited*
Source: Investment Manager

1.4. The Project Manager

(i) Epic Transnet Project Management Private Limited (formerly known as Chennai-Tada Tollway Private Limited) ("**ETPMPL**" or "**the Project Manager**") has been appointed the project manager of the Trust. ETMPL is a wholly owned subsidiary of ETIPL.

(ii) The Equity Shareholding Pattern of the Project Manager as at 31st December 2025 is as follows:

Sr. No	Particulars	No. of shares	%
1	Epic Transnet Infrastructure Private Limited*	42,000,000	100.00%
	Total	**42,000,000**	**100.00%**

**Includes shares held by the nominees of Epic Transnet Infrastructure Private Limited*
Source: Investment Manager

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1.5. Companies Proposed to be Acquired

The Trust proposes to acquire two Holding Companies and one SPV.

A. Epic Concesiones 3 Private Limited (EPIC3),
B. SRPL Roads Private Limited (SRPL) and
C. Thrissur Expressway Limited (TEL)

A. EPIC3 holds 6 BOT (Toll) SPVs namely:

(i) Ahmedabad - Maliya Tollway Private Limited (AMTPL)
(ii) Deccan Tollways Private Limited (DTPL)
(iii) Panipat Elevated Corridor Private Limited (PECPL)
(iv) Rajkot - Vadinar Tollway Private Limited (RVTPL)
(v) Samkhiali Bhachau Gandhidham Tollway Private Limited (SBGTPL)
(vi) Sambalpur-Rourkela Tollway Private Limited (SRTPL)

The Equity Shareholding of EPIC3 as on the 31st December 2025 is as under:

Sr. No	Particulars	No. of shares	%
1	Infrastructure Yield Trust (along with its schemes)	28,078,967	100.00%
	Total	**28,078,967**	**100.00%**

Source: Investment Manager

B. SRPL holds 3 BOT (Annuity) SPVs namely:

(i) Dhola Infra Projects Private Limited ("**Dhola**")
(ii) Dibang Infra Projects Private Limited ("**Dibang**")
(iii) Jorabat Shillong Expressway Limited ("**JSEL**")

The Equity Shareholding of SRPL as on the 31st December 2025 is as under:

Sr. No	Particulars	No. of shares	%
1	Edelweiss Infrastructure Yield Plus	7,249,999	100.00%
2	Vinit Agrawal*	1	0.00%
	Total	**7,250,000**	**100.00%**

**Shares held by nominees of Edelweiss Infrastructure Yield Plus*
Source: Investment Manager

C. TEL:

The Equity Shareholding of TEL as on the 31st December 2025 is as under:

Sr. No	Particulars	No. of Shares	%
1	Edelweiss Infrastructure Yield Plus	77,291	100.00%
2	Bhanuprakash Anisetti*	1	0.00%
3	Manish Chitkara*	1	0.00%
4	Mohankumar Kolli*	1	0.00%
5	Niraj Mohanty*	1	0.00%
6	Parveen Kumar*	1	0.00%
7	Sandip Das*	1	0.00%
	Total	**77,297**	**100.00%**

**Shares held by nominees of Edelweiss Infrastructure Yield Plus*
Source: Investment Manager

Scope and Purpose of Valuation

1.6. Financial Asset to be Valued

The financial assets under consideration are valued at Enterprise Value of the following:

Sr. No	Name of the SPVs	Term	Asset Type
1	Ahmedabad - Maliya Tollway Private Limited	AMTPL	State Toll
2	Deccan Tollways Private Limited	DTPL	NHAI Toll
3	Panipat Elevated Corridor Private Limited	PECPL	NHAI Toll
4	Rajkot - Vadinar Tollway Private Limited	RVTPL	State Toll
5	Samkhiali Bhachau Gandhidham Tollway Private Limited	SBGTPL	NHAI Toll
6	Sambalpur-Rourkela Tollway Private Limited	SRTPL	State Toll
7	Thrissur Expressway Limited	TEL	NHAI Toll
8	Dhola Infra Projects Private Limited	Dhola	MoRTH Annuity
9	Dibang Infra Projects Private Limited	Dibang	MoRTH Annuity
10	Jorabat Shillong Expressway Limited	JSEL	NHAI Annuity

*(Hereinafter referred to as "**the SPVs**")*

1.7. Purpose of Valuation

(i) I understand that the InvIT, acting through the Trustee, shall acquire two HoldCos namely; EPIC3 and SRPL (along with their subsidiaries, including the SPVs listed above) and one SPV namely; TEL. The Trust shall either pay cash consideration or swap units for consideration payable for the above mentioned acquisitions. The units of trust are to be listed on BSE and NSE consequent to the proposed Initial Public Offer ("**The Proposed Transaction**"). As per Regulation 21(7) of the SEBI InvIT Regulations, prior to any issue of units by publicly offered InvIT other than bonus issue, the valuer shall undertake full valuation of all the InvIT assets and include the same in the Offer Document.

(ii) In this regard, the Investment Manager has appointed me, Mr. S. Sundararaman ("**Registered Valuer**" or "**RV**" or "**I**" or "**My**" or "**Me**") bearing IBBI registration number IBBI/RV/06/2018/10238 to undertake fair valuation of the SPVs at the enterprise level as per the extant provisions of the SEBI InvIT Regulations issued by SEBI. This Report will form part of the initial investments of the Trust, in connection with the Draft Offer Documents ("**DOD**") and Final Offer Document ("**FOD**") by the Trust (the "Offering"). My Report was prepared solely for the purpose of inclusion as part of the Draft Offer Documents and Final Offer Documents and such other documents as may be required for the Offering and in accordance with the SEBI InvIT Regulations' guidelines requiring an independent valuation.

This Report should not be used or relied upon for any other purpose.

(iii) Enterprise Value ("**EV**") is described as the total value of the equity in a business plus the value of its debt and debt related liabilities, minus any Cash and Cash Equivalents to meet those liabilities.

(iv) Further, on the request of the Investment Manager, I have calculated Adjusted Enterprise Value ("**Adjusted EV**") of the SPVs which is derived as the EV as defined above plus Cash and Cash Equivalents of the SPVs and HoldCos as at the Valuation Date

(v) I declare that:

i. I am competent to undertake the financial valuation in terms of the SEBI InvIT Regulations;

ii. I am not an associate of the Sponsor(s) or Investment Manager or Trustee and I have not less than five years of experience in valuation of infrastructure assets;

iii. I am independent and have prepared the Report on a fair and unbiased basis;

iv. I have valued the SPVs based on the valuation standards as specified / applicable as per SEBI InvIT Regulations.

This Report covers all the disclosures required as per the SEBI InvIT Regulations and the Valuation of the SPVs is impartial, true and fair and in compliance with the SEBI InvIT Regulations.

(Please refer to appendix 8 for further information about myself)

1.8. Scope of Valuation

(i) Nature of the Asset to be Valued

The RV has been mandated by the Investment Manager to arrive at the Enterprise Value ("**EV**") of the SPVs. Enterprise Value is described as the total value of the equity in a business plus the value of its debt and debt related liabilities, minus any Cash and Cash Equivalents to meet those liabilities.

Further, on the request of the Investment Manager, I have calculated Adjusted Enterprise Value ("**Adjusted EV**") of the SPVs which is derived as the EV as defined above plus Cash and Cash Equivalents of the SPVs as at the valuation date.

(ii) Valuation Base

Valuation Base means the indication of the type of value being used in an engagement. In the present case, I have determined the fair value of the SPVs at the enterprise level. Fair Value Bases defined as under:

Fair Value

Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the valuation date. It is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction in the principal (or most advantageous) market at the measurement date under current market conditions (i.e. an exit price) regardless of whether that price is directly observable or estimated using another valuation technique. Fair value or Market value is usually synonymous to each other except in certain circumstances where characteristics of an asset translate into a special asset value for the party(ies) involved.

(iii) Valuation Date

Valuation Date is the specific date at which the value of the assets to be valued gets estimated or measured. Valuation is time specific and can change with the passage of time due to changes in the condition of the asset to be valued. Accordingly, valuation of an asset as at a particular date can be different from other date(s).

The Valuation Date considered for the fair enterprise valuation of the SPVs is 31st December 2025 ("**Valuation Date**"). The attached Report is drawn up by reference to accounting and financial information as on 31st December 2025. The RV is not aware of any other events having occurred since 31st December 2025 till date of this Report ("**Report Date**") which he deems to be significant for his valuation analysis, except for any events disclosed by the Investment Manager during the valuation exercise.

(iv) Premise of Value

Premise of Value refers to the conditions and circumstances of how an asset is deployed. In the present case, RV has determined the fair enterprise value of the SPVs on a Going Concern Value defined as below:

Going Concern Value

Going Concern value is the value of a business enterprise that is expected to continue to operate in the future. The intangible elements of going concern value result from factors such as having a trained work force, an operational plant, necessary licenses, systems, and procedures in place etc.

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1.9. Summary of Valuation

I have assessed the fair enterprise value of the SPVs on a stand-alone basis by using the Discounted Cash Flow ("**DCF**") method under the income approach. Following table summarizes my explanation on the usage or non-usage of different valuation methods:

Valuation Approach	Valuation Methodology	Used	Explanation
Cost Approach	Net Asset Value	No	NAV does not capture the future earning potential of the business. Hence NAV method is considered only for background reference.
Income Approach	Discounted Cash Flow	Yes	**For Annuity SPVs:** The revenue of NHAI/MoRTH Annuity SPVs is mainly derived from the annuity fees that are typically pre-determined with NHAI/MoRTH (as specified in the respective concession agreement) and cannot be modified to reflect prevailing circumstances like inflation & interest rates. **For Toll SPVs:** Toll SPVs derive almost all their revenue from their toll-road operations. The value of these SPVs are substantially dependent on the accuracy of the traffic volume forecasts for their respective projects. Accordingly, since all the SPVs are generating income based on pre-determined agreements / mechanisms and since the Investment Manager has provided me the financial projections for the balance tenor of the concession agreements, DCF Method under the income approach has been considered as the appropriate method for the present valuation exercise.
Market Approach	Market Price	No	The equity shares of the SPVs are not listed on any recognized stock exchange in India. Hence, I was unable to apply the market price method.
	Comparable Companies	No	In the absence of any exactly comparable listed companies with characteristics and parameters similar to that of the SPVs, I am unable to consider this method for the current valuation.
	Comparable Transactions	No	In the absence of adequate details about Comparable Transactions, I was unable to apply the CTM method.

Under the DCF Method, the Free Cash Flow to Firm ("**FCFF**") has been used for the purpose of valuation of the SPVs. In order to arrive at the fair EV of the SPVs under the DCF Method, I have relied on Unaudited Special Purpose Financial Statements for the period ended 31st December 2025 prepared in accordance with the Indian Accounting Standards (Ind AS) and the financial projections of the respective SPVs prepared by the Investment Manager as at the Valuation Date on their best judgement.

The discount rate considered for the SPVs for the purpose of this valuation exercise is based on the Weighted Average Cost of Capital ("**WACC**") for each of the SPVs.

As the SPVs under consideration have executed projects under the DBFOT/BOT model, the operating rights of the underlying assets shall be transferred back to the appointing authority after the expiry of the concession period. At the end of the agreed concession period, the operating rights in relation to the roads, the obligation to maintain the road reverts to the government entity that granted the concession by the SPVs. Accordingly, terminal period value i.e. value on account of cash flows to be generated after the expiry of concession period has not been considered.

Based on the methodology and assumptions discussed further, RV has arrived at the fair enterprise value of the SPVs as on the Valuation Date:

INR Mn

Sr. No.	SPVs	Balance Life***	WACC	Enterprise Value*	Adjusted Enterprise Value**
1	AMTPL (Base)	~ 7 years 5 months	9.41%	15,056	17,351
	AMTPL (Extension)	~3 years 11 months#	10.41%	1,252	1,252
2	DTPL	~ 18 years 3 months	10.40%	19,200	20,732
3	PECPL	~ 1 year 1 months	10.18%	850	1,086
4	RVTPL	~ 4 years 2 months	10.28%	4,971	5,624
5	SBGTPL	~ 8 years 11 months	9.59%	11,992	13,041
6	SRTPL	~ 14 years 11 months	9.47%	27,400	31,178
7	TEL	~ 10 years 9 months	9.56%	13,087	15,874
8	Dhola	~ 4 years 2 months	7.59%	3,442	4,584
9	Dibang	~ 4 years 11 months	7.64%	2,484	3,418
10	JSEL	~ 5 years 1 months	7.77%	5,210	6,447
	Total			**104,944**	**120,588**

#from 5th June 2033

**Enterprise Value ("EV") is described as the total value of the equity in a business plus the value of its debt and debt related liabilities, minus any cash and cash equivalents to meet those liabilities. The Report details the valuation methodologies used, calculations performed, and the conclusion reached with respect to this valuation.*

***Further, at the request of the Investment Manager, I have calculated Adjusted Enterprise Value of the SPVs as the EV (derived as above) plus operating cash and cash like items (which includes cash and cash equivalent and current investment) of the SPVs as at the Valuation Date. (Refer Appendix 1,2 & 3 for the detailed workings)*

****The balance life of the SPVs has been calculated using the revised concession dates after including extension. (Refer Appendix 1,2 & 3 for the detailed workings)*

The fair EV of the SPVs is estimated using DCF method. The valuation requires Investment Manager to make certain assumptions about the model inputs including forecast of cash flows, discount rate, and credit risk.

Further to above, considering that present valuation is based on estimates of future financial performance or opinions, which represent reasonable expectations at a particular point of time, but such information, estimates or opinions are not offered as predictions or as assurances that a particular level of income or profit will be achieved, a particular event will occur or that a particular price will be offered or accepted. Actual results achieved during the period covered by the prospective financial analysis will vary from these estimates and the variations may be material.

Accordingly, a quantitative sensitivity analysis is considered on following unobservable inputs for Enterprise Value and Adjusted Enterprise Value:

1. WACC by increasing / decreasing it by 0.5%
2. WACC by increasing / decreasing it by 1.0%
3. Expenses by increasing / decreasing it by 20%
4. Revenue of Toll SPVs by increasing / decreasing it by 10%

Sensitivity Analysis of Enterprise Value

1. Fair Enterprise Valuation Range based on WACC parameter (0.5%)

INR Mn

Sr. No	SPVs	WACC +0.5%	EV	Base WACC	EV	WACC -0.5%	EV
1	AMTPL (Base)	9.91%	14,811	9.41%	15,056	8.91%	15,307
	AMTPL (Extension)	10.91%	903	10.41%	1,252	9.91%	1,619
2	DTPL	10.90%	18,432	10.40%	19,200	9.90%	20,016
3	PECPL	10.68%	848	10.18%	850	9.68%	852
4	RVTPL	10.78%	4,926	10.28%	4,971	9.78%	5,016
5	SBGTPL	10.09%	11,737	9.59%	11,992	9.09%	12,256
6	SRTPL	9.97%	26,472	9.47%	27,400	8.97%	28,375
7	TEL	10.06%	12,768	9.56%	13,087	9.06%	13,418
8	Dhola	8.09%	3,407	7.59%	3,442	7.09%	3,477
9	Dibang	8.14%	2,455	7.64%	2,484	7.14%	2,514
10	JSEL	8.27%	5,156	7.77%	5,210	7.27%	5,266
	Total		**101,915**		**104,944**		**108,117**

2. Fair Enterprise Valuation Range based on WACC parameter (1.0%)

INR Mn

Sr. No	SPVs	WACC +1.00%	EV	Base WACC	EV	WACC -1.00%	EV
1	AMTPL (Base)	10.41%	14,573	9.41%	15,056	8.41%	15,565
	AMTPL (Extension)	11.41%	572	10.41%	1,252	9.41%	2,006
2	DTPL	11.40%	17,707	10.40%	19,200	9.40%	20,882
3	PECPL	11.18%	846	10.18%	850	9.18%	854
4	RVTPL	11.28%	4,882	10.28%	4,971	9.28%	5,063
5	SBGTPL	10.59%	11,489	9.59%	11,992	8.59%	12,529
6	SRTPL	9.97%	26,472	9.47%	27,400	8.97%	28,375
7	TEL	10.56%	12,460	9.56%	13,087	8.56%	13,761
8	Dhola	8.59%	3,373	7.59%	3,442	6.59%	3,513
9	Dibang	8.64%	2,426	7.64%	2,484	6.64%	2,544
10	JSEL	8.77%	5,103	7.77%	5,210	6.77%	5,322
	Total		**99,903**		**104,944**		**110,415**

3. Fair Enterprise Valuation Range based on Expenses parameter (20%)

INR Mn

Sr. No.	SPVs	EV at Expenses -20%	EV at Base Expenses	EV at Expenses +20%
1	AMTPL (Base)	15,625	15,056	14,486
	AMTPL (Extension)	1,494	1,252	1,010
2	DTPL	19,979	19,200	18,422
3	PECPL	876	850	824
4	RVTPL	5,187	4,971	4,755
5	SBGTPL	12,432	11,992	11,556
6	SRTPL	28,432	27,400	26,368
7	TEL	13,388	13,087	12,786
8	Dhola	3,499	3,442	3,385
9	Dibang	2,547	2,484	2,420
10	JSEL	5,310	5,210	5,111
	Total	**108,770**	**104,944**	**101,123**

4. Fair Enterprise Valuation Range based on Revenue parameter (10%)

INR Mn

Sr. No	SPVs	EV at Revenue -10%	EV at Base Revenue	EV at Revenue +10%
1	AMTPL (Base)	13,228	15,056	16,883
	AMTPL (Extension)	261	1,252	2,244
2	DTPL	15,588	19,200	22,506
3	PECPL	749	850	951
4	RVTPL	4,335	4,971	5,605
5	SBGTPL	9648	11,992	14,336
6	SRTPL	23,806	27,400	30,911
7	TEL	11,574	13,087	14,564
8	Dhola*	3,442	3,442	3,442
9	Dibang*	2,484	2,484	2,484
10	JSEL*	5,210	5,210	5,210
	Total	**90,325**	**104,944**	**119,136**

**Since these are annuity-based assets with fixed and predetermined revenue streams, revenue sensitivity analysis has not been carried out for these projects. Nevertheless, the assets have been included in the summary table above to facilitate completeness and ease of comparability across all projects.*

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Sensitivity Analysis of Adjusted Enterprise Value

5. Fair Adjusted Enterprise Valuation Range based on WACC parameter (0.5%)

INR Mn

Sr. No	SPVs	WACC +0.5%	Adj EV	Base WACC	Adj EV	WACC -0.5%	Adj EV
1	AMTPL (Base)	9.91%	17,106	9.41%	17,351	8.91%	17,602
	AMTPL (Extension)	10.91%	903	10.41%	1,252	9.91%	1,619
2	DTPL	10.90%	19,963	10.40%	20,732	9.90%	21,547
3	PECPL	10.68%	1,084	10.18%	1,086	9.68%	1,088
4	RVTPL	10.78%	5,580	10.28%	5,624	9.78%	5,670
5	SBGTPL	10.09%	12,785	9.59%	13,041	9.09%	13,305
6	SRTPL	9.97%	30,250	9.47%	31,178	8.97%	32,153
7	TEL	10.06%	15,555	9.56%	15,874	9.06%	16,205
8	Dhola	8.09%	4,550	7.59%	4,584	7.09%	4,619
9	Dibang	8.14%	3,389	7.64%	3,418	7.14%	3,448
10	JSEL	8.27%	6,393	7.77%	6,447	7.27%	6,503
	Total		**117,558**		**120,588**		**123,760**

6. Fair Adjusted Enterprise Valuation Range based on WACC parameter (1.0%)

INR Mn

Sr. No	SPVs	WACC +1.00%	Adj EV	Base WACC	Adj EV	WACC -1.00%	Adj EV
1	AMTPL (Base)	10.41%	16,868	9.41%	17,351	8.41%	17,860
	AMTPL (Extension)	11.41%	572	10.41%	1,252	9.41%	2,006
2	DTPL	11.40%	19,239	10.40%	20,732	9.40%	22,413
3	PECPL	11.18%	1,082	10.18%	1,086	9.18%	1,090
4	RVTPL	11.28%	5,536	10.28%	5,624	9.28%	5,716
5	SBGTPL	10.59%	12,537	9.59%	13,041	8.59%	13,578
6	SRTPL	9.97%	30,250	9.47%	31,178	8.97%	32,153
7	TEL	10.56%	15,248	9.56%	15,874	8.56%	16,549
8	Dhola	8.59%	4,516	7.59%	4,584	6.59%	4,655
9	Dibang	8.64%	3,360	7.64%	3,418	6.64%	3,478
10	JSEL	8.77%	6,340	7.77%	6,447	6.77%	6,559
	Total		**115,547**		**120,588**		**126,059**

7. Fair Adjusted Enterprise Valuation Range based on Expenses parameter (20%)

INR Mn

Sr. No.	SPVs	Adj EV at Expenses -20%	Adj EV at Base Expenses	Adj EV at Expenses +20%
1	AMTPL (Base)	17,920	17,351	16,781
	AMTPL (Extension)	1,494	1,252	1,010
2	DTPL	21,510	20,732	19,953
3	PECPL	1,112	1,086	1,060
4	RVTPL	5,840	5,624	5,409
5	SBGTPL	13,481	13,041	12,605
6	SRTPL	32,210	31,178	30,146
7	TEL	16,176	15,874	15,574
8	Dhola	4,641	4,584	4,527
9	Dibang	3,482	3,418	3,355
10	JSEL	6,547	6,447	6,348
	Total	**124,414**	**120,588**	**116,767**

8. Fair Adjusted Enterprise Valuation Range based on Revenue parameter (10%)

INR Mn

Sr. No	SPVs	Adj EV at Revenue -10%	Adj EV at Base Revenue	Adj EV at Revenue +10%
1	AMTPL (Base)	15,523	17,351	19,178
	AMTPL (Extension)	261	1,252	2,244
2	DTPL	17,119	20,732	24,037
3	PECPL	985	1,086	1,187
4	RVTPL	4,988	5,624	6,259
5	SBGTPL	10,697	13,041	15,385
6	SRTPL	27,584	31,178	34,689
7	TEL	14,362	15,874	17,352
8	Dhola*	4,584	4,584	4,584
9	Dibang*	3,418	3,418	3,418
10	JSEL*	6,447	6,447	6,447
	Total	**105,968**	**120,588**	**134,780**

**Since these are annuity-based assets with fixed and predetermined revenue streams, revenue sensitivity analysis has not been carried out for these projects. Nevertheless, the assets have been included in the summary table above to facilitate completeness and ease of comparability across all projects.*

1.10. Following are the Enterprise Values of all the SPVs during the previous Valuations:

INR Mn

Sr.No	SPVs	Jun-25
1	AMTPL (Base)	15,565
	AMTPL (Extension)	1,464
2	DTPL	19,413
3	PECPL	1,228
4	RVTPL	5,449
5	SBGTPL	11,790
6	SRTPL	28,078
7	TEL	13,489
8	Dhola	3,796
9	Dibang	2,608
10	JSEL	5,584
	Total	**108,464**

2. Procedures adopted for current valuation exercise

2.1. I have performed the valuation analysis, to the extent applicable, in accordance with ICAI Valuation Standards 2018 ("**IVS**") issued by the Institute of Chartered Accountants of India.

2.2. In connection with this analysis, I have adopted the following procedures to carry out the valuation analysis:

(i) Requested and received financial and qualitative information relating to the SPVs;

(ii) Obtained and analyzed data available in public domain, as considered relevant by me;

(iii) Discussions with the Investment Manager on:

- Understanding of the business of the SPVs – business and fundamental factors that affect its earning-generating capacity including strengths, weaknesses, opportunities and threats analysis and historical and expected financial performance;

(iv) Undertook industry analysis:

- Research on publicly available market data including economic factors and industry trends that may impact the valuation;
- Analysis of key trends and valuation multiples of comparable companies/comparable transactions, if any, using proprietary databases subscribed by me;

(v) Analysis of other publicly available information;

(vi) Selection of valuation approach and valuation methodology/(ies), in accordance with IVS, as considered appropriate and relevant by me;

(vii) Conducted physical site visit of the road stretch of the SPVs;

(viii) Determination of Fair EV of the SPVs on a going concern basis till the end of concession period at the Valuation Date and determination of fair value of the Adjusted EV of the SPVs on a going concern basis till the end of the concession period as at the Valuation Date on request of the Investment Manager

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3. Overview of InvIT and SPVs

3.1. The Trust

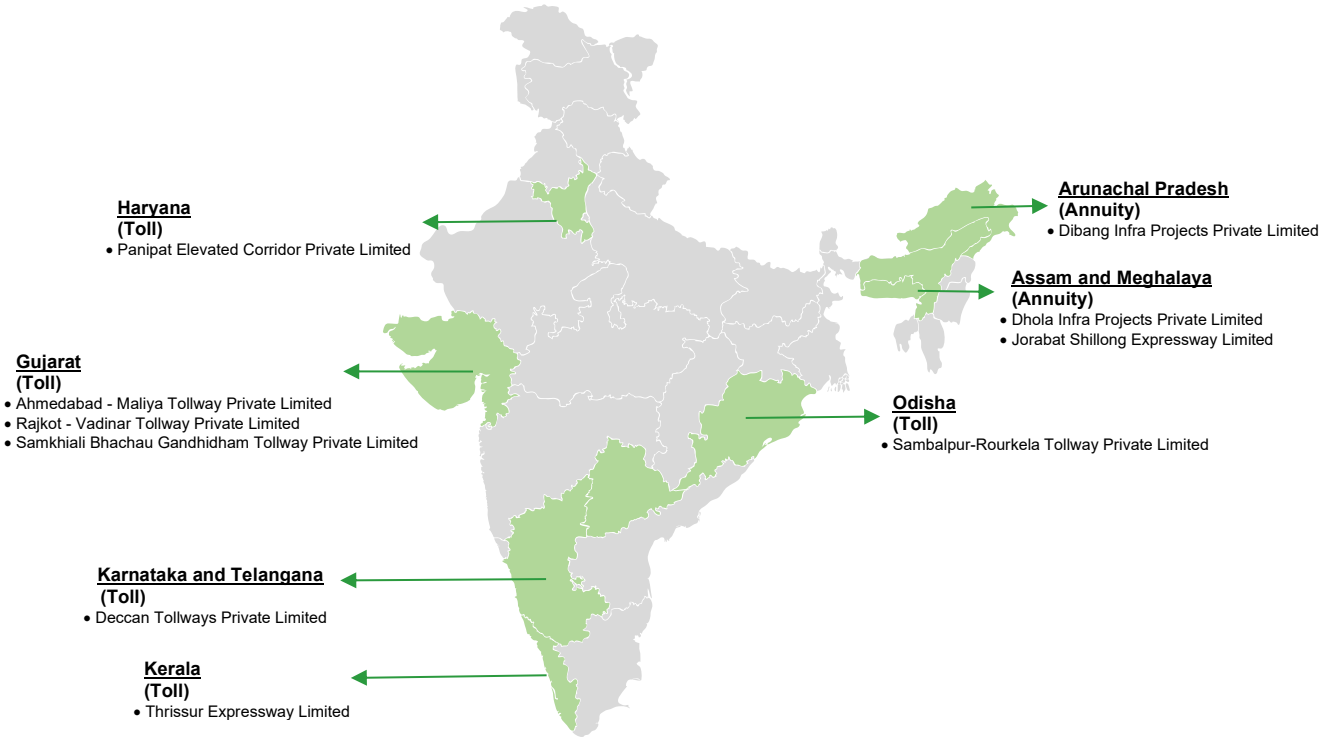
(i) Citius TransNet Investment Trust ("**the Trust**" or "**Citius**") was established on 21st July 2025 as an irrevocable trust pursuant to the trust deed under the provisions of the Indian Trusts Act, 1882. The Trust is registered as an Indian infrastructure investment trust with the Securities and Exchange Board of India ("**SEBI**") with effect from 1st August 2025, bearing registration number IN/InvIT/25-26/0032, pursuant to the SEBI (Infrastructure Investment Trusts) Regulations, 2014, as amended from time to time ("**the SEBI InvIT Regulations**").

(ii) EAAA TransInfra Managers Limited is the Investment Manager, Epic Transnet Project Management Private Limited ("**ETPMPL**") is the Project Manager and Epic Transnet Infrastructure Private Limited ("**ETIPL**") is the sponsor of the Citius TransNet Investment Trust ("**Trust**" or "**InvIT**"). Axis Trustee Services Limited ("**the Trustee**") has been appointed as the Trustee of the Trust.

(iii) The Trust is an infrastructure investment trust established to acquire, manage and invest in a portfolio of infrastructure assets across sectors and/or securities of companies engaged in the infrastructure sector. The Trust has proposed to acquire the SPVs and would be responsible for holding the SPVs in trust and for the benefit of the unitholders, undertaking the activities and other duties specified as per the SEBI InvIT Regulations.

(iv) The Initial Portfolio Assets is proposed to include 10 road SPVs (7 Toll Assets, and 3 Annuity Assets having a total length of 3,411 kms) and two HoldCos (EPIC3 and SRPL) in the Indian states of Gujarat, Odisha, Telangana, Karnataka, Kerala, Haryana, Assam, Meghalaya and Arunachal pursuant to the concessions granted by the National Highways Authority of India ("**NHAI**"), Ministry of Road Transport and Highways ("MoRTH"), Gujarat State Road Development Corporation ("**GSRDC**") and the Works Department, Government of Odisha ("**WD(O)**")

(v) Following is a map of India showing the area covered by the SPVs proposed to be acquired by the Trust:



(vi) **Proposed Transaction**

Citius TransNet Investment Trust is proposing to acquire 100% equity stake in the Holdcos ie. EPIC3 and SRPL and TEL from its existing shareholders ("**Proposed Transaction**").

EPIC3 holds 6 Toll SPVs - AMTPL, DTPL, PECPL, RVTPL, SBGTPL and SRTPL; while SRPL holds 3 Annuity SPVs - Dhola, Dibang and JSEL.

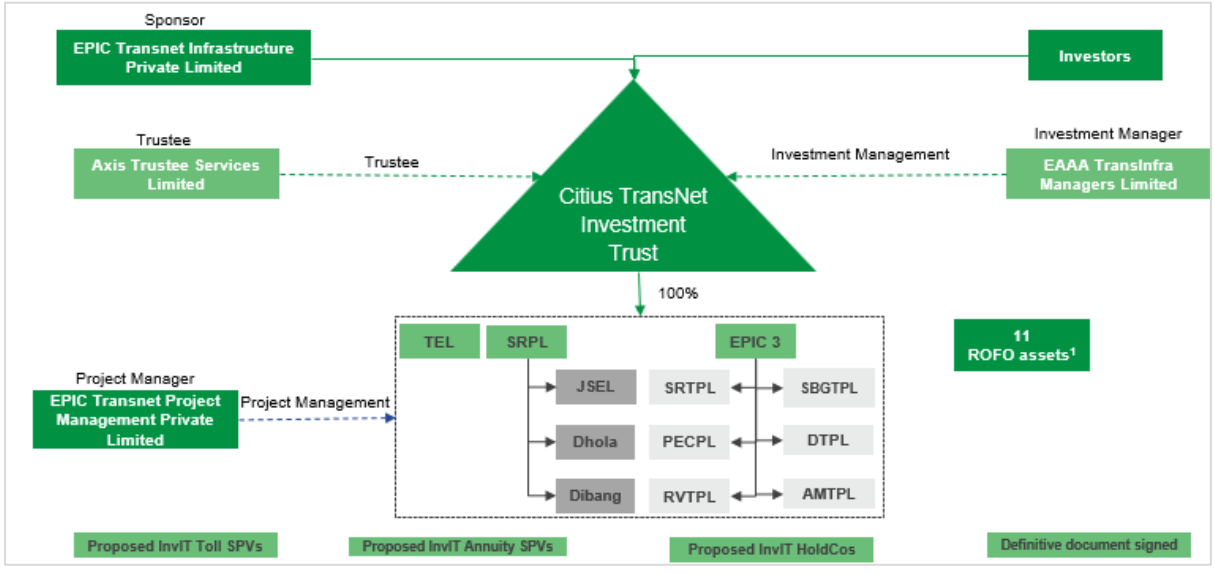
The following is the summary of SPVs held under the trust along with the acquisition date:

Sr. No	SPV/Holdco	Asset Type	Seller	Equity Stake to be Acquired by the Trust	Whether Seller is a related party of Trust
1	TEL	NHAI Toll	Edelweiss Infrastructure Yield Plus**	100%	No
2	SRPL	Holdco	Edelweiss Infrastructure Yield Plus**	100%	No
3	EPIC3	Holdco	Infrastructure Yield Trust*	100%	Yes

**Through its schemes Infrastructure Yield Plus II, Infrastructure Yield Plus IIA and India Infrastructure Yield Plus II*
***As per the Investment Manager, the Sponsor of Trust is ETIPL, which is an entity wholly owned by schemes of the Infrastructure Yield Trust(IYT), which is an AIF registered with SEBI. Companies owned by IYT, including Epic3 and its subsidiaries are proposed to be transferred to Trust. Hence, IYT and its schemes are related parties to Trust, being parties to the InvIT as per regulation 2(1)(zk) of SEBI InvIT Regulations. However, SRPL and its subsidiaries and TEL are owned by Edelweiss Infrastructure Yield Plus (EIYP), which is another AIF registered with SEBI and is not a party to the InvIT or a promoter of any party of the InvIT and it does not control or is controlled by the Sponsor or Sponsor Group of the Trust. Hence, EIYP is not a related party as per regulation 2(1)(zv) of SEBI InvIT regulations.*

1. **Equity Interest:** I understand the Trust is proposing to acquire 100% Equity Stake in the above-mentioned SPV's.
2. **Debt Interest:** I understand that the Trust has no debt interest in the SPV's as on the Valuation Date.
3. **Related Party transaction:** I understand that Infrastructure Yield Trust is a related party as per the definition of related parties as per regulation 2(1)(zv) of SEBI InvIT regulation and hence, the above Proposed Transaction is considered as a related party transaction.

The following is the Proposed Structure of the Trust:

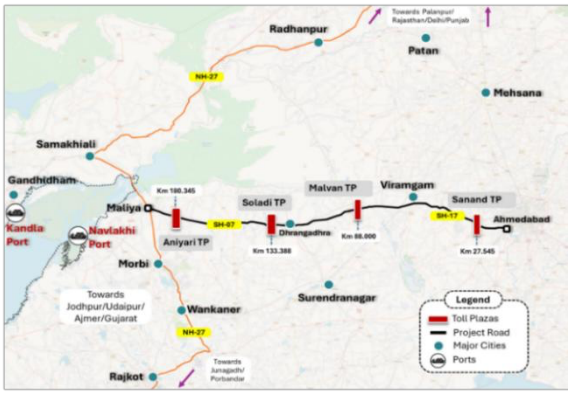


[1]EAAA Platform has signed definite documents to acquire ROFO assets. It has completed acquisition of 5 assets and is in process of completing the acquisition for balance 6 assets. These assets are proposed to be offered to Citius under a Right of First Offer (ROFO) agreement post stabilisation.

3.2. Background of the SPVs

(i) **A) Ahmedabad - Maliya Tollway Private Limited ("AMTPL- Base")**

- The project involves development of SH-17 which starts from Ahmedabad (Sarkhej) to Viramgam Km. 13/930 to Km. 61/430 and of SH-7 starts from Viramgam to Maliya (Km. 61/430 to Km. 194/633) to 4-lane divided carriageway including strengthening of existing carriageway, between Ahmedabad to Maliya (Km. 13/930 to Km. 194/633) in Gujarat including bypasses at Sachana, Dhrangdhra and Halvad.
- It has been undertaken on a Build -Operate- Transfer (BOT) Basis, with Gujarat State Road Development Corporation (GSRDC) as the implementing agency. The Project achieved Provisional Commercial Operation Date (PCOD) in a phased manner. Subsequently, all works forming part of the four-laning scope are completed in accordance with the provisions of the Concession Agreement and the Settlement Agreement. The Independent Engineer issued the final Completion Certificate for the entire stretch on 22nd June 2023.
- The corridor forms a primary freight route between Ahmedabad and the Kandla, Mundra, and other Kutch/Saurashtra ports. It links directly with NH-27 and NH-947 at Maliya, feeding into Gujarat's west-coast port cluster. This ensures faster evacuation of goods from industrial hubs in central/north Gujarat to ports for export. The map below illustrates the location of the project and the corridor it covers.



- Summary of project details of AMTPL are as follows:

Parameters	Details
Total Length	180.703 km
Lane km	722.812 km
No. of Lanes	4
No. of Toll Plazas	4
SH	SH-17 and SH-7
State Covered	Gujarat
Area (Start and End)	Ahmedabad to Viramgam to Maliya
Project Cost	INR 10,153.6 Mn
PPP Model	BOT
Project Type	Tolling, Operation, Maintenance and Transfer
Concession Granted by	Gujarat State Road Development Corporation (GSRDC)
FCOD Date	22-Jun-23
PCOD Date	Section I – 27-Aug-12 Section II – 01-Nov-12 Section III – 07-Apr-12 Section IV – 05-May-12
Appointed Date	12-Oct-09
Original Concession Period (CP)	22 years
Original Concession End Date	11-Oct-2031
Total Extension Days	602 days
Extension days as per New Concession agreement	1445 days
Estimated Concession End Date (AMTPL-Base)	4-Jun-33
Estimated Concession End Date (AMTPL-Extension)	19-May-37

Source: Investment Manager

- The following are the salient features of AMTPL:

Sr. No	Salient Features	Units
1	Total Length of Main Carriageway with Rigid Pavement	Only at Toll Plazas
2	Total Length of Main Carriageway with Flexible Pavement	180.703 kms
3	Total length of Service Roads	0.80 km
4	Total length of Slip Roads	NIL
5	No of Toll Plazas	4
6	No of Bus Bays with Bus Shelters	85
7	Number of Truck Lay Bays	NIL
8	No of Rest Areas	NIL
9	No of Major Junctions	11
10	No of Minor Junctions	102
11	No of Vehicular underpasses	2
12	No of Light Vehicular underpasses	NIL
13	No of Pedestrian underpasses	7
14	No of Subways	NIL
15	No of Flyovers	NIL
16	No of Major Bridges	9
17	No of Minor Bridges	74
18	No of Hume Pipe Culverts	241
19	No of Box / Slab Culverts	37

- The Equity Shareholding of AMTPL as on Valuation Date is as follows:

Sr. No	Particulars	No. of Shares	%
1	Epic Concesiones 3 Private Limited	148,999,994	100.00%
2	Amit Dasgupta*	1	0.00%
3	Manish Chitkara*	1	0.00%
4	Mohan Kumar Kolli*	1	0.00%
5	Sandip Das*	1	0.00%
6	Vaibhav Bhandari*	1	0.00%
7	Niraj Mohanty*	1	0.00%
	Total Equity	**149,000,000**	**100.00%**

**Shares held as a nominee of Epic Concesiones 3 Private Limited*
Source: Investment Manager

I have been represented by the Investment Manager that there is no change in the equity shareholding pattern from the Valuation Date till the date of this Report.

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- Projections provided by the Investment Manager consider the following assumptions:

Particulars	Unit	Details
Target date as per CA	Date	1-Oct-21
Target traffic as per CA	PCUs	Section: PCUs TP01: 43,250 TP02: 21,000 TP03: 21,000 TP04: 21,000
Actual Average Traffic on Target Date*	PCUs	Section: PCUs TP01: 38,016 TP02: 21,922 TP03: 26,899 TP04: 20,232
Comparison of average traffic at test date with target	%	Section: Effect TP01: -12.10% TP02: 4.39% TP03: 28.09% TP04: -3.66%
Original concession period	years	22
Increase in concession period due to traffic (Max. upto 20%)	%	4.54%
Estimated Target Traffic extension	days	365
Approved Extensions due to:		
COVID-19	days	51
Material Adverse Effect as per supplementary agreement dated 18-Dec-2015	days	103
Toll suspension on account of Demonetisation	days	77
Flood Impact	days	1
Trucker's Strike	days	5
Sanand 6-lane extension	days	1445*
Revised concession period	years	27.61
Appointed date	Date	12-Oct-09
Original concession end date	Date	11-Oct-31
Revised concession end date	Date	19-May-37

**The Concessionaire has been granted an additional 1,445 days to the concession period. Further, the Authority has issued new concession agreement for the extension of the project highway by 28.78 kilometres as part of the six-lane Sanand section. These approvals have been incorporated into the revised project scope and timeline*

- Modification in the Concession Period due to target traffic clause as per Concession Agreement

  As per the Article 29 of the concession agreement between GSRDC and AMTPL provided to us by the Investment Manager, if the actual traffic falls short or exceeds target traffic on a defined date, the concession period shall be revised subject to calculation specified therein. Accordingly, the concession period extends by 4.54% as given above.

B) Ahmedabad - Maliya Tollway Private Limited ("AMTPL- Extension")

- To strengthen connectivity and support industrial growth in the Sanand region, the Government of Gujarat, through GSRDC, has initiated the upgradation of State Highway-17 from Shantipura Chokdi to Khoraj GIDC Chokdi (Chainage 13+930 to 42+683).

- The project involves converting the existing four-lane section into a six-lane highway with service roads, covering a length of 28.752 km. This work, will be executed on a Build-Operate-Transfer (BOT) basis and includes construction, operation, and maintenance until 4th June, 2032.

- The remaining stretch of the Ahmedabad–Viramgam–Maliya Toll Road (Chainage 42+683 to 194+633) of AMTPL will continue under the existing concession until the Existing Transfer Date.

- Following this, the concessionaire will operate and maintain the entire toll road (Chainage 13+930 to 194+633, total 180.703 km) for an additional period of 3 years, 11 months, and 15 days commencing from COD, as per the new concession agreement.

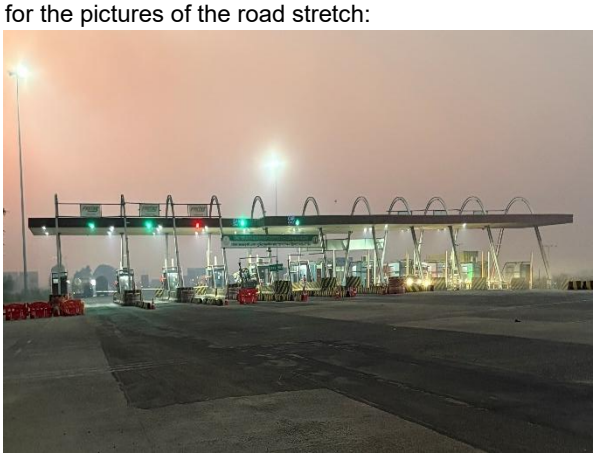
- GSRDC awarded the concession to Ahmedabad-Maliya Tollway Private Limited via Letter of Acceptance dated 7th October, 2025. Under the agreement, the concessionaire is granted exclusive rights to implement the project in accordance with the stipulated terms and conditions. The Concession Agreement was signed on 30th October, 2025.

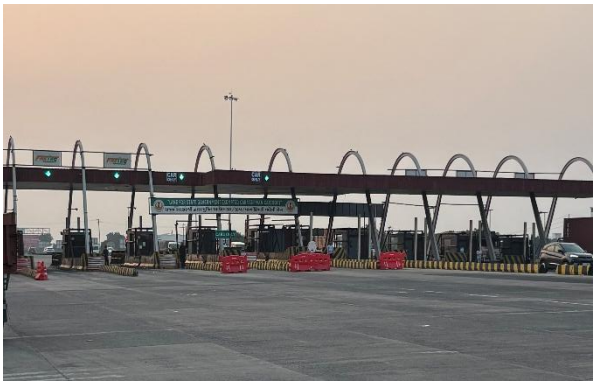
- Summary of project details of AMTPL- Sanand Six Lane Extension are as follows:

Particulars	Unit
Total Length	28.782 km
No. of Lanes	6
SH	SH-17
State Covered	Gujarat
Area (Start and End)	Shantipura Chokdi to Khoraj GIDC Chokdi
PPP Model	BOT
Project Type	Tolling, Operation, Maintenance and Transfer
Concession Granted by	Gujarat State Road Development Corporation (GSRDC)
LOA Date	07-Oct-25
Concession Period (CP)	3 years 11 months
Concession Start Date	05-Jun-32
Concession End Date	19-May-37

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- My team had conducted physical site visit of the road stretch of AMTPL on 15th November 2025. Refer below for the pictures of the road stretch:

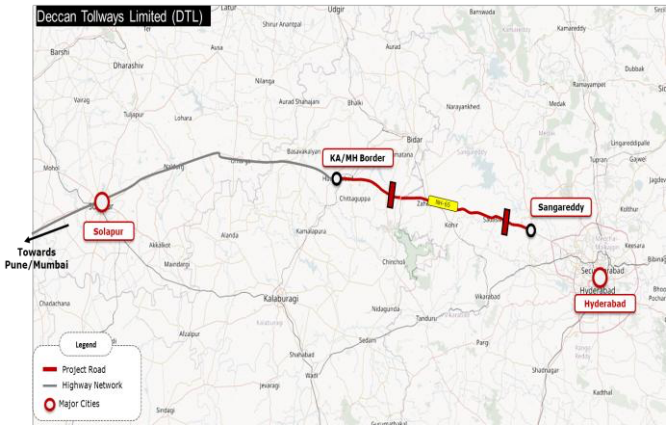





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(ii) **Deccan Tollways Private Limited ("DTPL")**

- The National Highway 65, commonly referred to as NH-65 (Old NH-9) is an 841 Km long National Highway in South India. It runs along the states of Maharashtra, Karnataka, Telangana and Andhra Pradesh. It starts at Pune and ends at Machilipatnam. Major cities on this route are Pune, Solapur, Hyderabad, Suryapet, Vijayawada and Machilipatnam.
- The Govt. of India had entrusted to National Highways Authority of India (NHAI) for development, maintenance and management of NH-9 including section from km 348.800 to km 493.000 (approx. km 145) on Design, Built, Fund, Operate and Transfer (DBFOT)-BOT TOLL basis. Currently, at site revised chainages exists, connecting Sangareddy to Karnataka/Maharashtra from km 352.000 to km 497.000 of NH-65 (old NH-9). The length of project road is equally spread between the states of Karnataka and Telangana.
- Provisional Certificate for the length of 142.786 km of the Project highway was issued by the Independent Engineer (IE) w.e.f. 14th October 2017 along with Punch lists and the Project Highway was placed in Commercial Operation. Subsequently, the Concessionaire completed the Punchlist and Completion Certificate for the said length was issued on 17th September 2019. Further, Final Completion Certificate achieved on 20th October 2023.
- The map below illustrates the location of the project and the corridor it covers:



Source: Investment Manager

- Summary of project details of DTPL are as follows:

Parameters	Details
Total Length	144.95 km
Lane km	579.80 km
No. of Lanes	4
No. of Toll Plazas	2
NH	NH- 65 (Old NH-9)
State Covered	Karnataka & Telangana
Area (Start and End)	Sangareddy to KN/ Maharashtra border
Project Cost	INR 12,666 Mn
PPP Model	BOT (Toll)
Project Type	Tolling, Operation, Maintenance and Transfer
Concession Granted by	NHAI
PCOD Date	14-Oct-17
FCOD Date	17-Sept-19 (for 142.786 km) 20-Oct-23 (for 2.164 km)
Appointed Date	1-Apr-14
Original Concession Period (CP)	25 years
Total Extension Days	1833 days
Estimated Concession End Date	6-Apr-44

Source: Investment Manager

- The following are the salient features of DTPL:

Sr. No	Salient Features	Units
1	Total Length of Main Carriageway with Rigid Pavement	Only at Toll Plazas
2	Total Length of Main Carriageway with Flexible Pavement	144.95 kms
3	Total length of Service Roads	LHS - 17.450 km RHS - 23.075 km
4	Total length of Slip Roads	NIL
5	No of Toll Plazas	2
6	No of Bus Bays with Bus Shelters	21
7	Number of Truck Lay Bays	4
8	No of Rest Areas	1
9	No of Major Junctions	22
10	No of Minor Junctions	32
11	No of Vehicular underpasses	9
12	No of Light Vehicular underpasses	1
13	No of Pedestrian underpasses	14
14	No of Subways	NIL
15	No of Flyovers	NIL
16	No of Major Bridges	3
17	No of Minor Bridges	47
18	No of Hume Pipe Culverts	157
19	No of Box / Slab Culverts	78

Source: Investment Manager

- The Equity Shareholding of DTPL as on Valuation Date is as follows:

Sr. No	Particulars	No. of Shares	%
1	Epic Concesiones 3 Private Limited	243,339,994	85.28%
2	Neelambur Madukkarai Tollway Private Limited	42,000,000	14.72%
3	Amit Dasgupta*	1	0.00%
4	Manish Chitkara*	1	0.00%
5	Mohan Kumar Kolli*	1	0.00%
6	Sandip Das*	1	0.00%
7	Vaibhav Bhandari*	1	0.00%
8	Niraj Mohanty*	1	0.00%
	Total	**285,340,000**	**100.00%**

**Shares held as a nominee of Epic Concesiones 3 Private Limited*
Source: Investment Manager

I have been represented by the Investment Manager that there is no change in the equity shareholding pattern from the Valuation Date till the date of this Report.

- Projections provided by the Investment Manager consider the following assumptions:

Particulars	Unit	Details
Target date as per CA	Date	1-Apr-21
Target traffic as per CA	PCUs	26,331
Actual Average Traffic on Target Date	PCUs	21,791
Comparison of average traffic at test date with target	%	-17.24%
Original concession period	years	25
Increase in concession period (Max. upto 20%)	%	20%
Estimated Target Traffic extension	days	1825
Approved Extensions Due to:		
COVID-19	days	8
Revised concession period	years	30
Appointed date	Date	1-Apr-14
Original concession end date	Date	31-Mar-39
Revised concession end date	Date	6-Apr-44

- <u>Modification in the Concession Period due to target traffic clause as per Concession Agreement</u>

  As per the Article 29 of the concession agreement between NHAI and DTPL provided to us by the Investment Manager, if the actual traffic falls short or exceeds target traffic on a defined date, the concession period shall be revised subject to calculation specified therein. Accordingly, the concession period extends by 20% as given above.

- My team had conducted physical site visit of the road stretch of DTPL on 31st October 2025. Refer below for the pictures of the road stretch:



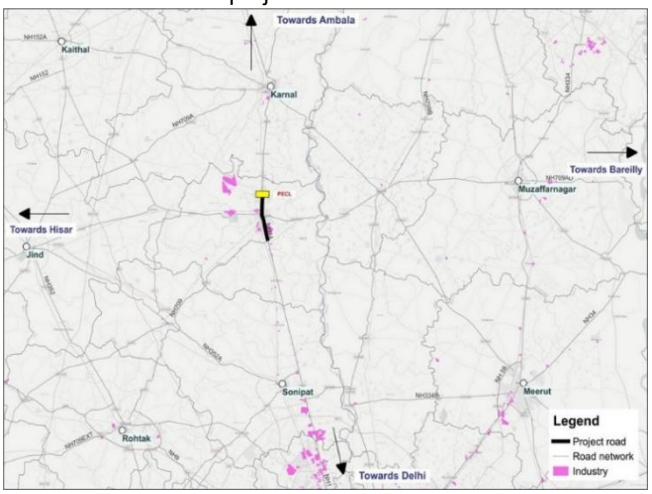






(iii) **Panipat Elevated Corridor Private Limited ("PECPL")**

- The Government of India had entrusted to National Highways Authority of India (NHAI) for development, maintenance, and management of National Highway No. 44 (old NH-1) which includes. - Widening of existing 4 lane portion from KM 86 to KM 96, covering Panipat City on NH-44 in Haryana, to 6 lanes elevated structure covering Gohana Road, Sanauli Road, Asandh Road Crossings, City Bus Stand and Skylark Tourist Complex and widening and construction of Peripheral Lanes on BOT basis.
- The Concession Agreement was executed on 27th July 2005. The Appointed Date for the project was declared as 23th January 2006, marking the commencement of the 20-year Concession Period from that date
- The Panipat Elevated Corridor Project is a major infrastructure initiative aimed at decongesting traffic and ensuring smooth flow of vehicles along the Delhi–Ambala section of National Highway-44 (old NH1), one of the busiest arterial highways in North India. NH-44 is a heavily trafficked corridor carrying long-distance freight, intercity, and local traffic simultaneously. Severe traffic congestion, bottlenecks at junctions, and frequent delays were observed within the city stretch. The elevated corridor provides segregation of through traffic from local traffic, ensuring faster transit, improved safety, and reduced pollution.
- The map below illustrates the location of the project and the corridor it covers:



Source: Investment Manager

- Summary of project details of PECPL are as follows:

Parameters	Details
Total Length	10 km
Lane km	60 km
No. of Lanes	6
No. of Toll Plazas	1
NH	NH-44 (Old NH-1)
State Covered	Haryana
Area (Start and End)	Elevated corridor in Panipat City
Project Cost	INR 3,250 Mn
PPP Model	BOT (Toll)
Project Type	Tolling, Operation, Maintenance and Transfer
Concession Granted by	NHAI
PCOD Date	15-July-08
FCOD Date	17-Mar-11
Appointed Date	23-Jan-06
Original Concession Period (CP)	20 years
Total Extension Days	375 days
Estimated Concession End Date	31-Jan-27

Source: Investment Manager

- The following are the salient features of PECPL:

Sr. No.	Salient Features	Units
1	Total Length of Main Carriageway with Rigid Pavement	Only at Toll Plaza
2	Total Length of Main Carriageway with Flexible Pavement	10 km
3	Total length of Service Roads	10 km (LHS & RHS)
4	Total length of Slip Roads	NIL
5	No of Toll Plazas	1
6	No of Bus Bays with Bus Shelters	9
7	Number of Truck Lay Bays	2
8	No of Rest Areas	NIL
9	No of Major Junctions	14
10	No of Minor Junctions	50
11	No of Vehicular underpasses	2
12	No of Light Vehicular underpasses	NIL
13	No of Pedestrian underpasses	1
14	No of Subways	NIL
15	No of Flyovers	1
16	No of Major Bridges	NIL
17	No of Minor Bridges	2
18	No of Hume Pipe Culverts	2
19	No of Box / Slab Culverts	8

Source: Investment Manager

- The Equity Shareholding of PECPL as on Valuation Date is as follows:

Sr. No	Particulars	No. of Shares	%
1	Epic Concesiones 3 Private Limited	30,046,600	100.00%
2	Niraj Mohanty*	1	0.00%
3	Mohan Kumar Kolli*	1	0.00%
4	Vaibhav Bhandari*	1	0.00%
5	Manish Chitkara*	1	0.00%
6	Amit Dasgupta*	1	0.00%
7	Sandip Das*	1	0.00%
	Total	**30,046,606**	**100.00%**

**Shares held as a nominee of Epic Concesiones 3 Private Limited*

Source: Investment Manager

I have been represented by the Investment Manager that there is no change in the equity shareholding pattern from the Valuation Date till the date of this Report.

- Projections provided by the Investment Manager consider the following assumptions:

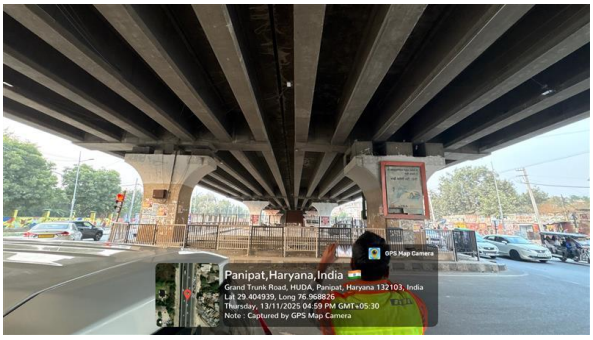
Particulars	Unit	Details
Original concession period	years	20
Toll Suspension at Panipat Elevated Toll Plaza due to Farmers Agitation	days	350
Change in concession period due to COVID-19	days	25
Revised concession period	years	21.0
Appointed date	Date	23-Jan-06
Original concession end date	Date	22-Jan-26
Revised concession end date	Date	31-Jan-27

- My team had conducted physical site visit of the road stretch of PECPL on 13th November 2025. Refer below for the pictures of the road stretch:





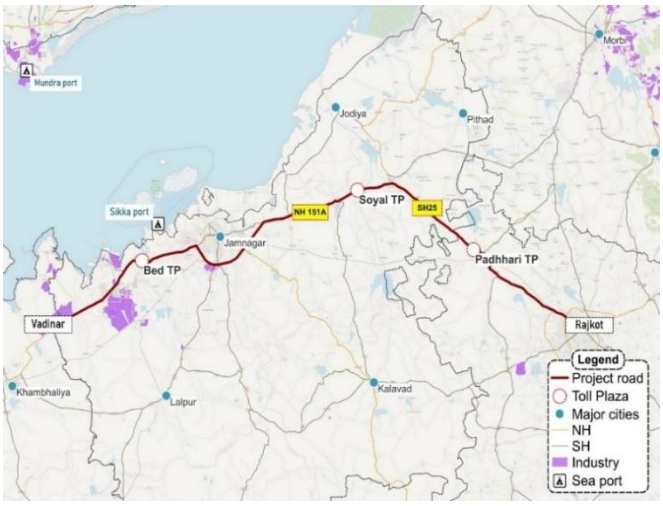




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(iv) **Rajkot-Vadinar Tollway Private Limited ("RVTPL")**

- The project involves development of SH-25 starts from Rajkot to Vadinar Km. 3.000 to Km. 129.350 including spur road length 5.300 km to 4-lane divided carriageway in Gujarat. It has been undertaken under the Viability Gap Funding (VGF) scheme of the Government of India on a Build -Operate- Transfer (BOT) Basis, with Gujarat State Road Development Corporation (GSRDC) as the implementing agency.
- The Concession Agreement was executed on 17th September 2008. The Appointed Date for the project was declared on 12th September 2009, marking the commencement of the 20-year Concession Period from that date. The Project achieved Provisional Commercial Operation Date (PCOD) on 27th January 2012. COD of the project is achieved on 17th June 2023.
- This State Highway-25 forms a primary east–west spine in Saurashtra, linking the regional growth center of Rajkot with the coastal industrial and port cluster spanning Jamnagar–Sikka–Vadinar. The corridor serves heavy industries (refining, petrochemicals, engineering), logistics parks, fisheries, and port operations, and provides connectivity to tourist and pilgrimage circuits in Dwarka district.
- The map below illustrates the location of the project and the corridor it covers.



Source: Investment Manager

- Summary of project details of RVTPL are as follows:

Parameters	Details
Total Length	131.65 km
Lane km	526.60 km
No. of Lanes	4
No. of Toll Plazas	3
SH	SH-25
State Covered	Gujarat
Area (Start and End)	Rajkot-Vadinar
Project Cost	INR 7,748 Mn
PPP Model	BOT (Toll)
Project Type	Tolling, Operation, Maintenance and Transfer
Concession Granted by	GSRDC
PCOD Date	27-Jan-12
FCOD Date	17-Jun-23
Appointed Date	12-Sep-09
Original Concession Period (CP)	20 years
Total Extension Days	162 days
Estimated Concession End Date	20-Feb-30

Source: Investment Manager

- The following are the salient features of RVTPL:

Sr. No.	Salient Features	Units
1	Total Length of Main Carriageway with Rigid Pavement	Only at Toll Plazas
2	Total Length of Main Carriageway with Flexible Pavement	131.65 kms
3	Total length of Service Roads	NIL
4	Total length of Slip Roads	NIL
5	No of Toll Plazas	3
6	No of Bus Bays with Bus Shelters	54
7	Number of Truck Lay Bays	50
8	No of Rest Areas	NIL
9	No of Major Junctions	9
10	No of Minor Junctions	117
11	No of Vehicular underpasses	2
12	No of Light Vehicular underpasses	NIL
13	No of Pedestrian underpasses	6
14	No of Subways	NIL
15	No of Flyovers	0
16	No of Major Bridges	14
17	No of Minor Bridges	60
18	No of Hume Pipe Culverts	147
19	No of Box / Slab Culverts	76

Source: Investment Manager

- The Equity Shareholding of RVTPL as on Valuation Date is as follows:

Sr. No	Particulars	No. of Shares	%
1	Epic Concesiones 3 Private Limited	109,999,994	100.00%
2	Amit Dasgupta*	1	0.00%
3	Manish Chitkara*	1	0.00%
4	Mohan Kumar Kolli*	1	0.00%
5	Sandip Das*	1	0.00%
6	Vaibhav Bhandari*	1	0.00%
7	Niraj Mohanty*	1	0.00%
	Total	**110,000,000**	**100.00%**

**Shares held as a nominee of Epic Concesiones 3 Private Limited*
Source: Investment Manager

I have been represented by the Investment Manager that there is no change in the equity shareholding pattern from the Valuation Date till the date of this Report.

- Projections provided by the Investment Manager consider the following assumptions:

Particulars	Unit	Details
Original concession period	years	20
Change in concession period due to Trucker's strike	days	3
Change in concession period due to Demonetization	days	74
Change in concession period due to COVID-19	days	38
Change in concession period due to Material Adverse Effect	days	47
Revised concession period	years	20.45
Appointed date	Date	12-Sep-09
Original concession end date	Date	11-Sep-29
Revised concession end date	Date	20-Feb-30

- My team had conducted physical site visit of the road stretch of RVTPL on 17th November 2025. Refer below for the pictures of the road stretch:



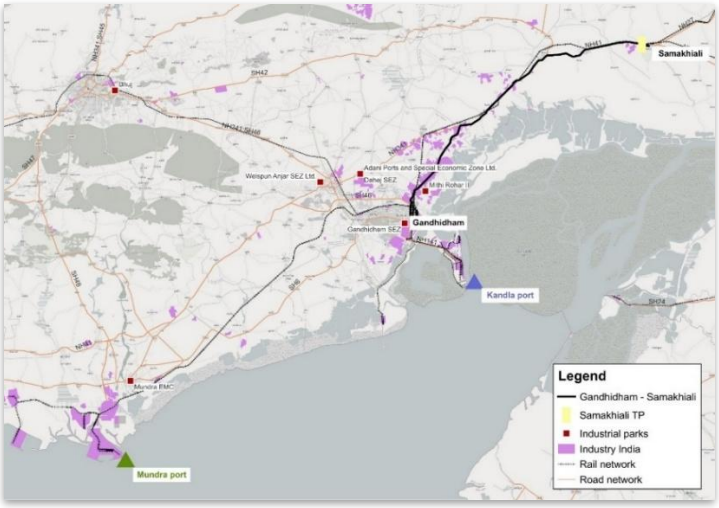






(v) **Samkhiali Bhachau Gandhidham Tollway Private Limited ("SBGTPL")**

- The Government of India had entrusted to National Highways Authority of India (NHAI) for development, maintenance, and management of National Highway No. 41 (old NH-8A) which includes. - Augmentation of existing road to six laning of NH-8A from Samakhiali to Gandhidham (km 306.000 to km 362.16) (length 56.16 km) in the state of Gujarat on DBFOT basis.
- The Appointed Date for the project was declared as 11th September 2010, marking the commencement of the 24-year Concession Period from that date. The Completion Certificate for the project was achieved on 09th December 2024. The Project Highway is currently under the Operation and Maintenance (O&M) phase, in accordance with the provisions of the existing Concession Agreement.
- The project runs east–west in Kutch and the stretch lies entirely in Kutch District, Gujarat, from Km 306.000 at Samakhiali to Km 362.160 near Gandhidham, covering a total length of 56.16 km. This section forms part of the strategic highway corridor connecting the inland national highway network with the major ports of Kandla and Mundra.
- The map below illustrates the location of the project and the corridor it covers.



Source: Investment Manager

- Summary of project details of SBGTPL are as follows:

Parameters	Details
Total Length	56.16 km
Lane km	336.96 km
No. of Lanes	6
No. of Toll Plazas	1
SH	NH-41 (Old NH-8A)
State Covered	Gujarat
Area (Start and End)	Samkhiali - Gandhidham
Project Cost	INR 8,053.9 Mn.
PPP Model	BOT (Toll)
Project Type	Design, Build, Finance, Operate and Transfer
Concession Granted by	NHAI
PCOD Date	04-Jan-20
FCOD Date	09-Dec-24
Appointed Date	11-Sep-10
Original Concession Period (CP)	24 years
Total Extension Days	63 days
Estimated Concession End Date	12-Nov-34

Source: Investment Manager

- The following are the salient features of SBGTPL:

Sr. No	Salient Features	Units
1	Total Length of Main Carriageway with Rigid Pavement	Only at Toll Plaza
2	Total Length of Main Carriageway with Flexible Pavement	56.16 km
3	Total length of Service Roads	LHS - 46.549 km RHS - 40.974 km
4	Total length of Slip Roads	NIL
5	No of Toll Plazas	1
6	No of Bus Bays with Bus Shelters	24
7	Number of Truck Lay Bays	6
8	No of Rest Areas	NIL
9	No of Major Junctions	9
10	No of Minor Junctions	NIL
11	No of Vehicular underpasses	11
12	No of Light Vehicular underpasses	NIL
13	No of Pedestrian underpasses	1
14	No of Subways	NIL
15	No of Flyovers	6
16	No of Major Bridges	5
17	No of Minor Bridges	23
18	No of Hume Pipe Culverts	33
19	No of Box / Slab Culverts	18

Source: Investment Manager

- The Equity Shareholding of SBGTPL as on Valuation Date is as follows:

Sr. No.	Particulars	No. of Shares	%
1	Epic Concesiones 3 Private Limited	80,539,994	100.00%
2	Amit Dasgupta*	1	0.00%
3	Manish Chitkara*	1	0.00%
4	Mohan Kumar Kolli*	1	0.00%
5	Sandip Das*	1	0.00%
6	Vaibhav Bhandari*	1	0.00%
7	Niraj Mohanty*	1	0.00%
	Total	**80,540,000**	**100.00%**

**Shares held as a nominee of Epic Concesiones 3 Private Limited*
Source: Investment Manager

I have been represented by the Investment Manager that there is no change in the equity shareholding pattern from the Valuation Date till the date of this Report.

- Projections provided by the Investment Manager consider the following assumptions:

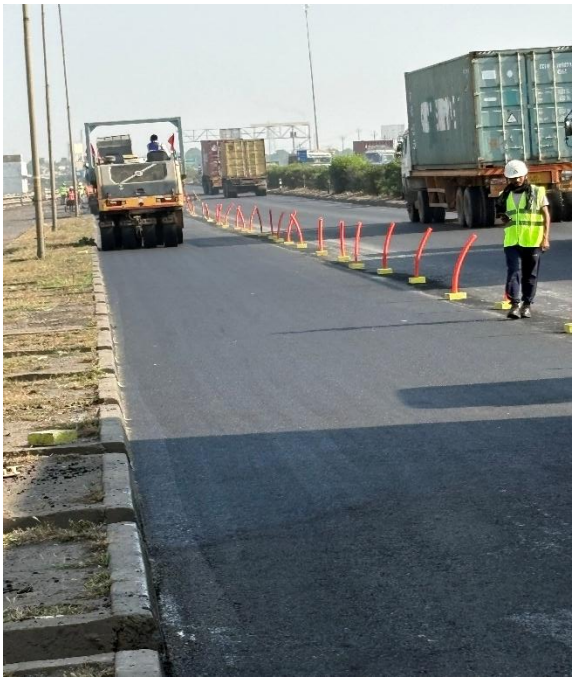
Particulars	Unit	Details
Target date as per CA	Date	31-Mar-19
Target traffic as per CA	PCUs	60,664
Actual Average Traffic on Target Date	PCUs	59,751
Comparison of average traffic at test date with target	%	-1.51%
Original concession period	years	24
Changes in Concession period due to Demonetization	days	23
Change in concession period due to COVID-19	days	36
Changes in Concession period due to Biporjoy cyclone	days	4
Revised concession period	years	24
Appointed date	Date	11-Sep-10
Original concession end date	Date	10-Sep-34
Revised concession end date	Date	12-Nov-34

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- My team had conducted physical site visit of the road stretch of SBGTPL on 16th November 2025. Refer below for the pictures of the road stretch:









(vi) **Sambalpur-Rourkela Tollway Private Limited ("SRTPL")**

- Sambalpur – Rourkela Tollway Private Limited (SRTPL), erstwhile L&T Sambalpur – Rourkela Tollway Limited, is an SPV originally sponsored by L&T Infrastructure Development Projects Limited (IDPL), that entered into a Concession Agreement on 08.11.2013 with Government of Odisha, Works Department, to undertake four laning with paved shoulders of Sambalpur to Rourkela section of SH-10 from Km. 4.900 to 167.900 Km in the state of Odisha to be executed as a BOT (Toll) project on DBFOT pattern.
- The Sambalpur-Rourkela project stretch is 163 km long section of SH-10, which falls in the Biju Expressway. For this project stretch, Provisional Certificate, PCOD-1 & 2 achieved on 13.03.2018 & 12.08.2019 for the length of 159.570 km & 2.16 km respectively. Further, Final Completion was achieved on 30.03.2021. The Concession Period is 22 years commencing from Appointed Date.
- The SH-10, runs between Chandili and Rourkela. It is also known as Biju Expressway. SH-10 has runs the total length of 650Kms. It is the longest State Highway in Odisha. It starts near Chandili village in Korput district and passes through the towns such as Kotpad, Boriguma, Nabarangpur, Papadahandi, Ambapani, Godbhanja, Dharmagarh, Sinapalli, Bhella, Nuapada, Paikamal, Padampur, Sohela, Sambalpur, Jharsuguda, Sundargarh before ending at Rourkela. The main expressway is between Sambalpur and Vedvyas.
- The map below illustrates the location of the project and the corridor it covers:



Source: Investment Manager

- Summary of project details of SRTPL are as follows:

Parameters	Details
Total Length	162.5 km
Lane km	646.92 km
No. of Lanes	4 lanes
No. of Toll Plazas	3
SH	SH-10
State Covered	Odisha
Area (Start and End)	Sambalpur-Rourkela
Project Cost	INR 12,925.6 Mn
PPP Model	BOT (Toll)
Project Type	Design, Build, Finance, Operate and Transfer
Concession Granted by	Odisha Works Department
PCOD Date	13-Mar-18 (for 159.57 km) 12-Aug-19 (for 2.16 km)
FCOD Date	30-Mar-21
Appointed Date	15-Jul-14
Original Concession Period (CP)	22 years
Total Extension Days	1606 days
Estimated Concession End Date	06-Dec-40

Source: Investment Manager

- The following are the salient features of SRTPL

Sr. No	Salient Features	Units
1	Total Length of Main Carriageway with Rigid Pavement	Only at Toll Plazas
2	Total Length of Main Carriageway with Flexible Pavement	161.73 kms
3	Total length of Service Roads	LHS - 14.391 km RHS - 14.805 km
4	Total length of Slip Roads	NIL
5	No of Toll Plazas	3
6	No of Bus Bays with Bus Shelters	24
7	Number of Truck Lay Bays	8
8	No of Rest Areas	NIL
9	No of Major Junctions	15
10	No of Minor Junctions	306
11	No of Vehicular underpasses	4
12	No of Light Vehicular underpasses	NIL
13	No of Pedestrian underpasses	13
14	No of Subways	3
15	No of Flyovers	3
16	No of Major Bridges	6
17	No of Minor Bridges	39
18	No of Hume Pipe Culverts	106
19	No of Box / Slab Culverts	223

Source: Investment Manager

- The Equity Shareholding of SRTPL as on Valuation Date is as follows:

Sr. No	Particulars	No. of Shares	%
1	Epic Concesiones 3 Private Limited	290,029,995	100.00%
2	Niraj Mohanty*	1	0.00%
3	Mohankumar Kolli*	1	0.00%
4	Vaibhav Bhandari*	1	0.00%
5	Manish Chitkara*	1	0.00%
6	Sandip Das*	1	0.00%
	Total	**290,030,000**	**100.00%**

**Shares held as a nominee of Epic Concesiones 3 Private Limited*
Source: Investment Manager

I have been represented by the Investment Manager that there is no change in the equity shareholding pattern from the Valuation Date till the date of this Report.

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- Projections provided by the Investment Manager consider the following assumptions:

Particulars	Unit	Details
Target date as per CA	Date	1-Oct-23
Target traffic as per CA	PCUs	25,732
Actual Average Traffic on Target Date	PCUs	15,179
Comparison of average traffic at test date with target	%	-41%
Original concession period	years	22
Increase in concession period (Max. upto 20%)	%	20%
Estimated change in concession period due to change in Target Traffic		1606
Revised concession period	years	26.4
Appointed date	Date	15-Jul-14
Original concession end date	Date	14-Jul-36
Revised concession end date	Date	6-Dec-40

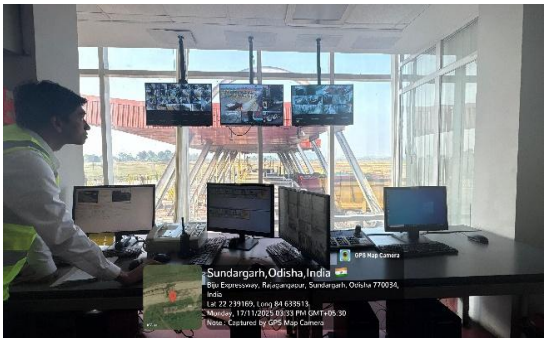
Note: COVID extension of 102.82 days, 190 days for MAE and 7.14 days for trucker's strike was recommended by IE in a letter dated 02-Feb-2023, this has not yet been approved by the Odisha Works Department. This extension has not been considered in the projection period.

- Modification in the Concession Period due to target traffic clause as per Concession Agreement
  As per the Article 29 of the concession agreement between Odisha Works Department and SRTPL provided to us by the Investment Manager, if the actual traffic falls short or exceeds target traffic on a defined date, the concession period shall be revised subject to calculation specified therein. Accordingly, the concession period extends by 20% as given above.

- My team had conducted physical site visit of the road stretch of SRTPL on 17th November 2025. Refer below for the pictures of the road stretch:



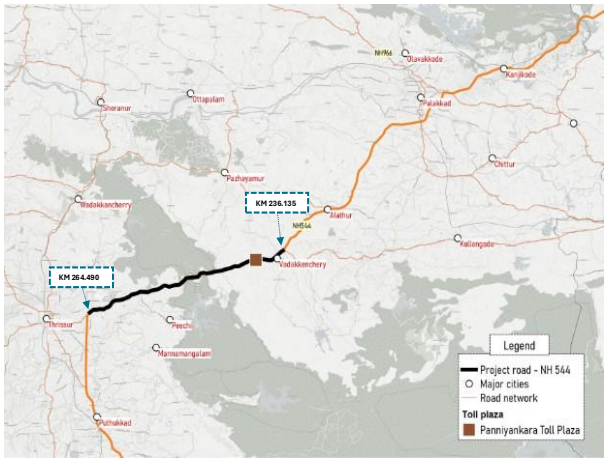






(vii) **Thrissur Expressway Limited ("TEL")**

- The project involves upgrading the existing two-lane carriageway to a six-lane dual carriageway configuration, including strengthening and widening of the existing two lanes to three lanes of NH – 47 (New NH 544), between Km 240.000 (Exiting km 236.135) at Vadakanchery and Km 270.000 (Exiting km 264.490) near Thrissur with a six-lane twin-tube tunnel, the Kuthiran Tunnel, near Kuthiran hills.
- The Concession Agreement was executed on 24 August 2009. The Appointed Date for the project was declared as 15th September 2012, marking the commencement of the 20-year Concession Period from that date. The Provisional Completion Certificate for the project was achieved on 09th March 2022, followed by the issuance of the Final Completion Certificate on 14th June 2024.
- The Kuthiran Tunnel has been constructed to mitigate traffic bottlenecks and reduce the frequency of accidents along the Kuthiran hill stretch, a previously challenging and accident-prone section of the highway. By bypassing this difficult terrain, the tunnel significantly reduces travel time and enhances road safety. Notably, this is Kerala's first-ever road transport tunnel and stands as South India's longest six-lane road tunnel. This stretch of NH-544 forms a critical segment of the highway corridor connecting Kochi in Kerala to Salem in Tamil Nadu. The route traverses several key cities including Thrissur, Palakkad, Coimbatore, and Erode.
- The map below illustrates the location of the project and the corridor under the SPV's purview.



Source: Investment Manager

- Summary of the project details of TEL are as follows:

Parameters	Details
Total Length	28.36 km
Lane km	170.13 km
No. of Lanes	6 Lane
No. of Toll Plazas	1
NH	NH-544 (Old NH-47)
State Covered	Kerala
Area (Start and End)	Vadakkencherry to Mannuthy
Project Cost	INR 6,170 Mn
PPP Model	DBFOT(Toll)
Project Type	Design, Build, Finance, Operate and Transfer
Concession Granted by	NHAI
PCOD Date	09-Mar-22
FCOD Date	14-Jun-24
Appointed Date	15-Sept-12
Original Concession Period (CP)	20 years
Total Extension Days	1461 days
Estimated Concession End Date	14-Sep-36

Source: Investment Manager

- The following are the salient features of TEL

Sr. No	Salient Features	Units
1	Total Length of Main Carriageway with Rigid Pavement	2.746 kms (Toll Plaza and Tunnel)
2	Total Length of Main Carriageway with Flexible Pavement	26.98 Kms
3	Total length of Service Roads	Completed as per CA Scope - 31.42 Kms, Under COS - 9.65 Kms
4	Total length of Slip Roads	Nil
6	No of Toll Plazas	1
7	No of Bus Bays with Bus Shelters	21
8	Number of Truck Lay Bays	1
9	No of Rest Areas	NIL
10	No of Major Junctions	3
11	No of Minor Junctions	7
12	No of Vehicular underpasses	4
13	No of Light Vehicular underpasses	1
14	No of Pedestrian underpasses	4
15	No of Subways	NIL
16	No of Flyovers	2
17	No of Major Bridges	1
18	No of Minor Bridges	1
19	No of Hume Pipe Culverts	29
20	No of Box / Slab Culverts	58

Source: Investment Manager

- The Equity Shareholding of TEL as on Valuation Date is as follows:

Sr. No	Particulars	No. of Shares	%
1	Edelweiss Infrastructure Yield Plus	77,291	99.99%
2	Bhanuprakash Anisetti*	1	0.00%
3	Manish Chitkara*	1	0.00%
4	Mohankumar Kolli*	1	0.00%
5	Niraj Mohanty*	1	0.00%
6	Parveen Kumar*	1	0.00%
7	Sandip Das*	1	0.00%
	Total	**77,297**	**100.00%**

**Shares held as a nominee of Edelweiss Infrastructure Yield Plus*
Source: Investment Manager

I have been represented by the Investment Manager that there is no change in the equity shareholding pattern from the Valuation Date till the date of this Report.

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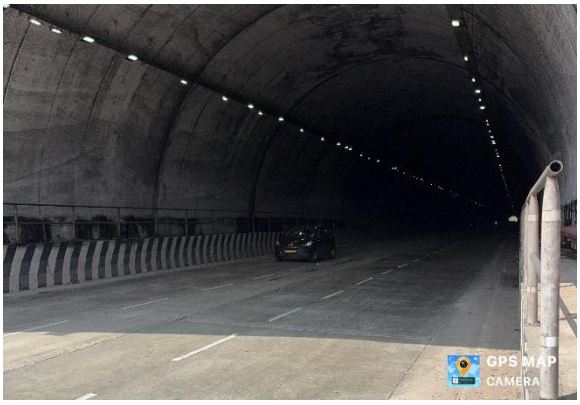
- Projections provided by the Investment Manager consider the following assumptions:

Particulars	Unit	Details
Target date as per settlement agreement	Date	14-Jul-2025
Target traffic as per CA	PCUs	69,164 PCU
Actual Average Traffic on Target Date	PCUs	1st Traffic sampling: 39,342 PCU 2nd Traffic sampling: 39,068 PCU
Comparison of average traffic at test date with target	%	NA
Original concession period	years	20
Increase in concession period (Max. upto 20%)	%	20%
Estimated Target Extension	days	1461
Revised concession period	years	24
Appointed date	Date	15-Sep-12
Original concession end date	Date	14-Sep-32
Revised concession end date	Date	14-Sep-36

- Modification in the Concession Period due to target traffic clause as per Concession Agreement

  As per the Article 29 of the concession agreement between NHAI and TEL provided to us by the Investment Manager, if the actual traffic falls short or exceeds target traffic on a defined date, the concession period shall be revised subject to calculation specified therein.

- My team conducted physical site visit for TEL on 30th October 2025. The following are the pictures of the plant site:



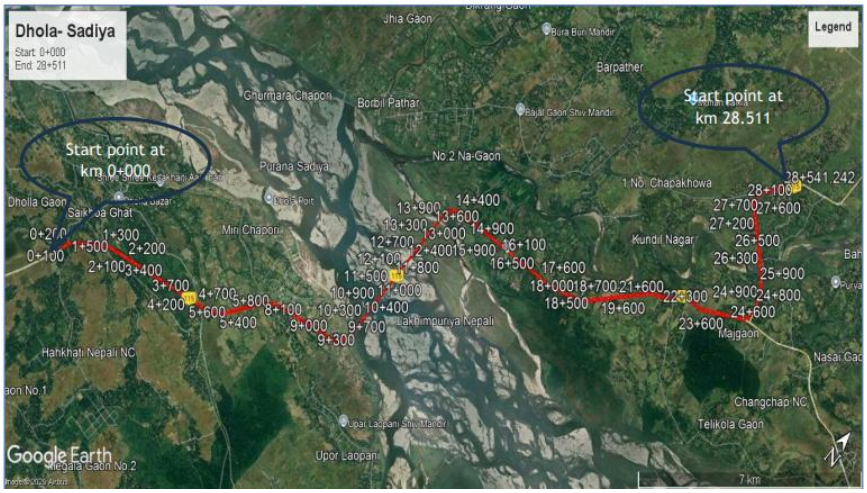






(viii) **Dhola Infra Projects Pvt Ltd ("Dhola")**

- The Govt. of India (GOI) through Ministry of Road Transport & highways (MoRTH) resolved to Construct 12.9m wide bridge between Dhola and Sadia Ghats along with 2 lane connecting roads from near Dhola to Islampur Tinali in Assam (28.511 Km) from km 0+000 (existing km16+540) to km 28+511 (existing km 45+051) section of NH-37 (New NH-115) under Arunachal Pradesh Package of Roads and Highways on Built, Operate and transfer (BOT) Annuity basis.
- IE has issued PCOD on dated 16th March 2018 with effective date of PCOD as 31st August 2017 and completion certificate received on dated 16th August 2019 with effective date of Completion certificate as 13th October 2018.
- The National Highway 115 (old NH-37), starts at Doom Dooma in Assam and Ends at Roing in Arunachal Pradesh
- The map below illustrates the location of the project and the corridor under the SPV's purview.



Source: Investment Manager

- Summary of Project details of Dhola are as follows:

Parameters	Details
Total Length	28.511 km
Lane km	57.02 km
No. of Lanes	2 Lane
No. of Toll Plazas	0
NH	New NH 115 (Old NH-37)
State Covered	Assam
Area (Start and End)	Start at Dhola Junction and Ends at Islampur Tinali
Bid Project Cost	INR 8,760 Mn
PPP Model	BOT (Annuity)
Project Type	Built, Operate and transfer (Annuity)
Concession Granted by	MoRTH
PCOD Date	31-Aug-17
FCOD Date	13-Oct-18
Appointed Date	17-Jun-11
Original Concession Period (CP)	17 years
Nos. of Annuities	25 Annuities
Balance Annuities to be received	9 Annuities
Annuity Amount	INR 559 Mn

Source: Investment Manager

- The following are the salient features of Dhola

Sr.No	Particulars	Units
1	Total Length of Main Carriageway with Rigid Pavement	NIL
2	Total Length of Main Carriageway with Flexible Pavement	28.51 kms
3	Total length of Service Roads	NIL
4	Total length of Slip Roads	NIL
5	No of Toll Plazas	NIL
6	No of Bus Bays with Bus Shelters	NIL
7	Number of Truck Lay Bays	NIL
8	No of Rest Areas	NIL
9	No of Major Junctions	3
10	No of Minor Junctions	NIL
11	No of Vehicular underpasses	NIL
12	No of Light Vehicular underpasses	NIL
13	No of Pedestrian underpasses	NIL
14	No of Subways	NIL
15	No of Flyovers	NIL
16	No of Major Bridges	2
17	No of Minor Bridges	2
18	No of Hume Pipe Culverts	23
19	No of Box / Slab Culverts	3

Source: Investment Manager

- The Equity Shareholding of Dhola as on Valuation Date is as follows:

Sr. No	Particulars	No. of Shares	%
1	SRPL Roads Private Limited	3,008,328	100.00%
2	Nitin Dhokale*	1	0.00%
3	Manoj Thapliyal*	1	0.00%
4	Sandip Das*	1	0.00%
	Total	**3,008,331**	**100.00%**

**Shares held as a nominee of SRPL Roads Private Limited*
Source: Investment Manager

I have been represented by the Investment Manager that there is no change in the equity shareholding pattern from the Valuation Date till the date of this Report.

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- My team conducted a physical site visit of Dhola on 17th November 2025. The following are the pictures of the plant site:






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(ix) **Dibang Infra Projects Private Ltd ("Dibang")**

- The Govt. of India (GOI) through Ministry of Roads & highways (MoRTH) resolved to Construct bridges across Dibang river systems and connecting road between Bomjir-Meka (NH-13) covering length of 18.95 Km & construct bridge across river Lohit at Alubari Ghat and connecting road between Chowkham - Digaru covering length of 12.00 Km in Arunachal Pradesh (total 30.95 Km) on BOT Annuity basis under Arunachal Pradesh package of Road and Highways.
- IE has issued PCOD on dated 7th December 2018 with effective date of PCOD as 19th May 2018 and completion certificate received on dated 10th October 2019 with effective date of Completion certificate as 12th Dec 2018.
- National Highway 13 (NH-13) originates from Baihata Chariali near Guwahati and runs along the northern bank of the mighty Brahmaputra River, connecting several important towns and villages such as North Lakhimpur, Banderdewa, Akajan, and Jonai in Assam. From Jonai, the highway enters the state of Arunachal Pradesh, passing through key locations including Pasighat, Bomjur, Roing, Digaru, Tezu, Parshuram Kund, Chowkham, Namsai, and Dirak. It then re-enters Assam at Dirak and terminates at Rupai on National Highway 37 (NH-37).
- The map below illustrates the location of the project and the corridor under the SPV's purview.



Source: Investment Manager

- Summary of Project details of Dibang are as follows:

Parameters	Details
Total Length	29.635 km
Lane km	59.27 km
No. of Lanes	2 Lane
No. of Toll Plazas	0
SH	NH 13 (Old NH-52)
State Covered	Arunachal Pradesh
Area (Start and End)	Section 1-Start at Digaru Junction and Ends at chowkham Junction; Section 2-Start at Bomjir and Ends at Meka junction
Bid Project Cost	INR 7,640 Mn
PPP Model	BOT (Annuity)
Project Type	Built, Operate and transfer (Annuity)
Concession Granted by	MoRTH
PCOD Date	19-May-18
FCOD Date	12-Dec-18
Appointed Date	11-Jun-11
Original Concession Period (CP)	17 years
Nos. of Annuities	25 Annuities
Balance Annuities to be received	10 Annuities
Annuity Amount	INR 397 Mn

Source: Investment Manager

- Following are the salient features of Dibang:

Sr.No	Salient Features	Units
1	Total Length of Main Carriageway with Rigid Pavement	NIL
2	Total Length of Main Carriageway with Flexible Pavement	29.635 kms
3	Total length of Service Roads	NIL
4	Total length of Slip Roads	NIL
5	No of Toll Plazas	NIL
6	No of Bus Bays with Bus Shelters	NIL
7	Number of Truck Lay Bays	NIL
8	No of Rest Areas	NIL
9	No of Major Junctions	3
10	No of Minor Junctions	0
11	No of Vehicular underpasses	NIL
12	No of Light Vehicular underpasses	NIL
13	No of Pedestrian underpasses	NIL
14	No of Subways	NIL
15	No of Flyovers	NIL
16	No of Major Bridges	6
17	No of Minor Bridges	7
18	No of Hume Pipe Culverts	13
19	No of Box / Slab Culverts	14

Source: Investment Manager

- The Equity Shareholding of Dibang as on Valuation Date is as follows:

Sr. No	Particulars	No. of Shares	%
1	SRPL Roads Private Limited	1,662,796	100.00%
2	Nitin Dhokale*	1	0.00%
3	Manoj Thapliyal*	1	0.00%
4	Sandip Das*	1	0.00%
	Total	**1,662,799**	**100.00%**

**Shares held as a nominee of SRPL Roads Private Limited*
Source: Investment Manager

I have been represented by the Investment Manager that there is no change in the equity shareholding pattern from the Valuation Date till the date of this Report.

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- My team conducted physical site visit for Dibang on 17th November 2025. The following are the pictures of the plant site:









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(x) **Jorabat Shillong Expressway Limited ("JSEL")**

- The Govt. of India (GOI) through National Highways Authority of India (NHAI) as "Authority" undertook the construction and augmentation of the Jorabat–Shillong (Barapani) section of NH 06, spanning from km 0.000 to km 61.800 traversing the states of in Assam and Meghalaya. The project was implemented under the Design–Build–Finance–Operate–Transfer (DBFOT) model on an Annuity basis, as part of the Special Accelerated Road Development Programme for the North Eastern Region (SARDP-NE).
- Following the satisfactory completion of construction works, Independent Engineer (IE) issued the PCOD with effect from on 28th January 2018. The Final Completion Certificate was later issued on 30th August 2019.
- This stretch of NH-40 (now part of NH 6) provides a critical link from Guwahati to Shillong, further connecting to Tripura, Mizoram, and access towards the India–Myanmar border via the East Khasi Hills. This expressway traverses challenging terrain characterized by hilly topography, dense vegetation, and one of India's highest rainfall zones and thus supporting regional commerce, mobility, and socio-economic development.
- The map below illustrates the location of the Project and the corridor it covers:



Source: Investment Manager

- Summary of project details of JSEL are as follows:

Parameters	Details
Total Length	61.80 km
Lane km	247.2 km
No. of Lanes	4 Lane
No. of Toll Plazas	1
NH	NH-06
State Covered	Assam & Meghalaya
Area (Start and End)	Jorabat- Barapani
Bid Project Cost	INR 5,360 Mn
PPP Model	DBFOT (Annuity)
Project Type	Design, Built, Operate, Finance and transfer (Annuity)
Concession Granted by	NHAI
PCOD Date	28-Jan-18
COD Date	30-Aug-19
Appointed Date	12-Jan-11
Original Concession Period (CP)	20 years
Nos. of Annuities	30 Annuities
Balance Annuities to be received	11 Annuities
Annuity Amount	INR 725 Mn

Source: Investment Manager

- Salient Features of JSEL have been given in the table below:

Sr. No.	Salient Features	Units
1	Total Length of Main Carriageway with Rigid Pavement	0.88 km
2	Total Length of Main Carriageway with Flexible Pavement	61.8 km
3	Total length of Service Roads	7.3 Km
4	Total length of Slip Roads	NIL
5	No of Toll Plazas	1
6	No of Bus Bays with Bus Shelters	20
7	Number of Truck Lay Bays	2
8	No of Rest Areas	NIL
9	No of Major Junctions	6
10	No of Minor Junctions	21
11	No of Vehicular underpasses	1
12	No of Light Vehicular underpasses	NIL
13	No of Pedestrian underpasses	NIL
14	No of Subways	NIL
15	No of Flyovers	1 (G S)
16	No of Major Bridges	1
17	No of Minor Bridges	13
18	No of Hume Pipe Culverts	305
19	No of Box / Slab Culverts	86

Source: Investment Manager

- The Equity Shareholding of JSEL as on Valuation Date is as follows:

Sr. No	Particulars	No. of Shares	%
1	SRPL Roads Private Limited	83,999,994	100.00%
2	Bhanuprakash Anisetti*	1	0.00%
3	Manish Chitkara*	1	0.00%
4	Mohankumar Kolli*	1	0.00%
5	Niraj Mohanty*	1	0.00%
6	Parveen Kumar*	1	0.00%
7	Sandip Das*	1	0.00%
	Total	**84,000,000**	**100.00%**

**Shares held as a nominee of SRPL Roads Private Limited*
Source: Investment Manager

I have been represented by the Investment Manager that there is no change in the equity shareholding pattern from the Valuation Date till the date of this Report.

- My team conducted physical site visit for JSEL on 15th November 2025.Following are the pictures of the plant site:









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4. Overview of the Industry

4.1 Transport infrastructure sector in India

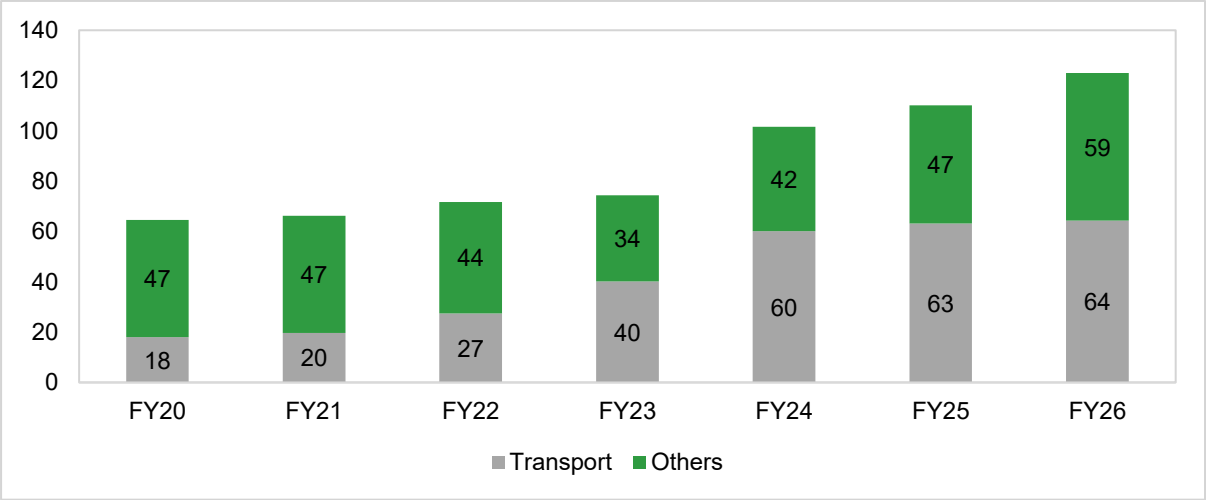
4.1.1 Overview of the Transport Infrastructure Sector

a. India's rapid economic growth necessitates a robust and efficient transport infrastructure to support mobility, trade and regional integration. In response, the government has prioritised modernisation of the transport sector through sustained investments, structural reforms and targeted policy initiatives. Total infrastructure investments are expected to nearly double from ₹47.8 trillion during FY2019-24 to ~₹93 trillion in FY2025-30, reflecting sustained public spending and growing private sector participation. Transport infrastructure alone is projected to attract ₹42-45 trillion over FY2025-30.

b. Budgetary allocations for the infrastructure sector have risen from $88 billion in fiscal 2020 to a projected $123 billion in fiscal 2026, logging a strong CAGR of 11.3%. Of the overall budgetary outlay for this fiscal, the transport sector accounts for over half the allocation at ~52%. The consistent upward trend in the outlay underscores policy continuity and the government's recognition of infrastructure as a key driver of productivity and competitiveness. Additionally, the Union Budget 2025-26 has earmarked $17 billion to be lent as 50-year interest-free loans to states, supporting capex and facilitating policy reforms.

c. After the successful monetisation of assets worth $44 billion under the first phase of the NMP between fiscals 2022 and 2024, the government has launched the second phase, targeting $115 billion in asset monetisation between fiscals 2025 and 2030. This is expected to unlock value from existing assets and channel funds into new infrastructure development.

d. Budgetary allocation for the infrastructure sector in India ($ billion)



Note: Includes budget allocations to the Ministry of Road Transport and Highways, Ministry of Railways, Ministry of Ports, Shipping and Waterways, Ministry of Civil Aviation and allocations to metro rails under the Ministry of Housing and Urban Affairs
Source: Budget estimates, Ministry of Finance, Crisil Intelligence

4.1.2 Investment trends: Public expenditure on transport infrastructure as a share of GDP

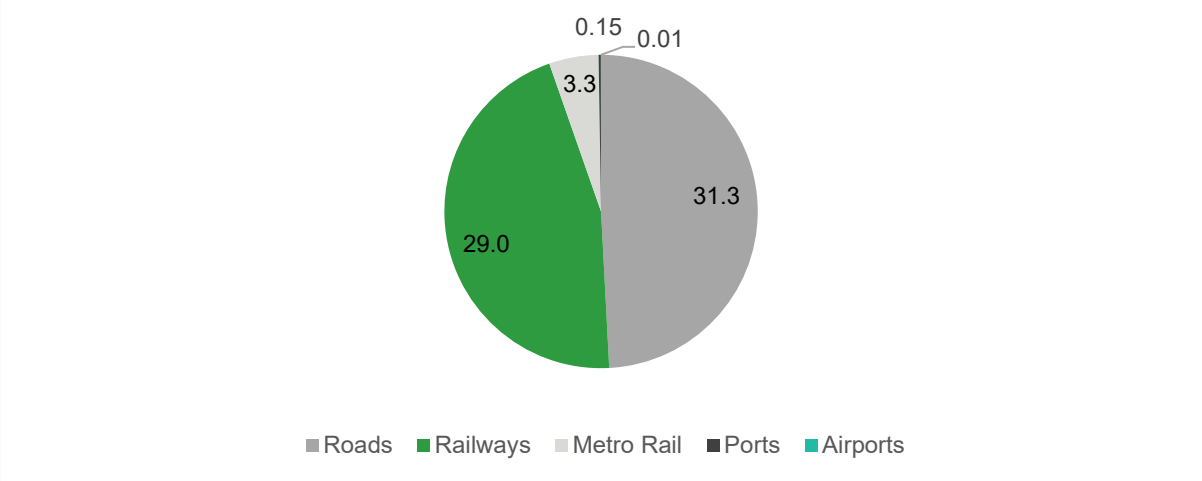
a. The share of public spending on transport infrastructure in GDP has almost doubled from 0.86% in fiscal 2021 to 1.66% in fiscal 2025. In contrast, most other countries show either stagnation or decline in incremental spending as a share of GDP. For instance, in the US, it fell from 0.74% to 0.5% and in the UK from 1.13% to 0.66% during the period, while in Brazil and South Africa it remained stable at 1.3% and 0.3%, respectively, indicating slower growth in developed and other emerging economies.

b. India's higher and rising investments reflect its aggressive infrastructure push under the PM Gati Shakti, NIP, NMP and Bharatmala programmes. As already mentioned, these initiatives aim to close the infrastructure gap, improve logistics efficiency and support rapid urbanisation and economic growth. In contrast, advanced economies such as the US, the UK and Japan, already run mature transport systems, leading to lower incremental spending as a share of GDP. India's strong capex focus is, thus, not only a developmental necessity but also a strategic move to sustain high economic growth.

c. Capex in the domestic transport sector has been strategically directed towards strengthening connectivity, improving logistics efficiency and enhancing competitiveness. The focus remains on developing multimodal infrastructure, with roads and railways continuing to dominate budgetary allocations, while metro, ports and airports receive relatively smaller but targeted investments.

d. Based on fiscal 2025 RE, roads and highways account for the largest share of transport capex, underscoring their central role in enabling last-mile connectivity and facilitating both passenger and freight movement. The strong allocation growth reflects policy emphasis on national highway expansion, expressway development and rural connectivity through programmes, such as the Bharatmala and Pradhan Mantri Gram Sadak Yojna (PMGSY). The railways form the second-largest component, driven by modernisation, network decongestion and electrification initiatives. Capex for the railways has more than tripled since fiscal 2020, reflecting the government's sustained focus on capacity enhancement and safety. Metro systems have also seen steady investments aligned with the government's urban transport priorities and growing need for sustainable mobility solutions. While ports and airports account for a smaller share in the overall transport capex, these represent strategic investments to expand trade competitiveness and regional air connectivity. Allocations in these segments are aligned with the Ude Desh Ka Aam Naagrik (UDAN) scheme, port modernisation initiatives and multimodal logistics development under the PM Gati Shakti Master Plan.

e. Sector-wise split of budgetary allocation for transport infrastructure for fiscal 2025 (RE; $ billion)



Source: Budget documents, Crisil Intelligence

4.1.3 Indian Government's Initiatives in the Transport Sector

a. National Infrastructure Pipeline

Launched in 2019, the NIP was a landmark initiative to systematically identify and develop large-scale infrastructure projects across India over fiscals 2020-2025. The goal of the NIP was to provide a structured framework for improving project preparation, accelerating approvals and aligning public as well as private investments. Of the planned capital outlay, the transportation sector accounted for ~55% share, reflecting its strategic importance in enabling economic integration and improving logistics efficiency. As of last fiscal, over 9,766 projects totalling $1,839 billion were tracked under the NIP in 37 sub-sectors.

b. National Monetisation Pipeline

The NMP, launched in August 2021, focuses on unlocking the value of existing public infrastructure assets through monetisation. It aims to recycle capital by attracting private investment into brownfield assets, thereby reducing the fiscal burden on the government and reinvest the monetisation proceeds into new infrastructure creation. Also, it complements the NIP by mobilising private capital for reinvestment in new infrastructure, creating a sustainable cycle of asset development and monetisation.

The NMP employs models such as PPP, InvITs and TOT to ensure predictable returns for investors while maintaining government ownership of the core assets.Between fiscals 2022 and 2025, asset monetisation of $44 billion was achieved across roads, railways, power, oil and gas, and ports.

The NMP is set to launch its second phase, spanning fiscals 2026-2030, with a substantial portfolio of assets valued at $115 billion for monetisation. It aims to unlock capital by leasing public assets such as roads, railways, airports, ports and power to the private sector for a defined period, which can then be reinvested into new infrastructure projects. NMP 2.0 will also focus on developing vacant public land and cover a broader range of assets compared with phase one.

c. Pradhan Mantri Gati Shakti

The platform enables real-time data integration through over 1,500 data layers from ministries and states, supporting evidence-based project planning under the PM Gati Shakti-National Master Plan framework. It aligns with flagship programmes such as Bharatmala, Sagarmala and UDAN, focusing on last-mile connectivity and logistics efficiency. As of October 2024, over 208 infrastructure projects totalling $117 billion were assessed under this initiative. The initiative supports the government's Viksit Bharat @ 2047 vision by ensuring seamless infrastructure connectivity.

d. National Logistics Policy

The NLP, launched in September 2022, seeks to build an integrated, efficient and technology-driven logistics ecosystem. The policy targets reducing logistic costs from the currently estimated 13-14% of GDP to global benchmarks of below 10% by 2030, thereby improving India's trade competitiveness and supply chain resilience.Its objectives include enhancing multimodal integration, promoting data-driven decision-making through the ULIP and improving India's Logistics Performance Index (LPI) ranking to among the top 25 countries by 2030.

In the World Bank's LPI 2023, India's rank improved to 38th from 54th in 2014, reflecting notable progress in port connectivity, infrastructure development and supply chain digitisation. Along with NIP, NMP and PM Gati Shakti, the NLP reinforces India's commitment to building a globally competitive and sustainable logistics network.

4.1.4 Modal split of freight movement in India

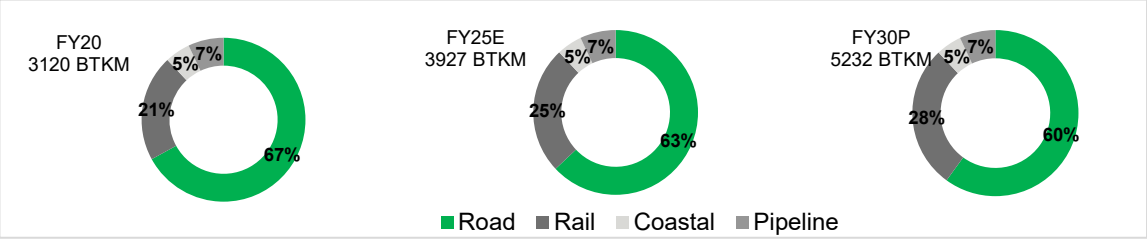
a. Investments in core transport infrastructure, such as roads, railways, ports and logistics parks, play a pivotal role in reducing logistics costs and enhancing the efficiency of freight movement across India. By developing integrated, multimodal transport corridors, these investments enable smoother interlinkages between different modes of transport, facilitating seamless cargo transfer.

b. Strengthened first- and last-mile connectivity through highways, rail sidings and port-access roads ensure faster movement of goods and minimises delays caused by modal fragmentation. Development of MMLPs and dedicated freight corridors (DFCs) further reduce turnaround times and promote aggregation of cargo volume, optimising both cost and time efficiency.

c. As logistics costs decline, driven by better infrastructure and coordination, there is a gradual rebalancing of the billion tonne kilometre (BTKM) mix.

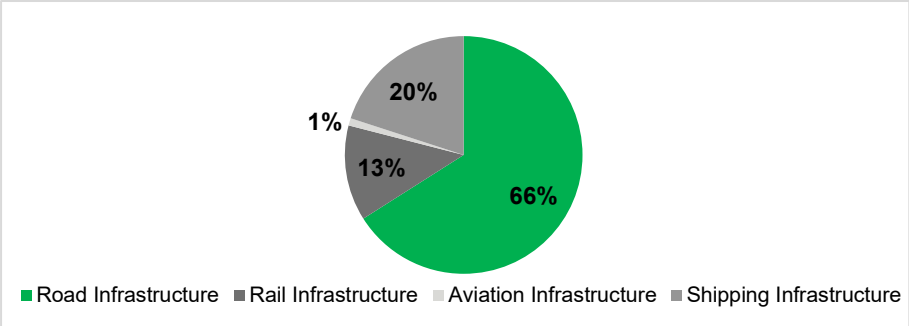
d. Road transport remains the preferred choice for transporting low-volume, high-value commodities on account of its superior service quality, reliability, personalised touch and end-to-end connectivity. It compensates for the limitations of rail transport, which is geared towards bulk freight. Also, the rail sector's modal share has increased notably, to 25% in fiscal 2025 from 21% in fiscal 2020, driven by the development of the DFCs and the government's decision to allow private companies to own terminals. In contrast, the modal shares of coastal and pipeline transport have been steady at 5% and 7%, respectively, since fiscal 2020, and are expected to remain so until fiscal 2030.

e. Share of freight movement by transportation mode:



P – projected, E – estimated
Note: BTKM is estimates
Source: Crisil intelligence

f. Ongoing projects across sectors by value (construction contracts and PPP)



4.2 Introduction of Indian Infrastructure Industry

As India strives towards becoming a developed economy, the transport sector plays a crucial role. In the 2025-26 Budget, the capital expenditure allocation is set at Rs 11.21 lakh crore.

During the Financial Year 2024–25, the National Highway Authority of India (NHAI) constructed 5,614 km of National Highways, exceeding its target of 5,150 km. Capital expenditure for highway development reached a record ₹2,50,000 crore, surpassing the target of ₹2,40,000 crore. This included both government budgetary support and NHAI's own funds. Compared to previous years, this marked a 21% increase from ₹2,07,000 crore in FY 2023–24 and a 45% rise from ₹1,73,000 crore in FY 2022–23

Rs 1.5 lakh crore have been outlaid for 50-year interest free loans to states for capital expenditure and incentives for reforms.

The second asset monetization plan for 2025-30 is to be launched for generating capital of Rs 10 lakh crore for new projects.

4.3 Other Sectors in India

4.3.1 Logistics Sector

The logistics sector encompasses various modes of transportation, enabling infrastructure and associated services, which complement and enhance the competitiveness of the overall flow of goods.Logistics is crucial to India's economic progress as it enables the smooth movement, storage and flow of goods, services and information from origin to consumption. As a country with a growing manufacturing base, expanding services sector and rising consumer demand, India needs an efficient logistics sector to ensure competitiveness, price stability and market access.

An efficient logistics infrastructure drives productivity, boosts consumption and enables competitiveness in the global markets. It remains central for industrial progress, urbanisation and sustaining a diversified and resilient business ecosystem.This section presents an overview of the logistics landscape in India and highlights how logistics contributes to economic growth. It also identifies policy initiatives, challenges and opportunities that are shaping the country's logistics ecosystem.

4.3.2 Airport Infrastructure

India has become the third-largest domestic aviation market in the world. The country's aviation sector has grown rapidly, driven by rising passenger demand, regional connectivity focus and infrastructure modernisation. Beyond core airport infrastructure, ancillary services offer significant opportunities. These services include ground handling, car parking, retail spaces and other airport-linked facilities, especially in PPP-operated airports

Airport capex is projected to exceed Rs 1 trillion between fiscals 2026 and 2030, up from Rs 750-800 billion during fiscals 2021 to 2025, driven by strong passenger and investor demand. Ongoing expansion projects will sustain the capex surge till fiscal 2025, with a further rise expected from fiscals 2026 to-2030as 25 airports are slated for privatization. Greenfield investments will also contribute to growth, led by projects such as Jewar, NMIA, Bhogapuram.

4.3.3 Metro Rail Infrastructure

India has the third-largest metro network globally, spanning over 1,000 km across 23 cities in 11 states and Union territories, providing safe and efficient transport daily to millions. Driven by rapid urbanization, rising population density and traffic congestion, metro rail has emerged as a sustainable alternative to road transport, cutting travel time and emissions. Strong policy backing through the Metro Rail Policy, 2017, multi-source funding (central/state, PPPs and international financial institutions or IFIs) and advances in automation and digital infrastructure have accelerated expansion.

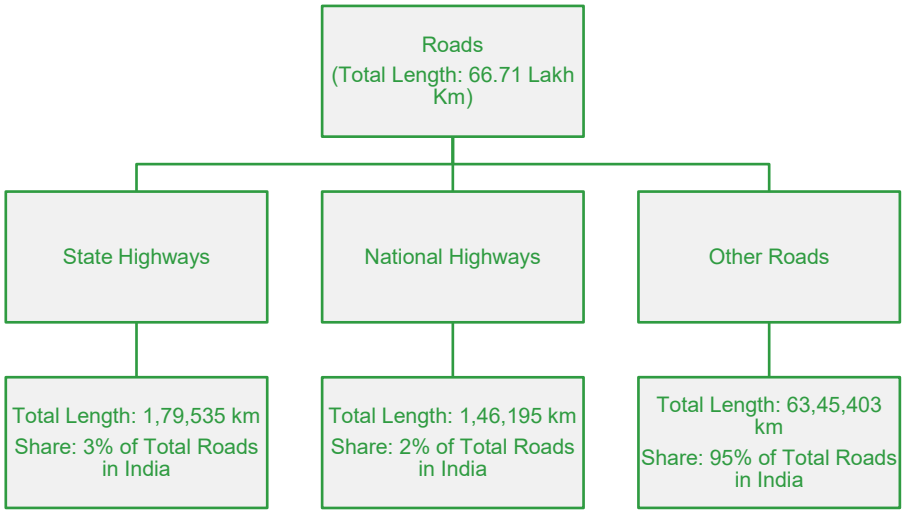
4.3.4 Ropeway Infrastructure

Ropeways in India are being scaled up under the National Ropeways Development Programme, or the Parvatmala Pariyojana, announced in the Union Budget for fiscal 2023-2024. The programme is spearheaded by the MoRTH and supported by agencies such as the NHAI. It aims to expand ropeway connectivity across states with hilly and difficult terrain through the PPP framework. At present, over 25 ropeways are operational in India, spread across 13 states and largely concentrated in Uttarakhand, Gujarat and the Union territory of Jammu and Kashmir. This initiative represents a significant shift towards a coordinated national programme designed to enhance regional accessibility, support local economies and promote sustainable mobility, moving away from sporadic ropeway projects that were previously limited to individual tourist or pilgrimage destinations.

4.4 Road Network in India

4.4.1 India is the second-largest road network in the world, The length of National Highways was 91,287 km in 2013-14 there has been an increase of about 60% extending 146,204 km in FY25 serving as the country's primary arterial routes. As of March 31, 2025, India has more than 63 lakh km of road network, out of which National Highways is 1,46,195 km, State Highways is 1,79,535 km and 60,19,723 km other roads==-/ To further strengthen and expand this network, the Government has launched several major initiatives, including the Bharatmala Pariyojana (along with NHDP), the Special Accelerated Road Development Programme for the Northeastern Region (SARDP-NE), and Externally Aided Projects (EAP).

Over 64.5% of all goods in the country are transported through roads, while 90% of the total passenger traffic uses road network to commute.



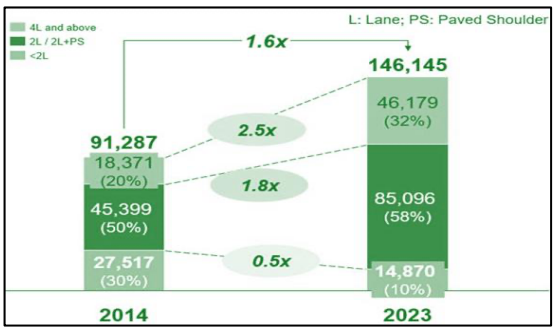
Source: MoRTH, Government of India

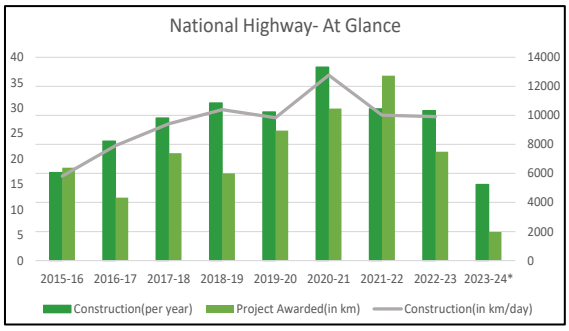
4.4.2 NHs constitute around 2 per cent of the total road network in the country but carry about 40% of the road traffic. The density of India's highway network at 1.89 km of roads per square kilometer of land – is similar to that of the France (1.98) and much greater than China's (0.49) or USA's (0.68).

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4.4.4 National Highway (NH) network increased by ~60% from 91,287 km in 2014 to 1,46,204 km in FY 2024-25. Following table provides the construction of Km per day for NH:

Year	Construction (per year)	Project Awarded (in km)	Construction (in km/day)
2015-16	6,061	6,397	16.6
2016-17	8,231	4,335	22.6
2017-18	9,829	7,400	26.9
2018-19	10,855	6,000	29.7
2019-20	10,237	8,948	28.1
2020-21	13,327	10,467	36.5
2021-22	10,457	12,731	28.6
2022-23	10,331	7,497	28.3
2023-24	12,349	8,581	33.8
2024-25	5,853	3,100	21.3
2025-26 (till Nov'25)	4612	1951	17,06





Source: MoRTH, Government of India

4.5 Government Agencies for Road Development

4.5.1 The Ministry of Road Transport & Highway ("**MoRTH**") is responsible for development of Road Transport and Highways in general and construction & maintenance of National Highways. The National Highways Authority of India ("**NHAI**") is an autonomous agency of the Government of India, set up in 1988 and is responsible for implementation of National Highways Development Project ("**NHDP**").

4.5.2 In 2025, the Indian government, through the Ministry of Road Transport and Highways (MoRTH), is focusing on constructing 10,000 km of national highways, including 5,800 km of high-speed corridors, and developing 700+ wayside amenities (WSAs) along national highways and expressways. A significant allocation of Rs 1,16,292 crore has been made towards roads and bridges in the 2025-26 financial year.

4.5.3 The NHDP in the context of NHs is nearing completion- in seven phases. Later, the other highway development programmes like Special Accelerated Road Development Programme for Development of Road Network in Northeastern States (SARDP- NE) and National Highways Interconnectivity Improvement Project (NHIIP) were also taken up by MoRTH. Further, Bharatmala Pariyojana is ongoing. For majority of the projects under NHDP and Bharatmala Pariyojana, NHAI is the implementation agency. Other NH related programmes/works are being implemented through agencies like National Highways Infrastructure Development Corporation Limited (NHIDCL), State Public Works Departments (PWDs), State Road Development Corporations and the Border Road Organization.

4.5.4 MoRTH has defined a Vision 2047 for the National Highways sector which serves as the guiding principle for the Master Plan of National Highways and allied infrastructure. Vision 2047 for the National Highways aims to provide equity, efficiency and strategic connectivity to meet 5 key objectives which are to access to high-speed corridor within 100-150 km to all citizens, India to rank amongst top 10 countries in G20 for high-speed corridor density, equitable access to National Highways in under-developed regions, improve passenger convenience with world class Passenger Amenities, reduction in logistics cost as a share of GDP

4.6 Trend of Road and Highways Construction

4.6.1 The current rate of road construction is almost three times that in 2007-08 as of June 2025. The length of India's National Highway network has surged by 60 per cent in the last 10 years from 91,287 km in 2014 to 146,204 km in March 2025, making it the second largest road network in the world, according to the year-end review of the Ministry of Road Transport and Highways.

4.6.2 In the last 11 years (2014-25), India has amplified 54,917 kms to the National highways network.

4.6.3 Under Asset Monetisation following TOT (Toll Operate and Transfer) model, NHAI monetises four TOT bundles realising Rs. 15,968 Crore during FY 2023-24 totalling Rs. 42,334 Crore by 2024

4.6.4 MoRTH plans network of 35 Multimodal Logistics Parks to be developed as part of Bharatmala Pariyojana.

4.6.5 Out of 108 (3700 km) port connectivity road projects, 8 (294 km) are completed, 28 (1808 km) are awarded and DPR under-progress for 72 (1595 km) projects

4.6.6 With the Government permitting 100% Foreign Direct Investment (FDI) in the road sector, several foreign companies have formed partnerships with Indian players to capitalise on the sector's growth. Cumulative FDI inflows in construction development stood at US$ 33.91 billion between April 2000 - March 2024.

4.6.7 PRAGATI (Pro-Active Governance and Timely Implementation) Launched on March 25, 2015, PRAGATI is a transformative initiative aiming at strengthening governance and infrastructure development through the integration of cutting-edge technology with administrative processes. The most recent, 46th PRAGATI meeting took place on April 30, 2025. During this session, the Prime Minister reviewed eight critical infrastructure projects valued at over ₹90,000 crore. Since its launch, 363 projects have been reviewed under the PRAGATI initiative.

4.6.8 The GST on construction equipment has been reduced to 18% from 28%, which is expected to give a boost to infrastructure development in the country.

4.6.9 The NHDP is a program to upgrade, rehabilitate and widen major highways in India to a higher standard. The project was started in 1998 to be implemented in 7 phases.

4.6.10 The Indian government launched Gati Shakti-National Master Plan, which has consolidated a list of 81 high impact projects, out of which road infrastructure projects were the top priority. The major highway projects include the Delhi-Mumbai expressway (1,350 kilometres), Amritsar-Jamnagar expressway (1,257 kilometres) and Saharanpur-Dehradun expressway (210 kilometres). This comprehensive initiative is to improve multimodal infrastructure connectivity across India’s economic zones. Rs. 100 lakh crores are being efficiently utilized through this integrated platform. Anchored on seven key sectors—railways, roads, ports, waterways, airports, mass transport, and logistics infrastructure—it promotes synchronized development across ministries and state governments.

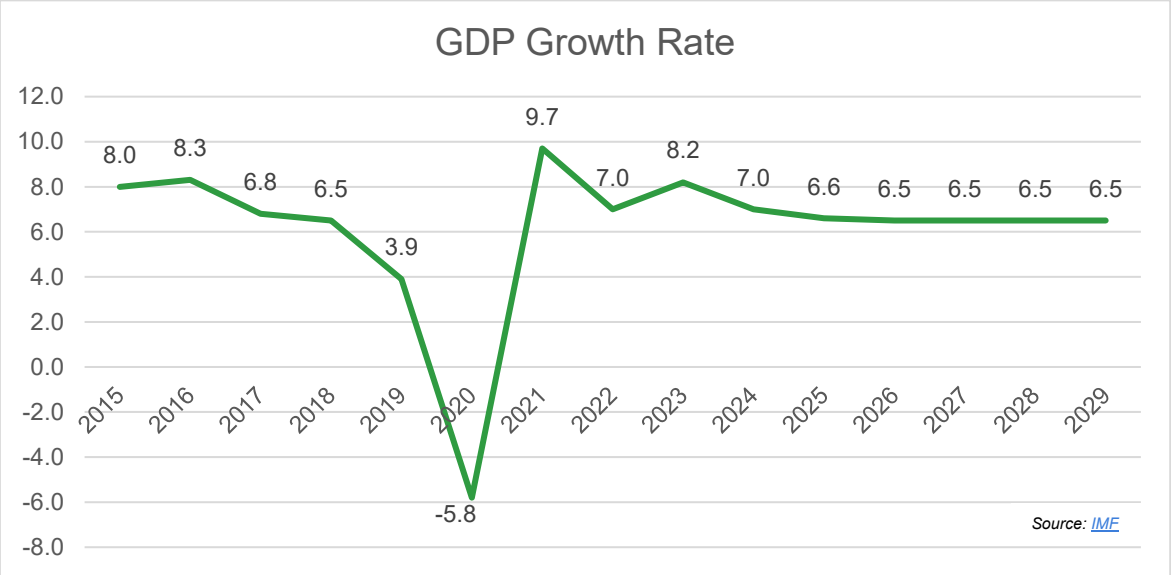
4.6.11 The main aim of this program is a faster approval process by digitizing the process through a dedicated Gati shakti portal.

4.6.12 The development of market for roads and highways is projected to exhibit a CAGR of 36.16% during 2016-2025, on account of growing government initiatives to improve transportation infrastructure in the country.

4.7 Economic and Financial Outlook

4.7.1 GDP Growth

India's real GDP grew by an impressive 8.2% in the third quarter of Financial Year 2026, compared to 6.2% in the third quarter of the last fiscal year. The International Monetary Fund has increased India's economic growth forecast for the fiscal year 2026 to 6.6% from 6.4%. The industrial sector is estimated to grow by 6.2 per cent in FY25. Strong growth rates in construction activities and electricity, gas, water supply and other utility services are expected to support industrial expansion.

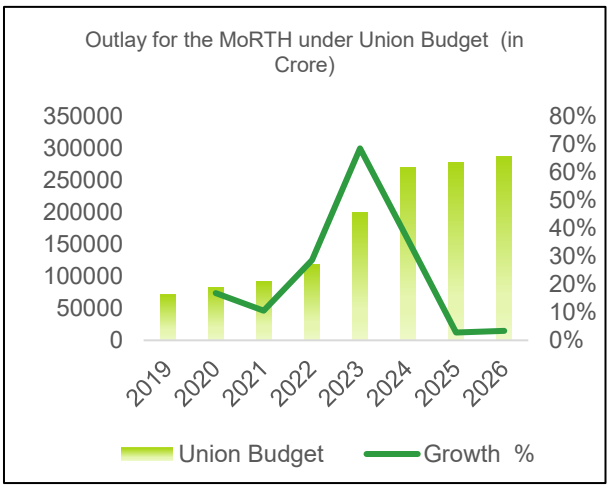


4.7.2 Government Spending

The Ministry of Road and Transport have been allocated Rs2.87 lakh crore under Budget 2025-26 which accounts to 5.7% of the total expenditure. This is an increase of 2.4% compared to the revised estimate for FY25.

Nearly 60% of the total allocation is set aside for the National Highways Authority of India (NHAI) at Rs1.7 lakh crore.

National Highways Authority of India (NHAI) spent a record-breaking Rs. 2,07,000 crore (US$ 24.79 billion) on the construction of national highways in the fiscal year 2023-24. This was the highest capital expenditure ever recorded, representing a 20% increase from last year.



4.7.3 Financing & Capital Structure Government Spending

Public Financing - Funding from government sources includes budgetary allocations, which are financed from taxes, cesses, or dedicated road funds. Publicly funded projects are usually given to contractors under various contract models such as the Engineering Procurement Construction (EPC).

Private Financing - Under private financing, the private developer builds a road, and in return has the right to collect toll for a specified period of time. The developer is responsible for the maintenance of roads during this period.

4.8 Implementation of important projects and expressways:

4.8.1 Bharatmala Pariyojna

Bharatmala Pariyojana is a new umbrella program for the highways sector that focuses on optimizing efficiency of freight and passenger movement across the country by bridging critical infrastructure gaps through effective interventions like development of Economic Corridors, Inter Corridors and Feeder Routes, National Corridor Efficiency Improvement, Border and International connectivity roads, Coastal and Port connectivity roads and Green-field expressway.

The Bharatmala Pariyojana envisages development of about 26,000 km length of Economic Corridors, which along with Golden Quadrilateral (GQ) and North-South and East-West (NS-EW) Corridors are expected to carry majority of the Freight Traffic on roads.

In Bharatmala Pariyojana, 60% projects are on Hybrid Annuity Mode (HAM), 10% projects on BOT (Toll) Mode and 30% projects on EPC mode have been envisaged respectively.

Till March 2025, 20,378 km has been constructed as part of Bharatmala Pariyojana.

Components under Bharatmala Pariyojana Phase-I are as given below:

Component	Length (Km)	Cost (INR Mn)
Economic corridors development	9,000	12,00,000
Inter-corridor & feeder roads	6,000	8,00,000
National Corridors Efficiency	5,000	10,00,000
Border & International connectivity	2,000	2,50,000
Coastal & port connectivity roads	2,000	2,00,000
Expressways	800	4,00,000
Sub Total	**24,800**	**38,50,000**
Other works - under NHDP	10,000	15,00,000
Total	**34,800**	**53,50,000**

Source: Ministry of Road Transport and Highways, Government of India

4.8.2 Pradhan Mantri Gram Sadak Yojana (PMGSY)

Government has approved Pradhan Mantri Gram Sadak Yojana - IV (PMGSY-IV) on September 11, 2024 to provide all-weather connectivity to eligible unconnected habitations of designated population size. Under PMGSY-IV, 25,000 unconnected eligible habitations are targeted for providing connectivity by constructing 62,500 km all-weather roads. The scheme will be implemented from financial year 2024-25 to 2028-29 with a total outlay of Rs. 70,125 crore. A total of 8,37,022 km road length has been sanctioned under various ongoing interventions/verticals of PMGSY, out of which 7,80,401 km road length has already been completed and upgraded as of May 24, 2025. As of March 2025, a total expenditure of Rs. 4,056 crores have been incurred on the maintenance of rural roads constructed under the PMGSY scheme through the eMARG

4.8.3 The Network Planning Group (NPG)

It was established by the Department for Promotion of Industry and Internal Trade (DPIIT), where all central/state infrastructure ministries can coordinate and provide inputs on infrastructure projects presented in the meetings. 131 projects of the MoRT&H have been presented for consultation till April 15, 2025. In addition to these projects, multiple Ministries/ Departments like MoD, MoPSW, NICDC, M/o Steel, D/o Fertilizer etc., have also sent requests for taking up projects to alleviate Critical Infrastructure Gaps out of which 100 projects have been identified as Critical Infrastructure Gap Projects (osf which 65 projects pertain to MoRT&H). Details of these 65 Critical Infrastructure Gap Projects are:

Status	No.	Length (Km)	Cost (INR Mn)
Completed	4	459.50	102,476.3
Under Implementation	5	156.81	51,482.7
To be approved in FY25-26	12	462.00	105,117.0
Non-NH Projects	44	850.00	232,240.0
No. of Projects taken up by State Government/Port Authorities/Other Agencies	16	202.00	66,020.0
Non-NH Projects (to be planned based on prioritization by MoPSW)	28	648.00	166,220.0

4.8.4 Char Dham Vikas Mahamarg Pariyojna:

This project envisages developmenth8 of easy access to the four dhams in India – Gangotri, Yamunotri, Kedarnath and Badrinath. Development of this route of 889 km route us expected at an estimated cost of INR 12,000 Crores.

4.8.5 Eastern peripheral and western peripheral expressway

These two projects will connect NH-1 and NH-2 from western and eastern side of Delhi.

4.8.6 NH-544G Bengaluru–Vijayawada Economic Corridor

Mr. Nitin Gadkari has recently approved the development of 32 km long 6-lane Access Controlled Greenfield Highway on NH-544G Bengaluru–Vijayawada Economic Corridor in Hybrid Annuity Mode in Andhra Pradesh worth US$ 157 million (Rs. 1,292.65 crores).

4.8.7 Setu Bharatam:

This project aims to replace crossings on NHs with Road Over Bridges and Road under Bridges. It is projected to construct 174 such structures.

4.9 Opportunities in road development & maintenance in India

a. India has joined the league of 15 of global alliance which will work towards the ethical use of smart city technologies

b. The Government aims to construct 65,000 kms of national highways at a cost of Rs. 53.5 lakh Mn (US$ 741.51 billion).

c. Road building in India is second least expensive in Asia.

4.10 Asset Monetization

4.10.1 **TOT Model** – Under this model, the right of collection of user fee (toll) in respect of selected operational highways constructed through public funding are assigned through a concession agreement as a result of bidding for a specified period of 15-30 years to the Concessionaire against upfront payment of a lump-sum amount quoted to the Government/NHAI. During the concession period, the responsibility for operations and maintenance of the road assets rests with the Concessionaire.

4.10.2 **InVIT Model** – NHAI has set up an InvIT under the SEBI InvIT Regulations, 2014 which is a pooled investment vehicle that issues units to investors, while having three entities for management of the Trust – Trustee, Investment Manager and Project Manager. The three entities have defined roles and responsibilities under the SEBI Regulations.

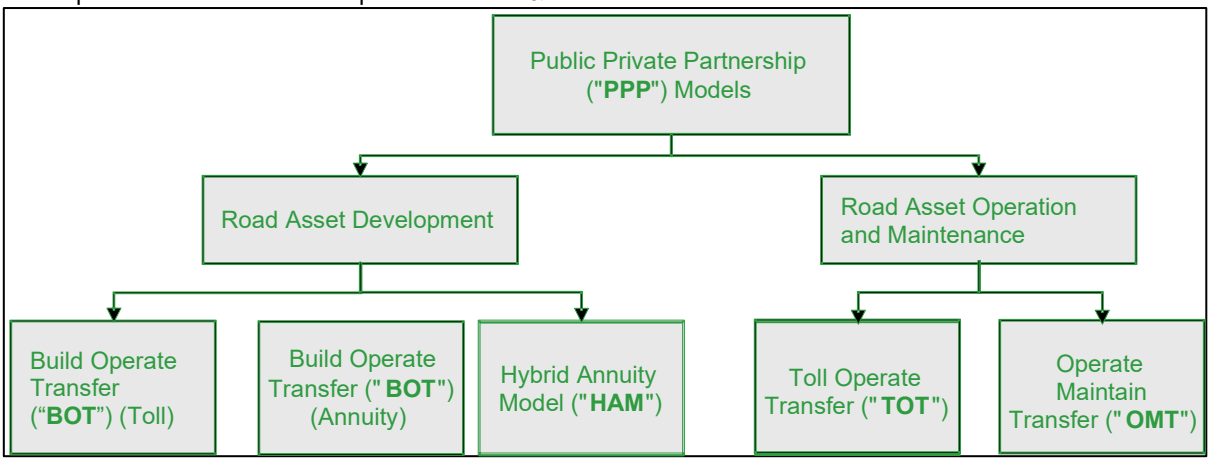
4.10.3 **Securitization through SPVs Model** – A SPV/DME (100% owned by NHAI), has been created by bundling road assets under consideration and securitizing the future user fee from the road assets. NHAI will collect tolls, maintain the road assets and periodically transfer payments to the SPV sufficient for servicing debt obligations at the SPV level. About Rs.3,70,000 Mn has already been raised through this method (DME- Delhi Mumbai Expressway) by NHAI so far.

4.11 Utility Corridors

Working towards development of around 10,000 km of Optic Fibre Cables (OFC) infrastructure across the country by FY2024-25, National Highways Logistics Management Limited (NHLML), a fully owned Company of NHAI, is implementing the network of Digital Highways by developing integrated utility corridors along the National Highways to develop OFC infrastructure. Around 1,367 km on Delhi – Mumbai Expressway and 512 km on Hyderabad - Bangalore Corridor have been identified for the Digital Highway Development.

4.12 Public Private Partnership ("PPP") Models of road development and maintenance in India

4.12.1 India has a well-developed framework for Public-Private-Partnerships (PPP) in the highway sector. PPP has been a major contributor to the success story of the roads and highway sector in India. With the emergence of private players over the last decade, the road construction market has become fragmented and competitive. Players bidding for projects also vary in terms of size. PPP modes have been used in India for both development and operation & maintenance of road assets.

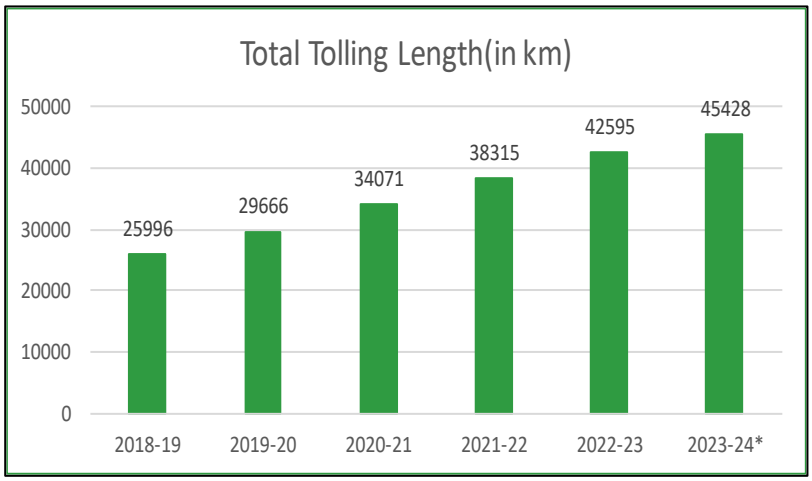


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4.13 Road Asset Development Models

4.13.1 BOT Toll

In a BOT toll project, the concessionaire is responsible for designing, building, financing, operating, maintaining, tolling and transferring the project to the relevant authority at the end of the concession period. The concession period is project specific but is usually for 20-25 years. In BOT Toll model, the concessionaire earns revenue primarily in the form of toll revenue which in turns depends on the traffic on the road stretch. Toll rates are regulated by the government through rules.



4.13.2 BOT Annuity

Similar to a BOT Toll projects, is BOT Annuity project, the concessionaire is responsible for designing, building, financing, operating, maintaining, tolling and transferring the project to the relevant authority at the end of the concession period. However, in these projects, the right to collect toll on road stretch lies with the government. The concessionaire earns revenue in the form of pre-determined semi-annual annuity payments.

4.13.3 HAM

Similar to a BOT projects, in HAM project, the concessionaire is responsible for designing, building, financing, operating, maintaining and transferring the project to the relevant authority at the end of the concession period. However, in these projects, the right to collect toll on road stretch lies with the government. The construction period for HAM projects is project specific and a fixed operation period of 15 years.

4.14 Growth Drivers

4.14.1 Robust Demand:

In the period of April to March 2025, domestic sales of passenger vehicles reached 43,01,848 units. Sales of commercial vehicles totalled 9,56,671 units during the same period. Three-wheeler sales were recorded at 7,41,420 units, while two-wheeler sales amounted to 1,96,07,332 units. These figures reflect the strong demand across various segments in the automotive industry during this period.

4.14.2 Increasing Investment:

Under the Union Budget 2025-26, the government has allocated Rs. 2,87,333.3 crore (US$ 33.07 billion) to the Ministry of Road Transport and Highways, reflecting a modest increase of 2.41% compared to the FY25.

4.14.3 Policy Support:

Infrastructure development is a critical driver of economic growth and development, and a reliable source of funding is essential to support the timely and efficient deployment of large-scale infrastructure projects. As such, NaBFID aims to be a key partner in helping India achieve its ambitious infrastructure development objectives – responsibly and sustainably. To achieve its US$ 5 trillion ambition, it is imperative for infrastructure investment to grow annually at the rate of 8-10% over the next 5 years. NaBFID is playing a

pivotal role in helping India meet its arduous infrastructural resolve, by providing the necessary financing, expertise, technology, and analytics to support the development of this sector.

4.15 Challenges & Issues in the Sector

4.15.1 Land Acquisition Delays & Cost:

- Land acquisition cost has increased more than 30% since 2017, primarily due to enhanced compensation payment requirements as per 'The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013'.
- Delay in pre-construction activities (such as land acquisition, relocation) affects project timelines. Land acquisition for road projects involves various stages. Each stage involves a number of stakeholders and regulatory bodies. Thus processes consume considerable time.

4.15.2 Regulatory Approvals & Disputes:

- Road development process requires a number of approvals such as environmental clearance, forest clearance, railways clearance, etc. Each of these activities takes considerable time and non-adherence to timelines result in cost overruns due to delays.
- Claims arising out of disputes between the concessionaire/ contractor and the government authorities are also a significant cost which can lead to large liabilities.

4.15.3 Operational Issues:

- Uncertainty of toll revenue collection and variation of collected toll revenue compared to projected levels as Actual traffic is much less than the anticipated traffic.
- Often unforeseen weather conditions require unplanned O&M, over and above the routine and periodic maintenance activities. This results in enhanced O&M expenses. The increase in O&M costs is also affecting the project returns.

4.15.4 Financing road construction projects:

- In the case of toll motorways, the challenge of financing construction projects is different but still remains. Traditionally, the construction of toll motorways is a profitable investment but in the times of recession, funding may be rare or nonexistent.
- Powerful national economies may be able to efficiently tackle the problem but weaker economies can hardly find the financing sources for road construction projects.

4.14.5 Climate Change:

- The road sector is vulnerable to climate change impacts. Climate change and extreme weather events pose a significant challenge to the safety, reliability, effectiveness and sustainability of road transportation systems. Tsunami waves, wildfires, floods and hurricanes constitute a big risk for passengers, vehicles and goods, as well as for the integrity of the transport infrastructure.
- Since reliable road transport is an essential driver of economic growth and social wellbeing worldwide, national road authorities and motorway operators must adapt the infrastructure to climate change and increase the resilience of road transport to extreme weather

4.14.6 Economy and cost effectiveness:

- Among all modes of transport, road transport occupies a significant place in short- and medium distance travel operations. However, the unit cost of transportation (per ton × km), compared with other modes of transport, remains high and is getting higher and cost ineffective as the travel distance increases.
- Road transport cost comprises direct costs (fuel, capital depreciation, maintenance, motorway tolls, ferry fares and wages) and external costs (noise, congestion, infrastructure damages, health and environmental issues).

4.15 Recent Initiatives by Government

4.15.1 Bhoomi Rashi – Land Acquisition Portal

The ministry has collaborated with the National Informatics Centre, to create Bhoomirashi, a web portal which digitises the cumbersome land acquisition process and also helps in processing notifications relating to land acquisition online. Processing time, which was earlier two to three months has come down to one to two weeks now.

4.15.2 Central Road and Infrastructure Fund (CRF)

A majority of the Ministry's expenditure is managed through transfers from CRIF. A portion of the cess collected on motor spirit and high-speed diesel is earmarked for the development of NHs and SHs, and the amount is transferred to the non-lapsable CRIF. This amount is eventually released to the NHAI, and to the state/UT governments for the development of road infrastructure, and other projects (such as ports, railway track, airports) in the country. For 2024-25, the transfer from CRIF towards the Ministry is estimated at Rs 3,46,400 Mn.

4.15.3 National Investment Fund (NIF)

The NIF was created in 2005 and is credited with proceeds from disinvestments of public sector enterprises. The Ministry finances the Special Accelerated Road Development Programme in Northeast (SARDP-NE) with funds from the NIF.

4.15.4 Investment in roads and other infrastructure

CareEdge Ratings estimates that India will require additional infrastructure investment of US$ 18-20 trillion in the next 25 years to become a US$ 25-30 trillion economy by 2047.

There is an increase of 6.4 times in Ministry investment on road infrastructure between 2013-14 and 2024-25.

The Cabinet Committee on Economic Affairs has given approval for the development of eight key National High-Speed Corridor projects, spanning a total length of 936 km, with an investment of Rs. 50,655 crore (US$ 6.09 billion) nationwide.

4.15.5 FASTag – Electronic Toll Collection

National Electronic Toll Collection (NETC) system, has been implemented on pan India basis in order to remove bottlenecks and ensure seamless movement of traffic and collection of user fee as per the notified rates, using passive Radio Frequency Identification (RFID) technology. As on December 31, 2024, collectively banks have issued over 10.30 crore FASTags; the average daily collection through ETC is around Rs. 192 crore with penetration of about 98.5% in total fee collection.

4.15.6 Revival of languishing projects

Projects which were languishing for a number of years have been attempted to be revived, with the help of a number of policy measures taken by the government. Some of the policy measures like Premium deferment in stressed projects, extension of concession period for languishing projects to the extent of delay not attributable to concessionaires, One Time Capital Support for physical completion of languishing projects that have achieved at least 50 per cent physical progress, through one time fund infusion by NHAI, subject to adequate due diligence on a case-to-case basis.

4.15.7 Rural development

The Pradhan Mantri Gram Sadak Yojana (PMGSY) has constructed 69,666.09 km of road length across India from 2022 to February 2025 under various ongoing initiatives. The government has also approved PMGSY-IV to connect 25,000 unconnected habitations, with a proposed 62,500 km of road length to be constructed at a cost of ₹70,125 crore from 2024-25 to 2028-29

4.15.8 Improve safety standards

The Government of India has announced rules to improve road safety, such as fixed driving hours for commercial truck drivers and a mandate to install sleep detection sensors in commercial vehicles. A memorandum of understanding (MoU) has been signed with the National Highways Authority of India (NHAI) by Guru Nanak Dev University (GNDU) to conduct advanced research on various aspects, including highway architecture, protection and revitalisation. The GNDU will undertake studies on ~137 km length of the National Highways passing through Pathankot, Gurdaspur and Amritsar districts.

4.15.9 Portfolios in roads & highways sector

The National Investment and Infrastructure Fund (NIIF) is constantly making progress towards integrating its road and highway portfolio. The NIIF has acquired Essel Devanahalli Tollway and Essel Dichpally Tollway through the NIIF master fund. These road infra-projects will be supported by Athaang Infrastructure, NIIF's proprietary road network, assisted by a team of established professionals with diverse domain expertise in the transport field.

4.15.10 International Tie-ups

The Ministry of Road Transport and Highways signed a MoU with the Federal Ministry of Climate Action, Environment, Energy, Mobility, Innovation and Technology of the Republic of Austria on technology cooperation in the road infrastructure sector.

4.15.11 Encourage private funding to reduce finance constraints

The OPEC Fund for International Development (the OPEC Fund) is providing a US$100 million loan to the government of India for the financing of the Chennai Peripheral Ring Road Project – Sections II & III in partnership with the Asian Infrastructure Investment Bank (AIIB) and the State of Tamil Nadu. The loan will support the construction of more than 50 km of new roads, helping to ease congestion and commercial traffic to ports, while reducing pollution and travel times. Chennai port handles the second largest volume of containers in India.

To date, the OPEC Fund has provided over US$350 million of public sector financing in India for around 20 projects. The loans have supported energy, health, agriculture, education, transport and water & sanitation projects and promoted sustainable economic growth.

The World Bank, JICA, and ADB have provided loan assistance for various road projects in India. For example, the World Bank has signed an agreement for the construction of Green National Highway Corridors Project (GNHCP) with a loan assistance of $500 million.

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4.16 Outlook

4.16.1 Development and maintenance of road infrastructure is a key Government priority, the sector has received strong budgetary support over the years. During the past years, the standardized processes for Public Private Partnership & public funded projects and a clear policy framework relating to bidding and tolling have also been developed.

4.16.2 The major initiatives undertaken by the Government such as National Infrastructure Pipeline (NIP) and the PM Gati Shakti National Master Plan will raise productivity and accelerate economic growth and sustainable development.

4.16.3 The highway sector in India has been at the forefront of performance and innovation. The government is committed towards expanding the National Highway network to 2 lakh kilometers by 2025 emphasizing the construction of the World Class Road infrastructure in time bound & target-oriented way. India has a well-developed framework for Public-Private-Partnerships (PPP) in the highway sector.

4.16.4 The Asian Development Bank ranked India at the first spot in PPP operational maturity and designated India as a developed market for PPPs. The Hybrid Annuity Model (HAM) has balanced risk appropriated between private and public partners and boosted PPP activity in the sector.

4.16.5 The Government of India has allocated ₹11.21 lakh crore under the National Infrastructure Pipeline 2025-26. This allocation is part of the Union Budget 2025-26 and represents a 3.1% increase in GDP. There has been a 570% increase in road transport and highway budget from 2014 to 2023–24.

Sources: IBEF Roads Report, February 2025; ICRA reports, IMF, website of Ministry of Road Transport and Highways, Government of India, Press Information Bureau

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5. Valuation Methodology and Approach

5.1. The present valuation exercise is being undertaken in order to derive the fair EV and Adjusted EV of the SPVs.

5.2. The valuation exercise involves selecting a method suitable for the purpose of valuation, by exercise of judgment by the valuers, based on the facts and circumstances as applicable to the business of the company to be valued.

5.3. There are three generally accepted approaches to valuation:

(a) "Cost" approach
(b) "Market" approach
(c) "Income" approach

5.4. **Cost Approach**

The cost approach values the underlying assets of the business to determine the business value. This valuation method carries more weight with respect to holding companies than operating companies. Also, cost value approaches are more relevant to the extent that a significant portion of the assets are of a nature that could be liquidated readily if desired.

Net Asset Value ("NAV") Method

The NAV Method under Cost Approach considers the assets and liabilities, including intangible assets and contingent liabilities. The Net Assets, after reducing the dues to the preference shareholders, if any, represent the value of a company.

The NAV Method is appropriate in a case where the main strength of the business is its asset backing rather than its capacity or potential to earn profits. This valuation approach is also used in cases where the firm is to be liquidated, i.e. it does not meet the "Going Concern" criteria.

As an indicator of the total value of the entity, the NAV method has the disadvantage of only considering the status of the business at one point in time.

Additionally, NAV does not properly take into account the earning capacity of the business or any intangible assets that have no historical cost. In many aspects, NAV represents the minimum benchmark value of an operating business.

5.5. **Market Approach**

Under the Market approach, the valuation is based on the market value of the company in case of listed companies, and comparable companies' trading or transaction multiples for unlisted companies. The Market approach generally reflects the investors' perception about the true worth of the company.

Comparable Companies Multiples ("CCM") Method

The value is determined on the basis of multiples derived from valuations of comparable companies, as manifest in the stock market valuations of listed companies. This valuation is based on the principle that market valuations, taking place between informed buyers and informed sellers, incorporate all factors relevant to valuation. Relevant multiples need to be chosen carefully and adjusted for differences between the circumstances.

Comparable Transactions Multiples ("CTM") Method

Under the CTM Method, the value is determined on the basis of multiples derived from valuations of similar transactions in the industry. Relevant multiples need to be chosen carefully and adjusted for differences between the circumstances. Few of such multiples are EV/Earnings before Interest, Taxes, Depreciation & Amortization ("**EBITDA**") multiple and EV/Revenue multiple.

Market Price Method

Under this method, the market price of an equity share of the company as quoted on a recognized stock exchange is normally considered as the fair value of the equity shares of that company where such quotations are arising from the shares being regularly and freely traded. The market value generally reflects the investors' perception of the true worth of the company.

5.6. Income Approach

The income approach is widely used for valuation on a “Going Concern" basis. It focuses on the income generated by the company in the past as well as its future earning capability. The Discounted Cash Flow Method under the income approach seeks to arrive at a valuation based on the strength of future cash flows.

DCF Method

Under DCF Method value of a company can be assessed using the Free Cash Flow to Firm Method (“**FCFF**”) or Free Cash Flow to Equity Method (“**FCFE**”). Under the DCF method, the business is valued by discounting its free cash flows for the explicit forecast period and the perpetuity value thereafter. The free cash flows represent the cash available for distribution to both the owners and creditors of the business. The free cash flows in the explicit period and those in perpetuity are discounted by the WACC. The WACC, based on an optimal vis-à-vis actual capital structure, is an appropriate rate of discount to calculate the present value of future cash flows as it considers equity-debt risk by incorporating debt-equity ratio of the firm.

The perpetuity (terminal) value is calculated based on the business’ potential for further growth beyond the explicit forecast period. The “Constant Growth Model” is applied, which implies an expected constant level of growth for perpetuity in the cash flows over the last year of the forecast period.

The discounting factor (rate of discounting the future cash flows) reflects not only the time value of money, but also the risk associated with the business’ future operations. The EV (aggregate of the present value of explicit period and terminal period cash flows) so derived, is further reduced by the value of debt, if any, (net of cash and cash equivalents) to arrive at value to the owners of the business.

5.7. Conclusion on Valuation Approach

It is pertinent to note that the valuation of any company or its assets is inherently imprecise and is subject to certain uncertainties and contingencies, all of which are difficult to predict and are beyond my control. In performing my analysis, I have made numerous assumptions with respect to industry performance and general business and economic conditions, many of which are beyond the control of SPVs. In addition, this valuation will fluctuate with changes in prevailing market conditions, and prospects, financial and otherwise, of the SPVs, and other factors which generally influence the valuation of companies and their assets.

The goal in selection of valuation approaches and methods for any business is to find out the most appropriate method under circumstances on the basis of available information. No one method is suitable in every possible situation. Before selecting the appropriate valuation approach and method, I have considered various factors, inter-alia, the basis and premise of current valuation exercise, purpose of valuation exercise, respective strengths and weaknesses of the possible valuation approach and methods, availability of adequate inputs or information and its reliability and valuation approach and methods considered by the market participant.

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5.7.1. Conclusion on Cost Approach

The existing book value of EV of the SPVs comprising of the value of its Net fixed assets, Net intangible assets and working capital based on the Special Purpose Financial statements as at 31st December 2025 prepared as per Indian Accounting Standards (Ind AS) are as under:

INR Mn

Sr. No	SPV	31st December 2025	
		Book EV*	Adjusted Book EV**
1	AMTPL	5,073	7,368
2	DTPL	2,671	4,203
3	PECPL	18	254
4	RVTPL	1,775	2,428
5	SBGTPL	163	1,212
6	SRTPL	3,445	7,222
7	TEL	5,560	8,347
8	Dhola	3,057	4,199
9	Dibang	2,358	3,292
10	JSEL	5,120	6,357
	Total	**29,239**	**44,882**

** Book Enterprise Value ("EV") is described as the total value of the equity in a business plus the value of its debt and debt related liabilities, minus any Cash and Cash Equivalents to meet those liabilities.*

*** Adjusted Enterprise Value of the SPVs is derived as the EV as defined above plus Cash and Cash Equivalents of the SPVs as at the Valuation Date.*

In the present case, the SPVs operate and maintain the project facilities in accordance with the terms and conditions under the relevant concession agreement. During the concession period, the SPVs operate and maintain the road asset and earns revenue through Charges and collection of user fee in the form of Toll revenue. The charges, fees or tolls that may be collected are notified by relevant government authority, which are usually revised annually as specified in the relevant concessions and toll notifications. In such scenario, the true worth of the business is reflected in its future earning capacity rather than the cost of the project. Accordingly, I have not considered the cost approach for the current valuation exercise.

5.7.2. Conclusion on Market Approach

The present valuation exercise is to undertake fair EV of the SPVs engaged in the road infrastructure projects for a predetermined tenure. Further, the tariff revenue and expenses are very specific to the SPVs depending on the nature of their geographical location, stage of project, terms of profitability. In the absence of any exactly comparable companies listed with characteristics and parameters similar to that of the SPVs, I have not considered CCM method in the present case. In the absence of adequate details about Comparable Transactions, I was unable to apply the CTM method. Currently, the equity shares of the SPVs are not listed on any recognized stock exchange of India. Hence, I was unable to apply market price method.

5.7.3. Conclusion on Income Approach

Each of the SPVs operates under a BOT or DBFOT based concession agreement with the relevant regulatory authorities. Government authorities in India typically award highway infrastructure development projects under BOT concessions, which are characterized by three distinct phases:

a. Build: upon successfully securing a project concession through a competitive bid, a concessionaire secures financing for, and completes construction, of a road;
b. Operate: during the agreed concession period, the concessionaire operates, manages and maintains the road at its own expense and earns revenues by collecting tolls from vehicles using the road or annuity payments from the Concessioning Authority; and
c. Transfer: at the end of the agreed concession period, the ownership of the road (rights over the road under the concession), the obligation to maintain the road and the right to collect tolls from the vehicles using the road revert to the government entity that granted the concession.
d. A DBFOT project involves, in addition to the activities required under a BOT project, the provision of engineering and design for such projects.

Currently, each of the SPVs are completed and are revenue generating.
The revenue of the Toll SPVs is based on tenure, tariff rates, traffic volumes, operations, macro-economic factors like GDP growth, WPI, and other factors that are unique to each of the Toll SPVs. The Toll SPVs derive almost all their revenue from their toll-road operations (toll collections) over the operation period. Traffic plying through the toll roads is primarily dependent on sustained economic development in the regions that they operate in and government policies relating to infrastructure development. The Toll SPVs are substantially dependent on the accuracy of their respective traffic volume forecasts. The rights in relation to the underlying assets of all the SPVs shall be transferred after the expiry of the Concession Period.

The revenue of Annuity SPVs is mainly derived from the annuity payments (annuity fees). The annuity fees are typically pre-determined with the relevant government authority (NHAI and MoRTH in this case) and cannot be modified to reflect prevailing circumstances. Interest on balance annuity payments are linked to bank rate, which is changed by RBI based on prevailing market conditions. The rights in relation to the underlying assets of the SPVs shall be transferred after the expiry of the Concession Period. Accordingly, since the SPVs are generating income based on pre-determined agreements / mechanism and since the Investment Manager has provided me with the financial projections of the SPVs for the balance tenor of the concession agreements, DCF Method under the income approach has been considered as the appropriate method for the present valuation exercise.

In the present exercise, my objective is to determine the Fair Enterprise Value of the SPVs as per the DCF Method. EV is described as the total value of the equity in a business plus the value of its debt and debt related liabilities, minus any cash or cash equivalents to meet those liabilities. Accordingly, in the present case, I have considered it appropriate to consider cash flows at FCFF (Free Cash Flow to Firm) level i.e., cash flows that are available to all the providers of capital (equity shareholders, preference shareholders and lenders). Therefore, cash flows required to service lenders and preference shareholders such as interest, dividend, repayment of principal amount and even additional fund raising are not considered in the calculation of FCFF.

While carrying out this engagement, I have relied extensively on the information made available to me by the Investment Manager. I have considered projected financial statement of the SPVs as provided by the Investment Manager. I have not tested individual assumptions or attempted to substantiate the veracity or integrity of such assumptions in relation to the forward-looking financial information, however, I have made sufficient enquiries to satisfy myself that such information has been prepared on a reasonable basis. Notwithstanding anything above, I cannot provide any assurance that the forward-looking financial information will be representative of the results which will be achieved during the cash flow forecast period.

Following are the major steps I have considered in order to arrive at the EV of the SPVs as per the DCF Method:

- Determination of Free Cash Flows to Firm which included:

a) Obtaining the financial projections to determine the cash flows expected to be generated by the SPVs from the Investment Manager;

b) Analyzed the projections and its underlying assumptions to assess the reasonableness of the cash flows;

- Determination of the discount rate; and
- Applying the discount rate to arrive at the present value of the cash flows.

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6. Valuation of the SPVs

6.1. Key Assumptions:

The key assumptions of the projections provided to me by the Investment Manager are:

6.1.1. Revenue cash flows for Annuity Model SPVs (Annuity SPVs)

Under this model, concessionaire is responsible for designing, building, financing, operating, maintaining and transferring the project to the authority at the end of the concession period. Under this model, post completion of the road project, the right and responsibility of tolling is with the government. Accordingly, only one mode of revenue is earned by these SPVs that is explained below:

Annuity Payments: The concessionaire earns revenue primarily in the form of pre-determined biannual annuity payments which are made by NHAI to the concessionaire based on the respective concession agreements.

Following table represents the balance number of biannual annuity installments expected to be received by the respective SPVs after 31st December, 2025:

Sr. No.	SPV	Annuities Received till Valuation Date	Balance Annuities to be Received
1	Dhola	16	9
2	Dibang	15	10
3	JSEL	19	11

6.1.2. Revenue cash flows for the Toll SPVs:

Under the Toll SPVs are responsible for designing, building, financing, operating, maintaining and transferring the project to the authority at the end of the concession period. The concessionaire earns revenue primarily in the form of toll revenue in the Toll Model.

a. Toll Revenue: As per the concession agreements for the respective Toll SPVs, the concessionaire is allowed to levy, demand, collect and appropriate the fees (called as toll fees) from vehicles and persons liable to payment of fees for using their road stretch or any part thereof and refuse entry of any vehicle to the road asset if the due fee is not paid. Toll revenues depend on toll receipts, which in turn depend on traffic volumes and toll fees on the toll roads.

b. Concession Period

The Concession Period refers to the period where the Concessionaire has the responsibility to construct the road asset and post-construction is granted with the exclusive rights, license and authority to demand, collect and appropriate fee, operate, manage and maintain the project highway subject to the terms and conditions mention in their respective concession agreement. The cash flow projections are prepared by the Investment Manager for the balance concession period remaining from the Valuation Date as summarized below:

SPV	Concession Period End Date		Extension Period (in Days)	
	Original	Revised	For Traffic Variance	For Other Reasons*
AMTPL (Base)	11-Oct-31	4-Jun-33	365	237
AMTPL (Extension)	19-May-37	19-May-37		1445
DTPL	31-Mar-39	6-Apr-44	1825	8
PECPL	22-Jan-26	31-Jan-27	0	375
RVTPL	11-Sep-29	20-Feb-30	0	162
SBGTPL	10-Sep-34	12-Nov-34	0	63
SRTPL	14-Jul-36	6-Dec-40	1606	0
TEL	14-Sep-32	14-Sep-36	1461	0

I understand, as per the extant provisions of the Concession Agreements for the respective Toll SPVs in relation to the traffic variation, the concession period could be modified to take into the account shortfall or excess in actual average traffic vis-à-vis the target traffic ranging beyond 1% and such concession extension or truncation shall be subject to a cap of 20% extension for shortfall and 10% for truncation for excess.

Accordingly, the Investment Manager has considered an extension period based on its calculation which is subject to the approval from the respective Authorities in case of AMTPL, DTPL, SRTPL and TEL. I have relied on the information provided by the Investment Manager.

***Extension for Other Reasons:** Respective authorities vide their various orders have extended the concession period of the BOT Toll Projects for reasons including natural calamities, lockdowns on account of COVID-19, Farmer's/Trucker's Strike, Demonetisation and Materially Adverse Effects as per supplementary agreements, etc.

In case of AMTPL, the Concessionaire has been granted an additional 1,445 days to the concession period. Further, the Authority has issued new concession agreement for the extension of the project highway by 28.78 kilometres as part of the six-lane Sanand section. These approvals have been incorporated into the revised project scope and timeline

I have considered the projection period for the current valuation exercise based on the balance concession period as represented by the Investment Manager, wherein expected extensions are considered for the Toll SPVs, but final approval from the authorities has not been received.

c. Traffic Volumes

Traffic volumes are directly or indirectly affected by a number of factors, many of which are outside of the control of the Toll SPVs, including: toll fees; fuel prices in India; the frequency of traveler use; the quality, convenience and travel efficiency of alternative routes outside the Toll SPV's network of toll roads; the convenience and extent of a toll road's connections with other parts of the local, state and national highway networks; the availability and cost of alternative means of transportation, including rail networks and air transport; the level of commercial, industrial and residential development in areas served by the Toll SPVs' projects; adverse weather conditions; and seasonal holidays.

d. Toll Rates

During the concession period, the Toll SPVs operate and maintain the road asset and earn revenues through charges, fees or tolls generated from the asset. The amount of charges, fees or tolls that they may collect are notified by the relevant government authorities, which are usually revised annually as specified in the relevant concessions and toll notifications.

The toll rates for the projected period have been derived in the manner stipulated in the individual concession agreements of the Toll SPVs.

In the present case, the Investment Manager has appointed **Crisil Intelligence Limited** an independent third-party research agency to forecast the traffic volumes and toll revenues for the SPV. As confirmed by the Investment Manager, the traffic volumes and toll revenues for the SPV have been estimated by the traffic consultant after considering overall structure and condition of the projects including analysis of demand and supply and strategic geographical locations of the individual road projects. The Traffic Study Report dated September 2025 was one of the most important inputs in projecting the toll revenues. The Traffic consultants have assumed a Wholesale Price Index (WPI) growth rate of approximately 3.0% to 4.3% per annum, which is an important factor for Tariff growth rate. Furthermore, the traffic growth for the SPVs, as considered based on the Traffic Study reports falls within the range of approximately 3.3% to 6.3%.

6.1.3. **Operating and Maintenance Expenses:**

Since all the SPVs are operational on the Valuation Date, the following are the major costs incurred by the SPV:

Operation and Maintenance Costs (Routine) ("O&M Costs")

These are routine costs incurred every year. These costs are related to the normal wear and tear of the road and hence involve repairing the patches damaged mainly due to heavy traffic movement. O&M Costs also include project manager fees, other service charges, staff salaries, consumables, security expenses, electricity, etc. In case of AMTPL, RVTPL and SRTPL, the O&M Costs also includes the Fastag related fees and charges. The primary purpose of these expenses is to maintain the road as per the specifications mentioned in the respective concession agreement. SPV is generally responsible for carrying out operation and maintenance activities at its toll road during its concession period**.** Within the scope of such operation and maintenance obligations, the SPV may be required to undertake routine maintenance of project roads, maintain and comply with safety standards to ensure smooth and safe traffic movement, deploy adequate human resources for incident management, maintain proper medical and sanitary arrangements for personnel deployed at the site, prevent any unauthorized entry to and exit from the project as may be required. The Investment Manager has escalated these costs by approximately 5% p.a. for all SPVs except Dhola and Dibang where it is 5.75% p.a.

The following table shows the broad breakup of Operations and Maintenance Cost for FY27:

INR Mn

Particulars	AMTPL (Base)	DTPL	PECPL*	RVTPL	SBGTPL	SRTPL	TEL	Dhola	Dibang	JSEL
O&M Expense	400	327	123	302	276	447	167	66	67	120
PM Expense	114	67	25	70	79	77	43	26	19	34
CSR Expense	-	-	-	-	-	-	-	-	-	-
Total Payout	**514**	**395**	**148**	**372**	**355**	**524**	**210**	**92**	**85**	**154**

**Up to 31st January 2027*

Further, Operation & Maintenance Costs have been considered based on the Technical Due Diligence ("**TDD**") Reports prepared Ramboll India Private Limited has been engaged for AMTPL, PECPL, RVTPL, SBGTPL and TEL; Samarth InfraEngg Technocrats Private Limited for Dhola, Dibang, JSEL, SRTPL and DTPL as provided to me by the Investment Manager. Given the technical nature of this study, I have referred on the expert's report for these costs. Further, no payment schedule for O&M Costs was provided to me and hence to that extent I have relied on the management's estimate.

Major Maintenance and Repairs Costs ("MMR Costs")

Estimating the MMR Costs

Major maintenance expenses will be incurred on periodic basis. These are the costs incurred to bring the road assets back to its earlier condition or keep the road assets in its normal condition as per the concession agreement terms. These expenses are primarily related to the construction or re-laying of the top layer of the road. Accordingly, such costs include considerable amounts of materials and labour. The Investment Manager has a view that the escalation per annum for MMR in SRTPL and TEL is 2%, RVTPL is 1.5%, JSEL is 5%, Dhola & Dibang is 4% while AMTPL, DTPL, PECPL and SBGTPL is 2.5% for the forecasted period.

Further, Major Maintenance Costs have been considered based on the Technical Due Diligence ("**TDD**") Reports prepared by Ramboll India Private Limited has been engaged for AMTPL, PECPL, RVTPL, SBGTPL and SRTPL; Samarth InfraEngg Technocrats Private Limited for Dhola, Dibang, DTPL, JSEL and SRTPL, as provided to me by the Investment Manager. Given the technical nature of this study, I have referred on the expert's report for these costs. I have relied on the Management's estimate as mentioned in TDD report.

(Refer section 8 for a detailed summary).

Provisions for MMR Costs and Cash Flow Adjustments

As per the financial requirements, provision is required for appropriate major maintenance expense over a period until the actual expenditure is incurred. These are non-cash expenses. Hence, for my DCF analysis, such provisions are added back in their respective years and the actual expenditure expected to be incurred during the particular interval (usually 5 years or more) is deducted in those respective years in order to arrive at net cash flows.

The Investment Manager has provided me the estimated Major Maintenance Expenses.

6.1.4. **Depreciation and Amortization:** In case of all SPVs except JSEL, the toll collection rights or the financial rights (intangible assets) of the SPVs are being amortized over the period of concession using the revenue-based amortization method prescribed under Schedule II to the Companies Act, 2013. In case of JSEL, the Written Down Value has been depreciated as per the Income Tax Act.

6.1.5. **Revenue Share:**

The revenues collected from the toll would be shared with GSRDC (in case of AMTPL and RVTPL) in the form of additional concession fee. The percentage of revenue that the SPV has to share with their respective appointing authority is defined in the Concession Agreement. This is applicable in case of AMTPL and RVTPL only.

INR Mn

SPVS	Date	Total Revenue share payable as per the Balance Sheet	Current Month Outstanding[1]	Revenue share payable converted as Debt[2]	PV of Future Liability[3]
AMTPL	30th June 2025	68	68	-	-
	31st December 2025	3,855	82	-	3,773
RVTPL	30th June 2025	511	32	479	-
	31st December 2025	2,116	-	-	2,116

Note 1 - This amount pertains to current month outstanding of the Revenue share. I have considered the same as a working capital in my valuation exercise as represented by the Investment manager.

Note 2 - As represented by the Investment manager, as per the settlement Agreement between GSRDC and RVTPL, the revenue share of RVTPL payable from May 2014 and 31st March 2026 was converted into debt carrying interest at Bank Rate + 2%. As at 30th June 2025, this outstanding debt was INR 479 Mn. Considering it as debt equivalent, I had not considered this outstanding in my pervious valuation exercise of Fair EV as on 30th June 2025. As represented by the Investment manager, this debt has been repaid as on 31st December 2025.

Note 3 - Yearly revenue share has been considered as an outflow of the respective SPV to arrive at FCFF for calculation of Enterprise Value. (Refer Appendix 1)

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6.1.6. **Premium payment:**

The revenues collected from the toll would be shared with NHAI (in case of SBGTPL and DTPL) in the form of additional concession fee. The fixed amount that the SPV has to share with their respective appointing authority is defined in the Concession Agreement. This is applicable in case of SBGTPL and DTPL only.

INR Mn

SPVS	Date	Total Liability as per Balance Sheet	Current Month Outstanding[1]	PV of Future Liability[2]	Deferred Premium Liability payable converted as Debt [3]
SGBTPL	30th June 2025	18,578	101	7,069	11,408
	31st December 2025	20,385	101	8,276	12,008
DTPL	30th June 2025	15,279	99	7,811	7,369
	31st December 2025	18,194	99	9,775	8,320

Note 1 - This amount pertains to current month outstanding of the Premium Payable. I have considered the same as a working capital in my valuation exercise as represented by the Investment manager.

Note 2 - The SPVs have recognized present value of future premium payable as liabilities in accordance with relevant IND AS and in compliance with the relevant clauses of the Concession Agreement. Accordingly, Yearly premium payment has been considered as an outflow of the respective SPV to arrive at FCFF for calculation of Enterprise Value. (Refer Appendix 1)

Note 3 - As represented by the Investment manager, as per the settlement agreement between NHAI and SBGTPL and between NHAI and DTPL, the deferred premium payments of SBGTPL and DTPL for the period 11th June 2014 to 31st March 2025 and 14th October 2017 to 31st March 2029, respectively has been converted into debt carrying interest at Bank Rate + 2%. Considering it as debt equivalent, I have not considered this outstanding in my valuation exercise of Fair EV.

Capital Expenditure ("Capex"): Consequent to execution of AMTPL (Extension) concession agreement on 30th October 2025, a capital expenditure of INR 9,150 Mn has been assumed for AMTPL (Extension). I have relied on the estimates provided by the Investment Manager for the capex estimated for the AMTPL (extension). No other capex other than routine and major maintenance expense (as mentioned above) has been envisaged for other SPVs.

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6.1.7. **Taxes and Tax Incentive**:

There have been changes in tax regime pursuant to introduction of Taxation Laws (Amendment) Ordinance 2019 made on 20th September 2019 which was enacted to make certain amendments in the Income Tax Act, 1961 and the Finance (No. 2) Act, 2019. As per the discussions with the Investment Manager, the old provisions of the Income Tax Act have been considered for the projected period of AMTPL, DTPL, SBGTPL, SRTPL, TEL, Dhola, Dibang and JSEL except PECPL and RVTPL which follows the new provisions of the Income Tax Act for the current valuation exercise, which inter alia provide benefits of additional depreciation, section 115JB and section 80-IA. New provision of Income Tax Act (with base corporate tax rate of 22%) have been considered for all SPVs after utilization of such 80-IA for the current valuation exercise.

6.1.8. **Working Capital:**

For the Toll SPVs,

The Investment Manager has provided me with the projected Working Capital for the Toll SPV which mainly consists of a debtors with relation to delay in toll collection, advance income tax, revenue share payable, premium payable and the credit period allowed by the O&M contractor. I have relied on the same.

For the Annuity SPVs,

The Investment Manager has provided projected financial information on annual basis for all the SPVs. The annual period is based on the annuity dates of the respective SPVs. The amount of O&M expenses payable to O&M contractor by the SPVs on the basis of their respective O&M Agreements is also due and payable on the basis of the annuity amount and date on which annuities are received. Hence, for all the SPVs where annuity payments are material component of revenue, there are no receivables and payables estimated to be outstanding at their respective annuity dates during the biannually prepared projected period. Other working capital items outstanding as at the Valuation Date mainly represent the advance income tax, GST input tax (and cash) credit, prepaid expenses, etc. that are separately adjusted in the calculation of the enterprise values of the SPVs. The Investment Manager has provided projected Working Capital information for all the SPVs. I have relied on the same.

6.2. **Impact of Ongoing Material Litigation on Valuation**

As on 31st December 2025, there are ongoing litigations as shown in Appendix 7. Further, Investment Manager has informed us that majority of the cases are low to medium risk and accordingly no material outflow is expected against the litigations, hence no impact has been factored on the valuation of the SPVs.

6.3. **GST Claim**: The Investment Manager has informed us that due to the changes in extant provision of the Goods & Services Tax ("GST") laws, the SPVs are eligible to receive GST claim from NHAI which are as follows

i. **On Annuity**: As per the clarification notification of Ministry of Road Transport & Highways as on 27th August 2021 vis-à-vis Ministry of Finance circular dated 17th June 2021, SPVs are eligible to claim reimbursement of GST on annuity, considering change in law, after adjusting GST input credit lying with the SPVs.

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6.4. Calculation of Weighted Average Cost of Capital for the SPV

6.4.1. Cost of Equity:

Cost of Equity (CoE) is a discounting factor to calculate the returns expected by the equity holders depending on the perceived level of risk associated with the business and the industry in which the business operates.

For this purpose, I have used the Capital Asset Pricing Model (CAPM), which is a commonly used model to determine the appropriate cost of equity for the SPVs.

K(e) = Rf + [ERP* Beta] + CSRP

Wherein:

K(e) = cost of equity

Rf = risk free rate

ERP = Equity Risk Premium

Beta = a measure of the sensitivity of assets to returns of the overall market

CSRP = Company Specific Risk Premium (In general, an additional company-specific risk premium will be added to the cost of equity calculated pursuant to CAPM).

For valuation exercise, I have arrived at adjusted cost of equity of the SPVs based on the above calculation *(Refer Appendix 2 for detailed workings).*

6.4.2. Risk Free Rate:

I have applied a risk-free rate of return of 6.80% on the basis of the zero-coupon yield curve as on 31st December 2025 for government securities having a maturity period of 10 years, as quoted on the website of Clearing Corporation of India Limited. For comparison, the previous valuation as of June 2025 risk free rate consider was 6.46%.

6.4.3. Equity Risk Premium ("ERP"):

The Equity Risk Premium (ERP) is a measure of the additional return that investors require for investing in equity markets over risk-free assets, such as government bonds. It is typically estimated by comparing historical realised returns on equity with the risk-free rate, often represented by 10-year government securities. For my estimation of the ERP for India, I have analysed rolling historical returns of the Nifty 50 Index over 10-year, 15-year, and 20-year periods, covering data from 2000 to 2025. As of 31st December, the calculated ERP based on these rolling return periods stands at 6.42%, 6.71% and 7.53% for the 10-year, 15-year and 20-year periods respectively. These figures indicate variability in ERP over different investment horizons, but collectively they suggest a range around 6% to 8%. Considering the historical trends, variability across periods, and long-term expectations, an equity risk premium of 7% for India continues to be an appropriate and reasonable assumption. For comparison, the previous valuation as of June 2025 used an Equity Risk Premium of 7.00%.

6.4.4. Debt – Equity Ratio:

I have considered the target debt-equity ratio as per the industry standards. I have considered the industry bench mark since the cost of capital is a forward looking measure, and captures the cost of raising new funds to buy the asset at any valuation date (not the current actually deployed). Specifically, such benchmark is required to consider the nature of the asset class, and the comparative facts from the industry to arrive at the correct assumption.

Given the risk profile of Toll projects, and considering the leverage at 50-60% of the total project cost based on a rating agencies report available in public domain, and further considering the InvIT Regulations allowing in general upto 49% leverage in assets where the AAA rating has not been obtained, a debt-to-equity ratio of 50% for Toll Assets was found to be appropriate. For comparison, the previous valuation as of June 2025 used a Debt-Equity Ratio of 50%.

Similarly, given the risk profile of Annuity projects, and considering the leverage at 70-80% of the total project cost based on a rating agencies report available in public domain, and further considering the InvIT Regulations allowing in general upto 70% leverage in assets where the AAA rating has not been obtained, a debt-to-equity ratio of 70% for Annuity Assets was found to be appropriate. For comparison, the previous valuation as of June 2025 used a Debt-Equity Ratio of 70%.

6.4.5. **Beta:**

Beta is a measure of the sensitivity of a company's stock price to the movements of the overall market index. In the present case, I find it appropriate to consider the beta of companies in similar business/ industry to that of the SPVs for an appropriate period.

For the valuation of the Toll SPVs, I find it appropriate to consider the beta of IRB Infrastructure Developers Limited, Dilip Buildcon Limited, Ashoka Buildcon Limited, POWERGRID Infrastructure Investment Trust, and IRB InvIT Fund for an appropriate period. The beta so arrived, is further adjusted based on the factors of mentioned SPVs like completion of projects, revenue certainty, past collection trend, lack of execution uncertainty, etc. to arrive at the adjusted unlevered beta appropriate to the SPV.

I have further unlevered the beta of such companies based on market debt-equity of the respective company using the following formula:

Unlevered Beta = Levered Beta / [1 + (Debt / Equity) *(1-T)]

Further I have re-levered it based on debt-equity at 50:50 based on the industry Debt: Equity ratio of a road toll based BOT/DBFOT projects using the following formula:

Re-levered Beta = Unlevered Beta * [1 + (Debt / Equity) *(1-T)]

Accordingly, as per above, I have arrived at re-levered betas of the Toll SPVs. (Refer Appendix 2)

For the valuation of the Annuity SPVs, I find it appropriate to consider the beta of PowerGrid Infrastructure Investment Trust and IRB InvIT Fund for an appropriate period. The beta so arrived, is further adjusted based on the factors of mentioned SPVs like completion of projects, revenue certainty, past collection trend, lack of execution uncertainty, etc. to arrive at the adjusted unlevered beta appropriate to the SPV.

I have further unlevered the beta of such companies based on market debt-equity of the respective company using the following formula:

Unlevered Beta = Levered Beta / [1 + (Debt / Equity) *(1-T)]

Further I have re-levered it based on debt-equity at 70:30 based on the industry Debt: Equity ratio of annuity-based road BOT/DBFOT projects using the following formula:

Re-levered Beta = Unlevered Beta * [1 + (Debt / Equity) *(1-T)]

Accordingly, as per above, I have arrived at re-levered betas of Annuity SPVs.

(Refer Appendix 4 for detailed workings)

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6.4.6. **Company Specific Risk Premium ("CSRP"):**

Discount Rate is the return expected by a market participant from a particular investment and shall reflect not only the time value of money but also the risk inherent in the asset being valued as well as the risk inherent in achieving future cash flows. In the present case, considering the counterparty risk for the SPVs, considering the length of the explicit period for the SPVs, and based on my discussion with Investment Manager, I found it appropriate to consider the following CSRP for the SPVs:

Sr. No.	SPVs	CSRP
1	AMTPL (Base)	0%
	AMTPL (Extension)	2%
2	DTPL	2%
3	PECPL	0%
4	RVTPL	0%
5	SBGTPL	0%
6	SRTPL	0%
7	TEL	0%
8	Dhola	0%
9	Dibang	0%
10	JSEL	0%

In our assessment, a project-specific risk premium has been incorporated to reflect elevated risks associated with factors such as potential schedule extensions, regulatory approval uncertainties, and construction-related contingencies. Based on these considerations, an additional risk premium of 2% has been applied in AMTPL and DTPL.

In the case of AMTPL, the extension as per the new concession agreement for the Sanand section has been approved, comprising both an extended concession period and an expanded project scope. As the extension is currently under construction as of the valuation date, the expanded scope entails construction and execution-related risks. Accordingly, a project-specific risk premium has been incorporated to reflect the elevated risk profile arising from these considerations. Based on this assessment, an additional risk premium of **2%** has been considered appropriate. For comparison, the previous valuation as on June 2025 considered a CSRP of 2% AMTPL.

In the case of **DTPL**, the proposed extension is still under approval, and the project remains exposed to uncertainties relating to approval outcomes and the projections based on the proposed extensions. To account for these elevated risks, a project-specific risk premium of 2% has similarly been applied. For comparison, the previous valuation as on June 2025 considered a CSRP of 2% DTPL.

For the SPVs where the extension approval is currently pending, appropriate economic, financial, commercial, legal or contractual remedies are available. Accordingly, no company-specific risk premium (CSRP) has been applied for other SPVs. For comparison, the previous valuation as on June 2025 considered a CSRP of 0% for other SPVs.

6.4.7. **Cost of Debt:**

The calculation of Cost of Debt post-tax can be defined as follows:

K(d) = K(d) pre-tax * (1 - T)

Wherein:

K(d) = Cost of debt

T = tax rate as applicable

For valuation exercise, pre-tax cost of debt has been considered as 7.50% for all the SPVs provided by the Investment Manager. For comparison, the previous valuation as on June 2025 used a Cost of Debt was 7.50%.

6.4.8. **Weighted Average Cost of Capital (WACC):**

The discount rate, or the WACC, is the weighted average of the expected return on equity and the cost of debt. The weight of each factor is determined based on the company's optimal capital structure.

Formula for calculation of WACC:

WACC = [K(d) * Debt /(Debt + Equity)] + [K(e) * (1 - Debt /(Debt + Equity))]

Accordingly, as per above, I have arrived the WACC for the explicit period of the SPVs. For comparison, the previous valuation as of June 2025 is shown in the below table.

Particulars	AMTPL (Base)	AMTPL (Extension)	DTPL	PECPL	RVTPL	SGTPL	SRTPL	TEL
Jun-25	9.24%	10.24%	10.28%	9.93%	10.14%	9.37%	9.37%	9.37%
Dec-25	9.41%	10.41%	10.40%	10.18%	10.28%	9.59%	9.47%	9.56%

Particulars	Dhola	Dibang	JSEL
Jun-25	7.52%	7.52%	7.63%
Dec-25	7.59%	7.64%	7.77%

(Refer Appendix 2 for detailed workings).

6.4.9. **Cash Accrual Factor (CAF) and Discounting Factor:**

Discounted cash flow requires to forecast cash flows in future and discount them to the present in order to arrive at present value of the asset as on Valuation Date. To discount back the projections, we use the Cash Accrual Factor ("CAF"). The Cash Accrual Factor refers to the duration between the Valuation date and the point at which each cash flow is expected to accrue.

In case of Annuity Projects, the annuities are received bi-annually at a predetermined date and the concession agreement provides that the annuities would be realized in 30 days from the annuity date. Hence we have considered the annuity realizations date for the purpose of determination of the CAF Accordingly, the cash flows during each year of the projected period are discounted back from the respective annuity realization to Valuation Date.

In case of Toll Projects, since the cash inflows and outflows occur continuously year-round, it is assumed that the Cash Flows are received in the middle of the annual period, i.e., Mid-point factor. Accordingly, the cash flows during each year of the projected period are discounted back from the mid-year to Valuation Date.

Discounted cash flow is equal to sum of the cash flow in each period divided by present value factor, where the present value factor is determined by raising one plus discount rate (WACC) raised to the power of the CAF.

$DCF = [CF1 / (1+r)^{CAF1}] + [CF2 / (1+r)^{CAF2}] + ... + [CFn /(1+r)^{CAFn}]$

Where,

CF = Cash Flows,

CAF = Cash accrual factor for particular period

R = Discount Rate (i.e. WACC)

6.4.10. At the end of the agreed concession period, the rights in relation to the underlying assets, its operations, the obligation to maintain the road reverts to the government authority that granted the concession. Hence, the SPVs is not expected to generate cash flow after the expiry of their respective concession agreements. Accordingly, I found it appropriate not to consider terminal period value, which represents the present value at the end of explicit forecast period of all subsequent cash flows to the end of the life of the asset or into perpetuity if the asset has an indefinite life, in this valuation exercise

7. Valuation Conclusion

7.1. The current valuation has been carried out based on the discussed valuation methodology explained herein earlier. Further, various qualitative factors, the business dynamics and growth potential of the business, having regard to information base, management perceptions, key underlying assumptions and limitations were given due consideration.

7.2. I have been represented by the Investment Manager that there is no potential devolvement on account of the contingent liability as of valuation date; hence no impact has been factored in to arrive at fair EV of the SPVs. Based on the above analysis, the fair EV on the Valuation Date of the SPVs are as mentioned below:

INR Mn

Sr. No.	SPVs	Balance Life***	WACC	Enterprise Value*	Adjusted Enterprise Value**
1	AMTPL (Base)	~ 7 years 5 months	9.41%	15,056	17,351
	AMTPL (Extension)	~3 years 11 months*	10.41%	1,252	1,252
2	DTPL	~ 18 years 3 months	10.40%	19,200	20,732
3	PECPL	~ 1 year 1 months	10.18%	850	1,086
4	RVTPL	~ 4 years 2 months	10.28%	4,971	5,624
5	SBGTPL	~ 8 years 11 months	9.59%	11,992	13,041
6	SRTPL	~ 14 years 11 months	9.47%	27,400	31,178
7	TEL	~ 10 years 9 months	9.56%	13,087	15,874
8	Dhola	~ 4 years 2 months	7.59%	3,442	4,584
9	Dibang	~ 4 years 11 months	7.64%	2,484	3,418
10	JSEL	~ 5 years 1 months	7.77%	5,210	6,447
	Total			**104,944**	**120,588**

 # from 5th June 2033

**Enterprise Value ("EV") is described as the total value of the equity in a business plus the value of its debt and debt related liabilities, minus any cash and cash equivalents to meet those liabilities. The Report details the valuation methodologies used, calculations performed, and the conclusion reached with respect to this valuation.*

***Further, at the request of the Investment Manager, I have calculated Adjusted Enterprise Value of the SPVs as the EV (derived as above) plus operating cash and cash like items (which includes cash and cash equivalent and current investment) of the SPVs as at the Valuation Date. (Refer Appendix 1,2 & 3 for the detailed workings)*

****The balance life of the SPVs has been calculated using the revised concession dates after including extension. (Refer Appendix 1, 2 & 3 for detailed workings)*

7.3. EV is described as the total value of the equity in a business plus the value of its debt and debt related liabilities, minus any cash or cash equivalents to meet those liabilities.

7.4. Adjusted Enterprise Value ("**Adjusted EV**") is described as the Enterprise Value plus any closing cash or cash equivalents as at the date of valuation.

7.5. The fair EV of the SPVs are estimated using DCF method. The valuation requires the Investment Manager to make certain assumptions about the model inputs including forecast cash flows, discount rate, and credit risk.

7.6. Valuation is based on estimates of future financial performance or opinions, which represent reasonable expectations at a particular point of time, but such information, estimates or opinions are not offered as predictions or as assurances that a particular level of income or profit will be achieved, a particular event will occur or that a particular price will be offered or accepted. Actual results achieved during the period covered by the prospective financial analysis will vary from these estimates and the variations may be material.

7.7. Accordingly, I have conducted sensitivity analysis on certain model inputs, the results of which are as indicated below for both Enterprise Value and Adjusted Enterprise Value:

1. WACC by increasing / decreasing it by 0.5%
2. WACC by increasing / decreasing it by 1.0%
3. Expenses by increasing / decreasing it by 20%
4. Revenue of Toll SPVs by increasing / decreasing it by 10%

Sensitivity Analysis of Enterprise Value

1. Fair Enterprise Valuation Range based on WACC parameter (0.5%)

INR Mn

Sr. No	SPVs	WACC +0.5%	EV	Base WACC	EV	WACC - 0.5%	EV
1	AMTPL (Base)	9.91%	14,811	9.41%	15,056	8.91%	15,307
	AMTPL (Extension)	10.91%	903	10.41%	1,252	9.91%	1,619
2	DTPL	10.90%	18,432	10.40%	19,200	9.90%	20,016
3	PECPL	10.68%	848	10.18%	850	9.68%	852
4	RVTPL	10.78%	4,926	10.28%	4,971	9.78%	5,016
5	SBGTPL	10.09%	11,737	9.59%	11,992	9.09%	12,256
6	SRTPL	9.97%	26,472	9.47%	27,400	8.97%	28,375
7	TEL	10.06%	12,768	9.56%	13,087	9.06%	13,418
8	Dhola	8.09%	3,407	7.59%	3,442	7.09%	3,477
9	Dibang	8.14%	2,455	7.64%	2,484	7.14%	2,514
10	JSEL	8.27%	5,156	7.77%	5,210	7.27%	5,266
	Total		**101,915**		**104,944**		**108,117**

2. Fair Enterprise Valuation Range based on WACC parameter (1.0%)

INR Mn

Sr. No	SPVs	WACC +1.00%	EV	Base WACC	EV	WACC - 1.00%	EV
1	AMTPL (Base)	10.41%	14,573	9.41%	15,056	8.41%	15,565
	AMTPL (Extension)	11.41%	572	10.41%	1,252	9.41%	2,006
2	DTPL	11.40%	17,707	10.40%	19,200	9.40%	20,882
3	PECPL	11.18%	846	10.18%	850	9.18%	854
4	RVTPL	11.28%	4,882	10.28%	4,971	9.28%	5,063
5	SBGTPL	10.59%	11,489	9.59%	11,992	8.59%	12,529
6	SRTPL	9.97%	26,472	9.47%	27,400	8.97%	28,375
7	TEL	10.56%	12,460	9.56%	13,087	8.56%	13,761
8	Dhola	8.59%	3,373	7.59%	3,442	6.59%	3,513
9	Dibang	8.64%	2,426	7.64%	2,484	6.64%	2,544
10	JSEL	8.77%	5,103	7.77%	5,210	6.77%	5,322
	Total		**99,903**		**104,944**		**110,415**

3. Fair Enterprise Valuation Range based on Expenses parameter (20%)

INR Mn

Sr. No.	SPVs	EV at Expenses -20%	EV at Base Expenses	EV at Expenses +20%
1	AMTPL (Base)	15,625	15,056	14,486
	AMTPL (Extension)	1,494	1,252	1,010
2	DTPL	19,979	19,200	18,422
3	PECPL	876	850	824
4	RVTPL	5,187	4,971	4,755
5	SBGTPL	12,432	11,992	11,556
6	SRTPL	28,432	27,400	26,368
7	TEL	13,388	13,087	12,786
8	Dhola	3,499	3,442	3,385
9	Dibang	2,547	2,484	2,420
10	JSEL	5,310	5,210	5,111
	Total	**108,770**	**104,944**	**101,123**

4. Fair Enterprise Valuation Range based on Revenue parameter (10%)

INR Mn

Sr. No	SPVs	EV at Revenue -10%	EV at Base Revenue	EV at Revenue +10%
1	AMTPL (Base)	13,228	15,056	16,883
	AMTPL (Extension)	261	1,252	2,244
2	DTPL	15,588	19,200	22506
3	PECPL	749	850	951
4	RVTPL	4,335	4,971	5,605
5	SBGTPL	9648	11,992	14,336
6	SRTPL	23,806	27,400	30,911
7	TEL	11,574	13,087	14,564
8	Dhola*	3,442	3,442	3,442
9	Dibang*	2,484	2,484	2,484
10	JSEL*	5,210	5,210	5,210
	Total	**90,325**	**104,944**	**119,136**

**Since these are annuity assets with fixed and predetermined revenue streams, sensitivity analysis has not been carried out for these projects. Nevertheless, the assets have been included in the summary table above to facilitate completeness and ease of comparability across all projects.*

Sensitivity Analysis of Adjusted Enterprise Value

5. Fair Adjusted Enterprise Valuation Range based on WACC parameter (0.5%)

INR Mn

Sr. No	SPVs	WACC +0.5%	Adj EV	Base WACC	Adj EV	WACC -0.5%	Adj EV
1	AMTPL (Base)	9.91%	17,106	9.41%	17,351	8.91%	17,602
	AMTPL (Extension)	10.91%	903	10.41%	1,252	9.91%	1,619
2	DTPL	10.90%	19,963	10.40%	20,732	9.90%	21,547
3	PECPL	10.68%	1,084	10.18%	1,086	9.68%	1,088
4	RVTPL	10.78%	5,580	10.28%	5,624	9.78%	5,670
5	SBGTPL	10.09%	12,785	9.59%	13,041	9.09%	13,305
6	SRTPL	9.97%	30,250	9.47%	31,178	8.97%	32,153
7	TEL	10.06%	15,555	9.56%	15,874	9.06%	16,205
8	Dhola	8.09%	4,550	7.59%	4,584	7.09%	4,619
9	Dibang	8.14%	3,389	7.64%	3,418	7.14%	3,448
10	JSEL	8.27%	6,393	7.77%	6,447	7.27%	6,503
	Total		**117,558**		**120,588**		**123,760**

6. Fair Adjusted Enterprise Valuation Range based on WACC parameter (1.0%)

INR Mn

Sr. No	SPVs	WACC +1.00%	Adj EV	Base WACC	Adj EV	WACC -1.00%	Adj EV
1	AMTPL (Base)	10.41%	16,868	9.41%	17,351	8.41%	17,860
	AMTPL (Extension)	11.41%	572	10.41%	1,252	9.41%	2,006
2	DTPL	11.40%	19,239	10.40%	20,732	9.40%	22,413
3	PECPL	11.18%	1,082	10.18%	1,086	9.18%	1,090
4	RVTPL	11.28%	5,536	10.28%	5,624	9.28%	5,716
5	SBGTPL	10.59%	12,537	9.59%	13,041	8.59%	13,578
6	SRTPL	9.97%	30,250	9.47%	31,178	8.97%	32,153
7	TEL	10.56%	15,248	9.56%	15,874	8.56%	16,549
8	Dhola	8.59%	4,516	7.59%	4,584	6.59%	4,655
9	Dibang	8.64%	3,360	7.64%	3,418	6.64%	3,478
10	JSEL	8.77%	6,340	7.77%	6,447	6.77%	6,559
	Total		**115,547**		**120,588**		**126,059**

7. Fair Adjusted Enterprise Valuation Range based on Expenses parameter (20%)

INR Mn

Sr. No.	SPVs	Adj EV at Expenses -20%	Adj EV at Base Expenses	Adj EV at Expenses +20%
1	AMTPL (Base)	17,920	17,351	16,781
	AMTPL (Extension)	1,494	1,252	1,010
2	DTPL	21,510	20,732	19,953
3	PECPL	1,112	1,086	1,060
4	RVTPL	5,840	5,624	5,409
5	SBGTPL	13,481	13,041	12,605
6	SRTPL	32,210	31,178	30,146
7	TEL	16,176	15,874	15,574
8	Dhola	4,641	4,584	4,527
9	Dibang	3,482	3,418	3,355
10	JSEL	6,547	6,447	6,348
	Total	**124,414**	**120,588**	**116,767**

8. Fair Adjusted Enterprise Valuation Range based on Revenue parameter (10%)

INR Mn

Sr. No	SPVs	Adj EV at Revenue -10%	Adj EV at Base Revenue	Adj EV at Revenue +10%
1	AMTPL (Base)	15,523	17,351	19,178
	AMTPL (Extension)	261	1,252	2,244
2	DTPL	17,119	20,732	24,037
3	PECPL	985	1,086	1,187
4	RVTPL	4,988	5,624	6,259
5	SBGTPL	10,697	13,041	15,385
6	SRTPL	27,584	31,178	34,689
7	TEL	14,362	15,874	17,352
8	Dhola*	4,584	4,584	4,584
9	Dibang*	3,418	3,418	3,418
10	JSEL*	6,447	6,447	6,447
	Total	**105,968**	**120,588**	**134,768**

**Since these are annuity assets with fixed and predetermined revenue streams, sensitivity analysis has not been carried out for these projects. Nevertheless, the assets have been included in the summary table above to facilitate completeness and ease of comparability across all projects.*

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8. Additional Procedures to be complied with in accordance with InvIT regulations

8.1. Scope of Work

The Schedule V of the SEBI InvIT Regulations prescribes the minimum set of mandatory disclosures to be made in the valuation report. In this reference, the minimum disclosures in valuation report may include following information as well, so as to provide the investors with the adequate information about the valuation and other aspects of the underlying assets of the InvIT.

The minimum set of disclosures, as prescribed under Schedule V of InvIT Regulations, to be made in the valuation report of the SPVs are as follows:

	Schedule V of the SEBI InvIT Regulations	Reference In Report
i.	Details of the project including whether the transaction is a related party transaction	Section 3.1 (vi) – Proposed transaction
ii.	Latest pictures of the project	Section 8.2 (B) & Section 3.2 – Background of SPVs
iii.	The existing use of the project	Section 3.2 – Background of the SPVs
iv.	The nature of the interest the InvIT holds or proposes to hold in the project, percentage of interest of the InvIT in the project	Section 3 – Overview of the InvIT and SPVs & Section 3.1 (vi) – Proposed transaction
v.	Date of inspection and date of valuation	Same as Point (ii) as mentioned above & Section 1.8- Executive summary
vi.	Qualifications and assumptions	Section 6 – Valuation of the SPVs (Key Assumptions)
vii.	Methods used for valuation	Section 5 – Valuation Methodology
viii.	Valuation standards adopted	Section 2 – Procedures adopted for Valuation
ix.	Extent of valuer's investigations and nature and source of data to be relied upon	Section 9 – Sources of information
x.	Valuation of the project in the previous 3 years; (for existing projects of the InvIT)	Section 1.10- Executive Summary
xi.	Detailed valuation of the project as calculated by the valuer;	Appendix 1,2,3,4
xii.	List of one-time sanctions/approvals which are obtained or pending;	Section 8.2 (C)
xiii.	List of up to date/overdue periodic clearances;	Section 8.2 (D)
xiv.	Statement of assets	Section 8.2 (E)
xv.	Estimates of already carried as well as proposed major repairs and improvements along with estimated time of completion;	Section 8.2 (F)
xvi.	Revenue pendencies including local authority taxes associated with InvIT asset and compounding charges, if any;	Section 8.2 (G)
xvii.	On-going material litigations including tax disputes in relation to the assets, if any;	Section 8.2 (H)
xviii.	Vulnerability to natural or induced hazards that may not have been covered in town planning/ building control.	Section 8.2 (I)

8.2. Analysis of Minimum Disclosures for the SPVs

A. **Purchase price of the SPVs by the InvIT:**

The acquisition of the SPVs is proposed to take place on listing against units of InvIT. Accordingly, the purchase consideration will be determined subsequent to the listing basis the price at which the units are listed. The Trust will acquired 100% effective ownership in all SPVs from its existing shareholder(s).

B. **Latest pictures of the project:**

The details relating to the respective projects along with relevant pictures are disclosed in the background of each SPVs (Refer section 3.2).

C. **List of one-time sanctions/approvals which are obtained or pending:**

The list of sanctions/ approvals obtained by the SPVs till the date of this Report is provided in Appendix 5.

D. **List of up to date/ overdue periodic clearances:**

The Investment Manager has confirmed that the SPVs are not required to take any periodic clearances and hence there are no up to date/ overdue periodic clearances as on 31st December 2025.

E. **Statement of assets included:**

The details of assets in INR Mn of the SPVs as at 31st December 2025 are as mentioned below:

INR Mn

Sr. No.	SPVs	Net Fixed Assets	Net Intangible Asset	Non-Current Assets*	Current Assets
1	AMTPL	21	10,068	35	2,433
2	DTPL	20	13,471	9	1,609
3	PECPL	5	234	1	329
4	RVTPL	16	4,808	18	795
5	SBGTPL	11	10,395	2	1,104
6	SRTPL	34	6,282	350	4,460
7	TEL	10	6,282	2	2,872
8	Dhola	5	-	2,754	1,514
9	Dibang	5	-	1,738	1,630
10	JSEL	2	-	4,327	2,526
	Total	**129**	**51,540**	**9,235**	**19,272**

Source: Investment Manager

**Non-Current Assets for Annuity SPVs include Non-Current Financial Assets in the form of Annuity Receivable from respective counterparties.*

F. **Estimates of already carried as well as proposed major repairs and improvements along with estimated time of completion:**

I have been informed that maintenance is regularly carried out by SPVs in order to maintain the working condition of the assets.

Historical Major Repairs

INR Mn

SPVs	FY 25	FY26 (9 Months)
AMTPL (Base)	642	8
AMTPL (Extension)	-	-
DTPL	1691	34
PECPL	15.9	-
RVTPL	68	15
SBGTPL	41.6	848
SRTPL	194	950
TEL	-	66
Dhola	110	27
Dibang	-	28
JSEL	673	28

Forecasted major repairs

INR Mn

SPVs	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33
AMTPL (Base)	39	54	-	3,206	-	-	-	164
AMTPL (Extension)	-	-	-	-	-	-	-	-
DTPL	2	38	-	-	-	1,113	1,043	-
PECPL	-	305						
RVTPL	34	54	1,113	930	-			
SBGTPL	409	421	92	-	1,924	42	35	-
SRTPL	1,021	1,053	-	-	-	-	-	2,135
TEL	302	356	-	-	72	-	516	350
Dhola	115	135	-	-	84			
Dibang	-	179	57	-	118	39		
JSEL	-	30	107	-	572	-		

INR Mn

SPVs	FY34	FY35	FY36	FY37	FY38	FY39	FY40	FY41
AMTPL (Base)	-							
AMTPL (Extension)	-	-						
DTPL	-	39	-	304	1,994	816	-	-
PECPL								
RVTPL								
SBGTPL	1,277	-						
SRTPL	1,520	-	-	-	-	-	1,394	884
TEL	-	221	216	-				
Dhola								
Dibang								
JSEL								

INR Mn

SPVs	FY42	FY43	FY44	FY45
AMTPL (Base)				
AMTPL (Extension)				
DTPL	-	236	1,361	-
PECPL				
RVTPL				
SBGTPL				
SRTPL				
TEL				
Dhola				
Dibang				
JSEL				

G. **Revenue pendencies including local authority taxes associated with InvIT asset and compounding charges, if any:**

Investment Manager has informed me that there are no material dues including local authority taxes (such as Municipal Tax, Property Tax, etc.) pending to be payable to the government authorities with respect to the SPVs (InvIT assets) except as may be disclosed in the financial statements.(Refer Appendix 6)

H. **On-going material litigations including tax disputes in relation to the assets, if any:**

As informed by the Investment Manager, the status of arbitration matters and status of tax assessments are updated in Appendix 7. Investment Manager has informed us that majority of the cases are having low to medium risk and accordingly no material outflow is expected against the litigations. Hence, I have relied on the Investment Manager with respect to the current status of the above mentioned cases

I. **Vulnerability to natural or induced hazards that may not have been covered in town planning/ building control:**

Investment Manager has confirmed to me that there are no such natural or induced hazards which have not been considered in town planning/ building control.

9. Sources of Information

9.1. For the Purpose of undertaking this valuation exercise, I have relied on the following sources of information provided by the Investment Manager:

i. Audited Financial Statements of the SPVs and HoldCos for Financial Year ("**FY**") ended 31st March 2022, 31st March 2023, 31st March 2024 and 31st March 2025.

ii. Unaudited Special Purpose Financial Statements of the SPVs for Financial Year ("**FY**") ended 31st December 2025.

iii. Details of brought forward losses and MAT credit (as per Income Tax Act) of the SPVs as at 31st March 2025.

iv. Projected financial information for the remaining project life for the SPVs;

v. Details of projected Major Maintenance & Repairs (MMR) Expenditure and Capital Expenditure (Capex).

vi. Traffic Study Report prepared by Crisil Intelligence for AMTPL, DTPL, PECPL, RVTPL, SBGTPL, SRTPL and TEL.

vii. Technical Due Diligence Reports prepared by Ramboll India Private Limited for AMTPL, PECPL, RVTPL, SBGTPL and TEL; Samarth InfraEngg Technocrats Private Limited for Dhola, Dibang, JSEL, SRTPL and DTPL as provided to me by the Investment Manager.

viii. Details of Written Down Value (WDV) of assets as at 31st December 2025.

ix. Concession Agreement of the SPVs with the respective authority;

x. List of licenses / approvals, details of tax litigations, civil proceeding and arbitrations of the SPVs;

xi. The Equity Shareholding pattern as on 31st December 2025 of the SPVs and other entities mentioned in this Report;

xii. Management Representation Letter by the Investment Manager dated 23rd March, 2026;

xiii. Relevant data and information about the SPVs provided to us by the Investment Manager either in written or oral form or in the form of soft copy;

9.2. Information provided by leading database sources, market research reports and other published data.

9.3. For the purpose of calculating raw beta, we have sourced the beta data from S&P Capital IQ.

9.4. The information provided to me by the Investment Manager in relation to the SPVs included but not limited to historical financial statements, forecasts/projections, other statements and assumptions about future matters like forward-looking financial information prepared by the Investment Manager. The forecasts and projections as supplied to me are based upon assumptions about events and circumstances which are yet to occur.

9.5. I have not tested individual assumptions or attempted to substantiate the veracity or integrity of such assumptions in relation to the forward-looking financial information, however, I have made sufficient enquiries to satisfy myself that such information has been prepared on a reasonable basis.

9.6. Notwithstanding anything above, I cannot provide any assurance that the forward-looking financial information will be representative of the results which will actually be achieved during the cash flow forecast period.

10. Exclusions and Limitations

10.1. My Report is subject to the limitations detailed hereinafter. This Report is to be read in totality, and not in parts, in conjunction with the relevant documents referred to herein.

10.2. Valuation analysis and results are specific to the purpose of valuation and is not intended to represent value at any time other than the valuation date of 31st December ("Valuation Date") mentioned in the Report and as per agreed terms of my engagement. It may not be valid for any other purpose or as at any other date. Also, it may not be valid if done on behalf of any other entity.

10.3. This Report, its contents and the results are specific to (i) the purpose of valuation agreed as per the terms of my engagements; (ii) the Valuation Date and (iii) are based on the financial information of the SPVs till 31st December 2025. The Investment Manager has represented that the business activities of the SPVs have been carried out in normal and ordinary course between 31st December 2025 and the Report Date and that no material changes have occurred in the operations and financial position between 31st December 2025 and the Report date.

10.4. The scope of my assignment did not involve me performing audit tests for the purpose of expressing an opinion on the fairness or accuracy of any financial or analytical information that was provided and used by me during the course of my work. The assignment did not involve me to conduct the financial or technical feasibility study. I have not done any independent technical valuation or appraisal or due diligence of the assets or liabilities of the SPVs or any of other entity mentioned in this Report and have considered them at the value as disclosed by the SPVs in their regulatory filings or in submissions, oral or written, made to me.

10.5. In addition, I do not take any responsibility for any changes in the information used by me to arrive at my conclusion as set out here in which may occur subsequent to the date of my Report or by virtue of fact that the details provided to me are incorrect or inaccurate.

10.6. I have assumed and relied upon the truth, accuracy and completeness of the information, data and financial terms provided to me or used by me; I have assumed that the same are not misleading and do not assume or accept any liability or responsibility for any independent verification of such information or any independent technical valuation or appraisal of any of the assets, operations or liabilities of the SPVs or any other entity mentioned in the Report. Nothing has come to my knowledge to indicate that the material provided to me was misstated or incorrect or would not afford reasonable grounds upon which to base my Report.

10.7. This Report is intended for the sole use in connection with the purpose as set out above. It can however be relied upon and disclosed in connection with any statutory and regulatory filing in connection with the provision of SEBI InvIT Regulations. However, I will not accept any responsibility to any other party to whom this Report may be shown or who may acquire a copy of the Report, without my written consent.

10.8. It is clarified that this Report is not a fairness opinion under any of the stock exchange/ listing regulations. In case of any third party having access to this Report, please note this Report is not a substitute for the third party's own due diligence/ appraisal/ enquiries/ independent advice that the third party should undertake for their purpose.

10.9. Further, this Report is necessarily based on financial, economic, monetary, market and other conditions as in effect on, and the information made available to me or used by me up to, the date hereof. Subsequent developments in the aforementioned conditions may affect this Report and the assumptions made in preparing this Report and I shall not be obliged to update, revise or reaffirm this Report if information provided to me changes.

10.10. This Report is based on the information received from the sources as mentioned in Section 9 of this Report and discussions with the Investment Manager. I have assumed that no information has been withheld that could have influenced the purpose of my Report.

10.11. Valuation is not a precise science and the conclusions arrived at in many cases may be subjective and dependent on the exercise of individual judgment. There is, therefore, no indisputable single value. I have arrived at an indicative EV based on my analysis. While I have provided an assessment of the value based

on an analysis of information available to me and within the scope of my engagement, others may place a different value on this business.

10.12. Any discrepancies in any table / appendix between the total and the sums of the amounts listed are due to rounding-off.

10.13. Valuation is based on estimates of future financial performance or opinions, which represent reasonable expectations at a particular point of time, but such information, estimates or opinions are not offered as predictions or as assurances that a particular level of income or profit will be achieved, a particular event will occur or that a particular price will be offered or accepted. Actual results achieved during the period covered by the prospective financial analysis will vary from these estimates and the variations may be material.

10.14. I do not carry out any validation procedures or due diligence with respect to the information provided/extracted or carry out any verification of the assets or comment on the achievability and reasonableness of the assumptions underlying the financial forecasts, save for satisfying ourselves to the extent possible that they are consistent with other information provided to me in the course of this engagement.

10.15. My conclusion assumes that the assets and liabilities of the SPVs, reflected in their respective latest balance sheets remain intact as of the Report date.

10.16. Whilst all reasonable care has been taken to ensure that the factual statements in the Report are accurate, neither myself, nor any of my associates, officers or employees shall in any way be liable or responsible either directly or indirectly for the contents stated herein. Accordingly, I make no representation or warranty, express or implied, in respect of the completeness, authenticity or accuracy of such factual statements. I expressly disclaim any and all liabilities, which may arise based upon the information used in this Report. I am not liable to any third party in relation to the issue of this Report.

10.17. The scope of my work has been limited both in terms of the areas of the business & operations which I have reviewed and the extent to which I have reviewed them. There may be matters, other than those noted in this Report, which might be relevant in the context of the transaction and which a wider scope might uncover.

10.18. For the present valuation exercise, I have also relied on information available in public domain; however the accuracy and timelines of the same has not been independently verified by me.

10.19. In the particular circumstances of this case, my liability (in contract or under any statute or otherwise) for any economic loss or damage arising out of or in connection with this engagement, however the loss or damage caused, shall be limited to the amount of fees actually received by me from the Investment Manager, as laid out in the engagement letter for such valuation work.

10.20. In rendering this Report, I have not provided any legal, regulatory, tax, accounting or actuarial advice and accordingly I do not assume any responsibility or liability in respect thereof.

10.21. This Report does not address the relative merits of investing in InvIT as compared with any other alternative business transaction, or other alternatives, or whether or not such alternatives could be achieved or are available.

10.22. I am not an advisor with respect to legal, tax and regulatory matters for the proposed transaction. No investigation of the SPV's claim to title of assets has been made for the purpose of this Report and the SPV' claim to such rights have been assumed to be valid. No consideration has been given to liens or encumbrances against the assets, beyond the loans disclosed in the accounts. Therefore, no responsibility is assumed for matters of a legal nature.

10.23. I have no present or planned future interest in the Trustee, Investment Manager or the HoldCos and SPVs and the fee for this Report is not contingent upon the values reported herein. My valuation analysis should not be construed as investment advice; specifically, I do not express any opinion on the suitability or otherwise of entering into any financial or other transaction with the Investment Manager, HoldCos or SPVs.

10.24. I have submitted the draft valuation report to the Trust and Investment Manager for confirmation of accuracy of the factual data used in my analysis and to prevent any error or inaccuracy in this Report.

Limitation of Liabilities

10.25. It is agreed that, having regard to the RV's interest in limiting the personal liability and exposure to litigation of its personnel, the Sponsor, the Investment Manager and the Trust will not bring any claim in respect of any damage against any of RV personally.

10.26. In no circumstances RV shall be responsible for any consequential, special, direct, indirect, punitive or incidental loss, damages or expenses (including loss of profits, data, business, opportunity cost, goodwill or indemnification) in connection with the performance of the services whether such damages are based on breach of contract, tort, strict liability, breach of warranty, negligence, or otherwise, even if the Investment Manager had contemplated and communicated to RV the likelihood of such damages. Any decision to act upon the deliverables (including this Report) is to be made by the Investment Manager and no communication by RV should be treated as an invitation or inducement to engage the Investment Manager to act upon the deliverable(s).

10.27. It is clarified that the Investment Manager will be solely responsible for any delays, additional costs, or other liabilities caused by or associated with any deficiencies in their responsibilities, misrepresentations, incorrect and incomplete information including information provided to determine the assumptions.

10.28. RV will not be liable if any loss arises due to the provision of false, misleading or incomplete information or documentation by the Investment Manager.

10.29. Further, this Report is necessarily based on financial, economic, monetary, market and other conditions as in effect on, and the information made available to me or used by me up to, the date hereof. Subsequent developments in the aforementioned conditions may affect this Report and the assumptions made in preparing this Report and I shall not be obliged to update, revise or reaffirm this Report if information provided to me changes.

Yours faithfully,



S. Sundararaman
Registered Valuer
IBBI Registration No.: IBBI/RV/06/2018/10238
Asset Class: Securities or Financial Assets
Place: Chennai
UDIN: 26028423AHSLKR5398

Appendix 1.1.1 – Valuation of AMTPL (Base) as on 31st December 2025 under the DCF Method

INR Mn

Year	Revenue	Revenue share Expense	Other Expense	EBITDA	EBITDA %	MMR Expense	Capex	Premium Payable	Change Working Capital	Tax	FCFF	CAF	WACC	DF	PVFCFF
	A	B	C	D=A-B-C		E	F	G	H	I	J=D-E-F-G-H-I	K	L	M	N=J*M
FY26 3M	1,119	281	95	743	66%	39	-	-	-	31	673	0.13	9.41%	0.99	666
FY27	4,850	1,267	514	3,068	63%	54	-	-	-	121	2,893	0.75	9.41%	0.93	2,705
FY28	5,232	1,419	590	3,223	62%	-	-	-	-	126	3,097	1.75	9.41%	0.85	2,646
FY29	5,594	1,573	627	3,393	61%	3,206	-	-	-	173	13	2.75	9.41%	0.78	10
FY30	5,985	1,743	660	3,582	60%	-	-	-	-	305	3,277	3.75	9.41%	0.71	2,339
FY31	6,406	1,930	699	3,777	59%	-	-	-	-	336	3,441	4.75	9.41%	0.65	2,245
FY32	6,872	2,139	746	3,988	58%	-	-	-	-	369	3,619	5.75	9.41%	0.60	2,158
FY33	7,318	2,351	797	4,170	57%	164	-	-	-	400	3,606	6.75	9.41%	0.55	1,966
FY34*	1,397	463	33	901	65%	-	-	-	-	205	697	7.34	9.41%	0.52	360
PVFCFF															**15,095**
(+) Present Value of Working Capital Release															(40)
Enterprise Value															**15,056**
(+) Closing cash or cash equivalents as at the Valuation Date															2,295
Adjusted Enterprise Value															**17,351**

**Up to 4th June 2033*

Appendix 1.1.2 – Valuation of AMTPL (Extension) as on 31st December 2025 under the DCF Method

INR Mn

Year	Revenue	Revenue share Expense	Other Expense	EBITDA	EBITDA %	MMR Expense	Capex	Premium Payable	Change Working Capital	Tax	FCFF	CAF	WACC	DF	PVFCFF
	A	B	C	D=A-B-C		E	F	G	H	I	J=D-E-F-G-H-I	K	L	M	N=J*M
FY26 3M	-	-	-	-	-	-	915	-	-	-	(915)	0.13	10.41%	0.99	(904)
FY27	-	-	-	-	-	-	4,118	-	-	-	(4,118)	0.75	10.41%	0.93	(3,823)
FY28	-	-	-	-	-	-	4,118	-	-	-	(4,118)	1.75	10.41%	0.84	(3,463)
FY29	-	-	-	-	-	-	-	-	-	-	-	2.75	10.41%	0.76	-
FY30	-	-	-	-	-	-	-	-	-	-	-	3.75	10.41%	0.69	-
FY31	-	-	-	-	-	-	-	-	-	-	-	4.75	10.41%	0.62	-
FY32	-	-	-	-	-	-	-	-	-	-	-	5.75	10.41%	0.57	-
FY33	-	-	-	-	-	-	-	-	-	-	-	6.75	10.41%	0.51	-
FY34	6,449	-	812	5,637	87%	-	-	-	-	1,121	4,516	7.75	10.41%	0.46	2,097
FY35	8,341	-	906	7,435	89%	-	-	-	-	1,587	5,848	8.75	10.41%	0.42	2,459
FY36	8,886	-	975	7,911	89%	-	-	-	-	1,712	6,199	9.75	10.41%	0.38	2,361
FY37	9,427	-	1,051	8,376	89%	-	-	-	-	1,837	6,538	10.75	10.41%	0.35	2,256
FY38*	1,343	-	254	1,089	81%	-	-	-	-	265	824	11.32	10.41%	0.33	269
PVFCFF															**1,252**
(+) Present Value of Working Capital Release															-
Enterprise Value															**1,252**
(+) Closing cash or cash equivalents as at the Valuation Date															-
Adjusted Enterprise Value															**1,252**

**Up to 19th May 2037*

Appendix 1.2 – Valuation of DTPL as on 31st December 2025 under the DCF Method

INR Mn

Year	Revenue	Expense	EBITDA	EBITDA %	MMR Expense	Capex	Premium Payable	Change Working Capital	Tax	FCFF	CAF	WACC	DF	PVFCFF
	A	B	C=A-B		D	E	F	G	H	I=C-D-E-F-G-H	J	K	L	M=I*L
FY26 3M	654	78	576	88%	2	-	296	-	6	273	0.13	10.40%	0.99	269
FY27	2,856	395	2,461	86%	38	-	1,242	-	34	1,147	0.75	10.40%	0.93	1,065
FY28	3,135	418	2,718	87%	-	-	1,304	-	59	1,355	1.75	10.40%	0.84	1,140
FY29	3,434	442	2,992	87%	-	-	1,369	-	85	1,539	2.75	10.40%	0.76	1,172
FY30	3,756	468	3,289	88%	-	-	1,437	-	113	1,739	3.75	10.40%	0.69	1,200
FY31	4,093	494	3,599	88%	1,113	-	1,509	-	141	836	4.75	10.40%	0.63	522
FY32	4,477	523	3,953	88%	1,043	-	1,585	-	202	1,124	5.75	10.40%	0.57	636
FY33	4,926	555	4,371	89%	-	-	1,664	-	274	2,433	6.75	10.40%	0.51	1,248
FY34	5,362	587	4,775	89%	-	-	1,747	-	319	2,709	7.75	10.40%	0.46	1,258
FY35	5,855	622	5,234	89%	39	-	1,834	-	371	2,989	8.75	10.40%	0.42	1,258
FY36	6,389	659	5,730	90%	-	-	1,926	-	427	3,377	9.75	10.40%	0.38	1,287
FY37	6,941	697	6,244	90%	304	-	2,022	-	484	3,434	10.75	10.40%	0.35	1,185
FY38	7,537	738	6,799	90%	1,994	-	2,123	-	553	2,129	11.75	10.40%	0.31	666
FY39	8,193	781	7,411	90%	816	-	2,230	-	983	3,383	12.75	10.40%	0.28	958
FY40	8,884	827	8,057	91%	-	-	2,341	-	1,322	4,394	13.75	10.40%	0.26	1,127
FY41	9,605	875	8,730	91%	-	-	2,458	-	1,462	4,809	14.75	10.40%	0.23	1,118
FY42	10,382	925	9,456	91%	-	-	2,581	-	1,614	5,261	15.75	10.40%	0.21	1,107
FY43	11,227	979	10,247	91%	236	-	2,710	-	1,721	5,579	16.75	10.40%	0.19	1,064
FY44	12,157	1,037	11,120	91%	1,361	-	2,846	-	1,624	5,290	17.75	10.40%	0.17	913
FY45*	215	16	199	93%	-	-	1	-	48	151	18.26	10.40%	0.16	25
PVFCFF														**19,219**
(+) Present Value of Working Capital Release														(19)
Enterprise Value														**19,200**
(+) Closing cash or cash equivalents as at the Valuation Date														1,531
Adjusted Enterprise Value														**20,732**

**Up to 6th April 2044*

Appendix 1.3 – Valuation of PECPL as on 31st December 2025 under the DCF Method

INR Mn

Year	Revenue	Expense	EBITDA	EBITDA %	MMR Expense	Capex	Premium Payable	Change Working Capital	Tax	FCFF	CAF	WACC	DF	PVFCFF
	A	B	C=A-B		D	E	F	G	H	I=C-D-E-F-G-H	J	K	L	M=I*L
FY26 3M	301	35	266	88%	-	-	-	-	-	266	0.12	10.18%	0.99	263
FY27*	1,110	148	962	87%	305	-	-	-	53	604	0.67	10.18%	0.94	566
PVFCFF														**829**
(+) Present Value of Working Capital Release														21
Enterprise Value														**850**
(+) Closing cash or cash equivalents as at the Valuation Date														236
Adjusted Enterprise Value														**1,086**

**Up to 31st January 2027*

Appendix 1.4 – Valuation of RVTPL as on 31st December 2025 under the DCF Method

INR Mn

Year	Revenue	Revenue share Expense	Expense	EBITDA	EBITDA %	MMR Expense	Capex	Premium Payable	Change Working Capital	Tax	FCFF	CAF	WACC	DF	PVFCFF
	A	B	C	D=A-B-C		E	F	G	H	I	J=D-E-F-G-H-I	K	L	M	N=J*M
FY26 3M	659	171	72	416	63%	34	-	-	-	-	382	0.13	10.28%	0.99	377
FY27	2,974	802	372	1,801	61%	54	-	-	-	-	1,747	0.75	10.28%	0.93	1,623
FY28	3,278	916	394	1,968	60%	1,113	-	-	-	-	855	1.75	10.28%	0.84	720
FY29	3,637	1,053	420	2,164	59%	930	-	-	-	-	1,233	2.75	10.28%	0.76	942
FY30*	3,565	1,068	400	2,098	59%	-	-	-	-	294	1,804	3.70	10.28%	0.70	1,257
PVFCFF															**4,919**
(+) Present Value of Working Capital Release															51
Enterprise Value															**4,971**
(+) Closing cash or cash equivalents as at the Valuation Date															654
Adjusted Enterprise Value															**5,624**

**Up to 20th February 2030*

Appendix 1.5 – Valuation of SBGTPL as on 31st December 2025 under the DCF Method

INR Mn

Year	Revenue	Expense	EBITDA	EBITDA %	MMR Expense	Capex	Premium Payable	Change Working Capital	Tax	FCFF	CAF	WACC	DF	PVFCFF
	A	B	C=A-B		D	E	F	G	H	I=C-D-E-F-G-H	J	K	L	M=I*L
FY26 3M	758	66	692	91%	409	-	304	-	18	(39)	0.13	9.59%	0.99	(38)
FY27	3,353	355	2,998	89%	421	-	1,275	-	86	1,215	0.75	9.59%	0.93	1,134
FY28	3,700	377	3,323	90%	92	-	1,339	-	108	1,784	1.75	9.59%	0.85	1,520
FY29	4,056	400	3,656	90%	-	-	1,406	-	125	2,124	2.75	9.59%	0.78	1,652
FY30	4,461	425	4,036	90%	1,924	-	1,477	-	171	464	3.75	9.59%	0.71	329
FY31	4,894	451	4,443	91%	42	-	1,551	-	244	2,606	4.75	9.59%	0.65	1,687
FY32	5,385	479	4,905	91%	35	-	1,628	-	281	2,960	5.75	9.59%	0.59	1,749
FY33	5,873	513	5,360	91%	-	-	1,710	-	316	3,333	6.75	9.59%	0.54	1,797
FY34	6,444	556	5,888	91%	1,277	-	1,795	-	376	2,440	7.75	9.59%	0.49	1,200
FY35*	4,341	383	3,958	91%	-	-	1,167	-	331	2,460	8.56	9.59%	0.46	1,124
PVFCFF														**12,154**
(+) Present Value of Working Capital Release														(161)
Enterprise Value														**11,992**
(+) Closing cash or cash equivalents as at the Valuation Date														1,049
Adjusted Enterprise Value														**13,041**

**Up to 12th November 2034*

Appendix 1.6 – Valuation of SRTPL as on 31st December 2025 under the DCF Method

INR Mn

Year	Revenue	Expense	EBITDA	EBITDA %	MMR Expense	Capex	Premium Payable	Change Working Capital	Tax	FCFF	CAF	WACC	DF	PVFCFF
	A	B	C=A-B		D	E	F	G	H	I=C-D-E-F-G-H	J	K	L	M=I*L
FY26 3M	744	106	638	86%	1,021	-	-	-	74	(457)	0.13	9.47%	0.99	(452)
FY27	3,242	524	2,718	84%	1,053	-	-	-	321	1,344	0.75	9.47%	0.93	1,256
FY28	3,549	553	2,996	84%	-	-	-	-	367	2,629	1.75	9.47%	0.85	2,244
FY29	3,865	612	3,253	84%	-	-	-	-	400	2,854	2.75	9.47%	0.78	2,225
FY30	4,209	656	3,553	84%	-	-	-	-	438	3,115	3.75	9.47%	0.71	2,219
FY31	4,598	700	3,898	85%	-	-	-	-	482	3,416	4.75	9.47%	0.65	2,222
FY32	5,009	744	4,265	85%	-	-	-	-	528	3,737	5.75	9.47%	0.59	2,221
FY33	5,461	790	4,671	86%	2,135	-	-	-	578	1,958	6.75	9.47%	0.54	1,063
FY34	5,947	837	5,110	86%	1,520	-	-	-	677	2,913	7.75	9.47%	0.50	1,444
FY35	6,485	888	5,597	86%	-	-	-	-	817	4,780	8.75	9.47%	0.45	2,165
FY36	7,080	945	6,136	87%	-	-	-	-	900	5,235	9.75	9.47%	0.41	2,166
FY37	7,698	1,007	6,691	87%	-	-	-	-	986	5,705	10.75	9.47%	0.38	2,156
FY38	8,352	1,073	7,279	87%	-	-	-	-	1,635	5,644	11.75	9.47%	0.35	1,948
FY39	9,089	1,141	7,948	87%	-	-	-	-	1,906	6,041	12.75	9.47%	0.32	1,905
FY40	9,896	1,213	8,683	88%	1,394	-	-	-	1,743	5,546	13.75	9.47%	0.29	1,597
FY41*	7,335	925	6,410	87%	884	-	-	-	1,343	4,183	14.59	9.47%	0.27	1,116
PVFCFF														**27,496**
(+) Present Value of Working Capital Release														(96)
Enterprise Value														**27,400**
(+) Closing cash or cash equivalents as at the Valuation Date														3,778
Adjusted Enterprise Value														**31,178**

**Up to 6th December 2040*

Appendix 1.7 – Valuation of TEL as on 31st December 2025 under the DCF Method

INR Mn

Year	Revenue	Expense	EBITDA	EBITDA %	MMR Expense	Capex	Premium Payable	Change Working Capital	Tax	FCFF	CAF	WACC	DF	PVFCFF
	A	B	C=A-B		D	E	F	G	H	I=C-D-E-F-G-H	J	K	L	M=I*L
FY26 3M	417	40	377	90%	302	-	-	-	33	42	0.13	9.56%	0.99	42
FY27	1,819	210	1,610	88%	356	-	-	-	145	1,108	0.75	9.56%	0.93	1,034
FY28	2,027	223	1,804	89%	-	-	-	-	177	1,627	1.75	9.56%	0.85	1,387
FY29	2,215	236	1,978	89%	-	-	-	-	202	1,776	2.75	9.56%	0.78	1,382
FY30	2,409	250	2,159	90%	72	-	-	-	228	1,859	3.75	9.56%	0.71	1,320
FY31	2,626	265	2,361	90%	-	-	-	-	257	2,105	4.75	9.56%	0.65	1,364
FY32	2,870	281	2,589	90%	516	-	-	-	289	1,784	5.75	9.56%	0.59	1,055
FY33	3,134	297	2,836	91%	350	-	-	-	336	2,150	6.75	9.56%	0.54	1,161
FY34	3,403	315	3,088	91%	-	-	-	-	394	2,694	7.75	9.56%	0.49	1,328
FY35	3,706	334	3,372	91%	221	-	-	-	438	2,713	8.75	9.56%	0.45	1,221
FY36	4,035	357	3,678	91%	216	-	-	-	492	2,970	9.75	9.56%	0.41	1,220
FY37*	1,994	183	1,811	91%	-	-	-	-	358	1,453	10.48	9.56%	0.38	558
PVFCFF														**13,073**
(+) Present Value of Working Capital Release														14
Enterprise Value														**13,087**
(+) Closing cash or cash equivalents as at the Valuation Date														2,788
Adjusted Enterprise Value														**15,874**

**Up to 14th September 2036*

Appendix 1.8 – Valuation of Dhola as on 31st December 2025 under the DCF Method

INR Mn

Period	Finance Income	Changes in Financial Asset	O&M Income	Total Cash Inflow	O&M Expense	Working Capital Changes	Major Maintainance Expense	Capex	Taxation	Total Outflow	FCFF	CAF	WACC	DF	PV FCFF
	A	B	C	D = A + B + C	E	F	G	H	I	J = E + F + G + H + I	K = D - J	L	M	N	O = K*N
28-Feb-26	104	306	150	559	16	543	-	115	-	22	406	0.24	7.59%	0.98	399
31-Aug-26	199	159	202	559	46	513	-	122	-	38	353	0.75	7.59%	0.95	334
28-Feb-27	182	306	71	559	46	513	-	13	-	32	469	1.24	7.59%	0.91	428
31-Aug-27	161	340	57	559	48	511	-	-	-	28	483	1.75	7.59%	0.88	425
29-Feb-28	138	364	57	559	48	511	-	-	-	24	487	2.25	7.59%	0.85	413
31-Aug-28	113	386	60	559	51	508	-	-	-	20	488	2.75	7.59%	0.82	399
28-Feb-29	86	413	60	559	51	508	-	-	-	15	493	3.25	7.59%	0.79	389
31-Aug-29	58	383	118	559	53	506	-	46	-	12	448	3.75	7.59%	0.76	340
28-Feb-30	26	434	99	559	46	513	40	38	-	6	429	4.25	7.59%	0.73	314
Enterprise Value															**3,442**
(+) Closing cash or cash equivalents as at the Valuation Date															1,142
Adjusted Enterprise Value															**4,584**

Appendix 1.9 – Valuation of Dibang as on 31st December 2025 under the DCF Method

INR Mn

Period	Finance Income	Changes in Financial Asset	O&M Income	Total Cash Inflow	O&M Expense	Working Capital Changes	Major Maintainance Expense	Capex	Taxation	Total Outflow	FCFF	CAF	WACC	DF	PV FCFF
	A	B	C	D = A + B + C	E	F	G	H	I	J = E + F + G + H + I	K = D - J	L	M	N	O = K*N
15-May-26	101	168	128	397	42	355	-71	65	-	18	343	0.45	7.64%	0.97	332
15-Nov-26	96	111	189	397	43	354	-	115	-	21	218	0.96	7.64%	0.93	203
15-May-27	90	185	122	397	44	353	-	57	-	18	277	1.45	7.64%	0.90	249
15-Nov-27	82	261	54	397	45	352	-	-	-	14	338	1.96	7.64%	0.87	292
15-May-28	70	272	55	397	46	351	-	-	-	12	338	2.45	7.64%	0.83	282
15-Nov-28	59	282	57	397	47	349	-	-	-	11	339	2.96	7.64%	0.80	273
15-May-29	46	246	105	397	49	348	-	39	-	10	299	3.45	7.64%	0.78	232
15-Nov-29	37	207	154	397	50	347	-	79	-	10	259	3.96	7.64%	0.75	193
15-May-30	27	262	108	397	51	346	-	39	-	7	300	4.45	7.64%	0.72	216
15-Nov-30	12	335	50	397	43	354	48	-	-	3	303	4.96	7.64%	0.69	211
Enterprise Value															**2,484**
(+) Closing cash or cash equivalents as at the Valuation Date															934
Adjusted Enterprise Value															**3,418**

Appendix 1.10 – Valuation of JSEL as on 31st December 2025 under the DCF Method

INR Mn

Period	Finance Income	Changes in Financial Asset	O&M Income	Total Cash Inflow	O&M Expense	Working Capital Changes	Major Maintainance Expense	Capex	Taxation	Total Outflow	FCFF	CAF	WACC	DF	PV FCFF
	A	B	C	D = A + B + C	E	F	G	H	I	J = E + F + G + H + I	K = D - J	L	M	N	O = K*N
28-Jan-26	114	579	32	725	29	696	-132	-	-	20	808	0.16	7.77%	0.99	798
28-Jul-26	208	415	102	725	77	648	-	15	-	36	597	0.65	7.77%	0.95	569
28-Jan-27	188	435	102	725	77	648	-	15	-	32	601	1.16	7.77%	0.92	551
28-Jul-27	168	409	148	725	80	645	-	53	-	30	562	1.65	7.77%	0.88	496
28-Jan-28	149	428	148	725	80	645	-	53	-	27	565	2.16	7.77%	0.85	481
28-Jul-28	128	505	93	725	83	642	-	-	-	22	619	2.66	7.77%	0.82	508
28-Jan-29	103	529	93	725	83	642	-	-	-	18	623	3.16	7.77%	0.79	492
28-Jul-29	82	229	413	725	87	638	-	286	-	-	353	3.66	7.77%	0.76	268
28-Jan-30	71	241	413	725	87	638	-	286	-	-	353	4.16	7.77%	0.73	258
28-Jul-30	56	569	100	725	90	635	-	-	-	44	591	4.66	7.77%	0.71	417
28-Jan-31	29	597	99	725	89	636	-50	-	-	140	546	5.16	7.77%	0.68	371
Enterprise Value															**5,210**
(+) Closing cash or cash equivalents as at the Valuation Date															1,237
Adjusted Enterprise Value															**6,447**

Appendix 2.1 – Weighted Average Cost of Capital of the SPV as on 31st December 2025- for Toll SPVs

Particulars	AMTPL (Base)	AMTPL (Extension)	DTPL	PECPL	RVTPL	SBGTPL	SRTPL	TEL	Remarks
Risk free return (Rf)	6.80%	6.80%	6.80%	6.80%	6.80%	6.80%	6.80%	6.80%	Note 1
Market Risk Premium (ERP)	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	Note 2
Beta (Relevered)	0.86	0.86	0.86	0.93	0.93	0.87	0.86	0.87	Note 3
Cost of Equity (Ke)	**12.79%**	**12.79%**	**12.79%**	**13.28%**	**13.33%**	**12.90%**	**12.84%**	**12.89%**	**Base Ke = Rf + (β x ERP)**
Company Specific Risk Premium (CSRP)	-	2.00%	2.00%	0.00%	0.00%	0.00%	0.00%	0.00%	Based on SPV specific risk(s)
Revised Cost of Equity (Ke)	**12.79%**	**14.79%**	**14.79%**	**13.28%**	**13.33%**	**12.90%**	**12.84%**	**12.89%**	**Adjusted Ke = Rf + (β x ERP) + CSRP**
Pre-tax Cost of Debt (Kd)	7.50%	7.50%	7.50%	7.50%	7.50%	7.50%	7.50%	7.50%	As represented by the Investment Manager
Tax rate of SPV	19.76%	19.76%	19.86%	5.68%	3.59%	16.42%	18.50%	16.97%	Tax Rate Applicable to SPVs is considered
Post-tax Cost of Debt (Kd)	**6.02%**	**6.02%**	**6.01%**	**7.07%**	**7.23%**	**6.27%**	**6.11%**	**6.23%**	**Effective cost of debt. Kd = Pre tax Kd * (1-Effective Tax Rate)**
Debt/(Debt+Equity)	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	Debt : Equity ratio computed as [D/(D+E)]
WACC	**9.41%**	**10.41%**	**10.40%**	**10.18%**	**10.28%**	**9.59%**	**9.47%**	**9.56%**	**WACC = [Ke * (1 - D/(D+E))] + [Kd * (1-t) * D/(D+E)]**

Particulars	Remarks
Note 1	Risk Free Rate has been considered based on zero coupon yield curve as at 31st December 2025 of Government Securities having maturity period of 10 years, as quoted on CCIL's website
Note 2	Based on historical realized returns on equity investments over a risk-free rate represented by 10 years government bonds, a 7% equity risk premium is considered appropriate for India
Note 3	Beta has been considered based on the beta of companies operating in the similar kind of business in India

Appendix 2.2 – Weighted Average Cost of Capital of the SPV as on 31st December 2025- for Annuity SPVs.

Particulars	Dhola	Dibang	JSEL	Remarks
Risk free return (Rf)	6.80%	6.80%	6.80%	Note 1
Market Risk Premium (ERP)	7.00%	7.00%	7.00%	Note 2
Beta (Relevered)	0.55	0.56	0.56	Note 3
Cost of Equity (Ke)	**10.64%**	**10.74%**	**10.73%**	**Base Ke = Rf + (β x ERP)**
Company Specific Risk Premium (CSRP)	-	-	-	Based on SPV specific risk(s)
Revised Cost of Equity (Ke)	**10.64%**	**10.74%**	**10.73%**	**Adjusted Ke = Rf + (β x ERP) + CSRP**
Pre-tax Cost of Debt (Kd)	7.50%	7.50%	7.50%	As per the Existing Cost of Debt of the SPVs, as represented by the Investment Manager
Tax rate of SPV	16.19%	15.80%	13.37%	Tax Rate Applicable to SPVs is considered
Post-tax Cost of Debt (Kd)	**6.29%**	**6.32%**	**6.50%**	**Effective cost of debt. Kd = Pre tax Kd * (1-Effective Tax Rate)**
Debt/(Debt+Equity)	70.00%	70.00%	70.00%	Debt : Equity ratio computed as [D/(D+E)]
WACC	**7.59%**	**7.64%**	**7.77%**	**WACC = [Ke * (1 - D/(D+E))] + [Kd * (1-t) * D/(D+E)]**

Particulars	Remarks
Note 1	Risk Free Rate has been considered based on zero coupon yield curve as at 31st December 2025 of Government Securities having maturity period of 10 years, as quoted on CCIL's website
Note 2	Based on historical realized returns on equity investments over a risk-free rate represented by 10 years government bonds, a 7% equity risk premium is considered appropriate for India
Note 3	Beta has been considered based on the beta of companies operating in the similar kind of business in India

Appendix 3.1 – Cash and Cash Equivalents included for Adjusted EV

		INR Mn
Sr.no	SPV	Cash and Cash Equivalents
1	AMTPL	2,295
2	DTPL	1,531
3	PECPL	236
4	RVTPL	654
5	SBGTPL	1,049
6	SRTPL	3,778
7	TEL	2,788
8	Dhola	1,142
9	Dibang	934
10	JSEL	1,237
	Total	**15,644**

Note:

1. The above does not include cash and cash equivalents of HoldCos as detailed below:

		INR Mn
Sr.no	SPV	Cash and Cash Equivalents
1	EPIC3	989
2	SRPL	139
Total		**1,128**

2. The figures are at the values as stated in the balance sheet provided by the Investment Manager.

Appendix 4.1 – Computation of Unlevered and Re-levered Beta for Toll SPVs

Ticker	Name of Company	Levered Beta	D/Mcap	Tax	Unlevered Beta
NSEI:PGINVIT	Powergrid Infrastructure Investment Trust	0.16	2%	17.47%	0.16
NSEI:IRBINVIT	IRB InvIT Fund	0.30	53%	25.17%	0.21
NSEI:IRB	IRB Infrastructure Developers Limited	1.52	179%	25.17%	0.65
NSEI:ASHOKA	Ashoka Buildcon Limited	1.43	141%	25.17%	0.70
NSEI:DBL	Dilip Buildcon Limited	1.26	124%	25.17%	0.66
Average					**0.48**
Median					**0.65**
Unlevered Beta					**0.48**

Particulars	AMTPL (Base)	AMTPL (Extension)	DTPL	PECPL	RVTPL	SBGTPL	SRTPL	TEL
Unlevered Beta	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48
Debt Equity Ratio Considered	50%	50%	50%	50%	50%	50%	50%	50%
Effective Tax Rate of SPVs	19.76%	19.76%	19.86%	5.68%	3.59%	16.42%	18.50%	16.97%
Relevered Beta	0.86	0.86	0.86	0.93	0.93	0.87	0.86	0.87

Source: Information provided by database sources, market research, other published data and internal workings. Raw Beta Considered has been derived from S&P Capital IQ.

Justification of Companies used for calculation of Beta for Toll SPVs:

The following companies are integral players in the Indian infrastructure sector and contributes significantly to the development, operation and maintenance of road and highway project. Their strong market presence, diversified portfolios and cosistent involvement in the key road infrastructure projects make them relevant for the computation of beta of TollSPV in the context of road business valuation.

1) **Powergrid Infrastructure Investment Trust**

PG InvIT (PowerGrid Infrastructure Investment Trust) is an infrastructure trust . It is a relevant comparable for toll road infrastructure valuation. Structurally, PG InvIT shares key characteristics with the Citius Transnet Investment Trust both are SEBI-registered InvITs with stable, contracted cash flows from long-term concession visibility. Both entities generate predictable, cash flows from completed operational assets, thereby providing a realistic benchmark for understanding risk & return in the infrastructure trust asset class. The comparable regulatory framework, similar operational maturity, and analogous cash flow characteristics make PG InvIT an appropriate peer for beta estimation purposes.

2) **IRB InvIT Fund**

The IRB InvIT Fund is a dedicated infrastructure trust that manages toll road assets across India, with a portfolio comprising sixteen operational highway projects. Its focused strategy within the transportation infrastructure sector and operational maturity positions it as a relevant peer in the broader infrastructure trust landscape.Structurally, IRB InvIT shares several characteristics with Citius Transnet Investment Trust both are SEBI-registered InvITs with stable, income-generating infrastructure assets and long-term cash flow visibility. These similarities make IRB InvIT a reasonable comparable for evaluating Citius Transnet Investment Trust, particularly in the context of computing beta for valuation purposes. Moreover, like Citius Transnet Investment Trust, IRB InvIT is currently operating and generating cash flows from completed assets, thereby offering a realistic proxy for riskreturn dynamics in the infrastructure domain. Both entities offer annuity-like cash flows, similar investor profiles, and comparable regulatory frameworks.For these reasons, IRB InvIT is considered an appropriate peer for beta estimation in the valuation analysis of Citius Transnet Investment Trust

3) **IRB Infrastructure Developers Limited**

IRB Infrastructure Developers Limited is among the India's largest and most diversified integrated transport infrastructure developers, with a strong presence in the BOT sector. The company boasts a well-balanced portfolio that included BOT, TOT and HAM projects. As of the valuation date, approximately 80% of IRB's order book is composed of O&M projects, primarily under BOT and TOT models. Additionally, the company holds ownership stake in two InvIT's (Infrastructure Investment Trusts) that focus on the road sector. Together with these InvIT's, IRB generates a significant portion of its cash flows from toll assets. Accordingly, I have considered these factors appropriate for the computation of beta for toll assets, as they reflect the entity's underlying risk profile.

4) Ashoka Buildcon Limited

Ashoka Buildcon Limited operates toll and annuity road assets through its dedicated subsidiary Ashoka Concessions Limited (ACL), with a portfolio encompassing both BOT and HAM infrastructure projects . Ashoka Buildcon is a relevant operational peer in the toll infrastructure domain. While distinct from the InvIT structure, Ashoka's operational management of long-duration toll concessions and HAM assets provides comparable risk-return characteristics—both entities generate stable, contracted cash flows . The similar regulatory environment, comparable asset duration, and cash flow predictability make Ashoka Buildcon an appropriate comparable for beta estimation in toll infrastructure valuation.

5) Dilip Buildcon Limited

Dilip Buildcon Ltd. is a prominent Indian infrastructure company, specializing in the construction of roads, highways, bridges, and other civil engineering projects. The company operates across multiple sectors, including road construction (EPC projects), road asset ownership (via toll roads and highway projects) and is heavily tied to infrastructure, especially highways, which exposes them to similar market risks to that of Citius Transnet Investment Trust such as policy changes, traffic volume, and toll revenue fluctuations. Hence, I deemed it appropriate to include Dilip Buildcon Ltd in my beta calculation, as its risk and policy aligns with the scope of this analysis similar to that of Toll SPV.

Source: The above information has been derived from annual reports, investor presentations, investor call transcripts and other relevant data which is publicly available and can be verified independently by any reader. Raw Beta Considered has been derived from S&P Capital IQ.

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Appendix 4.2 – Computation of Unlevered and Re-levered Beta for Annuity SPVs

Ticker	Name of Company	Levered Beta	D / Mcap	Tax	Unlevered Beta
NSEI:PGINVIT	Powergrid Infrastructure Investment Trust	0.16	2%	17.47%	0.16
NSEI:IRBINVIT	IRB InvIT Fund	0.30	53%	25.17%	0.21
Average					**0.19**
Median					**0.19**
Unlevered Beta					**0.19**

Particulars	Dhola	Dibang	JSEL
Unlevered Beta	0.19	0.19	0.19
Debt Equity Ratio Considered	70%	70%	70%
Effective Tax Rate of SPVs	16.19%	15.80%	13.37%
Relevered Beta	0.55	0.56	0.56

Source: Information provided by database sources, market research, other published data and internal workings. Raw Beta Considered has been derived from S&P Capital IQ.

Justification of Companies used for calculation of Beta for Annuity SPV's:

The following companies are integral players in the Indian infrastructure sector and contributes significantly to the development, operation and maintenance of road and highway project. Their strong market presence, diversified portfolios and cosistent involvement in the key road infrastructure projects make them relevant for the computation of beta of AnnuitySPV's in the context of road business valuation.

1) **IRB InvIT Fund**

The IRB InvIT Fund is a dedicated infrastructure trust that manages toll road assets across India, with a portfolio comprising sixteen operational highway projects. Its focused strategy within the transportation infrastructure sector and operational maturity positions it as a relevant peer in the broader infrastructure trust landscape. Structurally, IRB InvIT shares several characteristics with Citius Transet Investment Trust both are SEBI registered InvITs with stable, income-generating infrastructure assets and long-term cash flow visibility. These similarities make IRB InvIT a reasonable comparable for evaluating Citius Transet Investment Trust, particularly in the context of computing beta for valuation purposes. Moreover, like Citius Transet Investment Trust, IRB InvIT is currently operating and generating cash flows from completed assets, thereby offering a realistic proxy for risk-return dynamics in the infrastructure domain. Both entities offer annuity-like cash flows, similar investor profiles, and comparable regulatory frameworks. For these reasons, IRB InvIT is considered an appropriate peer for beta estimation in the valuation analysis of Citius Transet Investment Trust.

2) **PG InvIT**

PowerGrid InvIT (PG InvIT) primarily owns and operates high-voltage power transmission lines, which form a critical component of India's electricity infrastructure. The trust earns regulated revenues through long-term, fixed-fee contracts with utilities, offering predictable and stable cash flows over extended periods. Citius Transet Investment Trust, while operating in a different sector ,roads sector shares key structural and financial characteristics with PG InvIT. Both entities are SEBI registered InvITs with long-term contracted revenues, asset-heavy models, and yield focused investment propositions. These similarities support the application of standard infrastructure valuation methodologies such as the Discounted Cash Flow (DCF) approach, which emphasizes long term cash flow generation and yield expectations. From a capital market perspective, both InvITs are designed to deliver long term returns to investors through consistent distributions, making them suitable peers in a comparative valuation context.

Source: The above information has been derived from annual reports, investor presentations, investor call transcripts and other relevant data which is publicly available and can be verified independently by any reader. Raw Beta Considered has been derived from S&P Capital IQ.

Appendix 5.1: Summary of Approvals and Licenses of AMTPL

Sr. No.	Approvals	Date of Issue	Issuing Authority
1	CLRA-Registration	18-Mar-25	Addl.Labour Commissioner - Gandhinagar
2	EPFO-Registration	21-Mar-25	Regional PF Commissioner-Ahmedabad
3	ESIC-Registration	05-Dec-15	ESIC Officer
4	BoCW-Registration	23-Oct-24	Dy. Director/Asst. Director- Industrial Safety & Health
5	Shop & Establishment- Intimation	31-Dec-23	Dhangadhra Nagarpalika
6	PTRC-Registration	23-Feb-09	Nagarpalika Dhangadhra
7	PTEC-Registration	28-Mar-11	Nagarpalika Dhangadhra
8	Provisional Certificate of Completion	27-Aug-12	M/s. EGIS BCEOM International SA,
9	Provisional Certificate of Completion	01-Nov-12	M/s. EGIS BCEOM International SA,
10	Provisional Certificate of Completion	07-Apr-12	M/s. EGIS BCEOM International SA,
11	Provisional Certificate of Completion	05-May-12	M/s. EGIS BCEOM International SA,
12	Completion Certificate	22-Jun-23	LEA Associates

Appendix 5.2: Summary of Approvals and Licenses of DTPL

Sr. No.	Approvals	Date of Issue	Issuing Authority
1	CLRA-Licence	19-May-25	ALC Gulbarga
2	CLRA-Licence	16-Feb-24	ALC Gulbarga
3	CLRA-Licence	13-Oct-25	ALC Hyderabad II
4	ESIC-Registration	17-Feb-13	ESIC Officer
5	BoCW-Registration	23-Sep-20	ALC Hyderabad II
6	EPFO-Registration	09-Apr-25	Regional PF Commissioner
7	PTRC-Registration	15-Jul-13	Dy Commercial Tax Officer
8	Provisional Certificate	12-Oct-17	GETINSA – PAYMA, S.L.,
9	Completion Certificate	20-Oct-23	MSV International Inc.
10	Completion Certificate	17-Sep-19	TPF GETINSA EUROESTUDIOS S.L.
11	Final Approval from NHAI	17-Feb-26	NHAI

Appendix 5.3: Summary of Approvals and Licenses of PECL

Sr. No.	Approvals	Date of Issue	Issuing Authority
1	ESIC- Registration	26-Nov-13	ESIC Officer
2	Shop & Establishment- Registration	23-May-17	Shop & Establishment Inspector
3	CLRA-Licence	08-Apr-25	ALC Karnal
4	BoCW-Registration	17-Dec-15	ALC Karnal
5	EPFO-Registration	28-Mar-15	Regional PF Commissioner
6	Provisional Certificate	15-Jul-08	Consulting Engineering Services (India) Private Limited
7	Completion Certificate	17-Mar-11	NHAI

Appendix 5.4: Summary of Approvals and Licenses of RVTPL

Sr. No.	Approvals	Date of Issue	Issuing Authority
1	PTEC-Registration	06-Dec-23	Grampanchayat
2	PTRC-Registration	06-Dec-23	Grampanchayat
3	CLRA-Registration	23-Apr-25	Addl. Labour Commissioner-Gandhinagar
4	EPFO-Registration	04-Jul-15	Regional PF Commissioner
5	LWF-Registration		Gujarat Labour Welfare Board
6	BoCW-Registration	01-Jan-26	Dy. Director/Asst. Director, Industrial Safety & Health, Jamnagar
7	ESIC-Registration	22-Jan-26	ESIC Officer
8	Provisional Certificate	27-Jan-12	Stanley Consultants India Private Limited
9	Provisional Certificate	27-Jan-12	Stanley Consultants India Private Limited
10	Completion Certificate	17-Jun-23	LEA Associates South Asia Private Limited

Appendix 5.5: Summary of Approvals and Licenses of SBGTPL

Sr. No.	Approvals	Date of Issue	Issuing Authority
1	BoCW-Registration	13-Oct-24	ALC Adipur
2	CLRA-Licence	23-Jun-25	ALC Adipur
3	LWF-Registration		Gujarat Labour Welfare Board
4	PTEC-Registration	07-Sep-17	Taluka panchayat
5	PTRC-Registration	07-Sep-17	Taluka panchayat
6	EPFO-Registration	04-Jul-15	Regional PF Commissioner
7	Provisional Certificate	04-Jan-20	MSV International Inc.
8	Completion Certificate	24-Dec-24	MSV International Inc.

Appendix 5.6: Summary of Approvals and Licenses of SRTPL

Sr. No.	Approvals	Date of Issue	Issuing Authority
1	ESIC- Registration	09-Dec-24	ESIC Officer
2	EPFO-Registration	10-Feb-15	Regional PF Commissioner
3	BoCW-Registration	28-Sep-20	District Labour Officer Sundergarh (Rourkela)
4	CLRA-Registration	30-Jun-25	District Labour Officer, Sambalpur
5	LWF-Registration	07-Jun-24	Odisha Labour Welfare Board
6	PTEC-Registration	14-May-14	Professional Tax officer
7	PTRC-Registration	14-May-14	Professional Tax officer
8	Provisional Certificate	12-Mar-18	Aarvee Associates Architects Engineers & Consultants Private Limited
9	Provisional Certificate	12-Aug-19	Aarvee Associates Architects Engineers & Consultants Private Limited
10	Completion Certificate	20-Nov-21	Aarvee Associates Architects Engineers & Consultants Private Limited
11	CLRA-Registration	20-May-25	District Labour Officer, Jharsuguda
12	CLRA-Registration	09-Jun-25	District Labour Officer, Sundargarh

Appendix 5.7: Summary of Approvals and Licenses of TEL

Sr. No.	Approvals	Date of Issue	Issuing Authority
1	CLRA-Licence	27-Mar-25	ALC Ernakulam
2	BoCW-Registration	12-Mar-24	ALC Ernakulam
3	Shop & Establishment- Intimation	22-Nov-23	Facilitator-Shop and Establishments
4	EPFO-Registration	01-Dec-23	Regional PF Commissioner-Bandra(Mumbai-I)
5	ESIC-Registration	19-Jan-24	ESIC Officer
6	PTEC-Registration	23-Nov-23	DS Maharashtra Goods and Services Tax Department
7	PTRC-Registration		Vadakkenchery Grama Panchayat
8	PTEC-Registration		Vadakkenchery Grama Panchayat
9	Provisional Certificate	08-Mar-22	Intercontinental Consultants & Technocrats Private Limited
10	Provisional Certificate	29-Mar-22	Intercontinental Consultants & Technocrats Private Limited
11	Completion Certificate	28-Jun-24	Dhruv Consultancy Services Limited

Appendix 5.8: Summary of Approvals and Licenses of Dhola

Sr. No.	Approvals	Date of Issue	Issuing Authority
1	CLRA-Licence	28-Jun-25	Assistant Labour Commissioner(Tinsukia)
2	BoCW-Registration	11-Apr-25	Assistant Labour Commissioner(Tinsukia)
3	Trade Licence	30-Apr-25	Tinsukia Municipal Board
4	Shop & Establishment- Intimation	11-May-21	Facilitator-Shop and Establishments
5	Shop & Establishment- Registration	23-Dec-24	Assistant Labour Commissioner(Tinsukia)
6	EPFO-Registration	23-Jun-21	Regional PF Commissioner-Bandra(Mumbai-I)
7	ESIC-Registration	08-Dec-22	ESIC Officer
8	PTRC-Registration	05-Feb-21	Superintendent of Tax
9	PTEC-Registration	08-Feb-21	Superintendent of Tax
10	PTRC-Registration	10-Jun-25	DS Maharashtra Goods and Services Tax Department
11	PTEC-Registration	10-Jun-25	DS Maharashtra Goods and Services Tax Department
12	Provisional Certificate	16-Mar-18	TPF Engineering Private Limited
13	Completion Certificate	16-Aug-19	TPF Engineering Private Limited
14	Indirect Transfer	20-Feb-26	MORTH

Appendix 5.9: Summary of Approvals and Licenses of Dibang

Sr. No.	Approvals	Date of Issue	Issuing Authority
1	CLRA-Licence - Lohit	02-Dec-24	District Labour & Employment
2	CLRA-Licence - Roing	14-Nov-24	Deputy Commissioner Labour & Employment Cell Licensing Officer
3	BoCW-Registration	11-Feb-21	District Labour & Employment
4	Trade Licence	30-Apr-25	Tinsukia Municipal Board
5	Shop & Establishment- Intimation	11-May-21	Facilitator-Shop and Establishments
6	Shop & Establishment- Registration	23-Dec-24	Assistant Labour Commissioner(Tinsukia)
7	EPFO-Registration	24-Jun-21	Regional PF Commissioner-Bandra(Mumbai-I)
8	ESIC-Registration	08-Dec-22	ESIC Officer
9	PTRC-Registration	08-Feb-21	Superintendent of Tax
10	PTEC-Registration	08-Feb-21	Superintendent of Tax
11	PTRC-Registration	10-Jun-25	DS Maharashtra Goods and Services Tax Department
12	PTEC-Registration	10-Jun-25	DS Maharashtra Goods and Services Tax Department
13	Provisional Certificate	07-Dec-18	M/s. AECOM Asia Company Limited
14	Completion Certificate	10-Oct-19	M/s. AECOM Asia Company Limited
15	Indirect Transfer	20-Feb-26	MORTH

Appendix 5.10: Summary of Approvals and Licenses of JSEL

Sr. No.	Approvals	Date of Issue	Issuing Authority
1	CLRA-Licence	26-Feb-26	ALC Guwahati
2	BoCW-Registration	31-Jan-24	ALC Guwahati
3	Trade Licence	25-May-22	District Council
4	Shop & Establishment- Intimation	01-Dec-23	Facilitator-Shop and Establishments
5	EPFO-Registration	01-Jan-24	Regional PF Commissioner-Bandra(Mumbai-I)
6	ESIC-Registration	19-Jan-24	ESIC Officer
7	PTRC-Registration	28-Dec-23	DS Maharashtra Goods and Services Tax Department
8	PTEC-Registration	28-Dec-23	DS Maharashtra Goods and Services Tax Department
9	PTRC-Registration	15-May-25	Superintendent Professional Tax
10	PTEC-Registration	15-May-25	Superintendent Professional Tax
11	Provisional Certificate	28-Jan-16	Unihorn India Private Limited
12	Completion Certificate	30-Aug-19	Unihorn India Private Limited
13	CLRA-Licence	04-Mar-25	ALC Guwahati
14	Indirect Transfer	06-Feb-26	NHAI

Appendix 6.1: Summary of Tax Notices of AMTPL

Sr No	Name of the SPV	Act / Law	Assessment Year	Forum where dispute is pending	Tax amount involved (Rs. In Million)	Remarks
1	AMTPL	Income Tax	2017-18	CIT(A)	-	Various disallowances by assessing officer
2	AMTPL	Income Tax	2018-19	CIT(A)	40.2	Various disallowances by assessing officer
3	AMTPL	Income Tax	2022-23	CIT(A)	17.2	Various disallowances by assessing officer
4	AMTPL	Income Tax	2022-23	CIT(A)	-	Disallowance of Provision for Major Maintenance by the Assessing Officer for MAT
5	AMTPL	Income Tax	2018-19	CIT(A)	-	Disallowance of Provision for Major Maintenance by the Assessing Officer for MAT
6	AMTPL	VAT	2012-13	Gujarat Value Added Tax Tribunal	18.7	Dispute on applicability of Gujarat value added tax on purchases from unregistered dealer

Appendix 6.2: Summary of Tax Notices of DTPL

Sr No	Name of the SPV	Act / Law	Assessment Year	Forum where dispute is pending	Tax amount involved (Rs. In Million)	Remarks
1	DTPL	Income Tax	2016-17	in the process of filing appeal before the ITAT	1.9	Various disallowances by assessing officer
2	DTPL	GST	2017-20	The Deputy Commissioner, Hyderabad.	0.1	Availment of GST ITC credit
3	DTPL	GST- Telangana	2020-23	The Additional Commissioner of Commercial Taxes (Appeals) Telangana	3.8	GST short payment as per GST3B returns and irregular availment of ITC
4	DTPL	GST- Karnataka	2022-23	Commercial Tax officer, Audit-5, Kalaburgi	0.8	Allegations regarding difference in taxable value between books and GSTR-3B, ineligible credit availment and short payment of tax on RCM and credit notes

Appendix 6.3: Summary of Tax Notices of RVTPL

Sr No	Name of the SPV	Act / Law	Assessment Year	Forum where dispute is pending	Tax amount involved (Rs. In Million)	Remarks
1	RVTPL	Income Tax	2014-15	CIT(A)	-	Penalty proceedings
2	RVTPL	Income Tax	2015-16	CIT(A)	0.1	Disallowance for Major Maintenance provisions by assessing officer
3	RVTPL	Income Tax	2015-16	CIT(A)	48.2	Penalty proceedings
4	RVTPL	Income Tax	2016-17	CIT(A)	42.40	Penalty proceedings
5	RVTPL	Income Tax	2017-18	CIT(A)	-	Disallowance for Major Maintenance provisions by assessing officer
6	RVTPL	Income Tax	2017-18	in the proocess of fling appeal before the ITAT	-	Disallowance for Major Maintenance provisions by assessing officer in the re-assessment proceedings.
7	RVTPL	VAT	2012-13	Gujarat Value Added Tax Tribunal	3.00	Dispute on applicability of Gujarat value added tax on purchases from unregistered dealer
8	RVTPL	Income Tax	2018-19	CIT(A)	-	Disallowance for Major Maintenance provisions and adjustment to TCR by the Assessing Officer

Appendix 6.4: Summary of Tax Notices of PECPL

Sr No	Name of the SPV	Act / Law	Assessment Year	Forum where dispute is pending	Tax amount involved (Rs. In Million)	Remarks
1	PECPL	Income Tax	2023-24	CIT(A)	-	Non allowance of carry forward losses and refund
2	PECPL	Income Tax	2017-18	CIT(A)	181.60	Various disallowances made by the Assessing Officer
3	PECPL	Income Tax	2017-18	The Assistant Commissioner, Circle 1, LTU, Chennai	7.4	Delayed ITR filing

Appendix 6.5: Summary of Tax Notices of SBGTPL

Sr No	Name of the SPV	Act / Law	Assessment Year	Forum where dispute is pending	Tax amount involved (Rs. In Million)	Remarks
1	SBGTPL	Income Tax	2013-14	CIT(A)	3.50	Treating interest income during construction period as revenue receipt
2	SBGTPL	Income Tax	2016-17	CIT(A)	49.10	Penalty demand raised by the Assessing Officer on disallowance of MMR provisions
3	SBGTPL	Income Tax	2017-18	CIT(A)	-	Various disallowances by assessing officer including MMR provisions

Appendix 6.6: Summary of Tax Notices of SRTPL

Sr No	Name of the SPV	Act / Law	Assessment Year	Forum where dispute is pending	Tax amount involved (Rs. In Million)	Remarks
1	SRTPL	GST	2018-19	GST Tribunal	155.10	GST on grant received from government
2	SRTPL	GST	2017-18	Commissioner (Appeals)	5.80	Non reversal of Input tax credit
3	SRTPL	Income Tax	2016-17	The ITO, CW 4(4) Chennai	1.7	Income during construction period adjusted against the project cost.
4	SRTPL	Income Tax	2022-23	NFAC, New Delhi	18.1	Various disallowances made

Appendix 6.7: Summary of Tax Notices of Dhola

Sr No	Name of the SPV	Act / Law	Assessment Year	Forum where dispute is pending	Tax amount involved (Rs. In Million)	Remarks
1	Dhola	Union of India, State of Assam, The Central Board of Indirect Taxes and Customs, The Additional Director of Directorate General of Goods & Services Tax Intelligence, Joint/Additional Commissioner of Central Tax, CGST Goods and Service Tax Council	FY 2017-18 to FY 2021-22	The Gauhati High Court (High Court of Assam, Nagaland, Mizoram and Arunachal Pradesh)	419.25	GST on annuity from July 2017 to March 2021. **Status**: Last Hearing held on 20.06.2025 and 25.07.2025, and further adjourned to next hearing which is yet to be listed.
2	Dhola	Deputy Commissioner of State Tax	FY 2022-23	Adjudication Authorities	12.19	Discrepancies in ITC as per GSTR 2A and 3B **Status**: Appropriate response were submitted on 27.05.2024, no further commnunication from department.
3	Dhola	Deputy Commissioner of State Tax	FY 2023-24	Adjudication Authorities	8.02	Discrepancies in ITC as per GSTR 2A and 3B **Status**: Appropriate response were submitted on 09.01.2025, no further commnunication from department.
4	Dhola	GST	2021-22	Deputy Commissioner of State Tax	39.20	Availment of GST ITC credit **Status**: Appropriate response were submitted on 14.10.2025, no further commnunication from department.

Appendix 6.8: Summary of Tax Notices of Dibang

Sr No	Name of the SPV	Act / Law	Assessment Year	Forum where dispute is pending	Tax amount involved (Rs. In Million)	Remarks
1	Dibang	Income-tax Department	AY 2023-24	CIT(A)	4.67	Short TDS credit and excess interest charged under 234b and 234c
2	Dibang	Income-tax Department	AY 2024-25	in process of filing rectification application and/or CIT(A)	3.68	Erroneous demand due to non-consideration of MAT credit
3	Dibang	Union of India, State of Arunachal Pradesh, The Central Board of Indirect Taxes and Customs, The Additional Director of Directorate General of Goods & Services Tax Intelligence, Joint/Additional Commissioner of Central Tax, CGST Goods and Service Tax Council	FY 2017-18 to FY 2021-22	The Gauhati High Court (High Court of Assam, Nagaland, Mizoram and Arunachal Pradesh)	212.62	GST on annuity from July 2017 to March 2021 **Status**: Last hearing held on 29.01.2025 wherein the matter taking note of submissions made by company has been adjourned for 4 weeks for next hearing.
4	Dibang	GST	2021-22	Deputy Commissioner of State Tax	102.40	ITC mismatch **Status**: Appropriate response were submitted on 02.09.2025, no further commnunication from department.
5	Dibang	GST	2022-23	Deputy Commissioner of State Tax	15.83	ITC mismatch **Status**: Appropriate response were submitted on 05.01.2026, no further commnunication from department.

Appendix 6.9: Summary of Tax Notices of JSEL

Sr No	Name of the SPV	Act / Law	Assessment Year	Forum where dispute is pending	Tax amount involved (Rs. In Million)	Remarks
1	JSEL	Income-tax Department	AY 2016-17	CIT(A)	115.27	Disallowance for depreciation claim and other items
2	JSEL	Income-tax Department	AY 2017-18	ITAT	-	Disallowance for depreciation claim **Status**: CIT(A) upheld disallowances for depreciation. Appeal is filed before ITAT & is under process.
3	JSEL	Income-tax Department	AY 2018-19	ITAT	46.49	Disallowance for depreciation claim **Status**: CIT(A) upheld disallowances for depreciation. Appeal is filed before ITAT & is under process.
4	JSEL	Income-tax Department	AY 2020-21	ITAT	206.23	Disallowance for depreciation claim and other items **Status**: CIT(A) upheld disallowances for depreciation. Appeal is filed before ITAT & is under process.
5	JSEL	Income-tax Department	AY 2021-22	CIT(A)	-	Short TDS credit by CPC
6	JSEL	Income-tax Department	AY 2022-23	ITAT	453.21	Short TDS credit by CPC and Disallowance for depreciation claim **Status**: CIT(A) upheld disallowances for depreciation. Appeal is filed before ITAT & is under process.
7	JSEL	Assistant Commissioner of State Tax	FY 2017-18	Adjudication Authorities	0.39	RCM for period 2017-18
8	JSEL	Union of India, State of Meghalaya, The Central Board of Indirect Taxes and Customs, The Additional Director of Directorate General of Goods & Services Tax Intelligence, Additional Commissioner of Central Tax, CGST Goods and Service Tax Council	July 2017 to Dec 2022	High Court of Meghalaya at Shillong	2247.93	GST on annuity from July 2017 to December 2022 **Status:** Court reserved order on 17.12.2025. Order is awaited.

Appendix 7.1: Summary of Ongoing Litigations of AMTPL

Sr No	Details of Matter	Amount Involved (in Mn)
1	As per the terms of the AMTPL CA, AMTPL is responsible for submitting a monthly O&M report ("**Report**") to GSRDC. On March 16, 2024, GSRDC instructed an independent engineer ("**IE**") to examine the Report and furnish their comments on the same. Pursuant to review of the Report for February 2024, the IE determined damages aggregating to ₹ 947.70 million on AMTPL, due to delays in rectifying deficiencies identified in the Report. In this regard, the GSRDC has also been advised by the IE to proceed with the necessary steps to facilitate recovery of damages as per the AMTPL CA. AMTPL had clarified has not taken into consideration the settlement agreement dated April 27, 2023 entered into between GSDRC and AMTPL, whereby parties had agreed to settle all outstanding and pending claims and counter claims as on the date of the settlement agreement and per its terms. AMPTL has also clarified that the methodology adopted by the IE was erroneous. The matter is currently pending.	947.7
2	The Office of the Superintendent of Stamps and Registration, Gandhinagar *vide* its letter dated May 15, 2025 has alleged that the AMTPL CA was not adequately stamped and has instructed AMTPL to pay ₹ 281.80 million. AMTPL *vide* its letter dated July 8, 2025 has denied the allegations.	281.8
3	As per the concession agreement dated September 17, 2008, entered into between AMTPL and Gujarat State Road Development Corporation Limited ("GSRDC") ("AMTPL CA"), AMTPL is required to determine the actual traffic volume ("ATV") through traffic sampling on specified target dates to assess modifications to the concession period ("Concession Period"). An independent engineer ("IE") engaged for traffic sampling submitted its report to GSRDC, basis which GSRDC noted that the ATV had exceeded the target traffic volume ("TTV"). Consequently, GSRDC vide its letter dated July 19, 2024, reduced the Concession Period by 2.2 years in accordance with the AMTPL CA. AMTPL, vide its response dated August 2, 2024, contested the same, stating that the methodology adopted by the IE for computation of ATV is not in conformity with the AMTPL CA, and has further requested a joint meeting with GSRDC and the IE. The matter is currently pending.	

Appendix 7.2: Summary of Ongoing Litigations of DTPL

Sr No	Details of Matter	Amount Involved (in Mn)
1	DTPL received a temporary permit from the Assistant Director of Mines Geology, Sangareddy district, allowing the excavation of material from Mella Kunta Tank in Veltoor village for a construction project, which was finalized in October 2017.On June 24, 2025, the NHAI flagged concerns regarding alleged non-compliance with the permit conditions. Specifically, the NHAI claims that DTPL performed an illegal excavation of gravel exceeding the authorized quantity and failed to maintain the required slopes. DTPL has been directed to carry out remedial work, including back-filling the site and restoring the slopes, and to secure the necessary No Objection Certificates (NOCs) from both the irrigation and mines departments. This matter remains unresolved and is currently pending.	Nil
2	On November 13, 2025, the National Highways Authority of India (NHAI) issued a Show Cause Notice (SCN) to DTPL, citing the **non-fulfillment of specific Operation and Maintenance (O&M) obligations**. This notice was prompted by the Independent Engineer (IE), who had previously highlighted discrepancies in DTPL's O&M performance through letters dated November 8 and November 10, 2025. In response, DTPL submitted updates to both the IE and NHAI on November 14 and November 20, 2025, detailing the work undertaken to rectify the reported deficiencies and fulfill their contractual O&M duties. The resolution of this matter is currently pending.	Nil
3	As informed by the Management, DTPL has claimed compensation of approximately ₹ 11.17 million from NHAI towards loss of revenue on account of non-implementation of revised user fees for the period April 1, 2024 to June 2, 2024, in accordance with the terms of the DTPL CA. It is noted that NHAI, vide its letter dated August 27, 2024, rejected the said claim citing various reasons, pursuant to which DTPL, vide its response dated September 6, 2024, reiterated its entitlement and requested NHAI to reconsider its position. The matter is currently pending.	11.17
4	As informed by the Management, NHAI issued a show cause notice dated November 13, 2025 to DTPL, alleging non-fulfillment of certain operations and maintenance ("O&M") obligations. It is noted that the IE, vide its letters dated November 8, 2025 and November 10, 2025, had highlighted certain discrepancies in relation to the said O&M obligations. DTPL, vide its response letters dated November 14, 2025 and November 20, 2025, apprised both the IE and NHAI of the remedial work undertaken towards fulfillment of its O&M obligations. The matter is currently pending.	Nil

Appendix 7.3: Summary of Ongoing Litigations of RVTPL

Sr No	Details of Matter	Amount Involved (in Mn)
1	Pursuant to review of the monthly O&M report ("Report") for March 2024, the independent engineer ("IE") determined that RVTPL was liable for recovery of damages aggregating to ₹733.39 million for the period from May 2023 to January 2024, due to delays in rectifying deficiencies identified in the Report. RVTPL vide letter dated March 26, 2024 ("Letter") has disputed the calculations provided by the IE and alleged that the Report covered the period prior to the execution of the settlement agreement wherein the parties had agreed to settle all outstanding claims and counter claims as on date of settlement agreement dated April 27, 2023 SA and therefore had requested the IE to review the Report and rectify the calculations basis the observations made in the Letter. The matter is currently pending.	733.39
2	Based on input from the Accountant General, Ahmedabad, the Office of the Superintendent of Stamps and Registration in Gandhinagar issued a letter on May 15, 2025, asserting that the Concession Agreement (RVTPL CA) between RVTPL and GSRDCL, originally dated September 17, 2008, was inadequately stamped. Consequently, the authority has demanded that RVTPL pay a stamping deficit of ₹ 281.80 million. RVTPL formally disputed this allegation in its response dated July 8, 2025. This matter regarding the stamping compliance is currently pending resolution..	281.8

Appendix 7.4: Summary of Ongoing Litigations of SBGTPL

Sr No	Details of Matter	Amount Involved (in Mn)
1	The National Highways Authority of India (NHAI) imposed damages totaling approximately ₹ 2.14 million on SBGTPL, as documented in letters dated May 27, 2025. This action was taken based on the Independent Engineer's (IE) recommendation (April 7, 2025), which cited SBGTPL's alleged failure to meet certain Operation and Maintenance (O&M) obligations during December 2024 and January 2025, violating the terms of the SBGTPL CA. Although SBGTPL provided clarifications for the IE's observations in a letter dated April 23, 2025, the IE rejected these explanations on June 25, 2025, reaffirming the penalties. The NHAI subsequently re-imposed the ₹ 2.14 million fine on July 4, 2025. SBGTPL formally denied the alleged discrepancies in a letter dated July 11, 2025. The final resolution of this disputed damage claim is currently pending.	2.14
2	The Independent Engineer (IE), in a letter dated July 28, 2025, recommended that damages totaling ₹ 1.21 million be imposed on SBGTPL. This recommendation stemmed from an alleged breach of O&M obligations outlined in the SBGTPL CA, specifically due to the non-functional Weigh-in-Motion (WIM) systems at the Samakhiali toll plaza between June 20, 2025, and July 19, 2025. SBGTPL responded on July 16, 2025, arguing that the issue was systemic across the industry and requesting that the replacement of the WIM systems be treated as a Change of Scope. However, the IE refuted this on July 28, 2025, insisting that WIM maintenance is an inherent O&M obligation. Consequently, the NHAI officially imposed the recommended damages on August 4, 2025. SBGTPL has since requested (September 4, 2025) that the NHAI disregard the IE's recommendations based on justifications provided in their letter. The resolution of this disputed penalty is currently pending.	1.21
3	The National Highways Authority of India (NHAI) imposed substantial damages totaling ₹ 25.3 million on SBGTPL, as documented in a letter dated September 27, 2025. This penalty stems from the alleged non-fulfillment of various Operation and Maintenance (O&M) obligations spanning the period from March 1, 2025, to June 19, 2025. The imposition followed a recommendation made by the Independent Engineer (IE) on September 19, 2025, which cited multiple discrepancies. SBGTPL formally contested this penalty in its letter dated October 14, 2025, arguing that the NHAI imposed the damages without reviewing the clarifications previously provided by the company. SBGTPL reiterated its explanations and requested the IE to withdraw the damaging recommendations. Final communications to the NHAI outlining SBGTPL's denial were submitted on November 5, 2025. The resolution of this significant damages claim is currently pending.	25.3

Appendix 7.4: Summary of Ongoing Litigations of SBGTPL

Sr No	Details of Matter	Amount Involved (in Mn)
4	The National Highways Authority of India (NHAI), through a letter dated August 26, 2025, imposed damages amounting to approximately ₹ 1.37 million on SBGTPL. This action was taken due to the alleged non-fulfillment of specific Operation and Maintenance (O&M) obligations outlined in the SBGTPL Concession Agreement (CA) for the period of July 20, 2025, to August 22, 2025. The penalty was based on the Independent Engineer's (IE) recommendation, which detailed various discrepancies observed during that time. SBGTPL formally provided clarifications regarding the IE's observations in its letter dated September 4, 2025. The final resolution of this disputed matter is currently pending.	1.37
5	The National Highways Authority of India (NHAI) imposed damages totaling **₹ 1.00 million** on SBGTPL, as stated in a letter dated September 24, 2025. This action was taken due to the alleged breach of specific Operation and Maintenance (O&M) obligations under the SBGTPL Concession Agreement (CA) during the period from August 23, 2025, to September 16, 2025. The penalty was based on the Independent Engineer's (IE) recommendation (September 17, 2025), which cited various discrepancies in the O&M performance. SBGTPL provided its clarifications addressing the IE's observations in a letter dated September 25, 2025. The final resolution of this penalty and the compliance issue is currently pending.	1
6	Under the terms of the Concession Agreement (SBGTPL CA) dated March 17, 2010, the duration of the Concession Period is subject to modification based on a comparison between the Actual Traffic Volume (ATV) and the Target Traffic Volume (TTV), determined by traffic sampling on specified dates. Following a traffic sampling report submitted by the Independent Engineer (IE), the NHAI determined that the ATV had surpassed the TTV. Based on this finding, the NHAI invoked the CA and, through a letter dated December 7, 2024, reduced the Concession Period by 2.4 years. Disputing the accuracy of the ATV computation, SBGTPL initiated arbitration proceedings before the Society for Affordable Redressal of Disputes on August 28, 2025. The final resolution of this matter is currently pending.	

Appendix 7.4: Summary of Ongoing Litigations of SBGTPL

Sr No	Details of Matter	Amount Involved (in Mn)
7	As informed by the Management, NHAI vide its letter dated March 22, 2024 notified SBGTPL of the revision in user fee rates, effective April 1, 2024, however, vide its letter dated April 1, 2024, instructed SBGTPL not to implement the revised rates. Subsequently, NHAI vide its notification dated May 30, 2024 directed implementation of the revised user fee rates effective June 3, 2024. It is noted that SBGTPL, vide its letters dated April 23, 2024 and May 30, 2024, claimed compensation of approximately ₹ 10.89 million from NHAI towards loss of revenue on account of non-implementation of revised user fees for the period April 1, 2024 to June 2, 2024, in accordance with the terms of the SBGTPL CA. SBGTPL, vide its letter dated February 17, 2026, has applied for settlement of the matter through conciliation before the CCIE. The matter is currently pending.	10.89
8	As informed by the Management, NHAI, vide its letter dated October 13, 2025, imposed damages of ₹ 0.56 million on SBGTPL, alleging non-fulfillment of certain O&M obligations for the period September 17, 2025 to September 30, 2025, in accordance with the terms of the SBGTPL CA, based on the recommendations of the IE vide its letter dated October 4, 2025. SBGTPL, vide its letter dated November 6, 2025, submitted clarifications in response to the discrepancies highlighted in the IE's O&M inspection report for September 2025. SBGTPL, vide its letter dated February 17, 2026, has applied for settlement of the matter through conciliation before the CCIE. The matter is currently pending.	0.56
9	As informed by the Management, NHAI, vide its letter dated December 10, 2025, imposed damages of ₹ 1.56 million on SBGTPL, alleging non-fulfillment of certain O&M obligations for the period October 1, 2025 to October 31, 2025, in accordance with the terms of the SBGTPL CA, based on the recommendations of the IE vide its letter dated December 5, 2025. SBGTPL, vide its letter dated December 22, 2025, submitted clarifications in response to the discrepancies highlighted in the IE's O&M inspection report for October 2025. SBGTPL, vide its letter dated February 17, 2026, has applied for settlement of the matter through conciliation before the CCIE. The matter is currently pending.	1.56

Appendix 7.5: Summary of Ongoing Litigations of SRTL

Sr No	Details of Matter	Amount Involved (in Mn)
1	As informed by the Management, SRTPL has submitted consolidated claims of ₹ 6,315 million along with a request for extension of the concession period by 593.42 days, towards loss of revenue during the O&M period on account of various reasons including delay in land handover, change in law, change in scope and occurrence of force majeure events. It is noted that the IE, upon examination of the said claims, recommended payment of ₹ 1,117 million and extension of the concession period by 299.96 days, which SRTPL has accepted for amicable settlement. The Office of the Engineer-in-Chief (Civil), Odisha, vide its letter dated March 18, 2023, has submitted the claims for approval of the Government of Odisha. The matter is currently pending.	1,117

Appendix 7.6: Summary of Ongoing Litigations of TEL

Sr No	Details of Matter	Amount Involved (in Mn)
1	The Office of the Director General, Corporate Affairs, under the Ministry of Corporate Affairs (MCA), served a Show Cause Notice (SCN) on TEL, alleging non-compliance with Section 204 of the Companies Act, 2013. Specifically, the MCA asserted that TEL failed to annex the mandatory **Secretarial Audit Report** with its Board Report for the financial year 2016-17. TEL formally disputed this charge in a written response dated November 15, 2019, arguing that Section 204 was not applicable to the company. After the Registrar of Companies (RoC), Hyderabad, followed up on March 7, 2022, regarding the SCN and suggested a compounding application, TEL replied on March 16, 2022. In its reply, TEL reiterated its denial of any violation, enclosing its initial denial and proof of submission to the MCA portal (November 18, 2019). The final decision on this compliance matter is currently pending	Nil
2	Civil Case : The Kerala State Private Bus Operators Coordination Committee has filed a writ petition before the High Court of Kerala against TEL, NHAI and others on June 21, 2025 alleging inter alia the adverse conditions of roads due to poor maintenance, and have prayed to suspend the levy and collection of toll charges at the Panniyankara toll plaza, Kerala. NHAI along with certain Defendants vide the counter affidavit dated October 3, 2025 has denied all allegations, and has clarified that there are certain sections of the disputed stretch of road that are classified as “blackspots”, which have been entrusted by the NHAI to a third-party contractor for rectification. NHAI has further clarified that the said rectification of such “blackspots” is not connected with TEL, and TEL has the legal right to collect toll until the end of the concession period. Company has also handed over the operations and maintenance of these stretches to the third party contractor. The matter is currently pending.	Nil
3	As informed by the Management, TEL, vide its letter dated June 7, 2024, claimed compensation from NHAI towards loss of revenue on account of non-implementation of revised user fees for the period April 1, 2024 to June 2, 2024, in accordance with the terms of the concession agreement dated August 24, 2009 entered into between TEL and NHAI ("TEL CA"). It is noted that TEL, vide its letter dated August 8, 2025, revised the said compensation claim to ₹ 7.48 million. The matter is currently pending.	7.48

Appendix 7.7: Summary of Ongoing Litigations of Dibang

Sr No	Details of Matter	Amount Involved (in Mn)
1	On November 3, 2010, Dibang and the Ministry of Road Transport and Highways (MORTH) executed a Concession Agreement (the "Dibang CA") for a Build, Operate, Transfer (BOT) project involving the construction of bridges across the Dibang river system and the Lohit River, along with connecting roads in Arunachal Pradesh. The project faced significant delays primarily because MORTH failed to provide the necessary vacant land access and right-of-way as stipulated in the Dibang CA. These and other non-attributable delays led Dibang to formally request an extension of time. Consequently, Dibang was granted a substantial 870-day extension for the project's completion. The prolonged construction period resulted in significant financial losses for Dibang, including heightened borrowing interest, escalation in material and labor costs, and the idling of resources. Dibang subsequently submitted a claim to MORTH for ₹ 7,711.50 million to recover these losses. As of June 15, 2021, both parties agreed to pursue an amicable settlement, and the matter is presently awaiting MORTH's final response.	7,711.5
2	Dibang has put forward a claim against MORTH relating to a required Change of Scope (CoS) for the Dibang Project, specifically involving the construction of additional river protection infrastructure. This supplemental work, which was not part of the original Concession Agreement, included building nine repelling spurs—a measure recommended by the independent engineer to protect the main bridge and the project highway. Dibang is seeking reimbursement for the costs already incurred for these works, totaling ₹ 118.30 million. Furthermore, Dibang is also pursuing official Change of Scope approval for subsequent river protection measures planned for the upstream section of the project. This claim is currently awaiting MORTH's review and official response.	1,188.49

Appendix 7.8: Summary of Ongoing Litigations of Dhola

Sr No	Details of Matter	Amount Involved (in Mn)
1	The concessionaire, Dhola, secured a Build, Operate, Transfer (BOT) annuity agreement with the Ministry of Road Transport and Highways (MORTH) on November 3, 2010, for the development of a bridge linking Dhola and Sadia Ghats in Assam. By March 19, 2020, Dhola officially notified MORTH of significant project completion delays. These delays were attributed to factors outside the concessionaire's control, including MORTH's failure to timely hand over land, various force majeure events, and changes to the scope of work. Although Dhola was subsequently granted an extension of 746 days, the prolonged construction period led to substantial financial losses, such as increased interest on loans and the idling of essential resources (manpower, plant, and equipment). Claiming these losses were not attributable to its performance, Dhola submitted a claim of ₹ 6,483.50 million to MORTH. Following unsuccessful attempts at negotiation and conciliation, Dhola formally initiated arbitration proceedings on June 3, 2021, and the matter remains unresolved..	6,483.5

Appendix 8: Brief Details about the Valuer

Professional Experience

Sundararaman is a fellow member from the Institute of Chartered Accountants of India, Graduate member of the Institute of Cost and Works Accountants of India, Information Systems Auditor (DISA of ICAI) and has completed the Post Qualification Certification courses of ICAI on IFRS, Valuation. He is a registered Insolvency Professional and a Registered Valuer for Securities or Financial Assets, having been enrolled with the Insolvency and Bankruptcy Board of India (IBBI) after passing the respective Examinations. He possesses more than 30 years of experience in servicing large and medium-sized clients in the areas of Corporate Advisory including Strategic Restructuring, Governance, Acquisitions and related Valuations and Tax Implications apart from Audit and Assurance Services.

His areas of specialization include valuation for various Infrastructure Companies including valuation for Investment Infrastructure Trusts (InvITs)

Professional Qualifications & Certifications

- FCA
- Grad CWA
- Certificate Courses on Valuation
- Certificate Course on IFRS
- Information Systems Audit (DISA of ICAI)
- Registered Insolvency Professional
- IBBI Registered Valuer

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Registation Details

IBBI Registration No - IBBI/RV/06/2018/10238

<< End of Report >>

ANNEXURE B – TECHNICAL REPORTS

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Intended for

WATRAK INFRASTRUCTURE PRIVATE LIMITED

Document type

Technical Advisory Report

Date

October 2025

TECHNICAL DUE DILIGENCE REPORT

FOUR LANE OF AHMEDABAD-VIRAMGAM-MALIYA ROAD OF SH-17 AND SH-7, LENGTH 180.703 KM, IN THE STATE OF GUJARAT ON BOT BASIS



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TECHNICAL DUE DILIGENCE REPORT

FOUR LANE OF AHMEDABAD-VIRAMGAM-MALIYA ROAD OF SH-17 AND SH-7, LENGTH 180.703 KM, IN THE STATE OF GUJARAT ON BOT BASIS

Project name	**FOUR LANE OF AHMEDABAD-VIRAMGAM-MALIYA ROAD OF SH-17 AND SH-7, LENGTH 180.703 KM, IN THE STATE OF GUJARAT ON BOT BASIS**
Project no.	**1880003804**
Recipient	**WATRAK INFRASTRUCTURE PRIVATE LIMITED**
Document type	**Technical Advisory Report – Final**
Version	**-**
Date	**10th October 2025**
Prepared by	**Gopal Sharma, Mrunal Doshi, Patnala Venkatesh, Lokesh Kumar, Jai Vaishnav, Ashutosh Ankit**
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Acronyms and Abbreviations

BBD	Benkelman Beam Deflection	LCV	Light Commercial Vehicle
BOQ	Bill of Quantities	LHS	Left hand side
BC	Bituminous Concrete	LIE	Lenders' Independent Engineer
BOT	Build, Operate and Transfer	LT	Low Tension
CA	Concession Agreement	MOEF	Ministry of Environment and Forest
CAPEX	Capital Expenditure	MORT&H	Ministry of Road Transport & Highways
COD	Commercial Operation Date	MPRDC	Madhya Pradesh Road Development Corporation
CRPF	Central Reserve Police Force	MSA	Million Standard Axle
C & G	Clearing and grubbing	NCR	Non-Compliance Report
CRMB	Crumb Rubber Modified Bitumen	NH	National Highways
CUP	Cattle Under Pass	NHAI	National Highways Authority of India
DBM	Dense Bitumen Macadam	NHDP	National Highway Development Programme
DLC	Dense Lean Concrete	NRMB	Natural Rubber Modified Bitumen
DFO	Divisional Forest Office	NOC	No Objection Certificate
DG	Diesel Generator	OFC	Optical Fibre Cable
DLP	Defect liability period	OPEX	Operation Expenditure
DPR	Detailed Project Report	O&M	Operation and Maintenance
EIA	Environment Impact Assessment	PPE	Personal Protection Equipment
EMP	Environment Management Plan	PPP	Public-Private/Public Sector Partnership
EPC	Engineering Procurement & Construction	PQC	Pavement Quality Concrete
FCI	Food Corporation of India	PUP	Pedestrian Under pass
FRL	Formation Road Level	PWD	Public Works Department

FWD	Falling Weight Deflectometer	PCC	Plain Cement Concrete
GAD	General Arrangement Drawing	PD	Project Director
GFC	Good for Construction	PIU	Project Implementation Unit
GOI	Government of India	PLR	Prime lending rate
GSB	Granular Subbase	PMB	Polymer Modified Bitumen
HT	High Tension	PMC	Project Management Consultant
HMP	Hot Mix Plant	PUP	Pedestrian Under Pass
HDM	Highway Development & Management	QA/QC	Quality Assurance / Quality Control
IC	Independent Consultant	SDBC	Semi-dense Bitumen Concrete
IE	Independent Engineer	SPV	Special Purpose Vehicle
IPC	Interim Payment Certification	VDF	Vehicle Damage Factor
IRC	Indian Road Congress		

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1. EXECUTIVE SUMMARY

1.1 General

We understand that **EAAA TransInfra Managers Limited** is the **Investment Manager, Chennai - Tada Tollway Private Limited ("CTTPL")** is the proposed **Project Manager** and **Watrak Infrastructure Private Limited ("WIPL")** is the **sponsor** of the **Citius Transnet Investment Trust ("Trust"** or **"InvIT")** and **M/s Ahmedabad - Maliya Tollway Private Limited ("AMTL")** is proposed to be part of the initial portfolio assets of the Trust. The Trust is registered with **Securities and Exchange Board of India ("SEBI")** as an infrastructure investment trust under the SEBI InVIT Regulations.

M/s Watrak Infrastructure Private Limited (hereinafter **"**the **Client"**) as sponsor has appointed **M/s Ramboll India Private Limited** (hereinafter referred as **"Technical Consultant"**) to carry out Technical Due Diligence of operational asset of Four Laning of Ahmedabad-Viramgam-Maliya Road on BOT Toll Basis in the State of Gujarat (herein after refer as "the **Project**") which is being operated by **"M/s Ahmedabad - Maliya Tollway Private Limited"** (hereinafter refer as **"**the **Concessionaire** or **Company** or **AMTL"**).

1.2 Project Introduction

The Government of Gujarat had proposed to augment existing SH-17 from Ahmedabad (Sarkhej) to Viramgam Km 13.930 to Km 61.430 and on SH-7 starts from Viramgam to Maliya (Km 61.430 to Km 194.633) to four lane divided carriageway on build operate and transfer basis (BOT).

The Gujarat State Road Development Corporation Limited (GSRDC), set up by the Government of Gujarat initiated implementation of the project inviting Tender Notice no. 12/06-07 dated 09 October 2006. Following the evaluation of bids received, GSRDC accepted the bid of Larsen & Toubro Limited and issued Letter of Acceptance No. GMP.AVM/LOA/1804/2008 dated 07 August 2008.

Larsen & Toubro Limited subsequently promoted and incorporated the Concessionaire, L&T Ahmedabad – Maliya Tollway Private Limited, for the implementation of the project. The Concession Agreement was executed on 17 September 2008. The Appointed Date for the project was declared on 12 October 2009, marking the commencement of the 22-year Concession Period from that date.

The Project achieved Provisional Commercial Operation Date (PCOD) in a phased manner, upon Certification by the Independent Engineer confirming the section are safe and suitable for commercial operations. PCOD for Section-3 is declared on 07 April 2012, followed by Section-4 on 05 May 2012, Section-1 on 27 August 2012, and Section-2 on 01 November 2012. COD of the project is achieved on 22 June 2023. The Project Highway is currently under the Operation and Maintenance (O&M) phase, in accordance with the provisions of the existing Concession Agreement and shall continue to operate and maintain the project highway until the end of the Concession Period. The concession period, originally scheduled to end on 11 October 2031, has been extended to 04 June 2033. This extension is pursuant to three Supplementary Agreements executed on 18 December 2015, 16 September 2021, and 27 April 2023, which granted extensions of 103, 51, and 81 days, respectively. Furthermore, the concession is subject to an additional 365-day extension upon targeted traffic, pending confirmation from GSRDC.

Sekura India Management Limited completed the acquisition of the project and has been operating the project road in the same name as the former Concessionaire i.e. M/s Ahmedabad – Maliya Tollway Ltd (AMTL).

1.3 Upgradation to Six Lane

The development of the Project Highway will involve the upgradation of Shantipura Chokdi to Khoraj GIDC Chokdi section (SH-17) from the existing 4-lane with paved shoulders to a 6-lane facility, including the provision of service roads and grade separators.

This section forms a part of the Ahmedabad–Viramgam–Maliya Toll Road. In addition, the scope includes the operation and maintenance of the entire Ahmedabad–Viramgam–Maliya Toll Road (from Ch km 13.930 to km 194.633, covering a total length of 180.703 km).

The Concession Period has now been extended by 3 (three) years, 11 (eleven) months, and 15 (fifteen) days beyond the previous end date of June 4, 2033, for the entire stretch of Ahmedabad–Viramgam–Maliya Toll Road.

The maintenance of various elements of the Project Highway and associated facilities during the Concession Period shall adhere to the minimum maintenance requirements specified in Schedule K, except for periodical maintenance.

Sl. No.	Feature	Details
1	Project Name	Construction of Additional Two Lane for Ahmedabad-Viramgam-Maliya Road to make it Four Lane Divided Carriageway Facility Under Viability Gap Funding Scheme of Government of India on Build, Operate and Transfer (BOT) Basis.
2	Mode of the Execution (BOT Toll/ BOT Annuity/ EPC/ HAM/ Others)	Build, Operate and Transfer (BOT) Toll Basis
3	Project Phase	Tolling, Operation, Maintenance and Transfer
4	No. of Lanes/ Configuration	4 lanes
5	Length of the Project (in Km)	180.703 km
6	Authority	National Highways Authority of India (NHAI)
7	Concessionaire	Ahmedabad Maliya Toll Way Limited (AMTL)
8	Independent Engineer	LSR Engineering Consultancy Services
9	Letter of Acceptance	07 August 2008
10	Appointed Date	12 October 2009
11	Concession Agreement date	17 September 2008
12	Total project Cost as per CA	Rs. 1015.36 Cr.
13	Concession period	22 Years
14	Provisional Certificate issued on	07-04-2012 - Section III 05-05-2012 - Section IV 27-08-2012 - Section I

Sl. No.	Feature	Details
		01-11-2012 - Section II
15	Completion certificate issued on	22 June 2023
16	Length of Six lane upgradation	28.753 km
17	LOA for Six laning	07 October 2025
18	Extension of Concession period for Six laning	By 3 years, 11 months, and 15 days from previous end date
19	Concession end date	Previously 04 June 2033, now 19 May 2037 (after extension)

1.4 Project Description

180.703 km long Ahmedabad–Viramgam–Maliya Highway stretch involves – 4 lane corridors of SH-17 from Ahmedabad (Sarkhej) to Viramgam Km 13.930 to Km 61.430 and SH-7 from Viramgam to Maliya (Km 61.430 to Km 194.633) including bypasses at Sachana, Dhrangdhra and Halvad. It passes through three districts of Gujarat – Ahmedabad, Surendra Nagar and Morbi.

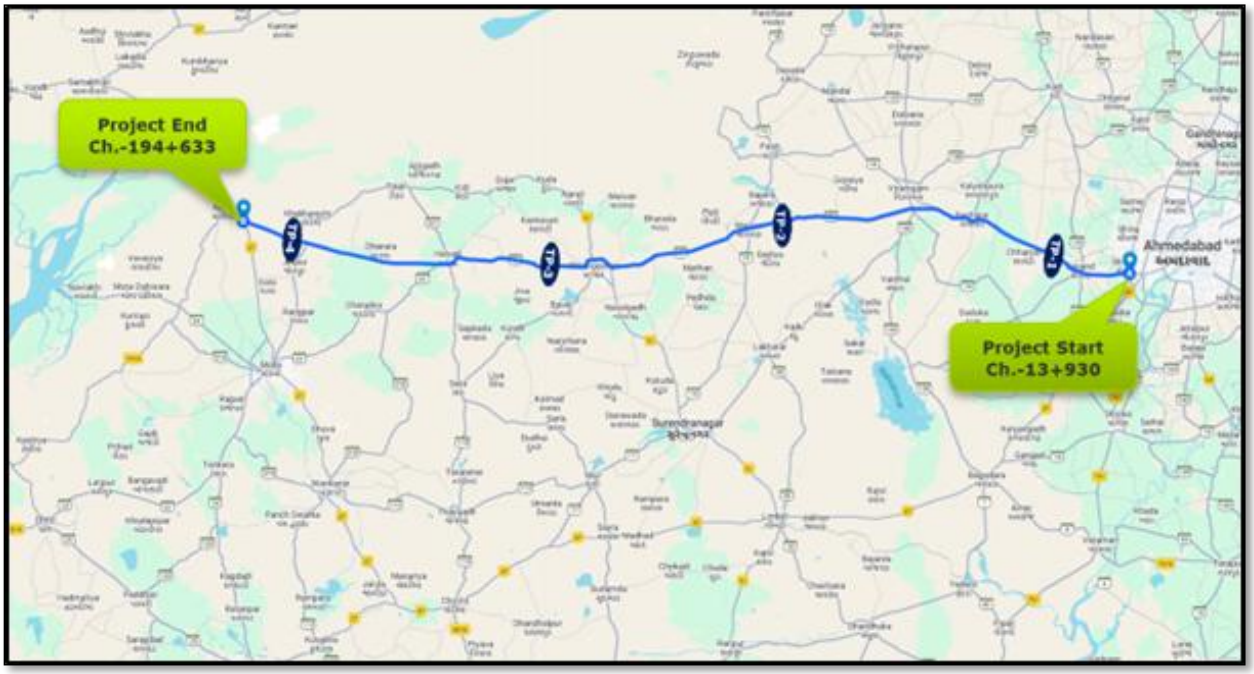
Project highway passes through numerous industrial establishments and connects to towns like Viramgam, Morbi, and Kadi. It is a vital highway corridor in the state of Gujarat, forming part of the arterial network that connects the commercial capital of Gujarat, Ahmedabad, to the strategic and industrial hubs of Viramgam, Maliya, and onward to Kandla Port and Mundra Port on the western coast. Provides direct road access between Ahmedabad and the port towns of Kandla and Mundra, facilitating heavy industrial cargo movement. Supports logistics and supply chains for companies in Sanand GIDC, Viramgam SEZ, and other industrial estates. The highway also acts as Rail-Road interface - Viramgam is a crucial railway junction, and this highway provides multimodal connectivity. Enhances last-mile connectivity from dry ports and logistic parks around Sanand and Viramgam.

Terrain and Land Use

The terrain along the Ahmedabad–Viramgam–Maliya highway varies gradually across the corridor, predominantly featuring flat to gently undulating topography, transitioning into low-lying saline plains near Maliya. It is Urban terrain with built-up areas, industrial development, and arterial road networks in the stretch Ahmedabad to Sanand. In the segment Sanand to Viramgam it is Semi-rural terrain with flat agricultural land interspersed with low-lying patches and industrial estates. From Viramgam to Halvad it is generally transitional terrain with increasing salt-affected zones and minor undulations. In the last phase up to Maliya it is Low-lying terrain prone to waterlogging and salinity, with salt pans and seasonal marshland.

Semi-arid climate with high summer temperatures. Seasonal monsoonal flooding risk in low-lying areas.

Project Location Map



1.5 Scope of work

This report is prepared as per scope of work defined in Work Order and project information provided to us. Ramboll work, which is summarized in this Due Diligence Report, has been limited to matters which have been identified that would appear to be of significance within the context of scope of work.

This report is prepared based on visual condition survey of highway, structures, site investigations and evaluation of test results and project information and direction provided by the Client. In this report, Ramboll provides an overview of the asset based on site survey on 2025 from technical perspective, and executed at site, Review of available documents and site visit, Field inspection, investigations, and Analysis, Operations and Maintenance assessment, Major Maintenance strategy and assessment, Estimation of Opex and CapEx of the project, Preparation of presentation and project report.

1.6 Key Findings

The key findings of the project are detailed in the table below,

H	**High Priority:** Critical activities that will have material impact on cost of project during balance concession period
M	**Medium Priority:** Moderate likelihood of impact on cost of project during balance concession period
L	**Low Priority:** Low level of impact on cost of project during balance concession period

Diligence Area	Findings	Priority level
Upgradation to Six	The section from Shantipura Chokdi to Khoraj GIDC Chokdi on State Highway-17, spanning 28.753 kilometres, is being upgraded from the existing 4-lane	H

Diligence Area	Findings	Priority level
Laning	configuration with paved shoulders to a 6-lane highway. This scope also includes service roads and grade separators and has been awarded under a separate contract dedicated to the six-laning upgradation of the project.	
Scheduled Six Laning Date	730 days from the Appointed Date	**H**
Completion Certificate (COD)	The Commercial Operation Date (COD) was declared on 22nd June 2023. The concession period was scheduled to end on 4th June 2033, incorporating extensions granted through three Supplementary Agreements and a further additional extension due to targeted traffic growth. The contract was executed on a Build-Operate-Transfer (BOT) basis. With the recent upgradation involving the six-laning of a 28.753 km stretch, the Concession Period has now been extended by 3 (three) years, 11 (eleven) months, and 15 (fifteen) days, resulting in a revised concession end date of 19th May 2037.	**L**
Operation and Maintenance	As per Section XVII of CA, the Concessionaire shall maintain project highway in conformity with Maintenance Requirements, the Maintenance Manuals or any schedules made as per plan. The O&M manual shall be revised and updated once for every 3 years. All the maintenance requirements shall be as per Sch-K No other additional details in present year are available	**H**
Maintenance Manual and Yearly Program	As per Article 17.3 of Concession Agreement, not later than 180 days prior to scheduled 4-laning date, the concessionaire shall in consultation with IE develop O&M Manual. While the maintenance programme not later than 45days prior to start of financial year during operation period the concessionaire shall provide the GSRDC and IE its annual plan covering immediate, periodic and scheduled maintenance activities.	**H**
Pavement Design	The submitted pavement design report approved by Independent Consultant for 20 years of design traffic as per IRC 37-2001 considering a minimum 10 % CBR. Key fact of pavement design is as follows: No Stage construction is considered. Pavement design period is for 20 years As per CA Table B-3 the minimum design traffic of 376msa is provided adopting a minimum CBR of 5%. The rigid pavement is proposed for the Toll Plaza section with a PQC-320mm, DLC-150mm and GSB-200mm with CBR of 10% designed as per IRC 58-2202	**L**
Pavement Condition	The pavement condition of the entire project road is observed to be in GOOD condition.	**M**
Toll Plaza	The Concession Agreement mandates the establishment of four toll plazas at Km 27+500, Km 88+000, Km 133+400, and Km 180+400. Each toll plaza is equipped with 6+6 lanes and operates under the Hybrid ETC (Electronic Toll Collection) system. These plazas are provided with standard facilities The overall condition of the toll plazas is good, with infrastructure and systems functioning as intended, ensuring safe and efficient toll operations. Routine maintenance appears to be in place. Ravelling/Stripping and texture loss is majorly observed in toll plaza pavement.	**M**

Diligence Area	Findings	Priority level
TMS and HTMS	As Per Schedule C, there is requirement of TMS following equipment's status of all equipment's is as follows: TMS systems is working in good condition and does not need any replacement except the automatic boom barriers which need immediate replacements due to poor condition. ECBs are not available at site. ATCC installed at four toll plazas are not providing any input to the control room. VMS are installed at 6 locations and are operational. Met Station is installed in TP1 and TP3 and equipment are operational.	**H**
Geometric Design	The project road is to be designed as per Specifications and Standards provided in Schedule D. Key parameters of design is as follows: Ruling design speed is 100 km/hr while the minimum design speed is 80km/hr. The minimum sight distances for ruling design speed are 180m, 360m and 640m for SSD, ISD and OSD respectively.	-
As-Built Drawings	As per Schedule -H, Annex-I, the Concessionaire is to deliver relevant records and reports pertaining to the Project Highway and its design, engineering, construction, operation and maintenance including all and all operation and maintenance records and programs and manuals pertaining thereto and complete As-Built Drawing on the Date of Divestment. Signed soft copies of the as-built drawings has been provided for the reference except the cross-sections drawings which are unsigned.	**M**
Hand back Requirement	As per the CA all project assets including the road, pavement, structure and equipment shall have been renewed and cured of all defects and deficiencies as necessary so that project highway is compliant with the Specification and standards set forth in this Agreement. All sections of traffic lane shall have a roughness value not more than 2500 mm/km. All Lamps shall be in working condition It is understood that the maintenance and replacement of all lamps shall be covered by the annual O&M estimates. Additionally, all other defects and rectification relating to the asset is covered under the O&M and MMR estimate	**H**

1.7 Assessment of Project Assets

Projects asset inventory and their condition assessment is prepared through visual inspection during site visits, review and analysing the reports shared by the client, by field investigations validating the findings and by NSV survey. All the elements and components pertaining to project asset are reported in subsequent Chapter 5, 6 & 7 of this report and their assessment is used to prepare the strategy for preventive, routine, and periodic maintenance. The overall condition of the project and its assets are satisfactory. Salient features of the project are given below.

S.no	Description	Units	Quantities
1	Section from Ahmedabad (km 13.930) to Maliya (km 194.633) of SH-7 & SH-17	Km	180.703
2	Service Road & Slip Road	Km	1.650
3	Bypasses	Km	2.300

S.no	Description		Units	Quantities
4	Major Intersections		Nos	11
5	Minor Intersection		Nos	102
6	Bus Bay & Shelters		Nos	85
7	Truck lay bye		Nos	NIL
8	Rest Area		Nos	NIL
9	Toll Plaza		Nos	4
10	Median Openings	Authorized	Nos	124
		Unauthorized	Nos	37
11	High Mast Light Locations		Nos	30
12	Solar LED Blinkers		Nos	111
13	Streetlights	Single Arm poles	Nos	0
		Double Arm poles	Nos	109
14	Fuel Stations		Nos	88
15	Pedestrian guard rail		Km	0.202
16	ECB (SOS Facility)		Nos	78
17	Gantry Boards	Cantilever Over Head	Nos	20
		Half Width Over Head	Nos	22
18	Sign Boards		Nos	1657
19	Variable message sign (VMS)	Cantilever Over Head	Nos	0
		Half Width Over Head	Nos	6
20	Entry & Exit		Nos	NIL
21	5th / Ordinary Kilometer stones		Nos	359
22	Hectometer stones		Nos	1393
23	Drainage	Median Drain	Km	14.574
		Shoulder line drain	Km	14.183
		Earthen Drain	Km	260.216
		Cut Drains	Km	2.142
		Chute Drain	Km	22.409
24	Median Plantation		Km	148.157
25	Avenue Plantation		Km	8.914
26	Metal Beam Crash Barrier (MBCB)	W-beam One Side	Km	1.435
		W-beam Two Side	Km	6.808
		Single side double beam	Km	49.727
27	Concrete Crash Barrier		Km	15.156
28	Land Use	Agriculture	Km	282.002

S.no	Description	Units	Quantities
	Residential	Km	12.726
	Commercial	Km	40.768
	Mixed	Km	7.730
29	Kerb	Km	366.125
30	Chevron Signs	Nos	291
31	Road Studs	Nos	43547
32	OHM	Nos	123
33	Delineators	Nos	1838
34	Footpath	Km	5.545
35	Guard post	Nos	1425
36	Handrail	Km	13.029
37	RCC railing	Km	0.839
38	CCTV	Nos	76
40	Fencing	Length (km/ m)	2.730
41	Road Marking	Length (km/ m)	1069.708
Extent of New Six laning for 28.753 Km			
1	Area of main Carriageway Excluding Wearing Coat	m2	537,981
2	Area - wearing Coat (Over Structure)	m2	13,563
3	Area of Service Road / Peripheral Road	m2	224,844
4	Area of Major Junctions	m2	51,282
5	Kerb length	RM	45,977
6	Area of road marking (Incl. Main carriageway, Junctions, service road etc. all inclusive)	m2	29,481
7	Covered RCC drain	RM	44,729
8	Metal Crash Barriers, single beam	RM	9,155
9	RCC Crash Barriers Double side	RM	22,973
10	Pedestrian Railing in Footpath	RM	15,180
11	Road Stud - Normal	Nos	5,596
12	Road Stud - Solar	Nos	2,077
13	Single arm poles	Nos	785
14	Double arm poles	Nos	1,369
15	Wall mounted lights under FO's & Underpasses	Nos	43
16	Traffic Sign Boards (Excluding Gantries)	Nos	400
17	Elastomeric bearings	Nos	269

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1.8 Assessment of Structures

Comprehensive visual inspection is carried out for inventory and assessing condition of Major bridges, Minor Bridges, Grade separators, underpasses ROBs and culverts. During the inspection and condition survey few Distresses are observed and are detailed in Chapter 6 of this project report. List of structures on the Project Highway are given in the table below

S.no	Structure Type	Unit	Nos of Structure
1	MJB	Nos	9
2	MNB	Nos	74
3	VUP	Nos	2
4	PUP	Nos	7
5	CUP	Nos	5
6	ROB	Nos	4
7	Box Culvert	Nos	37
8	Hume Pipe		241
	Total	**Nos**	**379**

1.9 Toll Management System (TMS)

The project section has in total 4 toll plazas as a split toll plaza type layout with 12 hybrid ETC lanes, 2 lanes planned for future expansion with separate 2W lanes adjacent to extra wide lane. The TMS installation is by M/s Logic Mo Systems running under AMC till date.

None of the Toll plazas equipped with WIM and SWB systems. The AVC in all lanes are functional and in good condition. The complete TMS systems is working in good condition and does not need any replacement except the automatic boom barriers which need immediate replacements due to poor condition.

To maintain the HTMS facilities the ECB are yet to be installed and be operational, only 35 locations have foundations constructed. The ATCC are not providing any input to control room and found faulty. VMS at 6 locations is working in good condition.

The details of all repairs / replacements are noted in Chapter -7 and relevant cost calculations presented specific to task as part of CAPEX and OPEX in Chapter 11

1.10 Soil and Material investigation

Soil and Material investigation are done with the samples collected from pit investigation and the results are narrated in Chapter 8 of this report.

Subsoil is generally consistent throughout the project road, and it is evident that the subsoil along the project corridor is generally consistent and predominantly sandy and gravel in nature. At few locations, silty and clayey with low to intermediate plasticity soils are observed.

The average CBR, % of this location tested samples is 9.70%.

Summary of strength parameters in the soil investigation is shown below.

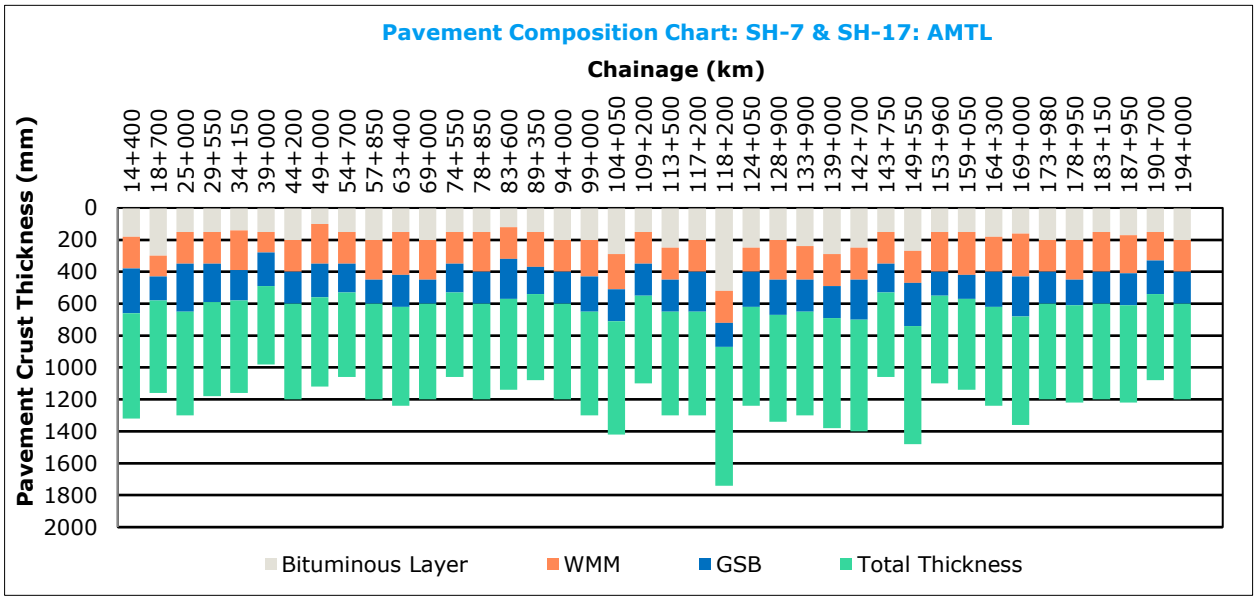
Description	Liquid Limit	Plasticity Index	Free Swell Index	4-days soaked CBR	Degree of compaction
Ahmedabad - Maliya (AMTL) section of SH-07 & SH-17 (From km 13.930 to Km 194.630)	18%-45%	Max 19%	Max 40%	4.6%-19.50%	92.3%-98.5%
MoRTH Limits	**<50%**	**<25%**	**<50%**		

*Variance between MDD and FDD is converted in-terms of degree of compaction

All the measured LL, PI and FSI values are within the acceptable limits as per MoRTH guidelines for both MCW and the SR.

The existing crust is flexible pavement along the project corridor. The pavement comprises of bituminous layer, granular base (WMM) over the granular sub-base (GSB). Summary of existing pavement crust thickness is presented in an illustrative bar graph below.

Pavement test pits summary



As per the test pits an average of 195mm bituminous and Granular course of 419mm is observed.

Granular layer samples:

Many samples collected refer to GSB MoRTH gradation of III or IV in the GSB and only one sample was found different at Km.44.200 conforming to GSB Grad. V & VI., while WMM refer to the gradation of Table 400-13 of MoRTH, but only 3 samples (Km.113.500, Km.49.000 and Km.29.550) are not conforming to standard WMM gradation.

The PI value exceeded at Km.159.050 on RHS side, except that rest of the PI, AIV values are in limits.

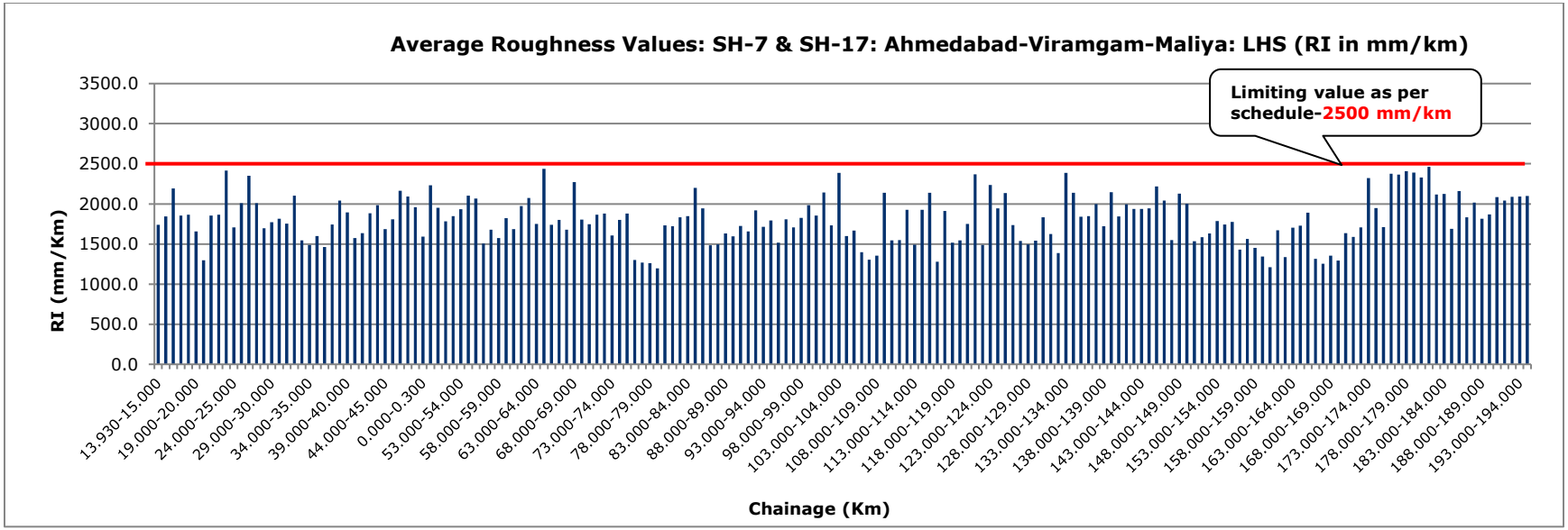
Bitumen core samples

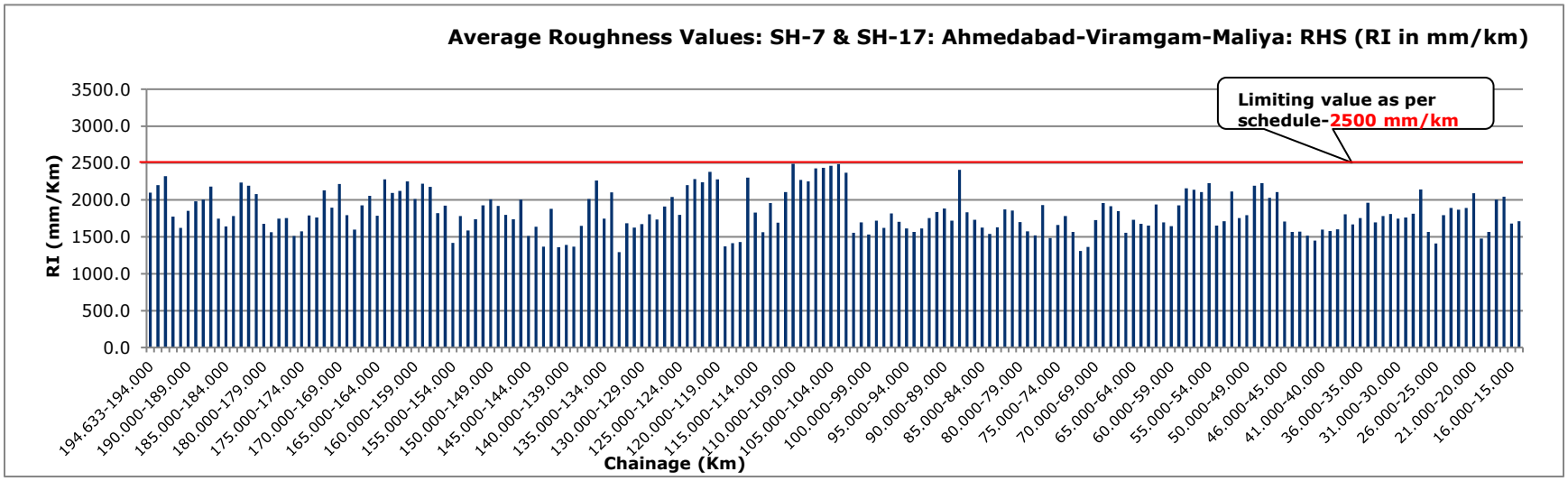
As per the site the gradation of BC is as per Grade-I / II. The samples at Km.141.600 and Km.189.800 are conforming the BC gradation as per MoRTH.

As per the site sampling the DBM conforms mostly to Grad. I, only one sample at Km.75.000 it is not conforming to any DBM MoRTH gradations.

1.11 Pavement Evaluation

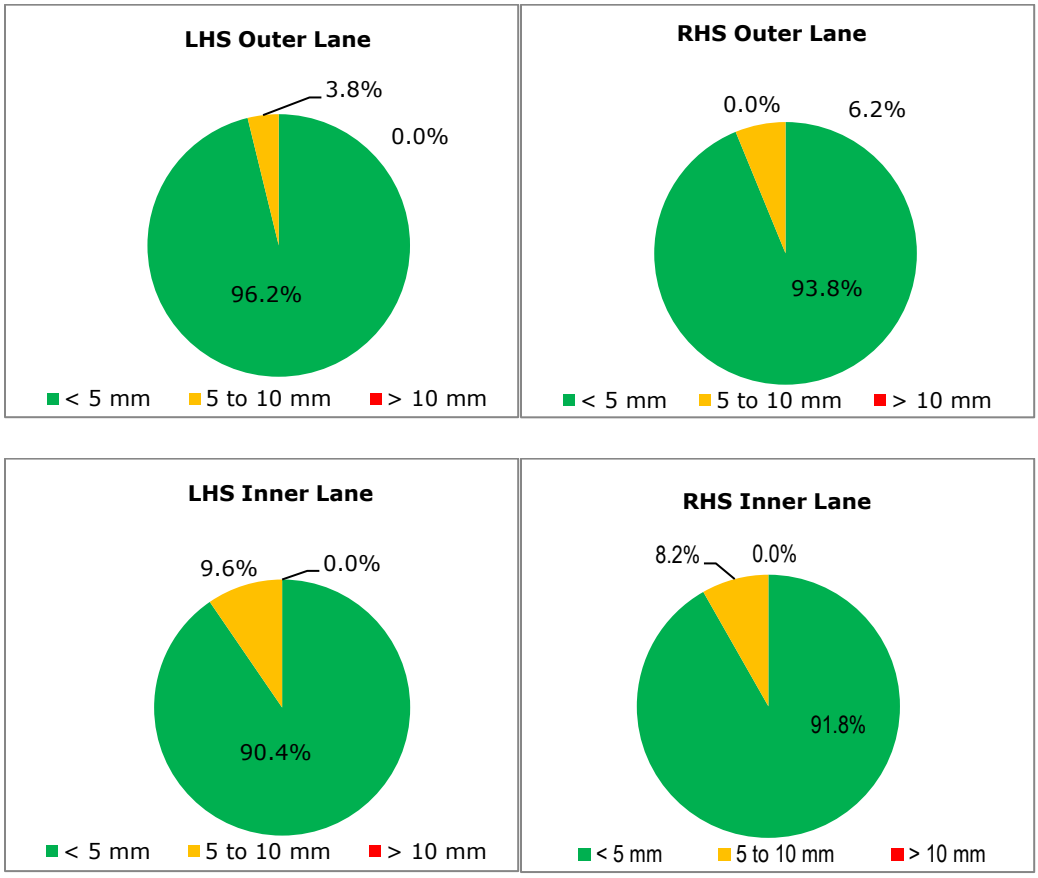
Pavement condition survey was conducted on each lane of each carriage way with NSV. The obtained lane wise Roughness summary in terms of RI (mm/km) is illustrated below and in Chapter 9 for Main carriage way.


Average Roughness Values: SH-7 & SH-17: Ahmedabad-Viramgam-Maliya: LHS (RI in mm/km)
Limiting value as per schedule-2500 mm/km
RI (mm/Km)
3500.0
3000.0
2500.0
2000.0
1500.0
1000.0
500.0
0.0
13.930-15.000
19.000-20.000
24.000-25.000
29.000-30.000
34.000-35.000
39.000-40.000
44.000-45.000
0.000-0.300
53.000-54.000
58.000-59.000
63.000-64.000
68.000-69.000
73.000-74.000
78.000-79.000
83.000-84.000
88.000-89.000
93.000-94.000
98.000-99.000
103.000-104.000
108.000-109.000
113.000-114.000
118.000-119.000
123.000-124.000
128.000-129.000
133.000-134.000
138.000-139.000
143.000-144.000
148.000-149.000
153.000-154.000
158.000-159.000
163.000-164.000
168.000-169.000
173.000-174.000
178.000-179.000
183.000-184.000
188.000-189.000
193.000-194.000
Chainage (Km)


Average Roughness Values: SH-7 & SH-17: Ahmedabad-Viramgam-Maliya: RHS (RI in mm/km)
Limiting value as per schedule-2500 mm/km
RI (mm/Km)
3500.0
3000.0
2500.0
2000.0
1500.0
1000.0
500.0
0.0
194.633-194.000
190.000-189.000
185.000-184.000
180.000-179.000
175.000-174.000
170.000-169.000
165.000-164.000
160.000-159.000
155.000-154.000
150.000-149.000
145.000-144.000
140.000-139.000
135.000-134.000
130.000-129.000
125.000-124.000
120.000-119.000
115.000-114.000
110.000-109.000
105.000-104.000
100.000-99.000
95.000-94.000
90.000-89.000
85.000-84.000
80.000-79.000
75.000-74.000
70.000-69.000
65.000-64.000
60.000-59.000
55.000-54.000
50.000-49.000
46.000-45.000
41.000-40.000
36.000-35.000
31.000-30.000
26.000-25.000
21.000-20.000
16.000-15.000
Chainage (Km)

The roughness of 2500 mm/km is considered as max allowable limit as per Schedule-K

Rutting data of flexible pavement section for MCW is also collected through Digital Laser Profilers System (DLP). The obtained lane wise rutting summary is graphically represented for both LHS & RHS direction as below and detailed in Chapter 9. In BHS of the MCW, rutting values were within the desirable limit.



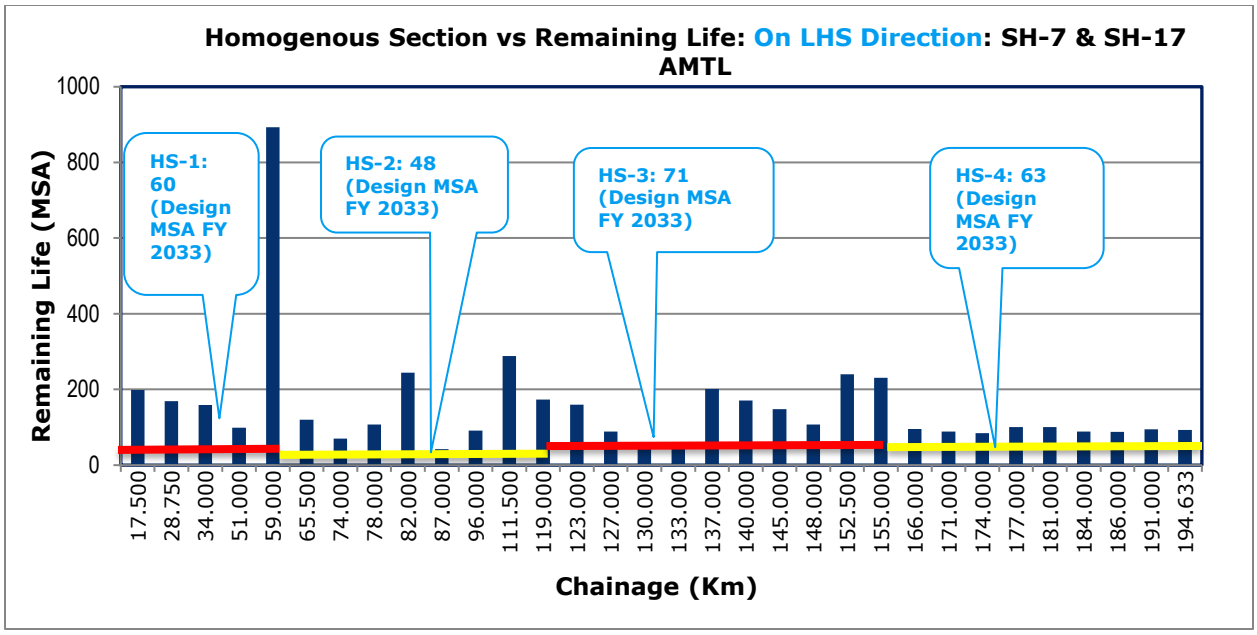
Illustrative summary of rutting for the MCW

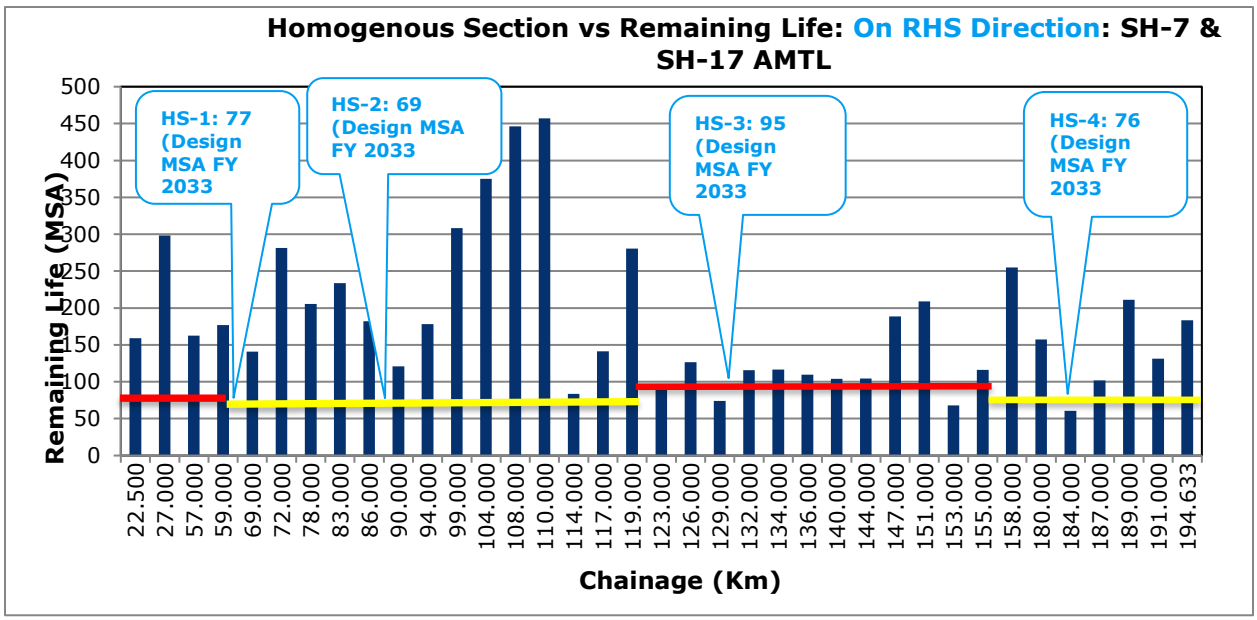
FWD deflection measurement

The measurement has been carried out for each carriageway on mainline to for the pavement structural strength and analysis of remaining life of project is carried out in conformity with IRC: 115-2014.

The in-service 3-layer pavement system has been analysed with the back-calculated corrected layer moduli and layer thicknesses. From the performance criteria equations, the residual/remaining rutting and fatigue life have been estimated. Remaining life and required overlay are calculated.

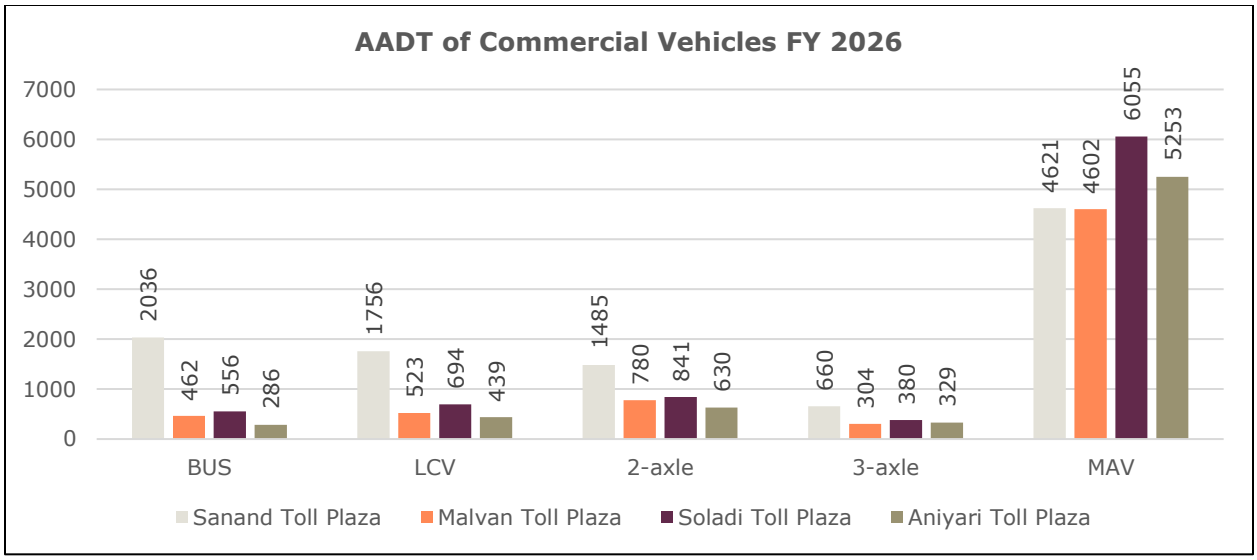
The detailed analysis is presented direction wise in Chapter 9 and the obtained remaining life are graphically presented below:





Illustrative summary of remaining life on both Directions (MCW)

Team for Technical Due Diligence conducted a 48--hr axle load survey at the toll plaza location. The Annual Average Daily Traffic (AADT) of all commercial class vehicles as provided by the client is shown below, For MSA calculation purposes, a direction distribution of 50% is considered for both LHS and RHS direction.



VDF values are obtained as per the analysis of 48-hr axle load survey are presented below:

S.no	Location	Direction	BUS	LCV	2axle	3axle	MAV
TP-01	**Sanand Toll Plaza**	LHS	0.98	0.49	1.65	3.08	8.27
		RHS	1.08	0.69	2.16	4.18	10.65
TP-02	**Malvan Toll Plaza**	LHS	0.95	0.58	1.57	2.77	7.22
		RHS	0.82	0.68	2.14	5.56	10.49
TP-03	**Soladi Toll Plaza**	LHS	0.99	0.63	1.85	2.52	8.37
		RHS	1.11	1.15	3.12	5.92	10.87
TP-04	**Aniyari Toll Plaza**	LHS	1.41	0.63	2.67	2.71	8.54
		RHS	1.33	1.00	3.18	5.77	10.11

The AADT was provided by concessionaire and Actual growth rates are considered on year on year, and the design traffic was projected till end of concession period. Design traffic for flexible pavement design is computed and summarized below,

The Remaining life of existing pavement is more than the design traffic hence; overlay is not considered in any flexible pavement section.

Location	Design Traffic (MSA) up to FY- YR 2033	
	LHS	RHS
Sanand Toll Plaza (TP-01)	60	77
Malvan Toll Plaza (TP-02)	48	69
Soladi Toll Plaza (TP-03)	71	95
Aniyari Toll Plaza (TP-04)	63	76

The summarised overlay thicknesses chainage wise for the MCW is provided below, a detailed analysis is presented in Chapter -9

Chainage (Km)		Side (LHS/ RHS)	Length (km)	Recommended Overlay (mm)	
From	To			BC (mm)	DBM (mm)
82.000	87.000	LHS	5.000	40	-
127.000	130.000	LHS	3.000	40	-
130.000	133.000	LHS	3.000	40	-
119.000	123.000	RHS	4.000	40	-
126.000	129.000	RHS	3.000	40	-
151.000	153.000	RHS	2.000	40	-
180.000	184.000	RHS	4.000	40	-

1.12 Operation and Maintenance Requirements and Strategy

The Contractor and concessionaire shall always maintain that during the Operation Period, the Project Highway conforms to the maintenance requirements set forth in Schedule K

Functional evaluation of pavement is conducted with NSV equipment to assess the distresses and at locations where roughness exceeding the limiting value (>2,500mm/km) specified in Annexure-I of Schedule-K. All appropriate technical and contractual parameters are carefully reviewed for the strategy of immediate repair.

The Major Maintenance Strategy is assessed in 2 scenarios based on engineering practice and HDM-4 model. The recommended Major Maintenance Strategy till the end concession period is presented below for MCW and SR below.

Major/Periodic Maintenance Strategy

M&M Schedule- Main carriageway & Service Road

Year	MM LHS of MCW	MM RHS of MCW	MM of SR	Remarks
YR 2029 - YR 2030	40 mm BC On 100% length	40 mm BC On 100% length		1st Cycle
YR 2032 - YR 2033	30 mm BC On 10% length			Handover Time

Note PMB 76E-10 Grade Bitumen considered.

1.13 Cost Estimate

The cost estimate is worked out for expenses on Immediate Works, periodic renewals (CAPEX) and expenses on operations and maintenance (OPEX) at present rates considering 2025-26 as the base year and is detailed in Chapter 11. Cost Estimate is worked out for expenses on

i. The costs for the restoration / improvement of the Toll Plaza pavement, highway flexible pavement, structural repairs, and replacement of few TMS equipment. These costs are accounted for Capex (Initial Improvement works).
ii. Cost for Installation/restoration of Sign Board, Thermoplastic Marking on pavement, Installation/restoration of 5th, KM, HM, Boundary Stone, Painting of Kerb Stone, etc. are taken as Preventive Maintenance. Routine Maintenance and Repairs are also considered and evaluated till end of concession period.

iii. Highway Lighting, Tolling operations, Survey, Insurance Charges, Administrative Expenses, Incident management, AMC cost for TMS is included as Operational cost for the Concessionaire.

iv. Bitumen has been assumed to be sourced from IOCL Koyali Refinery. PMB 76-10 grade bitumen and VG-40 grade bitumen is considered in cost estimate. Rates of Tata steel is taken from Ahmedabad.

OPEX and CAPEX of the project is estimated till end of Concession period and presented in Table 11-2 and represented here below.

- Periodic Maintenance is estimated as INR 332.04 Cr.
- Routine and preventive maintenance cost will be INR 121.56 Cr. and overall OPEX till end of concession for this 180.70 km stretch is INR 500.80 Cr.

CAPEX and OPEX for this corridor are estimated till end of concession period i.e. FY 2037 as INR 832.84 Cr. This estimate includes 18% GST and annual escalation of 5% on Opex and 2% on Major Maintenance.

2. INTRODUCTION, APPROACH AND METHODOLOGY

Ramboll India Private Limited is engaged to conduct a Technical Due Diligence (TDD) study for the Ahmedabad-Viramgam-Maliya section of SH-7 & 17 in the state of Gujarat.

Accordingly, Ramboll team has undertaken the work of preparing Technical Due Diligence Report based on study of project related reports and documents, visual inspections, and field investigations.

2.1 Scope of Work and Compliances

The scope of work agreed with Watrak Infrastructure Private Limited for conducting the technical due diligence study is presented in Table 2-1. The table also presents the chapters of the Technical Due Diligence Report where different items of scope of work are covered.

Table 2-1: Scope of Work and Compliances

SN	Scope of Work	Discussed At
1	**Site Visit and condition Survey – Visual Assessment** Site visit will be undertaken by Highway and Structural Engineers, Tunnel Expert, Pavement Expert, Quantity Surveyor, TMS & HTMS Expert and engineers to have visual assessment done for the project stretch. Observations will be recorded and critical issues for the Project will be identified. Project Structural integrity issues that require rectification / re-mediation will be observed and recorded along with possible risk mitigation strategy & costing thereof. The Consultant shall conduct a detailed reconnaissance of the project area and shall record and highlight key features and point out any issue that may be of importance to the Client in terms of operation and maintenance of the project.	Chapter 1, 3, 5, 6, 7, 10
2	**Conducting inventory, condition surveys and Field Investigations for Project Road** Inventory and detailed condition surveys will be conducted for project highway, bridges & cross drainage structures, project assets, safety appurtenances, TMS & ATMS system including recommendation for either strengthening / rehabilitation or reconstruction / replacement. *Requirements for NDT tests will be identified and informed. Based on the preliminary investigations and walk-through along the stretch, the Consultant shall prepare a project road map indicating the following elements Inventory of existing project assets Existing pavement condition – kilometer-wise (along with Photographs thereof) Intersecting/Crossroads (along with Photographs thereof); Inventory and condition assessment of CD structures (along with Photographs thereof).	Chapter 1, 3, 5, 6, 7, 8, 9

SN	Scope of Work	Discussed At
	Condition assessment of pavement. Condition assessment of structures. Review the extent of balance work. The Consultant should prepare a photo-documentation (Soft copy) of the mentioned areas and any other important findings. The Consultant shall assess the adequacy of Operations & Maintenance, Toll Management System and Advanced Toll Management system. The following field investigations will be conducted for the project stretch. Falling Weight Deflectometer (FWD) Surveys NSV Survey Test Pit investigations. Core samples from pavement. Axle Load Surveys	
3	**Review of available Project Documents and Reports** The available reports (Concession Agreements, Approved Pavement design report, Monthly Progress Reports, As-built Drawings, Correspondences of stake holders, Asset Management Contracts, Maintenance Manuals, Maintenance history etc) will be reviewed. The Consultant shall assess the completion status of work Vis-à-vis compared with schedule B, C and Schedule D	Chapter 4, 10
4	**Review of construction material and quality, Rehabilitation Plans by Developing strategy for immediate/periodic maintenance.** The Consultant should review of Quality of construction and compaction based on available data and from Laboratory testing of samples collected from trial pits, and cores The Consultant should conduct visual inspection of expansion joints, wearing coat, pitching, bearings, retaining structures, etc of the structures to assess the condition and requirements for its repair, replacements and / or rehabilitation. The pavement stretches along with the type of distresses will be identified analysing NSV and FWD data. The Consultant should assess maintenance cycles for pavements using HDM analysis. Repair techniques will be suggested for stretches requiring immediate rehabilitation measures. Pavement maintenance strategy (functional overlay/ structural overlay) will be developed for the entire concession period to bring back riding quality of each lane of the carriageway to maximum permissible as stipulated in the Concession Agreement.	Chapter 5, 6, 7, 9, 10,

SN	Scope of Work	Discussed At
5	**Preparation of BoQ and Cost Estimate** Bill of Quantities will be prepared for Immediate repairs, Routine maintenance, Periodic/major maintenance, O&M Cost, and Improvement works as per Schedule B of the CA. O&M cost will involve Routine maintenance and Incident Management, Tolling Operations, Admin Expenses and Preventive Maintenance. The Consultant should provide cost till the end of the concession period including any expected extension of Concession periods as informed by the Client. For assessing the cost, Ramboll will use rates available in the market or from the inhouse data base.	Chapter 11

2.2 Deliverables and Timelines

The deliverables and the timelines for the study are as under:

SN	Deliverables	Time period
1	Project Appreciation Report (PAR)	Within 15 days from date of receipt of Agreement from the Company.
2	Draft Report	Within 30 days from date of receipt of Agreement from the Company.
3	Final Report all-inclusive along with Preventive / Major Maintenance and yearly O&M Cost estimates	Within 15 days from draft report or within 7 days from the comments received from client on Draft report, whichever is earlier

The above timelines assume that all project related data are available at the start of work.

2.3 Structure of the Report

In line with the requirements of agreed scope of work, this Technical Due Diligence Report is being submitted. The report is organised in the following fashion.

Chapter 1	**Executive Summary:** The chapter presents an overview of the project after review & study of documents, site investigations and estimates for maintenance.
Chapter 2	**Introduction, Approach and Methodology:** The chapter presents a brief approach and methodology adopted for carrying out the Due Diligence Study.
Chapter 3	**Project Description:** The chapter summarises the project features based on Concession Agreement requirements.
Chapter 4	**Review of Concession Agreement:** This chapter contains a short review of the existing HAM CA of the package.

Chapter 5	**Assessment of Project Assets - Highway:** The chapter presents the details of various essential features of the project highway recorded through reconnaissance survey and data obtained through NSV Survey.
Chapter 6	**Assessment of Project Assets - Structures:** The chapter presents the details of various essential features of the structures recorded through visual inspection.
Chapter 7	**Assessment of Project Assets – Toll Systems:** The chapter presents the details of various essential features of the Toll Plaza Systems and associated facilities recorded through visual inspection.
Chapter 8	**Soil and Material Investigations:** This chapter describes the tests carried out for soil and material samples collected from site and analysis of the test results.
Chapter 9	**Pavement Evaluation Studies:** This chapter describes the tests carried for pavement evaluation and analyses of the test results.
Chapter 10	**Development of O&M Strategy:** The chapter presents the details of O&M strategy developed based on the Pavement evaluation studies and analysis described in Chapter 10.
Chapter 11	**Cost Estimate:** The chapter outlines the key assumption considered for cost estimate and provides details of cost estimates under various heads viz immediate, O&M and major maintenance for the concession period

2.4 List of Shared Documents of the project.

Documents shared by Watrak Infrastructure Private Limited for Technical Due Diligence of the project and reviewed by Ramboll is given below.

- Concession Agreement of the projects
- Pavement Reports
- Monthly Progress Report for March 2025
- Project Cross sections and Plan and Profile
- Project Manpower and Insurance fees
- Electricity Charges
- O&M Sub-Contracts for Road Maintenance
- AMTL Organogram
- AMC for TMS

2.5 Approach and Methodology

Our approach and methodology to address the requirements defined in terms of reference are briefly

presented below.

- Identification of objectives of Client through detailed study of scope of work and discussions with the Client.
- Identification of Assignment specific team of professionals covering all the skills and specializations required and involving with the assignment from day one.
- A Team Leader is assigned to coordinate various events / activities of various team members.
- Assessment of data / information required is made at the time of Proposal / Engagement letter and the list is shared with the Client.

2.6 Study

The following briefly presents the process followed for the present study.

- The data available for the project are collected from site offices of PIU – NHAI and of respective Independent Engineers of three packages.
- The data is reviewed by the study team and information collated in different categories e.g., asset inventory, contracts, change of scope, communications from NHAI, maintenance strategy and maintenance costs etc.
- Data gaps are identified through the above process and communicated to the Client.
- Detailed review of all the available data is carried out.
- Site visit is made by team of experts to understand the project features and observations are recorded.
- Field tests are carried out as per agreed scope of work.
- The test results are analysed in detail and maintenance strategies are developed.
- Inferences are made on various items of scope of work based on the available data and compared with the requirements of existing concession Agreement. Issues are flagged wherever required.
- The costs associated with the project under various head (immediate, routine operation and maintenance and Major Maintenance) are worked out in accordance with the requirements of existing Concession Agreement under current scenario.
- Finally, a comprehensive report is prepared covering all aspects of the agreed scope of work.

2.7 Delivery

Delivery follows the following flow:

- Formats of agreed deliverables are formalized and shared with Client, wherever required.
- Deliverables are shared with the Client within agreed timelines.

2.8 Feedback

Regular and end-of-the-assignment feedback are obtained from the client for further enhancing the quality of service.

3. PROJECT DESCRIPTION

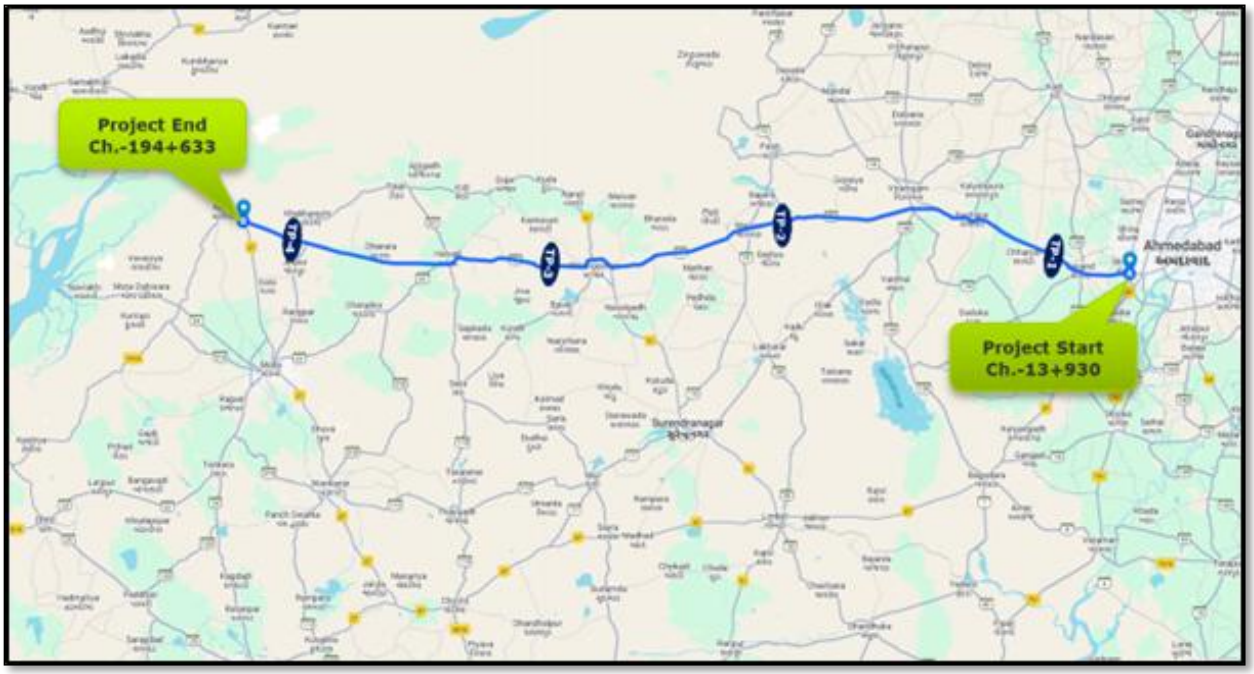
The project involves development of SH-17 starts from Ahmedabad (Sarkhej) to Viramgam Km. 13/930 to Km. 61/430 and of SH-7 starts from Viramgam to Maliya (Km. 61/430 to Km. 194/633) to 4-lane divided carriageway including strengthening of existing carriageway, between Ahmedabad to Maliya (Km. 13/930 to Km. 194/633) in Gujarat including bypasses at Sachana, Dhrangdhra and Halvad. It has been undertaken under the Viability Gap Funding (VGF) scheme of the Government of India on a Build -Operate- Transfer (BOT) Basis, with Gujarat State Road Development Corporation (GSRDC) as the implementing agency.

The Project achieved Provisional Commercial Operation Date (PCOD) in a phased manner, upon Certification by the Independent Engineer confirming the section are safe and suitable for commercial operations. PCOD for section -3 is declared on 07 April 2012, followed by section-4 on 05 May 2012, Section-1 on 27 August 2012, and Section-2 on 01 November 2012.

Subsequently, all works forming part of the four-laning scope are completed in accordance with the provisions of the Concession Agreement and the Settlement Agreement. Based on the satisfactory completion of the project, the Independent Engineer issued the final Completion Certificate for the entire stretch on 22nd June 2023.

The corridor forms a primary freight route between Ahmedabad and the Kandla, Mundra, and other Kutch/Saurashtra ports. It links directly with NH-27 and NH-947 at Maliya, feeding into Gujarat's west-coast port cluster. This ensures faster evacuation of goods from industrial hubs in central/north Gujarat to ports for export

Figure 3-1: Location Map of Project Stretch



3.1 Terrain and Land Use

The abutting land use along the project corridor is predominantly agricultural land (cropping/irrigated fields) with Towns / settlements where the road passes (or bypasses were built) Ahmedabad outskirts,

Sanand, Sachana, Viramgam and beyond toward Maliya — i.e., built-up / residential and semi-urban land use at several nodes. Industrial / commercial pockets, notably chemical and pharmaceutical plants around Sanand and some industrial clusters next to the corridor. is a mix of commercial, residential, agricultural, and industrial zones, reflecting the diverse and dynamic nature of the region's development. The alignment primarily traverses plain terrain, which is generally conducive to highway development and expansion but there is a notable hilly stretch between km 252.000 and km 255.000, which includes challenging topographical features.

3.2 Administrative Details of the Project

Administrative details of the project are listed below.

Table 3-1: Administrative Details of the Project

Sl. No.	Feature	Details
1	Project Name	Construction of Additional Two Lane for Ahmedabad-Viramgam-Maliya Road to make it Four Lane Divided Carriageway Facility Under Viability Gap Funding Scheme of Government of India on Build, Operate and Transfer (BOT) Basis.
2	Mode of the Execution (BOT Toll/ BOT Annuity/ EPC/ HAM/ Others)	Build, Operate and Transfer (BOT) Basis
3	Project Phase	Tolling, Operation, Maintenance and Transfer
4	No. of Lanes/ Configuration	4 lanes
5	Length of the Project (in Km)	180.703 km
6	Authority	National Highways Authority of India (NHAI)
7	Concessionaire	Ahmedabad Maliya Toll Way Limited (AMTL)
8	Independent Engineer	LSR Engineering Consultancy Services
9	Letter of Acceptance	07 August 2008
10	Appointed Date	12 October 2009
11	Concession Agreement signed on	17 September 2008
12	Total project Cost as per CA	Rs. 1015.36 Cr.
13	Concession Period	22 Years
14	Provisional Certificate issued on	07-04-2012 - Section III 05-05-2012 - Section IV 27-08-2012 - Section I 01-11-2012 - Section II
15	Completion certificate issued on	22 June 2023

Sl. No.	Feature	Details
16	Length of Six lane upgradation	28.753 km
17	LOA for Six laning	07 October 2025
18	Extension of Concession period for Six laning	By 3 years, 11 months, and 15 days from previous end date
19	Concession end date	Previously 04 June 2033, now 19 May 2037 (after extension)

3.3 Salient Features of the Project and Scope of Work

The salient features of the project are presented in Table 3-2.

Table 3-2: Salient Features of the Project

S.no	Description		Units	Quantities
1	Section from Ahmedabad (km 13.930) to Maliya (km 194.633) of SH-7 & SH-17		Km	180.703
2	Service Road & Slip Road		Km	1.650
3	Bypasses		Km	2.300
4	Major Intersections		Nos	11
5	Minor Intersection		Nos	102
6	Bus Bay & Shelters		Nos	85
7	Truck lay bye		Nos	NIL
8	Rest Area		Nos	NIL
9	Toll Plaza		Nos	4
10	Median Openings	Authorized	Nos	124
		Unauthorized	Nos	37
11	High Mast Light Locations		Nos	30
12	Solar LED Blinkers		Nos	111
13	Streetlights	Single Arm poles	Nos	0
		Double Arm poles	Nos	109
14	Fuel Stations		Nos	88
15	Pedestrian guard rail		Km	0.202
16	ECB (SOS Facility)		Nos	78
17	Gantry Boards	Cantilever Over Head	Nos	20
		Half Width Over Head	Nos	22

S.no	Description		Units	Quantities
18	Sign Boards		Nos	1657
19	Variable message sign (VMS)	Cantilever Over Head	Nos	0
		Half Width Over Head	Nos	6
20	Entry & Exit		Nos	NIL
21	5th / Ordinary Kilometer stones		Nos	359
22	Hectometer stones		Nos	1393
23	Drainage	Median Drain	Km	14.574
		Shoulder line drain	Km	14.183
		Earthen Drain	Km	260.216
		Cut Drains	Km	2.142
		Chute Drain	Km	22.409
24	Median Plantation		Km	148.157
25	Avenue Plantation		Km	8.914
26	Metal Beam Crash Barrier (MBCB)	W-beam One Side	Km	1.435
		W-beam Two Side	Km	6.808
		Single side double beam	Km	49.727
27	Concrete Crash Barrier		Km	15.156
28	Land Use	Agriculture	Km	282.002
		Residential	Km	12.726
		Commercial	Km	40.768
		Mixed	Km	7.730
29	Kerb		Km	366.125
30	Chevron Signs		Nos	291
31	Road Studs		Nos	43547
32	OHM		Nos	123
33	Delineators		Nos	1838
34	Footpath		Km	5.545
35	Guard post		Nos	1425
36	Handrail		Km	13.029
37	RCC railing		Km	0.839

S.no	Description	Units	Quantities
38	CCTV	Nos	76
40	Fencing	Length (km/ m)	2.730
41	Road Marking	Length (km/ m)	1069.708

List of structures on the Project Highway

S.no	Structure Type	Unit	Nos of Structure
1	MJB	Nos	9
2	MNB	Nos	74
3	VUP	Nos	2
4	PUP	Nos	7
5	CUP	Nos	5
6	ROB	Nos	4
7	Box Culvert	Nos	37
8	Hume Pipe		241
	Total	**Nos**	**379**

3.4 Specification and Standards

Four Laning of the Project shall comply with the Specifications and Standards set forth in Schedule D of the CA in Annex-I for construction.

The Manual for Specifications and Standards for Four Laning is applicable is for this State Highways on BOT Basis under VGH projects by GSRDC.

4. REVIEW OF CONCESSION AGREEMENT

This chapter contains a short review of the concession agreement

4.1 Brief Review of Concession Agreement

It may be noted that The Concession Agreement is primarily divided into 48 Articles and 23 Schedules that are available at the end of the CA. Contents of each of the Articles and the Schedules is briefly mentioned below.

Part I Preliminary

Concession Agreement

Article 1 Definitions and Interpretations

Addresses - the Definition and Interpretation, measurements and arithmetic conventions priority of agreements and Errors/Discrepancies

Part II The Concession

Article 2 Scope of the Project

Article 3 Grant of concession

Addresses- the concession

Article 4 Conditions precedent

Addresses-conditions precedent, damages for delay by the authority.

Article 5 Obligation of the concessionaire

Addresses-obligations of the concessionaire, obligations relating to project agreements, obligations relating to change in ownership, employment of foreign nationals, employment of trained personnel, sole purpose of the concessionaire.

Article 6 obligation of the authority

Addresses obligation of the authority, maintenance obligation prior to appointed date, obligation relating to competing roads.

Article 7 Representation and Warranties

Addresses- representation and warranties of the concessionaire, representation and warranties of the authority, disclosure.

Article 8 Disclaimer

Addresses - Disclaimer

Part III Development and Operation

Article 9 Performance Security

Addresses-performance security, appropriation of performance security, release of performance security.

Article 10 Right of way

Addresses-the site, license, access and right of way, procurement of site, site to be free from encumbrances, protection of site from encroachments, special temporary right of way, access to authority and independent engineer.

Article 11 Utilities associated roads and trees

Addresses- existing utilities and roads, shifting of obstruction utilities, new utilities and roads, felling of trees.

Article 12 Construction of project highway

Addresses -obligations prior to commencement of construction, maintenance during construction. Drawings, construction of project highway, construction of service lanes by authority.

Article 13 Monitoring of construction

Addresses- monthly progress reports, inspection, tests, delays during construction, suspension of unsafe construction works, video recording.

Article 14 Completion certificate

Addresses- tests, completion certificate, provisional certificate, completion of punch list items withholding of provisional certificate, rescheduling of tests.

Article 15 Entry into commercial service

Addresses-commercial operation date COD, damages for delay.

Article 16 Change of scope

Addresses- change of scope, procedure for change of scope, payment for change of scope, restriction on certain works, power of authority to undertake works, reduction in scope of the project.

Article 17 operation and maintenance

Addresses-all and M obligations of the concessionaire, maintenance requirements, maintenance manual, maintenance program, safety vehicle breakdowns and accidents, decommissioning due to emergency, lane closure, damages for breach of maintenance obligations, authorities right to take remedial measures, overriding power of the authority, restoration of loss or damage to project highway, modifications to project highway, excuse from performance of obligations, barriers and diversions, advertising on the site.

Article 18 Safety requirements

Addresses-safety requirements, expenditure on safety requirements

Article 19 Monitoring of operation and maintenance

Addresses- monthly status reports, inspection, tests, remedial measures, monthly fee statement.

Article 20 Traffic regulation

Addresses-traffic regulation by concessionaire, police assistants, building for traffic aid post, recurring expenditure on medical aid posts**.**

Article 21 Emergency medical aid

Addresses- medical aid posts, buildings for medical aid posts, recurring expenditure on medical aid posts.

Article 22 Traffic census and sampling

Addresses -traffic senses, traffic survey, traffic sampling, computer system and networking.

Article 23 Independent Engineer

Addresses- appointment of independent engineer, duties and functions, remuneration, termination of appointment, authorized signatories, dispute resolution.

Part IV Financial Covenants

Article 24 Financial closure-financial closure, domination due to failure to achieve financial closure

Addresses

Article 25 Grant

Addresses-grant equity support, O&M support.,

Article 26 concession fee

Addresses-concession fee, additional concession fee, determination of concession fee, payment of concession fee, verification of reliable fee.

Article 27 user fee

Addresses-collection and appropriation of fee revision of fee exemption of local traffic, free use of service lanes users, discounted fee for frequent users, reappropriation of extra fees, tolling contractor, fee collection points, additional charge for evasion of fee, display of fee rates.

Article 28 Revenue shortfall loan

Addresses-repayment of shortfall loan, repayment of shortfall revenue loan

Article 29 effect of variations in traffic growth

Addresses-effect of variations in traffic growth, modifications and concession.

Article 30 construction of additional tollway

Addresses-restrictions on construction of additional tollway, modification of concession., minimum fee for the project highway, minimum fee for additional tollway idiot

Article 31 escrow account

Addresses -escrow account, deposits into escrow account, withdrawals during concession., withdrawals upon termination.

Article 32 Insurance

Addresses-insurance during concession., notice to the authority, evidence of insurance cover, remedy for failure to ensure, waiver for subrogation, concessionaires' waiver, application of insurance proceeds.

Article 33 accounts and audit

Addresses- audited accounts, appointment of auditors, certification of claims by statutory auditors, dispute resolution.

Article 34 Force measure

Addresses force majeure, nonpolitical event, indirect political event, political event, duty to report force measure event effect force measure event on the concession, allocation of cost arising out of force

measure, termination notice for force measure event, termination payment for force majeure event, dispute resolution, excuse from performance of obligations.

Article 35 Compensation for Breach of Agreement

Addresses-compensation for default by concessionaire, compensation for default by the authority, extension of concession., compensation for competing roads, compensation to be in addition.

Article 36 Suspension of Concessionaire's rights

Addresses- suspension upon concessionaires' default, authority to act on behalf of concessionaire, revocation of suspension, suspension of concessionaire, termination right here

Article 37 Termination

Addresses-termination for concessionaire default, termination for authority default, termination payment, other rights and obligation of the authority, survival of rights.

Article 38 Divestment of rights and interest

Addresses- the investment requirements, inspection and cure, vesting certificate, additional facilities, divestment costs etc

Article 39 Defects liability after termination

Addresses-liability for defects after termination, retention in escrow account.

Article 40 assignment and charges-

Addresses-restriction on assignment and charges, permitted assignment and charges, substitution agreement, assignment by the authority

Article 41 Change in law

Addresses - increase in costs, reduction in costs, protection of NPV, restriction on cash compensation, no claim in the event of recovery from users

Article 42 Liability and indemnity

Addresses -general indemnity, indemnity by the concessionaire, notice and context of claims, defense of claims, no consequential claims, survival on termination.

Article 43 Rights and title over the site

Addresses- License rights, access rights of the authority and others, property taxes, restriction on subletting

Article 44 Dispute resolution

Addresses -dispute resolution, conciliation, arbitration, adjudication by regulatory authority or Commission

Article 45 Disclosure

Addresses - disclosure of specified documents, disclosure of documents relating to safety.

Article 46 Redressal of public grievances

Addresses- complaints register, redressal of complaints

Article 47 Miscellaneous

Addresses - governing law and jurisdiction, waiver of immunity, state support agreement, depreciation, delayed payments, favor, liability for review of documents and drawings, exclusion of implied warranties etc., survival, and tire agreement, severability, no partnership, third parties, successors and assigns, notices, language, counterparts

Article 48 Definitions

Addresses – Definitions

Schedules

Schedule A: Site of the Project,

Schedule B: Development of the Project Highway,

Schedule C: Project Facilities,

Schedule D: Specifications and Standards,

Schedule E: Applicable Permits,

Schedule F: Performance Security,

Schedule G: Project Completion Schedule,

Schedule H: Drawings,

Schedule I: Tests,

Schedule J: Completion Certificate,

Schedule K: Maintenance Requirements,

Schedule L: Safety Requirements,

Schedule M: Monthly Fee Statement,

Schedule N: Weekly Traffic Census,

Schedule O: Traffic Sampling,

Schedule P: Selection of Independent Engineer,

Schedule Q: Terms of Reference for Independent Engineer,

Schedule R: Fee Notification,

Schedule S: Escrow Agreement,

Schedule T: Panel of Chartered Accountants,

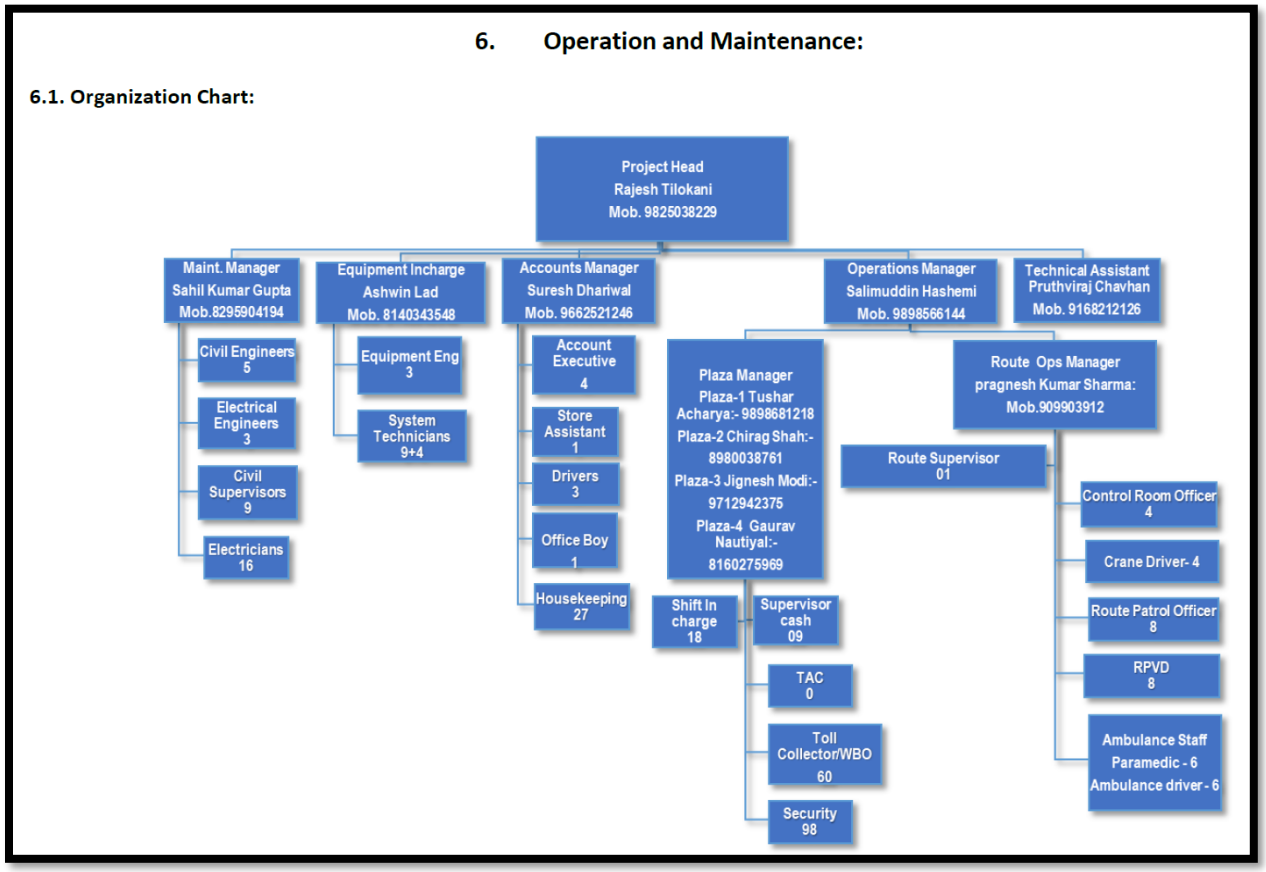
Schedule U: Vesting Certificate,

Schedule V: Substitution Agreement,

Schedule W: State Support Agreement

Schedule X: Tripartite Agreement

O&M Organization Chart of Concessionaire



4.2 Operation and Maintenance activities being undertaken by the Concessionaire:

Routine Maintenance

Emergency Maintenance

Other Maintenance

Corridor Maintenance

Safety &Traffic Management

Accident Reporting

Site inspection and Action taken report.

Emergency Services

Conformance to Performance Standards

Encroachment Reporting

Critical issues Reporting**:**

Details of Subcontracts

Routine Maintenance – Subcontractor No 1

AMTL, has appointed M/s. Mahavir Singh C Zala, for providing Routine Maintenance as per Scope of Work given below.

Scope of Work of Arclight Facilities Pvt Ltd is as follows.

1. Supply of manpower for the following routine maintenance works on daily basis as per directives of SPV or his authorized representative:

a) Routine Maintenance of Highway (Entire ROW including toll Plaza area, rest area, Road. furniture etc.)
b) Horticulture maintenance (median plants, Avenue plants and Landscaping)
c) Cleaning of accident site including debris from accident and assistance in removal of dead animals etc.
d) Any other items necessary for maintenance

Routine Maintenance – Subcontractor No 2

AMTL, has appointed M/s. Everest Infrastructure Company for providing Routine Maintenance as per Scope of Work given below.

Scope of Work of M/s. Everest Infrastructure Company is as follows.

1. Supply of manpower for the following routine maintenance works on daily basis as per directives of SPV or his authorized representative:

a) Routine Maintenance of Highway (Entire ROW including toll Plaza area, rest area, Road. furniture etc.)
b) Horticulture maintenance (median plants, Avenue plants and Landscaping)
c) Cleaning of accident site including debris from accident and assistance in removal of dead animals etc.
d) Any other items necessary for maintenance

Routine Maintenance – Subcontractor No 3

AMTL, has appointed M/s. KEYA Construction for providing Routine Maintenance as per Scope of Work given below.

Scope of Work of M/s. KEYA Construction is as follows.

1. Supply of manpower for the following routine maintenance works on daily basis as per directives of SPV or his authorized representative:

a) Routine Maintenance of Highway (Entire ROW including toll Plaza area, rest area, Road. furniture etc.)
b) Horticulture maintenance (median plants, Avenue plants and Landscaping)
c) Cleaning of accident site including debris from accident and assistance in removal of dead animals etc.
d) Any other items necessary for maintenance

AMC for Toll Management System

1. **Server Maintenance**
   a. *HEWLETT PACKARD ENTERPRISE Sarkhej, Ahmedabad,*

b. LOGICMO SYSTEMS PVT LTD B Wing, North Main Road, PUNE

Annual Maintenance Contract (AMC) without spares for Toll, Management system for AMTL Project - 4 Plazas, 42 lanes for the period of 1 years from 01/04/2024 to 31/03/2025 as per annexure 1 including Software support, HO Supports and all other necessary services & supports which is required for smooth operation of the TMS.

2. Maintenance of Toll System Software

Jelena Koller Key Account Manager Plešivička 3, Sv. Nedelja 10431, Croatia/Hrvatska Tel: + 385 1 3388516, Mob: +385 (98) 304960, Fax: + 385 1 3388599 jelena.koller@telegra-europe.com

Supplier's Scope of Works are services for 3rd level of maintenance of the toll system software (installed on toll plazas and lanes)

3. AMC of Toll equipment- Software

TELEGRA SYSTEMS D.O.O. - PLESIVICKA 3, SVETA NEDELJA, CROATIA, SVETA NEDELJA, Croatia, Repair & Maintenance, Equipment Item Description,

5. ASSESSMENT OF PROJECT ASSETS – HIGHWAY

The Ahmedabad–Viramgam–Maliya corridor is a strategic state highway route in Gujarat comprising State Highway-17 (SH-17) from Ahmedabad to Viramgam and State Highway-7 (SH-7) from Viramgam to Maliya. This corridor has been upgraded from a two-lane carriageway to a four-lane divided highway to meet growing transport demands, improve safety, and support economic development.

Project Start point: Ahmedabad (connecting with urban arterial network and national highways)

Intermediate towns / nodes: Sanand – Sachana – Viramgam – Dhrangdhra – Halvad

Project End point: Maliya (gateway to Kandla and Mundra ports, linking to NH-27/NH-947)

The main carriageway comprises four lanes with a flexible pavement structure. It has been recently overlaid and is generally in good condition. However, it was observed that the overlay works have not been extended to the paved shoulders, acceleration/deceleration lanes, and bus bays.

5.1 Service Roads/ Slip Roads

Service and slip roads have been constructed at only two locations along the Ahmedabad–Viramgam–Maliya project corridor, both executed with flexible pavement. The overall pavement condition of these service and slip roads was observed to range from fair to good during the site inspection.

Photographic evidence is presented below for reference.



Figure 5-1: Service roads

5.2 Intersections

The project corridor comprises both major and minor intersections, totalling 132 junctions. Of these, 12 are classified as major junctions and 120 as minor junctions. All junctions are surfaced with flexible

pavement. Representative photographs of selected intersections are presented below for reference.



Figure 5-2: Major Intersections





Figure 5-3: Minor Intersections

5.3 Toll Plaza

As per the Concession Agreement, four toll plazas have been established along the project corridor at the following chainages:

Km 27+400 – near Sanand

Km 87+950 – near Malvan

Km 133+400 – near Dhrangdhra

Km 180+350 – near Aniyari village

These toll plazas operate under an open system of toll collection. Each plaza is configured with 6+6 lanes (5 regular lanes plus 1 reversible lane on each side) and is equipped with Hybrid ETC facilities. Supporting infrastructure includes canopy lighting, high mast lighting, administrative buildings, toilet blocks, and related amenities. The overall condition of the toll plazas was found to be good during the site inspection.

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Figure 5-4: Toll Plaza

5.4 Fuel Station

Fuel stations are there on both sides of MCW with appropriate access arrangements. Few photographs are presented below.



Figure 5-5: Fuel stations

5.5 Bus bay and Bus Shelter

There are 85 bus shelters in this project and are provided on both sides along the project road; however, not all shelters are equipped with bus bays. Overall, the bus shelters are in good condition. Representative photographs are provided below.



Figure 5-6:Bus shelters

5.6 Drainage System

Road drainage along the project Highway includes Main carriageway drain, Median Longitudinal lined drain, and Chute drain. Condition of these drains are good but requires appropriate routine maintenance by cleaning debris and vegetations to make the arrangement working. Illustrative photographs are presented below**.**



Figure 5-7: Drainage system

5.7 Median opening

Median openings have been provided in the project highway. For the safety of road users, some median openings are temporarily blocked using New Jersey barriers. Representative photographs are presented below.



Figure 5-8: Median Opening

5.8 Metal Beam Crash Barriers

Metal Beam Crash Barriers (MBCB) are provided at main Carriageway along the project specifically at locations of high embankment. Double side crash barriers have been installed in the middle of the built-up area. MBCBs are in good condition. Few photographs of Metal beam crash barrier are given below.



Figure 5-9: Metal Beam Crash Barriers

5.9 Traffic Signage

Traffic Signage include roadside signs, overhead Gantry Mounted signs, Kerb mounted signs and median signs along the Project Highway. There are about 1657 sign boards, 20 Cantilever Over Head signs and 22 Over head gantry signs and are in good condition.



Figure 5-10: Traffic Signs

5.10 Highway lighting

Highway lighting is provided at, Built-up Locations with single and double arm light poles. High Mast lightings are provided at Toll Plazas and Major Intersections. These lights are properly maintained and are in good working condition. Solar Blinker Signals are provided at median opening and Intersections as per CA requirement. Few Photographs are presented below.



Figure 5-11: Highway Lighting

5.11 Plantation

Landscaping, including median and avenue plantation, is provided along the Ahmedabad–Viramgam–Maliya corridor to enhance visual appeal and environmental quality. These plantations not only beautify the corridor but also serve functional purposes — median plantations help reduce glare from oncoming headlights, influence driver behaviour by controlling vehicle speeds, moderate road surface temperatures, and contribute to improved air quality.

During site observations, it was noted that in certain locations, shrubs and plants exhibit overgrowth and require pruning, while in other stretches, some plants have dried out, necessitating regular watering, maintenance, and replacement.



Figure 5-12: Avenue and Median Plantation

5.12 Kilometre stone/Hectometre stones

Kilometre and hectometre stones are installed and largely visible along most sections of the Ahmedabad–Viramgam–Maliya corridor. However, during the site inspection, it was observed that some stones have been uprooted or damaged, and in several cases, the inscriptions have faded, making them difficult to read. These issues necessitate routine maintenance, including repair, repainting, or replacement, to ensure proper visibility and compliance with IRC standards.



Figure 5-13: Kilometre Stones & Hectometre Stones

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6. ASSESSMENT OF PROJECT ASSETS – STRUCTURES

6.1 General

Sekura Ahmedabad Maliya Tollway Limited have entrusted Ramboll India Private Limited for conducting technical due diligence services – Concessionaire (AMTL) has developed the project highway (presently called SH-7 & SH17) from Km 13.930 to Km 194.633 in the State of Gujarat under GSRDC (Gujarat State Road Development Corporation) on BOT basis.

Accordingly, Ramboll team has undertaken the work of preparing valuation study based on visual inspections and field investigations.

6.2 Structure Inventory

A visual condition survey of all structures was conducted during the site visit, in coordination with the Structural/Bridge Engineer from the consultant team. The purpose of this inspection was to validate the site inventory shared with Ramboll and to evaluate the overall condition of the structures, identifying any visible signs of deterioration or distress. Such deterioration may be due to various load effects, including dead load, live load, wind load, and environmental actions, as well as physical degradation (such as wear and abrasion) and chemical influences (such as corrosion caused by moisture, chlorides, or pollutants). The inspection also focused on identifying damage resulting from unpredictable external events, including earthquakes, flooding, or vehicular collisions, and on evaluating the impact of any construction-related imperfections or material deficiencies. By visually inspecting the structures, the assessment aimed to detect early signs of failure, deformation, or material loss that may not yet be critical but could worsen over time. This type of inspection is a vital part of the structural health monitoring process. It enables early detection of issues, supports the planning of appropriate remedial measures, enhances structural safety, and contributes to the long-term durability and service life extension of the assets through timely maintenance and repair strategies.

Table 6-1: Summary of Structures

S.no	Structure Type	Unit	Nos of Structure
1	MJB	Nos	9
2	MNB	Nos	74
3	VUP	Nos	2
4	PUP	Nos	7
5	CUP	Nos	5
6	ROB	Nos	4
7	Box Culvert	Nos	37
8	Hume Pipe		241
	Total	**Nos**	**379**

There are 9 major bridges, 74 minor bridges, 4 ROBs, 14 underpasses, and 278 culverts in this project corridor. All the structures are generally in fair condition. The survey of structures involves visual inspection to identify any cracking, spalling, staining, deformation, leaching, exposed reinforcement, honeycombing, condition of expansion joints, condition of bearings, approach slabs, drainage, damaged railings, and validation of structure data, etc.

During the condition survey, no major structural failures or serious distress were observed, with only minor attention needed for optimal performance, including repairing exposed reinforcement at

pier caps, repairing minor damaged crash barriers, improving the sealing material at expansion joints, and ensuring drainage spouts are clear and present, alongside routine maintenance to clear debris accumulation under culverts and within waterway sections, managing vegetation growth and removing unwanted materials around bearings of superstructures, and regularly removing vegetation around culverts and RE walls.

These findings indicate the need for regular maintenance and minor repairs to ensure the long-term durability, functionality, and safety of the structures.

Following codes are used for the condition rating of the structural members.

Code	Description
N	NOT APPLICABLE
9	EXCELLENT CONDITION
8	VERY GOOD CONDITION - no problems noted
7	GOOD CONDITION – some minor problems
6	SATISFACTORY CONDITION - structural elements show some minor deterioration
5	FAIR CONDITION - all primary structural elements are sound but may have minor section loss, cracking, spilling or scour
4	POOR CONDITION - advanced section loss, deterioration, Spalling or scour
3	SERIOUS CONDITION - loss of section, deterioration, spelling or scour have seriously affected primary structural components Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present
2	CRITICAL CONDITION - advanced deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken
1	IMMINENT' FAILURE CONDITION - major deterioration or section loss present in critical structural components or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic, but corrective action may put back in light service.
0	FAILED CONDITION - out of service - beyond corrective action

6.3 Major Bridge

There are 9 Major bridges found on this stretch; these bridges are in poor condition. Structural concerns including exposed and rusting steel reinforcement, Damaged pedestal, concrete spalling, various directional cracks, water staining and leakages, material degradation around bearing areas, visible cracks in slab and sub-structure, elastomeric bearing wear and deformation, corrosion of projection pipes, significant damage to stone protection of the pier, noticeable staining, disturbed excavation affecting foundation, and substantial damage to the RCC crash barrier exposing internal rebar. Detailed structural distresses are described in Table 6-2 and the comparative assessment of the Major bridges is presented in the Figure 6-1.

Table 6-2: Detailed distresses of major bridges

S. No	Chainage	Assessment
1	55+950	• **Bearing Wear and Deformation:** RHS Side elastomeric bearing shows signs of wear and deformation. • **Cracks:** Shear and diagonal cracks were found at the Girder edges.

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S. No	Chainage	Assessment
		• **Damaged Pedestal:** Right-hand side (RHS) of the pedestal on Abutment A-1 is significantly damaged and requires immediate repair and replacement.
2	100+040, 109+900, 121+200, 145+837, 149+050, 163+400, 187+230 and 191+600	• **Exposure of Reinforcement**: Exposed reinforcing steel bars are susceptible to rust, leading to further Girder degradation. • **Spalling of Concrete**: Significant concrete degradation and spalling noted, potentially due to reinforcement corrosion. • **Cracking**: Visible cracks ranging from 0.2mm to 0.5mm on the surface of the pier and abutment, particularly at the corner junction. • **Water Staining and Leakages**: Water infiltration causing freeze-thaw damage and promoting steel corrosion. • **Cracking and Spalling**: Significant cracks and spalling observed around the bearing area, the piers, and seismic restrainers. • **Condition of the Slab**: Concrete slab shows spalling and surface damage with exposed aggregate. • **Elastomeric Bearing Wear and Deformation**: At old existing bridges (Chainages 100+040, 121+200, 145+837, 149+050, 163+400, 187+230), elastomeric bearings show wear and deformation beyond serviceable limits. • **Exposure and Corrosion of Projection Pipe**: Corroded projection pipes leading to leaks and additional concrete damage. • **Significant Damage and Deterioration**: At old existing MJB Chainage 121+200, severe stone protection damage with substantial portions collapsed, increasing vulnerability to water damage. • **Excavation Work**: Visible earth disturbances affecting the bridge foundation at MJB Chainage 121+200. • **RCC Crash Barrier Damage**: Sizable portions of the RCC crash barrier are spalled, exposing internal steel reinforcement.

Table 6-3: Detailed List of Major Bridge

S.NO	Site Chainage (Km)	Location	Str On	Type of Structure	Deck Width (m)	Span Arrangement (m) as per site	Nos of POT-PTFE Bearings	Nos of Elastomeric bearings	Type of Expansion joint	Nos of Expansion joint	Type of Super-structure
1	55+950	LHS	MCW	New	12	3X24	0	24	strip seal	4	I Girder with RCC Slab
		RHS	MCW	Old	8.4	3X24	0	18	strip seal	4	I Girder with RCC Slab
2	103+252	LHS	MCW	Old	8.5	5X24	0	30	strip seal	6	I Girder with RCC Slab
		RHS	MCW	New	12	5X24	0	40	strip seal	6	I Girder with RCC Slab
3	109+548	LHS	MCW	Widening	12	15X10	0	0	-	0	Solid slab
		RHS	MCW	New	12	7X20+1X8.35	0	64	strip seal	9	I Girder with RCC Slab
4	121+146	LHS	MCW	Existing	8.4	10X20	0	60	strip seal	11	I Girder with RCC Slab
		RHS	MCW	New	12	10X20	0	80	strip seal	11	I Girder with RCC Slab
5	145+824	LHS	MCW	old	12	11X24.6		88	strip seal	12	I Girder with RCC Slab
		RHS	MCW	New	12	11X24.6	88	0	strip seal	12	I Girder with RCC Slab
6	149+016	LHS	MCW	Widening	12	5X16.6	0	40	strip seal	6	I Girder with RCC Slab
		RHS	MCW	New	12	5X16.6	40	0	strip seal	6	I Girder with RCC Slab
7	163+380	RHS	MCW	Existing	8.5	12X24.6	0	72	strip seal	13	I Girder with RCC Slab
		LHS	MCW	New	12	12X24.6	96	0	strip seal	13	I Girder with RCC Slab

S.NO	Site Chainage (Km)	Location	Str On	Type of Structure	Deck Width (m)	Span Arrangement (m) as per site	Nos of POT-PTFE Bearings	Nos of Elastomeric bearings	Type of Expansion joint	Nos of Expansion joint	Type of Super-structure
8	187+730	RHS	MCW	Widening	12	7X15.18	0	70	strip seal	8	RCC Girder with RCC Slab
		LHS	MCW	New	12	7X15.18	56	0	strip seal	8	PSC Girder with RCC Slab
9	191+600	RHS	MCW	Widening	12	9X8.1	0	0	0	0	RCC Slab Type
		LHS	MCW	New	12	3X24.3	24	0	strip seal	4	I Girder with RCC Slab

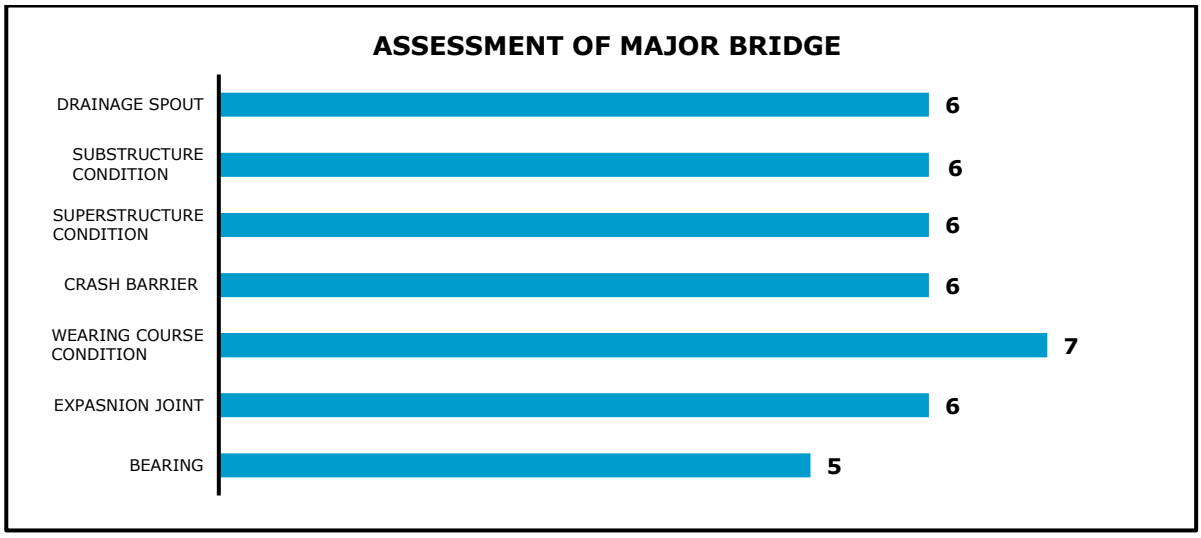


Figure 6-1: Comparative condition assessment of major bridge





MJB at Ch-55+950



Damaged Crash barrier at Ch. 55+950



Bearing deformation at Ch. 55+950 RHS



MJB at Ch.103+252



Multiple cracks in slab at Ch. 103+252


MJB at Ch. 109+548


MJB at Ch. 109+548



MJB at Ch.121+200


Bearing deformation at Ch.121+146 LHS

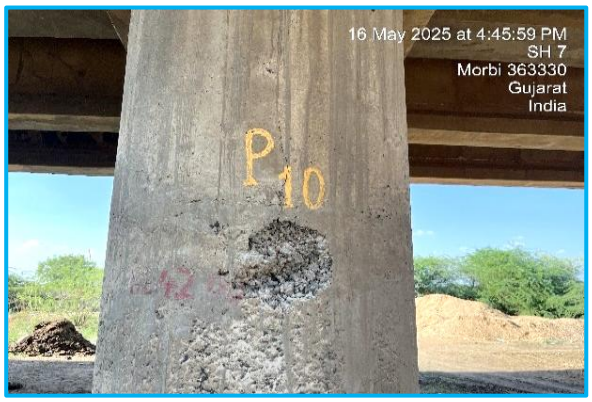

MJB at Ch. 145+824



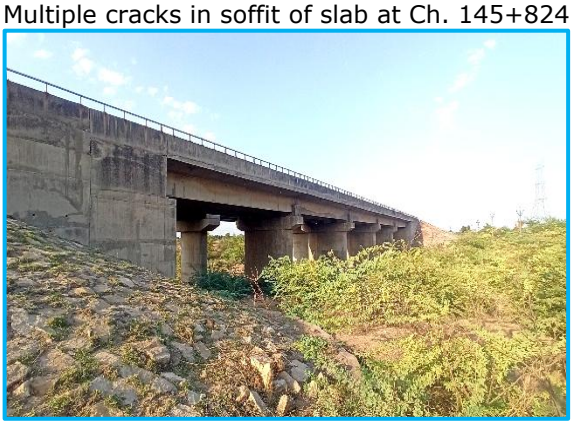
MJB at Ch. 145+824



Multiple cracks in soffit of slab at Ch. 145+824



Disintegration on pier At Ch 145+824


MJB at Ch. 149+016



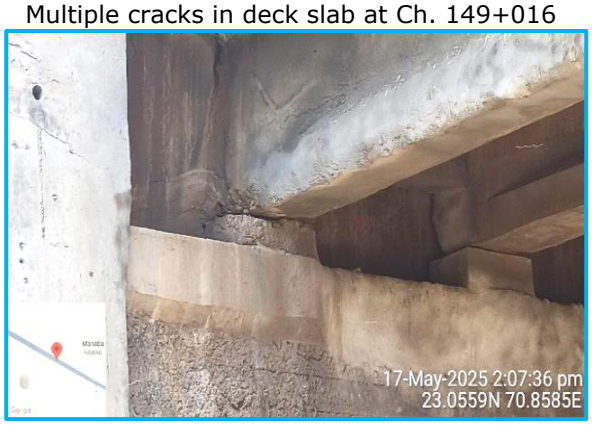
Drainage spout missing at Ch. 149+016



MJB at Ch. 187


Multiple cracks in deck slab at Ch. 149+016

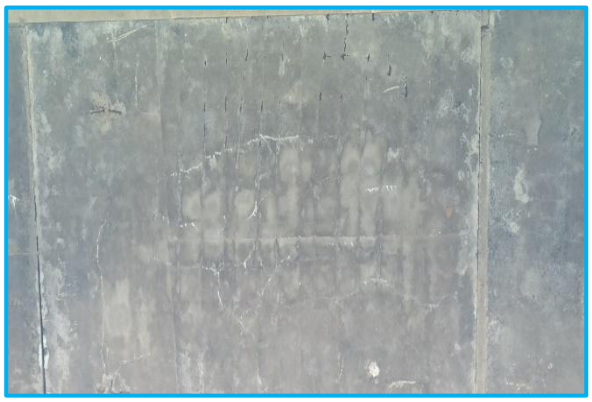

Repaired cracks at Ch. 187+730



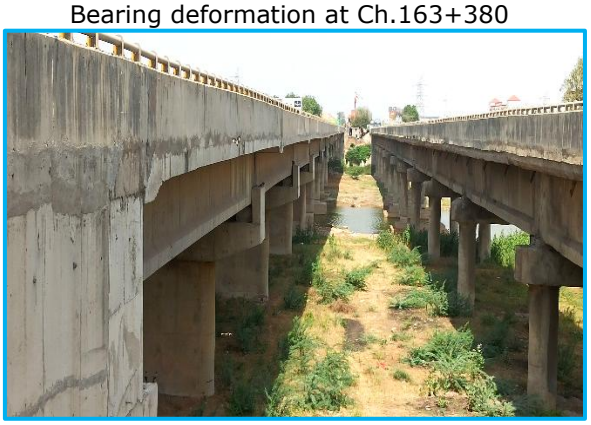
Damaged pedestal at Ch. 187+730



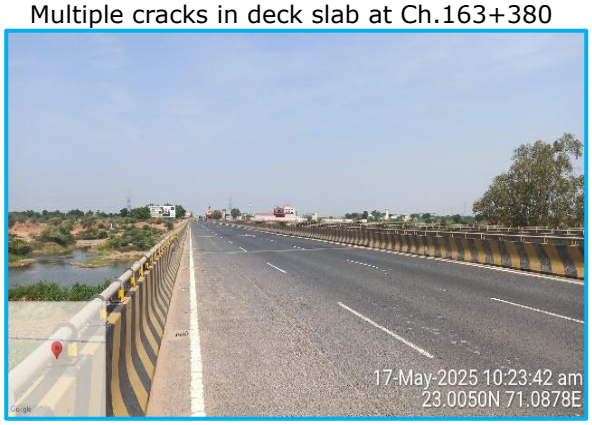
Bearing deformation at Ch.163+380



Multiple cracks in deck slab at Ch.163+380



MJB at 163+380



MJB at 163+380



MJB at Ch.191+600



MJB at Ch.191+600



Spalling in crash barrier at Ch. 191+600



Rusted drainage spout at Ch.191+600

Confidential



Vegetation around the structure at Ch. 191+600

Figure 6-2: Site Photographs of Major bridge

6.4 Minor Bridge

There are 75 Nos of minor bridge at this stretch, The bridges are in overall in fair condition and poor states of maintenance. Multiple vertical and diagonal cracks. These cracks contribute to major concrete spalling, exposing reinforcing steel bars at risk of corrosion due to the deteriorated concrete cover. Honeycombing, predominantly at Girder soffits, weakens the concrete and further exposes internal steel to corrosion. Discoloration and rust stains indicate moisture ingress and oxidation of steel, while surface degradation of pedestals and slabs exposes aggregates, reducing protective concrete cover. Environmental conditions are also concerning, with the horizontal clear space under the bridge is blocked with algae and floating debris, including plastic bottles and other waste materials. This condition indicates poor water excess and general environmental neglect. Immediate and comprehensive maintenance and repair are required to restore structural integrity and ensure the bridge's long-term durability and safety. Detailed structural distresses are described in Table 6-4. The comparative assessment of the Minor bridges is presented in the Figure 6-3.

Table 6-4: Detailed distresses of Minor Bridges

S. No	Chainage	Assessment
1	26+160, 90 +900 and 94+465	• **Cracks and Spalling**: Significant vertical cracking and major spalling on the pier, exposing reinforcing steel bars. • **Exposed Reinforcement**: Steel reinforcement bars exposed due to deteriorated concrete cover.
2	18+745 & 156+835 (Canal Crossing)	• **Cracks and Spalling:** Considerable vertical and horizontal cracks on piers with spalling concrete. • **Exposed Reinforcement:** Cracks exposing reinforcing steel bars. • **Corrosion:** Rust on exposed reinforcement indicating corrosion and potential structural deterioration. • **Overall Structural Condition:** Poor condition of the column, compromising structural integrity.

S. No	Chainage	Assessment
3	82+200	• **Cracks:** Multiple intersecting vertical and diagonal cracks indicating potential structural stress. • **Crack Depth:** Cracks penetrate several millimeters into the concrete, exact depth undetermined due to restricted access.
4	83+240 & 118+615	• **Discoloration:** Dark patches indicating moisture ingress or contaminants contributing to deterioration. • **Honeycombing:** Significant honeycombing observed on the Girder soffit. • **Cracks:** Multiple cracks on abutment and deck slab with rough, worn concrete. • **Exposed Reinforcement:** Damage to RCC crash barrier exposing internal steel reinforcement.
5	84+135	• **Corrosion:** Extensive corrosion with reddish-brown stains indicating rust and corroding reinforcing steel. • **Discoloration:** Deep brown and rust-colored patches indicating moisture ingress and chemical reactions degrading concrete and steel.
6	87+200	• **Surface Condition and Spalling:** Significant spalling and surface degradation on concrete pedestal with corroded steel bars, indicating potential structural weakening.
7	95+900 & 181+050	• **Crack Width and depth:** Vertical cracks found in pier; the width of the cracks is variable. The primary crack visible in the centre seems to have a maximum width of approximately 2-3 mm and cracks depth is 25.0 mm. The secondary hairline cracks branching off the main one are narrower, likely less than 1.0mm wide.
8	181+050	• **Crack Patterns:** There are multiple cracks visible on the surface of the Girder. The cracks appear to be both vertical and diagonal, indicating structural stress. Some cracks are hairline. • **Crack Width:** The width of the cracks varies. Hairline cracks are very narrow, likely less than 1.0mm or wide.
9	32+950, 36+419 & 104+785	• **Environmental Condition:** Environmental conditions are also concerning, the horizontal clear space under the bridge is blocked with algae and floating debris, including plastic bottles and other waste materials. This condition indicates poor water excess

Table 6-5: Detailed List of Minor Bridge

S.NO	Chainage (Km)	Location	Str On	Type of Structure	Span Arrangement (m)	Deck Width (m)	Nos of POT-PTFE Bearings	Nos of Elastomeric bearings	Type of Expansion joint	Nos of Expansion joint	Type of Super-structure
1	16+430	LHS	MCW	Existing	3X7.1	8.4	0	0	NA	0	RCC Slab
		RHS	MCW	Existing	3X7.1	8.4	0	0	NA	0	RCC Slab
2	18+745	LHS	MCW	Existing	3X3.533	14	0	0	NA	0	RCC Box
		RHS	MCW	New	3X3.533	14	0	0	NA	0	RCC Box
3	25+115	LHS	MCW	Existing	3X3.533	14	0	0	NA	0	RCC Box
		RHS	MCW	Existing	3X3.533	14	0	0	NA	0	RCC Box
4	26+160	LHS	MCW	Existing	6X3.0	14	0	0	NA	0	RCC Slab
		RHS	MCW	Existing	6X3.0	14	0	0	NA	0	RCC Slab
5	28+400	LHS	MCW	Existing	3X3.133	14	0	0	NA	0	RCC Slab
		RHS	MCW	Existing	3X3.133	14	0	0	NA	0	RCC Slab
6	28+810	LHS	MCW	Widening	5X7	14	0	0	NA	0	RCC Slab
		RHS	MCW	New	2X17.37	14	0	16	strip seal	3	I Grider, RCC slab
7	29+610	LHS	MCW	Widening	4X3	12	0	0	NA	0	RCC Box
		RHS	MCW	Widening	4X3	12	0	0	NA	0	RCC Box
8	32+950	LHS	MCW	Widening	3X3.133	12	0	0	NA	0	RCC Box
		RHS	MCW	Widening	3X3.133	12	0	0	NA	0	RCC Box
9	33+545	LHS	MCW	Widening	3X3.067	12	0	0	NA	0	RCC Box
		RHS	MCW	Widening	3X3.067	12	0	0	NA	0	RCC Box
10	34+580	LHS	MCW	Widening	3X4.067	12	0	0	NA	0	RCC Box

S.NO	Chainage (Km)	Location	Str On	Type of Structure	Span Arrangement (m)	Deck Width (m)	Nos of POT-PTFE Bearings	Nos of Elastomeric bearings	Type of Expansion joint	Nos of Expansion joint	Type of Super-structure
		RHS	MCW	Widening	3X4.067	12	0	0	NA	0	RCC Box
11	36+410	LHS	MCW	Widening	3X3.033	12	0	0	NA	0	RCC Box
		RHS	MCW	Widening	3X3.033	12	0	0	NA	0	RCC Box
12	37+925	LHS	MCW	Widening	4X3	12	0	0	NA	0	RCC Box
		RHS	MCW	Widening	4X3	12	0	0	NA	0	RCC Box
13	38+360	LHS	MCW	Widening	8X3.45	12	0	0	NA	0	RCC Slab
		RHS	MCW	Widening	8X3.45	12	0	0	NA	0	RCC Slab
14	40+450	LHS	MCW	Widening	4X3	12	0	0	NA	0	RCC Box
		RHS	MCW	Widening	4X3	12	0	0	NA	0	RCC Box
15	42+535	LHS	MCW	New	2X14	12	0	16	NA	0	RCC slab
		RHS	MCW	Old	4X3.5	12	0	0	NA	3	I Grider, RCC slab
16	43+270	LHS	MCW	Widening	3X4	12	0	0	NA	0	RCC slab
		RHS	MCW	New	3X4	12	0	16	NA	3	I Grider, RCC slab
17	44+055	LHS	MCW	Widening	3X3.1	12	0	0	NA	0	RCC Box
		RHS	MCW	New	3X3.1	12	0	0	NA	0	RCC Box
18	47+170/46+500	LHS	MCW	New	2X5.3	12	0	0	NA	0	RCC Box
		RHS	MCW	New	2X5.3	12	0	0	NA	0	RCC Box
19	53+200	LHS	MCW	Widening	5X4	12	0	0	NA	0	RCC Box
		RHS	MCW	Widening	5X4	12	0	0	NA	0	RCC Box
20	57+315	LHS	MCW	Widening	2X3.225	8.4	0	0	NA	0	RCC slab

S.NO	Chainage (Km)	Location	Str On	Type of Structure	Span Arrangement (m)	Deck Width (m)	Nos of POT-PTFE Bearings	Nos of Elastomeric bearings	Type of Expansion joint	Nos of Expansion joint	Type of Super-structure
		RHS	MCW	Widening	2X3.225	12	0	0	NA	0	RCC slab
21	57+410	LHS	MCW	Existing	7X3	12	0	0	NA	0	RCC slab
		RHS	MCW	Widening	7X3	12	0	0	NA	0	RCC slab
22	63+845	LHS	MCW	Existing	3X4	12	0	0	NA	0	RCC Box
		RHS	MCW	Widening	3X4	12	0	0	NA	0	RCC Box
23	66+430	LHS	MCW	Existing	2*4.8	12	0	0	NA	0	RCC Box
		RHS	MCW	Widening	2*4.8	12	0	0	NA	0	RCC Box
24	68+400	LHS	MCW	Existing	2X4	12	0	0	NA	0	RCC Slab
		RHS	MCW	Widening	2X4	12	0	0	NA	0	RCC Slab
25	73+955	LHS	MCW	Existing	4X4.6	12	0	0	NA	0	RCC Slab
		RHS	MCW	Widening	4X4.6	12	0	0	NA	0	RCC Slab
26	74+300	LHS	MCW	Existing	3X4.1	12	0	0	NA	0	RCC Slab
		RHS	MCW	New	3X4.1	12	0	0	NA	0	RCC Slab
27	77+160	LHS	MCW	Existing	6X4.1	12	0	0	NA	0	RCC Slab
		RHS	MCW	New	6X4.1	12	0	0	NA	0	RCC Slab
28	80+775	LHS	MCW	New	2X20	12	0	16	strip seal	3	I Grider, RCC slab
		RHS	MCW	New	2X20	12	0	16	strip seal	3	I Grider, RCC slab
29	82+200	LHS	MCW	Widening	5X10	12	0	0	NA	0	RCC Slab
		RHS	MCW	New	2X20+1X10	12	0	24	strip seal	4	I Grider, RCC slab

S.NO	Chainage (Km)	Location	Str On	Type of Structure	Span Arrangement (m)	Deck Width (m)	Nos of POT-PTFE Bearings	Nos of Elastomeric bearings	Type of Expansion joint	Nos of Expansion joint	Type of Super-structure
30	82+375	LHS	MCW	New	3X4.3	12	0	0	NA	0	RCC Slab
		RHS	MCW	Widening	3X4.3	12	0	0	NA	0	RCC Slab
31	83+240	LHS	MCW	Widening	2X10	12	0	0	NA	0	RCC Slab
		RHS	MCW	New	1X20	12	0	8	strip seal	2	I Grider, RCC slab
32	83+835	LHS	MCW	Widening	3X4.1	12	0	0	NA	0	RCC Slab
		RHS	MCW	New	3X4.1	12	0	0	NA	0	RCC Slab
33	84+135	LHS	MCW	Widening	2X10.42	12	0	24	NA	0	RCC Slab
		RHS	MCW	New	1X20.84	12	0	8	strip seal	2	I Grider, RCC slab
34	85+320	LHS	MCW	Widening	2X10	12	0	24	NA	0	RCC Slab
		RHS	MCW	New	1X20	12	0	8	strip seal	2	I Grider, RCC slab
35	87+200	LHS	MCW	Widening	4X10	12	0	48	NA	0	RCC Slab
		RHS	MCW	New	2X20	12	0	16	strip seal	3	I Grider, RCC slab
36	89+740	LHS	MCW	Widening	2X11+1X10.5	12	0	36	NA	0	RCC Slab
		RHS	MCW	New	2X11+1X10.5	12	0	24	strip seal	4	I Grider, RCC slab
37	90+900	LHS	MCW	New	3x11.25	12	0	0	NA	0	RCC Slab
		RHS	MCW	Widening	3x11.25	12	0	0	NA	0	I Grider, RCC slab
38	92+125	LHS	MCW	Widening	3x11.25	12	0	36	NA	0	RCC Slab
		RHS	MCW	New	3x11.25	12	0	24	strip seal	4	I Grider, RCC slab

S.NO	Chainage (Km)	Location	Str On	Type of Structure	Span Arrangement (m)	Deck Width (m)	Nos of POT-PTFE Bearings	Nos of Elastomeric bearings	Type of Expansion joint	Nos of Expansion joint	Type of Super-structure
39	92+390	LHS	MCW	Existing	2X4	12	0	0	NA	0	RCC Box
		RHS	MCW	New	2X4	12	0	0	NA	0	RCC Box
40	94+465	LHS	MCW	Existing	2X4	12	0	0	NA	0	RCC Box
		RHS	MCW	New	2X4	12	0	0	NA	0	RCC Box
41	94+935	LHS	MCW	Existing	3X10.9	12	0	24	NA	0	RCC Slab
		RHS	MCW	New	3X10.7	12	0	24	strip seal	4	Girder, RCC Slab
42	95+900	LHS	MCW	Existing	2X5	12	0	0	NA	0	RCC Box
		RHS	MCW	New	2X5	12	0	0	NA	0	RCC Box
43	96+765	LHS	MCW	Existing	5X10.7	12	0	36	NA	0	RCC Slab
		RHS	MCW	New	5X10.8	12	0	40	strip seal	6	Girder, RCC Slab
44	98+440	LHS	MCW	Existing	2X10.42	12	0	24	NA	0	RCC Slab
		RHS	MCW	New	1X20.82	12	0	8	strip seal	2	Girder, RCC Slab
45	100+040	LHS	MCW	Existing	1X10.5	12	0	12	NA	0	RCC Slab
		RHS	MCW	New	1X10.5	12	0	8	strip seal	2	Girder, RCC Slab
46	103+720	LHS	MCW	Existing	3X10.5	12	0	36	NA	0	RCC Slab
		RHS	MCW	New	3X10.5	12	0	24	strip seal	4	Girder, RCC Slab
47	104+785	LHS	MCW	Existing	2X4	12	0	0	NA	0	RCC Box
		RHS	MCW	New	2X4	12	0	0	NA	0	RCC Box

S.NO	Chainage (Km)	Location	Str On	Type of Structure	Span Arrangement (m)	Deck Width (m)	Nos of POT-PTFE Bearings	Nos of Elastomeric bearings	Type of Expansion joint	Nos of Expansion joint	Type of Super-structure
48	104+990	LHS	MCW	Existing	2X4.15+2X4.075	12	0	0	NA	0	RCC Box
		RHS	MCW	New	2X4.15+2X4.075	12	0	0	NA	0	RCC Box
49	105+280	LHS	MCW	Existing	2X4	12	0	0	NA	0	RCC Box
		RHS	MCW	New	2X4	12	0	0	NA	0	RCC Box
50	106+620	LHS	MCW	Existing	4X4.2	12	0	0	NA	0	RCC Box
		RHS	MCW	New	4X4.2	12	0	0	NA	0	RCC Box
51	107+325	LHS	MCW	Existing	3X12.5	12	0	0	NA	0	RCC Slab
		RHS	MCW	New	3X12.5	12	0	24	strip seal	4	Girder, RCC Slab
52	118+415	LHS	MCW	Existing	3X3	12	0	0	NA	0	RCC Box
		RHS	MCW	New	3X3	12	0	0	NA	0	RCC Box
53	118+615	LHS	MCW	Existing	2X4.125	12	0	0	NA	0	RCC Box
		RHS	MCW	New	2X4.125	12	0	0	NA	0	RCC Box
54	131+745	LHS	MCW	Existing	4X3	12	0	0	NA	0	RCC Box
		RHS	MCW	New	4X3	12	0	0	NA	0	RCC Box
55	131+835	LHS	MCW	Widening	3X3.3	12	0	0	NA	0	RCC Box
		RHS	MCW	Widening	3X3.3	12	0	0	NA	0	RCC Box
56	134+400	LHS	MCW	Existing	3X10	12	0	0	NA	0	RCC Slab
		RHS	MCW	New	3X10	12	0	24	strip seal	4	Girder, RCC Slab
57	135+570	LHS	MCW	Existing	4X10.275	12	0	30	NA	0	RCC Slab

S.NO	Chainage (Km)	Location	Str On	Type of Structure	Span Arrangement (m)	Deck Width (m)	Nos of POT-PTFE Bearings	Nos of Elastomeric bearings	Type of Expansion joint	Nos of Expansion joint	Type of Super-structure
		RHS	MCW	New	2X20.55	12	0	16	strip seal	3	Girder, RCC Slab
58	135+775	LHS	MCW	Existing	2X4.95	12	0	0	NA	0	RCC Box
		RHS	MCW	New	2X4.95	12	0	0	NA	0	RCC Box
59	137+120	LHS	MCW	Existing	8X2.75	12	0	0	NA	0	RCC Box
		RHS	MCW	New	8X2.75	12	0	0	NA	0	RCC Box
60	143+953	LHS	MCW	Existing	1X18.96	12	0	0	NA	0	RCC Box
		RHS	MCW	New	1X18.96	12	0	0	NA	0	RCC Box
61	146+100	LHS	MCW	Existing	3X10.47	12	0	36	NA	0	RCC Slab
		RHS	MCW	New	3X10.47	12	0	24	NA	0	Girder, RCC Slab
62	149+845	LHS	MCW	Existing	3X4	12	0	0	NA	0	RCC Box
		RHS	MCW	New	3X4	12	0	0	NA	0	RCC Box
63	153+685	LHS	MCW	Existing	4X7	12	0	0	NA	0	RCC Slab
		RHS	MCW	New	4X7	12	0	0	NA	0	RCC Slab
64	156+830	LHS	MCW	Existing	2X5	12	0	0	NA	0	RCC Slab
		RHS	MCW	New	2X5	12	0	0	NA	0	RCC Slab
65	158+200	LHS	MCW	Existing	2X3	12	0	0	NA	0	RCC Slab
		RHS	MCW	New	2X3	12	0	0	NA	0	RCC Slab
66	159+390	RHS	MCW	Widening	2X3	12	0	0	NA	0	RCC Slab
		LHS	MCW	New	2X3	12	0	0	NA	0	RCC Slab
67	164+535	LHS	MCW	Widening	1x18	12	8	0	NA	2	RCC Slab

S.NO	Chainage (Km)	Location	Str On	Type of Structure	Span Arrangement (m)	Deck Width (m)	Nos of POT-PTFE Bearings	Nos of Elastomeric bearings	Type of Expansion joint	Nos of Expansion joint	Type of Super-structure
		RHS	MCW	New	2x9	12	0	0	NA	0	RCC Slab
68	172+850	LHS	MCW	Widening	2X3.125	12	0	0	NA	0	RCC Slab
		RHS	MCW	New	2X3.125	12	0	0	NA	0	RCC Slab
69	173+360	LHS	MCW	New	3X16	12	24	0	NA	4	Girder, RCC Slab
		RHS	MCW	Existing	3X16	8.5	0	18	NA	4	RCC Slab
70	181+050	LHS	MCW	New	1X14+1X21	12	16	0	NA	3	Girder, RCC Slab
		RHS	MCW	Widening	5X7	12	0	0	NA	0	RCC Slab
71	181+710	LHS	MCW	New	2X14	12	16	0	NA	3	Girder, RCC Slab
		RHS	MCW	Widening	4X7	12	0	0	NA	0	RCC Slab
72	182+450	LHS	MCW	New	1X15.175	12	8	0	NA	2	Girder, RCC Slab
		RHS	MCW	Widening	2X7.5	12	0	0	NA	0	RCC Slab
73	183+900	LHS	MCW	New	1X20.565	12	8	0	NA	2	Girder, RCC Slab
		RHS	MCW	Widening	3X6.9	12	0	0	NA	0	RCC Slab
74	184+760	LHS	MCW	New	2X14	12	16	0	NA	3	Girder, RCC Slab
		RHS	MCW	Widening	4X7	12	0	0	NA	0	RCC Slab
75	187+230	LHS	MCW	New	2X20	12	16	0	NA	3	Girder, RCC Slab
		RHS	MCW	New	2X20	12	16	0	NA	3	Girder, RCC Slab

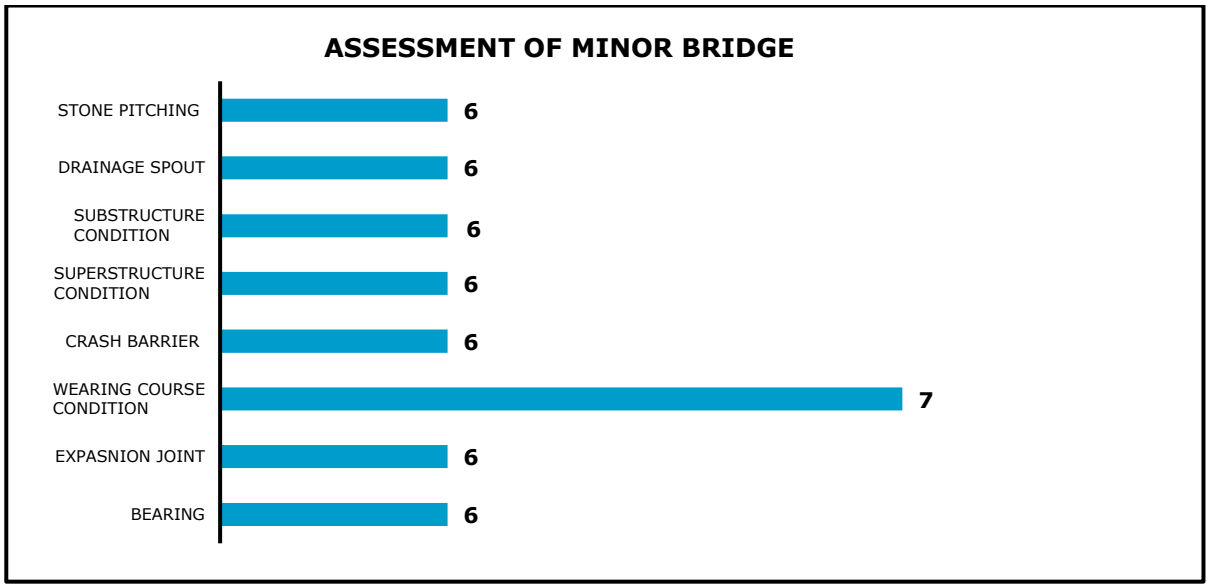


Figure 6-3: Comparative condition assessment of Minor bridge



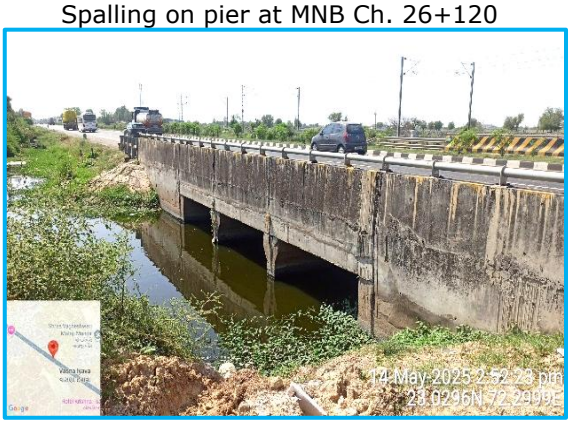
MNB at Ch. 26+160



Spalling on pier at MNB Ch. 26+120



Water logging around the MNB at Ch. 28+400



Water logging around the MNB at Ch. 32+950





MNB at Ch. 40+450



Crash barrier damged at MNB 42+535



MNB at Ch. 42+535



MNB at Ch 16+430



Spalling on pier at ch. 16+430



MNB at Ch. 53+200



Honey combing soffit of deck slab at MNB Ch. 53+200





MNB at Ch. 57+315





Vegeataion around MNB at Ch.77+160



Damged pedastal at MNB 87+200



Multiple cracks in deck slab 87+200





MNB at Ch. 94+465

Confidential



Vertical cracks in pier at MNB 94+935



Derbis in expansion joint at Ch. 94+935



Damged pedastal at MNB at Ch. 98+440



Rubber sealing damged at MNB ch. 98+440





MNB at Ch. 107+325



MNB at Ch. 118+615



Spalling in pier at MNB Ch. 118+615





MNB at Ch. 131+835





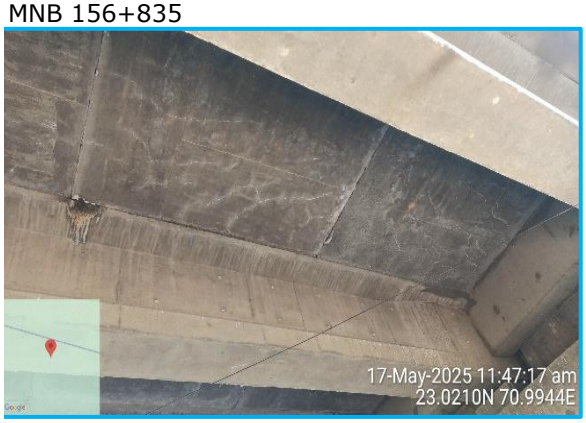
Spalling in pier at MNB 137+120





Saplling in pier at MNB 156+835





MNB at Ch-173+360

RAMBOLL
Confidential



Shear crack on Girder 181+050

Figure 6-4: Site Photographs of Minor bridges

6.5 ROB

The project road has 4 ROB which are Satisfactory condition with RE wall issues. RE wall including temporary stabilization by visible nails or bolts, extensive steel frame grids at ROB (Ch. 125+100) for reinforcement, marked panels for maintenance, wear and discoloration of panels due to weathering, damaged expansion joints needing immediate replacement. Detailed structural distresses are described in Table 6-6 and the comparative assessment of the Minor bridges is presented in the Figure 6-5.

Table 6-6: Detailed Distresses of Railway over bridge

S. No	Chainage	Observation
1	115+285 123+750 & 125+100	• **Nailing Technique**: The wall has visible nails or bolts that are used to prevent bulging. • **Framing Technique:** ROB at Ch. 125+100 The wall has an extensive steel frame grid that is nailed or bolted to the wall. This framework is used to prevent the wall from bulging by providing additional reinforcement and structural stability. • **Honeycombing**: Significant honeycombing observed on the cap of the Abutment cap at Chainage 116+300. • **Condition of Panel**: Some panels show signs of wear, discoloration, and cracks, which might be due to weathering or stress. Regular maintenance may be required to ensure long-term durability. • **Expansion joint:** The material is severely damaged and no longer functions as a seal. Immediate replacement is necessary to prevent further damage to the structure. • **Corrosion on steel members:** There is some discoloration and minor surface wear on the steel components, likely corrosion on steel members.

Table 6-7: Detailed List of Railway over bridge

S.NO	Chainage (km)	Location	Str On	Deck Width (m)	Span Arrangement (m)	Nos of POT-PTFE Bearings	Type of Expansion joint	Nos of Expansion joint	Type of Super-structure
1	65+945	LHS	MCW	13.85	1x 19.923+1x 31.390 + 1x 13.920	36	Strip seal	4	Plate I Girder, RCC slab
		RHS	MCW	13.85	1x 19.923+1x 31.390 + 1x 13.920	36	Strip seal	4	Plate I Girder, RCC slab
2	116+300	LHS	MCW	11	1X71.5	4	Strip seal	2	Steel truss with RCC slab
		RHS	MCW	11	1X71.5	4	Strip seal	2	Steel truss with RCC slab
3	123+225	LHS	MCW	13.85	1X20	12	Strip seal	2	Plate I Girder, RCC slab
		RHS	MCW	13.85	1X20	12	Strip seal	2	Plate I Girder, RCC slab
4	125+100	LHS	MCW	13.85	1 X 31	12	Strip seal	2	Plate I Girder, RCC slab
		RHS	MCW	13.85	1 X 31	12	Strip seal	2	Plate I Girder, RCC slab

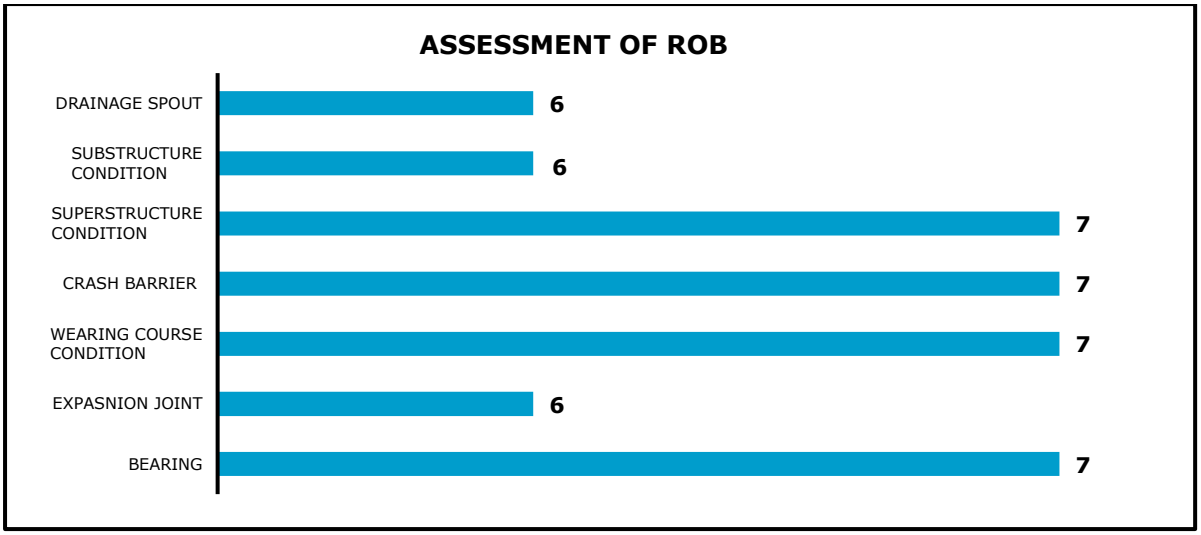


Figure 6-5: Comparative condition assessment of ROB





ROB at Ch. 65+945





ROB at Ch.116+300





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Rubber Sealing damged at ch. 116+300



Minor corrosion on bolt



Soil nailed in RE wall



Scaling on concrete at Abutment RHS 116+300



ROB at Ch. 123+225





ROB at Ch. 125+100





Steel framed with nailed on RE wall at Ch. 125+100

Figure 6-6: Site Photographs of ROB

6.6 Underpass

There are 14 Nos of underpasses along the project stretch, serving both urbanized and non-urbanized populations on either side of the road. The overall condition of these structures is fair condition. However, routine maintenance is recommended, including cleaning of the carriageway, removing vegetation on walls, and drainage spout. These repairs will help maintain the functionality and safety of the underpasses.

Detailed structural distresses are described in Table 6-8 and the comparative assessment of the Minor bridges is presented in the Figure 6-7.

Table 6-8: Detailed Distresses of Underpasses

S. No	Chainage	Observation
1	81+225, 87+305	• **Spalling**: Spalling observed in the crash barrier and at the edge of the abutment wall.
2	105+600 114+900, 131+535 & 115+400	• **Honeycombing:** Significant honeycombing observed on the soffit of the deck slab. • **Vegetation:** Vegetation growth has been observed on the bridge. • **Cracks:** Minor cracks on deck slab with rough, worn concrete.

Table 6-9: Detailed List of Underpasses

S. No	Chainage	Location	Type of Str's	Span Arrangement (m)	Deck width (m)	Type of Super-structure
1	48+100	BHS	PUP	1X4.5	24	BOX type
2	65+820	BHS	PUP	1X4.5	24	BOX type
3	66+058	BHS	PUP	1X4.5	24	BOX type
4	81+225	LHS	CUP	1X4.5	12	BOX type
		RHS		1X4.5	12	BOX type
5	87+305	LHS	CUP	1X4.5	12	BOX type
		RHS		1X4.5	12	BOX type
6	99+995	LHS	CUP	1X4.5	12	BOX type
		RHS		1X4.5	12	BOX type
7	102+930	LHS	CUP	1X4.5	12	BOX type
		RHS		1X4.5	12	BOX type
8	105+600	LHS	CUP	1X4.5	12	BOX type
		RHS		1X4.5	12	BOX type
9	114+900	LHS	VUP	1X10	12	BOX type
		RHS		1X10	12	BOX type
10	115+400	LHS	VUP	1X10	12	BOX type
		RHS		1X10	12	BOX type

S. No	Chainage	Location	Type of Str's	Span Arrangement (m)	Deck width (m)	Type of Super-structure
11	124+980	BHS	PUP	1X4.5	24	BOX type
12	131+535	LHS	PUP	1X10	12	BOX type
		RHS		1X10	12	BOX type
13	136+700	LHS	PUP	1X10	12	BOX type
		RHS		1X10	12	BOX type
14	163+100	LHS	PUP	1X10	12	BOX type
		RHS		1X10	12	BOX type

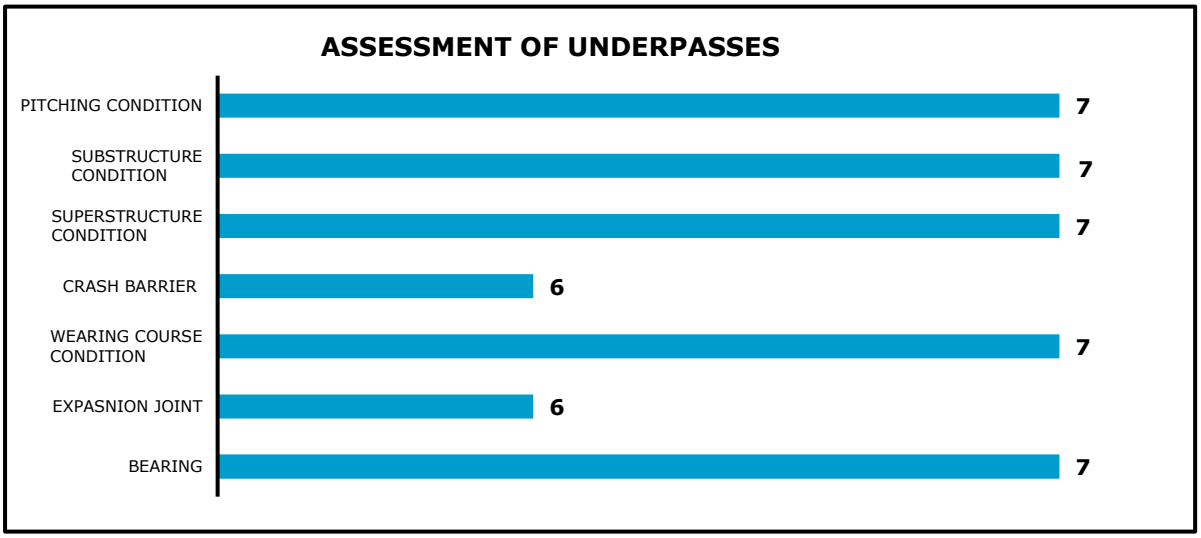


Figure 6-7: Comparative assessment of underpasses



PUP at Ch. 66+058



CUP at Ch. 105+600

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VUP at Ch. 114+900 Honey combing on soffit of deck





VUP at Ch.115+400





VUP at Ch.124+980





PUP at Ch. 131+535 Honey combing on soffit of deck

Confidential

Figure 6-8: Site Photographs of Underpass

6.7 Culverts

There are 278 culverts along the project stretch, including RCC box culverts and Hume pipe culverts. Visual inspection shows that these culverts are generally in good structural condition. However, maintenance is needed in some areas to address issues like debris removal at the inlet and outlet, vegetation blockage, and cleaning of the waterway to ensure smooth drainage.

A few representative photographs of the culverts are provided below to illustrate their current condition and maintenance.

Table 6-10: Detailed List of Hume Pipe culvert

S. No.	Chainage (Km)	Type of structure.	No. of pipe & opening size (m)	
			Nos.	Dia
1	14+375	HPC	2	900
2	14+400	HPC	4	1200
3	16+190	HPC	3	1200
4	17+210	HPC	1	1200
5	17+970	HPC	3	1000
6	18+210	HPC	2	1200
7	28+970	HPC	1	1200
8	29+160	HPC	1	1200
9	29+240	HPC	1	1200
10	29+450	HPC	1	1200
11	29+725	HPC	2	900
12	29+845	HPC	1	1200
13	30+250	HPC	3	900
14	30+840	HPC	1	900
15	31+020	HPC	1	1200
16	31+150	HPC	1	900
17	31+320	HPC	1	900
18	31+905	HPC	1	900
19	34+825	HPC	1	900
20	39+180	HPC	4	1800
21	42+310	HPC	7	1800
22	43+575	HPC	1	900
23	48+065	HPC	6	900
24	48+360	HPC	6	900
25	48+700	HPC	6	900
26	49+425	HPC	6	900
27	49+745	HPC	6	900

S. No.	Chainage (Km)	Type of structure.	No. of pipe & opening size (m)	
			Nos.	Dia
28	50+450	HPC	4	900
29	51+965	HPC	6	900
30	52+180	HPC	4	900
31	56+050	HPC	1	900
32	56+400	HPC	6	900
33	56+810	HPC	6	900
34	56+900	HPC	3	900
35	57+245	HPC	3	900
36	57+730	HPC	3	900
37	58+300	HPC	3	900
38	58+550	HPC	2	900
39	58+855	HPC	2	900
40	58+970	HPC	3	900
41	58+970	HPC	4	900
42	59+025	HPC	5	1200
43	59+700	HPC	5	1200
44	60+070	HPC	2	900
45	60+430	HPC	2	900
46	60+965	HPC	2	900
47	61+090	HPC	2	900
48	61+345	HPC	2	0.9
49	61+405	HPC	2	0.9
50	62+170	HPC	2	0.9
51	62+485	HPC	3	1.2
52	62+885	HPC	3	1.2
53	63+675	HPC	3	1.2
54	63+975	HPC	4	1.2
55	64+275	HPC	4	1.2
56	64+765	HPC	3	1.2
57	65+990	HPC	3	0.9
58	66+015	HPC	2	0.9
59	66+540	HPC	3	1.2
60	67+170	HPC	4	1.2
61	67+440	HPC	2	0.9
62	67+960	HPC	3	1.2

S. No.	Chainage (Km)	Type of structure.	No. of pipe & opening size (m)	
			Nos.	Dia
63	68+555	HPC	2	1.2
64	69+090	HPC	2	0.9
65	69+570	HPC	3	1.2
66	69+675	HPC	2	1.2
67	70+550	HPC	2	1.2
68	70+900	HPC	2	1.2
69	71+320	HPC	1	0.9
70	72+000	HPC	2	1.2
71	72+530	HPC	2	1.2
72	73+115	HPC	5	1.2
73	73+420	HPC	2	0.9
74	74+085	HPC	7	1.2
75	74+125	HPC	8	1.2
76	74+170	HPC	8	1.2
77	74+225	HPC	12	1.2
78	74+440	HPC	2	0.9
79	74+965	HPC	2	0.9
80	75+540	HPC	2	1.2
81	75+840	HPC	2	0.9
82	76+580	HPC	2	1.2
83	77+670	HPC	4	1.2
84	77+700	HPC	3	1.2
85	78+300	HPC	2	0.9
86	78+600	HPC	1	1.2
87	78+915	HPC	1	1.2
88	79+060	HPC	3	1.2
89	79+525	HPC	3	1.2
90	80+880	HPC	3	1.2
91	81+030	HPC	8	1.2
92	81+700	HPC	3	0.9
93	83+120	HPC	3	1.2
94	83+300	HPC	3	1.2
95	85+170	HPC	5	1.2
96	88+000	HPC	3	1.2
97	88+170	HPC	2	1.2

S. No.	Chainage (Km)	Type of structure.	No. of pipe & opening size (m)	
			Nos.	Dia
98	88+535	HPC	2	1.2
99	89+430	HPC	4	1.2
100	89+830	HPC	5	1.2
101	90+005	HPC	3	1.2
102	90+215	HPC	3	1.2
103	90+400	HPC	2	0.9
104	91+400	HPC	3	1.2
105	91+785	HPC	4	0.9
106	92+900	HPC	2	0.9
107	93+465	HPC	2	0.9
108	93+670	HPC	3	1.2
109	94+340	HPC	3	1.2
110	95+365	HPC	2	0.9
111	95+770	HPC	3	1.2
112	96+085	HPC	4	0.9
113	96+390	HPC	2	1.2
114	97+465	HPC	2	0.9
115	99+195	HPC	2	0.9
116	99+515	HPC	4	1.2
117	99+680	HPC	5	1.2
118	100+170	HPC	2	0.9
119	100+665	HPC	2	0.9
120	101+640	HPC	2	1.2
121	102+430	HPC	4	1.2
122	104+410	HPC	2	1.2
123	106+240	HPC	3	1.2
124	107+015	HPC	2	1.2
125	108+275	HPC	2	1.2
126	109+855	HPC	2	1.20
127	112+125	HPC	1	1.20
128	112+700	HPC	2	1.20
129	113+070	HPC	2	1.20
130	114+030	HPC	1	1.20
131	116+250	HPC	1	0.90
132	116+830	HPC	1	1.20

S. No.	Chainage (Km)	Type of structure.	No. of pipe & opening size (m)	
			Nos.	Dia
133	123+000	HPC	1	1.20
134	123+750	HPC	1	1.20
135	123+820	HPC	2	1.20
136	123+970	HPC	2	1.20
137	124+280	HPC	2	1.20
138	124+875	HPC	1	1.20
139	125+500	HPC	1	1.20
140	126+790	HPC	3	0.90
141	126+960	HPC	2	0.90
142	127+635	HPC	2	0.90
143	128+315	HPC	2	0.90
144	128+750	HPC	2	0.90
145	129+330	HPC	2	0.90
146	130+430	HPC	2	0.90
147	130+850	HPC	8	0.90
148	132+360	HPC	2	1.20
149	133+230	HPC	2	0.90
150	133+870	HPC	2	0.90
151	135+000	HPC	5	1.20
152	136+120	HPC	3	1.20
153	136+415	HPC	4	1.20
154	136+750	HPC	2	1.20
155	137+585	HPC	2	0.90
156	138+210	HPC	2	0.9
157	138+380	HPC	4	1.2
158	138+710	HPC	3	1.2
159	139+650	HPC	6	0.90
160	139+915	HPC	2	1.20
161	140+120	HPC	2	0.90
162	141+580	HPC	2	0.90
163	142+080	HPC	2	0.90
164	142+710	HPC	2	0.90
165	144+185	HPC	2	0.90
166	144+700	HPC	2	1.2
167	144+900	HPC	3	0.90

S. No.	Chainage (Km)	Type of structure.	No. of pipe & opening size (m)	
			Nos.	Dia
168	146+455	HPC	2	1.20
169	147+210	HPC	2	1.20
170	148+150	HPC	2	0.90
171	150+260	HPC	2	1.20
172	150+690	HPC	2	1.20
173	151+465	HPC	5	0.90
174	152+790	HPC	4	0.90
175	153+020	HPC	1	0.90
176	153+375	HPC	2	0.90
177	153+520	HPC	3	1.20
178	153+570	HPC	3	1.20
179	153+875	HPC	2	0.90
180	154+500	HPC	3	900
181	155+215	HPC	2	900
182	155+250	HPC	2	900
183	155+350	HPC	2	900
184	155+680	HPC	1	900
185	156+025	HPC	1	900
186	158+060	HPC	2	900
187	158+690	HPC	1	1200
188	159+030	HPC	1	1200
189	160+935	HPC	2	900
190	161+160	HPC	2	900
191	162+115	HPC	1	900
192	162+440	HPC	2	900
193	162+650	HPC	2	900
194	162+955	HPC	1	900
195	164+985	HPC	2	900
196	165+220	HPC	5	1200
197	165+920	HPC	1	1200
198	166+350	HPC	1	1200
199	166+970	HPC	2	900
200	167+988	HPC	1	1200
201	168+615	HPC	2	900
202	169+110	HPC	1	900

S. No.	Chainage (Km)	Type of structure.	No. of pipe & opening size (m)	
			Nos.	Dia
203	169+608	HPC	1	1200
204	169+727	HPC	1	1200
205	170+257	HPC	2	1200
206	171+280	HPC	1	900
207	171+500	HPC	2	900
208	173+200	HPC	1	1200
209	173+500	HPC	1	1200
210	174+255	HPC	1	1200
211	174+750	HPC	1	1200
212	174+950	HPC	1	1200
213	175+055	HPC	1	1200
214	175+600	HPC	1	1200
215	176+500	HPC	2	1200
216	177+360	HPC	1	1200
217	178+390	HPC	2	1200
218	178+675	HPC	2	1200
219	178+900	HPC	2	1200
220	179+585	HPC	3	1200
221	180+780	HPC	1	900
222	181+785	HPC	1	1200
223	182+910	HPC	1	1200
224	185+425	HPC	2	1200
225	185+610	HPC	2	1200
226	186+480	HPC	3	1200
227	187+060	HPC	2	1200
228	187+265	HPC	3	900
229	187+980	HPC	1	1200
230	188+800	HPC	1	1200
231	189+225	HPC	1	1200
232	193+770	HPC	1	1200
233	194+250	HPC	1	900

Table 6-11: Detailed List of Box culvert

S. No.	Chainage (Km)	Type of Structure	Size	
			No. of Cells	Dimensions (m)
				Length
1	15+865	Box	2	7.100

S. No.	Chainage (Km)	Type of Structure	Size	
			No. of Cells	Dimensions (m)
				Length
2	18+185	Box	1	3.600
3	27+330	Box	2	12.000
4	27+430	Box	2	9.800
5	29+300	Box	2	8.550
6	41+680	Box	1	4.700
7	53+945	Box	2	8.00
8	45+470	Box	1	1.500
9	46+955	Box	1	4.800
10	47+275	Box	1	3.000
11	48+370	Box	2	6.000
12	55+845	Box	2	8.00
13	57+890	Box	1	1.50
14	59+780	Box	1	2.00
15	91+700	Box	1	3.700
16	96+515	Box	1	3.700
17	104+130	Box	2	7.300
18	105+940	Box	1	3.800
19	110+940	Box	1	3.70
20	112+880	Box	1	4.70
21	114+300	Box	1	4.70
22	117+820	Box	2	7.60
23	118+960	Box	1	3.70
24	129+780	Box	1	4.70
25	134+565	Box	1	4.70
26	134+600	Box	2	7.05
27	135+985	Box	2	7.25
28	141+200	Box	2	8.65
29	155+510	Box	2	8.050
30	156+185	Box	1	1.500
31	157+760	Box	1	2.000
32	160+315	Box	1	3.600
33	161+450	Box	1	3.700
34	167+500	Box	1	3.200
35	168+465	Box	1	5.900
36	171+180	Box	1	3.700
37	181+335	Box	1	6.500

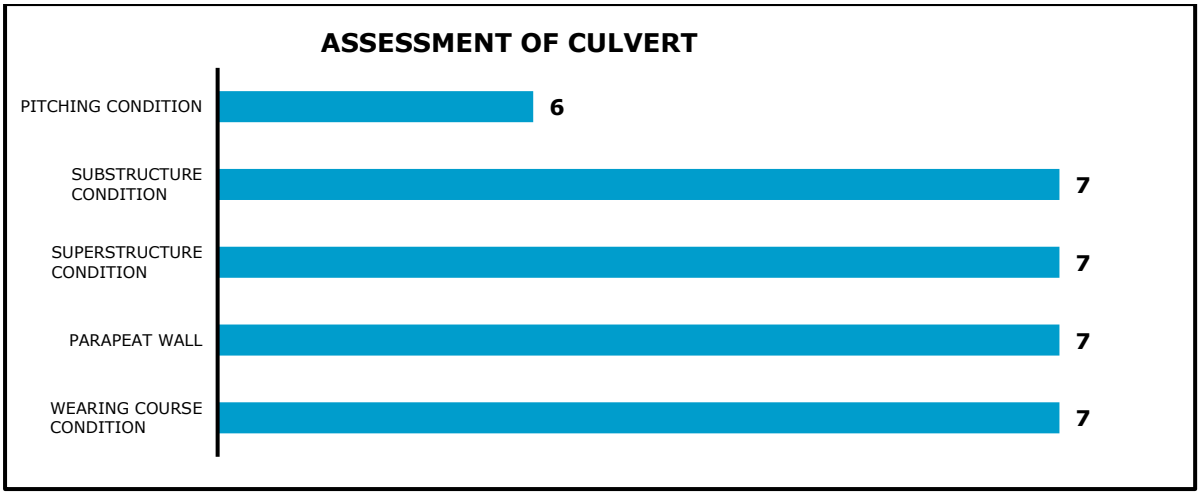


Figure 6-9: Comparative assessment of Culverts



HPC at Ch.49+425 blocked with mud



Slab Culvert at Ch. 59+780



HPC at Ch 59+700

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Slab Culvert at Ch. 91+700





HPC at Ch. 177+360





HPC Blocked with debris and mud at Ch. 16+120





HPC at Ch. 179+585

Figure 6-10: Site Photographs of Culverts

6.8 Routine maintenance and Remedial measures

According to IRC SP 35 and IRC SP 40, routine maintenance for structures involves periodic inspections, cleaning, minor repairs, lubrication of movable parts, application of protective coatings,

and updates to safety systems to ensure the ongoing integrity, performance, and safety of the structure.

Spalling of concrete, which often requires patching, is typically caused by corrosion of steel reinforcement. Honeycombing, on the other hand, occurs due to inadequate compaction of concrete during casting. While patching is a common repair method for spalled areas, it is considered a temporary solution unless all chloride-contaminated concrete is removed first.

Table 6-12: Remedial Measure

S.No.	Name of Component	Type of Distress as per IRC: SP:35 -1990	Remedial measures as per IRC: SP:40-2019	Repair Action (Required / Not Required)
1	Girders Beams, crash barrier, sub-structure and Slabs etc.	Cracking Delamination Spalling Disintegration	• Sealing of crack / porous concrete with Epoxy Grout by injection. • Applying epoxy mortar over leached, honey combed and spalled concrete surface and exposed steel reinforcement.	Required.
2	Abutment, Pier Abutment caps and Pier caps	Disintegration cracks, spalling, honey combing etc.	• Crack filling, • Concrete restoration (The surface honeycomb can mitigate by removing the honeycomb part and grouting) • Structural Strengthening (Jacketing, CFRP etc.)	Required
3	Elastomeric	Damages including embrittlement of elastomer, Cracking and tearing, Displacement	• Replacement	Required.
4	Girders Beams and Slabs	Cracking (dead / dormant), spalling and damage to Concrete, Displacement, Rusting & Corrosion on steel members.	• Corrosion preventative paint • Shuttering removes • Treatment by grouting and/or filler material micro concrete.	Required.
6	Expansion Joints	Non-functioning of joints due to Clogging or wearing out and failure of anchoring system,	• Cleaning • Replacement • Covered expansion joint need to be open.	Required
7	Handrails, Parapets & Crash Barriers	Damage (Spalling, Disintegration and cracking etc).	• Repair & Replacement	Required.

S.No.	Name of Component	Type of Distress as per IRC: SP:35 -1990	Remedial measures as per IRC: SP:40-2019	Repair Action (Required / Not Required)
8	Drainage Spouts and Vest Holes	Damage and non-functioning	• Cleaning required.	Required.
9	Footpaths	Damage and non-functioning.	• Cleaning required	Required

7. ASSESSMENT OF PROJECT ASSETS - TOLL SYSTEMS

7.1 General

Technical Due Diligence of the TMS (Toll Management System), ETC (Electronic Toll Collection System) and WIM (Weigh-in-Motion) System (as available) along Ahmedabad-Viramgam-Maliya Section of SH-17 & SH-07 in the state of Gujarat is done through site visits, site surveys, interactions at site and review of documents and reports.

7.2 Project Information

Toll Plaza 1 (TP 1) Km 27+400 – near Sanand

Toll Plaza 2 (TP 2) Km 87+950 – near Malvan

Toll Plaza 3 (TP 3) Km 133+400 – near Dhrangadhra

Toll Plaza 4 (TP 4) Km 180+350 – near Aniyari village

No. of Lanes at each Toll Plaza

- TP-1 is a split toll plaza with 12 Hybrid lanes (6 lanes in each direction), with a separate two-wheeler lane provided adjacent to the extra-wide lane in each direction.
- TP-2 is a straight-line toll plaza with 12 physical Lanes, however only 10 lanes (5 lanes in each direction) are equipped with Hybrid ETC equipment, two lanes are provisioned for future expansion, separate two-wheeler lanes provided adjacent to the extra-wide lane in each direction.
- TP-3 is a straight-line toll plaza with 12 physical Lanes, however only 10 lanes (5 lanes in each direction) are equipped with Hybrid ETC equipment, two lanes are provisioned for future expansion, separate two-wheeler lanes provided adjacent to the extra-wide lane in each direction.
- TP-4 is a straight-line toll plaza with 12 physical Lanes, however only 10 lanes (5 lanes in each direction) are equipped with Hybrid ETC equipment, two lanes are provisioned for future expansion, separate two-wheeler lanes provided adjacent to the extra-wide lane in each direction.

7.3 Toll System Maintenance

The TMS installation was done by M/s Logic Mo Systems in the year 2022 and since last two years is running under AMC by the same system integrator till date for all lanes at all four Toll Plazas.

7.4 WIM system

None of the lanes at the Toll Plaza are equipped with Weigh in Motion (WIM) systems.

7.5 SWB (Static Weigh Bridge)

None of the Toll Plazas are equipped with Static Weigh Bridge (SWB) for detection and collection of overload penalties

7.6 Review and Assessment of TMS (incl. AVCC Systems)

1. TMS maintenance at all four toll plazas is being done by i.e. M/s Logic Mo, for all the toll equipment with open tolling technology and is in the AMC since last 2 years.
2. Lane hardware is provided as per the industry standards, critical components required to check the vehicle classification e.g. AVC in all lanes are working in good condition, the AVC and TLC panels are installed inside the tunnel and caged to have the access to the TMS in a controlled way, at TP1 the AVC and TLC panels are installed inside the toll booth.
3. The MS-WIM and SWB to detect and collect overload penalty as per the government norms are not installed and all overloaded vehicles are moving through the lanes freely.

4. The network is Ethernet based and is provisioned with a backbone connectivity through OFC in parallel till the toll plaza building, which is installed at the center median, the toll plaza building is at the center which is approx. 300 meters distance from toll plazas in both directions. The OFC is provisioned to prevent any data loss in case the primary link from plaza to lanes becomes faulty and which will further prevent any data loss.
5. Fastag integration is done through IDFC as an Acquirer bank and a dual ILL link of 15 Mbps speed is established from Airtel and Jio for round the clock connectivity.

7.7 Assessment of Toll Operation and integration with TMS

The AVC is profiler based with independent storage but not sending parallel data to the database server if the lane controller if put down for maintenance and in such cases the control room staff is completely dependent on toll collectors' input for validation of all discrepancies, Violations etc.

The LSDU i.e. Lane Status Display Unit to monitor the entire hardware of each lane is provided which is an essential part for monitoring of the toll equipment on day-to-day basis and generating all alerts.

Middle four lanes at all three toll plazas are provisioned with height restrictors to only allow C/J/V Traffic which is free at the toll plaza.

7.8 Backoffice TMS review

a. The TMS is controlled through the control room which is housed with the validator performing real time transaction validations.

b. LSDU as stated above is working properly and equipment status / failures are well known to the shift supervisor.

c. As per the guidelines of IHMCL, the plaza server must be installed with a hot-standby server arrangement and provided accordingly.

d. No fake note detectors installed in the lane to detect counterfeit currency

7.9 Conclusion

The complete TMS systems is working in good condition and does not need any replacement except the automatic boom barriers which need immediate replacements due to poor condition.

7.10 HTMS

a. ECBs were constructed for 35 locations however all equipment has been removed from site.

b. ATCC which are installed in sets at all four toll plazas are not providing any input to the control room and found faulty.

c. VMS are installed at 6 locations and found working

d. Met Station Installed in TP1 and TP3 and found the equipment working

The cost estimate for total replacements have been worked out and detailed is annexed in the chapter of Cost Estimate.

Figure 7-1: Typical Site Photographs of Toll Plaza & Equipment

Toll Plaza 1





Toll Plaza 2





Toll Plaza 3



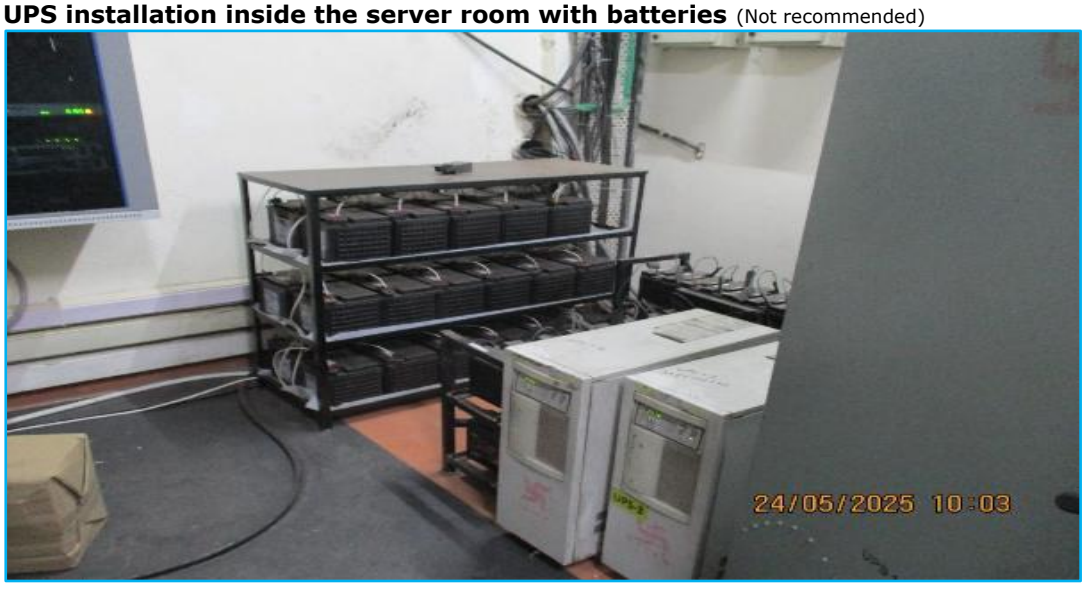
Toll Plaza 4



Server Room



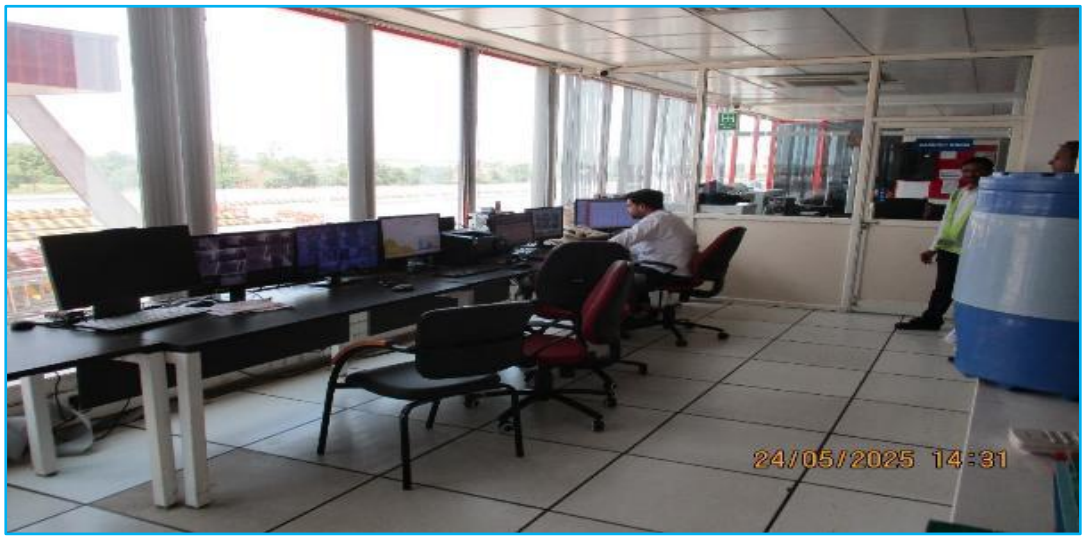
UPS installation inside the server room with batteries (Not recommended)



Control Room

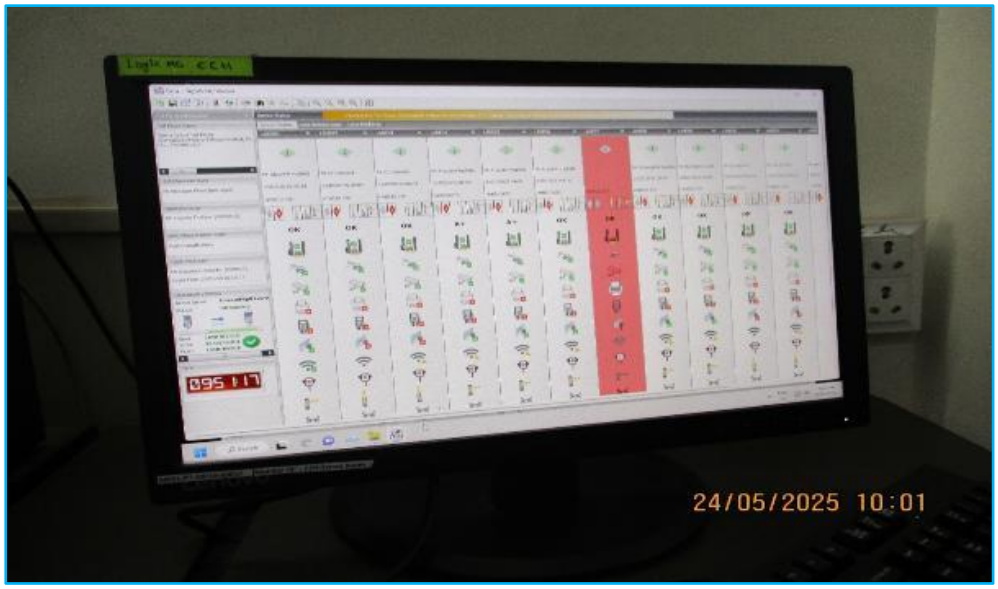


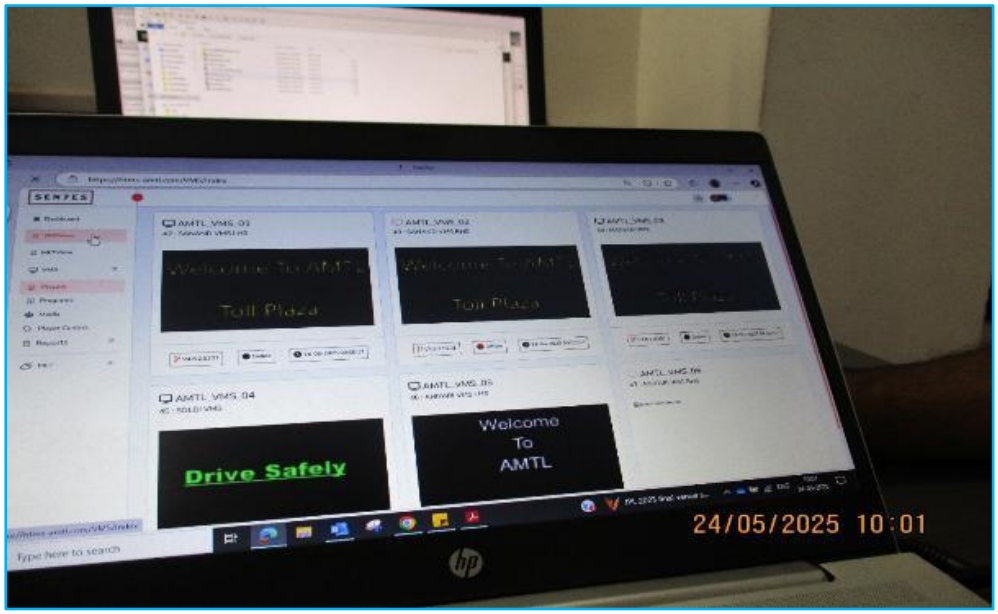




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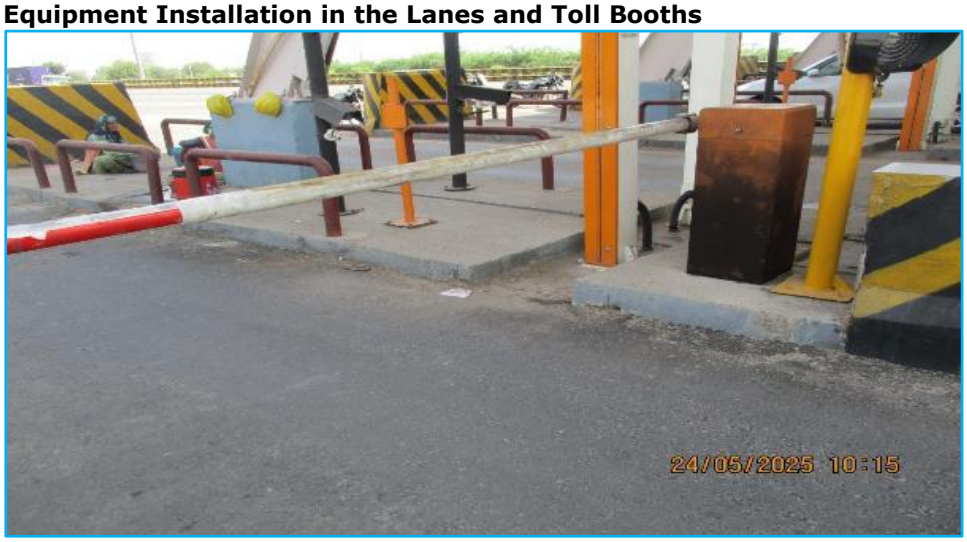






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Equipment Installation in the Lanes and Toll Booths









HTMS

VMS (Variable Massage Sign)





ECB (Electronic Call Box)





ATCC (Automatic Traffic Counter cum Classifier)









MET STATION





8. SOIL AND MATERIAL INVESTIGATION

8.1 General

As part of the soil and material investigation report, the consultants conducted tests on subgrade soils, granular layers, and bituminous layers along the project corridor to evaluate the properties and performance characteristics of the existing pavement materials.

8.2 Field investigation – sampling and testing

Field investigations were conducted on the subgrade soils, and representative pavement material samples were collected for laboratory analysis. The Table 8-1 outlines the sampling methodology, the list of tests performed, and the corresponding testing protocols employed for both field and laboratory evaluations.

Table 8-1: Site sampling and testing criteria

S. No.	Type of Soil Sample	Sampling Criteria	Testing Criteria	
			Description of Test	Standard Code Applicable
Existing subgrade and pavement materials				
i)	**Subgrade Strength Test Pits**	Minimum of one subgrade soil sample was obtained at an interval directed by the client & Material Engineer based on site condition.	In-situ Density	IS 2720 (Part – 29)
			In-situ moisture content	IS 2720 (Part – 2)
			Soil Classification	IS 1498
			Sieve Analysis	IS 2720 (Part – 4)
			Atterberg Limits	IS 2720 (Part – 5)
			Laboratory Compaction Test (using heavy compaction)	IS 2720 (Part – 8)
			Field Compaction	IS 2720 (Part-29)
			4-days soaked CBR	IS 2720 (Part – 16)
			Free swell Index	IS 2720 (Part-40)
ii)	**Existing Granular Layers**	Existing granular layer materials was collected from each subgrade test pit at an interval directed by client	Gradation	MoRTH Table: 400-1 & 400-13
			Atterberg Limits	IS 2720 (Part – 5)
			Specific Gravity and Water Absorption	IS 2386 (Part – 3)
			Aggregate Impact Value (AIV)	IS 2386 (Part – 4)
iii)	**Existing Bituminous Layers**	Existing bituminous layer's material was collected through core cutting process at specific intervals as directed by the pavement engineer	Gradation	MoRTH Table: 500-10 & 500-17
			Density of core	ASTM D 2726
			Bitumen extraction	ASTM–D 2172

8.3 Subgrade Sampling and Testing

Subgrade investigations were undertaken to evaluate the strength characteristics of the in-situ soil. As outlined in Table 8-1, subgrade strength test pits were excavated at intervals determined by the client and the materials engineer, considering prevailing site conditions. A combination of in-situ and

laboratory tests were conducted on the collected soil samples in accordance with the relevant standards summarized in Table 8-1.

The test results and discussion are described in the section below.

Field tests were conducted as per the project requirement to determine the subgrade characteristics and strength. The field testing for subgrade soil at each test pit includes the following,

- In-situ density determination using Core-cutter method
- Field moisture content determination using Rapid moisture meter.
- In-situ CBR Determination using the Dynamic Cone Penetrometer testing

8.3.1 In-Situ CBR (Dynamic Cone Penetration Test)

Dynamic Cone Penetration tests were conducted at subgrade strength test pit locations to assess in-situ CBR on existing soil. The CBR value was calculated based on different soil layers encountered. The slope change in the graph (Penetration Vs Number of Blows) indicates the interface of two layers of different penetration resistance. From the graph, thickness of layer and slope (penetration mm/blow) were calculated. The following equation given in IRC: 37-2012 has been used to calculate the layer DCP-CBR value for each layer:

$$log_{10}\, CBR = 2.465 - 1.12 \times log_{10}(mm/blow)$$

Once the DCP-CBR calculated for each layer, the overall CBR (Weighted average) of all sub-layers will be converted into single DCP-CBR values by using Japan road association formula 1989 as given below:

$$Overall\ CBR = \left\{ \sum layer\ thickness \times (DCP - CBR)^{1/3} \Big/ \sum layer\ thickness \right\}^3$$

Dynamic Cone Penetration test results showing penetration of cone in cm and number of blows at each pit are plotted.

Some of the field investigation photographs of DCP-CBR are shown in Figure 8-1. A summary of the DCP-derived CBR values is provided in Table 8-2, and an illustrative bar diagram depicting the spatial variation of DCP values across the project corridor is presented in Figure 8-2.



Figure 8-1: Field Investigations photographs of DCP-CBR

In general variations in DCP-CBR values are expected due to the influence of several site-specific factors. The penetration resistance of the DCP cone can be significantly affected by the prevailing in-situ moisture content, the presence of underlying layers beneath the subgrade, and obstructions

such as boulders or tree roots. Typically, DCP-CBR values tend to increase with a reduction in in-situ moisture content, and conversely, higher moisture levels can result in lower CBR values. Additionally, if the DCP cone encounters obstructions such as stones or boulders, the measured resistance increases, leading to abnormally high CBR estimations.

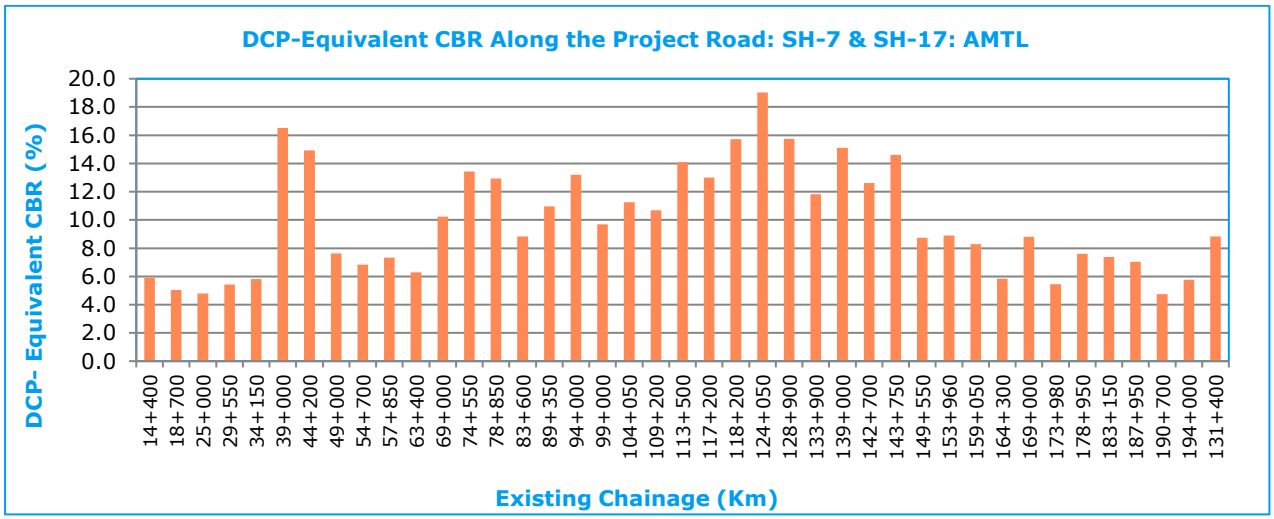


Figure 8-2: Illustrative summary of DCP-Equivalent CBR along the project corridor.

8.3.2 Field Density & Moisture Content

In-situ density (field dry density) and moisture content of the subgrade were determined in accordance with the applicable standards listed in Table 8-1.The field density measurements were utilized to assess the degree of compaction achieved in the existing subgrade, and to determine the in-situ California Bearing Ratio (CBR) under field density conditions.

A consolidated summary of the field test results for the entire project corridor is presented in Table 8-2. Representative photographs of the field investigation are shown in Figure 8-3



Figure 8-3: Field Investigations photographs.

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Table 8-2: Statistical summary of field tests in soil

Chainage (km)			FMC (%)			FDD (gm/cc)			DCP-CBR (%)		
Road	From	To	Min	Max	Avg.	Min	Max	Avg.	Min	Max	Avg.
SH-7 & SH-17 (MCW)	13+930	194.630	6.0	14	8.7	1.82	1.99	1.91	4.7	19	9.9

8.3.3 Subgrade test results

Approximately 50 kg of subgrade soil samples were collected in damp-proof bags to facilitate the necessary laboratory testing. The required tests, as specified in Table 8-1 were subsequently conducted in accordance with relevant standards. A summary of the laboratory test results is presented in Table 8-3.

Table 8-3: Summary of subgrade test results

S. No	Type of carriage way	Existing Chainage (Km.)	Side (LHS/ RHS)	Soil Classification as per IS: 1498	Gravel content %	Sand content %	Clay & silt content %	Atterberg Limits [IS :2720-Pt-V]			Modified Proctor Test (IS:2720-Pt-VIII)		Field Density		4-Days Soaked CBR at MDD (%)	Free Swell Index (%)	Degree of Compaction (%)
								Liquid Limit (LL) %	Plastic Limit (PL) %	Plasticity Index (PI)	Max. dry density (gm/cc)	OMC (%)	Field Dry Density (gm/cc)	FMC (%)			
1	MCW	14+400	LHS	CL	0.8	37.9	61.3	35.0	23.0	12	1.92	11.2	1.83	12.0	7.0	20.0	95.3
2	MCW	18+700	RHS	ML-CL	19.8	24.2	56.0	27.0	21.0	6	1.96	10.5	1.87	11.0	8.2	10.0	95.4
3	MCW	25+000	LHS	CI	8.7	26.7	64.6	37.0	19.0	18	1.93	11.6	1.88	11.0	5.1	30.0	97.4
4	MCW	29+550	RHS	CL	7.6	31.2	61.2	35.0	22.0	13	1.93	10.8	1.85	12.0	5.6	25.0	95.9
5	MCW	34+150	LHS	CL	4.5	38.7	56.8	35.0	21.0	14	1.96	10.8	1.85	14.0	6.0	30.0	94.4
6	MCW	39+000	RHS	SM	6.8	55.4	37.8	21.0	NP	NP	2.01	8.6	1.91	7.0	10.7	0.0	95.0
7	MCW	44+200	LHS	SM	18.1	36.2	45.7	23.0	NP	NP	2.03	8.7	1.90	8.0	9.1	12.5	93.6
8	MCW	49+000	RHS	CI	11.5	27.9	60.6	39.0	22.0	17	1.98	10.3	1.92	11.0	8.5	30.0	97.0
9	MCW	54+700	LHS	CL	4.8	41.9	53.3	31.0	19.0	12	1.97	9.6	1.90	10.0	9.2	20.0	96.4
10	MCW	57+850	RHS	CI	4.0	19.7	76.3	41.0	24.0	17	1.91	11.4	1.87	8.0	4.6	33.3	97.9
11	MCW	63+400	LHS	SC	29.4	38.4	32.2	38.0	22.0	16	2.01	10.1	1.89	10.0	8.8	30.0	94.0
12	MCW	69+000	RHS	SM	20.7	49.3	30.0	24.0	NP	NP	2.00	8.5	1.97	6.0	10.7	10.0	98.5
13	MCW	74+550	LHS	CL	8.5	36.5	55.0	34.0	20.0	14	1.98	11.4	1.91	9.0	7.3	20.0	96.5
14	MCW	78+850	RHS	SC	13.6	54.3	32.1	31.0	22.0	9	2.07	9.6	1.93	8.0	10.6	12.5	93.2
15	MCW	83+600	LHS	SC	5.6	47.6	46.8	38.0	23.0	15	2.02	9.7	1.92	11.0	9.4	33.3	95.0

S. No	Type of carriage way	Existing Chainage (Km.)	Side (LHS/ RHS)	Soil Classification as per IS: 1498	Gravel content %	Sand content %	Clay & silt content %	Atterberg Limits [IS :2720-Pt-V]			Modified Proctor Test (IS:2720-Pt-VIII)		Field Density		4-Days Soaked CBR at MDD (%)	Free Swell Index (%)	Degree of Compaction (%)
								Liquid Limit (LL) %	Plastic Limit (PL) %	Plasticity Index (PI)	Max. dry density (gm/cc)	OMC (%)	Field Dry Density (gm/cc)	FMC (%)			
16	MCW	89+350	RHS	SM-SC	11.0	46.3	42.7	25.0	20.0	5	2.07	9.6	1.95	9.0	6.2	11.1	94.2
17	MCW	94+000	LHS	SM-SC	20.6	57.0	22.4	27.0	21.0	6	2.08	9.1	1.94	10.0	12.7	12.5	93.3
18	MCW	99+000	RHS	CL	6.2	39.8	54.0	34.0	19.0	15	2.05	10.8	1.98	7.0	7.2	22.2	96.6
19	MCW	104+050	LHS	SC	20.1	49.8	30.1	31.0	18.0	13	2.07	9.5	1.96	9.0	10.6	20.0	94.7
20	MCW	109+200	RHS	GC	41.9	27.2	30.9	45	26.0	19	1.99	12.2	1.93	8.0	8.4	40.0	97.0
21	MCW	113+500	LHS	GM	41.7	37.5	20.8	20.0	NP	NP	2.08	8.6	1.92	8.0	16.8	0.0	92.3
22	MCW	117+200	LHS	GC	41.6	10.4	48.0	37.0	23.0	14	1.91	10.7	1.88	8.0	12.9	25.0	98.4
23	MCW	118+200	RHS	GM	61.8	25.9	12.3	20.0	NP	NP	2.14	8.1	1.99	7.0	19.5	0.0	93.0
24	MCW	124+050	LHS	SM	38.6	39.2	22.2	22.0	NP	NP	2.07	8.7	1.94	7.0	14.9	0.0	93.7
25	MCW	128+900	RHS	GM	48.4	24.7	26.9	24.0	NP	NP	2.05	8.7	1.94	8.0	15.1	10.0	94.6
26	MCW	133+900	LHS	SC	23.3	33.3	43.4	29.0	17.0	12	1.98	10.8	1.93	6.0	8.3	20.0	97.5
27	MCW	139+000	RHS	SM	31.5	51.1	17.4	19.0	NP	NP	2.10	8.3	1.95	6.0	16.8	0.0	92.9
28	MCW	142+700	RHS	SM	20.0	57.5	22.5	18.0	NP	NP	2.13	8.4	1.97	7.0	12.7	12.5	92.5
29	MCW	143+750	LHS	GP-GM	56.2	32.6	11.2	19.0	NP	NP	2.11	8.6	1.95	7.0	15.9	11.1	92.4
30	MCW	149+550	RHS	SM	31.0	41.9	27.1	24.0	NP	NP	2.05	9.0	1.90	7.0	12.6	11.1	92.7
31	MCW	153+960	LHS	GC	54.3	22.4	23.3	37.0	22.0	15	2.03	10.7	1.95	10.0	9.1	25.0	96.1

S. No	Type of carriage way	Existing Chainage (Km.)	Side (LHS/ RHS)	Soil Classification as per IS: 1498	Gravel content %	Sand content %	Clay & silt content %	Atterberg Limits [IS :2720-Pt-V]			Modified Proctor Test (IS:2720-Pt-VIII)		Field Density		4-Days Soaked CBR at MDD (%)	Free Swell Index (%)	Degree of Compaction (%)
								Liquid Limit (LL) %	Plastic Limit (PL) %	Plasticity Index (PI)	Max. dry density (gm/cc)	OMC (%)	Field Dry Density (gm/cc)	FMC (%)			
32	MCW	159+050	RHS	SC	8.7	65.7	25.6	32.0	19.0	13	1.98	10.4	1.92	8.0	8.1	10.0	96.5
33	MCW	164+300	LHS	SC	23.9	35.7	40.4	41.0	25.0	16	1.97	11.6	1.87	8.0	7.4	30.0	94.9
34	MCW	169+000	RHS	GC	38.0	32.7	29.3	32.0	19.0	13	2.05	9.4	1.98	9.0	14.5	20.0	96.6
35	MCW	173+980	LHS	CI	10.9	35.1	54.0	43.0	25.0	18	1.92	12.4	1.85	9.0	6.3	30.0	96.4
36	MCW	178+950	RHS	CI	14.0	31.2	54.8	37.0	20.0	17	1.93	11.7	1.89	8.0	7.1	33.3	97.9
37	MCW	183+150	LHS	MI	3.3	37.2	59.5	41.0	26.0	15	1.94	11.8	1.91	9.0	6.0	40.0	98.5
38	MCW	187+950	RHS	SC	10.2	53.6	36.2	35.0	21.0	14	1.99	10.2	1.95	7.0	8.1	11.1	98.0
39	MCW	190+700	LHS	CL	5.6	30.4	64.0	33.0	22.0	11	1.87	11.2	1.82	8.0	5.8	25.0	97.3
40	MCW	194+000	RHS	CI	9.9	28.2	61.9	41.0	25.0	16	1.89	11.8	1.86	9.0	5.7	33.3	98.4
41	SR	131+400	RHS SR	SM-SC	25.7	32.5	41.8	26.0	19.0	7	2.01	9.4	1.92	11.0	10.7	12.5	95.5

8.3.4 Summary of Soil Test results

Soil Classification and Distribution:

From Table 8-3, it is evident that the subsoil along the project corridor is generally consistent and predominantly sandy and gravel in nature. At few locations, silty and clayey with low to intermediate compressibility soils were observed.

The Liquid Limit (LL) of these soils is ranging between 18%-45%, and these values are within the limit as per MoRTH specifications (<50%). The obtained maximum Plasticity Index (PI) of the subgrade soils is 19% and the degree of free swell (FSI) is 40.0%. All the measured PI and FSI values are also within the acceptable limits as per MoRTH guidelines, of 25% and 50%, respectively.

Strength parameters:

Variance between MDD and FDD is converted in-terms of degree of compaction. The degree of compaction along the project corridor is ranging between 92.3% - 98.5%. The 4-days soaked CBR along the project corridor is ranging from 4.6% to 19.5% with an average value of 9.7%.

8.4 Existing Pavement Composition

Existing pavement composition (pavement course, material type, and thickness) were recorded at an interval directed by the client & material engineer based on the site condition along the project road.

The summary of existing pavement crust thickness is presented in a tabular form in the Table 8-4, as well as an illustrative bar graph in Figure 8-5 and few of the pavement crust photographs are shown in Figure 8-4

Table 8-4: Summary of pavement crust along the project corridor- MCW

S. No.	Location (Km.)	Side (LHS/ RHS)	Pavement Composition (mm)				Remarks
			Bituminous Layer	WMM	GSB	Total Thickness	
1	14+400	LHS	180	200	280	660	
2	18+700	RHS	300	130	150	580	
3	25+000	LHS	150	200	300	650	
4	29+550	RHS	150	200	240	590	
5	34+150	LHS	140	250	190	580	
6	39+000	RHS	150	130	210	490	
7	44+200	LHS	200	200	200	600	
8	49+000	RHS	100	250	210	560	
9	54+700	LHS	150	200	180	530	
10	57+850	RHS	200	250	150	600	
11	63+400	LHS	150	270	200	620	
12	69+000	RHS	200	250	150	600	
13	74+550	LHS	150	200	180	530	
14	78+850	RHS	150	250	200	600	
15	83+600	LHS	120	200	250	570	
16	89+350	RHS	150	220	170	540	
17	94+000	LHS	200	200	200	600	
18	99+000	RHS	200	230	220	650	
19	104+050	LHS	290	220	200	710	
20	109+200	RHS	150	200	200	550	

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S. No.	Location (Km.)	Side (LHS/ RHS)	Pavement Composition (mm)				Remarks
			Bituminous Layer	WMM	GSB	Total Thickness	
21	113+500	LHS	250	200	200	650	
22	117+200	LHS	200	200	250	650	
23	118+200	RHS	520	200	150	870	
24	124+050	LHS	250	150	220	620	
25	128+900	RHS	200	250	220	670	
26	133+900	LHS	240	210	200	650	
27	139+000	RHS	290	200	200	690	
28	142+700	RHS	250	200	250	700	
29	143+750	LHS	150	200	180	530	
30	149+550	RHS	270	200	270	740	
31	153+960	LHS	150	250	150	550	
32	159+050	RHS	150	270	150	570	
33	164+300	LHS	180	220	220	620	
34	169+000	RHS	160	270	250	680	
35	173+980	LHS	200	200	200	600	
36	178+950	RHS	200	250	160	610	
37	183+150	LHS	150	250	200	600	
38	187+950	RHS	170	240	200	610	
39	190+700	LHS	150	180	210	540	
40	194+000	RHS	200	200	200	600	



Figure 8-4: Pavement Crust Thickness measuring photographs.

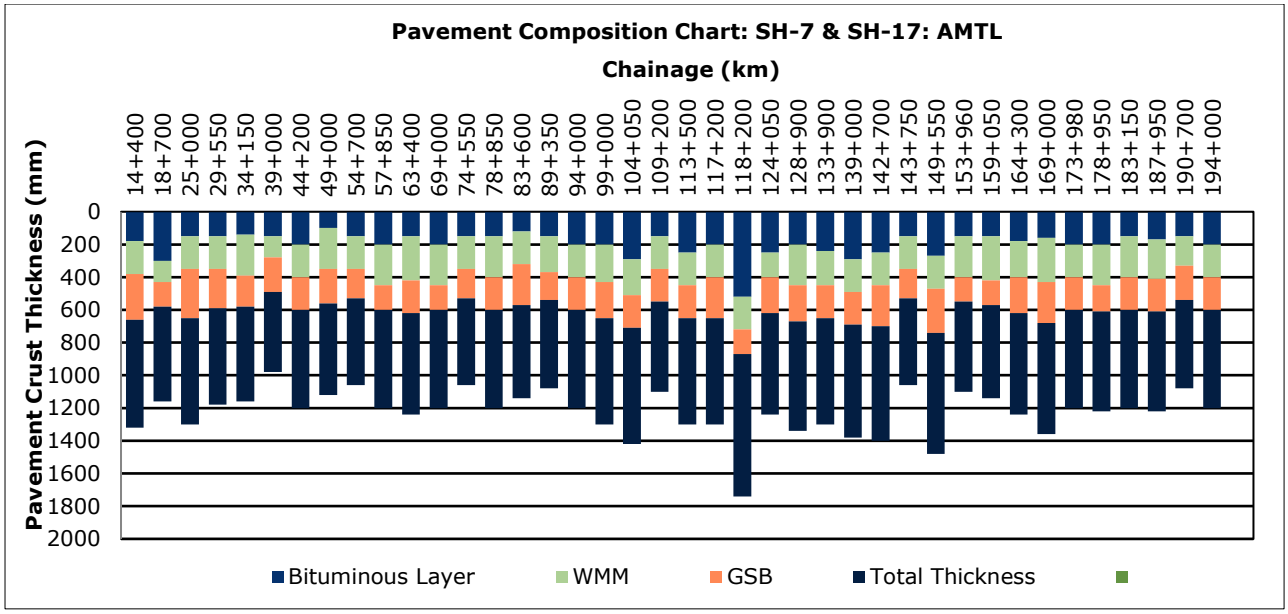


Figure 8-5: Existing pavement crust summary along the project road.

8.4.1 Summary of Pavement test pit results

- The existing pavement along the project corridor is bituminous pavement. The pavement composition comprises of bituminous layer, granular base over the granular sub-base.
- Throughout the project road it possesses consistent bituminous/ granular layer thickness with an average of 195mm bituminous layer over the average Granular course of 419mm were observed.

8.5 Existing Granular Layers Testing

Granular layer samples were collected at intervals directed by the Client and the Material Engineer, based on prevailing site conditions along the project road. Care was taken to collect representative samples of the respective granular layers, such as WMM (Wet Mix Macadam) and GSB (Granular Sub-Base), separately from the excavated test pits.

Enough material was obtained to carry out the required laboratory tests, as specified in Table 8-1. The summary of granular material test results is presented in Table 8-5.

Table 8-5: Summary of Granular layers Test Results

S. No	Chainage (km)	Side (LHS/ RHS)	Type of Sample	Gradation Conformation as per MoRTH 5th Revision	Atterberg Limits			Specific Gravity	Water Absorption (%)	Aggregate Impact Value (%)
					Liquid Limit (LL) %	Plastic Limit (PL) %	Plasticity Index (PI)			
1	14+400	LHS	WMM	2.36mm and 0.600mm IS sieves material coarser side in WMM gradation	18	NP	NP	2.913	0.73	13.6

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S. No	Chainage (km)	Side (LHS/ RHS)	Type of Sample	Gradation Conformation as per MoRTH 5th Revision	Atterberg Limits			Specific Gravity	Water Absorption (%)	Aggregate Impact Value (%)
					Liquid Limit (LL) %	Plastic Limit (PL) %	Plasticity Index (PI)			
2	18+700	RHS	GSB	53.0mm IS sieve material coarser side in GSB grade-III & IV	22	NP	NP	2.821	1.11	13.3
3	25+000	LHS	GSB	53.0mm, 26.5mm and 4.75mm IS sieves material coarser side in GSB grade-III & IV	20	NP	NP	2.854	1.65	18.4
4	29+550	RHS	WMM	Not Confirming to WMM gradation	19	NP	NP	2.904	0.53	11.4
5	34+150	LHS	WMM	4.75mm IS sieve material coarser side in WMM gradation	22	NP	NP	2.908	0.67	13.6
6	39+000	RHS	GSB	Confirming to GSB grade-III & IV	21	NP	NP	2.818	1.36	15.8
7	44+200	LHS	GSB	Confirming to GSB grade-V & VI	20	NP	NP	2.841	0.89	15.2
8	49+000	RHS	WMM	Not Confirming to WMM gradation	20	NP	NP	2.933	0.77	10.5
9	54+700	LHS	WMM	Confirming to WMM gradation	19	NP	NP	2.899	0.84	12.3
10	57+850	RHS	GSB	53.0mm, 26.5mm IS sieves material coarser side in GSB grade-III & IV	20	NP	NP	2.845	0.78	14.4
11	63+400	LHS	GSB	53.0mm, 4.75mm IS sieves material coarser side in GSB grade -III & IV	18	NP	NP	2.871	0.75	16.6
12	69+000	RHS	WMM	Confirming to WMM gradation	22	NP	NP	2.897	0.94	14.5

S. No	Chainage (km)	Side (LHS/ RHS)	Type of Sample	Gradation Conformation as per MoRTH 5th Revision	Atterberg Limits			Specific Gravity	Water Absorption (%)	Aggregate Impact Value (%)
					Liquid Limit (LL) %	Plastic Limit (PL) %	Plasticity Index (PI)			
13	74+550	LHS	WMM	0.600mm IS sieve material coarser side in WMM gradation	22	NP	NP	2.921	0.51	12.0
14	78+850	RHS	GSB	53.0mm IS sieve material coarser side in GSB grade-III & IV	20	NP	NP	2.854	0.98	13.6
15	83+600	LHS	GSB	53.0mm IS sieve material coarser side in GSB grade-III & IV	23	NP	NP	2.840	1.14	12.8
16	89+350	RHS	WMM	Confirming to WMM gradation	20	NP	NP	2.904	1.04	10.7
17	94+000	LHS	WMM	Confirming to WMM gradation	21	NP	NP	2.906	0.78	13.3
18	99+000	RHS	GSB	Confirming to GSB grade-III & IV	19	NP	NP	2.867	1.01	12.1
19	104+050	LHS	GSB	Confirming to GSB grade-III & IV	20	NP	NP	2.860	1.47	16.6
20	109+200	RHS	WMM	2.36mm and 0.600mm IS sieves material coarser side in WMM gradation	19	NP	NP	2.897	0.84	14.7
21	113+500	LHS	WMM	Not Confirming to WMM gradation	21	NP	NP	2.887	0.85	13.4
22	117+200	LHS	WMM	11.2mm IS sieve material coarser side in WMM gradation	23	NP	NP	2.869	0.79	12.8
23	118+200	RHS	GSB	53.0mm IS sieve material coarser side in GSB grade-III & IV	20	NP	NP	2.832	0.89	14.7
24	124+050	LHS	GSB	Confirming to GSB grade-III & IV	21	NP	NP	2.835	0.78	13.6

S. No	Chainage (km)	Side (LHS/ RHS)	Type of Sample	Gradation Conformation as per MoRTH 5th Revision	Atterberg Limits			Specific Gravity	Water Absorption (%)	Aggregate Impact Value (%)
					Liquid Limit (LL) %	Plastic Limit (PL) %	Plasticity Index (PI)			
25	128+900	RHS	WMM	4.75mm IS sieve material coarser side in WMM gradation	20	NP	NP	2.874	0.85	14.0
26	133+900	LHS	WMM	Confirming to WMM gradation	23	NP	NP	2.870	1.00	13.6
27	139+000	RHS	GSB	26.5mm IS sieve material coarser side in GSB grade-III & IV	21	NP	NP	2.865	0.86	14.7
28	142+700	RHS	GSB	53.0mm IS sieve coarser side in GSB grade-IV	19	NP	NP	2.860	1.37	17.8
29	143+750	LHS	GSB	Confirming to GSB grade-III & IV	20	NP	NP	2.869	1.10	13.4
30	149+550	RHS	WMM	Confirming to WMM gradation	19	NP	NP	2.914	1.02	10.2
31	153+960	LHS	WMM	11.2mm and 4.75mm IS sieves material coarser side in WMM gradation	23	NP	NP	2.910	0.89	13.2
32	159+050	RHS	GSB	Confirming to GSB grade-III & IV	27	20	7	2.897	1.13	12.7
33	164+300	LHS	GSB	Confirming to GSB grade-III & IV	24	NP	NP	2.854	1.04	11.6
34	169+000	RHS	WMM	4.75mm and 0.600mm IS sieves material coarser side in WMM gradation	22	NP	NP	2.940	0.34	10.3
35	173+980	LHS	WMM	0.600mm IS sieve material coarser side in WMM gradation	21	NP	NP	2.928	0.67	14.3
36	178+950	RHS	GSB	26.5mm IS sieve material coarser side in	23	NP	NP	2.858	1.05	13.8

S. No	Chainage (km)	Side (LHS/ RHS)	Type of Sample	Gradation Conformation as per MoRTH 5th Revision	Atterberg Limits			Specific Gravity	Water Absorption (%)	Aggregate Impact Value (%)
					Liquid Limit (LL) %	Plastic Limit (PL) %	Plasticity Index (PI)			
				GSB grade-III & IV						
37	183+150	LHS	GSB	53.0mm, 26.5mm IS sieves material coarser side in GSB grade-III & IV	20	NP	NP	2.861	1.44	12.5
38	187+950	RHS	WMM	4.75mm and 0.600mm IS sieves material coarser side in WMM gradation	22	NP	NP	2.936	0.60	10.4
39	190+700	LHS	WMM	0.600mm IS sieve material coarser side in WMM gradation	24	NP	NP	2.915	0.74	12.1
40	194+000	RHS	GSB	53.0mm, 26.5mm and 4.75mm IS sieves material coarser side in GSB grade-III & IV	21	NP	NP	2.894	0.97	12.3

8.6 Existing Bituminous Layers Testing

Bituminous layer samples were extracted using a core cutting drilling machine with a 100 mm diameter bit to obtain representative bituminous core specimens. The locations of all core extractions are listed in Table 8-6. Laboratory tests, as specified in Table 8-1, were conducted on the recovered bituminous cores. The corresponding test results are presented in Table 8-7, while few core sample photographs extracted provided in Figure 8-6.

Table 8-6: Bituminous Layers Core cutting locations.

S. No	Existing Road	Location (km)	Side (LHS/ RHS)	Lane	Wheel path	Height of Core (mm)
1	SH-7 & SH-17	15+100	LHS	Inner	IWP	185
2	SH-7 & SH-17	18+600	RHS	Outer	IWP	260
3	SH-7 & SH-17	21+200	RHS	Inner	IWP	190

S. No	Existing Road	Location (km)	Side (LHS/ RHS)	Lane	Wheel path	Height of Core (mm)
4	SH-7 & SH-17	25+200	LHS	Outer	IWP	210
5	SH-7 & SH-17	28+400	RHS	Outer	OWP	115
6	SH-7 & SH-17	32+200	RHS	Inner	OWP	150
7	SH-7 & SH-17	35+600	LHS	Inner	OWP	170
8	SH-7 & SH-17	37+400	RHS	Outer	OWP	200
9	SH-7 & SH-17	40+800	RHS	Inner	OWP	320
10	SH-7 & SH-17	44+500	LHS	Outer	OWP	160
11	SH-7 & SH-17	50+400	RHS	Outer	IWP	280
12	SH-7 & SH-17	55+100	LHS	Inner	IWP	380
13	SH-7 & SH-17	64+750	LHS	Outer	IWP	190
14	SH-7 & SH-17	69+600	RHS	Inner	IWP	210
15	SH-7 & SH-17	75+000	LHS	Inner	OWP	170
16	SH-7 & SH-17	78+600	RHS	Outer	OWP	170
17	SH-7 & SH-17	84+800	LHS	Outer	OWP	160
18	SH-7 & SH-17	90+000	RHS	Inner	OWP	170
19	SH-7 & SH-17	95+100	LHS	Inner	IWP	165
20	SH-7 & SH-17	100+600	RHS	Outer	IWP	195
21	SH-7 & SH-17	104+600	LHS	Outer	IWP	245
22	SH-7 & SH-17	109+000	RHS	Inner	IWP	180
23	SH-7 & SH-17	114+400	LHS	Inner	OWP	200
24	SH-7 & SH-17	120+400	RHS	Outer	OWP	165
25	SH-7 & SH-17	127+000	LHS	Outer	OWP	165

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S. No	Existing Road	Location (km)	Side (LHS/ RHS)	Lane	Wheel path	Height of Core (mm)
26	SH-7 & SH-17	132+600	RHS	Inner	OWP	210
27	SH-7 & SH-17	137+050	LHS	Inner	IWP	170
28	SH-7 & SH-17	141+600	RHS	Outer	IWP	180
29	SH-7 & SH-17	144+400	LHS	Outer	OWP	180
30	SH-7 & SH-17	147+400	RHS	Inner	IWP	145
31	SH-7 & SH-17	154+900	LHS	Inner	OWP	215
32	SH-7 & SH-17	160+500	RHS	Outer	OWP	180
33	SH-7 & SH-17	165+400	LHS	Outer	IWP	190
34	SH-7 & SH-17	170+400	RHS	Inner	OWP	170
35	SH-7 & SH-17	174+600	LHS	Inner	IWP	195
36	SH-7 & SH-17	181+200	RHS	Outer	IWP	175
37	SH-7 & SH-17	184+200	LHS	Outer	IWP	190
38	SH-7 & SH-17	189+800	LHS	Inner	OWP	200
39	SH-7 & SH-17	190+800	RHS	Inner	IWP	175
40	SH-7 & SH-17	193+600	LHS	Outer	OWP	200

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Figure 8-6: Core cutting investigation photographs.

Table 8-7: Summary of bituminous layers test results

S. No	Location (Km.)	Side (LHS/ RHS)	Lane	Wheel path	Type of Material Tested	Source of Sample	Bitumen Content (%)	Bulk Specific gravity	Gradation Confirming to MoRTH 5th Revision
1	15+100	LHS	Inner	IWP	BC	Core	5.64	2.537	9.5mm IS sieve material finer side in BC grade-II
2	18+600	RHS	Outer	IWP	BC	Core	5.47	2.538	4.75mm IS sieve material finer side in BC grade-II
3	21+200	RHS	Inner	IWP	DBM	Core	4.15	2.578	19.0mm IS sieve material finer side in DBM grade-II
4	25+200	LHS	Outer	IWP	DBM	Core	4.23	-	Confirming to DBM grade-II
5	28+400	RHS	Outer	OWP	BC	Core	5.60	2.528	4.75mm IS sieve material finer side in BC grade-II
6	32+200	RHS	Inner	OWP	DBM	Core	4.28	2.765	19.0mm IS sieve material finer side in DBM grade-II
7	35+600	LHS	Inner	OWP	DBM	Core	4.21	2.581	19.0mm IS sieve material finer side in DBM grade-II
8	37+400	RHS	Outer	OWP	BC	Core	5.57	2.543	4.75mm IS sieve material finer side in BC grade-II
9	40+800	RHS	Inner	OWP	DBM	Core	4.20	-	4.75mm, 2.36mm and 0.300mm IS sieves material coarser side in DBM grade-II

S. No	Location (Km.)	Side (LHS/ RHS)	Lane	Wheel path	Type of Material Tested	Source of Sample	Bitumen Content (%)	Bulk Specific gravity	Gradation Confirming to MoRTH 5th Revision
10	44+500	LHS	Outer	OWP	DBM	Core	4.02	2.574	13.2mm IS sieve material finer side in DBM grade-II
11	50+400	RHS	Outer	IWP	BC	Core	5.94	2.536	9.5mm,4.75mm IS sieves material finer side in BC grade-II
12	55+100	LHS	Inner	IWP	BC	Core	5.47	2.556	9.5mm IS sieve material finer side in BC grade-II
13	64+750	LHS	Outer	IWP	BC	Core	5.39	2.588	2.36mm IS sieve material finer side in BC grade-II
14	69+600	RHS	Inner	IWP	DBM	Core	3.89	2.574	4.75mm, 2.36mm IS sieves material coarser side in DBM grade-II
15	75+000	LHS	Inner	OWP	DBM	Core	3.88	2.584	Not confirming to any DMB gradation
16	78+600	RHS	Outer	OWP	BC	Core	5.63	2.546	9.5mm IS sieve material finer side in BC grade-II
17	84+800	LHS	Outer	OWP	BC	Core	5.14	2.537	13.2mm and 9.5mm IS sieves material finer side in BC grade-I
18	90+000	RHS	Inner	OWP	DBM	Core	4.02	-	13.2mm IS sieve material finer side in DBM grade-II
19	95+100	LHS	Inner	IWP	DBM	Core	4.02	2.590	Confirming to DBM grade-II
20	100+600	RHS	Outer	IWP	BC	Core	5.39	2.542	13.2mm IS sieve material finer side in BC grade-I
21	104+600	LHS	Outer	IWP	DBM	Core	3.50	2.578	4.75mm, 2.36mm IS sieves material coarser side in DBM grade-II
22	109+000	RHS	Inner	IWP	BC	Core	5.79	2.539	Confirming to BC grade-I
23	114+400	LHS	Inner	OWP	BC	Core	5.51	2.551	4.75mm IS sieve material finer side in BC grade-II
24	120+400	RHS	Outer	OWP	DBM	Core	4.27	-	19.0mm IS sieve material finer side in DBM grade-II
25	127+000	LHS	Outer	OWP	BC	Core	5.27	2.543	13.2mm and 9.5mm IS sieves material finer side in BC grade-I

S. No	Location (Km.)	Side (LHS/ RHS)	Lane	Wheel path	Type of Material Tested	Source of Sample	Bitumen Content (%)	Bulk Specific gravity	Gradation Confirming to MoRTH 5th Revision
26	132+600	RHS	Inner	OWP	DBM	Core	4.62	2.573	19.0mm IS sieve material finer side and 4.75mm, 2.36mm IS sieves material coarser side in DBM grade-II
27	137+050	LHS	Inner	IWP	DBM	Core	4.58	2.584	4.75mm, 2.36mm IS sieves material coarser side in DBM grade-II
28	141+600	RHS	Outer	IWP	BC	Core	5.38	2.559	Not confirming to any BC gradation
29	144+400	LHS	Outer	OWP	DBM	Core	5.25	2.585	26.5mm IS sieve material finer side in DBM grade-I & 19.0mm IS sieve material finer side in DBM grade-II
30	147+400	RHS	Inner	IWP	DBM	Core	5.03	2.590	26.5mm IS sieve material finer side in DBM grade-I & 19.0mm IS sieve material finer side in DBM grade-II
31	154+900	LHS	Inner	OWP	BC	Core	5.32	2.561	13.2mm IS sieve material finer side in BC grade-I
32	160+500	RHS	Outer	OWP	DBM	Core	5.13	2.599	Confirming to DBM grade-II
33	165+400	LHS	Outer	IWP	BC	Core	5.27	-	13.2mm, 9.5mm IS sieves material finer side in BC grade-I
34	170+400	RHS	Inner	OWP	BC	Core	4.96	2.570	1.18mm, 0.600mm and 0.300mm IS sieves material coarser side in BC grade-I
35	174+600	LHS	Inner	IWP	DBM	Core	3.46	2.575	13.2mm, 4.75mm and 2.36mm IS sieves material coarser side in DBM grade-II
36	181+200	RHS	Outer	IWP	BC	Core	4.89	2.545	9.5mm IS sieve material finer side in BC grade-I
37	184+200	LHS	Outer	IWP	DBM	Core	3.98	2.574	13.2mm IS sieve material finer side in DBM grade-II
38	189+800	LHS	Inner	OWP	BC	Core	4.46	2.564	Not confirming to any BC gradation

S. No	Location (Km.)	Side (LHS/ RHS)	Lane	Wheel path	Type of Material Tested	Source of Sample	Bitumen Content (%)	Bulk Specific gravity	Gradation Confirming to MoRTH 5th Revision
39	190+800	RHS	Inner	IWP	DBM	Core	4.16	2.569	2.36mm IS sieve material coarser side in DBM grade-II
40	193+600	LHS	Outer	OWP	BC	Core	4.58	2.549	13.2mm IS sieve material finer side in BC grade-I

9. PAVEMENT EVALUATION STUDIES

9.1 Pavement condition survey with Network Survey Vehicle

9.1.1 Network Survey Vehicle Description

Road Runner NSV (Network Survey Vehicle) has been deployed to collect condition data along the project corridor. Road Runner NSV is a multi-functional and high-precision road survey equipment capable of capturing a wide spectrum of pavement and roadway asset information at highway speeds. It is specifically designed to facilitate non-intrusive, continuous, and efficient data collection across large-scale road networks.

Road Runner NSV can collect roughness, rutting, pavement distresses, assets along with GPS coordinates and project chainage.

The main components which are integrated into Road Runner NSV are.

1. Digital Laser Profilers (DLP) -Road roughness and rutting.
2. Digital Imaging System (DIS) -Pavement distresses and road assets data.
3. Differential Global Positioning System (DGPS).
4. High Resolution Distance Measuring Instrument (HRDMI).





1. Digital Laser Profiler (DLP)

- DLP is integrated into the NSV consisting of eleven lasers to collect Road Roughness and Rutting.
- This inertial profiler can record the data continuously along each wheel path.

(a) Roughness

Road Runner NSV equipment fitted with dual wheel path laser profilometer to collect the roughness data. The roughness data was collected and reported for 100 m interval.

The outputs of the lasers and accelerometers located in each wheel path (750 mm either side of the Centre line of the vehicle) are sampled every 25 mm of longitudinal travel and used to calculate the longitudinal profile of the road.

The profile is then passed through the quarter car model to calculate the International Roughness Index (IRI) lane roughness as per the methodologies specified in the ASTM E-950.

(b) Rutting

Rutting will be measured and reported through DLP, and the data will be recorded at every 100m interval on both the wheel paths.

2. Digital Imaging System (DIS)

Digital Imaging System (DIS) in Network Survey Vehicle (NSV) consist of 5 high resolution roof mounted cameras to capture pavement distresses and road assets data. These cameras are oriented in a certain configuration to ensure that the information of interest, such as inventory or pavement condition, is being recorded in the camera field of view. Three cameras are forward facing and mounted on front side of vehicle (Left corner, Centre and Right corner), covers 160° angle images and are set to sample at every 10m interval. Another two cameras are mounted on back side of the vehicle (Left corner, Right corner) to capture the distress image of pavement 10m*4m (length*width) i.e., captures at 10m interval.

Digital image system is capable of

- Collecting real time digital images.
- Achieving a sampling rate of at least one set per 2.5 meters for Distress camera's and one set per 10 meters for Asset cameras.
- Incorporating real time differentially corrected GPS (DGPS).
- Capturing & recording at highway speeds.
- Providing real time on-screen displays for operator verification during collection.
- Storing images straight to PC's / NAS (Network Attached Storage).
- Linking into the client's referencing system via distance and GPS.

3. Geo Referencing (DGPS Data)

The Road Runner NSV is equipped with a Differential GPS (DGPS) system, enabling accurate geo-referencing of collected data. All pavement condition data and images are captured along with corresponding spatial coordinates. Each image is tagged with precise latitude and longitude values, allowing direct referencing and correlation with specific locations on the roadway.

4. Distance Measuring Instrument (DMI)

Road Runner NSV is equipped with DMI, and it is fitted to rear tyre of the network survey vehicle. The distance and speed measurement performed by the distance measuring instrument, which is a distance transducer and it's highly accurate providing GPS distance and speed.



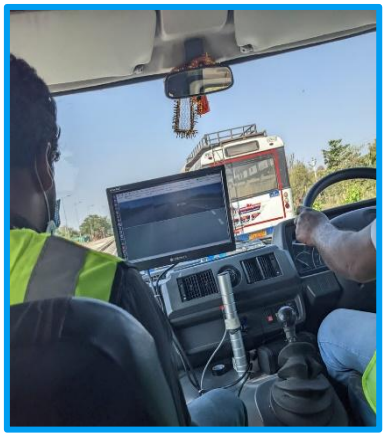


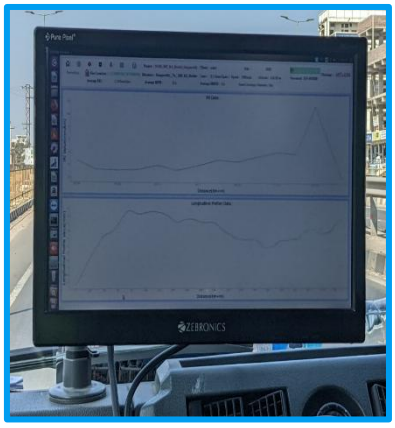
9.2 Methodology for NSV Field Testing

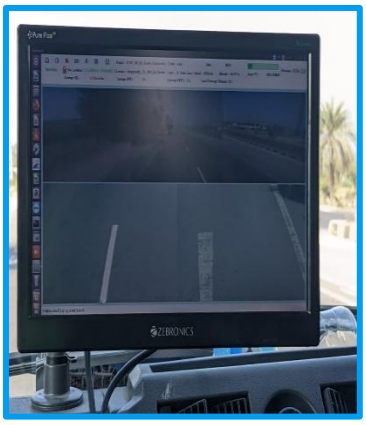
Usually, 4 members are assigned for site to collect the field data. Two of the trained/ experienced field engineers and two drivers during the collection phases of projects. During the survey, engineer is responsible for operating the vehicle's acquisition systems. Road Runner NSV dashboard tool is used to for data acquisition.

The survey will be conducted by lane wise, and the following steps will be followed during the survey.

- Engineer will setup the equipment and check the data collection system prior to the survey.
- Prior to the survey field engineer do set the project name, direction, lane number and starting chainage with increasing or decreasing (as per direction) details.
- The vehicle will run in middle of the lane and collects data up to a vehicle running speed of 80 Kmph.
- Digital Laser Profiler (DLP), Digital Imaging System (DIS) collect the data with GPS co-ordinates and chainage reference.
- Field Engineer will review the data collection and specifies any remarks/ details in observation column.
- At the end of project chainage, engineer will stop that survey and save all the recorded and the same process is followed for all other lanes of the project stretch.







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9.3 Analysis of NSV Survey Data

Pavement condition survey was conducted on each lane of each carriage way with NSV. The NSV survey was conducted on the project corridor from 16/05/2025 to 18/05/2025, data was processed, analyzed.

9.3.1 Roughness

As stated in the earlier section, NSV collected the roughness data at 100m interval on each lane in terms of IRI (International Roughness Index) value.

In Indian context, the IRI values were converted to RI as per IRC: SP:16-2019 "Guidelines on Measuring Road Roughness and Norms" with the following equation.

$RI = 630*(IRI)^{\wedge 1.12}$

Were,

RI = Roughness in mm/km

IRI = International Roughness Index.

Roughness data of the pavement is collected through Digital Laser Profilers System (DLP) for each section of the Main Carriageway (MCW).

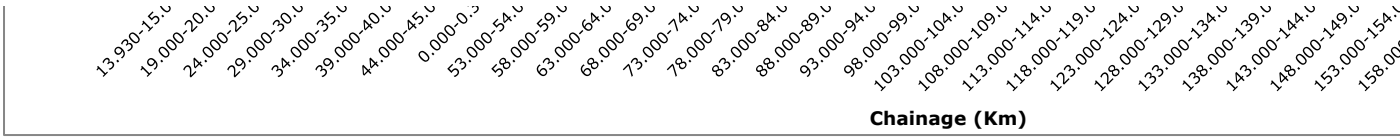


Figure 9-1 and Figure 9-2, respectively.

Table 9-1: Summary of MCW roughness data on LHS direction

Chainage (km)		LHS Direction		
		Avg. BI (mm/km)		
From	To	Outer Lane	Inner Lane	Average
13.930	15.000	1772.2	1706.8	1739.5
15.000	16.000	1748.5	1936.5	1842.5
16.000	17.000	2013.3	2373.5	2193.4
17.000	18.000	2088.3	1621.2	1854.8
18.000	19.000	1841.3	1889.6	1865.4
19.000	20.000	1548.4	1768.1	1658.2
20.000	21.000	1243.4	1351.3	1297.3
21.000	22.000	1859.2	1847.9	1853.5
22.000	23.000	1786.1	1945.0	1865.6
23.000	24.000	2405.6	2422.8	2414.2
24.000	25.000	1717.4	1699.3	1708.3
25.000	26.000	2023.9	1997.7	2010.8
26.000	27.000	2351.1	2353.0	2352.1
27.000	28.000	2039.6	1981.2	2010.4

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Chainage (km)		LHS Direction		
		Avg. BI (mm/km)		
From	To	Outer Lane	Inner Lane	Average
28.000	29.000	1712.6	1676.4	1694.5
29.000	30.000	1906.3	1638.4	1772.4
30.000	31.000	1883.3	1748.9	1816.1
31.000	32.000	1721.8	1784.4	1753.1
32.000	33.000	2079.2	2126.9	2103.1
33.000	34.000	1606.9	1486.0	1546.5
34.000	35.000	1572.5	1402.1	1487.3
35.000	36.000	1681.3	1515.9	1598.6
36.000	37.000	1489.7	1432.1	1460.9
37.000	38.000	1630.0	1854.0	1742.0
38.000	39.000	1961.5	2118.6	2040.0
39.000	40.000	1841.1	1950.1	1895.6
40.000	41.000	1521.7	1626.6	1574.2
41.000	42.000	1664.5	1606.6	1635.5
42.000	43.000	1909.3	1857.3	1883.3
43.000	44.000	1960.3	2004.4	1982.4
44.000	45.000	1685.6	1687.0	1686.3
45.000	46.000	1856.1	1758.0	1807.0
46.000	47.000	1900.3	2426.7	2163.5
47.000	48.000	2119.7	2067.4	2093.5
48.000	49.000	1918.3	1999.8	1959.1
0.000	0.300	1649.2	1531.7	1590.5
49.000	50.000	1993.5	2467.8	2230.6
50.000	51.000	1931.6	1969.2	1950.4
51.000	52.000	1909.5	1655.4	1782.4
52.000	53.000	1848.3	1849.7	1849.0
53.000	54.000	1768.2	2101.9	1935.0
54.000	55.000	1926.0	2281.6	2103.8
55.000	56.000	2056.8	2079.0	2067.9
56.000	57.000	1589.1	1422.8	1506.0
57.000	58.000	1604.0	1752.6	1678.3
58.000	59.000	1483.7	1661.4	1572.6
59.000	60.000	1853.8	1790.9	1822.3
60.000	61.000	1839.2	1530.8	1685.0
61.000	62.000	2058.2	1885.1	1971.6
62.000	63.000	2072.8	2073.6	2073.2
63.000	64.000	1793.3	1709.4	1751.3

Chainage (km)		LHS Direction		
		Avg. BI (mm/km)		
From	To	Outer Lane	Inner Lane	Average
64.000	65.000	2418.5	2453.0	2435.8
65.000	66.000	1866.4	1611.6	1739.0
66.000	67.000	1856.3	1744.8	1800.5
67.000	68.000	1736.7	1621.3	1679.0
68.000	69.000	2457.3	2083.8	2270.6
69.000	70.000	1990.4	1616.3	1803.3
70.000	71.000	1842.5	1649.9	1746.2
71.000	72.000	1950.6	1780.3	1865.4
72.000	73.000	1824.7	1937.2	1881.0
73.000	74.000	1758.2	1457.3	1607.8
74.000	75.000	1959.9	1639.4	1799.6
75.000	76.000	1775.0	1981.3	1878.1
76.000	77.000	1321.0	1280.1	1300.6
77.000	78.000	1284.5	1254.2	1269.3
78.000	79.000	1179.1	1345.6	1262.4
79.000	80.000	1183.2	1206.8	1195.0
80.000	81.000	1703.0	1764.1	1733.5
81.000	82.000	1715.5	1730.8	1723.1
82.000	83.000	1876.9	1791.2	1834.1
83.000	84.000	2042.0	1651.1	1846.6
84.000	85.000	2414.9	1985.8	2200.4
85.000	86.000	2053.3	1835.5	1944.4
86.000	87.000	1581.4	1383.3	1482.3
87.000	88.000	1574.1	1416.2	1495.2
88.000	89.000	1594.8	1666.9	1630.8
89.000	90.000	1688.3	1499.9	1594.1
90.000	91.000	1851.7	1599.4	1725.5
91.000	92.000	1677.6	1636.0	1656.8
92.000	93.000	1985.6	1852.2	1918.9
93.000	94.000	1753.9	1677.0	1715.5
94.000	95.000	1752.6	1833.1	1792.9
95.000	96.000	1530.8	1499.3	1515.0
96.000	97.000	1751.8	1863.3	1807.6
97.000	98.000	1544.9	1867.6	1706.3
98.000	99.000	1840.0	1811.8	1825.9
99.000	100.000	2109.5	1856.6	1983.0
100.000	101.000	1727.2	1981.6	1854.4

Chainage (km)		LHS Direction		
		Avg. BI (mm/km)		
From	To	Outer Lane	Inner Lane	Average
101.000	102.000	2041.1	2245.2	2143.2
102.000	103.000	1569.1	1897.1	1733.1
103.000	104.000	2374.2	2397.0	2385.6
104.000	105.000	1747.8	1449.4	1598.6
105.000	106.000	1586.0	1747.4	1666.7
106.000	107.000	1315.6	1478.8	1397.2
107.000	108.000	1193.5	1416.6	1305.1
108.000	109.000	1332.7	1373.2	1353.0
109.000	110.000	1900.0	2379.1	2139.5
110.000	111.000	1547.4	1543.1	1545.3
111.000	112.000	1368.2	1732.5	1550.4
112.000	113.000	1899.0	1951.2	1925.1
113.000	114.000	1423.3	1559.8	1491.6
114.000	115.000	1752.4	2096.8	1924.6
115.000	116.000	2081.0	2194.3	2137.7
116.000	117.000	1160.9	1395.7	1278.3
117.000	118.000	1793.1	2030.2	1911.7
118.000	119.000	1329.5	1700.2	1514.9
119.000	120.000	1364.7	1726.5	1545.6
120.000	121.000	1517.1	1979.7	1748.4
121.000	122.000	2363.6	2374.1	2368.8
122.000	123.000	1401.6	1575.6	1488.6
123.000	124.000	2135.4	2334.3	2234.8
124.000	125.000	1663.2	2228.9	1946.0
125.000	126.000	1894.7	2376.0	2135.3
126.000	127.000	1601.8	1866.5	1734.2
127.000	128.000	1600.6	1475.5	1538.1
128.000	129.000	1353.0	1635.0	1494.0
129.000	130.000	1366.2	1720.2	1543.2
130.000	131.000	1754.2	1914.5	1834.4
131.000	132.000	1416.0	1835.6	1625.8
132.000	133.000	1158.4	1617.0	1387.7
133.000	134.000	2370.9	2404.5	2387.7
134.000	135.000	2093.0	2185.9	2139.4
135.000	136.000	1695.2	1982.7	1838.9
136.000	137.000	1584.5	2112.2	1848.3
137.000	138.000	1982.6	2013.9	1998.2

Chainage (km)		LHS Direction		
		Avg. BI (mm/km)		
From	To	Outer Lane	Inner Lane	Average
138.000	139.000	1745.7	1696.1	1720.9
139.000	140.000	2012.7	2276.3	2144.5
140.000	141.000	1610.9	2076.1	1843.5
141.000	142.000	2057.5	1934.3	1995.9
142.000	143.000	1723.6	2151.8	1937.7
143.000	144.000	1726.2	2147.8	1937.0
144.000	145.000	1696.4	2191.3	1943.9
145.000	146.000	1946.4	2490.6	2218.5
146.000	147.000	1822.1	2260.8	2041.5
147.000	148.000	1311.4	1789.4	1550.4
148.000	149.000	1987.8	2270.7	2129.2
149.000	150.000	1832.0	2174.9	2003.4
150.000	151.000	1452.4	1617.1	1534.7
151.000	152.000	1502.7	1663.8	1583.3
152.000	153.000	1706.8	1555.4	1631.1
153.000	154.000	1693.7	1878.9	1786.3
154.000	155.000	1742.5	1742.7	1742.6
155.000	156.000	1664.2	1888.0	1776.1
156.000	157.000	1370.5	1487.9	1429.2
157.000	158.000	1337.3	1791.0	1564.1
158.000	159.000	1301.1	1599.0	1450.1
159.000	160.000	1268.2	1417.7	1343.0
160.000	161.000	1144.4	1277.1	1210.7
161.000	162.000	1638.5	1700.0	1669.2
162.000	163.000	1303.6	1372.0	1337.8
163.000	164.000	1696.5	1706.7	1701.6
164.000	165.000	1592.2	1866.4	1729.3
165.000	166.000	1869.5	1911.8	1890.7
166.000	167.000	1119.9	1513.5	1316.7
167.000	168.000	1124.3	1386.9	1255.6
168.000	169.000	1238.8	1471.8	1355.3
169.000	170.000	1185.9	1401.8	1293.9
170.000	171.000	1565.7	1703.0	1634.4
171.000	172.000	1535.5	1642.7	1589.1
172.000	173.000	1745.2	1667.7	1706.4
173.000	174.000	2254.0	2390.9	2322.4
174.000	175.000	1897.2	2001.3	1949.2

Chainage (km)		LHS Direction		
		Avg. BI (mm/km)		
From	To	Outer Lane	Inner Lane	Average
175.000	176.000	1681.6	1742.6	1712.1
176.000	177.000	2347.4	2401.9	2374.6
177.000	178.000	2239.4	2491.2	2365.3
178.000	179.000	2329.0	2490.4	2409.7
179.000	180.000	2372.2	2407.4	2389.8
180.000	181.000	2390.9	2266.4	2328.7
181.000	182.000	2423.9	2499.2	2461.6
182.000	183.000	2033.9	2197.0	2115.5
183.000	184.000	1957.3	2288.0	2122.6
184.000	185.000	1636.4	1742.6	1689.5
185.000	186.000	2299.6	2019.8	2159.7
186.000	187.000	1744.3	1924.8	1834.6
187.000	188.000	2015.3	2014.2	2014.7
188.000	189.000	1654.4	1974.0	1814.2
189.000	190.000	1948.6	1786.2	1867.4
190.000	191.000	2118.9	2050.6	2084.7
191.000	192.000	2039.2	2040.7	2039.9
192.000	193.000	2085.7	2087.4	2086.5
193.000	194.000	2101.7	2082.1	2091.9
194.000	194.633	2169.1	2028.3	2098.7

Table 9-2: Summary of MCW roughness data on RHS direction

Chainage (km)		RHS Direction		
		Avg. BI (mm/km)		
From	To	Outer Lane	Inner Lane	Average
194.633	194.000	1925.1	2272.1	2098.6
194.000	193.000	2021.2	2379.3	2200.3
193.000	192.000	2167.3	2479.4	2323.3
192.000	191.000	1824.6	1720.4	1772.5
191.000	190.000	1613.5	1626.1	1619.8
190.000	189.000	1832.2	1874.2	1853.2
189.000	188.000	1791.0	2170.1	1980.6
188.000	187.000	1997.3	2008.6	2003.0
187.000	186.000	1898.3	2462.8	2180.5
186.000	185.000	1716.0	1776.5	1746.3
185.000	184.000	1674.3	1610.2	1642.3
184.000	183.000	1809.7	1756.4	1783.0
183.000	182.000	2129.5	2337.7	2233.6

Chainage (km)		RHS Direction		
		Avg. BI (mm/km)		
From	To	Outer Lane	Inner Lane	Average
182.000	181.000	2096.2	2290.2	2193.2
181.000	180.000	1983.3	2170.8	2077.0
180.000	179.000	1606.8	1745.2	1676.0
179.000	178.000	1389.1	1735.9	1562.5
178.000	177.000	1588.3	1906.8	1747.5
177.000	176.000	1624.9	1885.3	1755.1
176.000	175.000	1402.2	1621.4	1511.8
175.000	174.000	1393.5	1757.6	1575.5
174.000	173.000	1713.9	1866.8	1790.3
173.000	172.000	1626.6	1896.2	1761.4
172.000	171.000	1787.4	2469.9	2128.6
171.000	170.000	1638.5	2149.8	1894.2
170.000	169.000	2038.3	2395.0	2216.7
169.000	168.000	1651.2	1931.8	1791.5
168.000	167.000	1553.3	1638.7	1596.0
167.000	166.000	1950.7	1898.3	1924.5
166.000	165.000	1962.3	2149.4	2055.9
165.000	164.000	1629.6	1943.5	1786.6
164.000	163.000	2063.1	2497.2	2280.2
163.000	162.000	1788.6	2401.4	2095.0
162.000	161.000	1921.3	2322.2	2121.7
161.000	160.000	2198.7	2301.5	2250.1
160.000	159.000	2109.2	1912.1	2010.6
159.000	158.000	2101.1	2338.1	2219.6
158.000	157.000	2128.2	2223.7	2175.9
157.000	156.000	1718.2	1919.9	1819.0
156.000	155.000	1761.8	2080.6	1921.2
155.000	154.000	1382.9	1453.0	1417.9
154.000	153.000	1723.6	1837.6	1780.6
153.000	152.000	1544.5	1631.0	1587.8
152.000	151.000	1575.2	1900.7	1738.0
151.000	150.000	1886.3	1965.9	1926.1
150.000	149.000	1778.8	2236.1	2007.4
149.000	148.000	1824.1	2016.1	1920.1
148.000	147.000	1733.7	1857.4	1795.5
147.000	146.000	1658.1	1819.5	1738.8
146.000	145.000	1962.5	2043.1	2002.8
145.000	144.000	1442.2	1584.0	1513.1

Chainage (km)		RHS Direction		
		Avg. BI (mm/km)		
From	To	Outer Lane	Inner Lane	Average
144.000	143.000	1593.5	1678.9	1636.2
143.000	142.000	1293.1	1440.8	1367.0
142.000	141.000	1744.2	2013.5	1878.9
141.000	140.000	1251.5	1465.8	1358.7
140.000	139.000	1291.1	1493.0	1392.0
139.000	138.000	1252.9	1484.2	1368.6
138.000	137.000	1615.2	1679.1	1647.2
137.000	136.000	1983.6	2038.9	2011.3
136.000	135.000	2182.2	2339.5	2260.9
135.000	134.000	1653.9	1841.4	1747.7
134.000	133.000	2053.2	2150.5	2101.8
133.000	132.000	1286.0	1298.2	1292.1
132.000	131.000	1647.9	1716.4	1682.1
131.000	130.000	1710.3	1537.2	1623.7
130.000	129.000	1593.7	1746.5	1670.1
129.000	128.000	1659.9	1952.9	1806.4
128.000	127.000	1682.6	1782.7	1732.6
127.000	126.000	1755.2	2066.2	1910.7
126.000	125.000	1768.5	2310.7	2039.6
125.000	124.000	1644.8	1950.9	1797.9
124.000	123.000	2036.3	2362.1	2199.2
123.000	122.000	2133.4	2429.1	2281.2
122.000	121.000	2095.8	2383.3	2239.5
121.000	120.000	2407.1	2353.1	2380.1
120.000	119.000	2177.7	2381.6	2279.7
119.000	118.000	1235.2	1508.1	1371.7
118.000	117.000	1225.1	1605.4	1415.2
117.000	116.000	1189.5	1665.5	1427.5
116.000	115.000	2218.5	2386.7	2302.6
115.000	114.000	1803.2	1850.4	1826.8
114.000	113.000	1455.0	1672.2	1563.6
113.000	112.000	1783.3	2130.7	1957.0
112.000	111.000	1605.5	1778.1	1691.8
111.000	110.000	2005.6	2206.5	2106.1
110.000	109.000	2485.5	2493.5	2489.5
109.000	108.000	2160.8	2378.5	2269.6
108.000	107.000	2183.0	2321.8	2252.4
107.000	106.000	2462.6	2391.7	2427.2

Chainage (km)		RHS Direction		
		Avg. BI (mm/km)		
From	To	Outer Lane	Inner Lane	Average
106.000	105.000	2390.9	2480.5	2435.7
105.000	104.000	2473.5	2449.5	2461.5
104.000	103.000	2488.2	2485.4	2486.8
103.000	102.000	2359.9	2374.9	2367.4
102.000	101.000	1365.8	1747.1	1556.4
101.000	100.000	1632.7	1761.7	1697.2
100.000	99.000	1601.0	1459.5	1530.3
99.000	98.000	1783.9	1655.5	1719.7
98.000	97.000	1665.7	1579.2	1622.5
97.000	96.000	1806.1	1829.3	1817.7
96.000	95.000	1686.9	1720.8	1703.9
95.000	94.000	1403.0	1823.2	1613.1
94.000	93.000	1592.2	1540.2	1566.2
93.000	92.000	1683.1	1541.4	1612.3
92.000	91.000	1817.3	1687.2	1752.2
91.000	90.000	1853.3	1823.0	1838.2
90.000	89.000	1864.6	1901.8	1883.2
89.000	88.000	1672.9	1761.5	1717.2
88.000	87.000	2347.2	2471.7	2409.4
87.000	86.000	1847.5	1820.2	1833.8
86.000	85.000	1632.5	1827.6	1730.0
85.000	84.000	1573.9	1674.8	1624.3
84.000	83.000	1430.2	1645.8	1538.0
83.000	82.000	1689.2	1564.9	1627.0
82.000	81.000	1863.8	1876.4	1870.1
81.000	80.000	1946.2	1769.0	1857.6
80.000	79.000	1737.2	1659.0	1698.1
79.000	78.000	1588.0	1562.2	1575.1
78.000	77.000	1275.5	1765.5	1520.5
77.000	76.000	1732.2	2131.1	1931.6
76.000	75.000	1430.6	1537.1	1483.9
75.000	74.000	1511.8	1811.5	1661.6
74.000	73.000	1757.5	1807.9	1782.7
73.000	72.000	1536.9	1598.2	1567.5
72.000	71.000	1330.9	1284.0	1307.5
71.000	70.000	1387.6	1334.6	1361.1
70.000	69.000	1802.3	1650.3	1726.3
69.000	68.000	2055.1	1857.1	1956.1

Chainage (km)		RHS Direction		
		Avg. BI (mm/km)		
From	To	Outer Lane	Inner Lane	Average
68.000	67.000	2015.0	1815.4	1915.2
67.000	66.000	1741.5	1953.0	1847.2
66.000	65.000	1470.9	1639.9	1555.4
65.000	64.000	1577.6	1884.3	1731.0
64.000	63.000	1457.7	1897.6	1677.6
63.000	62.000	1577.5	1729.2	1653.4
62.000	61.000	1889.1	1985.4	1937.3
61.000	60.000	1742.9	1646.0	1694.4
60.000	59.000	1763.3	1528.4	1645.8
59.000	58.000	1852.5	2001.7	1927.1
58.000	57.000	1941.5	2373.9	2157.7
57.000	56.000	1893.3	2385.1	2139.2
56.000	55.000	2093.7	2121.4	2107.6
55.000	54.000	2248.0	2210.4	2229.2
54.000	53.000	1617.8	1689.3	1653.5
53.000	52.000	1707.6	1717.9	1712.7
52.000	51.000	1842.4	2384.8	2113.6
51.000	50.000	1614.0	1896.5	1755.2
50.000	49.000	1828.4	1760.9	1794.7
0.300	0.000	2198.0	2186.0	2192.0
49.000	48.000	2083.7	2372.3	2228.0
48.000	47.000	1955.4	2098.6	2027.0
47.000	46.000	1998.8	2214.5	2106.6
46.000	45.000	1743.1	1671.4	1707.3
45.000	44.000	1646.6	1486.5	1566.6
44.000	43.000	1702.9	1434.2	1568.6
43.000	42.000	1533.3	1497.5	1515.4
42.000	41.000	1406.9	1493.2	1450.1
41.000	40.000	1568.9	1629.3	1599.1
40.000	39.000	1585.7	1572.7	1579.2
39.000	38.000	1526.6	1676.2	1601.4
38.000	37.000	1802.6	1805.7	1804.2
37.000	36.000	1630.3	1703.8	1667.0
36.000	35.000	1764.8	1742.7	1753.8
35.000	34.000	2058.6	1867.4	1963.0
34.000	33.000	1699.4	1690.6	1695.0
33.000	32.000	1871.1	1695.1	1783.1
32.000	31.000	1862.7	1753.3	1808.0

Chainage (km)		RHS Direction		
		Avg. BI (mm/km)		
From	To	Outer Lane	Inner Lane	Average
31.000	30.000	1829.2	1663.4	1746.3
30.000	29.000	1880.9	1644.0	1762.4
29.000	28.000	1770.6	1858.9	1814.8
28.000	27.000	2204.4	2080.3	2142.3
27.000	26.000	1627.2	1507.6	1567.4
26.000	25.000	1394.3	1422.6	1408.4
25.000	24.000	1897.0	1692.0	1794.5
24.000	23.000	1475.3	2307.0	1891.2
23.000	22.000	1980.6	1754.5	1867.6
22.000	21.000	1955.6	1829.9	1892.7
21.000	20.000	2246.8	1937.3	2092.1
20.000	19.000	1703.9	1247.7	1475.8
19.000	18.000	1754.2	1376.8	1565.5
18.000	17.000	1926.8	2085.3	2006.0
17.000	16.000	1762.5	2324.8	2043.6
16.000	15.000	1563.0	1798.0	1680.5
15.000	13.930	1788.8	1631.5	1710.2

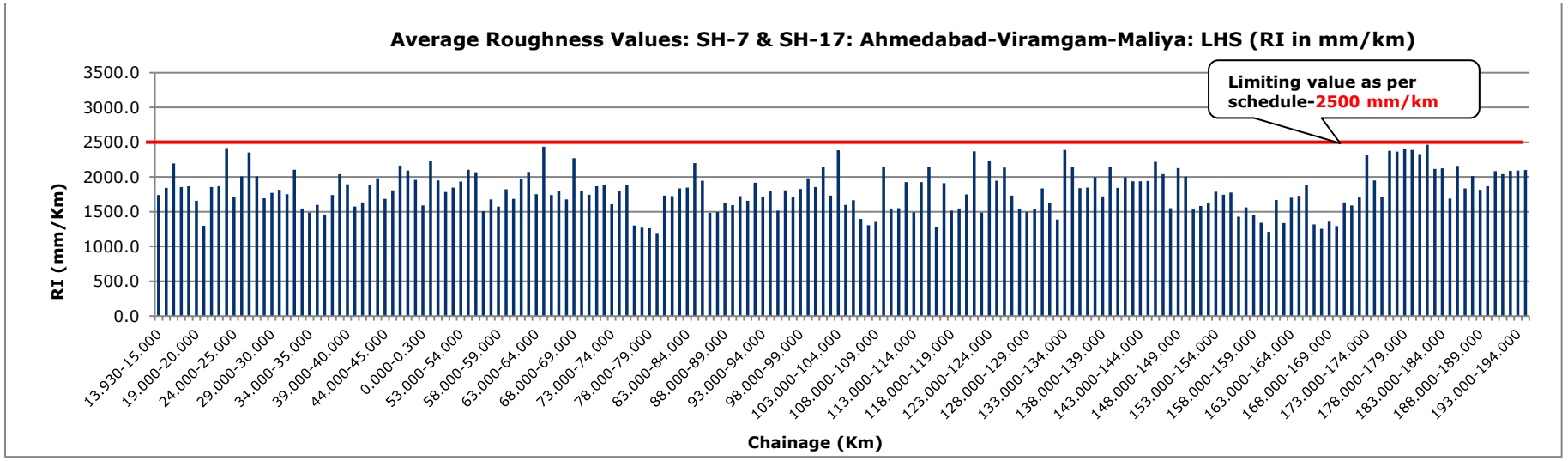


Figure 9-1: Illustrative summary of MCW roughness on LHS direction

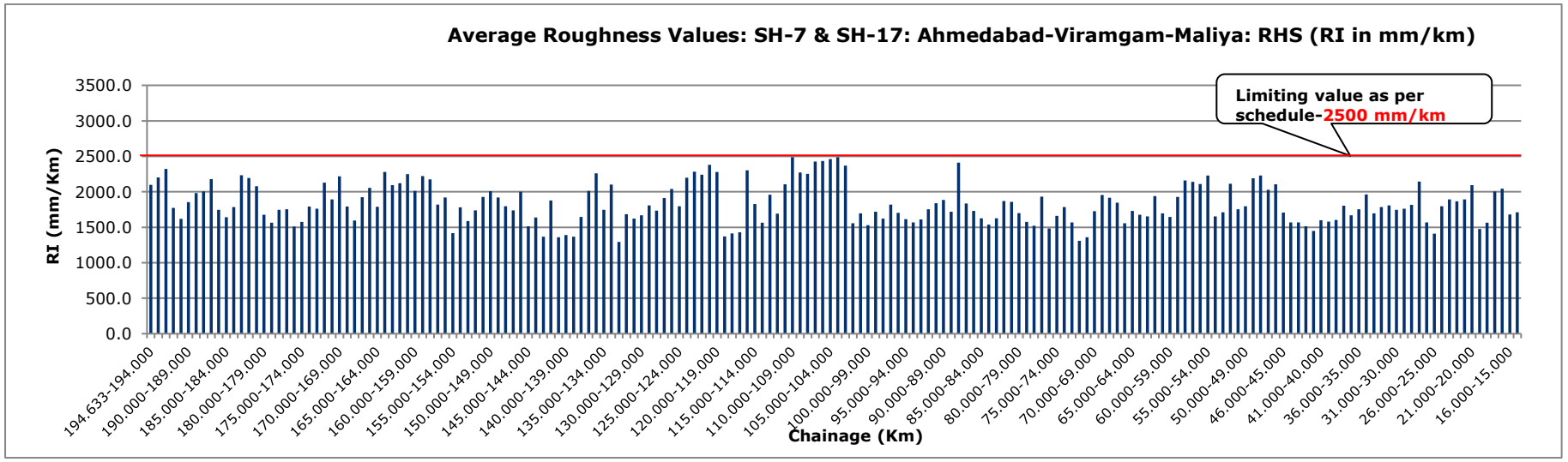


Figure 9-2: Illustrative summary of MCW roughness on RHS direction

Observations:

Roughness 2500 mm/km is considered as max allowable limit as per schedule-K

Table 9-3: Roughness summary in LHS & RHS direction

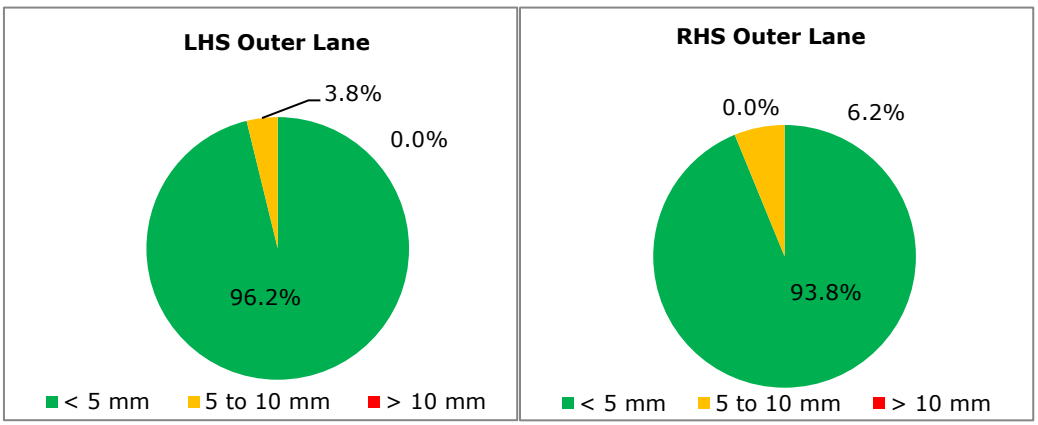
Roughness Summary										
S.no	Condition	BI (mm/km)	LHS				RHS			
			Outer Lane		Inner Lane		Outer Lane		Inner Lane	
			Length (km)	Length (%)	Length (km)	Length (%)	Length (km)	Length (%)	Length (km)	Length (%)
1	Good	<1800	98.750	55.41	87.250	49.04	103.710	58.43	80.790	45.24
2	Fair	1800-2400	74.830	41.99	80.220	45.09	68.770	38.75	87.080	48.77
3	Poor	>2400	4.650	2.61	10.430	5.86	5.000	2.82	10.700	5.99
As per Schedule K		>2500	0.000	0.000	0.000	0.00	0.000	0.00	0.000	0.00
Total Length surveyed (in km)			178.230	100.00	177.900	100.00	177.480	100.00	178.570	100.00

9.3.2 Rutting

Rutting data of flexible pavement section is collected through digital laser profilers. The obtained lane wise MCW rutting summary is presented in Table 9-4. The graphical representation of rutting data is presented in Figure 9-3.

Table 9-4: Summary of MCW rutting data on both directions

Summary of Rutting Analysis of LHS & RHS direction									
Distress	Depth (in mm)	Length of the Road Effected with Rutting							
		LHS (Length in Km)		LHS (Length in %)		RHS (Length in Km)		RHS (Length in %)	
		Outer Lane	Inner Lane	Outer Lane	Inner Lane	Outer Lane	Inner Lane	Outer Lane	Inner Lane
Rutting	< 5 mm	171.430	160.900	96.2%	90.4%	166.480	163.870	93.8%	91.8%
	5- 10 mm	6.800	17.000	3.8%	9.6%	11.000	14.700	6.2%	8.2%
	> 10 mm	0.000	0.000	0.0%	0.0%	0.000	0.000	0.0%	0.0%
Total Length surveyed (in km)		178.230	177.900	100.0 %	100.0 %	177.480	178.570	100.0 %	100.0 %



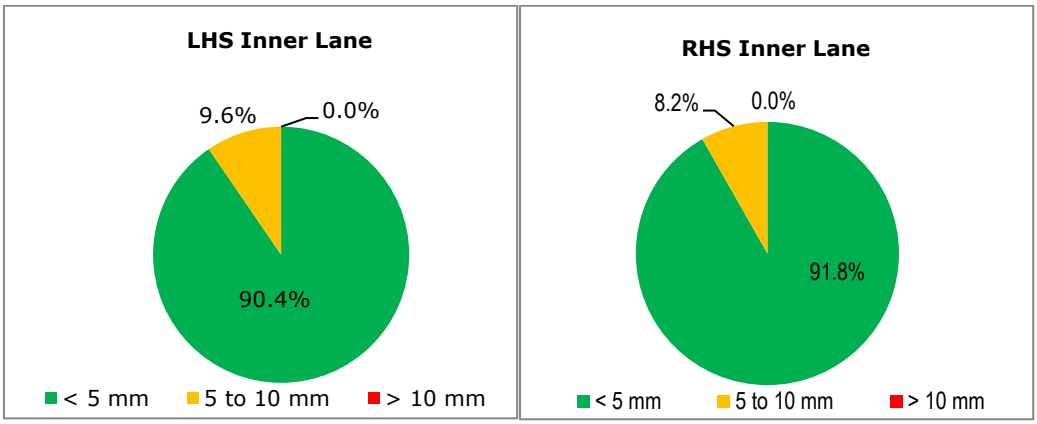


Figure 9-3: Illustrative summary of MCW rutting

Observations:

The desirable limit for rutting is not more than 10 mm.

- In BHS of the MCW, rutting values were within the desirable limit.

9.3.3 Pavement distress data of Flexible Pavement

The NSV software processes the collected data and automatically geotags each image and measurement with the corresponding GPS coordinates and chainage. It further classifies pavement distresses by type, location, magnitude, and severity, enabling precise mapping and assessment of roadway conditions.

Pavement distress data of Flexible pavement- Main carriageway

The following Pavement distresses are considered for assessing the flexible pavement condition as per IRC: 82-2023 "Code of Practice for Maintenance of Bituminous Road Surfaces".

- Cracking
  - Longitudinal cracks
  - Transverse cracks
  - Alligator cracks/ Crocodile cracks
  - Multiple cracks
- Ravelling
- Shoving
- Bleeding
- Slippage/ Delamination
- Potholes
  - Area: Surface Area of the Pothole.
  - Numbers
- Edge break
- Patching
- Settlements, Depressions

All the above pavement distress will be provided at 100 m interval.

The detailed pavement condition analysis and distress rating is carried out as per Table 5.1 given in IRC 82:2023. The pavement distress summary is presented in Table 9-5 for MCW. Few Sites

investigation photographs are presented in Figure 9-4 below. The distress mapping photographs of the flexible pavement in the Figure 9-5

Table 9-5: Summary of MCW Flexible pavement distresses

Distress	Severity (% of Area)	Length of the Road Effected				Length of the Road Effected			
		LHS				RHS			
		Inner Lane		Outer Lane		Inner Lane		Outer Lane	
		Length in km	Length in %	Length in km	Length in %	Length in km	Length in %	Length in km	Length in %
Cracking	< 5%	177.900	100.00	177.930	99.83	178.570	100.00	177.480	100.00
	5% to 10%	0.000	0.00	0.200	0.11	0.000	0.00	0.000	0.00
	> 10%	0.000	0.00	0.100	0.06	0.000	0.00	0.000	0.00
Ravelling	< 1%	177.700	99.89	178.030	99.89	178.270	99.83	177.380	99.94
	1% to 10%	0.200	0.11	0.200	0.11	0.300	0.17	0.100	0.06
	> 10%	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
Potholes	Nil	177.900	100.00	178.230	100.00	178.470	99.94	177.480	100.00
	1 to 2	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
	>2	0.000	0.00	0.000	0.00	0.100	0.06	0.000	0.00
Patching	< 1%	167.620	94.22	173.530	97.36	152.470	85.38	160.680	90.53
	1% to 10%	9.880	5.55	4.700	2.64	25.000	14.00	15.900	8.96
	> 10%	0.400	0.22	0.000	0.00	1.100	0.62	0.900	0.51
Rut depth	< 5	160.900	90.44	171.430	96.18	163.870	91.77	166.480	93.80
	5 to 10	17.000	9.56	6.800	3.82	14.700	8.23	11.000	6.20
	> 10	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
IRI	< 2.55	101.400	57.00	113.040	63.42	87.090	48.77	106.430	59.97
	2.55 to 3.3	47.800	26.87	44.460	24.95	62.700	35.11	54.850	30.90
	> 3.3	28.700	16.13	20.730	11.63	28.780	16.12	16.200	9.13

9.3.4 Pavement distress data of Rigid Pavement (Toll Plaza)

The following Pavement distresses are considered for assessing the rigid pavement condition as per IRC SP: 83-2018 (Guidelines for Maintenance, Repair and Rehabilitation of Cement concrete pavements);

- Cracking
  - Longitudinal cracks
  - Transverse cracks/ Diagonal Cracks
  - Corner cracks/ Corner breaks
  - Multiple cracks
- Spalling of Joints
- Joint seal defects
- Joint Faulting/ Stepping
- Joint Separation
- Blow up/ Buckling
- Ravelling/ Scaling
- Potholes/ Pop outs

All the above pavement distresses will be provided at 10 m interval.

The existing distresses are measured in five level distress rating system as specified in IRC: SP: 83-2018. The five-level distress rating system is given in Table 9-6 below.

Table 9-6: Five-level distress rating system for the Rigid Pavement

Distress Rating	Slab Condition	Severity (Defects) Rating
0	Excellent	No Discernible
1	Very Good	Minor
2	Good/Average	Moderate
3	Fair	Major
4	Poor	Extreme
5	Very Poor	Unsafe/ Unserviceable

The condition survey of the rigid pavement was carried out by observing all the listed distresses as specified in IRC: SP: 83-2018 in conformity with proforma given code. Type of distresses and assessment rating as given in Table 4.5 of IRC: SP: 83-2018 is followed and the same is listed in Table 9-7 below. Some of the investigation pictures are shown in Figure 9-6

Table 9-7: Type of distresses and its assessment rating

S. No	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating
1	**CRACKING**			
	Single Discrete Cracks Not interaction with Any joint	w=width of crack L=length of crack d=depth of crack D=depth of slab	0	Nil, not discernible
			1	w<0.2 mm, hair cracks
			2	w= 0.2 -0.5 mm, discernible from slow-moving car
			3	w=0.5-1.5 mm, discernible from fast-moving car
			4	w=1.5-3.00 mm
			5	w>3 mm
2	Single Transverse (or Diagonal) Crack intersecting with one or more joints	w=width of crack L=length of crack d=depth of crack D=depth of slab	0	Nil, not discernible
			1	w<0.2 mm, hair cracks
			2	w=0.2 -0.5 mm, discernible from slow vehicle
			3	w=0.5-3.0 mm, discernible from fast vehicle
			4	w=3.0-6.0 mm
			5	w>6mm, usually associated with spalling, and/or slab rocking under traffic
3	Single Longitudinal Crack intersecting with one or more joints	w=width of crack L=length of crack d=depth of crack D=depth of slab	0	Nil, not discernible
			1	w<0.5 mm, discernible from slow vehicle
			2	w= 0.5 -3.0 mm. discernible from fast vehicle
			3	w=3.0-6.0 mm

S. No	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating
			4	w=6.0-12. mm
			5	w>12mm, usually associated with spalling, and/or slab rocking under traffic
4	Multiple Cracks Intersecting with one or more joints or cracks	w=width of crack	0	Nil, not discernible
			1	w<0.2 mm, hair cracks
			2	w=0.2 - 0.5 mm, discernible from slow vehicle
			3	w=0.5-3.0 mm, discernible from fast vehicle
			4	w=3.0 - 6.0 mm panel broken into 2 or 3 pieces
			5	w > 6 mm and/or panel broken into more than 4 pieces
5	Corner Break	w=width of crack L=length of crack	0	Nil, not discernible
			1	w<0.5 mm only one corner broken
			2	w< 1.5 mm, L<0.6 m, only one corner broken
			3	w< 1.5 mm. L <0.6 m, two corners broken
			4	w>1.5 mm, L >0.6 m, or Three corners broken
			5	Three or four corners broken
6	Punchout (Applicable to CRCP only)	w=width of crack L=length (m/m^2)	0	Nil, not discernible
			1	w< 0.5 mm; L< 3 m/m^2
			2	either w>0.5 mm or L<3 m/m^2
			3	w> 1.5 mm and L< 3 m/m^2
			4	w>3 mm, L<3 m/m^2 and deformation
			5	w>3 mm, L>3 m/m^2 and deformation
7	**SURFACE DEFECTS**			
	Ravelling or Honeycomb type surface	r= area damaged surface / total surface of slab (%) h=maximum depth of damage	0	Nil, not discernible
			1	r < 2 %
			2	r =2-10%
			3	r=10-25%
			4	r=25-50%
			5	r >50% and h>25 mm
8	Scaling	r= area damaged surface / total surface of slab (%) h=maximum depth of damage	0	Nil, not discernible
			1	r < 2 %
			2	r =2-10%
			3	r=10-20%
			4	r=20-30%
			5	r >30% and h>25 mm

S. No	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating
9	Polished Surface/ Glazing	t=texture depth sand patch test	0	
			1	t > 1mm
			2	t=1-0.6 mm
			3	t=0.6-0.3 mm
			4	t=0.3-0.1 mm
			5	t<0.1 mm
10	Pop out (small Hole), Pothole Refer Para 8.4	n=number/m2 d=diameter h= maximum depth		
			0	d<50 mm; h<25 mm; n <1 per 5 m^2
			1	d=50-100 mm: h<50 mm: n<1 per 5 m^2
			2	d=50-100 mm: h>50 mm: n<1 per 5 m^2
			3	d=100-300 mm: h<100 mm: n<1 per 5 m^2
			4	d=100-300 mm: h>100 mm: n<1 per 5 m^2
			5	d>300 mm: h>100 mm: n>1 per 5 m^2
	JOINT DEFECTS			
11	Joint Seal Defects	Loss or damage L=Length as % total joint length	0	Difficult to discern.
			1	Discernible, L<25% but of little immediate consequence eighth regard to ingress of water or trapping incompressible material.
			3	Notable, L>25% insufficient protection against ingress of water and trapping in incompressible material.
			5	Severe; w>3 mm negligible protection against ingress of water and trapping in incompressible material.
12	Spalling of Joints	w= width on either side of the joint L= Length as % total joint length		
			0	Nil, not discernible
			1	w<10 mm
			2	w=10-20 mm, L<25%
			3	w=20-40 mm, L >25%
			4	w=40-80mm, L >25%
			5	w>80mm, and L>25%
13	Faulting (or stepping) in Cracks or Joints	f=difference of level	0	Not discernible, f< 1 mm
			1	f< 3 mm
			2	f=3-6 mm
			3	f=6-12 mm
			4	f=12-18 mm
			5	f>18 mm
14			0	Nil, not discernible

S. No	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating
	Blow up or buckling	h=vertical displacement from normal profile	1	h< 6 mm
			2	h=6-12 mm
			3	h=12-25 mm
			4	h>25 mm
			5	shattered slabs, i.e., 4 or more pieces
15	Depression	h= negative vertical displacement from profile L= Length		
			0	Nil, not discernible, h<5 mm
			1	h=5-15 mm
			2	h=15-30 mm. Nos < 20% joints
			3	h=30-50 mm
			4	h>50mm or >20% joints
			5	h>100 mm
16	Heave	h= positive vertical displacement from profile L= Length	0	Nil, not discernible, h<5 mm
			1	h=5-15 mm
			2	h=15-30 mm. Nos < 20% joints
			3	h=30-50 mm
			4	h>50 mm or >20% joints
			5	h>100 mm
17	Bump	h=vertical displacement from normal profile	0	h<4 mm
			1	h=4-7 mm
			3	h= 7 - 15 mm
			5	h>15 mm
			0	Nil, not discernible f<5 mm
18	Lane to Shoulder Dropoff	f=difference of level	1	f=3-10 mm
			2	f=10-25 mm.
			3	f=25-50 mm
			4	f=50-75 mm
			5	f >75 mm
19	**DRAINAGE**			
	Pumping	quantity of fines and water expelled through open joints and cracks Nos/ 100 m stretch	0	Not discernible
			1 to 2	slight / occasional Nos <10%
			3 to 4	appreciable / Frequent 10-25%
			5	Abundant, crack development>25%
20	Ponding		0-2	No discernible problem

S. No	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating
		Ponding on slabs due to blockage of drains	3 to 4	Blockages observed in drains, but water flowing
			5	Ponding, accumulation of water observed

The rigid pavement condition summary of each section in lane wise is presented from Table 9-8.

Table 9-8: Rigid Pavement Distress Summary (Toll Plaza):

Annexure 9-4: Rigid Distress Summary as per IRC SP 83-2018:SH-7 & SH-17 AMTL									
Distress	**Unit**	**TP-01 LHS**	**TP-01 RHS**	**TP-02 LHS**	**TP-02 RHS**	**TP-03 LHS**	**TP-03 RHS**	**TP-04 LHS**	**TP-04 RHS**
Single discrete Cracks	Rm.	4.500	0.000	0.000	16.000	0.000	0.000	0.000	0.000
Transverse Cracks	Rm.	57.500	52.500	14.000	0.000	14.000	14.000	3.500	14.000
Longitudinal Cracks	Rm.	100.750	12.000	35.000	31.500	10.000	10.000	0.000	0.000
Multiple Cracks	Rm.	50.000	42.000	0.000	0.000	0.000	0.000	0.000	0.000
Corner Cracks	Rm.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Joint Seal Defects	Rm.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Joint Separation	Rm.	0.000	0.000	0.000	402.500	0.000	0.000	0.000	0.000
Joint Spalling	Rm.	30.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ravelling/ Scaling	Sq. m	42.000	167.500	542.500	0.000	635.000	635.000	875.000	875.000
Pothole	Sq. m	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000







Figure 9-4 Field testing photographs captured during the NSV survey

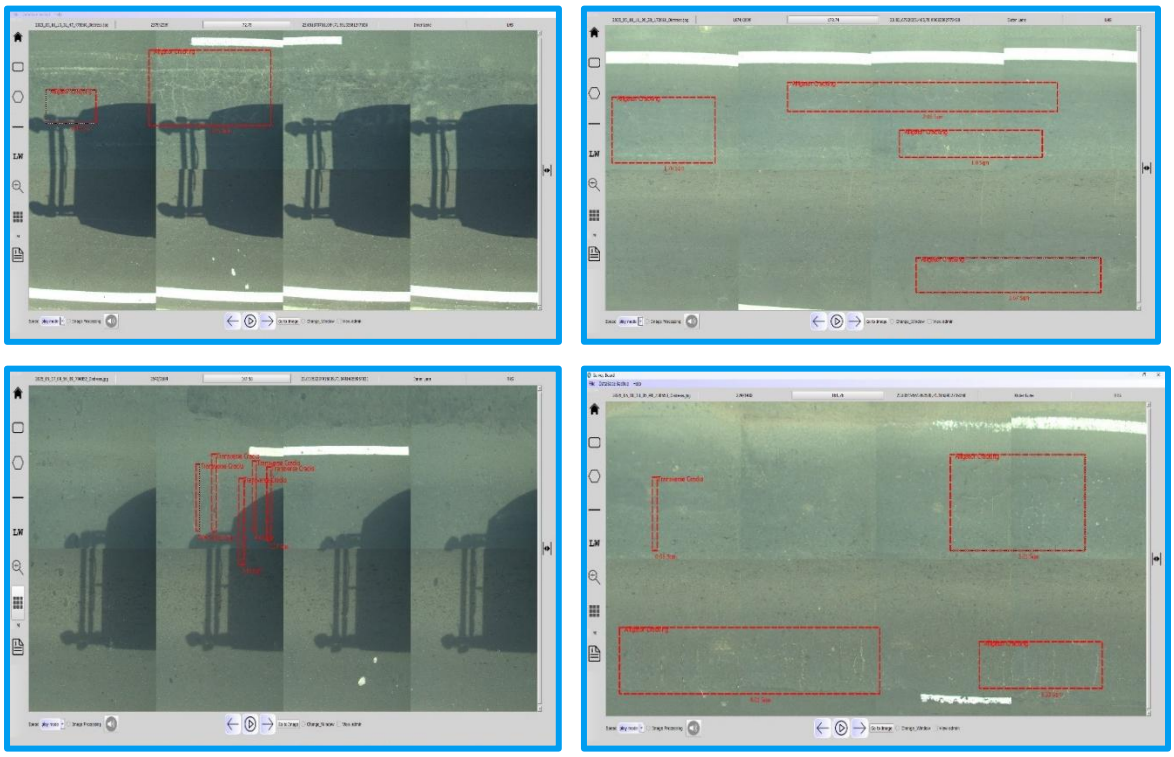


Figure 9-5 : Distress Mapping Photographs- Flexible Pavement



Figure 9-6: Investigation Photographs- Rigid Pavement (Toll Plaza)

9.4 Structural Evaluation of Flexible Pavement by Using FWD

9.4.1 Equipment Description and Test Methodology

Principle of Pavement Evaluation Using FWD

Performance of flexible pavements can be evaluated by applying loads on the pavements that simulate the actual traffic loading conditions, The recording of such responses is made by measuring the elastic deflection under such loads. The collected deflection data from survey is duly analysed considering the factors influencing the performance of pavement such as subgrade strength, thickness and quality of each of the pavement layers, drainage conditions, pavement surface temperature etc.

Among the equipment available for structural evaluation of pavements, the Falling Weight Deflectometer (FWD) is extensively used world-wide because it simulates, to a large extent, the actual loading conditions of the pavement. When a moving wheel load passes over the pavement it produces load pulses. Normal stresses (vertical as well as horizontal) at a location in the pavement will increase in magnitude from zero to a peak value as the moving wheel load approaches the location. The time taken for the stress pulse to vary from zero to peak value is termed as 'rise time of the pulse'. As the wheel moves away from the location, magnitude of stress reduces from peak value to zero. The time during which the magnitude of stress pulse varies from 'zero-to-peak-to-zero' is the pulse duration. Peak load and the corresponding pavement responses are of interest for pavement evaluation.

The resulting load-deflection data can be interpreted through appropriate analytical techniques, such as back calculation technique, to estimate the elastic moduli of the pavement layers. The computed moduli are, in turn, used for (i) the strength evaluation of different layers of in-service pavements (ii) the estimation of the remaining life of in-service pavement (iii) determination of strengthening requirement, if any and (iv) evaluation of different rehabilitation alternatives (overlay, recycling, partial reconstruction, etc

Brief Description of Falling Weight Deflectometer (FWD)

Falling Weight Deflectometer is an impulse-generating device with a guide system. This device allows a variable weight to be dropped from a variable height. The apparatus has a loading plate which is used for uniform force distribution on the test layer. When the weight affects this plate, this loading plate ensures that the resulting force is applied perpendicularly to the test layer's surface. It also has a load cell for measuring the actual applied impulse. It also has one or more deflection sensors. (Note: Deflection basin tests require at least seven sensors). It also has a system for collecting, processing, and storing deflection data. Structural evaluation of pavements involves application of a standard load to the pavement and measuring its response in terms of stress, strain or deflection.
The basic working principle of the impulse loading equipment is to drop a mass on the pavement to produce an impulse load and measure the surface deflections. The mass is dropped on a spring system, which in turn transmits the load to the pavement through a loading plate. The resulting deflection bowl characteristics are observed and used in the back calculation of pavement material properties. The principle is illustrated in Figure 9-7

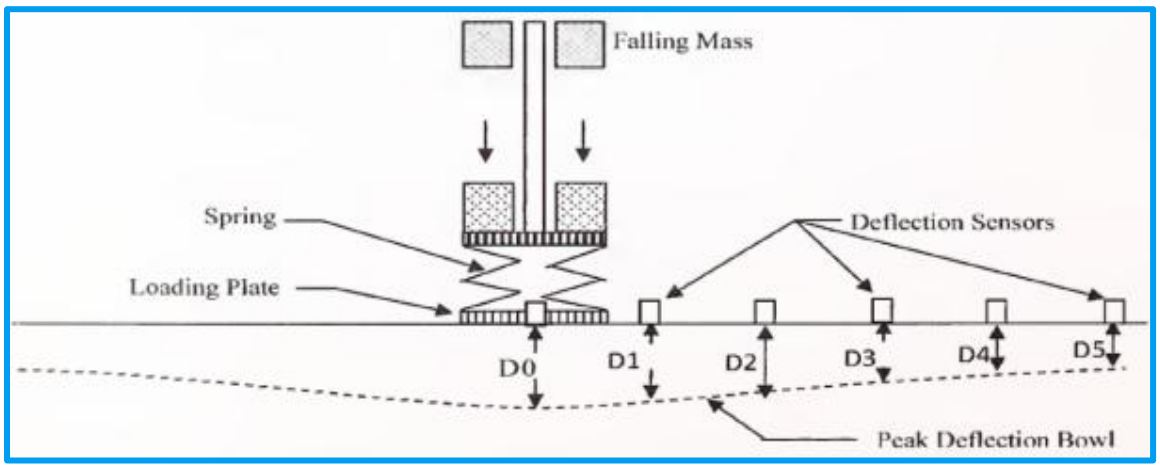


Figure 9-7: Working Principle of FWD

FWD Instrument Used for the Deflection Survey: DYNATEST 8002 FWD

To conducting FWD survey on the project road **DYNATEST 8002 FWD** Fully Automatic Vehicle-Mounted FWD was used. The FWD can apply a loading in the range of 12-150 KN, enabling it to simulate all type of vehicle loads on pavement surface. This model is complete with back-up battery and vehicle mounted with all other accessories for evaluation of pavements.
Moreover, this instruments mostly outperforms or matches all the criteria given in the IRC: 115-2014.

Testing Procedure and Methodology

The detailed test methodology and procedure was described in IRC: 115-2014 "Guidelines for Structural Evaluation and Strengthening of Flexible Road Pavements Using Falling Weight Deflectometer (FWD) Technique". However, as per the client's requirement the sampling procedure was customized in this project. In adherence to the same, structural evaluation of the existing 'pavement and subgrade system' by measuring its response in terms of deflection was carried out using FWD for the project road in the month of May 2025 (07/05/2025 to 11/05/2025).
Evaluation of pavement structural strength is carried out in accordance with requirements of TOR and IRC: 115-2014.

Testing Equipment

The equipment used for the testing is:

- DYNATEST 8002 FWD Vehicle Mounted Falling Weight Deflectometer with 1 loading plate and 7 numbers of geophones placed at the spacing of 0, 300, 600, 900, 1200, 1500 and 1800mm from the centre of the loading plate.
- GPS, Air Temperature and Pavement Surface Temperature sensors as part of the FWD instrument.
- Glycerol and digital thermometer.
- Red flags and red cones and flashing lamps for traffic arrangement.

FWD Deflection Testing Points and Measurement

FWD deflection measurement has been carried out for each lane in both directions. FWD deflection measurement has been carried out at a test point along outer wheel path of each lane which is at an offset of 0.75m from the outer edge of outer lane, at 4.2m from the outer edge of outer lane as specified in section 5.4.5 of IRC: 115-2014. At every measurement location, four drops were made, such that the first drop is neglected as 'seating drop' and the rest three drops' deflections are recorded. Photographs of FWD test under progress at some locations are shown in Figure 9-8



Figure 9-8: Photographs showing FWD survey under progress

Also, during survey pavement temperature of bituminous layer was recorded as per the procedure specified in section 5.4.7, xiii of IRC: 115-2014.

The following steps are carried out for measuring deflections at a test point:

i. Mark the test point on the pavement
ii. Centre the load plate over the test point
iii. Lower the loading plate onto the pavement ensuring there should be no standing water on the pavement surface. The loading plate should be in proper contact with pavement surface.

The longitudinal and transverse slope of the pavement should not exceed 10 percent at the test location.

iv. Lower the frame holding the geophones so that the transducers are in contact with pavement surface.

v. Raise the mass to a pre-determined height required for producing a target load of 40 kN (+10%).

vi. Drop one seating load. The load and deflection data for this seating load is not recorded.

vii. Raise the mass and drop. Record the load and deflection data into the computer through data acquisition system. While peak load and peak deflections at different selected radial positions must be recorded. At least 2 drops should be made at one location for precision.

viii. If, during previous 2 steps, the deflections measured are giving variations or the deflections/load pulses are not proper, repeat the test drop.

ix. Raise the geophone frame and load plate and move to the next test location

x. Deflection measurements should not be made when the pavement temperature is more than 45°C.

9.4.2 Existing Pavement Composition Details

The crust composition details used for analysis are presented in Table 9-9, Table 9-10 and Table 9-11. Thickness in the table is taken as the maximum of core height and test pit.

Table 9-9: Details of BT Thickness in LHS Direction

BT Thickness from Max of Core & Test pit					
LHS Inner			LHS Outer		
From	To	BT thicknesses	From	To	BT thicknesses
13.930	25.350	185	13.930	34.700	210
25.350	45.350	170	34.700	54.475	200
45.350	65.050	380	54.475	74.775	190
65.050	85.050	170	74.775	94.425	160
85.050	104.750	165	94.425	115.525	290
104.750	125.725	200	115.525	135.700	165
125.725	145.975	170	135.700	154.900	180
145.975	164.750	215	154.900	174.800	190
164.750	182.200	195	174.800	188.900	190
182.200	194.633	200	188.900	194.633	200

Table 9-10: Details of BT Thickness in RHS Direction

BT Thickness from Max of Core & Test pit					
RHS Inner			RHS Outer		
From	To	BT thicknesses	From	To	BT thicknesses
13.930	26.700	190	13.930	23.550	300
26.700	36.500	150	23.550	32.900	115
36.500	55.200	320	32.900	43.900	200
55.200	79.800	210	43.900	64.500	280
79.800	99.500	170	64.500	89.600	170
99.500	120.800	180	89.600	110.500	195
120.800	140.000	210	110.500	131.000	165

BT Thickness from Max of Core & Test pit					
RHS Inner			RHS Outer		
From	To	BT thicknesses	From	To	BT thicknesses
140.000	158.900	145	131.000	151.050	180
158.900	180.600	170	151.050	170.850	180
180.600	194.633	175	170.850	194.633	175

Table 9-11: Details of Granular Thickness in BHS Direction

Granular thicknesses from Test pits					
LHS			RHS		
From	To	Granular	From	To	Granular
13.930	19.700	480	13.930	24.125	280
19.700	29.575	500	24.125	34.275	440
29.575	39.175	440	34.275	44.000	340
39.175	49.450	400	44.000	53.425	460
49.450	59.050	380	53.425	63.425	400
59.050	68.975	470	63.425	73.925	400
68.975	79.075	380	73.925	84.100	450
79.075	88.800	450	84.100	94.175	390
88.800	99.025	400	94.175	104.100	450
99.025	108.775	420	104.100	113.700	400
108.775	115.350	400	113.700	123.550	350
115.350	120.625	450	123.550	133.950	470
120.625	128.975	370	133.950	140.850	400
128.975	138.825	410	140.850	146.125	450
138.825	148.855	380	146.125	154.300	470
148.855	159.130	400	154.300	164.025	420
159.130	169.140	440	164.025	173.975	520
169.140	178.565	400	173.975	183.450	410
178.565	186.925	450	183.450	190.975	440
186.925	194.633	390	190.975	194.633	400

9.4.3 Pavement Condition

During the FWD survey, the pavement surface was generally observed to be in good condition throughout the entire project road. The same condition is considered for providing the input for back-calculation as per IRC:115-2014.

9.4.4 In-put Data for Back Calculation Analysis

(a) Processing of Load and Deflection data

The FWD test data collected from different drops at each test point primarily consists of peak load and peak deflections at different radial locations. Unrealistic deflection values and obviously erroneous data must be removed.

Average values of load and deflections are calculated from the three drop test data collected. FWD tests were carried out using 40 kN impulse load. However, since the FWD equipment does not impart

the same load at every test point, normalization of all measured deflections was carried out to a common test load of 40 kN. Such 'normalization' of the data was carried out using the following formula:

$D_n = 40kN/L_m \times D_m$

were,

D_n = Normalized Deflection.

L_m = Imparted Load and

D_m = Measured Deflection

The "normalized deflection data" was then used for determining deflections, deflection bowl and finally in framing of homogeneous sections and calculation of overlay requirements.

Back-calculation of Layer Moduli

Layer moduli have been back calculated using KGPBACK program. The pavement has been modelled as a three-layer system with bituminous layer, granular layer and subgrade. The following inputs have been provided for back analysis.

- Single wheel load 40 kN and contact pressure 0.56 MPa
- No. of deflection sensors: 7
- Radial Distances of the Geophones i.e., 0, 300, 600, 900, 1200, 1500 and 1800
- Measured Surface Deflections normalized to 40kN in mm
- Pavement Layer Thicknesses
- Poisson's ratio of 0.35 is considered for bituminous, granular and subgrade layers.
- Range of Possible modulus value (Lower and Upper limits) of bituminous layer, granular layer and subgrade

Range of different layers moduli given as input to KGPBACK for back-calculation. These ranges selected judiciously by an experienced pavement engineer taking into considerations about approximate age of pavement, visual assessment of the condition of bituminous layer, prevailing climatic conditions during deflection measurements and based on information available from test pits, laboratory tests conducted as detailed in the sections below:

(b) Range of modulus for existing subgrade:

The range of moduli of existing subgrade layers is taken as 50-100 MPa.

(c) Range of modulus value of existing granular layers i.e., base and subbase:

The range of moduli of existing granular layers is based on clause II.8.4 of IRC 115-2014.The range for combined (base and sub-base) is taken as 200-500 MPa.

(d) Range of modulus value of existing bituminous layers:

The range of moduli of existing thick bituminous layer has been determined based on condition data. As the road condition is good the range is considered as per client requirement 1700MPa to 3000MPa.

9.4.5 Correction for data analysis

Correction for Temperature

Back-calculated moduli values of the bituminous layers evaluated by FWD survey are influenced by the pavement temperature. The standard pavement temperature for India is recommended as 35°C, hence the back-calculated moduli obtained at temperatures other than the identified standard

temperature will have to be corrected using a suitable correction factor using equations 4 and 5 of IRC:115-2014 and the same is extracted below for ready reference.

ET1 = λ ET2

Were,

λ, temperature correction factor, is given as

λ = (1-0.238 lnT1) / (1-0.238 lnT2)

Were,

ET1 = Back-calculated modulus (MPa) at temperature T1 (°C)

ET2 = Back-calculated modulus (MPa) at temperature T2 (°C)

Correction for Seasonal Variation

Moisture content affects the strength of subgrade and granular subbase/base layers. The below equations are provided for Summer and Winter Seasonal reference.

$$E_{sub_mon} = 3.351 * (E_{sub_win})^{0.7688} - 28.9 \ldots (6)$$

$$E_{sub_mon} = 0.8554 * (E_{sub_sum}) - 8.461 \ldots (7)$$

were,

E_{sub_mon} = subgrade modulus in monsoon (MPa)

E_{sub_sum} = subgrade modulus in Summer (MPa)

E_{sub_win} = subgrade modulus in Winter (MPa)

$$E_{gran_mon} = -0.0003 * (E_{gran_sum})^2 + 0.9584 * (E_{gran_sum}) - 32.989 \ldots (8)$$

$$E_{gran_mon} = 10.5523 * (E_{gran_win})^{0.624} - 113.857 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (9)$$

were,

E_{gran_mon} = granular layer modulus in monsoon (MPa)

E_{gran_sum} = granular layer modulus in Summer (MPa)

E_{gran_win} = granular layer modulus in Winter (MPa)

As the survey is conducted during summer period and hence the correction is required as per IRC: 115-2014 for granular & subgrade.

9.5 Remaining Life Estimation

The in-service three-layer pavement system has been analysed with the back-calculated corrected layer moduli and layer thicknesses. The critical strains have been calculated by IITPAVE program. From the performance criteria equations, the residual/remaining rutting and fatigue life have been estimated.

The remaining life is presented in Table 9-12 and Table 9-13. The graphical presentation of remaining life is in Figure 9-9

Table 9-12: Obtained remaining life of MCW on LHS direction

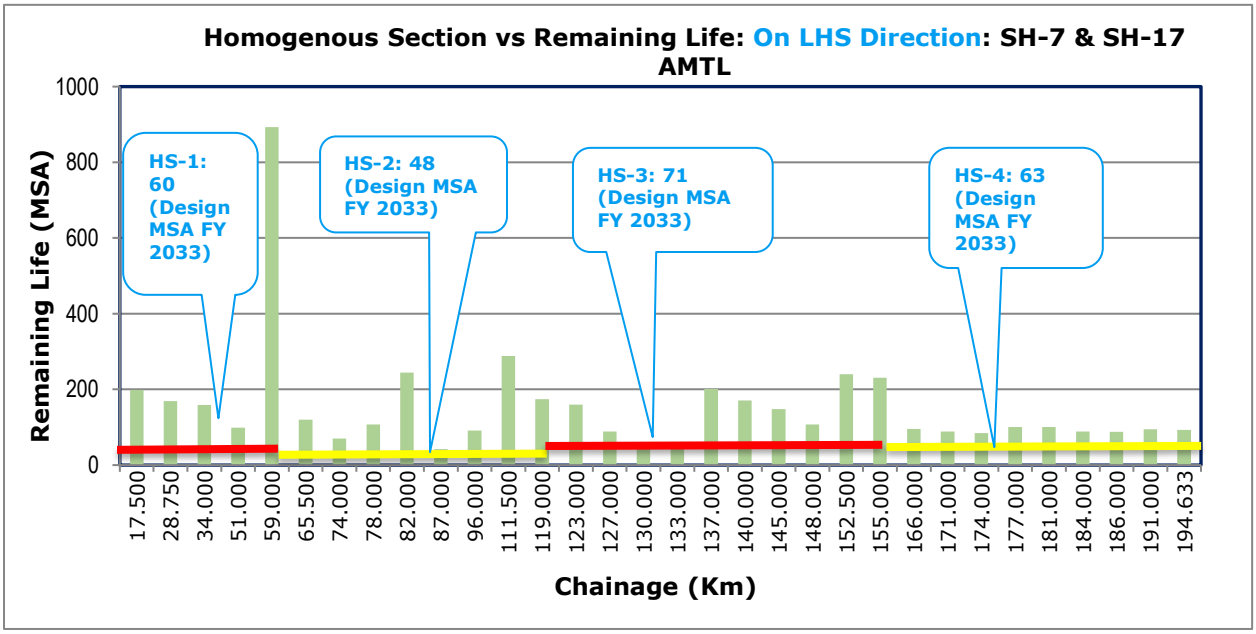
Chainage (km)		Remaining life in LHS Direction
From	To	
13.930	17.500	199.04

Chainage (km)		Remaining life in LHS Direction
From	To	
17.500	28.750	169.27
28.750	34.000	158.62
34.000	51.000	98.98
51.000	59.000	893.06
59.000	65.500	119.80
65.500	74.000	69.97
74.000	78.000	107.55
78.000	82.000	244.04
82.000	87.000	42.19
87.000	96.000	91.48
96.000	111.500	288.14
111.500	119.000	173.73
119.000	123.000	160.10
123.000	127.000	88.81
127.000	130.000	56.42
130.000	133.000	50.43
133.000	137.000	201.07
137.000	140.000	171.04
140.000	145.000	147.89
145.000	148.000	107.62
148.000	152.500	240.33
152.500	155.000	230.64
155.000	166.000	95.44
166.000	171.000	88.83
171.000	174.000	84.86
174.000	177.000	100.74
177.000	181.000	100.32
181.000	184.000	88.35
184.000	186.000	87.80
186.000	191.000	94.47
191.000	194.633	92.57

Table 9-13: Obtained remaining life of MCW on RHS direction

Chainage (km)		Remaining life in RHS Direction
From	To	
13.930	22.500	159.28
22.500	27.000	298.17
27.000	57.000	162.62
57.000	59.000	176.69
59.000	69.000	140.99
69.000	72.000	281.41
72.000	78.000	205.61
78.000	83.000	233.83
83.000	86.000	182.04
86.000	90.000	120.99
90.000	94.000	178.33

Chainage (km)		Remaining life in RHS Direction
From	To	
94.000	99.000	308.21
99.000	104.000	375.19
104.000	108.000	446.13
108.000	110.000	456.99
110.000	114.000	83.54
114.000	117.000	141.28
117.000	119.000	280.47
119.000	123.000	89.29
123.000	126.000	126.74
126.000	129.000	74.25
129.000	132.000	115.64
132.000	134.000	116.49
134.000	136.000	109.63
136.000	140.000	104.11
140.000	144.000	104.50
144.000	147.000	188.38
147.000	151.000	208.83
151.000	153.000	68.08
153.000	155.000	116.17
155.000	158.000	254.79
158.000	180.000	157.27
180.000	184.000	60.54
184.000	187.000	101.72
187.000	189.000	210.98
189.000	191.000	131.21
191.000	194.633	183.19



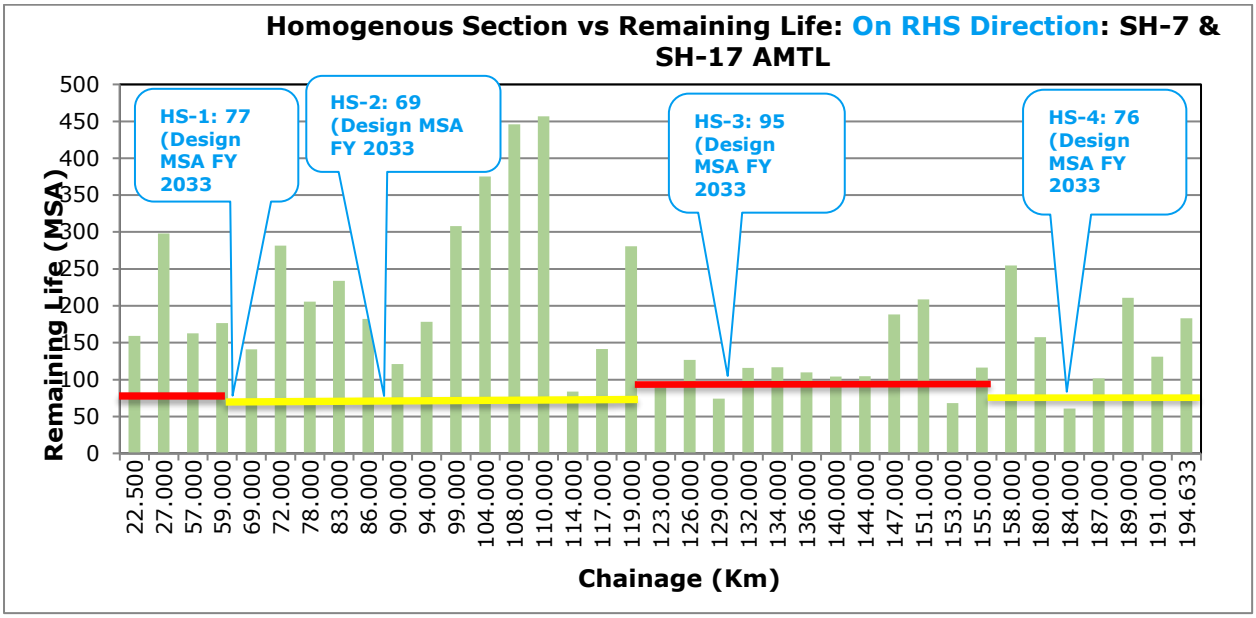


Figure 9-9: Illustrative summary of remaining life on both Directions (MCW)

9.6 Traffic Survey and Analysis

Axle load survey of 48 hrs has been conducted at all Toll Plaza location. The AADT and growth rates required for the further computations are provided by the client.

9.6.1 Annual Average Daily Traffic

The Annual Average Daily Traffic (AADT) in the FY 2026 are presented in Table 9-14.

Table 9-14: AADT of commercial vehicles at all toll plaza in both directions FY 2026

Location/ Toll Plaza	BUS	LCV	2-axle	3-axle	MAV
Sanand Toll Plaza	2036	1756	1485	660	4621
Malvan Toll Plaza	462	523	780	304	4602
Soladi Toll Plaza	556	694	841	380	6055
Aniyari Toll Plaza	286	439	630	329	5253

*For MSA calculation purposes, a direction distribution of 50% is considered for both LHS and RHS direction.

9.6.2 Vehicle Damage Factor

The axle load survey was conducted at all four-toll plaza; the number of equivalent 8.16 t standard axles for the different categories of commercial vehicles have been determined based on the axle load surveys.

The equations for computing equivalency factor for single, tandem and tridem axles given below is used as directed in the IRC: 37-2018 for converting different axle load repetitions into equivalent standard axle load repetitions.

- Single axle with single wheel on either side = {axle load in kN / 65}^{4}
- Single axle with dual wheel on either side = {axle load in kN / 80}^{4}

- Tandem axle with single wheel on either side = {axle load in kN /148}^{4}
- Tridem axle with dual wheel on either side = {axle load in kN /224}^{4}

Referring to section 4.4.3 of IRC 37-2018, some tandem axles have only one (single) wheel on each side of the axle. In such cases, each axle of the tandem axle set may be considered as two separate single axles (with single wheels). Similarly, if the axle spectrum has a tridem axle with single wheels, it may be considered as three separate single axles having single wheels.

VDF values are obtained as per the analysis of 48hrs axle load data and the VDF summary is presented in Table 9-15.

The sample photographs axle load survey is shown in Figure 9-10

Table 9-15: Summary of Vehicle Damage Factor

S.no	Location	Direction	BUS	LCV	2axle	3axle	MAV
TP-01	Sanand Toll Plaza	LHS	0.984	0.490	1.647	3.081	8.272
		RHS	1.080	0.689	2.164	4.183	10.656
TP-02	Malvan Toll Plaza	LHS	0.953	0.579	1.569	2.768	7.224
		RHS	0.816	0.677	2.143	5.563	10.485
TP-03	Soladi Toll Plaza	LHS	0.989	0.631	1.853	2.519	8.369
		RHS	1.107	1.105	3.124	5.924	10.866
TP-04	Aniyari Toll Plaza	LHS	1.410	0.630	2.674	2.714	8.541
		RHS	1.331	0.998	3.117	5.767	10.105



Figure 9-10: Photographs showing Axle load Survey

9.6.3 Design Traffic (Cumulative Number of Standard Axles)

The traffic loading in terms of the cumulative number of standard axles for the given period has been computed using the following relationship as given in IRC: 37-2018.

$$N = \frac{365 \times \left\{(1+r)^n - 1\right\}}{r} \times A \times D \times F$$

Were,

N = Cumulative number of standard axles to be catered for the design life in terms of MSA.

r = Annual growth rate of commercial vehicles

n = Design life in years

A = Initial traffic in the year of completion of construction in terms of number of commercial vehicles per day exceeding 3 ton

D = Lane distribution factor

F = Vehicle Damage Factor

Based on the preceding discussions, the traffic loading in terms of cumulative number of equivalent 8.16 t standard axle loads, the AADT was provided by concessionaire and Actual growth rates are considered on year on year, and the design traffic was projected for next 8 years (FY 2033 end of concession period). Design traffic for flexible pavement design is computed and summarized in Table 9-16.

Table 9-16: Design Traffic (MSA) till end of the Concession Period (FY 2033)

Location	Design Traffic (MSA) up to FY- YR 2033	
	LHS	RHS
HS-1 from Km 13.930 to Km 59.000 Sanand Toll Plaza (TP-01)	60	77
HS-2 from Km 59.000 to Km 119.000 Malvan Toll Plaza (TP-02)	48	69
HS-3 from Km 119.000 to km 155.000 Soladi Toll Plaza (TP-03)	71	94
HS-4 from Km 155.000 to Km 194.630 Aniyari Toll Plaza (TP-04)	63	76

Note: MSA is rounded up to the next digit number

9.7 Required Overlay Calculation as Per FWD Analysis

Based on the remaining life assessment, it is observed that certain sections of the existing pavement do not meet the required design life till end of the concession period. The Homogenous sections and their corresponding MSA is shown in the above Table 9-16

To ensure these sections can sustain the projected traffic load, the required additional overlay thicknesses have been computed using IIT-Pave

The summarised overlay thicknesses chainage wise are presented in Table 9-17. The overall summary of different overlay thicknesses for LHS and RHS directions is presented in Table 9-18.

Table 9-17: Required Overlay as per FWD

Chainage (Km)		Side (LHS/ RHS)	Length (km)	Recommended Overlay (mm)	
From	To			BC (mm)	DBM (mm)
82.000	87.000	LHS	5.000	40	-
127.000	130.000	LHS	3.000	40	-
130.000	133.000	LHS	3.000	40	-
119.000	123.000	RHS	4.000	40	-
126.000	129.000	RHS	3.000	40	-
151.000	153.000	RHS	2.000	40	-
180.000	184.000	RHS	4.000	40	-

Table 9-18: Direction-wise summary of required overlay thickness as per FWD

Rehabilitation/ Repairing Strategy	Treatment length in km	
	LHS	RHS
40mm BC Overlay	11.000	13.000

10. DEVELOPMENT OF O&M STRATEGY

10.1 General

The Concessionaire is responsible for Operation & Maintenance of the Project Highway in accordance with the provisions of the Concession Agreement.

10.2 Maintenance Requirements as per Schedule K.

The concessionaire shall always maintain that during the Operation Period, the Project Highway conforms to the maintenance requirements set forth in Schedule K.

Repair/ Rectification of Defects and deficiencies specified in Schedule K within time limit set forth hereunder.

Table 10-1: Maintenance requirements with timelines

A: Schedule K		
S. No.	**Nature of Defect/ Deficiency**	**Timelines for Repair/ Rectification**
Project Highway		
(a)	**Carriageway and paved shoulders**	
(i)	Breach or blockade	Time Limit: Temporary restoration of traffic within 24 hours; permanent restoration within 07 (Seven) days.
(ii)	Roughness value Exceeding 2,500 mm in a stretch of 1 km (as measured by a calibrated bump integrator)	Time Limit: 180 (One Hundred and Eighty) days
(iii)	Potholes	Time Limit: 24 hours
(iv)	Cracking in more than 5% of road surface in a stretch of 1 Km	Time Limit: 15 days
(v)	Rutting exceeding 10mm in more than 2% of the road surface in a stretch of 1 km (measured with 3m straight edge)	Time Limit: 15 days
(vi)	Bleeding / Skidding	Time Limit: 03 (Three) days
(vii)	Ravelling / Stripping of Road surface exceeding 10 sq.m road	Time Limit: 07 (Seven) days.
(viii)	Damages to Pavement edges exceeding 10 cm	Time Limit: 07 (Seven) days.
(ix)	Removal of debris	Time Limit: 06 hours
(b)	**Hard / earth shoulders, side slopes, drains and culverts.**	
(i)	Variation by more than 2% in the prescribed slope of camber / cross fall	Time Limit: 15 (Fifteen) days.
(ii)	Edge drop at shoulders exceeding 40 mm	Time Limit: 04 (Four) days
(iii)	Variation by more than 15% in the prescribed side (embankment) slopes	Time Limit: 15 (Fifteen) days

A: Schedule K

S. No.	Nature of Defect/ Deficiency	Timelines for Repair/ Rectification
(iv)	Rain cuts / gullies in slope	Time Limit: 07 (Seven) days
(v)	Damage to or silting of culverts and side drains during and immediately preceding the rainy season	Time Limit: 07 (Seven) days
(vi)	Desilting of drains in urban / semi-urban areas	Time Limit: 48 hours
(C)	**Roadside furniture including road signs and pavement marking**	
(i)	Damage to shape or position, poor visibility or loss of retro-reflectivity	Time Limit: 24 hours
(d)	**Street lighting and telecom (ATMS)**	
(i)	Any major failure of the system	Time Limit: 24 hours
(ii)	Faults and minor failures	Time Limit: 08 hours
(e)	**Trees and plantation**	
(i)	Obstruction in a minimum headroom of 5 m above carriageway or obstruction in visibility of road signs	Time Limit: 12 hours
(ii)	Deterioration in health of trees and bushes	Time Limit: Timely watering and treatment
(iii)	Trees and bushes requiring replacement	Time Limit: 30 days
(iv)	Removal of vegetation affecting sight line and road structures	Time Limit: 03(Three) days
(f)	**Rest areas**	
(i)	Cleaning of toilets	Time Limit: Every 4 hours
(ii)	Defects in electrical, water and sanitary installations	Time Limit: 12 hours
(g)	**Toll plaza**	
(i)	Failure of toll collection equipment or lighting	Time Limit: Every 6hours
(ii)	Damage to toll plaza	Time Limit: 03 (Three) days
(h)	**Other Project Facilities and Approach roads**	
(i)	Damage in approach roads, pedestrian facilities, truck laybys, bus-bays, cattle crossings, (Traffic Aid Posts, Medical Aid Posts) and service road	Time Limit: 10 (Ten) days.
Bridges		
(a)	**Superstructure**	*Cracks* Temporary measures Time Limit: Within 24 Hours

A: Schedule K		
S. No.	**Nature of Defect/ Deficiency**	**Timelines for Repair/ Rectification**
		Permanent measures Time Limit: Within 30 days *Spalling / Scaling* Time Limit: Within 07 days
(b)	**Foundations**	Scouring and/or cavitation Time Limit: 07 (Seven) days
(c)	**Piers, abutments, return walls and wing walls**	*Cracks and damages including settlement and tilting.* Time Limit: 15 (Fifteen) days
(d)	**Bearings (metallic) of bridges**	*Deformation* Time Limit: 15 (Fifteen) days;
(e)	**Joints in bridges**	*Loosening and malfunctioning of joints* Time Limit: 07 (Seven) days
(f)	**Other items relating to Bridges**	
(i)	Deforming of pads in elastomeric bearings	Time Limit: 03 (Three) days
(ii)	Gathering of dirt in bearings and joints; or clogging of spouts, weep holes and vent-holes	Time Limit: 03 (Three) days
(iii)	Damage or deterioration in kerbs, parapets, handrails and crash barriers	Time Limit: 03 (Three) days.
(iv)	Rain-cuts or erosion of banks of the side slopes of approaches	Time Limit: 07 (Seven) days
(v)	Damage to wearing coat	Time Limit: 07 (Seven) days
(vi)	Damage or deterioration in approach slabs, pitching, apron, toes, floor or guide bunds	Time Limit: 15 (Fifteen) days.
(vii)	Growth of vegetation affecting the structure or obstructing the waterway	Time Limit: 03 (Three) days
(g)	**Underpasses/RUBs**	Clearence of flooding Time Limit: 36Hours

10.3 Immediate Repair/ Rehabilitation-Combined (Surface Distress)

Functional evaluation of pavement is conducted with NSV equipment to assess the present condition of the road, and to observe locations where roughness (RI) exceeds the limiting value (>2,500mm/km) specified in Annexure-I of Schedule-K. All appropriate technical and contractual parameters are carefully reviewed to assess the strategy of immediate repair.

10.4 Major Maintenance Schedule

Based on the discussions and inputs, the overlay cycles have been derived. The MM schedule for the main carriageway is presented in Table 10-2 .

Table 10-2: M&M Schedule- Main carriageway

Year	MM LHS of MCW	MM RHS of MCW	MM of SR	Remarks
YR 2029 - YR 2030	40 mm BC On 100% length	40 mm BC On 100% length		1st Cycle
YR 2032 - YR 2033	30 mm BC On 10% length			Before start of Concession period for Six Laning

11. COST ESTIMATE

11.1 General

Cost Estimates have been worked out for expenses on Immediate Works (CAPEX) and expenses on operations and maintenance (OPEX). The cost estimates have been worked out at present rates considering 2025-26 as the base year.

11.2 Assumptions

The cost estimates are based on the following assumptions:

(a) Bitumen has been assumed to be sourced from IOCL Koyali Refinery. The distance (to & fro) from the midpoint of Project Highway is taken as 212 km. Modified Bitumen and VG-40 grade bitumen is considered in our cost estimate.

(b) Hire charges for the Machinery have been considered in accordance with Standard Data Book - 2020 and escalation have been considered to reach the current base rate. Rates for various items of works have been arrived at based on 'Standard Data Book for Analysis of Rates' published by MORT&H.

(c) Manpower rates have been taken from Minimum Wages Order, Government of Gujarat, issued on 30 March 2025 and effective from 01 April 2025.

(d) Material Rates are obtained from Halvad, Local vendor of the project.

(e) Cement is procured from the nearest local market of Ahmedabad, Viramgam, Malian, Halvad, Maliya.

(f) Tata Steel rates of June 2025 are taken in cost estimate.

(g) Some of the rates are based on Consultant's experience on the similar ongoing projects in adjacent locations.

(h) Overheads and profits have been considered based on MORT&H Standard Data Book. Applicable taxes have been considered in the Rate Analysis.

11.3 CAPEX

Details of CAPEX are worked out under the following categories.

- Immediate maintenance / defect rectification.
- O&M maintenance

11.3.1 Immediate Maintenance

As per site investigation we have considered for immediate maintenance. Few items noticed are covered under routine maintenance.

11.4 O&M Estimates

Operation and Maintenance estimates have been worked out under the following heads:

(a) Preventive Maintenance / Routine Maintenance

(b) Operations

(c) Major Maintenance

11.4.1 Routine Maintenance - Categories

Routine Maintenance covers all activities required to maintain the road in traffic worthy condition to provide desired comforts to the road users. Routine Maintenance can be classified into following three categories:

(a) Routine or day to day maintenance

(b) Pre-monsoon maintenance

(c) Post monsoon maintenance

11.4.1.1 Routine or day to day maintenance

Routine maintenance is required continuously on the road stretch and structures and covers the following activities:

(a) Cleaning of the Road

(b) Pavement maintenance to include crack sealing and pothole repairs

(c) Shoulder repairs

(d) Maintenance of avenue plantation, horticulture, and median plantation

(e) Maintenance of signage, gantry boards and road furniture.

(f) Maintenance of culverts, bridge drainage spouts, expansion joints, side slopes and verges

(g) Surface cleaning, dust or vegetation control, sand removal from structures

(h) Reporting any damage caused to bridges by traffic accidents

(i) Maintenance of guard rails and crash barrier etc.

11.4.1.2 Pre-monsoon Maintenance

This is carried out prior to the monsoons and includes the following:

(a) Inspection of channels/streams to ensure that there are no accumulation of logs, trees and other debris in the vicinity of piers and abutments.

(b) Cleaning of roadside / median drains.

(c) Removal of vegetation growth on sub structures.

(d) Cleaning of culverts.

11.4.1.3 Post-monsoon Maintenance

This includes maintenance that is carried out immediately after the monsoons and includes the following:

(a) Inspection of all structures for any damages and taking appropriate actions.

(b) Cleaning of roadside drains, culverts etc.

11.5 Operations Estimates

11.5.1 Toll Plaza

This cost includes the following:

(a) Maintenance of Toll Plaza building, booths, and tolling equipment.

(b) Security of the booths, lanes, and toll plazas.

(c) Collection of toll and handling of cash till bank deposit.

(d) Provision of IT in-charge, IT supervisor, other staff at Toll Plaza location.

(e) Administration and essential facilities for the staff and road users.

(f) Maintenance of Toll Plaza equipment and replacement of expendable and short life items.

(g) Electricity cost including standby generator.

11.5.2 Highway

This cost includes the following:

(a) Providing one patrolling vehicle including operating cost for round-the-clock patrolling of the Project Highway for each plaza.

(b) Providing of one ambulance at Toll Plaza for accident victims for each plaza.

(c) Provision of one crane with 30 MT and tow truck facilities for clearing the highway and evacuating the breakdown vehicles at Toll Plazas.

(d) Provision of one Broomer for cleaning of the highway.

(e) Expenditure on medical aid and provision of nursing staff.

(f) Cost of tests and surveys.

11.5.3 Energy

As per the Concession agreement, Highway lighting is provided at, Built-up Locations with single and double arm light poles. High Mast lightings are provided at Toll Plazas and Major Intersections. Streetlight luminaries, high mast lights with electricity tariff, provision of standby Genset are considered in the cost estimate.

11.5.4 Miscellaneous

(a) We have taken IE cost as per Industry norms.

(b) Insurance expenses have been taken as per Industry norms.

11.6 Summary of O&M Cost

Summary of yearly O&M cost at present rate is presented in Table 11-1:

Table 11-1: Summary of OPEX (without escalation)

Sl. No.	Item Head	Unit	Rate (in Rs.) (Per Km /Per Month) for 4 Lane	Monthly Cost For FY 2026	Annual Cost in (Rs.) For FY 2026
1	Preventive Maintenance During Operation	Per Month	9,503	1,717,294	20,607,534
2	Routine Maintenance During Operation	Per Month	20,359	3,678,846	44,146,147
3	Highway Lighting	Per Month		938,573	11,262,878
4	Head Office, Admin Office, and Toll Operation manpower cost				
(a)	On roll & off roll staff	Per Month		11,542,925	138,515,102

Sl. No.	Item Head	Unit	Rate (in Rs.) (Per Km /Per Month) for 4 Lane	Monthly Cost For FY 2026	Annual Cost in (Rs.) For FY 2026
5	Incident management expenses	Per Month		2,128,387	25,540,649
6	Toll system & AMC	Per Month		341,667	4,100,000
7	Admin Expenses	Per Month		636,692	7,640,300
8	Professional Fee Expense	Per Month		1,594,383	19,132,591
9	Insurance Fee	Per Month		891,667	10,700,000
10	Survey & Investigation charges	Per Month		208,965	2,507,579
	Total Annual Cost in Rs.			**23,679,398**	**284,152,780**
	Total Annual Cost in Crore.			**2.37**	**28.42**

11.7 Year Wise Summary of CAPEX & OPEX

Year-wise summary of CAPEX & OPEX for the balance concession period till FY 2037 is estimated and presented in Table 11-2:

Table 11-2: Summary of Year wise CAPEX & OPEX – AMTL

Year			CAPEX				Major Maintenance				OPEX											(CAPEX+MMR+OPEX)	Remarks
Year in Nos	From	To	Pavement Repair	Structure Repair	TMS & ATMS Repair	Sub Total (A)	Periodic Maintenance (Highways)	Periodic Maintenance (Structures)	TMS & ATMS Replacement (Every 6 years)	Sub Total (B)	Preventive Maintenance	Routine Maintenance	Highway Lighting	SPV Staff (On & Off Roll)	Incident Management	AMC for HTMS & TMS	Professional Fee	Insurance Fee	Survey & Investigation charges	Admin Expenses	Sub Total (C)	Grand Total (D) = (A)+(B)+(C)	
1	1-Apr-25	31-Mar-26	-	-	-	-		1.00	1.17	2.18	2.06	4.41	1.13	13.85	2.55	0.41	1.91	1.07	0.25	0.76	28.42	30.59	4 Lane
2	1-Apr-26	31-Mar-27	-	-	-	-				-	2.16	4.64	1.18	14.54	2.68	0.43	2.01	1.12	0.26	0.80	29.84	29.84	4 Lane
3	1-Apr-27	31-Mar-28	-	-	-	-				-	2.27	4.87	1.24	15.27	2.82	0.45	2.11	1.18	0.28	0.84	31.33	31.33	4 Lane
4	1-Apr-28	31-Mar-29	-	-	-	-	136.03	9.60		145.63	2.94	6.02	3.01	16.03	2.96	0.47	2.44	1.36	0.31	0.88	36.42	182.05	4 & 6 Lane
5	1-Apr-29	31-Mar-30	-	-	-	-	138.75	10.88		149.63	3.09	6.32	3.16	16.84	3.10	0.50	2.56	1.43	0.32	0.93	38.24	187.87	4 & 6 Lane
6	1-Apr-30	31-Mar-31	-	-	-	-					3.24	6.63	3.31	17.68	3.26	0.52	2.69	1.50	0.34	0.98	40.16	40.16	4 & 6 Lane
7	1-Apr-31	31-Mar-32	-	-	-				2.64	2.64	3.41	6.97	3.48	18.56	3.42	0.55	2.82	1.58	0.36	1.02	42.16	44.81	4 & 6 Lane
8	1-Apr-32	31-Mar-33	-	-	-	-	29.29	2.68		31.97	3.58	7.31	3.65	19.49	3.59	0.58	2.96	1.66	0.38	1.08	44.27	76.24	4 & 6 Lane
9	1-Apr-33	31-Mar-34	-	-	-						3.75	7.68	3.84	20.46	3.77	0.61	3.11	1.74	0.39	1.13	46.49	46.49	4 & 6 Lane
10	1-Apr-34	31-Mar-35	-	-	-						3.94	8.06	4.03	21.49	3.96	0.64	3.26	1.83	0.41	1.19	48.81	48.81	4 & 6 Lane
11	1-Apr-35	31-Mar-36	-	-	-						4.14	8.47	4.23	22.56	4.16	0.67	3.43	1.92	0.43	1.24	51.25	51.25	4 & 6 Lane
12	1-Apr-36	31-Mar-37	-	-	-						4.33	8.87	4.43	23.63	4.36	0.70	3.59	2.01	0.45	1.30	53.67	53.67	4 & 6 Lane
13	1-Apr-37	19-May-37	-	-	-						0.79	1.61	0.80	4.29	0.79	0.13	0.65	0.36	0.08	0.24	9.75	9.75	4 & 6 Lane
Total Cost (INR Crore)			**-**	**-**	**-**	**-**	**304.07**	**24.15**	**3.82**	**332.04**	**39.71**	**81.85**	**37.49**	**224.7**	**41.43**	**6.65**	**33.54**	**18.76**	**4.28**	**12.39**	**500.80**	**832.84**	

Note: Cost includes 18% GST. An annual escalation of 5% for Opex and 2% for Major Maintenance is applied in projections.

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TECHNICAL REPORT



Four Laning of MH/KNT border – Sangareddy Section of NH-09 (New NH-65) from km 348.800 to km 493.000 in the States of Karnataka and Andhra Pradesh (Presently in Telangana) under NHDP – III on BOT (Toll) mode-DTL

SAMARTH INFRAENGG Technocrats Private Limited

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September 2025

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LIST OF ABBREVIATIONS AND SYMBOLS

AADT	-Average Annual Daily Traffic
AE	-Authority Engineer
AMC	-Annual Maintenance Contract
ATMS	-Advanced Traffic Management System
BBD	-Benkelman Beam Deflection
BC	-Bituminous Concrete
BHS	-Both Hand Side
BOQ	-Bill of Quantities
BOT	-Build, Operate & Transfer
CA	-Concession Agreement
CBR	-California Bearing Ratio
CCB	-Concrete Crash Barrier
CCR	-Cement Concrete Railing
COD	-Commercial Operation Date
COS	-Change of scope
CPI	-Consumer Price Index
CUP	-Cattle Underpass
CVC	-Classified Volume Count
CVPD	-Commercial Vehicles per Day
DBM	-Dense Bituminous Concrete
DPR	-Detailed Project Report
ECB	-Emergency Call Box
EPC	-Engineering, Procurement and Construction
ESI	- Employees' State Insurance
FDD	-Filed Dry Density
FOB	-Foot Over Bridge
FRL	-Finished Road Level
FSI	-Free Swell Index
FWD	-Falling Weight Deflectometer
FY	-Financial Year
GOI	- Government of India
GR	-Growth Rates
GS	-Grade Separated
GSB	-Granular Sub Base
GST	-Goods and Services Tax
HCPT	-Half-cell Potential Test
HPC	-Hume Pipe Culvert

HR	- Human Resources
HTMS	-Highway Traffic Management Systems
IE	-Independent Engineer
IRC	- Indian Roads Congress
IRC SP	- Indian Roads Congress Special Publications
IRI	-International Roughness Index
Km	-kilometer
LHS	-Left Hand Side
LL	-Liquid Limit
LS	-Lumpsum
m	-Meter
MAP	-Medical Aid Post
MBIU	-Mobile Bridge Inspection Unit
MCB	-Metal Beam Crash Barrier
MCS	-Micro Surfacing
MCW	-Main Carriageway
MDD	-Maximum Dry Density
MHR	-Metallic Hand Rail
MJB	-Major Bridge
mm	-Millimeter
MM	-Major Maintenance
MNB	-Minor Bridge
MoRTH	- Ministry of Road Transport & Highways
Mpa	-Mega Pascal
MR	-Resilient Modulus
MSA	-Million Standard Axle
NDT	-Non-Destructive Testing
NHAI	- National Highways Authority of India
NSV	-Network survey Vehicle
O&M	- Operation and Maintenance
OL	-Overlay
PCOD	-Provisional Completion
PF	-Provident Fund
PGR	-Pedestrian Guard Rail
PI	-Plasticity Index
PL	-Plastic Limit
PM	-Periodic Maintenance
PUP	-Pedestrian Underpass
R&R	-Repair and Rehabilitation
RCC	-Reinforced Cement Concrete
RE Wall	-Reinforced Earth Wall

RHS	-Right Hand Side
RHT	-Rebound Hammer Test
RM	-Routine Maintenance
ROB	-Road Over Bridge
RPO	-Route Patrol Officer
RUB	-Road Under Bridge
SDBC	-Semi-Dense Bituminous Concrete
SPV	-Special Purpose Vehicle
SR	-Service Road
SWB	-Static Weigh Bridge
TAP	-Traffic Aid Post
TCS	-Typical cross Section
TDRT	-Transient Dynamic Response test
TMS	-Toll Management System
UI	-Unevenness Index
UPVT	-Ultra Pulse Velocity test
VDF	-Vehicle Damage Factor
VG	-Viscosity Grade
VUP	-Vehicular Underpass
WBM	-Water Bound Macadam
WMM	-Wet Mix Macadam
WPI	-Wholesale Price Index

CHAPTER 1. INTRODUCTION

1.1 INTRODUCTION

The Govt. of India had entrusted to National Highways Authority of India (NHAI) for development, maintenance and management of NH-9 including section from km 348.800 to km 493.000 (approx. km 145) on Design, Built, Fund, Operate and Transfer (DBFOT)-BOT TOLL basis. Currently, at site revised chainages exists, connecting Sangareddy to Karnataka/Maharashtra from km 352.000 to km 497.000 of NH-65 (old NH-9). The length of project road is equally spread between the states of Karnataka and Telangana.

The Authority had invited the proposal from the bidders to execute this project. After evaluation of the bids, Authority had accepted the bid of M/s L&T Infrastructure Development Projects Limited (L&T IDPL) and Letter of Award (LOA) issued on 30th November 2011.

Subsequently, the selected bidder has promoted and incorporated "M/s L&T Deccan Tollways Limited (hereafter referred to as Concessionaire or SPV or L&T DTL).

Provisional Certificate for the length of 142.786 km of the Project highway was issued by the Independent Engineer (IE) w.e.f. 14th October 2017 along with Punch lists and the Project Highway was placed in Commercial Operation. Subsequently, the Concessionaire completed the Punchlist and Completion Certificate for the said length was issued on 17th September 2019. Further, Final Completion Certificate achieved on 20th October 2023.

In April 2024, Deccan Tollways Limited (DTL) was acquired by M/s Sekura Roads Pvt. Ltd., a portfolio company of EPIC 3, and was subsequently transferred to EPIC Concessions Private Limited. This acquisition was facilitated through an Alternate Investment Fund managed by EAAA India Alternatives Limited (EAAA), formerly known as Edelweiss Alternative Asset Advisors Limited).

We understand that EAAA TransInfra Managers Limited is the Investment Manager, Chennai -Tada Tollway Private Limited ("CTTPL") is the proposed Project Manager and Watrak Infrastructure Private Limited ("WIPL") is the sponsor of the Citius TransNet Investment Trust ("Trust" or "InvIT") and M/s Deccan Tollways Limited ("DTL") is proposed to be part of the initial portfolio assets of the Trust. The Trust was incorporated on 1st August 2025 with Securities and Exchange Board of India ("SEBI") as an infrastructure investment trust under the SEBI InVIT Regulations.

M/s Watrak Infrastructure Private Limited (hereinafter "the Client") as sponsor has appointed M/s Samarth Infraengg Technocrats Pvt Ltd (hereinafter referred as "Technical Consultant") to carry out Technical Due Diligence of operational asset of "Four laning of MH/KNT Border to Sangareddy from km 352+000 to km 497+000 of NH-9 (New NH-65) in the States of Karnataka and Andhra Pradesh (Presently Telangana) on BOT-Toll Basis (herein after refer as "the Project") which is being operated by "M/s Deccan Tollways Limited ("DTL") (hereinafter refer as "the Concessionaire or Company or "DTL").

The details of the Road asset ("Project Highway") are as follows:

S. No	Project Description	Length (Km)
1	Construction of 12.9 m wide bridge between Dhola and Sadia ghats along with 2 lane connecting roads from near about Dhola to islampur tinali in assam on BOT basis under Arunachal Pradesh package of Roads and Highways.- **Dhola**	28.511
2	Construction of bridges across Dibang river system and connecting road between Bomjur-Meka (NH 52) covering length of 18.95 km and construct bridge across river Lohit at alubari ghat and connecting road between Chowkham Digaru covering length of 12 km in Arunachal Pradesh on BOT basis under Arunachal Pradesh package of Roads and Highways- Dibang	29.635
3	*Four Laning of Maharashtra/Karnataka Border - Sangareddy section of NH9 (from KM 348.800 to Km 493.000) in the states of Karnataka and Andhra Pradesh to be executed as BOT (Toll project) on DBFOT pattern under NHDP phase IV B.- **DTL***	*144.950*
4	Four Laning of Jorbat Shillong of NH 40 from Km 0 to Km 61.8 in the state of Assam and Meghalaya on DBFOT Pattern under SARDP NE on BOT Basis. – **JSEL**	61.800
5	Four Laning of paved shoulders of Sambalpur- Rourkela section of SH-10 from Km 4.900 to 167.900 in the state of Odisha to be executed as BOT (toll) project on DBFOT pattern- **SRTL**	161.730

This report deals with the "*Four Laning of Maharashtra/ Karnataka Border - Sangareddy section of NH-9 (from KM 348.800 to Km 493.000) in the states of Karnataka and Andhra Pradesh to be executed as BOT (Toll project) on DBFOT pattern under NHDP phase IV B.- DTL*".

1.2 PROJECT AT A GLANCE

The National Highway 65, commonly referred to as NH-65 (Old NH-9) is an 841 Km long National Highway in South India. It runs along the states of Maharashtra, Karnataka, Telangana and Andhra Pradesh. It starts at Pune and ends at Machilipatnam. Major cities on this route are Pune, Solapur, Hyderabad, Suryapet, Vijayawada and Machilipatnam.



Map Showing the Project Corridor

The CA and actual existing chainages at site, for the start and the end points are as follows:

Table 1: Project Corridor Chainage System

Referencing system	Project Corridor Start Point (km)	Project Corridor End Point (km)	Length (km)
CA Chainage (old NH-9)	348.800	493.000	144.200
Site Chainage (new NH-65)	352.000	497.000	145.000 (Actual 144.950)

Photograph showing the start and end point of the project road are presented below



Start Point of Project Road at km 352.000



End Point of Project Road at km 497.000

Following Table highlights the total project at a glance:

Table 2: Project Details

S No.	Description	Remarks
1.	Employer	National Highways Authority of India
2.	Concessionaire	Deccan Tollways Limited
3.	Mode of the Project	BOT-Toll
4.	Length of the Project as per CA	144.950
5.	Total Project Cost as per CA	1266.6 crores
6.	Date of Signing the Concession Agreement	02.02.2012
7.	Appointed Date	01.04.2014
8.	Scheduled Project completion	910 Days (2 ½ Yrs) from Appointed date 01.10.2016
9.	Date of issue of Provisional Completion Certificate, PCOD	14.10.2017
10.	Date of Issue of Final Completion Certificate	20.10.2023
11.	Scheduled End of Concession (25 years from Appointed date including construction period)	25 years from Appointed date 26.03.2039
	Revised Scheduled End of Concession (Considering Extension)	06.04.2044

1.3 DATA COLLECTION AND REVIEW

In brief, following were covered

- ✓ Review of CA and Technical Schedules
- ✓ Review of Concessionaire's MPR's (latest available is Apr-2025)
- ✓ Review of latest Correspondence made available

- ✓ Review of Pavement Design Report.

1.4 REVIEW OF O&M REQUIREMENTS

The O&M requirements related to the Project based on Schedules and Manuals are as follows:

Applicable Manual	Applicable Schedule for O&M	Maximum Roughness Allowed	Minimum Thickness of Mandatory Overlay	Frequency of Roughness Test	Frequency of BBD Test	Remarks
IRC: SP:84-2009	Schedule-K and Manual	2500 mm/Km	-	2 Times in a Year	Once in a 5-Years	Overlay Design shall be done as per IRC:81

From the above table it is clear that the applicable method for overlay design is BBD (Overlay Design shall be done as per IRC: 81). Though BBD is applicable, considering the advantages of FWD Technique compared to BBD Technique, presently overlay assessment has been done by using FWD Technique but when it is required to assess the overlay in due course of time after acquiring the project the same can be done using BBD Technique for submission to IE/Authority.

No specific Handing Over (Divestment) requirements are mentioned under CA. Clause 7 of Schedule K specifies that, all defects and deficiencies specified in this schedule-K shall be repaired and rectified by the Concessionaire.

1.5 COS WORKS

The Concessionaire has shared the following data related to COS works.

S. No.	Description of claim/COS	Amount of claim/COS Submitted by Concessionaire	Actual estimated cost of Work	Recommended by IE	Work Status
1	Construction of Flyover at Chidri Bypass	50,24,30,260	-	41,30,43,589	NHAI has executing the work under stand-alone basis.
2	Construction of VUP at Nandikandi	44,95,43,637	-	37,28,58,072	NHAI has executing the work under stand-alone basis.
3	Construction of Lay bye Platforms at RTO Check post from Ch. 428+275 to Ch.428+475]	6,93,49,620	-	Yet to recommend	COS yet to be recommend
4	Construction of LVUP at Aroor village	36,11,98,198	-	36,48,87,574	COS yet to be recommend
5	Construction of VUP at Algol village	57,65,63,854	-	Yet to recommend	COS yet to be recommend

S. No.	Description of claim/COS	Amount of claim/COS Submitted by Concessionaire	Actual estimated cost of Work	Recommended by IE	Work Status
6	Construction of VOP at Lingampally	22,79,61,962	-	18,35,43,500	NHAI has executed the work under stand-alone basis
7	Construction of FOB and Service Road -Ch. 414+460 under COS Mannekhelli area	12,23,57,180	-	Yet to recommend	COS yet to be recommend
8	Construction of VUP at Km. 455+558 near Digwal	33,65,77,295	-	29,32,59,442	COS yet to be recommend
9	M.P Patil proposal for development of the MNB vents to motorable	39,45,604	-	33,47,662	COS yet to be recommend
	Total:	**2,64,99,27,610**		**1,63,09,39,839**	

1.6 REVIEW OF PAVEMENT DESIGN

Based on the Pavement Design Report considering the traffic pattern following homohomogeneous sections identified:

Section	Chainage
Section I	MH/KA Border to Zaheerabad (Km 348/800 to Km 438/400) -89.6 Km (KA/AP)
Section II	Zaheerabad to Kamkol (Km 438/400 to Km 467/000) - 28.6Km (AP)
Section III	Kamkol to Sangareddy (Km 467/000 to Km 493/000) - 26Km (AP)

Based on the VDF survey conducted during the month by March and September 2012. The axle load survey was conducted in the project stretch for both directions at three locations viz Ch.409+500, Ch.463+400 & Ch.486+600. And VDFs are as presented below:

Direction	Description	VDF by Fourth Power Rule @ km 409+500	VDF by Fourth Power Rule @ km 463+200	VDF by Fourth Power Rule @ km 486+600
Solapur to Sangareddy	LCV	1.00	0.03	0.90
	2-Axle Truck	1.26	1.16	2.72
	3-Axle Truck	2.20	2.53	3.87
	MAV	3.10	4.95	5.01
	Bus	0.50	0.45	0.99
Sangareddy to Solapur	LCV	0.47	0.18	0.80
	2-Axle Truck	1.52	1.12	2.30
	3-Axle Truck	2.48	1.64	3.00
	MAV	4.49	2.46	4.60

Direction	Description	VDF by Fourth Power Rule @ km 409+500	VDF by Fourth Power Rule @ km 463+200	VDF by Fourth Power Rule @ km 486+600
	Bus	0.50	0.36	0.73

For different homogeneous sections, MSA arrived are as follows

Location	Mid-Block Chainage	Year	MSA	
			Solapur to Sangareddy	Sangareddy to Solapur
Homogeneous Section 1	368+500	2024	18	21
		2032	40	45
		2037	64	68
	389+300	2024	20	21
		2032	40	45
		2037	59	66
	409+500	2024	19	21
		2032	41	45
		2037	61	67
Homogeneous Section II	463+200	2024	22	15
		2032	48	34
		2037	71	50
Homogeneous Section III	487+200	2024	46	36
		2032	102	80
		2037	150	118

The new pavement design as per IRC: 37-2001, considering 12% CBR is as follows

Chainage (km)		Section Length (km)	New Pavement Design msa		CBR (%)	BC (mm)	DBM (mm)	Base course WMM (mm)	Sub-Base GSB (mm)	Sub Grade (mm)
						VG-30				
From	To		10 Years	23 Years		10 Years msa (2014-2024)		23 Years msa (2014-2037)		
348.8	438.4	89.6	21	67	12	40	60	250	200	500
438.4	467.0	28.6	22	71		40	60	250	200	500
467.0	493.0	26.0	46	150		40	95	250	200	500

The overlay thicknesses as calculated based on IRC 81: 1997 are varying from 40 mm to 115mm

For service road, new pavement design considering 12% CBR is as follows

Section	Design Traffic (MSA)	Design CBR (%)	SDBC (mm) VG-30	DBM (mm) VG-30	Base (WMM) (mm)	Sub-base (GSB) (mm)	Sub-grade (mm)
Both the Directions	5	12	25	50	250	150	500

CHAPTER 2. SURVEYS AND INVESTIGATIONS

2.1 INTRODUCTION

The main objective of undertaking Surveys and Investigations is to appreciate the existing engineering features along the project corridor and to understand the present condition of the various elements of the project road and to prepare required inputs for various rehabilitation and maintenance strategies.

Following Survey and Investigations have been undertaken as a part of study with an objective to understand the present condition of the road and there by access the quality of construction and as well to prepare requisite rehabilitation/corrective designs where necessary.

- Road Inventory Surveys
- Pavement Condition using NSV
- FWD Surveys
- Roughness Surveys using NSV
- Pavement Composition surveys (Test Pits)
- Subgrade Investigations & Laboratory testing
- Material Investigations
- Core Investigations
- Axle Load Survey
- Structure Inventory and Condition Surveys

2.2 ROAD INVENTORY

The project corridor has 4-lane divided carriageway with Flexible pavement 7.0m wide carriageway on either-side of the median, flanked by 1.5m paved shoulder plus 0.25m Shyness on each side. However, rigid pavement exists at Toll Plaza.

In general, the median width is 2.0m at Built-up locations and 4.5m at remaining locations along the project road are observed.

The project corridor generally runs in plain terrain. The land use along the project road is mostly Barren, Built-up and Agricultural. It passes through urban settlements like Budhera, Digwal, Mannekhelli, Humnabad etc.

In general, road embankments are in the range of 1.0 - 2.0m height. Embankments higher than 2.0m are observed mainly in the approaches of CD structures and Underpass locations.

Typical View of Project Road is shown below:



A view of the Project Corridor with 4.5m median at Km 356.950



A view of the Project Corridor with MBCB 2.0m median at Km 487.350



A view of the Project Corridor with 4.5m median at Km 456.950



A view of the Project Corridor with solar lights at Km 474.000

The Project Road has 24 major junctions and 47 minor junctions along its length. Photographs showing the Major Junctions and minor junctions are presented below:



Major Junction at km 367+550 LHS



Major Junction at km 441+600 RHS



Minor Junction at km 388+900 LHS



Minor Junction at km 460+550 RHS

Service road/slip roads with 7.0m width carriageway for a length of 54.860 km. These lengths include Under-Construction and Balance works of service road. Photos depicting the service road pavement surface type, and Condition. Few photos taken at service road locations are presented below:



Service Road not constructed at km 317.550 RHS



Service Road @ km 384.000 on LHS

	
Service Road @ km 406.550 on RHS	**Service Road @ km 332.800 on LHS**

There are about 30 numbers of High-mast locations at Major Junctions and Toll Plaza locations, whereas, 1777 numbers of Double arm lighting locations, 52 number of single arm lighting locations and 319 number of solar lightings are provided at various Minor Junctions, Built-up locations and service road locations.

Few photos showing lighting are presented below:

	
A view of High mast lighting at km 388.500 LHS	**A view of Solar Lighting at km 484.000**



A view of Single arm Lighting at km 382.700



A view of Double Arm lightning's at 496.300

All together the Project Road has 28 numbers of Bus-Bay with Bus shelters along the project road. Few photos taken at the Bus Shelter are presented below:



Bus Shelter at km 448.850-LHS



Bus bay with Shelter at km 377.000-LHS

The Project Road has four Truck lay-bye along the project corridor. Few photos depicting the truck lay-bye are presented below:



Truck Lay bye at km 382.750 RHS



Toilet block at TLB at km 382.750 RHS

The Project Road has 2 Toll Plazas at Km 410.700 (Mangalgi Toll plaza) and km 467.800 (Kamkole Toll plaza). Rigid pavement exists at the toll plaza including tapering portions. The condition of the toll plaza appears to be fair. Mangalgi toll plaza has 3+1 lanes on each side and Kamkole toll plaza has 5+1 lanes on each side. 6 numbers of High mast lighting provide at each plaza.

The details of Toll Plaza are as follows.

S No	Type	Units	TP-1	TP-2	Remarks
1	Chainage	*Km*	410.900	467.700	
2	Toll plaza name		Mangalgi Toll plaza	Kamkole Toll plaza	
3	Pavement Type		Rigid	Rigid	
4	Pavement Type Central Portion		Rigid	Rigid	
5	No of lanes	*Nos*	8	12	
6	Canopy		Yes	Yes	
7	Toll office		Yes	Yes	
8	Toll booths		Yes	Yes	
9	Fast tag lanes	*Nos*	8	12	
10	Total Toll Plaza length	*Rmt*	340	340	
11	Toll plaza width	*m*	50	75	
12	Toll lanes width	*m*	3.5	3.5	
13	Extra Wide Lane width	*m*	4	4	
14	Bike Lane width	*m*	1	1	
15	Separator width at Toll booths	*m*	2.3	2.3	
16	Static Weigh bridges		Yes	Yes	
17	WIMS	*Nos*	8	12	
18	Highmast lights posts	*Nos*	6	6	
19	Double arm lighting posts	*Nos*	20	23	
20	Ambulances	*Nos*	1	1	
21	Cranes	*Nos*	1	1	
22	Highway Patrolling Vehicles	*Nos*	1	1	Additionally, 1 No. is provided.
23	Tunnel		Yes	Yes	
24	Toilets		Yes	Yes	



A view of the Existing Toll Plaza near km 410.700 (Mangalgi Toll plaza)



A view of the Existing Toll Plaza near km 467.800 (Kamkole Toll plaza)

The collected Road Inventory Data is presented in **Appendix 1** of this Report

2.3 PAVEMENT CONDITION SURVEYS

The present Pavement condition data has been collected using Network Survey Vehicle (NSV). The Pavement Condition report covering the data collection for each km length in each direction has been presented in **Appendix 2** of this Report. However, by visual inspection the pavement condition appears to be good to fair in entire length. It is noted that entire stretch is recently overlaid.

The photographs showing the pavement condition of the Project Road is presented below.

		
Fair Condition at km 352.900 LHS	**Fair condition 356.350 LHS**	**Fair condition 370.700 LHS**
		
Fair condition 373.850 RHS	**Fair condition 383.950 RHS**	**Fair condition 407.200 LHS**

2.4 FALLING WEIGHT DEFLECTOMETER (FWD) SURVEYS

In order to evaluate the structural strength of the existing pavement, Falling Weight Deflectometer (FWD) survey has been carried out along the project road in Main carriageway and Service Road in line with IRC: 115-2014.

- ✓ Prior to the start the surveys, Load repeatability tests are performed on each day
- ✓ The target Peak Load of 40 KN (+/- 4 KN) is maintained during survey.
- ✓ At Regular intervals of time Pavement temperature is noted.
- ✓ For every 1 Km of stretch 6 test Points (3 pts- Outer,3 pts-inner) were taken on Main Carriageway in each direction. Whereas, for service road minimum 3 points are taken in a km length.
- ✓ Temperature correction equation is applied for back calculated modulus of BT and summer seasonal correction factor is applied for the back calculated modulus of granular and Subgrade considering the summer Season (May Month).

The collected FWD Data and Analysis is presented in **Appendix 3** of this Report.

Few photos taken during the progress of FWD Surveys are presented below:



Deflection Measurement in progress

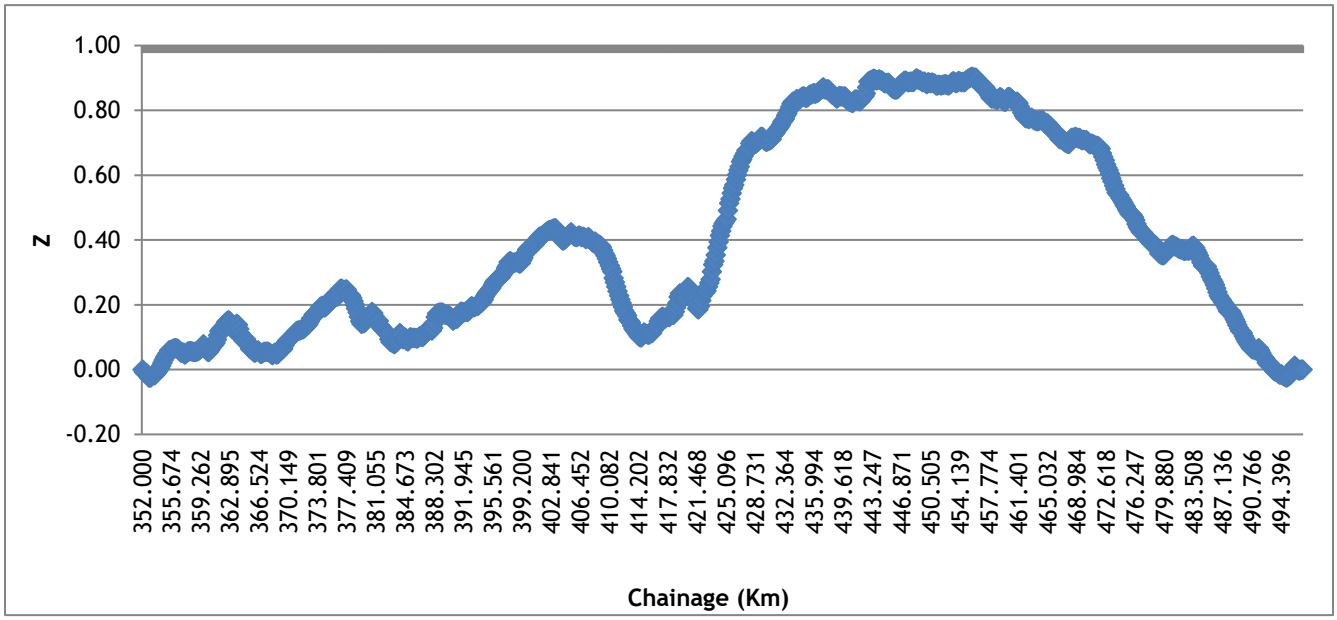


Deflection Measurement in progress

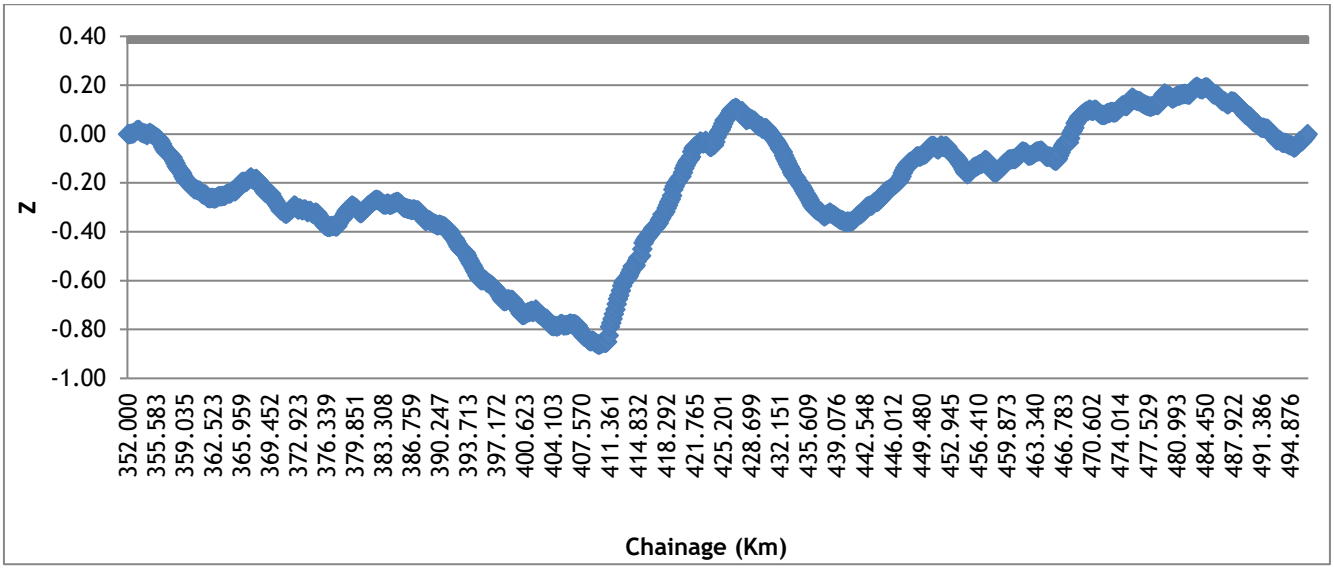
Cumulative Difference Approach (CDA) has been used for the identification of homogeneous sections on the basis of Surface Curvature Index (SCI). SCI is calculated as the difference between D_0 and D_{300}, where D_0 and D_{300} are the peak deflections (mm) measured at the center of loading plate and at a radial distance of 300mm.

The homogenous sections in each direction of traffic (i.e., LHS & RHS) for the project stretch have been identified and are given in the below table followed by graphical representation of the same.

❖ ***For Main Carriageway:***



Delineation of Homogeneous Sections – LHS, Main Carriageway



Delineation of Homogeneous Sections – RHS, Main Carriageway

Table 3: FWD Data - Homogenous Sections of Main Carriageway – LHS

Homo Sections	From (Km)	To (Km)	Length (Km)	Remarks
1	352.000	354.143	2.14	
2	354.143	356.132	1.99	
3	356.132	358.112	1.98	
4	358.112	360.253	2.14	
5	360.253	362.421	2.17	
6	362.421	365.532	3.11	
7	365.532	368.665	3.13	
8	368.665	371.144	2.48	
9	371.144	373.801	2.66	
10	373.801	376.589	2.79	
11	376.589	379.265	2.68	
12	379.265	381.213	1.95	
13	381.213	383.193	1.98	
14	383.193	385.987	2.79	
15	385.987	388.810	2.82	
16	388.810	391.275	2.46	
17	391.275	393.921	2.65	
18	393.921	396.387	2.47	
19	396.387	398.697	2.31	
20	398.697	401.006	2.31	
21	401.006	403.165	2.16	
22	403.165	405.297	2.13	
23	405.297	407.604	2.31	
24	407.604	410.750	3.15	
25	410.750	411.100	0.35	Toll Plaza
26	411.100	414.202	3.10	
27	414.202	416.844	2.64	
28	416.844	419.159	2.32	
29	419.159	421.468	2.31	
30	421.468	423.945	2.48	
31	423.945	427.000	3.06	Homosectional Break Due to Traffic Diversion

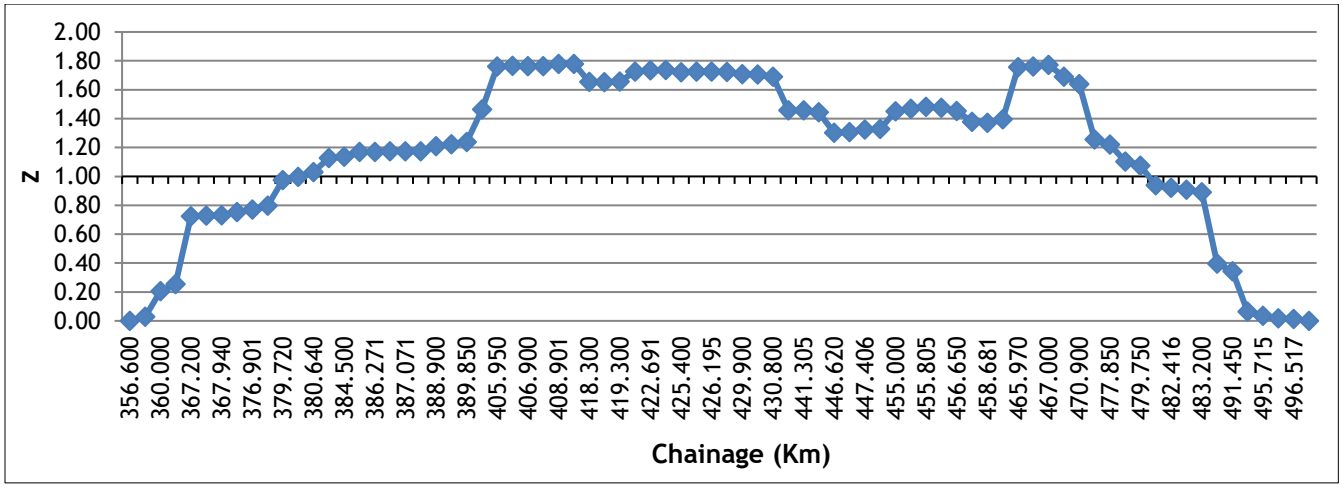
Homo Sections	From (Km)	To (Km)	Length (Km)	Remarks
32	427.000	429.386	2.39	
33	429.386	432.850	3.46	
34	432.850	434.998	2.15	
35	434.998	437.155	2.16	
36	437.155	439.781	2.63	
37	439.781	442.585	2.80	
38	442.585	446.062	3.48	
39	446.062	448.526	2.46	
40	448.526	451.165	2.64	
41	451.165	453.154	1.99	
42	453.154	455.292	2.14	
43	455.292	457.603	2.31	
44	457.603	460.092	2.49	
45	460.092	462.055	1.96	
46	462.055	464.202	2.15	
47	464.202	467.500	3.30	
48	467.500	467.850	0.35	Toll Plaza
49	467.850	469.975	2.13	
50	469.975	471.956	1.98	
51	471.956	474.433	2.48	
52	474.433	476.919	2.49	
53	476.919	479.385	2.47	
54	479.385	481.355	1.97	
55	481.355	483.344	1.99	
56	483.344	485.981	2.64	
57	485.981	488.623	2.64	
58	488.623	491.424	2.80	
59	491.424	494.080	2.66	
60	494.080	497.000	2.92	

Table 4: FWD Data - Homogenous Sections of Main Carriageway -RHS

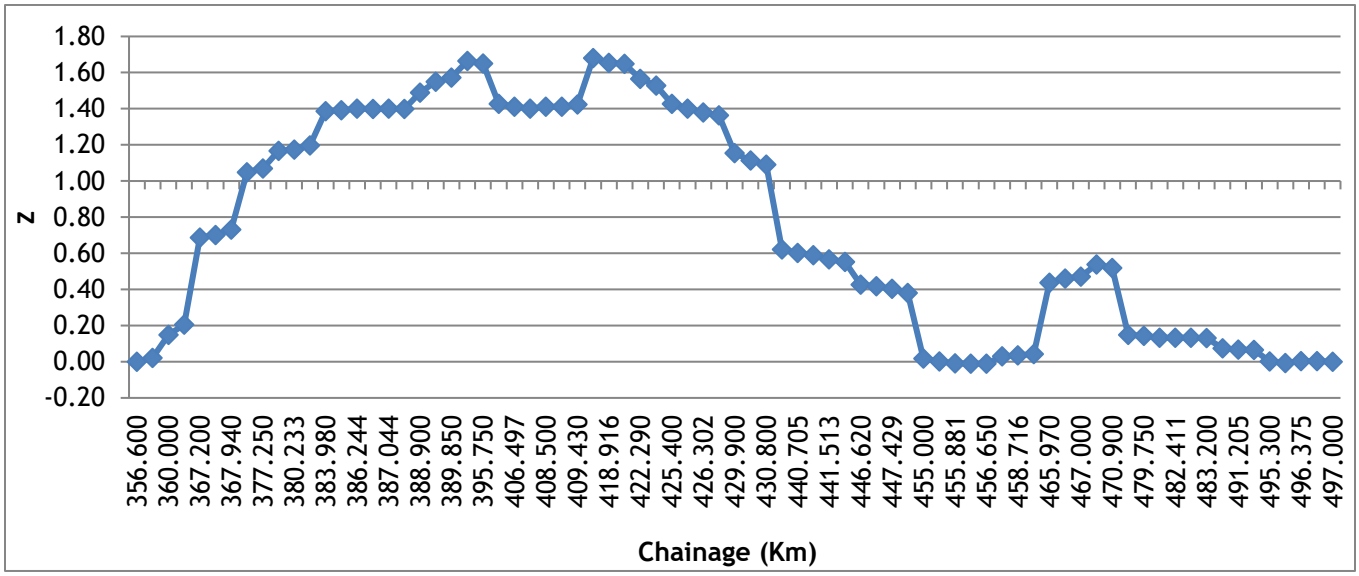
Homo Sections	From (Km)	To (Km)	Length (Km)	Remarks
1	352.000	355.255	3.26	
2	355.255	358.549	3.29	
3	358.549	361.877	3.33	
4	361.877	364.332	2.45	
5	364.332	367.142	2.81	
6	367.142	369.294	2.15	
7	369.294	371.432	2.14	
8	371.432	375.050	3.62	
9	375.050	377.537	2.49	
10	377.537	380.345	2.81	
11	380.345	382.493	2.15	
12	382.493	384.799	2.31	
13	384.799	387.442	2.64	
14	387.442	390.247	2.81	
15	390.247	392.722	2.47	
16	392.722	395.192	2.47	
17	395.192	398.003	2.81	
18	398.003	400.313	2.31	
19	400.313	403.942	3.63	
20	403.942	406.913	2.97	
21	406.913	410.750	3.84	

Homo Sections	From (Km)	To (Km)	Length (Km)	Remarks
22	410.750	411.100	0.35	Toll Plaza
23	411.100	413.188	2.09	
24	413.188	415.327	2.14	
25	415.327	418.794	3.47	
26	418.794	420.934	2.14	
27	420.934	423.085	2.15	
28	423.085	427.000	3.92	Homo sectional Break due to Traffic Diversion
29	427.000	429.514	2.51	
30	429.514	432.450	2.94	
31	432.450	434.970	2.52	
32	434.970	437.759	2.79	
33	437.759	440.732	2.97	
34	440.732	443.670	2.94	
35	443.670	447.170	3.50	
36	447.170	449.641	2.47	
37	449.641	451.945	2.30	
38	451.945	454.924	2.98	
39	454.924	458.220	3.30	
40	458.220	461.676	3.46	
41	461.676	463.660	1.98	
42	463.660	467.500	3.84	
43	467.500	467.850	0.35	Toll Plaza
44	467.850	470.431	2.58	
45	470.431	472.910	2.48	
46	472.910	475.346	2.44	
47	475.346	477.352	2.01	
48	477.352	479.344	1.99	
49	479.344	481.818	2.47	
50	481.818	484.291	2.47	
51	484.291	487.582	3.29	
52	487.582	491.225	3.64	
53	491.225	494.173	2.95	
54	494.173	497.000	2.83	
Total length			**145.000**	

❖ ***For Service Carriageway:***



Delineation of Homogeneous Section – LHS Service Road



Delineation of Homogeneous Section - RHS Service Road

Table 5: FWD Data - Homogenous Section of Service Road - LHS

Homo Sections	From (Km)	To (Km)	Length (Km)	Remarks
1	352.000	356.600	4.60	No Service Road
	356.600	357.160	0.56	
	357.160	360.000	2.84	No Service Road
	360.000	360.500	0.50	
	360.500	367.200	6.70	No Service Road
	367.200	367.940	0.74	
	367.940	376.520	8.58	No Service Road
	376.520	377.250	0.73	
	377.250	379.720	2.47	No Service Road
	379.720	380.640	0.92	
2	380.640	383.980	3.34	No Service Road
	383.980	384.500	0.52	
	384.500	385.900	1.40	No Service Road
	385.900	387.450	1.55	
	387.450	388.900	1.45	No Service Road
	388.900	389.850	0.95	
	389.850	395.501	5.65	No Service Road
	395.501	395.700	0.20	
	395.700	405.950	10.25	No Service Road
	405.950	406.900	0.95	
	406.900	408.500	1.60	No Service Road
	408.500	409.430	0.93	
3	409.430	418.300	8.87	No Service Road
	418.300	419.300	1.00	
	419.300	422.290	2.99	No Service Road
	422.290	422.950	0.66	
	422.950	425.400	2.45	No Service Road
	425.400	426.700	1.30	
	426.700	429.900	3.20	No Service Road
	429.900	430.800	0.90	

Homo Sections	From (Km)	To (Km)	Length (Km)	Remarks
	430.800	440.090	9.29	No Service Road
	440.090	440.905	0.81	No Data
	440.905	441.900	1.00	
4	441.900	446.620	4.72	No Service Road
	446.620	447.800	1.18	
	447.800	455.000	7.20	No Service Road
	455.000	456.650	1.65	
	456.650	458.270	1.62	No Service Road
	458.270	459.080	0.81	
	459.080	465.970	6.89	No Service Road
	465.970	467.000	1.03	
	467.000	470.250	3.25	No Service Road
5	470.250	470.900	0.65	
	470.900	477.200	6.30	No Service Road
	477.200	477.850	0.65	
	477.850	479.330	1.48	No Service Road
	479.330	479.750	0.42	
	479.750	482.000	2.25	No Service Road
	482.000	483.200	1.20	
	483.200	490.800	7.60	No Service Road
	490.800	491.450	0.65	
	491.450	495.300	3.85	No Service Road
	495.300	497.000	1.70	
	Total Length (Km)		145.000	

Table 6: FWD Data - Homogenous Section of Service Road - RHS

Homo Sections	From (Km)	To (Km)	Length (Km)	Remarks
1	352.000	356.600	4.60	No Service Road
	356.600	357.160	0.56	
	357.160	360.000	2.84	No Service Road
	360.000	360.500	0.50	
	360.500	367.200	6.70	No Service Road
	367.200	367.940	0.74	
	367.940	376.520	8.58	No Service Road
	376.520	377.250	0.73	
	377.250	379.720	2.47	No Service Road
	379.720	380.640	0.92	
	380.640	383.980	3.34	No Service Road
2	383.980	384.500	0.52	
	384.500	385.900	1.40	No Service Road
	385.900	386.244	0.34	No Data
	386.244	387.450	1.21	
	387.450	388.900	1.45	No Service Road
	388.900	389.850	0.95	
	389.850	395.280	5.43	No Service Road
	395.280	395.750	0.47	
	395.750	405.950	10.20	No Service Road
	405.950	406.900	0.95	
	406.900	408.500	1.60	No Service Road
	408.500	409.430	0.93	
3	409.430	418.300	8.87	No Service Road
	418.300	419.300	1.00	
	419.300	422.290	2.99	No Service Road
	422.290	422.950	0.66	
	422.950	425.400	2.45	No Service Road

Homo Sections	From (Km)	To (Km)	Length (Km)	Remarks
	425.400	426.700	1.30	
	426.700	429.900	3.20	No Service Road
	429.900	430.800	0.90	
4	430.800	440.090	9.29	No Service Road
	440.090	441.900	1.81	
	441.900	446.620	4.72	No Service Road
	446.620	447.800	1.18	
	447.800	450.700	2.90	No Service Road
	450.700	451.150	0.45	No Data
	451.150	455.000	3.85	No Service Road
	455.000	456.650	1.65	
	456.650	458.270	1.62	No Service Road
5	458.270	459.080	0.81	
	459.080	465.970	6.89	No Service Road
	465.970	467.000	1.03	
	467.000	470.250	3.25	No Service Road
	470.250	470.900	0.65	
	470.900	479.330	8.43	No Service Road
	479.330	479.750	0.42	
	479.750	482.000	2.25	No Service Road
	482.000	483.200	1.20	
	483.200	490.800	7.60	No Service Road
	490.800	491.600	0.80	
	491.600	495.300	3.70	No Service Road
	495.300	497.000	1.70	
Total length			**145.000**	

2.5 ROUGHNESS SURVEYS

The Roughness data has been collected using Network Survey Vehicle for main carriageway and service road and analyzed in terms of International Roughness Index (IRI), separately for each lane, for both direction of travel. The data collection and computation of IRI for each km length in each direction is presented in **Appendix 4** of this Report.

Schedule K of CA specifies that Roughness values exceeding 2500 mm/km in a Km length, needs to be corrected.

❖ **Main carriageway**

The km-wise roughness index values for both Left-Hand Side (LHS) and Right-Hand Side (RHS) directions are presented below:

Chainage (km)		Length (m)	Roughness Index (mm/km)		
From	To		Inner Lane	Outer Lane	Average RI (LHS)
Main Carriageway LHS					
352.000	353.000	1000	1585	1350	1468
353.000	354.000	1000	971	790	880
354.000	355.000	1000	947	757	852
355.000	356.000	1000	872	921	897
356.000	357.000	1000	959	879	919
357.000	358.000	1000	910	802	856
358.000	359.000	1000	734	592	663

Chainage (km)		Length (m)	Roughness Index (mm/km)		
From	To		Inner Lane	Outer Lane	Average RI (LHS)
Main Carriageway LHS					
359.000	360.000	1000	763	707	735
360.000	361.000	1000	738	718	728
361.000	362.000	1000	890	775	832
362.000	363.000	1000	1001	933	967
363.000	364.000	1000	837	716	776
364.000	365.000	1000	894	772	833
365.000	366.000	1000	897	868	882
366.000	367.000	1000	913	934	924
367.000	368.000	1000	1047	949	998
368.000	369.000	1000	1058	907	982
369.000	370.000	1000	893	793	843
370.000	371.000	1000	693	611	652
371.000	372.000	1000	776	680	728
372.000	373.000	1000	963	836	900
373.000	374.000	1000	965	899	932
374.000	375.000	1000	1113	1093	1103
375.000	376.000	1000	977	991	984
376.000	377.000	1000	1136	1146	1141
377.000	378.000	1000	925	791	858
378.000	379.000	1000	757	680	719
379.000	380.000	1000	920	855	887
380.000	381.000	1000	1016	918	967
381.000	382.000	1000	952	859	905
382.000	383.000	1000	1004	825	915
383.000	384.000	1000	894	758	826
384.000	385.000	1000	962	861	912
385.000	386.000	1000	1021	922	972
386.000	387.000	1000	956	983	969
387.000	388.000	1000	893	785	839
388.000	389.000	1000	1654	1448	1862
389.000	390.000	1000	815	726	1069
390.000	391.000	1000	1125	956	1041
391.000	392.000	1000	691	594	642
392.000	393.000	1000	664	581	623
393.000	394.000	1000	861	721	791
394.000	395.000	1000	833	775	804
395.000	396.000	1000	1038	888	963
396.000	397.000	1000	844	710	777
397.000	398.000	1000	801	630	716
398.000	399.000	1000	671	480	575
399.000	400.000	1000	1004	976	990
400.000	401.000	1000	717	710	713
401.000	402.000	1000	585	530	558
402.000	403.000	1000	661	561	611
403.000	404.000	1000	883	739	811
404.000	405.000	1000	779	636	708
405.000	406.000	1000	753	554	654
406.000	407.000	1000	627	643	635
407.000	408.000	1000	808	845	827
408.000	409.000	1000	815	801	808
409.000	410.000	1000	1079	1000	1039
410.000	410.750	750	1062	1253	1157
410.750	411.100	350			

Chainage (km)		Length (m)	Roughness Index (mm/km)		
From	To		Inner Lane	Outer Lane	Average RI (LHS)
Main Carriageway LHS					
411.100	412.000	900	1591	1143	1367
412.000	413.000	1000	1533	1232	1382
413.000	414.000	1000	1451	1309	1380
414.000	415.000	1000	1821	1749	1785
415.000	416.000	1000	1593	1404	1498
416.000	417.000	1000	1566	1099	1333
417.000	418.000	1000	1220	1116	1168
418.000	419.000	1000	2123	1479	1801
419.000	420.000	1000	1839	1133	1486
420.000	421.000	1000	1762	1413	1587
421.000	422.000	1000	1934	1363	1649
422.000	423.000	1000	1720	1352	1536
423.000	424.000	1000	1640	1202	1421
424.000	425.000	1000	1715	1058	1387
425.000	426.000	1000	1872	1164	1518
426.000	427.000	1000	2040	1150	1595
427.000	428.000	1000	1374	1003	1189
428.000	429.000	1000	1188	896	1042
429.000	430.000	1000	1034	778	906
430.000	431.000	1000	949	728	838
431.000	432.000	1000	825	760	792
432.000	433.000	1000	1088	967	1028
433.000	434.000	1000	1143	965	1054
434.000	435.000	1000	1426	1101	1263
435.000	436.000	1000	1209	848	1029
436.000	437.000	1000	1131	893	1012
437.000	438.000	1000	1170	1170	1170
438.000	439.000	1000	911	868	889
439.000	440.000	1000	929	856	893
440.000	441.000	1000	940	716	828
441.000	442.000	1000	1080	863	972
442.000	443.000	1000	1243	975	1109
443.000	444.000	1000	1105	1045	1075
444.000	445.000	1000	1239	1127	1183
445.000	446.000	1000	1275	1241	1258
446.000	447.000	1000	1254	1146	1200
447.000	448.000	1000	1223	1253	1238
448.000	449.000	1000	899	816	858
449.000	450.000	1000	1068	976	1022
450.000	451.000	1000	877	769	823
451.000	452.000	1000	695	671	683
452.000	453.000	1000	753	707	730
453.000	454.000	1000	1088	1040	1064
454.000	455.000	1000	828	647	737
455.000	456.000	1000	976	806	891
456.000	457.000	1000	637	523	580
457.000	458.000	1000	742	647	694
458.000	459.000	1000	714	667	691
459.000	460.000	1000	592	534	563
460.000	461.000	1000	548	480	514
461.000	462.000	1000	756	553	654
462.000	463.000	1000	808	736	772
463.000	464.000	1000	916	803	859

Chainage (km)		Length (m)	Roughness Index (mm/km)		
From	To		Inner Lane	Outer Lane	Average RI (LHS)
Main Carriageway LHS					
464.000	465.000	1000	644	505	574
465.000	466.000	1000	734	610	672
466.000	467.000	1000	905	833	869
467.000	467.500	500	850	633	741
467.500	467.850	350			
467.850	468.000	150	1474	1682	1578
468.000	469.000	1000	984	933	958
469.000	470.000	1000	893	763	828
470.000	471.000	1000	1211	1049	1130
471.000	472.000	1000	1109	953	1031
472.000	473.000	1000	930	1109	1020
473.000	474.000	1000	1074	1137	1106
474.000	475.000	1000	1324	1286	1305
475.000	476.000	1000	1278	1136	1207
476.000	477.000	1000	1131	1168	1149
477.000	478.000	1000	1051	962	1006
478.000	479.000	1000	1147	993	1070
479.000	480.000	1000	790	697	743
480.000	481.000	1000	895	849	872
481.000	482.000	1000	814	661	737
482.000	483.000	1000	880	767	823
483.000	484.000	1000	806	684	745
484.000	485.000	1000	759	613	686
485.000	486.000	1000	858	671	765
486.000	487.000	1000	937	823	880
487.000	488.000	1000	1271	1111	1191
488.000	489.000	1000	966	899	933
489.000	490.000	1000	1002	924	963
490.000	491.000	1000	849	810	829
491.000	492.000	1000	869	748	808
492.000	493.000	1000	907	819	863
493.000	494.000	1000	870	880	875
494.000	495.000	1000	940	802	871
495.000	496.000	1000	1228	970	1099
496.000	497.000	1000	1013	846	929

Note: The average roughness varying from 514 mm/km to 1862 mm/km

Existing Chainage (km)		Length (km)	Roughness Index (mm/km)		
From	To		Inner Lane	Outer Lane	Average RI (RHS)
Main Carriageway RHS					
352.000	353.000	1000	1305	1356	1331
353.000	354.000	1000	937	894	915
354.000	355.000	1000	985	943	964
355.000	356.000	1000	1177	934	1055
356.000	357.000	1000	849	815	832
357.000	358.000	1000	894	789	842
358.000	359.000	1000	769	699	734
359.000	360.000	1000	822	769	796
360.000	361.000	1000	845	798	822

Existing Chainage (km)		Length (km)	Roughness Index (mm/km)		
From	To		Inner Lane	Outer Lane	Average RI (RHS)
Main Carriageway RHS					
361.000	362.000	1000	754	712	733
362.000	363.000	1000	875	651	763
363.000	364.000	1000	783	595	689
364.000	365.000	1000	823	690	757
365.000	366.000	1000	878	730	804
366.000	367.000	1000	1157	1024	1091
367.000	368.000	1000	1184	1039	1111
368.000	369.000	1000	920	896	908
369.000	370.000	1000	821	744	783
370.000	371.000	1000	863	653	758
371.000	372.000	1000	723	661	692
372.000	373.000	1000	773	785	779
373.000	374.000	1000	752	687	719
374.000	375.000	1000	863	818	840
375.000	376.000	1000	917	732	824
376.000	377.000	1000	933	867	900
377.000	378.000	1000	844	823	834
378.000	379.000	1000	789	671	730
379.000	380.000	1000	1151	923	1037
380.000	381.000	1000	893	896	894
381.000	382.000	1000	936	935	935
382.000	383.000	1000	665	559	612
383.000	384.000	1000	796	679	738
384.000	385.000	1000	844	847	846
385.000	386.000	1000	870	764	817
386.000	387.000	1000	1153	941	1047
387.000	388.000	1000	809	751	780
388.000	389.000	1000	1340	1204	1272
389.000	390.000	1000	1031	953	992
390.000	391.000	1000	836	849	843
391.000	392.000	1000	742	735	739
392.000	393.000	1000	657	629	643
393.000	394.000	1000	672	638	655
394.000	395.000	1000	923	885	904
395.000	396.000	1000	1048	1053	1050
396.000	397.000	1000	1201	1029	1115
397.000	398.000	1000	1165	898	1032
398.000	399.000	1000	1068	926	997
399.000	400.000	1000	1078	889	983
400.000	401.000	1000	958	991	975
401.000	402.000	1000	926	918	922
402.000	403.000	1000	648	693	670
403.000	404.000	1000	672	739	705
404.000	405.000	1000	1114	911	1012
405.000	406.000	1000	1101	1067	1084
406.000	407.000	1000	933	923	928
407.000	408.000	1000	1084	1100	1092
408.000	409.000	1000	958	949	954
409.000	410.000	1000	1191	953	1072
410.000	410.750	750	1418	1329	1373
410.750	411.100	350			
411.100	412.000	900	1684	1385	1535
412.000	413.000	1000	1721	1426	1573

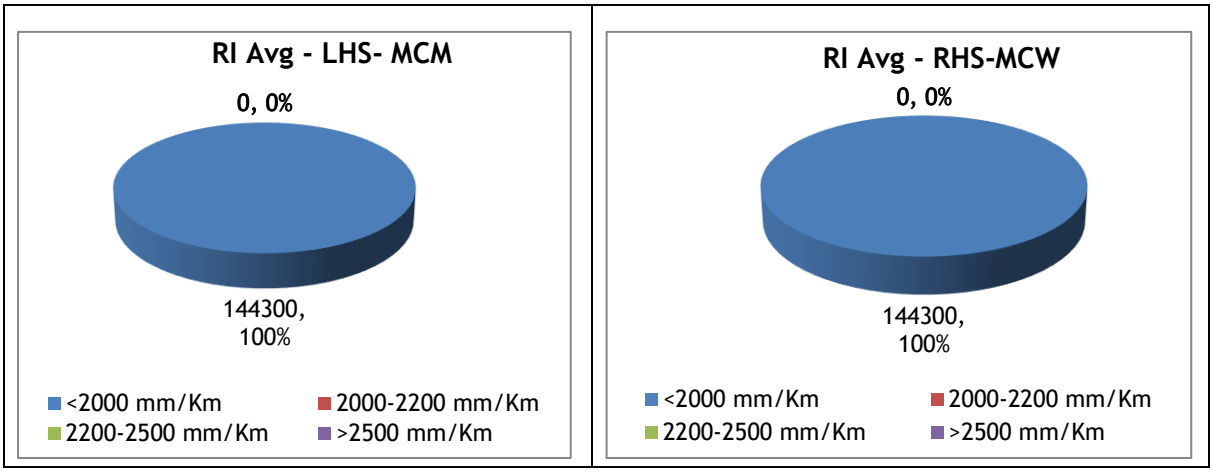
Existing Chainage (km)		Length (km)	Roughness Index (mm/km)		
From	To		Inner Lane	Outer Lane	Average RI (RHS)
Main Carriageway RHS					
413.000	414.000	1000	1917	1471	1694
414.000	415.000	1000	1314	1179	1246
415.000	416.000	1000	1687	1478	1582
416.000	417.000	1000	1411	1128	1269
417.000	418.000	1000	1461	1232	1346
418.000	419.000	1000	1177	935	1056
419.000	420.000	1000	1140	1068	1104
420.000	421.000	1000	1122	895	1009
421.000	422.000	1000	1434	1031	1233
422.000	423.000	1000	1454	1284	1369
423.000	424.000	1000	1365	1576	1471
424.000	425.000	1000	1333	1287	1310
425.000	426.000	1000	1630	1050	1340
426.000	427.000	1000	1433	1055	1244
427.000	428.000	1000	1682	1193	1438
428.000	429.000	1000	1793	1627	1710
429.000	430.000	1000	1378	935	1157
430.000	431.000	1000	1592	1153	1373
431.000	432.000	1000	1282	1139	1211
432.000	433.000	1000	1357	1077	1217
433.000	434.000	1000	1160	983	1072
434.000	435.000	1000	948	904	926
435.000	436.000	1000	734	797	766
436.000	437.000	1000	963	1139	1051
437.000	438.000	1000	923	852	888
438.000	439.000	1000	828	754	791
439.000	440.000	1000	823	671	747
440.000	441.000	1000	842	776	809
441.000	442.000	1000	1082	1005	1044
442.000	443.000	1000	1373	1145	1259
443.000	444.000	1000	1247	1188	1217
444.000	445.000	1000	1243	1071	1157
445.000	446.000	1000	1359	1081	1220
446.000	447.000	1000	1277	1039	1158
447.000	448.000	1000	1237	1065	1151
448.000	449.000	1000	1080	950	1015
449.000	450.000	1000	1239	1111	1175
450.000	451.000	1000	1229	1096	1163
451.000	452.000	1000	1042	959	1001
452.000	453.000	1000	1041	1059	1050
453.000	454.000	1000	1244	1327	1286
454.000	455.000	1000	847	845	846
455.000	456.000	1000	1265	1199	1232
456.000	457.000	1000	1013	883	948
457.000	458.000	1000	960	1015	987
458.000	459.000	1000	989	934	961
459.000	460.000	1000	835	737	786
460.000	461.000	1000	746	618	682
461.000	462.000	1000	714	585	650
462.000	463.000	1000	687	645	666
463.000	464.000	1000	937	832	885
464.000	465.000	1000	636	616	626
465.000	466.000	1000	828	803	815

Existing Chainage (km)		Length (km)	Roughness Index (mm/km)		
From	To		Inner Lane	Outer Lane	Average RI (RHS)
Main Carriageway RHS					
466.000	467.000	1000	909	746	827
467.000	467.500	500	1135	809	972
467.500	467.850	350			
467.850	468.000	150	1174	1296	1235
468.000	469.000	1000	1270	1033	1152
469.000	470.000	1000	1090	996	1043
470.000	471.000	1000	897	901	899
471.000	472.000	1000	940	889	914
472.000	473.000	1000	1046	935	991
473.000	474.000	1000	1138	1021	1080
474.000	475.000	1000	1055	959	1007
475.000	476.000	1000	663	669	666
476.000	477.000	1000	748	813	780
477.000	478.000	1000	677	576	626
478.000	479.000	1000	749	673	711
479.000	480.000	1000	730	718	724
480.000	481.000	1000	1006	854	930
481.000	482.000	1000	689	555	622
482.000	483.000	1000	1001	730	866
483.000	484.000	1000	951	787	869
484.000	485.000	1000	803	674	739
485.000	486.000	1000	1007	808	907
486.000	487.000	1000	965	1064	1014
487.000	488.000	1000	1607	1611	1609
488.000	489.000	1000	1094	960	1027
489.000	490.000	1000	1050	910	980
490.000	491.000	1000	1203	1057	1130
491.000	492.000	1000	1250	1073	1161
492.000	493.000	1000	1114	1045	1079
493.000	494.000	1000	856	931	894
494.000	495.000	1000	936	784	860
495.000	496.000	1000	1045	763	904
496.000	497.000	1000	873	832	853

Note: The average roughness varying from 612 mm/km to 1710 mm/km

Average Roughness Index (RI) values along the corridor were grouped in to four categories i.e., RI<=2000mm/km-Excellent, <=2200mm/km-Good, <=2500mm/km-Fair and >2500mm/km-Poor

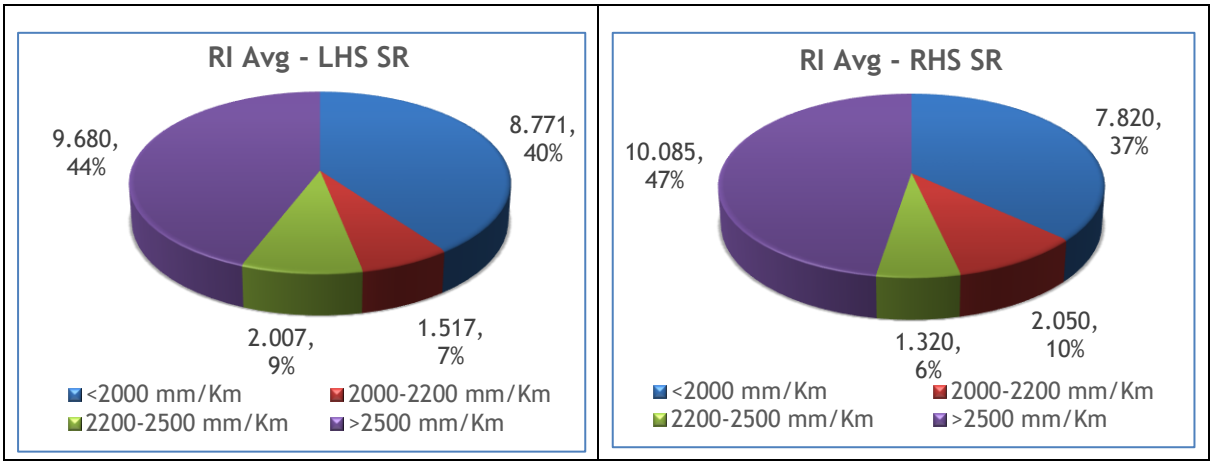
Pie chart showing the range of RI values in each carriageway of the project road have been presented below:



It can be seen from the above pie charts; Project Road has Excellent riding quality (RI<2000 mm/km) in Overall Length of the project road in both the directions.

❖ **Service Road**

Similarly, for service road also roughness values were captured and grouped in to four categories, Pie chart showing the range of RI values either service road has been presented below:



Based on the above pie charts, the Project Road exhibits good to fair riding quality (RI < 2500 mm/km) over 56% of the length on the LHS and 53% on the RHS.

2.6 PAVEMENT COMPOSITION SURVEYS (TEST PITS)

The composition of the existing pavement crust has been recorded from test pit surveys conducted at every 5 km intervals in staggered pattern across both carriageways. Thus, a total of eighteen (18 no's) pits have been dug along the corridor in which, 16 Nos. on the Main Carriageway edge and 2 Nos. on Service Road edge.

Table 7: Pavement Composition of Existing Pavement along Project Road

S No	Test Pit Number	Design Chainage	Direction	BT (mm)	WMM (mm)	GSB -I (mm)	GSB-II (mm)	Total (mm)
1	DTL-TP-2	352+400	LHS	190	190	210	-	590
2	DTL-TP-3	359+800	RHS	160	200	230	320	590
3	DTL-TP-4	370+100	LHS	170	160	250	-	580
4	DTL-TP-5	379+400	RHS	210	200	230	-	640
5	DTL-TP-6	390+080	LHS	190	250	220	-	660
6	DTL-TP-7	400+050	RHS	230	180	150	-	560
7	DTL-TP-8	410+000	LHS	180	200	170	-	550
8	DTL-TP-9	420+000	RHS	180	160	200	-	540
9	DTL-TP-10	430+900	LHS	170	200	160	-	530
10	DTL-TP-11	439+800	RHS	170	250	200	-	620
11	DTL-TP-12	450+080	LHS	140	200	250	-	590
12	DTL-TP-13	459+950	RHS	150	250	200	-	600
13	DTL-TP-14	470+050	LHS	180	200	180	-	560
14	DTL-TP-15	480+220	RHS	230	250	220	-	700
15	DTL-TP-16	490+180	LHS	230	250	220	-	700
16	DTL-TP-17	495+030	RHS	220	250	200	-	670
17	DTL-SR-TP-1	386+000	LHS	100	230	150	-	480
18	DTL-SR-TP-2	441+600	RHS	110	240	150	-	500

Total average crust thickness of the MCW pavement is 605mm. Pavement is mainly composed of a BT layer, WMM & GSB over subgrade. The average Total thickness of Service Road is about 490mm.

2.7 MATERIAL INVESTIGATIONS

2.7.1 SUBGRADE INVESTIGATIONS & LABORATORY TESTING

Sub-grade Investigations have been carried out to examine the subgrade soil characteristics along the project road. A total number of 18 test pits have been carefully dug from the pavement surface up to sub-grade level. In which 16 Nos. are on Main Carriage way edge and 2 on Service Road edge. Field density tests have been conducted for subgrade samples and a small quantity of sample has also been collected in airtight containers for determining the field moisture content. Upon completion of the field density test, representative sample of sub-grade soil has been collected in bulk, in gunny bags, from each test pit for laboratory testing.

The soil samples collected have been tested for the following properties to assess the existing sub-grade soil properties.

- Sieve analysis
- Atterberg limits
- Heavy compaction
- Four (4) days soaked CBR as per IS standards at 97% of MDD as applicable for sub-grade (Heavy Compaction)
- Free swelling index

Photographs have been taken at all test pit locations depicting the crust thickness and nature of material in the pavement. Few photographs are presented below:

<table>
<tr><td> 
DTL-TP-2</td><td> 
DTL-TP-4</td></tr>
<tr><td> 
DTL-TP-7</td><td> 
DTL-SR-TP-2</td></tr>
</table>

2.7.2 AGGREGATE & M-SAND SAMPLES

Aggregates to be used for sub-base, base, surface courses and concrete works have been collected from the crushers under operation in the existing quarries. The locations, estimated

quantity, basic cost of material and the approximate distance from each source to the nearest point on the project corridor are compiled in Tables below.

Table 8: Aggregate Samples Details

sample No.	Ex.Chainage (Km.)	Left/ Right	Name of Village	Name of Source/ Crusher	Lead from Nearest Ex.Chainage (Km.)	Approximate Quantity (ton)	Basic cost of the material (Rs.)	Remarks	Co-ordinate
AQ-1	386+600	RHS	Hummanabad	Cusher -Raj Rajeswary Stone Crusher Name: Akshay patil Mob no-86608 36693 Name: Veer Shatti Mob no-94816 33228	12kmkm	Plenty	30mm-Rs 1600/- per Brass 20mm-Rs 2400/- per Brass 10mm-Rs 1000/- Per Brass 6mm - Rs 1500/- Per Brass Dust- Rs 1600/- Per Brass GSB - Rs 1500/- Per Brass WMM - Rs 150/- Per Brass	Royalty Per ton R/-100 GST 5%	17.712387 77.059058
AQ-2	441+500	LHS	Almaspur/Bidar	Cusher - National Stone Crusher Name: Nashar khan Mob no:80958 07477	36km	Plenty	30mm-Rs 1700/ - per 100 cft 20mm-Rs 2100/- per 100 cft 10mm-Rs 1200/- per 100 cft 6mm - Rs 1600/- per 100 cft Dust - Rs 1600/- per 100 cft M-Sand - Rs 3800/- per 100 cft GSB - Rs 1600/- per 100 cft WMM - Rs 1800/- per 100 cft	including Royalty and GST 5%	17.915226 77.615505
AQ-3	441+500	LHS	Malgi/Bidar	Cusher - Sapna Stone Crusher Name: Ravi Mob no: 87927 51235	36km	Plenty	40mm-Rs 16/ -per cft 20mm-Rs 22/- per cft 10mm-Rs 15/- per cft 6mm - Rs 15/- per cft Dust - Rs 15/- per cft M-Sand - Rs 35/- per cft GSB - Rs 18/- per cft WMM - Rs 20/- per cft	including Royalty and GST 5%	17.888357 77.592424
AQ-4	386+600	RHS	Hummanabad	Cusher -Naga Bhushan Stone Crusher Name:Santosh Patil Mob no-78990 56666 Name:Raju	12km	Plenty	40mm-Rs 550/- per ton 20mm-Rs 700/- per ton 10mm-Rs 450/- Per ton 6mm - Rs 500/- Per ton Dust-Rs 550/- Per ton	Excluding Royalty and GST 5%	17.713403 77.072511

sample No.	Ex.Chainage (Km.)	Left/ Right	Name of Village	Name of Source/ Crusher	Lead from Nearest Ex.Chainage (Km.)	Approximate Quantity (ton)	Basic cost of the material (Rs.)	Remarks	Co-ordinate
				Mob:98809 84559			GSB - Rs 480/- Per ton WMM- Rs 500/- Per ton		
AQ-5	380+000	RHS	Hiranagaon	Cusher Rama Lingeswara Stone Crusher Name: Sharanappa Mob no-93795 93555	21km	Plenty	40mm-Rs 1600/- per Brass 20mm-Rs 2400/- per Brass 10mm-Rs 1600/- Per Brass 6mm - Rs 1600/- Per Brass Dust - Rs 1500/- Per Brass M-Sand - Rs 4000/- Per Brass Dry-Sand - Rs 3500/- Per Brass GSB - Rs 1600/- Per Brass WMM - Rs 1800/- Per Brass	GST 5%	17.956270 76.956727



DTL-AQ-1



DTL-AQ-2



DTL-AQ-4



DTL-AQ-5

2.8 CORE CUTTING SAMPLES

The objective of the core cutting is to examining the engineering properties of the materials relevant to the project as per specifications. Accordingly, 32 Nos. of cores were taken carefully in 30 locations from the project corridor, in which on LHS(MCW): 16 Nos, on RHS(MCW) :16 Nos.

The Core samples collected from these identified locations have been tested for the following properties.

- Density of Core
- Theoretical Maximum Sp. gravity (GMM)
- Air voids
- Compaction
- Extraction and Gradation
- Gradation of Aggregates

The recorded details such as location, lane, condition, depth of core etc. for each core sample are presented below

Table 9: Core Cutting Samples Details

Sample No.	Chainage	Direction	Carriage way	Distance from Kerb(m)	Pavement condition	Core Thickness (mm)	Core hole depth(mm)	Layer Thickness				
								OL	BC	DBM	BC	DBM
DTL-C-1	439+800	RHS	OL	6.6	GOOD	175	180	45	50	80		
DTL-C-2	435+000	RHS	IL	3.0	GOOD	145	150	25	50	70		
DTL-C-3	419+995	RHS	OL	6.5	GOOD	150	160	38	40	70		
DTL-C-4	414+950	RHS	IL	2.9	Minor Ravelling	155	170	40	45	70		
DTL-C-5	400+030	RHS	OL	6.5	GOOD	215	220	55	50	105		
DTL-C-6	394+950	RHS	IL	2.8	Mild Rutting Formed	175	180	40	50	85		
DTL-C-7	379+400	RHS	OL	6.6	GOOD	180	195	45		40	35	60
DTL-C-8	374+850	RHS	IL	2.9	Mild Rutting Formed	145	155	25	45	70		
DTL-C-9	359+800	RHS	OL	6.5	GOOD	155	160	35	50	70		
DTL-C-10	354+640	RHS	IL	2.9	GOOD	165	175	55	50	60		
DTL-C-11	352+400	LHS	OL	6.7	GOOD	195	200	55	45	95		
DTL-C-12	365+200	LHS	IL	2.8	Mild Rutting Formed	230	240	50	45	90	40	
DTL-C-13	370+100	LHS	OL	6.5	GOOD	150	190	45	50	55		
DTL-C-14	384+840	LHS	IL	2.9	Mild Rutting Formed	270	280	50	70	90	30	40
DTL-C-14A	384+840	LHS	OL	6.6	Mild Rutting Formed	275	280	40	50	110	45	30
DTL-C-15	390+080	LHS	OL	6.7	GOOD	160	170	40	35	80		
DTL-C-16	405+200	LHS	IL	2.8	GOOD	210	220	35	50	80	40	

Sample No.	Chainage	Direction	Carriage way	Distance from Kerb(m)	Pavement condition	Core Thickness (mm)	Core hole depth(mm)	Layer Thickness				
								OL	BC	DBM	BC	DBM
DTL-C-17	410+000	LHS	OL	6.6	GOOD	140	160	35	40	65		
DTL-C-18	425+280	LHS	IL	2.9	Fare	170	180	40		50	CC-80	
DTL-C-19	430+900	LHS	OL	6.7	Mild Ravelling	145	160	30	60	55		
DTL-C-20	445+000	LHS	IL	3.0	GOOD	185	195	70	60	55		
DTL-C-21	450+010	LHS	OL	6.7	GOOD	180	190	30		55	35	60
DTL-C-22	465+020	LHS	IL	2.9	GOOD	190	200	30		45	55	60
DTL-C-23	470+220	LHS	OL	6.8	GOOD	210	220	60	55	90		
DTL-C-24	485+020	LHS	IL	2.8	GOOD	210	220	40		45	40	80
DTL-C-25	490+150	LHS	OL	6.5	GOOD	220	240	35		45	30	105
DTL-C-26	495+030	RHS	IL	3.0	GOOD	205	220	30		50	30	95
DTL-C-27	480+450	RHS	OL	4.2	Fare Bleeding	210	220	35		55	40	75
DTL-C-28	475+000	RHS	IL	3.0	GOOD	250	260	30		50	50	120
DTL-C-28A	475+000	RHS	OL	6.6	GOOD	210	220	30		50	50	80
DTL-C-29	460+020	RHS	OL	6.9	GOOD	160	170	25	45	90		
DTL-C-30	455+000	RHS	IL	2.9	GOOD	190	300	30	40	120	110 mm strucked	

The sample photographs of cores are shown below.



DTL-CORE-3



DTL-CORE-14

	
DTL-CORE-20	**DTL-CORE-28A**

2.9 AXLE LOAD SURVEYS

Traffic loading has a significant impact on pavement performance and design. This is because the damage that vehicles create to a road depends very strongly on the axle loads of the vehicles. The exact relationship is influenced by the type of road structure and the way the road deteriorates but a "fourth power" damage law gives a good approximation.

Axle load study has been conducted using portable axle load pads. The survey was conducted near Toll Plaza-1 at km 410.700 on date 19.05.2025 to 21.05.2025, Toll Plaza-2 at km 468+800 on date 15.05.2025 to 17.05.2025 for 48 hrs duration. The survey has been conducted in both the directions. The measurements have been made on random sampling basis. The collected axle load data and analysis is presented in **Appendix 5** of this Report.

The vehicle damage factors have been calculated using the standard axle loadings given in IRC: 37-2018. The standard axle loadings adopted have been presented in the following table.

Axle Configuration	Standard Axle load (Tonnes)/ KN	Remarks
Single Wheel, Single Axle	6.60/ 65	As per IRC:37-2018
Dual Wheel, Single Axle	8.16/ 80	As per IRC:37-2018
Dual Wheel, Tandem Axle group	15.10/ 148	As per IRC:37-2018
Dual Wheel, Tridem Axle group	22.90/ 224	As per IRC:37-2018

Few photographs illustrating the survey locations and axle load measurements are presented below.



Survey in Progress



Survey in Progress

Direction wise VDF for each mode of commercial traffic has been estimated. Results of axle load surveys have been presented in the following table.

Table 10: VDF Values Estimated

Mode Type	Mangalig Toll plaza@ km 410.900		Kamkol Toll plaza @ km 467.800	
	UP (Solapur - Hyderabad)	DOWN (Hyderabad- Solapur)	UP (Solapur - Hyderabad)	DOWN (Hyderabad- Solapur)
LCV	1.61	1.11	1.10	1.43
2 Axle Truck	3.19	2.02	2.65	2.15
3 Axle Truck	4.74	3.69	4.56	5.28
MAV (4-6 Axle)	9.46	11.0	10.71	13.04
Buses	1.06	-	1.24	0.58

CHAPTER 3. VALIDATION OF EXECUTED WORKS

3.1 ROAD WORKS

The project road has been closely inspected to verify the executed works on ground. The scope works to be executed by the Concessionaire/Contractor as envisaged in CA is compared with the executed work on the Ground. Each structure has been inspected to note down its structural configuration and condition. The following table highlights the scope comparison of the executed works on ground.

Table 11: Scope Comparison of Executed works

S.no	Particulars	Length/ Nos	As per site	As per CA	Remarks
1	**Start Chainage (Km)**	Km	352.00	348.80	
2	**End Chainage (Km)**	Km	497.00	493.00	
3	Length of the Project Corridor	Kms	144.950	144.200	
4	Service Road / Slip Road	Kms	43.1	42.50	
5	Bypass Length	Kms	17.90	18.25	
6	ROBs	Nos	1	1	
7	RUB's	Nos	1	1	
8	Flyovers	Nos	6	7	
9	VOP	Nos	1	-	
10	VUPs	Nos	2	-	
11	LVUP's	Nos	-	-	
12	PUP's/CUP's	Nos	15	14	
13	FOBs	Nos	1	1	
14	Major Bridges	Nos	3	3	
15	Minor Bridges	Nos	47	47	
16	Culverts (Pipe)	Nos	164	157	
17	Culvert (Box)	Nos	73	36	
18	Culvert (Slab)	Nos	4	23	
19	Major Junctions	Nos	24	23	
20	Minor junctions	Nos	47	37	
21	High Embankments	Kms	10.490		
22	RCC Wall-Full Height	Kms	9.630		
23	RE Panels - Full height	Kms	11.48		
24	Partial RE Wall with Stone Pitching	Kms	3.12		
25	RCC Cover Drain	Kms	24.090		
26	Median drain	Kms	14.74		
27	Median Cuts	Nos	2,787		
28	Chutes	Nos	58		
29	Toll Plaza	Nos	2	2	
30	No. of Lanes (Both side)	Nos	20		12+8
31	Route Patrolling Vehicle	Nos	3		
32	Ambulance	Nos	2		
33	Cranes	Nos	2		
34	SWB	Nos	4		
35	High Mast locations	Kms	30		
36	Highway Lighting (length only)	Kms	60.60	23.05	

S.no	Particulars	Length/ Nos	As per site	As per CA	Remarks
37	Single Arm Lightings poles	Nos	52		(LED=52 Nos and Solar=175 Nos)
38	Double Arm Lightings poles	Nos	1,777		(LED=1777x2 Nos and Solar = 72x2 Nos) =
39	Solar Blinkers	Nos	56		
40	Solar Lights with Panel	Nos	319		Lights (Single arm 175 Nos + Double arm (72*2=144 Nos) =319 Nos
41	Bus Bays with Shelter	Nos	28	36	
42	Truck Lay bye	Nos	4	4	
43	Median Opening	Nos	55		
44	Median Plantation_ Functional	Kms	126.27		
45	Road Markings	Kms	290		
46	Delineators	Nos	270		
47	Kilometre Stones	Nos	230		
48	Hectometre Stones	Nos	1,099		
49	5th Km Stone	Nos	58		
50	Single Face W-Beam Safety Barriers	Kms	28.720	30.20	
51	Double faced W-Beam Safety Barriers	Kms	5.88		
52	Rigid Concrete Barriers	Kms	31.670		
53	Pedestrian Guard Rails	Kms	27.809	13.10	
54	Road Signs	Nos	2,941		
55	4-Lane Gantry Sign Boards	Nos	6		
56	Cantilever Sign Boards	Nos	19	16	
57	Toll Plaza Sign Boards	Nos	36		

The project corridor appears to have been constructed with the cross-sectional elements matching to those given in the manual at the time of execution. The carriageway width of 7.0m plus paved shoulders of 1.5m, shyness of 0.25m has been provided over the entire length except at structures.

In the project stretch, the Service Roads/Slip Roads with an overall length of 43.1Km is observed along the project corridor. The summary of service roads and slip roads are presented as below the details are provided in Road items, **Appendix 6** of this Report.

RCC Lined Covered drains exist mostly at service load locations of Underpass approaches towards outer-side. Whereas, Median drains are provided in Curve locations along the project road. It is observed that in few locations cover slab is damaged and in few locations cleaning is needed. The details are provided in Road items, **Appendix 6** of this Report.

Table 12: Summary of Drain

S No	Description	Median Drain (Kms)	RCC Cover lined drain (Kms)	Open lined drains (Kms)
2	As per Site	14.740	24.090	

On curved sections with super-elevation, Median drain cuts are provided and summary are presented below details are provided in **Appendix-6** of this report.

Table 13: Median drain cuts

Summary	Site (Nos.)
As Per Site	2787
No of Cuts Damaged	6
Cuts required cleaning	29

Slope protection in the form of RE-walls/RCC-wall are found in approaches to the underpasses. The summary of slope protection is presented below and the details are presented in **Appendix-6** of this report.

Table 14: Slope Protection

Approach Type	LHS (Kms)	RHS (Kms)	Length (Kms)
Embankment (>6m)	5.28	5.21	10.49
RE Wall	5.74	5.74	11.48
RCC Wall	5.11	4.52	9.63
Stone Pitching	1.95	2.05	4.00
RE wall with Stone pitching	1.56	1.56	3.12
Length (km)			38.720

In general, the median width varying from 4.5m to 1.0m in project road. There are 55 No. of Median openings are observed. For the reserve lane locations, the width of the median reduced to 1m. Solar blinkers are installed at median opening location. The details of these locations are provided in Road items, **Appendix 6** of this Report.

Table 15: Median Openings

Summary	As per site (Nos.)
Normal Lane	4
Reserved lane	51

The Project Road has 24 Nos. of Major Junctions and 47 Nos. of Minor Junctions. The List of Major & Minor junctions are provided. The details of these locations are provided in Road items, **Appendix 6** of this Report.

Safety barriers in the form of MBCB and concrete barriers have been provided along the project road at high embankments and at sharp curve locations, at approaches of grade separated and cross drainage Structures. Whereas, pedestrian Guardrails are provided in median separators. The details of these locations are provided in Road items, **Appendix 6** of this Report. The table below shows the summary of Safety Barriers provided along the project corridor are provided below:

Table 16: Details of Safety Barriers

Summary	MCB (Km)	Double faced MBCB (Km)	CCB (Km)	PGR (Km)
As per Site (Kms)	28.720	5.884	31.670	27.809
Damaged (Kms)	0.105	-	-	0.019

Road furniture in the form of Signs/Markings, Gantry signs and traffic safety blinkers, lighting, high mast lights have been provided along the project road the details presented in the **Appendix-6** of this Report. The summary of the same is presented in the Tables below:

Table 17: Locations of Highway Lightings

Summary	Nos	Remarks
No of High masts as per site	30	Average 16 no of Bulbs Per single pole
No of Single-arm Poles as per Site	52	LED Bulbs (52x1)
No of Double-arm Poles as per Site	1777	LED Bulbs (1777x2)
Solar Lights	319	

Table 18: Details of Road Signs

Summary of Road Signs (Nos.)							Total
Description	LHS	RHS	Junctions	Total	Missing	Damage	Poor
Unit	Nos	Nos	Nos	Nos	Nos	Nos	Nos
Overhead Gantry	3	3	0	6	0	0	0
Cantilever Gantry	10	9	0	19	0	0	0
Toll Boards	18	18	0	36	0	0	0
ADS/RAS	12	14	0	26	0	1	0
Rectangular	155	153	0	308	0	0	2
Triangular	253	271	22	546	0	2	2
Circular	300	264	0	564	0	4	1
Octagonal	47	51	45	143	0	0	1
Flag Type	19	14	2	35	0	1	0
Chevron	385	399	0	784	0	3	0
Hazard	264	258	9	531	0	1	1
Route marker	2	2	0	4	0	0	0
Total	1468	1456	78	3002	0	12	7

Road user facilities such as Bus Shelters and Truck Lay byes have been provided along the corridor.

The project Road has total 28 no's of Bus Bay with Bus Shelter and 4 number of Truck lay byes along the project Road. As per CA total 34 No's of bus bay with shelters to be provided and water kiosks, Telephone and litter bins, have to be provided at Truck lay byes locations. But have not been provided at site. The details of the bus shelter and Truck lay byes are provided in **Appendix-6** of this report.

An Incident Management System (IMS) has been implemented along the project stretch to ensure timely detection, reporting, and resolution of any unforeseen events or emergencies. The details of the Incident Management System established for the project corridor are presented below.

Table 19: Summary of Incident Management Equipment

S. No	Item/Particulars	Unit	Established
1	Ambulance	Nos	2

2	Recovery Crane	Nos	2
3	Patrolling vehicle	Nos	3

3.2 STRUCTURES

The inventory of structures has been carried for all every individual structure. The overall summary of existing bridges / structures is as presented below:

Table 20: Summary of Structures as per CA & Site

S. No	Type of Structure	No. of Structures As per CA	As per site					Remarks
			No. of Structures			Total No.of Str's	Total No.of Locations	
			LHS	RHS	BHS			
1	ROB	1	1	1	-	2	1	
2	RUB	1	-	-	1	1	1	
3	MJB	3	3	3	-	6	3	
4	MNB	47	47	47	-	94	47	
5	FLYOVER	7	6	6	-	12	6	
6	VOP	-	-	-	1	1	1	Flyover to VOP
7	VUP	-	2	2	-	4	2	2 Nos. under COS
8	LVUP	-	-	-	-	-	-	5 No's additionally proposed (Not yet constructed)
9	PUP	14	15	15	-	30	15	1 No additional as per COS
10	FOB	-	-	-	1	1	1	1 No additionally proposed (Not yet constructed) 1 No additional as per COS
11	Box culvert	36	-	-	73	73	73	
12	Slab culvert	23	-	-	4	4	4	
13	Pipe culvert	157	-	-	164	164	164	
Total Nos		**292**	**79**	**79**	**245**	**403**	**324**	

Table 21: Age of Structures

S. No	Type of Str	LHS		RHS		BHS		Total (Nos)		Total No. of Str's
		Old	New	Old	New	Old	New	Old	New	
1	ROB	-	1	-	1	-	-	-	2	2
2	RUB	-	-	-	-	-	1		1	1
3	MJB	-	3	3		-	-	3	3	6
4	MNB	11	36	21	26	-	-	32	62	94
5	FLYOVER	-	6	-	6	-	-	-	12	12
6	VOP	-	-	-	-	-	1	-	1	1
7	VUP	-	2	-	2	-	-	-	4	4
8	LVUP	-	5	-	5	-	-	-	10	10
9	PUP	-	15	-	15	-	-	-	30	30
10	FOB	-	-	-	-	-	2	-	2	2
11	BC	-	-	-	-	-	73	-	73	73
12	SC	-	-	-	-	-	4	-	4	4
13	PC	-	-	-	-	-	164	-	164	164
Total Nos		**11**	**68**	**24**	**55**	**0**	**245**	**35**	**368**	**403**

Table 22: Summary of Expansion Joints & Bearings

S. No	Type of Str	Expansion joints		Bearings					
				Pot PTFE		Elastomeric		Spherical	
		Old	New	Old	New	Old	New	Old	New
1	ROB	-	8	-	32	-	-	-	20
2	RUB	-	-	-	-	-	24	-	-
3	MJB	-	7	-	-	42	56	-	-
4	MNB	-	23	-	-	-	72	-	-
5	FLYOVER	-	28	-	8	-	144	-	-
6	VOP	-	2	-	-	-		-	-
Total		**-**	**68**	**-**	**40**	**42**	**296**	**-**	**20**
		68		**40**		**338**		**20**	
				398					

Table 23: Summary & Combination of Superstructures

S. No	Type of Str	Steel Girder & RCC Girder	RCC Girder	PSC Girder	RCC Solid Slab	RCC Box	PSC Box Girder & RCC Girder	Steel Truss	Total No. of Structures
1	ROB	2	-	-	-	-	-	-	2
2	RUB	-	1	-	-	-	-	-	1
3	MJB	-	2	2	2	-	-	-	6
4	MNB	-	6	3	41	44	-	-	94
5	FLYOVER	-	10	-	-	-	2	-	12
6	VOP	-	-	-	-	1	-	-	1
7	VUP	-	-	-	-	4	-	-	4
8	LVUP	-	-	-	-	10	-	-	10
9	PUP	-	-	-	-	30	-	-	30
10	FOB	-	-	-	-	-	-	2	2
Total		**2**	**19**	**5**	**43**	**89**	**2**	**2**	**162**

Table 24: Summary of Substructures

S. No	Type of Str	ABUTMENT					PIER					
		RCC Wall type	RCC Box	Stone Masonry wall type	Stone masonry & RCC Wall type	Steel Truss	RCC Wall type	RCC Rectangular Wall type	RCC Box	RCC Circular Column type	Steel Truss	Stone masonry & RCC Wall type
1	ROB	2	-	-	-	-	2	-	-	-	-	-
2	RUB	1	-	-	-	-	-	-	-	-	-	-
3	MJB	6	-	-	-	-	4	2	-	-	-	-
4	MNB	43	44	1	2	-	21	2	27	10	-	1
5	FLYOVER	12	-	-	-	-	8	-	-	-	-	-
6	VOP	-	1	-	-	-	-	-	1	-	-	-
7	VUP	-	6	-	-	-	-	-	-	-	-	-
8	LVUP	-	8	-	-	-	-	-	-	-	-	-
9	PUP	-	30	-	-	-	-	-	-	-	-	-
10	FOB	-	-	-	-	2	-	-	-	-	2	-
Total		**64**	**89**	**1**	**2**	**2**	**35**	**4**	**28**	**10**	**2**	**1**
		162					**80**					

Table 25: Details of CD & Other Structures

S.No.	Structure coordinates	Chainage (Km)	Type of Structure	Side	Str on	Age of Structure	Skew	Span Arrangement (No x Length)	No. of Spans	Span Length (m)	Deck Width (m)	Remarks
1	17°49'43.74" 76°47'44.92"	352+650	MNB	LHS	MCW	Old	No	4 x 9.4	4	9.4	11	-
2	17°49'43.74" 76°47'44.92"	352+650	MNB	RHS	MCW	New	No	2 x 18.8	2	18.8	12	-
3	17°50'12.00" 76°49'59.45"	356+825	PUP	LHS	MCW	New	No	1 x 7	1	7	12.5	-

S.No.	Structure coordinates	Chainage (Km)	Type of Structure	Side	Str on	Age of Structure	Skew	Span Arrangement (No x Length)	No. of Spans	Span Length (m)	Deck Width (m)	Remarks
4	17°50'12.00" 76°49'59.45"	356+825	PUP	RHS	MCW	New	No	1 x 7	1	7	12.5	-
5	17°50'13.04" 76°50'10.52"	357+155	MNB	LHS	MCW	New	No	2 x 7	2	7	12	-
6	17°50'13.04" 76°50'10.52"	357+155	MNB	RHS	MCW	New	No	2 x 7	2	7	12	-
7	17°50'19.99" 76°51'34.73"	359+650	MNB	LHS	MCW	New	No	1 x 17.8	1	17.8	12	-
8	17°50'19.99" 76°51'34.73"	359+650	MNB	RHS	MCW	Old	No	2 x 8.9	2	8.9	12.9	-
9	17°50'10.85" 76°52'31.74"	361+380	MNB	LHS	MCW	New	No	1 x 10.8	1	10.8	12	-
10	17°50'10.85" 76°52'31.74"	361+380	MNB	RHS	MCW	Old	No	1 x 10.8	1	10.8	11	-
11	17°50'02.27" 76°52'59.10"	362+230	MNB	LHS	MCW	Old	No	1 x 8.6	1	8.6	11.1	-
12	17°50'02.27" 76°52'59.10"	362+230	MNB	RHS	MCW	New	No	1 x 8.6	1	8.6	12	-
13	17°49'57.55" 76°53'17.48"	362+795	MNB	LHS	MCW	Old	No	1 x 8.9	1	8.9	11.1	-
14	17°49'57.55" 76°53'17.48"	362+795	MNB	RHS	MCW	New	No	1 x 8.9	1	8.9	12	-
15	17°49'42.15" 76°54'09.52"	364+400	MNB	LHS	MCW	Old	No	1 x 8.8	1	8.8	11.1	-
16	17°49'42.15" 76°54'09.52"	364+400	MNB	RHS	MCW	New	No	1 x 8.8	1	8.8	12	-
17	17°49'23.45" 76°55'50.17"	367+520	FLYOVER	LHS	MCW	New	No	2 x 20	2	20	12	-
18	17°49'23.45" 76°55'50.17"	367+520	FLYOVER	RHS	MCW	New	No	2 x 20	2	20	12	-
19	17°49'05" 76°57'39"	370+780	LVUP	LHS	MCW	New	No	1 x 12	1	12	12.5	SCH-B Proposal Not yet constructed
20	17°49'05" 76°57'39"	370+780	LVUP	RHS	MCW	New	No	1 x 12	1	12	12.5	SCH-B Proposal Not yet constructed
21	17°48'56" 76°58'26"	372+200	FOB	BHS	MCW	New	No	2 x 25.7	2	25.7	2.65	SCH-B Proposal Not yet constructed
22	17°48'41.88" 76°59'17.76"	373+800	MNB	LHS	MCW	New	No	1 x 10.7	1	10.7	12	-
23	17°48'41.88" 76°59'17.76"	373+800	MNB	RHS	MCW	Old	No	1 x 10.7	1	10.7	11.1	-
24	17°48'30.29" 76°59'58.97"	375+075	MNB	LHS	MCW	New	No	1 x 7.5	1	7.5	15.5	-
25	17°48'30.29" 76°59'58.97"	375+075	MNB	RHS	MCW	Old	No	1 x 7.5	1	7.5	12	-
26	17°48'18.85" 77°00'37.14"	376+250	MNB	LHS	MCW	New	No	1 x 9.2	1	9.2	15.5	-
27	17°48'18.85" 77°00'37.14"	376+250	MNB	RHS	MCW	Old	No	1 x 9.2	1	9.2	12.5	-
28	17°48'18.85" 77°00'37.14"	376+860	PUP	LHS	MCW	New	No	1 x 10.5	1	10.5	12.5	COS
29	17°48'18.85" 77°00'37.14"	376+860	PUP	RHS	MCW	New	No	1 x 10.5	1	10.5	12.5	COS
30	17°47'38.32" 77°00'37.14"	380+025	PUP	LHS	MCW	New	No	1 x 7	1	7	12.5	-

S.No.	Structure coordinates	Chainage (Km)	Type of Structure	Side	Str on	Age of Structure	Skew	Span Arrangement (No x Length)	No. of Spans	Span Length (m)	Deck Width (m)	Remarks
31	17°47'38.32" 77°00'37.14"	380+025	PUP	RHS	MCW	New	No	1 x 7	1	7	12.5	-
32	17°47'25.00" 77°02'58.80"	380+770	MNB	LHS	MCW	Old	Yes	2 x 10.4	2	10.4	12.6	-
33	17°47'25.00" 77°02'58.80"	380+770	MNB	RHS	MCW	New	Yes	1 x 20.8	1	20.8	12	-
34	17°47'19.81" 77°03'08.40"	381+100	MNB	LHS	MCW	Old	No	2 x 7	2	7	12	-
35	17°47'19.81" 77°03'08.40"	381+100	MNB	RHS	MCW	New	No	2 x 7	2	7	15.7	-
36	17°46'39.93" 77°04'20.51"	383+565	MNB	LHS	MCW	New	Yes	2 x 7	2	7	12.5	-
37	17°46'39.93" 77°04'20.51"	383+565	MNB	RHS	MCW	Old	Yes	2 x 7	2	7	11.5	-
38	17°46'14.65" 77°05'22.45"	385+580	MNB	LHS	MCW	New	No	3 x 9.8	3	9.8	12	-
39	17°46'14.65" 77°05'22.45"	385+580	MNB	RHS	MCW	Old	No	3 x 9.8	3	9.8	12.5	-
40	17°46'06.24" 77°05'56.24"	386+650	FLYOVER	LHS	MCW	New	No	2 x 20 + 1 x 40	3	26.67	12	-
41	17°46'06.24" 77°05'56.24"	386+650	FLYOVER	RHS	MCW	New	No	2 x 20 + 1 x 40	3	26.67	12	-
42	17°46'08.23" 77°06'55.59"	388+375	MNB	LHS	MCW	New	No	1 x 16.8	1	16.8	12	-
43	17°46'08.23" 77°06'55.59"	388+375	MNB	RHS	MCW	Old	No	2 x 8.4	2	8.4	12.5	-
44	17°45'51.88" 77°07'27.82"	389+450	VOP	BHS	MCW	New	Yes	2 x 16.5	2	16.5	33	-
45	17°46'07" 77°08'05"	390+728	LVUP	LHS	MCW	New	No	1 x 12	1	12	12.5	SCH-B Proposal Not yet constructed
46	17°46'07" 77°08'05"	390+728	LVUP	RHS	MCW	New	No	1 x 12	1	12	12.5	SCH-B Proposal Not yet constructed
47	17°46'09.31" 77°08'20.81"	391+180	RUB	BHS	MCW	New	No	1 x 27.2	1	27.2	17.5	-
48	17°45'40.21" 77°02'35.89"	395+500	PUP	LHS	MCW	New	No	1 x 7	1	7	12.5	-
49	17°45'40.21" 77°02'35.89"	395+500	PUP	RHS	MCW	New	No	1 x 7	1	7	12.5	-
50	17°45'39.66" 77°10'52.05"	395+780	MNB	LHS	MCW	New	Yes	3 x 10.4	3	10.4	12	-
51	17°45'39.66" 77°10'52.05"	395+780	MNB	RHS	MCW	Old	Yes	3 x 10.4	3	10.4	12	Stone Masonry Structure widened with RCC on the shoulder side
52	17°45'41.47" 77°11'42.25"	397+270	MNB	LHS	MCW	New	No	1 x 8.4	1	8.4	12	-
53	17°45'41.47" 77°11'42.25"	397+270	MNB	RHS	MCW	Old	No	1 x 8.4	1	8.4	12.7	Stone Masonry Structure concentric widened with RCC
54	17°45'47.95" 77°12'22.02"	398+450	MNB	LHS	MCW	Old	No	1 x 8.8	1	8.8	12.5	-
55	17°45'47.95" 77°12'22.02"	398+450	MNB	RHS	MCW	New	No	1 x 8.8	1	8.8	12	-

S.No.	Structure coordinates	Chainage (Km)	Type of Structure	Side	Str on	Age of Structure	Skew	Span Arrangement (No x Length)	No. of Spans	Span Length (m)	Deck Width (m)	Remarks
56	17°45'54.68" 77°15'58.01"	404+845	MNB	LHS	MCW	Old	No	1 x 8.7	1	8.7	11	-
57	17°45'54.68" 77°15'58.01"	404+845	MNB	RHS	MCW	New	No	1 x 8.7	1	8.7	12	-
58	17°45'50.68" 77°16'52.02"	406+300	PUP	LHS	MCW	New	No	1 x 7	1	7	12.5	-
59	17°45'50.68" 77°16'52.02"	406+300	PUP	RHS	MCW	New	No	1 x 7	1	7	12.5	-
60	17°45'46.92" 77°17'13.76"	407+100	MJB	LHS	MCW	New	No	4 x 22.4	4	22.4	12	-
61	17°45'46.92" 77°17'13.76"	407+100	MJB	RHS	MCW	Old	No	4 x 22.4	4	22.4	11.15	-
62	17°45'10.32" 77°18'09.67"	409+110	PUP	LHS	MCW	New	No	1 x 7	1	7	12.5	-
63	17°45'10.32" 77°18'09.67"	409+110	PUP	RHS	MCW	New	No	1 x 7	1	7	12.5	-
64	17°43'45" 77°21'17"	415+380	LVUP	LHS	MCW	New	No	1 x 12	1	12	12.5	SCH-B Proposal Not yet constructed
65	17°43'45" 77°21'17"	415+380	LVUP	RHS	MCW	New	No	1 x 12	1	12	12.5	SCH-B Proposal Not yet constructed
66	17°43'31" 77°21'30"	415+960	MNB	LHS	MCW	New	Yes	3 x 6	3	6	12	-
67	17°43'31" 77°21'30"	415+960	MNB	RHS	MCW	New	Yes	3 x 6	3	6	12	-
68	17°43'27.25" 77°21'34.73"	416+140	MNB	LHS	MCW	New	Yes	3 x 6	3	6	12	-
69	17°43'27.25" 77°21'34.73"	416+140	MNB	RHS	MCW	New	Yes	3 x 6	3	6	12	-
70	17°43'15.95" 77°21'57.98"	416+930	MNB	LHS	MCW	New	No	2 x 5	2	5	12	-
71	17°43'15.95" 77°21'57.98"	416+930	MNB	RHS	MCW	New	No	2 x 5	2	5	12	-
72	17°43'15.74" 77°22'08.26"	417+240	PUP	LHS	MCW	New	No	1 x 7	1	7	13.75	-
73	17°43'15.74" 77°22'08.26"	417+240	PUP	RHS	MCW	New	No	1 x 7	1	7	13.75	-
74	17°43'20.51" 77°22'29.32"	417+870	MNB	LHS	MCW	New	No	2 x 22.5	2	22.5	12	-
75	17°43'20.51" 77°22'29.32"	417+870	MNB	RHS	MCW	New	No	2 x 22.5	2	22.5	12	-
76	17°43'12.02" 77°22'59.88"	418+860	FLYOVER	LHS	MCW	New	No	2 x 20	2	20	12	-
77	17°43'12.02" 77°22'59.88"	418+860	FLYOVER	RHS	MCW	New	No	2 x 20	2	20	12	-
78	17°42'31.61" 77°24'22.27"	421+600	MNB	LHS	MCW	New	Yes	3 x 6	3	6	12	-
79	17°42'31.61" 77°24'22.27"	421+600	MNB	RHS	MCW	New	Yes	3 x 6	3	6	12	-
80	17°42'24.12" 77°24'53.30"	422+570	PUP	LHS	MCW	New	No	1 x 7	1	7	12.5	-
81	17°42'24.12" 77°24'53.30"	422+570	PUP	RHS	MCW	New	No	1 x 7	1	7	12.5	-
82	17°41'50.11" 77°26'06.40"	424+950	MNB	LHS	MCW	New	No	3 x 7	3	7	12	-

S.No.	Structure coordinates	Chainage (Km)	Type of Structure	Side	Str on	Age of Structure	Skew	Span Arrangement (No x Length)	No. of Spans	Span Length (m)	Deck Width (m)	Remarks
83	17°41'50.11" 77°26'06.40"	424+950	MNB	RHS	MCW	Old	No	3 x 7	3	7	12	-
84	17°41'35.33" 77°26'42.17"	426+020	VUP	LHS	MCW	New	No	1 x 12	1	12	12.5	COS
85	17°41'35.33" 77°26'42.17"	426+020	VUP	RHS	MCW	New	No	1 x 12	1	12	12.5	COS
86	17°41'35.02" 77°27'08.35"	426+850	MJB	LHS	MCW	New	No	3 x 22.3	3	22.3	12	-
87	17°41'35.02" 77°27'08.35"	426+850	MJB	RHS	MCW	Old	No	3 x 22.3	3	22.3	11	-
88	17°41'42.52" 77°29'05.19"	430+400	PUP	LHS	MCW	New	No	1 x 7	1	7	12.5	-
89	17°41'42.52" 77°29'05.19"	430+400	PUP	RHS	MCW	New	No	1 x 7	1	7	12.5	-
90	17°41'43.38" 77°29'26.89"	431+030	MNB	LHS	MCW	New	No	1 x 6.8 + 1 x 6.6	2	6.7	11.5	-
91	17°41'43.38" 77°29'26.89"	431+030	MNB	RHS	MCW	Old	No	1 x 6.8 + 1 x 6.6	2	6.7	11	-
92	17°41'53.81" 77°30'23.31"	432+720	MNB	LHS	MCW	New	No	2 x 6.8	2	6.8	11.5	-
93	17°41'53.81" 77°30'23.31"	432+720	MNB	RHS	MCW	Old	No	2 x 6.8	2	6.8	11.5	-
94	17°42'00.19" 77°32'15.22"	436+050	MNB	LHS	MCW	New	No	4 x 5.8	4	5.8	11.5	-
95	17°42'00.19" 77°32'15.22"	436+050	MNB	RHS	MCW	Old	No	4 x 5.8	4	5.8	11.5	-
96	17°41'27.09" 77°34'46.29"	440+690	FOB	BHS	MCW	New	No	2 x 25.7	2	25.7	2.65	COS
97	17°41'14.38" 77°35'09.86"	441+470	FLYOVER	LHS	MCW	New	No	2 x 20	2	20	13.5	-
98	17°41'14.38" 77°35'09.86"	441+470	FLYOVER	RHS	MCW	New	No	2 x 20	2	20	13.5	-
99	17°41'16.7"N 77°35'30.6"E	442+150	ROB	LHS	MCW	New	No	1 x 15 + 1 x 45.70 + 1 x 18	3	26.2333333	12	-
100	17°41'16" 77°35'30"	442+150	ROB	RHS	MCW	New	No	1 x 15 + 1 x 45.70 + 1 x 18	3	26.2333333	12	-
101	17°41'18.99" 77°35'35.82"	442+300	MNB	LHS	MCW	New	Yes	2 x 4.3	2	4.3	11.5	-
102	17°41'18.99" 77°35'35.82"	442+300	MNB	RHS	MCW	New	Yes	2 x 4.3	2	4.3	11.5	-
103	17°41'24.79" 77°35'59.80"	443+030	MNB	LHS	MCW	New	No	1 x 7.8	1	7.8	11.5	-
104	17°41'24.79" 77°35'59.80"	443+030	MNB	RHS	MCW	New	No	1 x 7.8	1	7.8	11.5	-
105	17°41'27.71" 77°36'25.64"	443+775	MNB	LHS	MCW	New	No	3 x 6	3	6	11.5	-
106	17°41'27.71" 77°36'25.64"	443+775	MNB	RHS	MCW	New	No	3 x 6	3	6	11.5	-
107	17°41'27.50" 77°36'24.84"	443+810	PUP	LHS	MCW	New	Yes	1 x 7	1	7	11.5	-
108	17°41'27.50" 77°36'24.84"	443+810	PUP	RHS	MCW	New	Yes	1 x 7	1	7	11.5	-

S.No.	Structure coordinates	Chainage (Km)	Type of Structure	Side	Str on	Age of Structure	Skew	Span Arrangement (No x Length)	No. of Spans	Span Length (m)	Deck Width (m)	Remarks
109	17°41'30.33" 77°36'48.93"	444+490	MNB	LHS	MCW	New	Yes	4 x 10	4	10	11.5	-
110	17°41'30.33" 77°36'48.93"	444+490	MNB	RHS	MCW	New	Yes	4 x 10	4	10	11.5	-
111	17°41'33.59" 77°37'18.74"	445+380	MNB	LHS	MCW	New	Yes	2 x 5	2	5	11.5	-
112	17°41'33.59" 77°37'18.74"	445+380	MNB	RHS	MCW	New	Yes	2 x 5	2	5	11.5	-
113	17°41'35.40" 77°38'23.14"	447+290	FLYOVER	LHS	MCW	New	No	1 x 20	1	20	11	-
114	17°41'35.40" 77°38'23.14"	447+290	FLYOVER	RHS	MCW	New	No	1 x 20	1	20	11	-
115	17°41'22.58" 77°38'51.43"	448+220	MNB	LHS	MCW	New	Yes	3 x 8	3	8	11.5	-
116	17°41'22.58" 77°38'51.43"	448+220	MNB	RHS	MCW	New	Yes	3 x 8	3	8	11.5	-
117	17°40'56.14" 77°39'37.93"	449+810	MNB	LHS	MCW	New	Yes	4 x 8.8	4	8.8	11.5	-
118	17°40'56.14" 77°39'37.93"	449+810	MNB	RHS	MCW	New	Yes	4 x 8.8	4	8.8	11.5	-
119	17°40'16.49" 77°40'35.80"	451+975	MNB	LHS	MCW	New	No	3 x 5.8	3	5.8	11.5	-
120	17°40'16.49" 77°40'35.80"	451+975	MNB	RHS	MCW	Old	No	3 x 5.8	3	5.8	11.5	-
121	17°40'06.10" 77°41'18.94"	453+300	MJB	LHS	MCW	New	No	7 x 8.8	7	8.8	11.5	-
122	17°40'06.10" 77°41'18.94"	453+300	MJB	RHS	MCW	Old	No	7 x 8.8	7	8.8	11.5	-
123	17°39'54" 77°42'35"	455+586	LVUP	LHS	MCW	New	No	1 x 12	1	12	12.5	SCH-B Proposal Not yet constructed
124	17°39'54" 77°42'35"	455+586	LVUP	RHS	MCW	New	No	1 x 12	1	12	12.5	SCH-B Proposal Not yet constructed
125	17°39'25.14" 77°44'12.83"	458+600	PUP	LHS	MCW	New	No	1 x 7	1	7	12.5	-
126	17°39'25.14" 77°44'12.83"	458+600	PUP	RHS	MCW	New	No	1 x 7	1	7	12.5	-
127	17°39'25.60" 77°45'13.83"	460+445	MNB	LHS	MCW	Old	No	3 x 4.8	3	4.8	11.5	-
128	17°39'25.60" 77°45'13.83"	460+445	MNB	RHS	MCW	New	No	3 x 4.8	3	4.8	11.5	-
129	17°39'23.66" 77°46'31.88"	462+760	MNB	LHS	MCW	Old	No	2 x 6.9	2	6.9	11.5	-
130	17°39'23.66" 77°46'31.88"	462+760	MNB	RHS	MCW	New	No	2 x 6.9	2	6.9	11.5	-
131	17°38'53.83" 77°48'27.37"	466+315	PUP	LHS	MCW	New	No	1 x 7	1	7	12.5	-
132	17°38'53.83" 77°48'27.37"	466+315	PUP	RHS	MCW	New	No	1 x 7	1	7	12.5	-
133	17°38'36.12" 77°49'58.80"	469+075	MNB	LHS	MCW	Old	Yes	1 x 8.35	1	8.35	13.65	-
134	17°38'36.12" 77°49'58.80"	469+075	MNB	RHS	MCW	New	Yes	1 x 9	1	9	13.65	-
135	17°38'33.51" 77°50'48.95"	470+570	PUP	LHS	MCW	New	Yes	1 x 7	1	7	14.6	-

S.No.	Structure coordinates	Chainage (Km)	Type of Structure	Side	Str on	Age of Structure	Skew	Span Arrangement (No x Length)	No. of Spans	Span Length (m)	Deck Width (m)	Remarks
136	17°38'33.51" 77°50'48.95"	470+570	PUP	RHS	MCW	New	Yes	1 x 7	1	7	14.6	-
137	17°38'10" 77°52'37"	473+873	LVUP	LHS	MCW	New	No	1 x 12	1	12	12.5	SCH-B Proposal Not yet constructed
138	17°38'10" 77°52'37"	473+873	LVUP	RHS	MCW	New	No	1 x 12	1	12	12.5	SCH-B Proposal Not yet constructed
139	17°37'52.74" 77°53'52.44"	476+150	MNB	LHS	MCW	New	No	3 x 19	3	19	12.5	-
140	17°37'52.74" 77°53'52.44"	476+150	MNB	RHS	MCW	New	No	3 x 19	3	19	11.5	-
141	17°37'35.00" 77°56'21.00"	480+850	MNB	LHS	MCW	New	Yes	4 x 10	4	10	14.8	-
142	17°37'35.00" 77°56'21.00"	480+850	MNB	RHS	MCW	New	Yes	4 x 10	4	10	14.8	-
143	17°37'51.00" 77°57'22.00"	482+790	FLYOVER	LHS	MCW	New	Yes	1 x 20	1	20	12.2	-
144	17°37'51.00" 77°57'22.00"	482+790	FLYOVER	RHS	MCW	New	Yes	1 x 20	1	20	12.2	-
145	17°36'40.00" 78°00'00.00"	488+220	MNB	LHS	MCW	New	Yes	4 x 10.3	4	10.3	12.2	-
146	17°36'40.00" 78°00'00.00"	488+220	MNB	RHS	MCW	Old	Yes	4 x 10.3	4	10.3	12.2	-
147	17°36'24.00" 78°00'58.00"	490+000	MNB	LHS	MCW	New	No	3 x 8.8	3	8.8	11.5	-
148	17°36'24.00" 78°00'58.00"	490+000	MNB	RHS	MCW	Old	No	3 x 8.8	3	8.8	11.5	-
149	17°36'20.00" 78°01'39.00"	491+240	PUP	LHS	MCW	New	No	1 x 7	1	7	12.5	-
150	17°36'20.00" 78°01'39.00"	491+240	PUP	RHS	MCW	New	No	1 x 7	1	7	12.5	-
151	17°36'14" 78°02'19"	492+430	MNB	LHS	MCW	New	No	4 x 6.4	4	6.4	11.5	-
152	17°36'14" 78°02'19"	492+430	MNB	RHS	MCW	Old	No	4 x 6.4	4	6.4	11.5	-
153	17°36'10" 78°02'34"	492+880	MNB	LHS	MCW	New	Yes	1 x 7.3	1	7.3	12.5	-
154	17°36'10" 78°02'34"	492+880	MNB	RHS	MCW	Old	Yes	1 x 7.3	1	7.3	17.2	-
155	17°36'10" 78°02'35"	492+925	MNB	LHS	MCW	New	Yes	1 x 7.3	1	7.3	15	-
156	17°36'10" 78°02'35"	492+925	MNB	RHS	MCW	Old	Yes	1 x 7.3	1	7.3	15.5	-
157	17°36'03" 78°02'58"	493+650	MNB	LHS	MCW	New	No	2 x 9 + 4 x 8.8	6	8.8	11.5	-
158	17°36'03" 78°02'58"	493+650	MNB	RHS	MCW	Old	No	2 x 9 + 4 x 8.8	6	8.8	11.5	-
159	17°35'38" 78°04'00"	495+640	VUP	LHS	MCW	New	No	1 x 12	1	12	12.5	COS
160	17°35'38" 78°04'00"	495+640	VUP	RHS	MCW	New	No	1 x 12	1	12	12.5	COS
161	17°35'28" 78°04'35"	496+710	PUP	LHS	MCW	New	No	1 x 7	1	7	12.5	-
162	17°35'28" 78°04'35"	496+710	PUP	RHS	MCW	New	No	1 x 7	1	7	12.5	-

4.1 MATERIAL INVESTIGATION INFERENCES

4.1.1 SUBGRADE

The subgrade samples collected from the test pits taken from project road appears to be in fair condition as revealed by test pit investigations. Soil classification has been done according to IS Classification of Soils (ISC) as detailed in IS 1498 - 1978.

Laboratory test results indicate that majority of the Subgrade soil samples collected belongs to Coarse Grained Soil. Out of 18 subgrade samples, 3 samples belong to CI type of soil, 4 Samples belongs to GC type of Soil, 11 Sample belongs to SC type of Soil.

Pie Chart showing the percentage distribution of soil classification of existing subgrade sample is presented below:

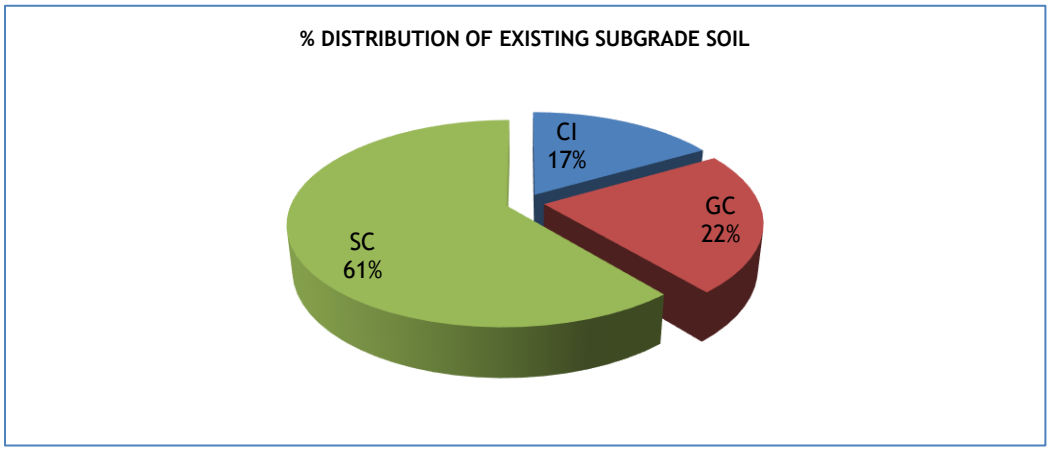
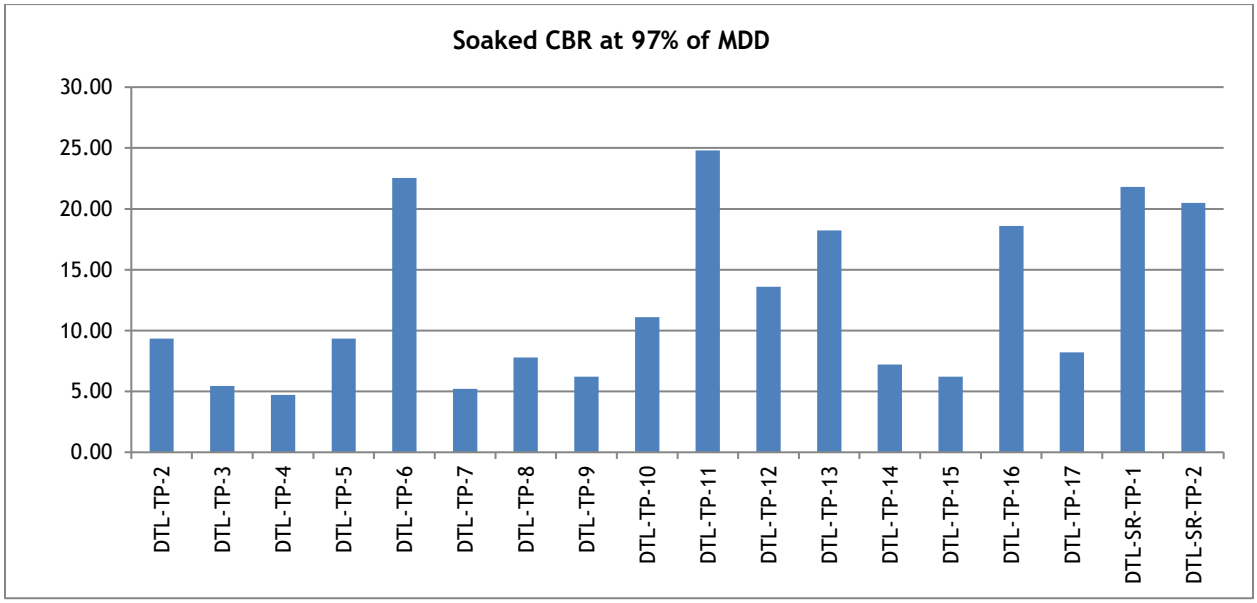


Table 26: Summary of test results of Existing Subgrade Soils

Lab Sample No	Site Identification		Grain size analysis					Atterberg Limits (%)			Soil Class	MDD (gm/cc)	OMC (%)	Dry Density at 97% MDD	Soaked CBR 97% MDD	FDD (gm/cc)	Free Swelling Index (%)
	Location (km)	Up/Dn	Percentage passing from					LL	PL	PI							
			4.75 mic IS Sieve	425 mic IS Sieve	75 mic IS Sieve	Gravel %	Sand %										
DTL-TP-2	352+400	LHS	80.64	60.31	53.50	19.36	27.14	47	24	23	CI	1.81	13.60	1.76	11.50	1.785	12
DTL-TP-3	359+800	RHS	90.33	76.58	69.77	9.67	20.56	49	25	24	CI	1.87	15.50	1.81	6.40	1.781	20
DTL-TP-4	370+100	LHS	71.9	41.47	34.56	28.10	37.34	43	23	20	SC	1.77	15.50	1.72	6.20	1.645	28
DTL-TP-5	379+400	RHS	74.91	50.16	43.77	25.09	31.14	40	25	15	SC	1.85	15.60	1.79	10.90	1.738	20
DTL-TP-6	390+080	LHS	68.18	33.03	259	31.82	42.59	42	22	20	SC	2.09	10.10	2.03	27.40	2.030	21
DTL-TP-7	400+050	RHS	88.1	64.8	59.04	11.90	29.06	49	29	20	SC	1.82	16.30	1.77	6.25	1.665	43
DTL-TP-8	410+000	LHS	74.99	56.75	52.47	25.01	22.52	46	25	21	CI	1.92	12.70	1.86	9.90	1.863	19
DTL-TP-9	420+000	RHS	87.00	55.74	49.60	13.00	37.40	49	29	20	SC	1.92	12.40	1.86	7.60	1.761	21
DTL-TP-10	430+900	LHS	73.81	50.53	44.09	26.19	29.72	47	26	21	SC	1.99	14.10	1.93	14.30	1.903	15
DTL-TP-11	439+800	RHS	82.46	41.25	35.48	17.54	46.98	43	22	21	SC	2.12	13.00	2.06	31.60	2.026	27
DTL-TP-12	450+080	LHS	45.31	31.43	27.40	54.69	17.91	45	25	20	GC	2.12	10.80	2.06	18.25	2.044	15
DTL-TP-13	459+950	RHS	42.09	26.91	24.07	57.91	18.02	47	29	18	GC	2.06	11.00	2.00	21.10	1.904	25
DTL-TP-14	470+050	LHS	97.25	43.90	31.86	2.75	65.39	43	24	19	SC	1.95	12.50	1.89	8.65	1.853	33

Lab Sample No	Site Identification		Grain size analysis					Atterberg Limits (%)			Soil Class	MDD (gm/cc)	OMC (%)	Dry Density at 97% MDD	Soaked CBR 97% MDD	FDD (gm/cc)	Free Swelling Index (%)
	Location (km)	Up/Dn	Percentage passing from 4.75 mic IS Sieve	425 mic IS Sieve	75 mic IS Sieve	Gravel %	Sand %	LL	PL	PI							
DTL-TP-15	480+220	RHS	97.76	52.34	38.32	2.24	59.44	40	21	19	SC	1.92	13.20	1.86	7.60	1.900	40
DTL-TP-16	490+180	LHS	93.36	44.76	26.65	6.64	66.71	35	21	14	SC	2.06	8.50	2.00	22.50	1.944	23
DTL-TP-17	495+030	RHS	92.22	37.05	24.58	7.78	67.64	40	22	18	SC	2.05	9.30	1.99	9.80	1.937	25
DTL-SR-TP-1	386+000	LHS	42.87	16.55	13.02	57.13	29.85	38	23	15	GC	2.16	9.00	2.10	27.60	1.905	17
DTL-SR-TP-2	441+600	RHS	59.07	34.16	28.38	40.93	30.69	47	26	21	GC	2.15	12.50	2.09	26.40	1.974	15



The following observations can be made from the above test results conducted on of existing subgrade samples

- Maximum Dry Density for all subgrade samples varies between 1.77 and 2.16 gm/cc. 18 number of samples satisfying the MDD criterion (MDD>=1.75 gm/cc).
- OMC for existing subgrade samples varies Between 8.5% to 16.3%.
- Free Swelling Index for existing subgrade samples varies from 12% to 43%. All samples satisfying the FSI criterion (FSI<=50%)
- CBR Values are in the range of 6.2% to 31.60%
- Liquid limit Values are in the range of 35% to 49% all sample are satisfying the LL limits <50%
- Plastic index ranges of 14% to 24% out of all samples are satisfying the PL limits <25%

On the whole, it can be concluded that the existing subgrade is in fair condition. The laboratory test results for soil samples are presented in **Appendix-8** of this Report.

4.1.2 AGGREGATE

Aggregates to be used for sub-base, base, surface courses and concrete works have been collected from the crushers under operation from the existing quarries. The Table below represents the test results of the Aggregate and Sand Samples

Table 27: Test Results of Aggregate Samples Details

S. No	Sample	Location (km)	Up/Dn	SIZE OF AGGREGATE	A.I.V	Water Absorption	Specific Gravity	Stripping	DLBD (Loose)	DLBD (Rodded)
1	AQ-1	386+600	RHS	10 MM	15.86	1.45	2.88	> 95% Retained Coating	1.44	1.59
				20 MM		1.07	2.91		1.57	1.7
				M sand					1.84	2.09
2	AQ-2	441+500	LHS	10 MM	7.68	0.71	2.95	> 95% Retained Coating	1.64	1.77
				20 MM		0.51	2.98		1.52	1.66
				M sand		0.96	2.94		-	-
3	AQ-3	441+500	LHS	10 MM	12	1.76	2.87	> 95% Retained Coating	1.51	1.67
				20 MM		1.47	2.91		1.52	1.68
				M sand		1.88	2.82		1.76	2.02
4	AQ-4	386+600	RHS	10 MM	16	1.05	2.80	> 95% Retained Coating	1.43	1.6
				20 MM		0.80	2.89		1.51	1.65
				M sand					-	-
5	AQ-5	380+000	RHS	10 MM	8	0.87	2.90	> 95% Retained Coating	1.64	1.76
				20 MM		0.55	2.95		1.51	1.66
				M sand		1.28	2.80		-	-

Note: All the Aggregates samples are satisfying MoRTH requirements i.e., AIV (max. limit is 24% for BC-layer), Water Absorption (max. limit is 2%), Stripping >95% retained coating.

4.1.3 M-SAND

M-Sand samples have been tested for its suitability. Summary of the test results carried out on these samples are presented in the following tables whilst the complete details are presented as an **Annexure-8** of this report.

Table 28: Test Results of Sand Samples Details

S No	Sample No	CHAINAGE	SIDE	10 mm Passing %	4.75 mm Passing %	2.36 mm Passing %	1.18mm Passing %	600mic Passing %	300mic Passing %	150mic Passing %	FM	ZONE
1	M sand - 2	441+500	LHS	100	100.00	76.00	39.00	19.00	10.00	4.00	3.52	ZONE-I
2	M sand - 3	441+500	LHS	100	97.00	93.00	61.00	42.00	16.00	4.00	2.87	ZONE-II
3	M sand - 5	380+000	RHS	100	98.00	83.00	60.00	41.00	12.00	4.00	2.92	ZONE-II

Note: Sample belongs to Zone-I & II of MORTH Specifications.

4.1.4 CORE RESULTS

The core samples as extracted at 30 locations were tested in the laboratory to find the engineering properties of BC/DBM materials.

The test results of the pavement cores are as presented below.

Table 29: Test Results of Pavement cores-BC Layers

Sl. No.	Name of Material	Core No.	Chainage	Direction	Carriage way lane	Distance from kerb M	Condition of Road	% of Bitumen Obtained (by extraction of core)		% Agg by Wt. of tatol Mix	Thickness of Specimen mm	DENSITY	Mixmum Theoretical Sp.Gr.of Mix (GMM)	% of Air Voids	Filler Asphalt Ratio (%)	% compaction	Gradation as per Morth
								BC	Limits						0.075 mm		
1	OL	DTL-C-1	439+800	RHS	Outer Lane	6.6	Good	5.51	As per MORTH 5th Revision Table no 500-17, Bitumen Content for BC grading - 1 is 5.2%+ 0.3%	94.49	45.77	2.558	2.735	6.47	0.25	94	Grade-I
	BC							4.58		95.42	46.08	2.545	2.752	7.52	0.28	92	Grade-I
2	OL	DTL-C-2	435+000	RHS	Inner lane	3.00	Good	5.29		94.71	25.56	2.574	2.766	6.94	0.57	93	Grade-I
	BC							5.43		94.57	46.59	2.643	2.744	3.68	0.59	96	Grade-I
3	OL	DTL-C-3	419+995	RHS	Outer Lane	6.5	Good	5.42		94.58	35.47	2.613	2.780	6.01	0.51	94	Grade-I
	BC							5.50		94.5	27.9	2.536	2.742	7.51	0.58	92	Grade-I
4	OL	DTL-C-4	414+950	RHS	Inner lane	2.9	Minor Ravelling	5.38		94.62	44.11	2.536	2.754	7.92	0.44	92	Grade-I
	BC							5.36		94.64	39.79	2.481	2.693	7.87	0.45	92	Grade-I
5	OL	DTL-C-5	400+300	RHS	Outer Lane	6.5	Good	5.11		94.89	52.51	2.620	2.720	3.68	0.16	96	Grade-I
	BC							5.26		94.74	50.77	2.582	2.723	5.18	0.65	95	Grade-I
6	OL	DTL-C-6	394+950	RHS	Inner lane	2.8	Mild Rutting	5.45		94.55	36.21	2.618	2.702	3.11	0.48	97	Grade-I
	BC							5.00		95	39.4	2.535	2.627	3.50	0.58	96	Grade-I
7	OL	DTL-C-7	379+400	RHS	Outer Lane	6.6	Good	5.11		94.89	42.88	2.530	2.725	7.16	0.09	93	not confirming
	BC							4.98		95.02	36	2.652	2.738	3.14	0.68	97	Grade-I
8	OL	DTL-C-8	374+850	RHS	Inner lane	2.9	Mild Rutting	5.48		94.52	29.15	2.545	2.705	5.91	0.56	94	Grade-I
	BC							5.02		94.98	38.24	2.553	2.685	4.92	0.69	95	Grade-I
9	OL	DTL-C-9	359+800	RHS	Outer Lane	6.5	Good	5.30		94.7	32.61	2.584	2.724	5.14	0.56	95	Grade-I
	BC							4.98		95.02	37.22	2.605	2.704	3.66	0.63	96	Grade-I
10	OL	DTL-C-10	354+640	RHS	Inner lane	2.9	Good	4.08		95.92	54.57	2.657	2.809	5.41	0.6	95	Grade-I
	BC							5.11		94.89	43.73	2.632	2.785	5.49	0.6	95	Grade-I
11	OL	DTL-C-11	352+400	LHS	Outer Lane	6.7	Good	5.20		94.8	53.44	2.610	2.726	4.26	0.66	96	Grade-I
	BC							4.98		95.02	43.04	2.541	2.683	5.29	0.6	95	Grade-I

Sl. No.	Name of Material	Core No.	Chainage	Direction	Carriage way lane	Distance from kerb M	Condition of Road	% of Bitumen Obtained (by extraction of core)		% Agg by Wt.of tatol Mix	Thickness of Specimen mm	DENSITY	Miximum Theoretical Sp.Gr.of Mix (GMM)	% of Air Voids	Filler Asphalt Ratio (%)	% compaction	Gradation as per Morth
								BC	Limits						0.075 mm		
12	OL	DTL-C-12	365+200	LHS	Inner lane	2.8	Mild Rutting	5.50		94.5	49.44	2.688	2.793	3.76	0.42	96	Grade-I
	BC							5.10		94.9	40.37	2.547	2.693	5.42	0.74	95	Grade-I
13	OL	DTL-C-13	370+100	LHS	Outer Lane	6.5	Good	5.40		94.6	41.35	2.548	2.679	4.89	0.35	95	Grade-I
	BC							5.00		95	34.35	2.620	2.724	3.82	0.37	96	Grade-I
14	OL	DTL-C-14	384+840	LHS	Inner lane	2.9	Mild Rutting	ITS									
	BC							ITS									
15	OL	DTL-C-15	390+080	LHS	Outer Lane	6.7	Good	5.13		94.87	35.99	2.590	2.714	4.57	0.46	95	Grade-I
	BC							5.31		94.69	31.58	2.601	2.720	4.38	0.34	96	Grade-I
16	OL	DTL-C-16	405+200	LHS	Inner lane	2.8	Good	5.40		94.6	34.99	2.534	2.671	5.13	0.29	95	Grade-I
	BC							4.90		95.1	42.58	2.605	2.719	4.19	0.32	96	Grade-I
17	OL	DTL-C-17	410+000	LHS	Outer Lane	6.6	Good	5.20		94.8	32.44	2.582	2.745	5.94	0.31	94	Grade-I
	BC							4.80		95.2	32.7	2.596	2.763	6.04	0.44	94	Grade-I
18	BC	DTL-C-18	425+280	LHS	Inner lane	2.9	Fare	5.00		95	44.43	2.565	2.762	7.13	0.49	93	Grade-I
19	OL	DTL-C-19	430+900	LHS	Outer Lane	6.7	Mild Ravelling	5.10		94.9	30.07	2.556	2.719	5.99	0.26	94	Grade-I
	BC							4.90		95.1	53.59	2.564	2.783	7.87	0.52	92	Grade-I
20	OL	DTL-C-20	445+000	LHS	Inner lane	3	Good	5.17		94.83	68	2.629	2.730	3.70	0.09	96	Grade-I
	BC							5.29		94.71	59.1	2.537	2.718	6.66	0.3	93	Grade-I
21	OL	DTL-C-21	450+010	LHS	Outer Lane	6.7	Good	5.30		94.7	31	2.626	2.789	5.84	0.44	94	Grade-I
	Old BC							5.38		94.62	35.72	2.577	2.729	5.57	0.33	94	Grade-I
22	OL	DTL-C-22	465+020	LHS	Inner lane	2.9	Good	5.32		94.68	34.72	2.566	2.682	4.33	0.62	96	Grade-I
	OLD BC							5.27		94.73	50.99	2.522	2.702	6.66	0.44	93	Grade-I
23	OL	DTL-C-23	470+220	LHS	Outer Lane	6.8	Good	5.09		94.91	58.71	2.627	2.784	5.64	0.21	94	Grade-I
	BC							5.34		94.66	49.45	2.544	2.750	7.49	0.39	93	Grade-I
24	OL	DTL-C-24	485+020	LHS	Inner lane	2.8	Good	5.50		94.5	37.1	2.487	2.685	7.37	0.27	93	Grade-I

Sl. No.	Name of Material	Core No.	Chainage	Direction	Carriage way lane	Distance from kerb M	Condition of Road	% of Bitumen Obtained (by extraction of core)		% Agg by Wt.of tatol Mix	Thickness of Specimen mm	DENSITY	Miximum Theoretical Sp.Gr.of Mix (GMM)	% of Air Voids	Filler Asphalt Ratio (%)	% compaction	Gradation as per Morth
								BC	Limits						0.075 mm		
	BC							5.23		94.77	31.58	2.653	2.727	2.71	0.57	97	Grade-I
25	OL	DTL-C-25	490+150	LHS	Outer Lane	6.5	Good	5.35		94.65	36.67	2.539	2.733	7.10	0.25	93	not confirming
	BC							5.40		94.6	27.81	2.525	2.664	5.22	0.21	95	Grade-2
26	OL	DTL-C-26	495+030	RHS	Inner lane	3.0	Good	5.30		94.7	29.92	2.564	2.716	5.60	0.50	94	Grade-I
	BC							5.30		94.7	30.48	2.568	2.634	2.51	0.39	97	Grade-I
27	OL	DTL-C-27	480+450	RHS	Outer Lane	4.2	fare Bleeding	5.46		94.54	34.55	2.587	2.721	4.92	0.22	95	Grade-I
	BC							5.42		94.58	37.51	2.611	2.778	6.01	0.18	94	Grade-I
28	OL	DTL-C-28	475+000	RHS	Inner lane	3.0	Good	ITS									
	BC							ITS									
29	OL	DTL-C-29	460+020	RHS	Outer Lane	6.9	Good	5.15		94.85	22.86	2.584	2.722	5.07	0.62	95	Grade-I
	BC							5.49		94.51	36.94	2.387	2.485	3.94	0.23	96	Grade-I
30	OL	DTL-C-30	455+000	RHS	Inner lane	2.9	Good	5.15		94.85	28.86	2.605	2.698	3.45	0.63	97	Grade-I
	BC							5.29		94.71	39.21	2.539	2.650	4.19	0.33	96	Grade-I

Observations:

- Binder content for BC: ranging from 4.08% to 5.51%. The MORTH Table 500-17 specifies the Bitumen content range is 5.2 ± 0.3 %. Majority of the sample satisfy for bitumen requirement.
- BC-Gradation results indicate the mix design: Grade I proportion.
- BC-Air Voids: ranging from 2.506% to 7.916% (MORTH Table-11, specifies 3% to 5%)
- Compaction –More than 92% of Compaction is observed.
- Filler Asphalt Ratio– 12 out of 30 core samples have Filler –Asphalt ratio is within the specified limit of 0.6-1.2 (refer MORTH clause 505.3 or as per MS-2 (5.10).

Table 30: Test Results of Pavement cores-DBM Layers

Core No.	Chainage	Direction	Carriage way lane	Distance from kerb m	Condition of Road	% of Bitumen Obtained (by extraction of core)		% Agg by Wt. of total Mix	Thickness of Specimen mm	DENSITY	Maximum Theoretical Sp.Gr.of Mix (GMM)	% of Air Voids	Filler Asphalt Ratio (%)	% compaction	Gradation as per Morth
						DBM	Limits						0.075 mm		
DTL-C-1	439+800	RHS	Outer Lane	6.6	Good	4.04	As per MORTH 5th Revision Table no 500-10, Bitumen Content for DBM grading - 2 is 4.5%	95.96	74.50	2.646	2.739	3.40	0.92	97	Grade-2
DTL-C-2	435+000	RHS	Inner lane	3.0	Good	4.14		95.86	71.86	2.635	2.769	4.84	1.12	95	Grade-2
DTL-C-3	419+995	RHS	Outer Lane	6.5	Good	4.06		95.94	79.27	2.543	2.732	6.92	0.35	93	not confirming
DTL-C-4	414+950	RHS	Inner lane	2.9	Minor Ravelling	4.25		95.75	77.25	2.555	2.764	7.56	0.89	92	Grade-2
DTL-C-5	400+300	RHS	Outer Lane	6.5	Good	4.07		95.93	96.08	2.545	2.744	7.25	0.50	93	Grade-2
DTL-C-6	394+950	RHS	Inner lane	2.8	Mild Rutting	4.44		95.56	55.96	2.523	2.652	4.86	1.01	95	Grade-2
DTL-C-7	379+400	RHS	Outer Lane	6.6	Good	4.12		95.88	64.28	2.571	2.776	7.38	0.99	93	Grade-2
DTL-C-8	374+850	RHS	Inner lane	2.9	Mild Rutting	4.10		95.90	76.86	2.534	2.694	5.94	0.97	94	Grade-2
DTL-C-9	359+800	RHS	Outer Lane	6.5	Good	4.20		95.80	73.48	2.560	2.701	5.22	0.62	95	Grade-2
DTL-C-10	354+640	RHS	Inner lane	2.9	Good	4.37		95.63	68.79	2.583	2.746	5.94	0.64	94	Grade-2
DTL-C-11	352+400	LHS	Outer Lane	6.7	Good	4.50		95.50	95.21	2.572	2.663	3.42	0.69	97	Grade-2
DTL-C-12	365+200	LHS	Inner lane	2.8	Mild Rutting	4.00		96.00	89.81	2.513	2.668	5.81	0.58	94	Grade-2
DTL-C-13	370+100	LHS	Outer Lane	6.5	Good	4.40		95.60	73.71	2.538	2.624	3.28	0.65	97	Grade-2
DTL-C-14	384+840	LHS	Inner lane	2.9	Mild Rutting	ITS									
DTL-C-14A	384+840	LHS	Outer Lane	6.6	Mild Rutting	ITS									
DTL-C-15	390+080	LHS	Outer Lane	6.7	Good	4.42		95.58	93.24	2.545	2.728	6.71	0.50	93	Grade-2
DTL-C-16	405+200	LHS	Inner lane	2.8	Good	4.20		95.80	49.35	2.568	2.683	4.29	0.96	96	Grade-2
DTL-C-17	410+000	LHS	Outer Lane	6.6	Good	4.20		95.80	73.17	2.563	2.702	5.14	0.61	95	Grade-2
DTL-C-18	425+280	LHS	Inner lane	2.9	Fare	4.00		96.00	48.51	2.567	2.688	4.50	0.75	95	Grade-2
DTL-C-19	430+900	LHS	Outer Lane	6.7	Mild Ravelling	3.90		96.10	59.83	2.559	2.704	5.36	0.68	95	Grade-2
DTL-C-20	445+000	LHS	Inner lane	3.0	Good	4.34		95.66	56.74	2.501	2.733	8.49	1.12	92	Grade-2

Core No.	Chainage	Direction	Carriage way lane	Distance from kerb m	Condition of Road	% of Bitumen Obtained (by extraction of core)		% Agg by Wt. of total Mix	Thickness of Specimen mm	DENSITY	Maximum Theoretical Sp.Gr.of Mix (GMM)	% of Air Voids	Filler Asphalt Ratio (%)	% compaction	Gradation as per Morth
						DBM	Limits						0.075 mm		
DTL-C-21	450+010	LHS	Outer Lane	6.7	Good	4.20		95.80	48.32	2.645	2.748	3.75	1.09	96	Grade-2
DTL-C-22	465+020	LHS	Inner lane	2.9	Good	4.50		95.50	43.11	2.547	2.681	5.00	0.66	95	Grade-2
DTL-C-23	470+220	LHS	Outer Lane	6.8	Good	4.42		95.58	100.24	2.556	2.650	3.55	0.67	96	Grade-2
DTL-C-24	485+020	LHS	Inner lane	2.8	Good	4.40		95.60	40.81	2.529	2.653	4.67	0.36	95	Grade-2
DTL-C-25	490+150	LHS	Outer Lane	6.5	Good	4.01		95.99	40.61	2.524	2.680	5.82	0.16	94	Grade-2
DTL-C-26	495+030	RHS	Inner lane	3.0	Good	4.25		95.75	93.22	2.615	2.700	3.15	0.47	97	Grade-2
DTL-C-27	480+450	RHS	Outer Lane	4.2	fare Bleeding	4.49		95.51	53.02	2.561	2.685	4.62	0.33	95	Grade-2
DTL-C-28	475+000	RHS	Inner lane	3.0	Good	ITS									
DTL-C-28A	475+000	RHS	Outer Lane	6.6	Good	ITS									
DTL-C-29	460+020	RHS	Outer Lane	6.9	Good	4.50		95.50	40.09	2.501	2.693	7.13	0.50	93	Grade-2
DTL-C-30	455+000	RHS	Inner lane	2.9	Good	4.28		95.72	56.68	2.474	2.681	7.72	0.58	92	not confirming

Observations:

- Binder content for DBM: ranging from 3.900% to 4.5%. The MORTH Table 500-10 specifies the Bitumen content range is 4.5 ± 0.3 %. only 1-sample is showing less bitumen content.
- DBM-Gradation results indicate the mix design: Grade II proportion.
- DBM-Air Voids: ranging from 3.148% to 8.489% (MORTH Table-11, specifies 3% to 5%)
- Compaction –More than 92% of Compaction is observed.
- Filler Asphalt Ratio– 18 out of 30 tested core samples have Filler –Asphalt ratio is within the specified limit of 0.6-1.2 (refer MORTH clause 505.3 or as per MS-2 (5.10)).

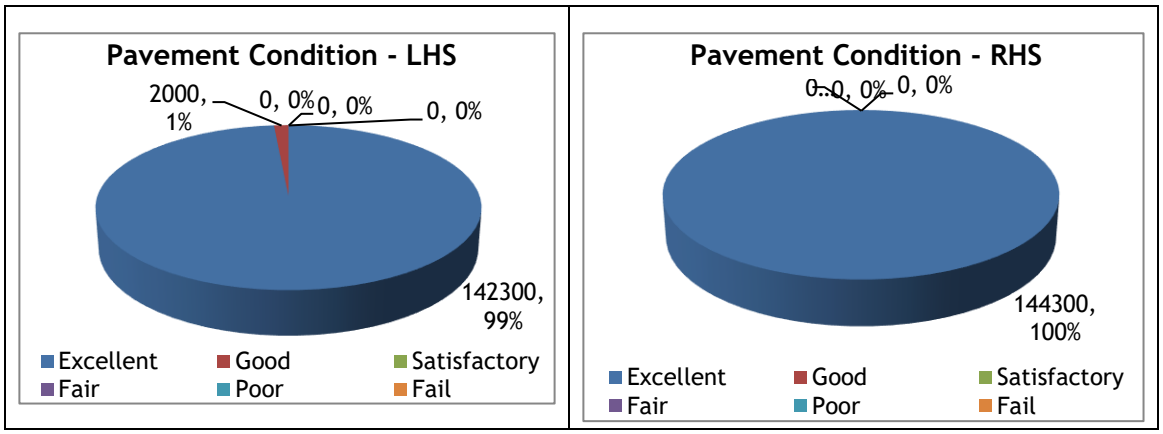
4.2 PAVEMENT CONDITION

The distresses in pavement surface have been captured on the project corridor for each lane separately by NSV survey. Pavement Condition rating (PCI) as per IRC:82-2023 from the data collected for each km length in each direction has been presented in the **Annexure-2** of this report.

The project corridor has been provided with flexible pavement over entire length including service roads. Rigid pavement is only provided at Toll Plaza.

- **For Main Carriageway:**

The Pavement condition rating (PCI) is presented in Pie-chart from Excellent to Fail are as below:



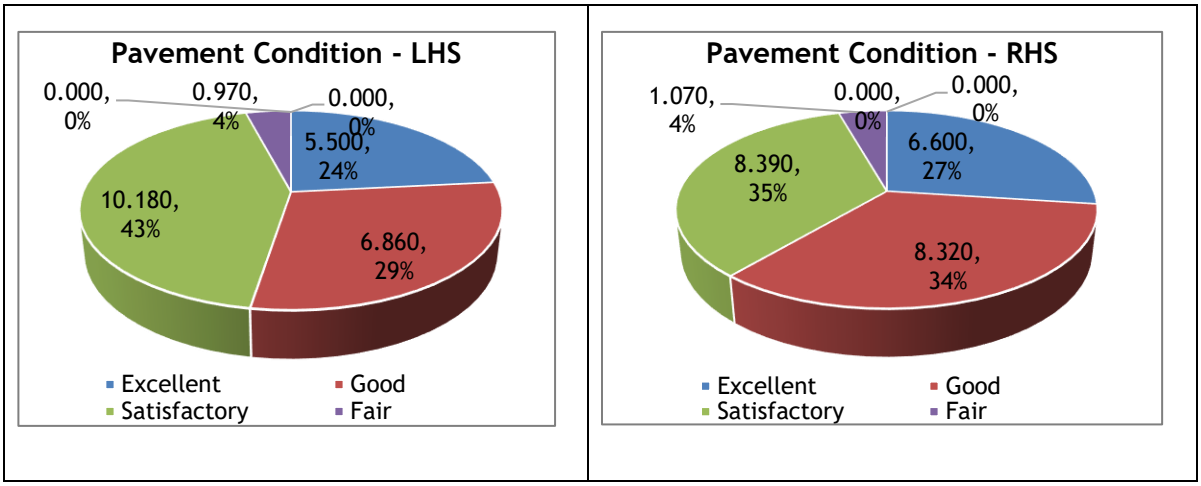
The condition rating for Main carriageway is presented in table as below

Overall PCI		Condition Rating	Length (km)	
>	<=		LHS	RHS
90	100	Excellent	142.300	144.300
80	90	Good	2.000	-
60	80	Satisfactory	-	-
40	60	Fair	-	-
20	40	Poor	-	-
0	20	Fail	-	-
Under Construction			-	-
Toll Plaza			0.700	0.700

From NSV pavement condition (PCI) analysis, entire length falls under Excellent to Good.

➢ **For Service Road:**

The Pavement condition rating (PCI) is presented in Pie-chart from Excellent to Fail are as below



The condition rating for service Road is presented in table as below

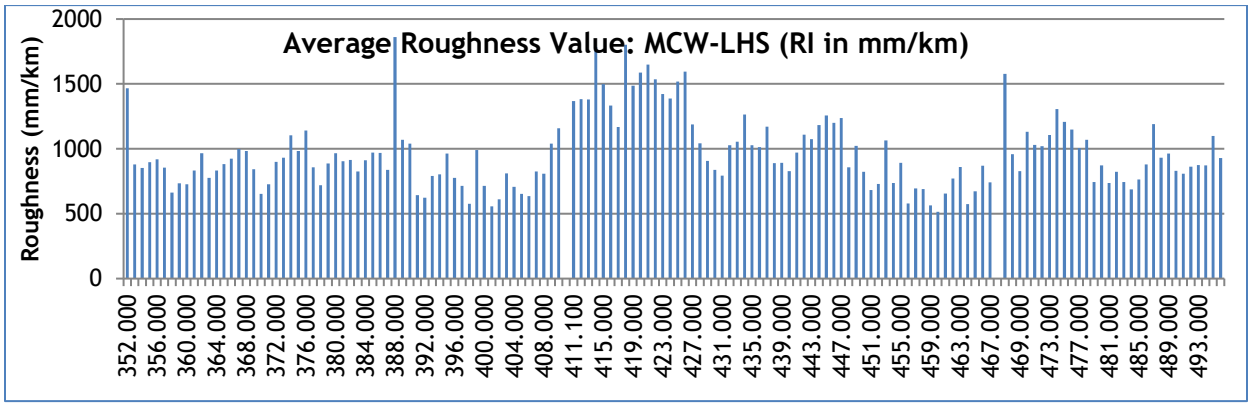
Overall PCI		Condition Rating	Length (km)	
>	<=		LHS	RHS
90	100	Excellent	5.500	6.600
80	90	Good	6.860	8.320
60	80	Satisfactory	10.180	8.390
40	60	Fair	0.970	1.070
20	40	Poor	0.000	0.000
0	20	Fail	0.000	0.000

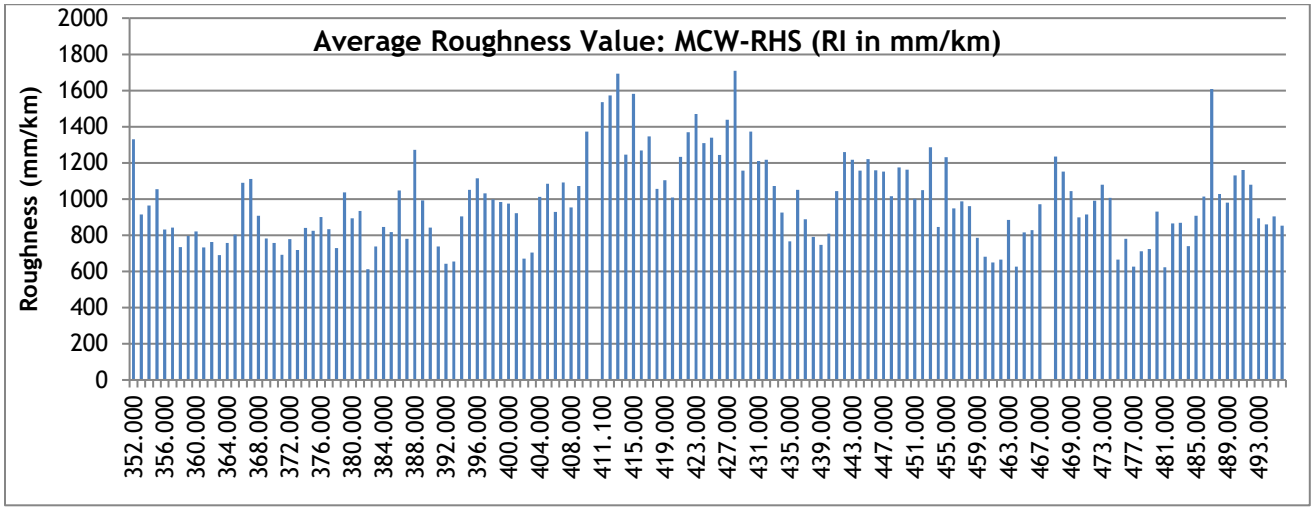
From NSV pavement condition (PCI) analysis, entire length falls under Excellent to Fair.

4.3 ROUGHNESS

❖ **MAIN CARRIAGEWAY**

The Roughness represented in Bar charts for the main carriageway are as presented below:





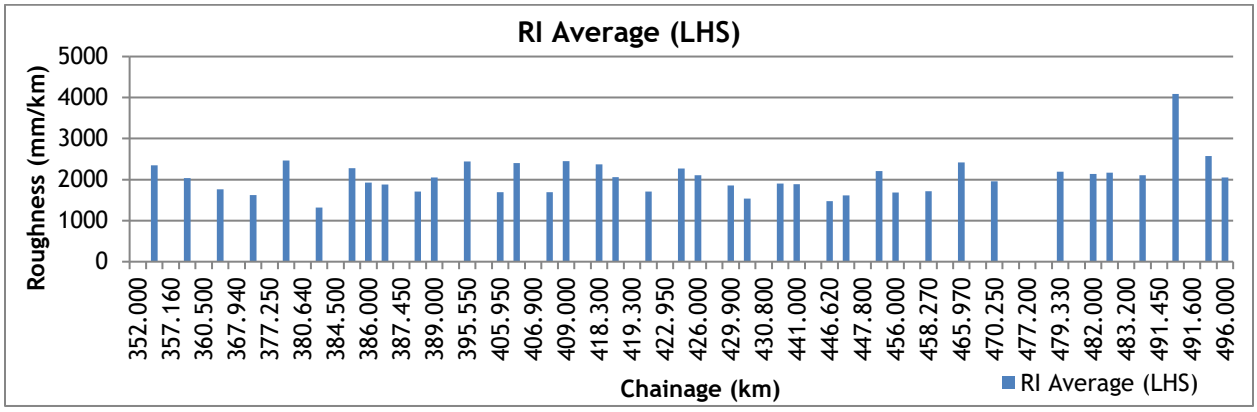
Based on the above, considering the Km-stone reference system the summary of direction-wise km lengths having varying roughness values are as presented below:

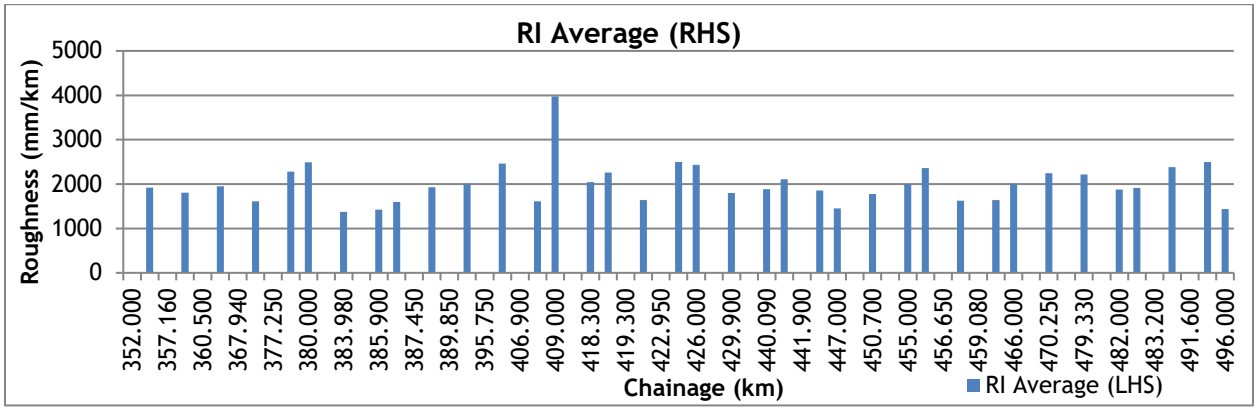
Roughness Range (mm/km)	Criteria	MCW-Length in Km	
		LHS	RHS
Less than 2000	Excellent	144.300	144.300
2000 – 2200	Good	-	-
2200 -2500	Fair	-	-
More Than 2500	Poor	-	-
Toll Plaza		0.700	0.700

From the above charts and tables, in the both directions of the project road do not require any functional overlay as roughness Index (RI) is less than minimum requirement of Schedule-K, i.e., 2500mm/km.

❖ **SERVICE ROAD**

Bar diagrams showing the Kilometer wise roughness along the project road are presented below:





Roughness Range (mm/km)	Service Road--Length in Km	
	LHS	RHS
Less than 2000	10.750	13.190
2000 – 2200	5.620	4.070
2200 -2500	6.390	6.690
More Than 2500	0.750	0.430

From the above charts, 0.750 km in LHS direction and 0.430 km in RHS direction of the project road requires functional overlay as unevenness Index (UI) is less than minimum requirement of Schedule-K, i.e., 2500mm/km. However, no separate costing has been considered for these sections, as the lengths are minimal and can be addressed under routine maintenance activities.

4.4 FWD ANALYSIS AND ASSESSMENT OF OVERLAY REQUIREMENT

By looking at the age and condition and performance of the pavement following different set of ranges have been used while finalizing the modulus values:

Layer	Bituminous Layers	Granular Layer Modulus	Subgrade
Modulus Value (MPa)	750-3000	100-500	50-100

Bituminous layer Moduli obtained from back calculations shall be corrected for a standard pavement temperature of 35^{o}C using given equations. Whereas, for back calculated moduli values obtained for granular and subgrade layer shall be corrected for seasonal variations (using winter and summer equations). As FWD tests, performed, during the summer, thus seasonal correction factor is applied for granular and subgrade layer. The design moduli (15th percentile moduli) of in-service layers for each homogenous section are given in table below.

Table 31: Summary of Design Moduli of different layers – LHS MCW

S No	Side	From	To	Length (Km)	15th Percentile MR values		
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)
1	LHS	352.00	354.14	2.14	2519	289	77
2	LHS	354.14	356.13	1.99	2779	364	77
3	LHS	356.13	358.11	1.98	2618	289	77
4	LHS	358.11	360.25	2.14	2696	365	77
5	LHS	360.25	362.42	2.17	2806	364	77
6	LHS	362.42	365.53	3.11	2893	366	77
7	LHS	365.53	368.67	3.13	2787	333	77
8	LHS	368.67	371.14	2.48	3136	334	77
9	LHS	371.14	373.80	2.66	3012	312	77
10	LHS	373.80	376.59	2.79	2905	306	77
11	LHS	376.59	379.27	2.68	3280	365	77
12	LHS	379.27	381.21	1.95	2955	325	77
13	LHS	381.21	383.19	1.98	3381	362	77
14	LHS	383.19	385.99	2.79	3214	365	77
15	LHS	385.99	388.81	2.82	3377	363	77
16	LHS	388.81	391.28	2.46	3348	224	77
17	LHS	391.28	393.92	2.65	3504	360	77
18	LHS	393.92	396.39	2.47	2472	240	77
19	LHS	396.39	398.70	2.31	2217	335	77
20	LHS	398.70	401.01	2.31	2905	312	77
21	LHS	401.01	403.17	2.16	3268	351	77
22	LHS	403.17	405.30	2.13	3160	365	77
23	LHS	405.30	407.60	2.31	3034	348	77
24	LHS	407.60	410.75	3.15	3213	301	77
25	LHS	410.75	411.10	0.35	Toll Plaza		
26	LHS	411.10	414.20	3.10	2838	364	77
27	LHS	414.20	416.84	2.64	2675	354	77
28	LHS	416.84	419.16	2.32	2813	329	77
29	LHS	419.16	421.47	2.31	2890	365	77
30	LHS	421.47	423.95	2.48	1589	230	77
31	LHS	423.95	427.00	3.06	1876	184	77
32	LHS	427.00	429.39	2.39	2687	174	77
33	LHS	429.39	432.85	3.46	1993	224	77
34	LHS	432.85	435.00	2.15	2003	222	77
35	LHS	435.00	437.16	2.16	2198	277	77
36	LHS	437.16	439.78	2.63	2342	356	77
37	LHS	439.78	442.59	2.80	2395	356	77
38	LHS	442.59	446.06	3.48	2396	338	77
39	LHS	446.06	448.53	2.46	2487	354	77
40	LHS	448.53	451.17	2.64	2541	294	77
41	LHS	451.17	453.15	1.99	2457	302	77
42	LHS	453.15	455.29	2.14	2634	345	77
43	LHS	455.29	457.60	2.31	2641	363	77
44	LHS	457.60	460.09	2.49	2702	362	77
45	LHS	460.09	462.06	1.96	2435	359	77
46	LHS	462.06	464.20	2.15	2328	366	77
47	LHS	464.20	467.50	3.30	2349	319	77
48	LHS	467.50	467.85	0.35	Toll Plaza		
49	LHS	467.85	469.98	2.13	2337	231	77
50	LHS	469.98	471.96	1.98	2428	367	77
51	LHS	471.96	474.43	2.48	2484	367	77

S No	Side	From	To	Length (Km)	15th Percentile MR values		
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)
52	LHS	474.43	476.92	2.49	2423	333	77
53	LHS	476.92	479.39	2.47	2577	367	77
54	LHS	479.39	481.36	1.97	1744	181	77
55	LHS	481.36	483.34	1.99	2441	277	77
56	LHS	483.34	485.98	2.64	2482	342	77
57	LHS	485.98	488.62	2.64	2250	259	77
58	LHS	488.62	491.42	2.80	2309	228	76
59	LHS	491.42	494.08	2.66	2405	317	77
60	LHS	494.08	497.00	2.92	2687	328	77
Total length				145.000			

Table 32: Summary of Design Moduli of different layers – RHS MCW

S.No	Side	From	To	Length (Km)	15th Percentile MR values		
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)
1	RHS	352.00	355.26	3.26	2548	322	77
2	RHS	355.26	358.55	3.29	2582	366	77
3	RHS	358.55	361.88	3.33	2573	362	77
4	RHS	361.88	364.33	2.45	2506	342	77
5	RHS	364.33	367.14	2.81	2455	329	77
6	RHS	367.14	369.29	2.15	2539	365	77
7	RHS	369.29	371.43	2.14	2802	367	77
8	RHS	371.43	375.05	3.62	2770	339	77
9	RHS	375.05	377.54	2.49	2789	369	77
10	RHS	377.54	380.35	2.81	2642	365	77
11	RHS	380.35	382.49	2.15	2481	363	77
12	RHS	382.49	384.80	2.31	2470	359	77
13	RHS	384.80	387.44	2.64	2480	365	77
14	RHS	387.44	390.25	2.81	2486	365	77
15	RHS	390.25	392.72	2.47	2470	366	77
16	RHS	392.72	395.19	2.47	2473	368	77
17	RHS	395.19	398.00	2.81	2411	361	77
18	RHS	398.00	400.31	2.31	2109	321	77
19	RHS	400.31	403.94	3.63	2353	254	77
20	RHS	403.94	406.91	2.97	2151	346	77
21	RHS	406.91	410.75	3.84	2346	355	77
22	RHS	410.75	411.10	0.35	Toll Plaza		
23	RHS	411.10	413.19	2.09	2421	185	77
24	RHS	413.19	415.33	2.14	2603	338	77
25	RHS	415.33	418.79	3.47	2470	266	77
26	RHS	418.79	420.93	2.14	2460	239	77
27	RHS	420.93	423.09	2.15	2413	357	77
28	RHS	423.09	427.00	3.92	2232	276	70
29	RHS	427.00	429.51	2.51	2484	356	77
30	RHS	429.51	432.45	2.94	2478	366	77
31	RHS	432.45	434.97	2.52	2406	366	77
32	RHS	434.97	437.76	2.79	2366	367	77
33	RHS	437.76	440.73	2.97	2388	361	77
34	RHS	440.73	443.67	2.94	2419	335	77

S.No	Side	From	To	Length (Km)	15th Percentile MR values		
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)
35	RHS	443.67	447.17	3.50	2527	274	77
36	RHS	447.17	449.64	2.47	2521	312	77
37	RHS	449.64	451.95	2.30	2496	360	77
38	RHS	451.95	454.92	2.98	2459	323	77
39	RHS	454.92	458.22	3.30	2342	344	77
40	RHS	458.22	461.68	3.46	2437	356	77
41	RHS	461.68	463.66	1.98	2484	210	77
42	RHS	463.66	467.50	3.84	2459	324	77
43	RHS	467.50	467.85	0.35	Toll Plaza		
44	RHS	467.85	470.43	2.58	2919	365	77
45	RHS	470.43	472.91	2.48	1165	147	77
46	RHS	472.91	475.35	2.44	1866	141	77
47	RHS	475.35	477.35	2.01	2183	162	77
48	RHS	477.35	479.34	1.99	1401	144	77
49	RHS	479.34	481.82	2.47	2178	147	77
50	RHS	481.82	484.29	2.47	2202	220	77
51	RHS	484.29	487.58	3.29	2616	172	77
52	RHS	487.58	491.23	3.64	2919	242	77
53	RHS	491.23	494.17	2.95	2413	349	77
54	RHS	494.17	497.00	2.83	2369	212	77
Total length				145.00			

Observations on FWD Results

It can be noticed from the above table that the layer moduli for the three layers are varying along the length and direction. The MR value for BT layer is 1589 Mpa to 3504 Mpa in LHS & 1165 Mpa to 2919 Mpa in RHS Carriageway. The MR value for Granular Layers is 174 Mpa to 367 Mpa in LHS & 141 Mpa to 369 Mpa in RHS Carriageway. Similarly, the MR value for Subgrade Layer is 76 Mpa to 77 Mpa in LHS & 70 Mpa to 77 Mpa RHS Carriageway.

Table 33: Summary of Design Moduli of different layers – LHS Service Road

S No	Side	From	To	Length (Km)	15th Percentile MR values		
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)
1	LHS	352.00	356.60	4.60	3262	242	77
2	LHS	356.60	357.16	0.56			
3	LHS	357.16	360.00	2.84			
4	LHS	360.00	360.50	0.50			
5	LHS	360.50	367.20	6.70			
6	LHS	367.20	367.94	0.74			
7	LHS	367.94	376.52	8.58			
8	LHS	376.52	377.25	0.73			
9	LHS	377.25	379.72	2.47			
10	LHS	379.72	380.64	0.92			
11	LHS	380.64	383.98	3.34	2946	314	77
12	LHS	383.98	384.50	0.52			
13	LHS	384.50	385.90	1.40			

S No	Side	From	To	Length (Km)	15th Percentile MR values		
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)
14	LHS	385.90	387.45	1.55			
15	LHS	387.45	388.90	1.45			
16	LHS	388.90	389.85	0.95			
17	LHS	389.85	395.50	5.65			
18	LHS	395.50	395.70	0.20			
19	LHS	395.70	405.95	10.25			
20	LHS	405.95	406.90	0.95			
21	LHS	406.90	408.50	1.60			
22	LHS	408.50	409.43	0.93			
23	LHS	409.43	418.30	8.87			
24	LHS	418.30	419.30	1.00			
25	LHS	419.30	422.29	2.99			
26	LHS	422.29	422.95	0.66			
27	LHS	422.95	425.40	2.45			
28	LHS	425.40	426.70	1.30	2933	227	77
29	LHS	426.70	429.90	3.20			
30	LHS	429.90	430.80	0.90			
31	LHS	430.80	440.09	9.29			
32	LHS	440.09	440.91	0.81			
33	LHS	440.91	441.90	1.00			
34	LHS	441.90	446.62	4.72			
35	LHS	446.62	447.80	1.18			
36	LHS	447.80	455.00	7.20			
37	LHS	455.00	456.65	1.65			
38	LHS	456.65	458.27	1.62	2880	184	77
39	LHS	458.27	459.08	0.81			
40	LHS	459.08	465.97	6.89			
41	LHS	465.97	467.00	1.03			
42	LHS	467.00	470.25	3.25			
43	LHS	470.25	470.90	0.65			
44	LHS	470.90	477.20	6.30			
45	LHS	477.20	477.85	0.65			
46	LHS	477.85	479.33	1.48			
47	LHS	479.33	479.75	0.42			
48	LHS	479.75	482.00	2.25	2538	362	77
49	LHS	482.00	483.20	1.20			
50	LHS	483.20	490.80	7.60			
51	LHS	490.80	491.45	0.65			
52	LHS	491.45	495.30	3.85			
53	LHS	495.30	497.00	1.70			
Total length				145.000			

Table 34: Summary of Design Moduli of different layers – RHS Service Road

S.No	Side	From	To	Length (Km)	15th Percentile MR values		
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)
1	RHS	352.00	356.60	4.60	2527	287	77
2	RHS	356.60	357.16	0.56			
3	RHS	357.16	360.00	2.84			
4	RHS	360.00	360.50	0.50			
5	RHS	360.50	367.20	6.70			
6	RHS	367.20	367.94	0.74			
7	RHS	367.94	376.52	8.58			
8	RHS	376.52	377.25	0.73			
9	RHS	377.25	379.72	2.47			
10	RHS	379.72	380.64	0.92			
11	RHS	380.64	383.98	3.34			
12	RHS	383.98	384.50	0.52	2420	358	77
13	RHS	384.50	385.90	1.40			
14	RHS	385.90	386.24	0.34			
15	RHS	386.24	387.45	1.21			
16	RHS	387.45	388.90	1.45			
17	RHS	388.90	389.85	0.95			
18	RHS	389.85	395.28	5.43			
19	RHS	395.28	395.75	0.47			
20	RHS	395.75	405.95	10.20			
21	RHS	405.95	406.90	0.95			
22	RHS	406.90	408.50	1.60			
23	RHS	408.50	409.43	0.93			
24	RHS	409.43	418.30	8.87	3277	254	77
25	RHS	418.30	419.30	1.00			
26	RHS	419.30	422.29	2.99			
27	RHS	422.29	422.95	0.66			
28	RHS	422.95	425.40	2.45			
29	RHS	425.40	426.70	1.30			
30	RHS	426.70	429.90	3.20			
31	RHS	429.90	430.80	0.90			
32	RHS	430.80	440.09	9.29	3137	246	77
33	RHS	440.09	441.90	1.81			
34	RHS	441.90	446.62	4.72			
35	RHS	446.62	447.80	1.18			
36	RHS	447.80	450.70	2.90			
37	RHS	450.70	451.15	0.45			
38	RHS	451.15	455.00	3.85			
39	RHS	455.00	456.65	1.65			
40	RHS	456.65	458.27	1.62			
41	RHS	458.27	459.08	0.81	2758	247	77
42	RHS	459.08	465.97	6.89			
43	RHS	465.97	467.00	1.03			
44	RHS	467.00	470.25	3.25			
45	RHS	470.25	470.90	0.65			
46	RHS	470.90	479.33	8.43			

S.No	Side	From	To	Length (Km)	15th Percentile MR values		
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)
47	RHS	479.33	479.75	0.42			
48	RHS	479.75	482.00	2.25			
49	RHS	482.00	483.20	1.20			
50	RHS	483.20	490.80	7.60			
51	RHS	490.80	491.60	0.80			
	RHS	491.60	495.30	3.70			
	RHS	495.30	497.00	1.70			
Total length				145.00			

Observations on FWD Results

It can be noticed from the above table that the layer moduli for the three layers are varying along the length and direction. The MR value for BT layer is 2538 Mpa to 3262 Mpa in LHS & 2420 Mpa to 3277 Mpa in RHS Carriageway. The MR value for Granular Layers is 184 Mpa to 362 Mpa in LHS & 246 Mpa to 358 Mpa in RHS Carriageway. Similarly, the MR value for Subgrade Layer is 77 Mpa in both LHS & RHS Carriageway.

4.5 PAVEMENT COMPOSITION

As per Previous Pavement Design Report from vendor crust composition for the main carriageway and service road as follows:

- Main Carriageway Crust

Thickness (mm) from Concessionaire Pavement Design		
Pavement Layer	From km 348.8 to km 467	From km 467 to km 493
Bituminous Concrete	40	40
Dense Bituminous Macadam	60	95
Wet Mix Macadam	250	250
Granular Sub-base	200	200
Total	**550**	**585**

- Service Road Crust

Pavement Composition in Service Road	
Pavement Layer	**Thickness (mm)**
Bituminous Concrete	25
Dense Bituminous Macadam	50
Wet Mix Macadam	250
Granular Sub-base	150
Total	**475**

However, from the test pits dug at 18 locations, 16 locations along the main carriageway and 2 locations in service road the crust observed is as

a) Main Carriageway Crust

	BT, mm	Granular layers, mm	Total Crust, mm
Average	**190**	**420**	**610**

b) Service Road Crust

	BT, mm	Granular layers, mm	Total Crust, mm
Average	105	385	490

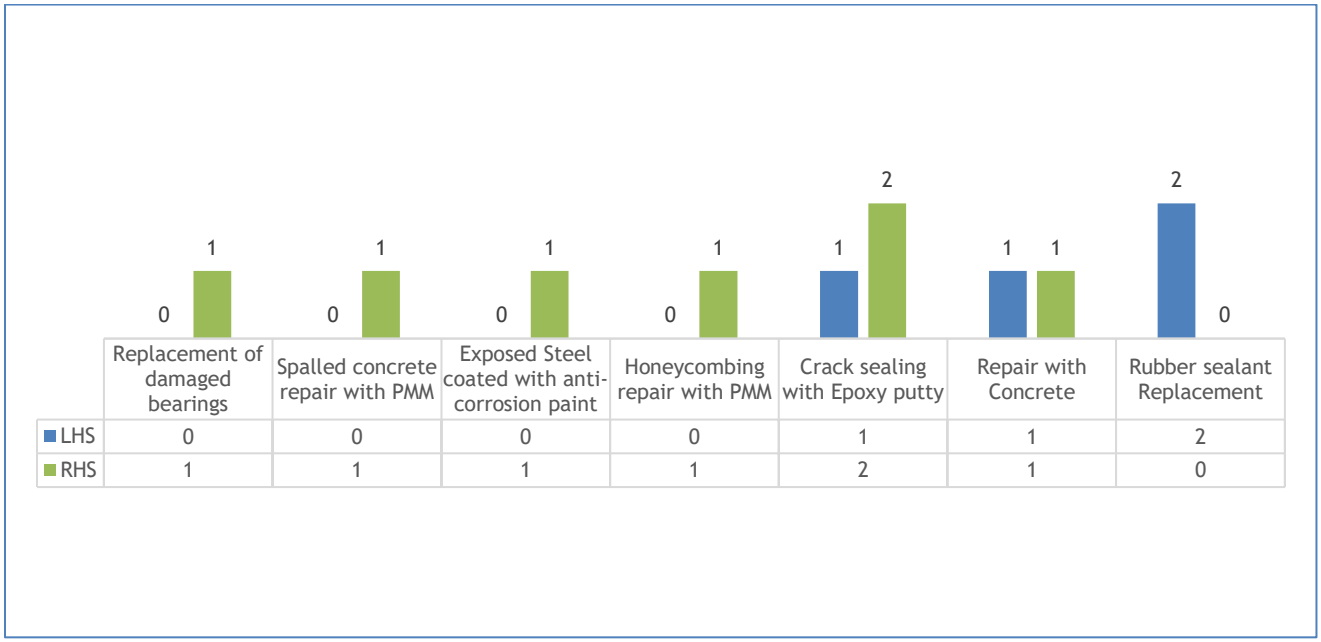
4.6 STRUCTURES

Inventory and asset condition all the existing structures falling within project road have been verified as per IRC: SP-35 procedures and guidelines with following field surveys

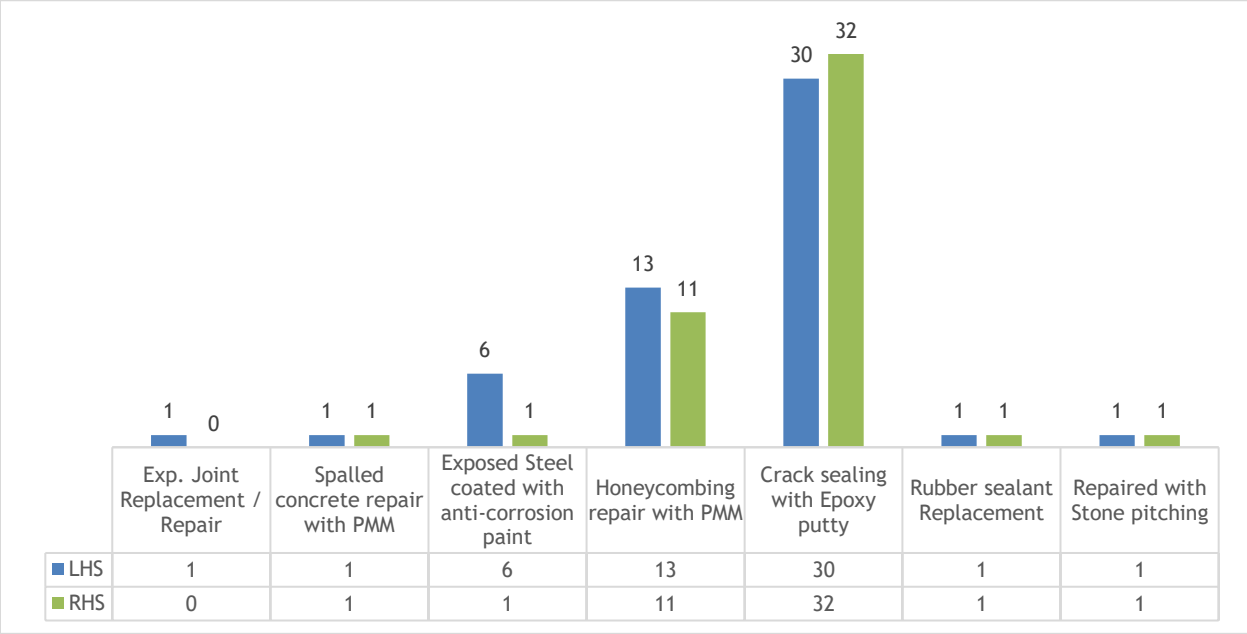
- Inventory of existing highway bridges / structures
- Visual condition survey of existing highway bridges / structures

Each and every structure has been verified at site and detailed inventory and condition survey is presented in **Appendix-7** of this report.

Maintenance of major and Minor structures includes the following



Type of repairs at number of locations for major structures



	Exp. Joint Replacement / Repair	Spalled concrete repair with PMM	Exposed Steel coated with anti-corrosion paint	Honeycombing repair with PMM	Crack sealing with Epoxy putty	Rubber sealant Replacement	Repaired with Stone pitching
LHS	1	1	6	13	30	1	1
RHS	0	1	1	11	32	1	1

Type of repairs at number of locations for minor structures

Overall condition of few of the major structures are presented on sample basis as below. However, each and every structure detail are presented in **Appendix-7** of this report.

Chainage: 442+150
General Description
LHS MCW (New)

- Type of Structure : ROB
- Span Arrangement : 1 x 15 + 1 x 45.70 + 1 x 18 m
- Total length of Structure : 78.7 m
- Total deck width of Structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure (Abutment & Pier) : RCC Wall type
- Type of Superstructure : Steel Girder & RCC Girder
- Type of Bearing : Pot PTFE & Spherical
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on pier cap P1 & P2.
- ✓ Bearing bolts are not properly fixed at some locations.









Chainage: 442+150
General Description
RHS MCW (New)

- Type of Structure : ROB
- Span Arrangement : 1 x 15 + 1 x 45.70 + 1 x 18 m
- Total length of Structure : 78.7 m
- Total deck width of Structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure (Abutment & Pier) : RCC Wall type
- Type of Superstructure : Steel Girder & RCC Girder
- Type of Bearing : Pot PTFE & Spherical
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on pier cap P1 & P2.
- ✓ Leaching observed on soffit of deck slab in span-1.









Chainage: 391+180
General Description
BHS MCW (New)

- Type of Structure : RUB
- Span Arrangement : 1 x 27.2 m
- Total length of Structure : 27.2 m
- Total deck width of Structure : 17.5 m
- Type of Foundation : Not Visible
- Type of Substructure (Abutment & Pier) : RCC Wall type
- Type of Superstructure : RCC Girder
- Type of Bearing : Elastomeric
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Structure is in fair condition.





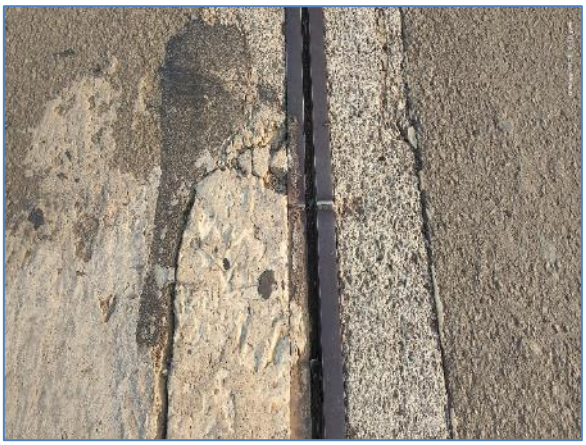

Chainage: 407+100
General Description
LHS MCW (New)

- Type of Structure : MJB
- Span Arrangement : 4 x 22.4 m
- Total length of Structure : 89.6 m
- Total deck width of Structure : 12 m
- Type of Foundation : Pile
- Type of Substructure (Abutment & Pier) : RCC Wall type
- Type of Superstructure : PSC Girder
- Type of Bearing : Elastomeric
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Concrete portion damaged at EJ-2.

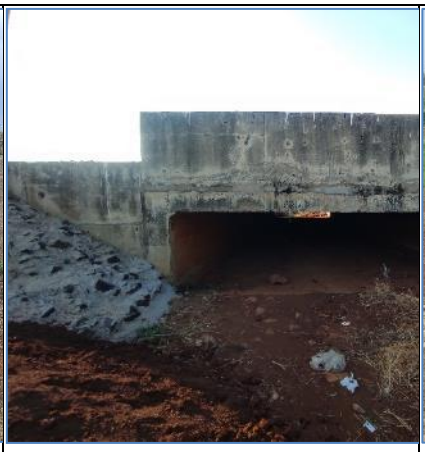


Photos depicting the major structures are presented below

	
Major structure at km 407+100	Major structure at km 407+100
	
Major structure at km 426+850	Major structure at km 426+850

	
Major structure at km 453+300	Major structure at km 453+300

Photos depicting the existing culvert are presented below

		
Box Culvert at Km 355+500	**Box Culvert at Km 399+805**	**Box Culvert at Km 415+490**
		
Box Culvert at Km 421+840	**Box Culvert at Km 431+920**	**Box Culvert at Km 443+550**

General Observations on Structures: -

- The Project stretch have 81 No's of major structures, in that 1 ROB, 1 RUB, 3 MJB's, 47 MNB's, 6 Flyover's, 1 VOP, 2 VUP's, 5 LVUP's and15 PUP's.
- The Project Road has varieties of superstructure types for various structures such as PSC Box Girder, Steel Girder, Steel Struss, RCC Girder, PSC Girder, RCC Box & RCC Solid Slab.
- In this Project stretch, there are 338 No's Elastomeric (Old-42 No's & New-296 No's), 40 No's New Pot PTFE bearings and 40 No's New Spherical bearings are observed in Girder type Structures.
- Structures are having 68 No's of Expansion joints on the new structures.
- Some structures are already repaired and it would be necessary to closely examine these structures for further distress during the maintenance period/Project duration, by way of close inspection and testing.
- Debris observed on Abutment & pier cap at couple of locations, Cleaning of expansion joints, drainage spouts need to be done regularly.
- All the structures appear to be fair condition except at few locations having distresses like Minor cracks, Spalling, Leaching, Honeycombing and Reinforcement exposure.
- In the project corridor 2 VUPs at CH.426+100, Ch.495+640, PUP at Ch.376+860 and FOB at CH.440+690 were constructed under COS.
- In the project corridor following are proposed for new construction in Schedule-B. Construction work not yet started.

    A. VUP at Ch.415+380
    B. LVUPs at Ch.370+780, Ch.390+728, Ch.455+586 and 473+873 (4 Nos)
    C. FOB at Ch.372+200

4.7 DRAINAGE AND SLOPE PROTECTION

- ✓ Lined Covered drains observed at service road and Toll Plaza Locations along the corridor.
- ✓ Median Cuts and Median drains at curve locations are in good condition. No major distress is observed on the carriageway on downstream side at median drain locations.

4.8 TRAFFIC SAFETY AND ROAD FURNITURE

- ✓ Metal beam crash barriers provided along the project road appear to be intact over entire length except for few locations where it got damaged.
- ✓ Pedestrian guard rails installed Urban areas. Median Opening locations appear to be in good condition.
- ✓ Concrete Crash Barriers installed at different locations appear to be in fair condition.
- ✓ Solar Blinker are observed in median opening locations. Street lightings in the form of Double arm, Single arm lightings are provided at built-up location along the project corridor and appears to be good in condition locations.

4.9 ROAD USER FACILITIES

- ✓ The project Road has total 28 Nos. of Bus bays with bus shelters 4 Nos. of Truck laybyes along the project Road. The details of the bus shelter and Truck lay byes are provided in **Appendix-6** of this report.

CHAPTER 5. REHABILITATION PLANS AND DESIGNS

5.1 DESIGN TRAFFIC LOADING

Design Traffic loading has been estimated by considering the latest traffic (given) and VDFs as estimated from the latest axle load survey data and with 5% growth rates for 10 years, 15 years and 20 years design period as below:

Table 35: Traffic Volume (AADT)

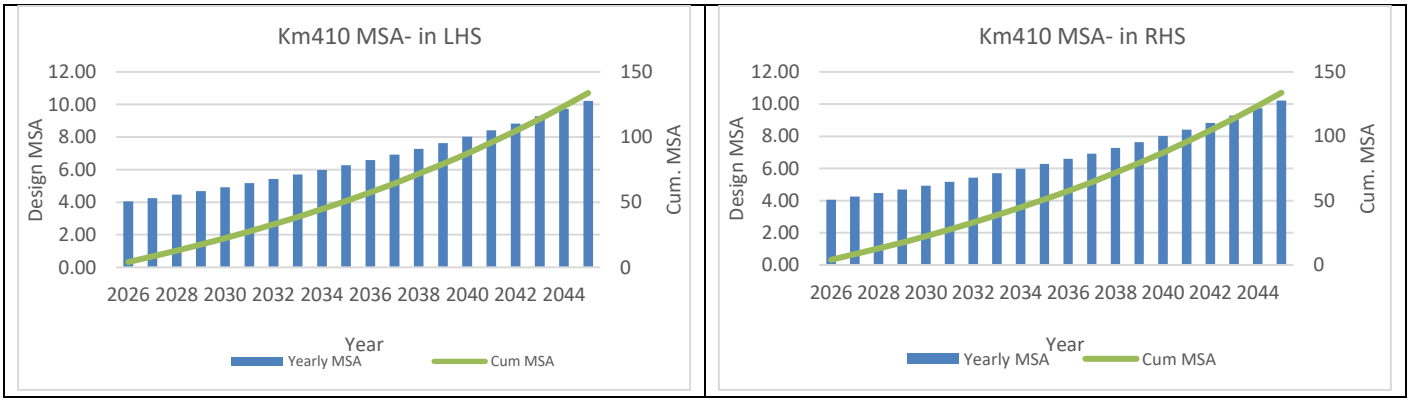
Vehicle/Mode	AADT (both direction) @ TP, km 410.900	AADT (both direction) @ TP, km 467.800
LCV	547	957
2A truck	1336	1821
3A truck	689	883
MAV truck	2175	2525
BUS	547	1020

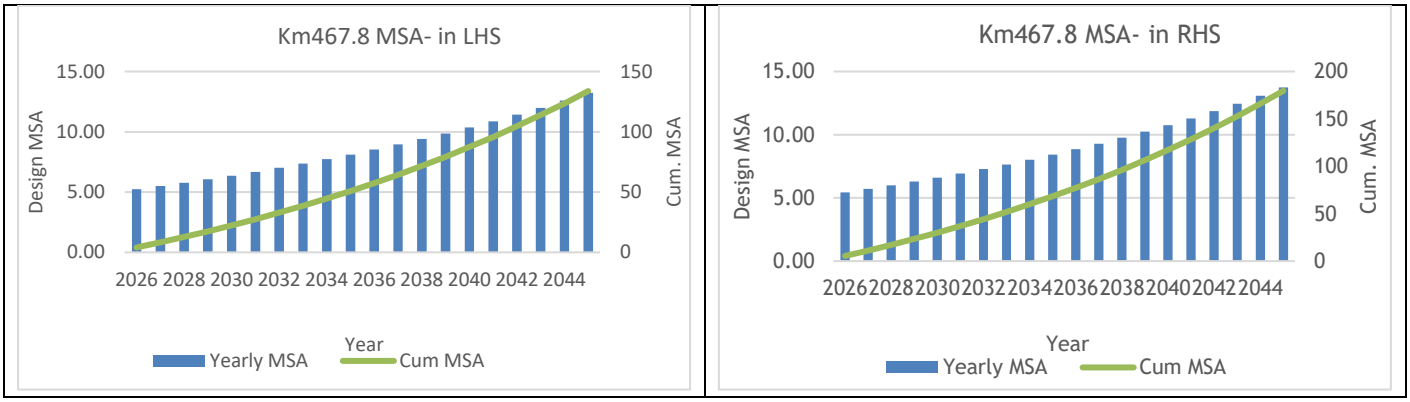
*Note: 50:50 Direction Distribution

Table 36: Estimated Design traffic loading

Design Period	Mangalgi Toll Plaza (Km.410.900)		Kamkol Toll Plaza (Km.467.800)	
	LHS	RHS	LHS	RHS
10 Years, Yr-2026	51	52	66	68
15 Years, Yr-2030	87	89	113	117
End of Concession, Yr-2044	124	126	160	166

Pictorial representation of yearly MSA





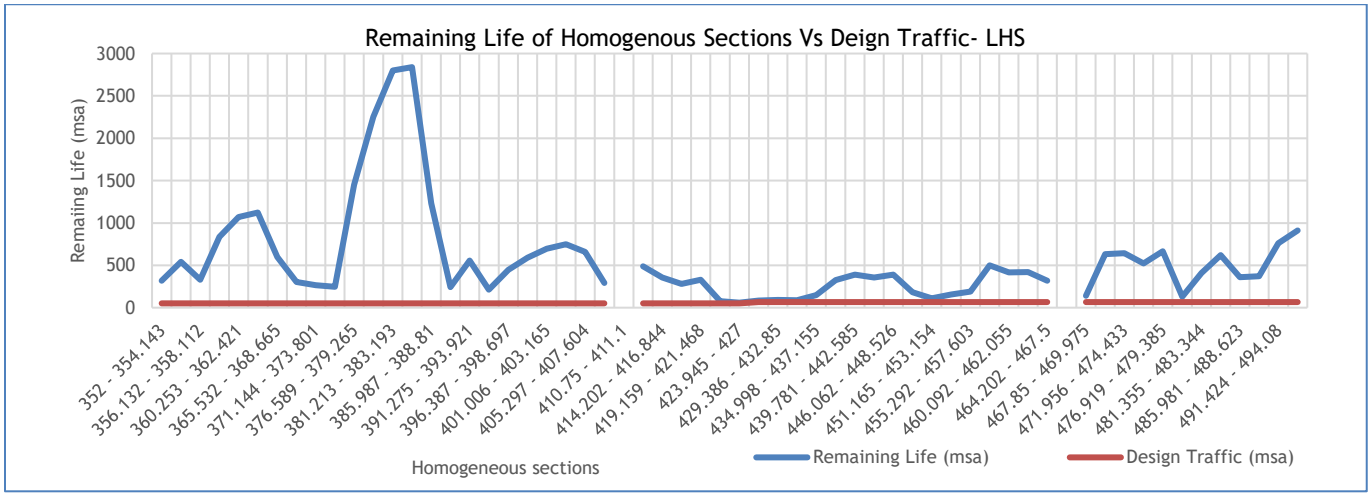
The computation of traffic loadings is presented in **Appendix 9** of this Report.

5.2 PAVEMENT REHABILITATION AND STRENGTHENING

For Design the Overlay Thickness the following method as suggested in IRC: 115 has been used

- The existing pavement is considered as a 3-layer system consisting of subgrade, granular and bituminous layer. The remaining life of exiting pavement in terms of Fatigue and Rutting life (MSA) are estimated
- The remaining life is compared with design traffic loading. An overlay with assumed thickness is considered on exiting pavement where required.
- The Total system including the proposed Overlay (Trial thickness) is assumed as a four-layer system and considered the relevant MR values for all the four layers namely New BT layer, existing bituminous surface, total existing Granular layers and Subgrade layers.
- The MR value for the New BT is assumed as 3000 MPA (considering VG40 Bituminous grade) for Main Carriageway and 2000 MPA (considering VG30 Bituminous grade) for Service Road and for all the remaining three layers, the MR Values derived and finalized from the FWD Analysis are considered.
- Critical Tensile strains and Vertical strains are found out by using the IIT PAVE Software at the bottom of existing bituminous layer and at the top of the subgrade layer respectively.
- The Fatigue and Rutting equations (equation given in the IRC: 37) have been used to estimate the Fatigue and Rutting Life of the Pavement system considering 80% reliability equation satisfying design philosophy provisions of the IRC 37-2001.
- The Obtained Fatigue and Rutting Life are compared with the required life for the assumed trial overlay thickness.
- Analysis is carried out for individual homogeneous sections as well for minimum and Average Modulus Values on each direction separately.

Remaining life of the existing pavement from the above analysis is presented in graphs along with following tables:


Remaining Life of Homogenous Sections Vs Deign Traffic- LHS
Remaiing Life (msa)
3000
2500
2000
1500
1000
500
0
352 - 354.143
356.132 - 358.112
360.253 - 362.421
365.532 - 368.665
371.144 - 373.801
376.589 - 379.265
381.213 - 383.193
385.987 - 388.81
391.275 - 393.921
396.387 - 398.697
401.006 - 403.165
405.297 - 407.604
410.75 - 411.1
414.202 - 416.844
419.159 - 421.468
423.945 - 427
429.386 - 432.85
434.998 - 437.155
439.781 - 442.585
446.062 - 448.526
451.165 - 453.154
455.292 - 457.603
460.092 - 462.055
464.202 - 467.5
467.85 - 469.975
471.956 - 474.433
476.919 - 479.385
481.355 - 483.344
485.981 - 488.623
491.424 - 494.08
Homogeneous sections
Remaining Life (msa)
Design Traffic (msa)

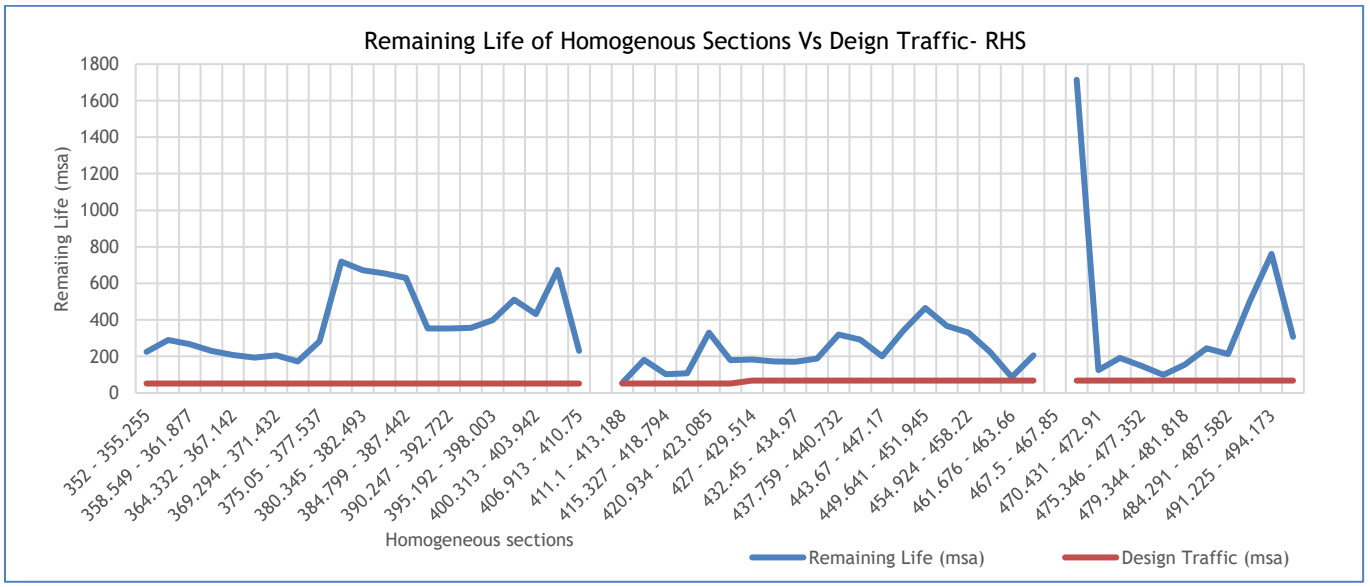

Remaining Life of Homogenous Sections Vs Deign Traffic- RHS
Remaiing Life (msa)
1800
1600
1400
1200
1000
800
600
400
200
0
352 - 355.255
358.549 - 361.877
364.332 - 367.142
369.294 - 371.432
375.05 - 377.537
380.345 - 382.493
384.799 - 387.442
390.247 - 392.722
395.192 - 398.003
400.313 - 403.942
406.913 - 410.75
411.1 - 413.188
415.327 - 418.794
420.934 - 423.085
427 - 429.514
432.45 - 434.97
437.759 - 440.732
443.67 - 447.17
449.641 - 451.945
454.924 - 458.22
461.676 - 463.66
467.5 - 467.85
470.431 - 472.91
475.346 - 477.352
479.344 - 481.818
484.291 - 487.582
491.225 - 494.173
Homogeneous sections
Remaining Life (msa)
Design Traffic (msa)

Table 37: Remaining life of the existing pavement MCW-LHS

S.No	Side	From	To	Length (Km)	15th Percentile MR values			Average Existing Crust		Total Crust (mm)	Adopted MR for BT (Mpa)	Strains From IITPAVE		Remaining Life as per IRC 37-2012 equation for 80% Reliability			
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)	BT (mm)	Granular (mm)			Vertical strain at bottom, epZ	Tensile strain at top, epT	Nf-Fatigue life, mSA	Rutting life,mSA	Target MSA	Remarks
1	LHS	352.00	354.14	2.14	2519	289	77	195	400	595	2519	0.0002421	0.0001343	317	1032	51	No Overlay
2	LHS	354.14	356.13	1.99	2779	364	77	195	400	595	2779	0.0002221	0.0001146	541	1525	51	No Overlay
3	LHS	356.13	358.11	1.98	2618	289	77	195	400	595	2618	0.0002397	0.0001318	330	1079	51	No Overlay
4	LHS	358.11	360.25	2.14	2696	365	77	219	400	619	2696	0.0002015	0.0001032	834	2371	51	No Overlay
5	LHS	360.25	362.42	2.17	2806	364	77	230	405	635	2806	0.0001885	0.0000960	1069	3208	51	No Overlay
6	LHS	362.42	365.53	3.11	2893	366	77	230	410	640	2893	0.0001847	0.0000942	1121	3519	51	No Overlay
7	LHS	365.53	368.67	3.13	2787	333	77	208	410	618	2787	0.0002100	0.0001116	598	1966	51	No Overlay
8	LHS	368.67	371.14	2.48	3136	334	77	170	410	580	3000	0.0002453	0.0001308	303	972	51	No Overlay
9	LHS	371.14	373.80	2.66	3012	312	77	170	410	580	3000	0.0002502	0.0001353	266	889	51	No Overlay
10	LHS	373.80	376.59	2.79	2905	306	77	170	410	580	2905	0.0002534	0.0001387	248	839	51	No Overlay
11	LHS	376.59	379.27	2.68	3280	365	77	242	410	652	3000	0.0001740	0.0000875	1450	4612	51	No Overlay
12	LHS	379.27	381.21	1.95	2955	325	77	275	445	720	2955	0.0001473	0.0000784	2252	9815	51	No Overlay
13	LHS	381.21	383.19	1.98	3381	362	77	275	470	745	3000	0.0001367	0.0000738	2801	13770	51	No Overlay
14	LHS	383.19	385.99	2.79	3214	365	77	275	470	745	3000	0.0001364	0.0000736	2839	13908	51	No Overlay
15	LHS	385.99	388.81	2.82	3377	363	77	230	470	700	3000	0.0001622	0.0000912	1231	6341	51	No Overlay
16	LHS	388.81	391.28	2.46	3348	224	77	190	470	660	3000	0.0002168	0.0001384	243	1702	51	No Overlay
17	LHS	391.28	393.92	2.65	3504	360	77	190	470	660	3000	0.0001916	0.0001118	558	2980	51	No Overlay
18	LHS	393.92	396.39	2.47	2472	240	77	190	470	660	2472	0.0002241	0.0001492	214	1464	51	No Overlay
19	LHS	396.39	398.70	2.31	2217	335	77	200	470	670	2217	0.0002010	0.0001266	445	2398	51	No Overlay
20	LHS	398.70	401.01	2.31	2905	312	77	210	427	637	2905	0.0002020	0.0001110	590	2345	51	No Overlay
21	LHS	401.01	403.17	2.16	3268	351	77	210	370	580	3000	0.0002197	0.0001056	696	1602	51	No Overlay
22	LHS	403.17	405.30	2.13	3160	365	77	210	370	580	3000	0.0002176	0.0001037	747	1674	51	No Overlay
23	LHS	405.30	407.60	2.31	3034	348	77	208	370	578	3000	0.0002222	0.0001071	659	1522	51	No Overlay
24	LHS	407.60	410.75	3.15	3213	301	77	180	370	550	3000	0.0002636	0.0001322	291	702	51	No Overlay
25	LHS	410.75	411.10	0.35													Toll Plaza
26	LHS	411.10	414.20	3.10	2838	364	77	188	409	597	2838	0.0002234	0.0001171	489	1485	51	No Overlay
27	LHS	414.20	416.84	2.64	2675	354	77	180	370	550	2675	0.0002598	0.0001287	356	749	51	No Overlay
28	LHS	416.84	419.16	2.32	2813	329	77	173	370	543	2813	0.0002711	0.0001354	280	618	51	No Overlay
29	LHS	419.16	421.47	2.31	2890	365	77	170	365	535	2890	0.0002686	0.0001290	330	644	51	No Overlay
30	LHS	421.47	423.95	2.48	1589	230	77	170	360	530	1589	0.0003525	0.0002130	78	188	51	No Overlay
31	LHS	423.95	427.00	3.06	1876	184	77	170	360	530	1876	0.0003544	0.0002206	59	183	51	No Overlay
32	LHS	427.00	429.39	2.39	2687	174	77	170	360	530	2687	0.0003241	0.0001866	84	275	66	No Overlay
33	LHS	429.39	432.85	3.46	1993	224	77	170	360	530	1993	0.0003364	0.0001954	90	232	66	No Overlay
34	LHS	432.85	435.00	2.15	2003	222	77	170	360	530	2003	0.0003366	0.0001958	89	232	66	No Overlay
35	LHS	435.00	437.16	2.16	2198	277	77	170	360	530	2198	0.0003128	0.0001680	149	323	66	No Overlay
36	LHS	437.16	439.78	2.63	2342	356	77	181	360	541	2342	0.0002731	0.0001354	327	597	66	No Overlay
37	LHS	439.78	442.59	2.80	2395	356	77	185	429	614	2395	0.0002261	0.0001287	391	1407	66	No Overlay
38	LHS	442.59	446.06	3.48	2396	338	77	185	450	635	2396	0.0002190	0.0001317	357	1626	66	No Overlay

S.No	Side	From	To	Length (Km)	15th Percentile MR values			Average Existing Crust		Total Crust (mm)	Adopted MR for BT (Mpa)	Strains From IITPAVE		Remaining Life as per IRC 37-2012 equation for 80% Reliability			
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)	BT (mm)	Granular (mm)			Vertical strain at bottom, epZ	Tensile strain at top, epT	Nf-Fatigue life, mSA	Rutting life,mSA	Target MSA	Remarks
39	LHS	446.06	448.53	2.46	2487	354	77	183	450	633	2487	0.0002159	0.0001276	392	1734	66	No Overlay
40	LHS	448.53	451.17	2.64	2541	294	77	163	450	613	2541	0.0002487	0.0001546	182	913	66	No Overlay
41	LHS	451.17	453.15	1.99	2457	302	77	140	450	590	2457	0.0002757	0.0001770	111	572	66	No Overlay
42	LHS	453.15	455.29	2.14	2634	345	77	140	450	590	2634	0.0002601	0.0001596	156	745	66	No Overlay
43	LHS	455.29	457.60	2.31	2641	363	77	144	450	594	2641	0.0002506	0.0001514	191	882	66	No Overlay
44	LHS	457.60	460.09	2.49	2702	362	77	190	445	635	2702	0.0002068	0.0001176	501	2108	66	No Overlay
45	LHS	460.09	462.06	1.96	2435	359	77	190	380	570	2435	0.0002468	0.0001261	417	946	66	No Overlay
46	LHS	462.06	464.20	2.15	2328	366	77	190	380	570	2328	0.0002480	0.0001271	421	925	66	No Overlay
47	LHS	464.20	467.50	3.30	2349	319	77	190	380	570	2349	0.0002573	0.0001363	318	783	66	No Overlay
48	LHS	467.50	467.85	0.35													Toll Plaza
49	LHS	467.85	469.98	2.13	2337	231	77	180	380	560	2337	0.0002916	0.0001681	141	444	66	No Overlay
50	LHS	469.98	471.96	1.98	2428	367	77	210	380	590	2428	0.0002248	0.0001134	632	1444	66	No Overlay
51	LHS	471.96	474.43	2.48	2484	367	77	210	380	590	2484	0.0002235	0.0001123	644	1482	66	No Overlay
52	LHS	474.43	476.92	2.49	2423	333	77	210	380	590	2423	0.0002308	0.0001192	522	1281	66	No Overlay
53	LHS	476.92	479.39	2.47	2577	367	77	210	380	590	2577	0.0002214	0.0001105	665	1547	66	No Overlay
54	LHS	479.39	481.36	1.97	1744	181	77	210	440	650	1744	0.0002517	0.0001829	131	865	66	No Overlay
55	LHS	481.36	483.34	1.99	2441	277	77	210	470	680	2441	0.0001992	0.0001266	410	2498	66	No Overlay
56	LHS	483.34	485.98	2.64	2482	342	77	210	470	680	2482	0.0001872	0.0001134	621	3311	66	No Overlay
57	LHS	485.98	488.62	2.64	2250	259	77	214	470	684	2250	0.0002032	0.0001333	360	2283	66	No Overlay
58	LHS	488.62	491.42	2.80	2309	228	76	225	470	695	2309	0.0001997	0.0001314	372	2470	66	No Overlay
59	LHS	491.42	494.08	2.66	2405	317	77	230	470	700	2405	0.0001782	0.0001084	760	4139	66	No Overlay
60	LHS	494.08	497.00	2.92	2687	328	77	230	470	700	2687	0.0001716	0.0001010	910	4912	66	No Overlay
Total length				145.000													

Table 38: Remaining life of the existing pavement MCW-RHS

S.No	Side	From	To	Length (Km)	15th Percentile MR values			Average Existing Crust		Total Crust (mm)	Adopted MR for BT (Mpa)	Strains From IITPAVE		Remaining Life as per IRC 37-2012 equation for 80% Reliability			
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)	BT (mm)	Granular (mm)			Vertical strain at bottom, epZ	Tensile strain at top, epT	Nf-Fatigue life, mSA	Rutting life,mSA	Target MSA	Remarks
1	RHS	352.00	355.26	3.26	2548	322	77	165	430	595	2548	0.0002509	0.0001462	226	878	52	No Overlay
2	RHS	355.26	358.55	3.29	2582	366	77	163	430	593	2582	0.0002421	0.0001367	290	1032	52	No Overlay
3	RHS	358.55	361.88	3.33	2573	362	77	160	430	590	2573	0.0002465	0.0001398	267	951	52	No Overlay
4	RHS	361.88	364.33	2.45	2506	342	77	160	430	590	2506	0.0002525	0.000146	230	853	52	No Overlay
5	RHS	364.33	367.14	2.81	2455	329	77	160	430	590	2455	0.0002568	0.0001505	208	790	52	No Overlay
6	RHS	367.14	369.29	2.15	2539	365	77	146	430	576	2539	0.0002624	0.0001522	194	716	52	No Overlay
7	RHS	369.29	371.43	2.14	2802	367	77	145	430	575	2802	0.0002585	0.0001465	207	766	52	No Overlay

S.No	Side	From	To	Length (Km)	15th Percentile MR values			Average Existing Crust		Total Crust (mm)	Adopted MR for BT (Mpa)	Strains From IITPAVE		Remaining Life as per IRC 37-2012 equation for 80% Reliability			Remarks
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)	BT (mm)	Granular (mm)			Vertical strain at bottom, epZ	Tensile strain at top, epT	Nf-Fatigue life, mSA	Rutting life,mSA	Target MSA	
8	RHS	371.43	375.05	3.62	2770	339	77	145	430	575	2770	0.0002664	0.0001538	173	669	52	No Overlay
9	RHS	375.05	377.54	2.49	2789	369	77	158	430	588	2789	0.0002433	0.0001352	283	1009	52	No Overlay
10	RHS	377.54	380.35	2.81	2642	365	77	210	430	640	2642	0.0001971	0.0001077	719	2621	52	No Overlay
11	RHS	380.35	382.49	2.15	2481	363	77	210	430	640	2481	0.0002004	0.0001111	672	2431	52	No Overlay
12	RHS	382.49	384.80	2.31	2470	359	77	210	430	640	2470	0.0002013	0.000112	654	2382	52	No Overlay
13	RHS	384.80	387.44	2.64	2480	365	77	206	430	636	2480	0.0002034	0.000113	630	2273	52	No Overlay
14	RHS	387.44	390.25	2.81	2486	365	77	175	430	605	2486	0.0002317	0.0001311	353	1259	52	No Overlay
15	RHS	390.25	392.72	2.47	2470	366	77	175	430	605	2470	0.0002318	0.0001313	352	1257	52	No Overlay
16	RHS	392.72	395.19	2.47	2473	368	77	175	430	605	2473	0.0002313	0.0001308	357	1269	52	No Overlay
17	RHS	395.19	398.00	2.81	2411	361	77	184	430	614	2411	0.0002252	0.0001279	398	1432	52	No Overlay
18	RHS	398.00	400.31	2.31	2109	321	77	217	416	633	2109	0.0002164	0.0001236	510	1716	52	No Overlay
19	RHS	400.31	403.94	3.63	2353	254	77	230	330	560	2353	0.0002511	0.0001259	432	874	52	No Overlay
20	RHS	403.94	406.91	2.97	2151	346	77	230	330	560	2151	0.0002431	0.0001146	673	1013	52	No Overlay
21	RHS	406.91	410.75	3.84	2346	355	77	165	330	495	2346	0.0003187	0.0001481	231	297	52	No Overlay
22	RHS	410.75	411.10	0.35													Toll Plaza
23	RHS	411.10	413.19	2.09	2421	185	77	155	330	485	2421	0.0003864	0.0002125	55	124	52	No Overlay
24	RHS	413.19	415.33	2.14	2603	338	77	155	330	485	2603	0.0003322	0.0001538	182	246	52	No Overlay
25	RHS	415.33	418.79	3.47	2470	266	77	153	330	483	2470	0.0003621	0.0001800	103	166	52	No Overlay
26	RHS	418.79	420.93	2.14	2460	239	77	164	344	508	2460	0.0003378	0.0001781	108	228	52	No Overlay
27	RHS	420.93	423.09	2.15	2413	357	77	180	360	540	2413	0.0002732	0.0001342	330	596	52	No Overlay
28	RHS	423.09	427.00	3.92	2232	276	70	180	360	540	2232	0.0003117	0.0001596	180	328	52	No Overlay
29	RHS	427.00	429.51	2.51	2484	356	77	150	360	510	2484	0.0003127	0.0001552	183	323	68	No Overlay
30	RHS	429.51	432.45	2.94	2478	366	77	145	360	505	2478	0.0003178	0.0001575	173	301	68	No Overlay
31	RHS	432.45	434.97	2.52	2406	366	77	145	360	505	2406	0.0003196	0.0001592	170	293	68	No Overlay
32	RHS	434.97	437.76	2.79	2366	367	77	150	360	510	2366	0.0003126	0.0001556	189	324	68	No Overlay
33	RHS	437.76	440.73	2.97	2388	361	77	175	390	565	2388	0.0002583	0.0001357	319	769	68	No Overlay
34	RHS	440.73	443.67	2.94	2419	335	77	175	450	625	2419	0.0002287	0.0001385	291	1336	68	No Overlay
35	RHS	443.67	447.17	3.50	2527	274	77	175	450	625	2527	0.0002406	0.0001508	202	1061	68	No Overlay
36	RHS	447.17	449.64	2.47	2521	312	77	189	450	639	2521	0.0002181	0.0001316	343	1656	68	No Overlay
37	RHS	449.64	451.95	2.30	2496	360	77	190	450	640	2496	0.0002084	0.000122	465	2036	68	No Overlay
38	RHS	451.95	454.92	2.98	2459	323	77	190	450	640	2459	0.0002162	0.0001301	367	1723	68	No Overlay
39	RHS	454.92	458.22	3.30	2342	344	77	180	450	630	2342	0.0002235	0.000135	331	1482	68	No Overlay
40	RHS	458.22	461.68	3.46	2437	356	77	155	450	605	2437	0.0002439	0.0001481	223	998	68	No Overlay
41	RHS	461.68	463.66	1.98	2484	210	77	160	450	610	2484	0.0002773	0.0001877	87	558	68	No Overlay
42	RHS	463.66	467.50	3.84	2459	324	77	160	450	610	2459	0.000246	0.000151	205	960	68	No Overlay
43	RHS	467.50	467.85	0.35													Toll Plaza
44	RHS	467.85	470.43	2.58	2919	365	77	250	450	700	2919	0.0001569	8.428E-05	1714	7372	68	No Overlay
45	RHS	470.43	472.91	2.48	1165	147	77	250	450	700	1165	0.0002408	0.0002017	126	1057	68	No Overlay
46	RHS	472.91	475.35	2.44	1866	141	77	242	450	692	1866	0.0002171	0.0001631	193	1691	68	No Overlay

S.No	Side	From	To	Length (Km)	15th Percentile MR values			Average Existing Crust		Total Crust (mm)	Adopted MR for BT (Mpa)	Strains From IITPAVE		Remaining Life as per IRC 37-2012 equation for 80% Reliability			
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)	BT (mm)	Granular (mm)			Vertical strain at bottom, epZ	Tensile strain at top, epT	Nf-Fatigue life, mSA	Rutting life,mSA	Target MSA	Remarks
47	RHS	475.35	477.35	2.01	2183	162	77	210	450	660	2183	0.0002357	0.0001683	149	1165	68	No Overlay
48	RHS	477.35	479.34	1.99	1401	144	77	228	450	678	1401	0.0002052	0.0002057	100	2184	68	No Overlay
49	RHS	479.34	481.82	2.47	2178	147	77	218	463	681	2178	0.0002242	0.0001665	156	1462	68	No Overlay
50	RHS	481.82	484.29	2.47	2202	220	77	210	470	680	2202	0.0002154	0.0001479	245	1752	68	No Overlay
51	RHS	484.29	487.58	3.29	2616	172	77	210	470	680	2616	0.0002140	0.0001476	213	1805	68	No Overlay
52	RHS	487.58	491.23	3.64	2919	242	77	220	470	690	2919	0.0001876	0.0001156	501	3279	68	No Overlay
53	RHS	491.23	494.17	2.95	2413	349	77	220	470	690	2413	0.0001801	0.0001083	760	3945	68	No Overlay
54	RHS	494.17	497.00	2.83	2369	212	77	220	456	676	2369	0.0002093	0.0001372	308	1996	68	No Overlay
Total length				145.00													

From the above, for the main carriageway there is **No Overlay requirement** in both the carriageways as the obtained remaining life of the pavement is greater than Target MSA.

Similar exercise has been done for the Service Road and the results are as follows.

Table 39: Remaining life of the existing pavement, SRroad-LHS

S.No	Side	From	To	Length (Km)	15th Percentile MR values			Average Existing Crust		Total Crust (mm)	Adopted MR for BT (Mpa)	Strains From IITPAVE		Remaining Life as per IRC 37-2012 equation for 80% Reliability			
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)	BT (mm)	Granular (mm)			Vertical strain at bottom, epZ	Tensile strain at top, epT	Nf-Fatigue life, mSA	Rutting life,mSA	Target MSA	Remarks
1	LHS	352.00	356.60	4.60													No Service Road
2	LHS	356.60	357.16	0.56								0.0004242	0.0002405	28	81	10	No Overlay
3	LHS	357.16	360.00	2.84													No Service Road
4	LHS	360.00	360.50	0.50													No Overlay
5	LHS	360.50	367.20	6.70	3262	242	77	100	380	480	3000						No Service Road
6	LHS	367.20	367.94	0.74													No Overlay
7	LHS	367.94	376.52	8.58													No Service Road
8	LHS	376.52	377.25	0.73													No Overlay
9	LHS	377.25	379.72	2.47													No Service Road
10	LHS	379.72	380.64	0.92													No Overlay
11	LHS	380.64	383.98	3.34													No Service Road
12	LHS	383.98	384.50	0.52								0.0003895	0.0002086	50	119	10	No Overlay
13	LHS	384.50	385.90	1.40	2946	314	77	100	380	480	2946						No Service Road
14	LHS	385.90	387.45	1.55													No Overlay
15	LHS	387.45	388.90	1.45													No Service Road

S.No	Side	From	To	Length (Km)	15th Percentile MR values			Average Existing Crust		Total Crust (mm)	Adopted MR for BT (Mpa)	Strains From IITPAVE		Remaining Life as per IRC 37-2012 equation for 80% Reliability			Remarks
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)	BT (mm)	Granular (mm)			Vertical strain at bottom, epZ	Tensile strain at top, epT	Nf-Fatigue life, mSA	Rutting life,mSA	Target MSA	
16	LHS	388.90	389.85	0.95													No Overlay
17	LHS	389.85	395.50	5.65													No Service Road
18	LHS	395.50	395.70	0.20													No Overlay
19	LHS	395.70	405.95	10.25													No Service Road
20	LHS	405.95	406.90	0.95													No Overlay
21	LHS	406.90	408.50	1.60													No Service Road
22	LHS	408.50	409.43	0.93													No Overlay
23	LHS	409.43	418.30	8.87													No Service Road
24	LHS	418.30	419.30	1.00								0.0004340	0.0002514	24	73	10	No Overlay
25	LHS	419.30	422.29	2.99													No Service Road
26	LHS	422.29	422.95	0.66													No Overlay
27	LHS	422.95	425.40	2.45													No Service Road
28	LHS	425.40	426.70	1.30	2933	227	77	100	380	480	2933						No Overlay
29	LHS	426.70	429.90	3.20													No Service Road
30	LHS	429.90	430.80	0.90													No Overlay
31	LHS	430.80	440.09	9.29													No Service Road
32	LHS	440.09	440.91	0.81													No Data
33	LHS	440.91	441.90	1.00													No Overlay
34	LHS	441.90	446.62	4.72													No Service Road
35	LHS	446.62	447.80	1.18								0.0004608	0.0002822	16	56	10	No Overlay
36	LHS	447.80	455.00	7.20													No Service Road
37	LHS	455.00	456.65	1.65													No Overlay
38	LHS	456.65	458.27	1.62	2880	184	77	100	380	480	2880						No Service Road
39	LHS	458.27	459.08	0.81													No Overlay
40	LHS	459.08	465.97	6.89													No Service Road
41	LHS	465.97	467.00	1.03													No Overlay
42	LHS	467.00	470.25	3.25													No Service Road
43	LHS	470.25	470.90	0.65								0.0003763	0.0002006	66	140	10	No Overlay
44	LHS	470.90	477.20	6.30													No Service Road
45	LHS	477.20	477.85	0.65													No Overlay
46	LHS	477.85	479.33	1.48													No Service Road
47	LHS	479.33	479.75	0.42													No Overlay
48	LHS	479.75	482.00	2.25	2538	362	77	100	380	480	2538						No Service Road
49	LHS	482.00	483.20	1.20													No Overlay
50	LHS	483.20	490.80	7.60													No Service Road
51	LHS	490.80	491.45	0.65													No Overlay
52	LHS	491.45	495.30	3.85													No Service Road
53	LHS	495.30	497.00	1.70													No Overlay
Total length				145.000													

Table 40: Remaining life of the existing pavement, SRroad-RHS

S.No	Side	From	To	Length (Km)	15th Percentile MR values			Average Existing Crust		Total Crust (mm)	Adopted MR for BT (Mpa)	Strains From IITPAVE		Remaining Life as per IRC 37-2012 equation for 80% Reliability			
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)	BT (mm)	Granular (mm)			Vertical strain at bottom, epZ	Tensile strain at top, epT	Nf-Fatigue life, mSA	Rutting life,mSA	Target MSA	Remarks
1	RHS	352.00	356.60	4.60													No service road
2	RHS	356.60	357.16	0.56								0.0003787	0.0002194	47	136	10	No Overlay
3	RHS	357.16	360.00	2.84													No service road
4	RHS	360.00	360.50	0.50													No Overlay
5	RHS	360.50	367.20	6.70													No service road
6	RHS	367.20	367.94	0.74	2527	287	77	110	390	500	2527						No Overlay
7	RHS	367.94	376.52	8.58													No service road
8	RHS	376.52	377.25	0.73													No Overlay
9	RHS	377.25	379.72	2.47													No service road
10	RHS	379.72	380.64	0.92													No Overlay
11	RHS	380.64	383.98	3.34													No service road
12	RHS	383.98	384.50	0.52								0.0003515	0.0001943	78	190	10	No Overlay
13	RHS	384.50	385.90	1.40													No service road
14	RHS	385.90	386.24	0.34													No Data
15	RHS	386.24	387.45	1.21													No Overlay
16	RHS	387.45	388.90	1.45													No service road
17	RHS	388.90	389.85	0.95	2420	358	77	110	390	500	2420						No Overlay
18	RHS	389.85	395.28	5.43													No service road
19	RHS	395.28	395.75	0.47													No Overlay
20	RHS	395.75	405.95	10.20													No service road
21	RHS	405.95	406.90	0.95													No Overlay
22	RHS	406.90	408.50	1.60													No service road
23	RHS	408.50	409.43	0.93													No Overlay
24	RHS	409.43	418.30	8.87													No service road
25	RHS	418.30	419.30	1.00								0.0003837	0.0002184	41	128	10	No Overlay
26	RHS	419.30	422.29	2.99													No service road
27	RHS	422.29	422.95	0.66	3277	254	77	110	390	500	3000						No Overlay
28	RHS	422.95	425.40	2.45													No service road
29	RHS	425.40	426.70	1.30													No Overlay
30	RHS	426.70	429.90	3.20													No service road
31	RHS	429.90	430.80	0.90													No Overlay
32	RHS	430.80	440.09	9.29													No service road
33	RHS	440.09	441.90	1.81								0.0003874	0.0002221	39	122	10	No Overlay
34	RHS	441.90	446.62	4.72	3137	246	77	110	390	500	3000						No service road
35	RHS	446.62	447.80	1.18													No Overlay
36	RHS	447.80	450.70	2.90													No service road
37	RHS	450.70	451.15	0.45													No Data

S.No	Side	From	To	Length (Km)	15th Percentile MR values			Average Existing Crust		Total Crust (mm)	Adopted MR for BT (Mpa)	Strains From IITPAVE		Remaining Life as per IRC 37-2012 equation for 80% Reliability			
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)	BT (mm)	Granular (mm)			Vertical strain at bottom, epZ	Tensile strain at top, epT	Nf-Fatigue life, mSA	Rutting life,mSA	Target MSA	Remarks
38	RHS	451.15	455.00	3.85													No service road
39	RHS	455.00	456.65	1.65													No Overlay
40	RHS	456.65	458.27	1.62													No service road
41	RHS	458.27	459.08	0.81								0.0003924	0.0002302	36	116	10	No Overlay
42	RHS	459.08	465.97	6.89													No service road
43	RHS	465.97	467.00	1.03													No Overlay
44	RHS	467.00	470.25	3.25													No service road
45	RHS	470.25	470.90	0.65													No Overlay
46	RHS	470.90	479.33	8.43													No service road
47	RHS	479.33	479.75	0.42	2758	247	77	110	390	500	2758						No Overlay
48	RHS	479.75	482.00	2.25													No service road
49	RHS	482.00	483.20	1.20													No Overlay
50	RHS	483.20	490.80	7.60													No service road
51	RHS	490.80	491.60	0.80													No Overlay
52	RHS	491.60	495.30	3.70													No service road
53	RHS	495.30	497.00	1.70													No Overlay
Total length				145.00													

From the above, for the Service Road there is **No overlay requirement** in both the carriageways as the obtained remaining life of the pavement is greater than Target MSA.

Input data used and the output from the IIT Pave software has been presented as screen shots for ready reference as **Appendix 10** of this Report.

5.3 STRUCTURAL REHABILITATION

All the structure found to be in fair condition except minor treatment like repair of stone pitching, cleaning of drainage spouts, cleaning of vegetation etc. may be required. Detailed structural rehabilitation quantities have been worked out based on the prevailing condition of existing structures. This methodology describes in detail the procedure for the execution of each item of rehabilitation work of the Existing Bridges of the project.

The scope of this methodology covers the items mentioned below for rehabilitation work of all the existing Bridges.

- Repair/ Replacement of Existing Bearings
- Repair / Replacement of Existing Expansion Joints
- Repair / Replacement of Existing Wearing Coat
- Profile Correction for Existing Deck Slab by Cement Concrete
- Sealing of Cracks for Bridges by Epoxy Resin
- Replacement of Spalled Concrete of ECW by Epoxy Mortar
- Cement Grouting for Repair of Existing Bridges
- Guniting / Shotcreting for Repair of Existing Bridges
- Providing & Fixing of Drainage Spouts
- Repair of Substructure Component
- Repair / Replacement of Railing & Crash Barrier
- Epoxy Bonding between New and Old Concrete.

CHAPTER 6. OPERATION AND MAINTENANCE

6.1 INTRODUCTION

Looking at the contractual requirements of maintaining project road under specified level of roughness it is felt that roughness is the most important criterion for finalizing the O&M schedule for the project. Accordingly, the methodology adopted by present consultants includes predicting the roughness year by year under the traffic using a well acknowledged HDM-4 model developed for developing countries like India after lot of research by World Bank. The said model is widely prescribed by MORTH and NHAI during the preparation of detailed project reports for several projects in doing economic analysis for the projects. The economic analysis mainly consists of two parts:

1. Predicting the road deterioration and estimating VOC
2. Estimating Benefits

Considering its importance and present use in India, consultants felt prudent to use the first part, i.e. estimating road deterioration and predicting roughness in HDM 4 model to finalize the O&M schedule for the project. This approach is more scientific as it does not assume hypothetical deflection values at 10^{th} and 20^{th} year and includes main criterion of maintaining roughness at 2500mm/Km as per Schedule K.

6.2 CA SPECIFICATIONS FOR MAJOR MAINTENANCE

- Schedule K of CA species that Roughness values exceed 2500mm/km in a length of KM, needs to be corrected within 180 days. Roughness survey has to be done two times in a year.
- BBD survey to be done in every 5years.

6.3 INPUTS FOR MM SCHEDULE

❖ PROJECT SECTIONS

The entire project road is divided into “two sections” based on traffic characteristics i.e., Karnataka section and Telangana section.

- Section-1: km 352+000 to 427+000
- Section-2: km 427+000to 497+000

Then, taking the consideration of Roughness as a key criterion for major maintenance, further the above sub-sections categorized in to four cases below:

- Case 1: Roughness value <2000 mm/km
- Case 2: Roughness values 2000<UI in mm/km <2200
- Case 3: Roughness values 2200< UI in mm/km <2500
- Case 4: Roughness values >2500 mm/Km

Direction wise analysis has been done separately for LHS (UP)/RHS (DN) along the project.

6.4 HDM INPUTS

FWD and Roughness values are used as obtained from surveys and investigations as below:

Section-1_LHS & RHS: No Overlay

	LHS					RHS			
No Overlay	**<2000**	**>=2000 and <2200**	**>=2200 and <2500mm**	**>=2500**		**<2000**	**>=2000 and <2200**	**>=2200 and <2500mm**	**>=2500**
	case-1	**case-2**	**case-3**	**case-4**		**case-1**	**case-2**	**case-3**	**case-4**
Length, kms	75.000	-	-	-		75.000	-	-	-
Roughness, mm/km	1007	-	-	-		988	-	-	-
IRI. m/km	1.51	-	-	-		1.49	-	-	-
Deflection, mm	0.41	-	-	-		0.35	-	-	-
Cracking %	0.01	-	-	-		0.02	-	-	-
Raveling %	0.00	-	-	-		0.01	-	-	-
Rut Depth, mm	1.33	-	-	-		1.08	-	-	-
Patching, %	0.06	-	-	-		0.03	-	-	-
Potholes, %	3.00	-	-	-		0.00	-	-	-
BT Crust, mm	202	-	-	-		177	-	-	-
Granular Crust, mm	410	-	-	-		397	-	-	-

Section-2_LHS & RHS: No Overlay

	LHS					RHS			
No Overlay	**<2000**	**>=2000 and <2200**	**>=2200 and <2500mm**	**>=2500**		**<2000**	**>=2000 and <2200**	**>=2200 and <2500mm**	**>=2500**
	case-1	**case-2**	**case-3**	**case-4**		**case-1**	**case-2**	**case-3**	**case-4**
Length, kms	70.000	-	-	-		70.000	-	-	-
Roughness, mm/km	920	-	-	-		985	-	-	-
IRI. m/km	1.40	-	-	-		1.49	-	-	-
Deflection, mm	0.38	-	-	-		0.36	-	-	-
Cracking %	0.03	-	-	-		0.01	-	-	-
Raveling %	0.02	-	-	-		0.00	-	-	-
Rut Depth, mm	1.06	-	-	-		1.00	-	-	-
Patching, %	0.08	-	-	-		0.02	-	-	-
Potholes, %	0.00	-	-	-		0.00	-	-	-
BT Crust, mm	190	-	-	-		191	-	-	-
Granular Crust, mm	417	-	-	-		438	-	-	-

6.5 OPTIONS FOR MM SCHEDULES

Based on the requirements of CA, various options have been considered to be used as responsive overlays triggered at specified level of roughness of 2500 mm/km. Micro surfacing has also been considered to examine its feasibility for major maintenance.

Following options were considered in the analysis:

- ✓ Base Case: MCS at Roughness of 2500mm/Km with regular maintenance, with regular maintenance, it is pertinent to note that Base alternative is included as "Do nothing Scenario" for the purpose of analysis in model. It is not be reckoned with.
- ✓ Opt-1: Responsive Mill & Overlay of 30mm BC whenever roughness is >2500mm/KM with regular maintenance
- ✓ Opt-2: Responsive Mill & Overlay of 40mm BC whenever roughness is >2500mm/KM with regular maintenance

6.6 ROUGHNESS PROGRESSION

Roughness progression for each section under each alternative maintenance option has been done using the deterioration models in HDM-4. Following graphs represents the roughness progression for each alternative:

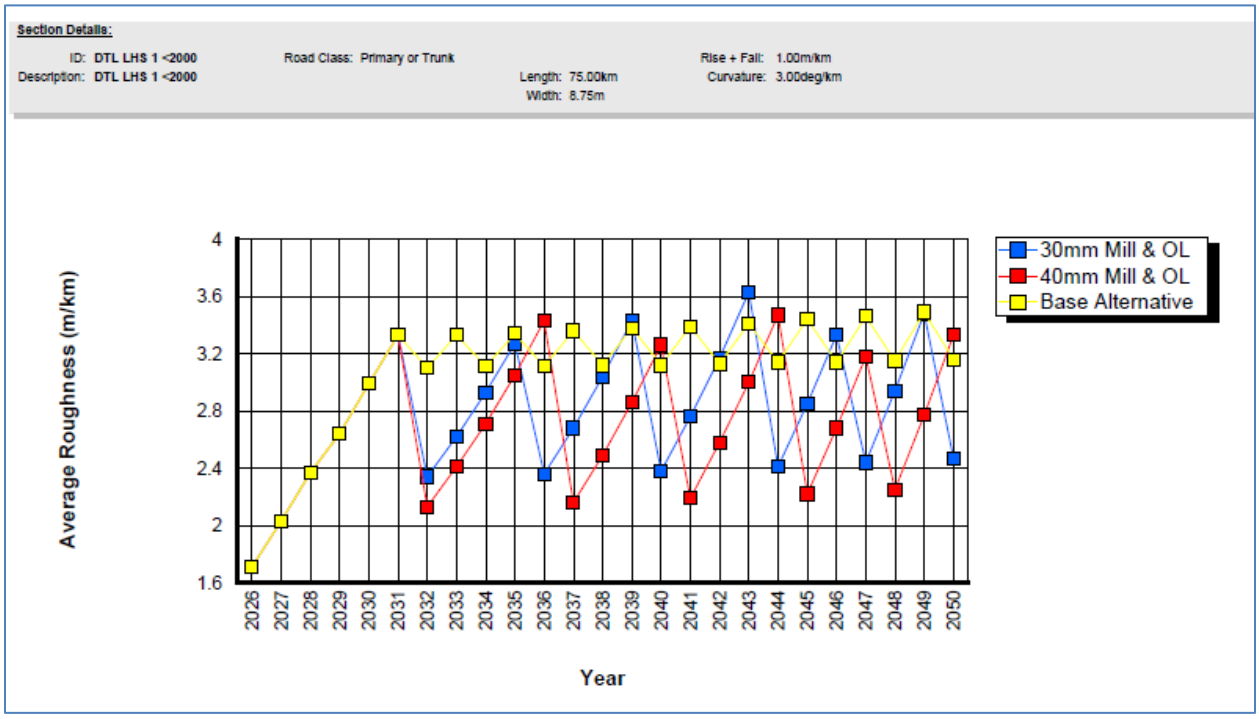


Figure 1: Average Roughness in LHS Carriageway Sec-1 No Overlay (LHS<2000mm/Km)

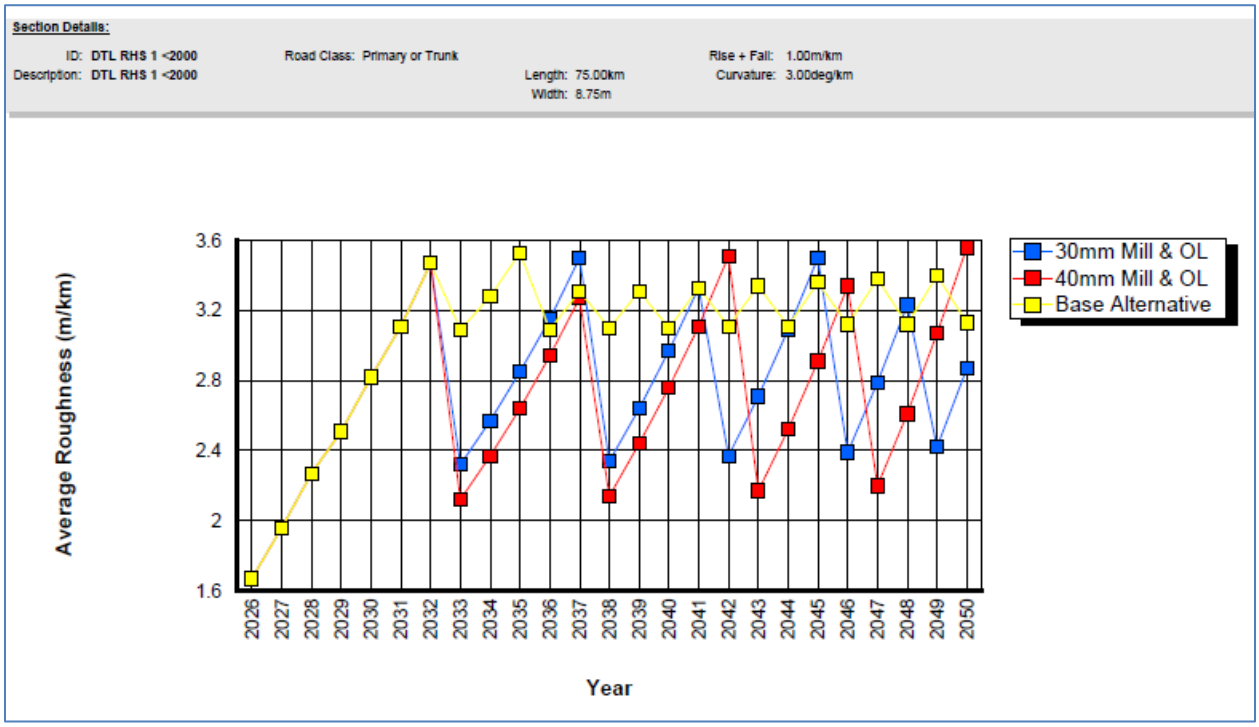


Figure 2: Average Roughness in RHS Carriageway Sec-1 No Overlay (RHS<2000mm/Km)

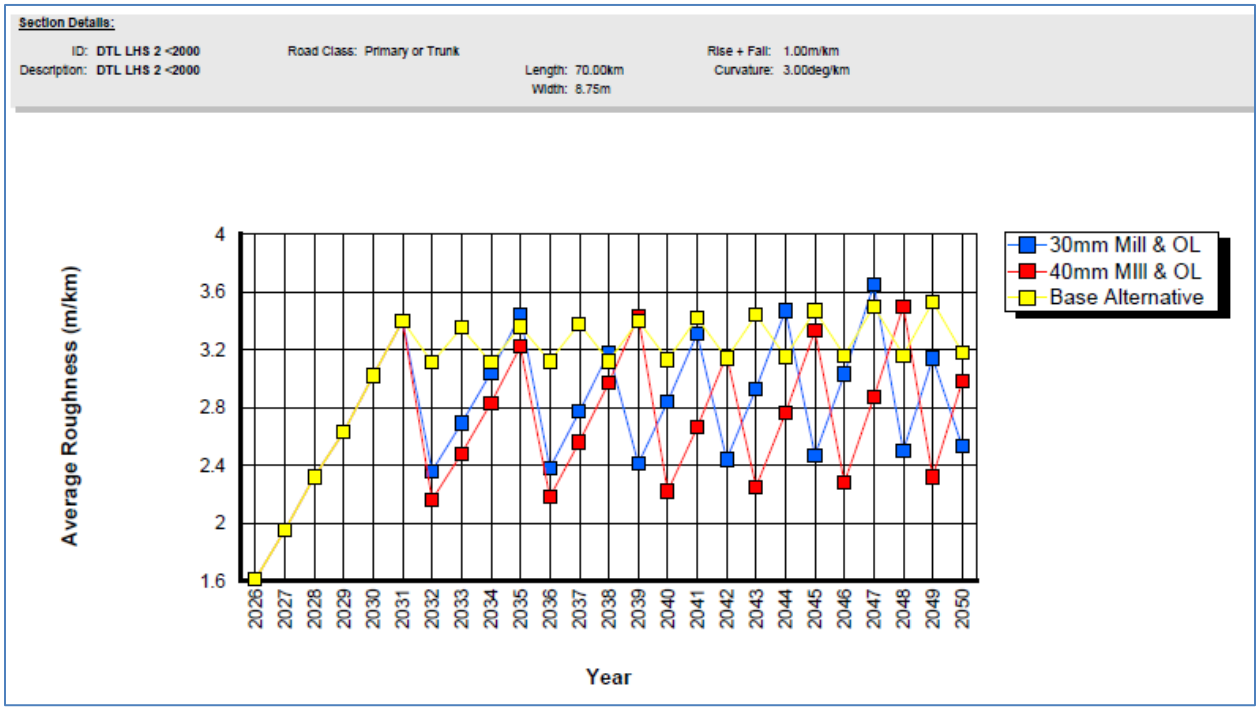


Figure 3: Average Roughness in LHS Carriageway Sec-2 No Overlay (LHS<2000mm/Km)

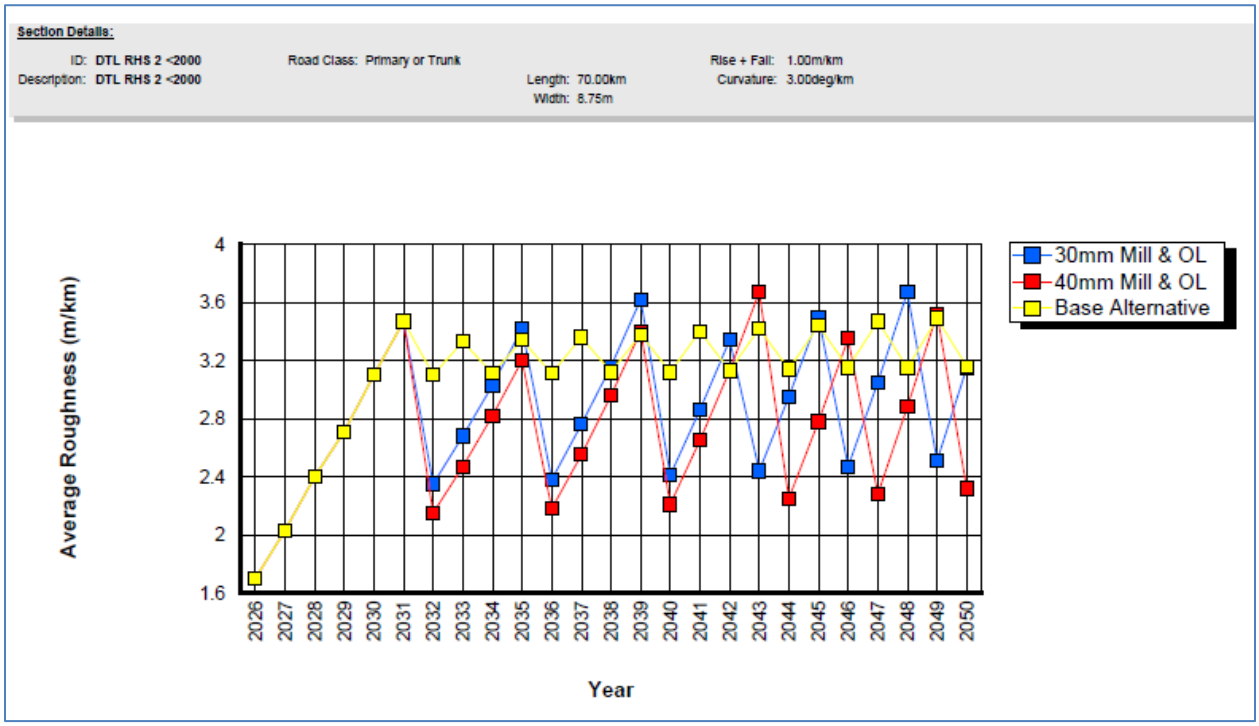


Figure 4: Average Roughness in RHS Carriageway Sec-2 No Overlay (RHS<2000mm/Km)

6.7 ADOPTED M&M SCHEDULE

Looking at the present condition, progression of traffic with actual traffic growth rates, it is felt prudent to consider 40mm/30mm BC OL as the preferred option. Adopted MM schedule for the project is as below:

		LHS: length in mts							RHS: length in mts					
Cycle	Base year	1st		2nd		3rd			1st		2nd		3rd	
Planned in Financial Year	***2026***	***FY 2031***	***FY 2032***	***FY 2037***	***FY 2038***	***FY 2043***	***FY 2044***		***FY 2032***	***FY 2033***	***FY 2038***	***FY 2039***	***FY 2043***	***FY 2044***
Milling required for BC?		***No***	***No***	***Yes***	***Yes***	***No***	***No***		***No***	***No***	***Yes***	***Yes***	***No***	***No***
BC with VG40 - 50 mm														
BC with VG40 - 40 mm		29824	38887	29824					29824		29824			
BC with VG40 - 30 mm			75925		114812	29824	114812			114812		114812		
DBM with VG40 - 50 mm			1898		2870									

Cycle	Base year	SERVICE ROAD (LHS+RHS), length in mts				
Planned in Financial Year	***2026***	***FY2031***	***FY3038***	***FY2044***		
Milling required for BC?		***Yes***	***No***	***No***		
BC with VG40 - 50 mm						
BC with VG40 - 40 mm						
BC with VG40 - 30 mm		40387	40387	40387		
DBM with VG40 - 50 mm						

6.8 STRUCTURAL PERIODIC MAINTENANCE STRATEGY

Expansion joints:

- Visual inspection is shall be carried out to check for seal breakages, Armor angle, Weld failures, cracks between deck & Expansion joints concrete and Joints filled with debris. However, no serious damages were observed.
- In the absence of records pertaining to Expansion joint replacements it is highly difficult to predict the date of replacement needed for compliance to IRC codal requirements. However, periodic maintenance is considered.

Bearings:

- All types of Bearings are considered for periodic maintenance.

Wearing Coat:

- Wearing coat is a very weak component on the bridge structure which is subjected to severe deterioration due to Loading, Environment etc. This requires periodic maintenance and is considered in BOQ.

Cost Component for various items and activities have been worked out by considering the Best Industry practice and most appropriate methods. Detailed quantities for work items have been estimated based on the details presented in previous chapters for various heads as per schedule provisions, roughness criteria (RI<2500mm/km) and other required parameters inline with Concession Agreement provisions.

The gist of the cost components considered are presented below:

- Immediate Repair's Cost
- Routine Maintenance Cost
- Incident Management Cost
- Periodic Maintenance Cost
- Operations Cost
- Year by Year total O&M Costs

7.1 RATE ANALYSIS

Detailed rate analysis has been carried out based on MORTH guidelines to arrive at the unit rates of various items. Material rates and their leads from the project corridor are considered as per the material investigations done on the project road. Summary of unit rates arrived at are presented in table below:

Table 41: Summary of Unit Rates of Basic material

Sl.no	Description	Units	Source	Basic rate excluding Transportation & GST	Lead in Kms
1	Good earth	Cum	BA	222	11.40
2	40 mm	Cum	Crusher	512	31.95
3	20 mm	Cum	Crusher	742	31.95
4	12 mm	Cum	Crusher	406	31.95
5	6 mm	Cum	Crusher	485	31.95
6	Dust	Cum	Crusher	485	31.95
7	M sand	Cum	Crusher	1290	31.95
8	Boulders	Cum	Querry	263	1.00
9	Sand source to Plant	Cum	River	1290	32.00
10	Sand source to working site	Cum	Stock yard	1290	30.00
11	Bitumen 60/70	MT	Mumbai	49850	656.00
12	Bitumen 80/100	MT	Mumbai	46440	656.00
13	VG-40 (CAPEX)	MT	Mumbai	46657	656.00
14	CRMB-55	MT	Mumbai	52841	656.00
15	PMB	MT	Mumbai	58440	656.00
16	SS1	MT	Mumbai	45000	656.00
17	Steel	MT	Zaheerabad	47500	73.00
18	HTS Strands	MT	Zaheerabad	75000	73.00
19	Cement	MT	Zaheerabad	6600	73.00
20	Structural Steel	MT	Zaheerabad	58000	73.00

Note: *For asphalt pavement rehabilitation works, a discount of 7.5% is applied on Bitumen (VG-40) to the present market rate.

Table 42: Summary of Major Material Rates excluding GST

S No	Item	Unit	Rate (INR) Excluding GST
1	BC - G1	Cum	10231
2	Tack coat on bituminous surface	Sqm	16
3	DBM G-1	Cum	8375
4	Tack coat on granular	Sqm	17
5	Prime Coat	Sqm	50
6	WMM	Cum	1899
7	GSB G-2	Cum	1799
8	CTSB	Cum	2361
9	CTB	Cum	2755
10	PQC	Cum	7428
11	DLC	Cum	3759
12	SG	Cum	575
13	Embankment - borrow	Cum	563
14	Embankment - Excavation	Cum	79
15	Select Fill	Cum	633
16	RE wall	Sqm	2993
17	Filter Media	Cum	1685
18	Road Marking	Sqm	347
19	M15	Cum	6554
20	M20	Cum	7279
21	M25	Cum	7889
22	M30	Cum	7793
23	M35	Cum	8096
24	M40	Cum	8232
25	PSC M45	Cum	9818
26	HYSD	MT	70006
27	HT strand	MT	162743
28	PQC	Cum	7428
29	DLC	Cum	3759

NOTE: 1. Item rates are considered for small projects

2. Labour: Central Minimum Wages as on April'2025 for "C-Area" Category of construction workers

7.2 IMMEDIATE REPAIRS COSTS

Costs associated with immediate repairs are estimated based on the detailed asset inventory and condition assessment surveys, Pavement condition and structural condition assessment surveys. Items which are not executed as part of scope or in damaged condition have been considered for immediate costs as a part of 1-year Capex. Following items are mainly considered for immediate costs:

- Scope which is not executed
- Road work items
- Bridge Work Items
- Pavement Rehabilitation works
- Structural Rehabilitation works
- Drainage Works
- Slope Protection works
- Safety Works

Immediate repair costs assessed by the Consultants have not been included, as the Concessionaire is undertaking the rehabilitation works at site.

7.3 ROUTINE MAINTENANCE & INCIDENT MANAGEMENT COSTS

Routine maintenance costs include general maintenance costs of road elements, bridge elements and road furniture and appurtenances. This can be mainly divided into two parts as:

- ✓ General Maintenance of Works
- ✓ Repairs to Highway & Bridge Elements

❖ General Routine Maintenance

General Routine Maintenance of Roads generally include following items:

- Cleaning of Project facilities
- Structures cleaning,
- Cleaning of ROW
- Cleaning and Maintenance of Toll Plaza
- Unlined Drain Maintenance
- Lined Drain Maintenance
- Maintenance of Highway Lighting at Toll Plaza and other project locations
- Median Plantation maintenance & Avenue plantation maintenance:
- Maintenance of Road Furniture
- Maintenance of Road Safety Items

The above items are estimated by considering the detailed break-up of following items:

- Manpower including Managers/Labour etc.
- Vehicles for Labour Transport/Water Tankers/Sweeping Machines etc.
- Resources/Equipment's such as grass cutters, tools, jet sprayers, hydraulic trimmers etc.

❖ Repairs to Highway & Bridge Works

Repairs to highway and bridge works have been estimated based on the assumed quantities (Percentage basis) of execution for every year.

These items include the following:

A. Roads

1	Providing treatment for sealing of road surface / isolated cracks at scattered locations
	i) covered with 6.7 mm size stone chipping @ 0.1 cum/ 10 sqm.
	ii) covered with dry coarse sand passing through 2.36 mm sieve and retained on 180-micron sieve @ 0.03 cum/10 sqm heated to 600 C
	iii) filling discrete cracks with slow curing bitumen emulsion as per Technical Specification Clause 3004.3.3
2	Providing treatment to bleeding bituminous surface at scattered locations
3	Providing localized repair to rutted portion and edge breaking of bituminous surface
4	Providing treatment and repair to pot-holes and patch work
5	Providing and laying dense bituminous macadam using bitumen grade 60/70 complete as per Technical Specification Clause 507
6	Proving and laying bituminous concrete (asphaltic concrete)
	(a) Using bitumen (VG-40) as per IRC: SP: 53
7	Road Roughness survey
8	Turfing on embankment slopes and at all other Project Facilities
9	Providing repair to stone pitching/apron at scattered locations
10	Rain Cuts Maintenance: Restoration of rain cuts soil, moorum, gravel or a mixture of these
11	Cleaning of Lined Drain
12	Repair of damaged lined drain
13	Unlined drain cleaning
14	Filling in median island with approved materials with all leads and lifts complete as per TS Clause No. 407
15	Replacing damaged / broken railing with new pre-cast / cast-in-situ, concrete railing to match with existing design and pattern.
24	Carrying out repair to road signs including strengthening resetting or otherwise repairing signs and delineators
	a) Road sign board mounted on single post
	b) Road sign board mounted on double post
	c) Overhead/ Gantry Sign boards
	d) Delineator
25	Supplying and fixing at site retro-reflectorized type sign boards/signs
	90cm Equilateral triangle
	60cm circular
	90 cm circular
	90cm high octagon
	80cm x 60cm rectangle
	Chevron signs 60cm x 45cm
	Place identification signs (Fig 15.7 of IRC 67)

	Providing and fixing Object Markers
	Providing and fixing of retro-reflectorized Route Marker signs (size 450mm x 600mm)
26	Hazard Marker Sign:
	a) size 90 x 30 cm
	b) size 30cm triangular side cluster of red reflectors (screen printed)
27	Cats Eyes/Raised pavement marker (NMC Nails Less)
28	Painting two coats on old surface after minor repairs to give an even and smooth surface and printing letters and figures with synthetic enamel paint
	a) Hectometer stones
	b) Kilometer Stone
	c) 5 Kilometer stone
	d) Boundary stone
	e) Guard stone
29	Providing painting lettering and fixing of distance measurement stones including dismantling of old damaged/ broken ones, confirming to TS Clause 804
	a) Hectometer stones
	b) Kilometer Stone
	c) 5 Kilometer stone
	d) Boundary stone
	e) Guard stone
30	Providing and fixing road delineators conforming to TS Clause No. 805 as directed by the Engineer.
31	Repainting the Kerb stones and separation barrier with first quality synthetic enamel paint of approved brand
32	Painting all types of pavement markings including lines, dashes, arrows etc. on roads as per relevant IRC/MOST standards after cleaning the surface complete in all respects as directed by the Engineer.
	a) Hot applied Thermoplastic compound
	(i) Lane / Centre Line / Edge Line
	(ii) Direction Arrows, Diagonal Chevrons Markings, PC etc.,
	(iii) Transverse bar Marking
33	Supplying and laying cast-in-situ cement concrete Kerb without channel section
	a) by Manual/machine including formwork
34	Major repair / replacement of metal beam crash barrier (W profile guard rails)
35	Providing and fixing chain link/ welded mesh fencing / square bars fencing
36	Dismantling the old damaged chain link/welded mesh / square bars fencing and replacing it with new chain link/ welded mesh/square bars fencing
37	Provision of rumble strips
38	Shoulder Maintenance
39	synthetic enamel paint of approved brand on metal pedestrian guard rail
40	Dismantling of wearing course
41	Toll Plaza building repairs, booths, canopy and also maintenance of TP buildings
42	Median plantation maintenance
43	RE wall Maintenance

B. Structures

1. Wearing coat comprising of 50 mm thick BC.
2. Cleaning and adding rubber sealant near expansion joints.
3. Modular Expansion joints.
4. Replacement of Damaged Concrete Railing all complete as per technical specifications and as directed by the Engineer
5. Provision of an RCC crash barrier (0.35sqm cross sectional area) constructed with M-40 grade concrete including reinforcement
6. Cleaning of rocker & roller bearing using high pressure water jet, free from rust scales, re-setting & greasing the bearings using graphite grease including cost of materials, labour etc., complete.
7. POT PTF Bearings greasing and maintaining (sand plastering).
8. Elastomeric Bearings and maintaining.
9. Cutting of groove of 15 mm x 15 mm along crack and sealing the same with epoxy putty including cost of material, labour etc.
10. Carrying out 50 to 60 mm thick shortsheeting using a mix proportion of 1:2:2 (cement: sand:6 mm down aggregate) added with Polypropylene fibers at a dosage rate of 125 gms/bag of cement including cost of labour, material, scaffolding, equipment etc complete.
11. Repair of Floor Aprons, pitching and other protection works
12. Cleaning of Drainage Spouts
13. M-25 Concrete

❖ **Incident Management Cost**

Incident Management & Safety items include the following:

- ✓ ATMS control room operations,
- ✓ Regular patrolling & reaching accident/incident site,
- ✓ providing relief to injured persons including taking them to nearest hospital and attending to the safety requirements at the location (putting cones, safely guide & manage the traffic using signs, safety barricades, etc.),
- ✓ removal of accident /breakdown vehicles, removing of dead animals/birds lying on the highway and loading, unloading, transportation & disposal of surplus material left over by accidental vehicle or otherwise lying on road (on carriageway) and
- ✓ Encroachment prevention & removal with all lead & lifts complete with proper communication equipment,
- ✓ consumables, materials, suitable Towing vehicles, Ambulance, patrolling vehicles and manpower like drivers, helpers, para-medical staff, labour including deployment of crane and all works shall be done as per requirement and as directed by Client representative and as per Relevant Specifications as applicable.

7.4 OPERATIONS COSTS

Cost towards Operations include the following:

- Electricity Bill of lighting
- ATMS & Toll Plaza Operation cost
- Operation and management costs of rest areas and lay byes
- SPV Costs
- Survey Costs
- Insurance
- Audit Charges
- IE Fee
- Administrative Cost

Referring to Schedule-C, clause 2.15 of CA, provision have been made for implementation of the Highway Traffic Management Systems (HTMS) covering for the entire Project Highway when Traffic will exceed 40,000 PCU. Based on the average PCU volumes from both toll plazas, the HTMS requirement is anticipated to arise by FY2031

Following table presents the summary of Operations & Maintenance cost for the project

Table 43: 1st Year O&M Cost, FY2026

S No	Description	Amount in Crs.	GST %	GST Amt	Total Crore	Amount in Crs.	GST %	GST Amt	Total Crore
	SPV - Expenditure	**From FY2032**				**FY2026 to FY2031**			
1	SPV staff	3.24	0%	-	3.24	3.24	0%	-	3.24
2	Highway lighting	2.96	0%	-	2.96	2.90	0%	-	2.90
3	Tolling and ATMS AMC/ Spare Parts	0.27	18%	0.05	0.32	0.15	18%	0.03	0.17
4	Surveys & Investigations (BBD, Roughness)	0.16	18%	0.03	0.19	0.16	18%	0.03	0.19
5	IE fees	0.54	18%	0.10	0.64	0.54	18%	0.10	0.64
6	Insurance Charges	0.86	18%	0.15	1.02	0.86	18%	0.15	1.02
7	Professional Charges (Audit, legal etc.)	0.10	18%	0.02	0.12	0.10	18%	0.02	0.12
8	Admin cost - Board Meeting Expenses, valuation etc.	0.14	18%	0.03	0.17	0.14	18%	0.03	0.17
	Agency - Expenditure			-	-				
9	Toll Operation - Agency	3.85	18%	0.69	4.55	3.85	18%	0.69	4.55
10	Route patrolling	3.34	18%	0.60	3.94	3.34	18%	0.60	3.94
11	TAP & MAP	0.00	18%	-	-	0.00	18%	-	-
12	Routine maintenance	5.36	18%	0.97	6.33	5.36	18%	0.97	6.33
13	Repair of Road - Boq Items	4.88	18%	0.88	5.76	4.88	18%	0.88	5.76
14	Repair of Structures	0.21	18%	0.04	0.25	0.21	18%	0.04	0.25
	Total Amount in CRs	**25.93**		**3.55**	**29.47**	**25.73**		**3.53**	**29.26**

Note:

1. The amount is Crores inclusive of GST (18%) and without escalation, considering FY2026 rates
2. Except for lighting and ATMS, O&M costs for FY2032 onwards are treated the same as those up to FY2031.

Further, O&M Cost has been escalated with 5% and the projected Y-O-Y cost is as presented below:

Year (FY)	Total O&M Including GST
2026	29.26
2027	30.72
2028	32.26
2029	33.87
2030	35.57
2031	37.34
2032	39.50
2033	41.47
2034	43.55
2035	45.72
2036	48.01
2037	50.41
2038	52.93
2039	55.58
2040	58.36
2041	61.28
2042	64.34
2043	67.56
2044	70.93

Note: The Above numbers including GST and escalation

7.5 PERIODIC MAINTENANCE COSTS

Cost towards major maintenance include following:

- ✓ Cost of Periodic maintenance of Pavement based on Finalized MM schedule
- ✓ Cost of Periodic Maintenance of Structures
- ✓ Cost of Periodic replacement of ATMS & Toll Equipment's & Software

Referring to Schedule-C, clause 2.15 of CA, provision have been made for implementation of the Highway Traffic Management Systems (HTMS) covering for the entire Project Highway when Traffic will exceed 40,000 PCU. Based on the average PCU volumes from both toll plazas, the HTMS requirement is anticipated to arise by FY2031. Accordingly, 100% of the HTMS cost is accounted in this year.

As suggested by Client, periodic maintenance cost has been projected with 2% escalation.

Table 44: Periodic Maintenance Costs in Crores

S. No	Financial Year (FY)	Periodic Maintenance				
		Functional +Structural overlay MCW+ S/R	Major Maintenance of Rigid Pavement	Replacement of **ATMS**	Replacement of **TMS**	Structure specified repairs
1	2026	-	-			-
2	2027	-	-			-
3	2028	-	-			-
4	2029	-	-			-
5	2030	-	-			-
6	2031	34.38	1.19	13.77	2.58	3.73
7	2032	96.25	-			-
8	2033	53.04	-			-
9	2034	-	-			-
10	2035	1.92	-			-
11	2036	-	-			0.47
12	2037	22.12	-			-
13	2038	118.74	1.37	4.75	2.96	6.72
14	2039	60.64	-			-
15	2040	-	-			-
16	2041	1.48	-			0.52
17	2042	0.70	-			-
18	2043	18.87	-			-
19	2044	138.94	1.54	7.13	3.33	6.41
	Total:	**547.08**	**4.10**	**25.65**	**8.87**	**17.85**

Note: The amount is Crores inclusive of GST (18%) and with 2%escalation, considering FY2026 rates

- The project corridor has 4-lane divided carriageway with Flexible pavement with an overall length of 145 km.
- There are 2 Toll Plazas provided within the Project Stretch.
- The O&M requirements related to the Project based on Schedules and Manuals are as follows:

Applicable Manual	Applicable Schedule for O&M	Maximum Roughness Allowed	Minimum Thickness of Mandatory Overlay	Frequency of Roughness Test	Frequency of BBD Test	Remarks
IRC: SP:84-2009	Schedule-K and Manual	2500 mm/Km	-	2 Times in a Year	Once in a 5-Years	Overlay Design shall be done as per IRC:81

- From the axle load analysis, slightly higher VDF-values are observed in the RHS when compare to LHS.
- The Project Road has excellent riding quality (UI<2000 mm/km) based on analysis of Roughness data with combined both directions. However, the threshold limit should not exceed 2500mm/km.
- Based on pavement condition, entire length of the project road is rated as excellent to good.
- From FWD analysis, no overlay is warranted as remaining life is more than Target Traffic.
- The following MMR cycle are considered during the concession period

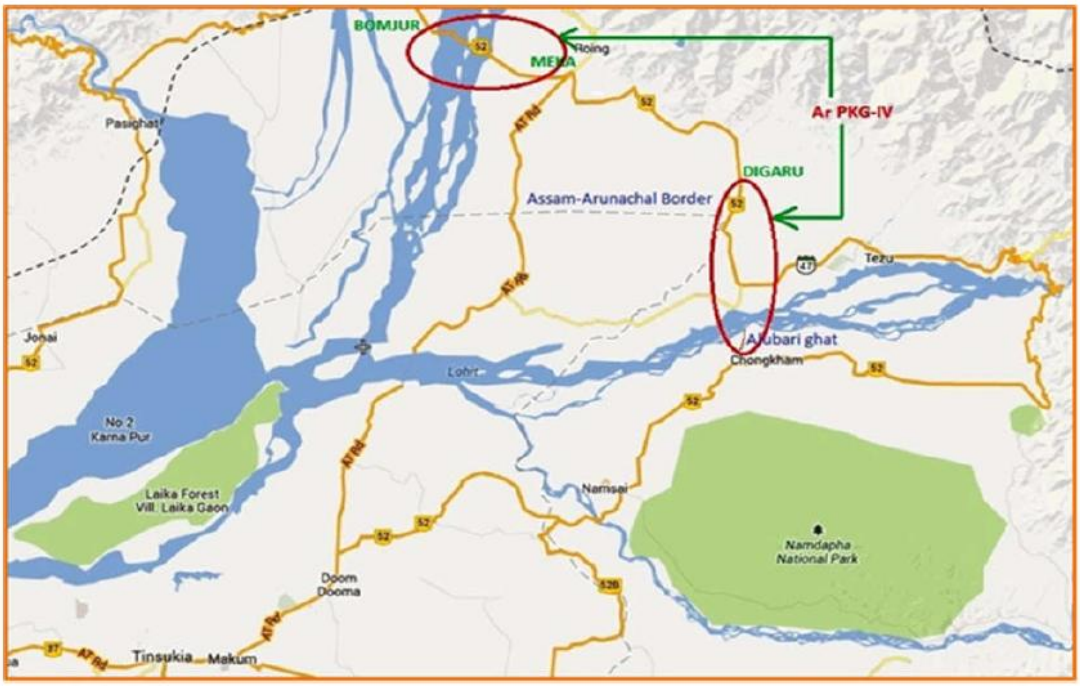
		LHS: length in mts							RHS: length in mts					
Cycle	Base year	1st		2nd		3rd			1st		2nd		3rd	
Planned in Financial Year	***2026***	***FY 2031***	***FY 2032***	***FY 2037***	***FY 2038***	***FY 2043***	***FY 2044***		***FY 2032***	***FY 2033***	***FY 2038***	***FY 2039***	***FY 2043***	***FY 2044***
Milling required for BC?		***No***	***No***	***Yes***	***Yes***	***No***	***No***		***No***	***No***	***Yes***	***Yes***	***No***	***No***
BC with VG40 – 50 mm														
BC with VG40 – 40 mm		29824	38887	29824					29824		29824			
BC with VG40 – 30 mm			75925		114812	29824	114812			114812		114812		
DBM with VG40 – 50 mm			1898		2870									

- There is no immediate repair cost envisaged in this project as the Concessionaire is undertaking the rehabilitation works at site.
- In the Costing, the amount considered is Crores inclusive of GST (18%) considering FY2026 rates

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TECHNICAL REPORT



Construction of bridges across Dibang River system and connecting road between Bomjur - Meka covering length of 18.950 km & construction of bridge across river Lohit at Alubari Ghat and connecting road between Chowkham-Digaru covering a length of 12.00 km in Arunachal Pradesh (total 30.950 km) on built, operate and transfer ("BOT") basis under Arunachal Pradesh Package of Road and Highways

SAMARTH INFRAENGG Technocrats Private Limited

SAMARTH
committed competence

SEPTEMBER 2025

(A Portfolio Company of Watrak Infrastructure Private Limited)

TECHNICAL REPORT



Construction of 12.9m width bridge between Dhola and Sadia ghats along with 2 lane connect-ing roads from near about Dhola to Islampur Tinali in Assam (Approx. 25.8 km) on built, operate and transfer ("BOT") Annuity basis under Arunachal Pradesh package of Road and Highways

SAMARTH INFRAENGG Technocrats Private Limited

September 2025

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LIST OF ABBREVIATIONS AND SYMBOLS

AADT	-Average Annual Daily Traffic
AE	-Authority Engineer
AMC	-Annual Maintenance Contract
ATMS	-Advanced Traffic Management System
BBD	-Benkelman Beam Deflection
BC	-Bituminous Concrete
BHS	-Both Hand Side
BOQ	-Bill of Quantities
BOT	-Build, Operate & Transfer
CA	-Concession Agreement
CBR	-California Bearing Ratio
CCB	-Concrete Crash Barrier
CCR	-Cement Concrete Railing
COD	-Commercial Operation Date
COS	-Change of scope
CPI	-Consumer Price Index
CUP	-Cattle Under pass
CVC	-Classified Volume Count
CVPD	-Commercial Vehicles per Day
DBM	-Dense Bituminous Concrete
DPR	-Detailed Project Report
ECB	-Emergency Call Box
EPC	-Engineering, Procurement and Construction
ESI	- Employees' State Insurance
FDD	-Filed Dry Density
FOB	-Foot Over Bridge
FRL	-Finished Road Level
FSI	-Free Swell Index
FWD	-Falling Weight Deflectometer
FY	-Financial Year
GOI	- Government of India
GR	-Growth Rates
GS	-Grade Separated
GSB	-Granular Sub Base
GST	-Goods and Services Tax
HCPT	-Half cell Potential Test

HPC	-Hume Pipe Culvert
HR	- Human Resources
HTMS	-Highway Traffic Management Systems
IE	-Independent Engineer
IRC	- Indian Roads Congress
IRC SP	- Indian Roads Congress Special Publications
IRI	-International Roughness Index
Km	-kilometer
LHS	-Left Hand Side
LL	-Liquid Limit
LS	-Lumpsum
m	-Meter
MAP	-Medical Aid Post
MBIU	-Mobile Bridge Inspection Unit
MCB	-Metal Beam Crash Barrier
MCS	-Micro Surfacing
MCW	-Main Carriageway
MDD	-Maximum Dry Density
MHR	-Metallic Hand Rail
MJB	-Major Bridge
mm	-Millimeter
MM	-Major Maintenance
MNB	-Minor Bridge
MoRTH	- Ministry of Road Transport & Highways
Mpa	-Mega Pascal
MR	-Resilient Modulus
MSA	-Million Standard Axle
NDT	-Non-Destructive Testing
NHAI	- National Highways Authority of India
NSV	-Network survey Vehicle
O&M	- Operation and Maintenance
OL	-Overlay
PCOD	-Provisional Completion
PF	-Provident Fund
PGR	-Pedestrian Guard Rail
PI	-Plasticity Index
PL	-Plastic Limit
PM	-Periodic Maintenance
PUP	-Pedestrian Under pass
R&R	-Repair and Rehabilitation
RCC	-Reinforced Cement Concrete

RE Wall	-Reinforced Earth Wall
RHS	-Right Hand Side
RHT	-Rebound Hammer Test
RM	-Routine Maintenance
ROB	-Road Over Bridge
RPO	-Route Patrol Officer
RUB	-Road Under Bridge
SDBC	-Semi-Dense Bituminous Concrete
SPV	-Special Purpose Vehicle
SR	-Service Road
SWB	-Static Weigh Bridge
TAP	-Traffic Aid Post
TCS	-Typical cross Section
TDRT	-Transient Dynamic Response test
TMS	-Toll Management System
UI	-Unevenness Index
UPVT	-Ultra Pulse Velocity test
VDF	-Vehicle Damage Factor
VG	-Viscosity Grade
VUP	-Vehicular Under pass
WBM	-Water Bound Macadam
WMM	-Wet Mix Macadam
WPI	-Wholesale Price Index

CHAPTER 1. INTRODUCTION

1.1 INTRODUCTION

The Govt. of India (GOI) through Ministry of Road Transport & highways (**MoRTH**) resolved to Construct 12.9m wide bridge between Dhola and Sadia Ghats along with 2 lane connecting roads from near Dhola to Islampur Tinali in Assam (28.511 Km) from km 0+000 (existing km16+540) to km 28+511 (existing km 45+051) section of NH-37 (New NH-115) under Arunachal Pradesh Package of Roads and Highways on Built Operate and transfer (BOT) Annuity basis.

Accordingly, Authority invited the proposals and awarded the works to **M/s Navayuga Dhola Infra Projects Pvt Ltd**. Authority and M/s Navayuga Dhola Infra Projects Pvt Ltd entered into the Concession Agreement by signing the contract on 3rd November 2010.

IE has issued PCOD on dated 16th March 2018 with **effective date of PCOD as 31st August 2017** and completion certificate received on dated 16th August 2019 with **effective date of Completion certificate as 13th October 2018**.

In June 2020, M/s Navayuga Dhola Infra Projects Pvt Ltd (DIPPL) was acquired by M/s Sekura Roads Pvt. Ltd., a portfolio company of EPIC 3, and was subsequently transferred to EPIC Concessions Private Limited. This acquisition was facilitated through an Alternate Investment Fund managed by EAAA India Alternatives Limited (EAAA), formerly known as Edelweiss Alternative Asset Advisors Limited.

We understand that EAAA TransInfra Managers Limited is the Investment Manager, Chennai -Tada Tollway Private Limited ("CTTPL") is the proposed Project Manager and Watrak Infrastructure Private Limited ("WIPL") is the sponsor of the Citius TransNet Investment Trust ("Trust" or "InvIT") and M/s Dhola Infra Projects Pvt Ltd (“DIPPL”) is proposed to be part of the initial portfolio assets of the Trust. The Trust was incorporated on 1st August 2025 with Securities and Exchange Board of India (“SEBI”) as an infrastructure investment trust under the SEBI InVIT Regulations.

M/s Watrak Infrastructure Private Limited (hereinafter “the Client”) as sponsor has appointed M/s Samarth Infraengg Technocrats Pvt Ltd (hereinafter referred as “Technical Consultant”) to carry out Technical Due Diligence of operational asset of “Construct 12.9m wide bridge between Dhola and Sadia Ghats along with 2 lane connecting roads from near Dhola to Islampur Tinali in Assam (28.511 Km) from km 0+000 (existing km16+540) to km 28+511 (existing km 45+051) section of NH-37 (New NH-115) under Arunachal Pradesh Package of Roads and Highways on Built Operate and transfer (BOT) Annuity basis (herein after refer as “the Project”) which is being operated by “M/s Dhola Infra Projects Pvt Ltd (“DIPPL") (hereinafter refer as “the Concessionaire or Company or “DIPPL”).

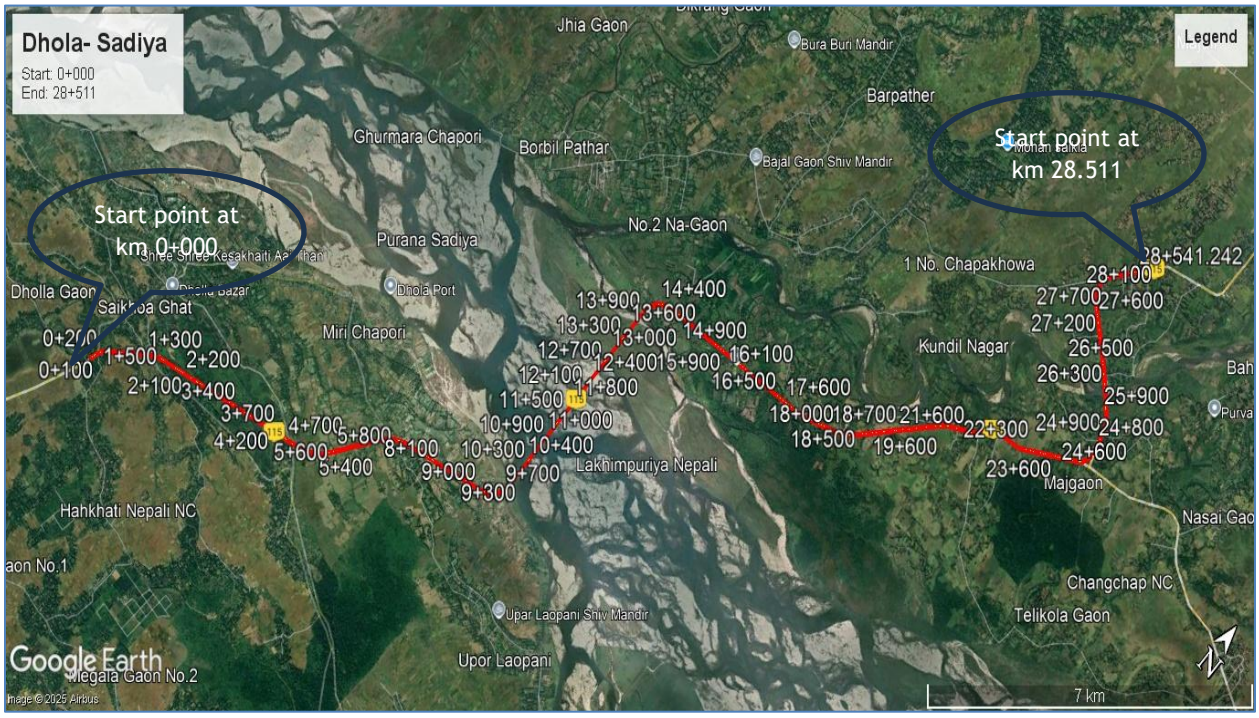
The details of the Road asset (“Project Highway”) are as follows:

S. No	Project Description	Length (Km)
1	Construction of 12.9 m wide bridge between Dhola and Sadia ghats along with 2 lane connecting roads from near about Dhola to Islampur Tinali in assam on BOT basis under Arunachal Pradesh package of Roads and Highways. - **Dhola**	28.511
2	Construction of bridges across Dibang river system and connecting road between Bomjur-Meka (NH 52) covering length of 18.95 km and construct bridge across river Lohit at alubari ghat and connecting road between Chowkham Digaru covering length of 12 km in Arunachal Pradesh on BOT basis under Arunachal Pradesh package of Roads and Highways- **Dibang**	29.635
3	Four Laning of Maharashtra/Karnataka Border - Sangareddy section of NH9 (from KM 348.800 to Km 493.000) in the states of Karnataka and Andhra Pradesh to be executed as BOT (Toll project) on DBFOT pattern under NHDP phase IV B.- **DTL**	144.950
4	Four Laning of Jorbat Shillong of NH 40 from Km 0 to Km 61.8 in the state of Assam and Meghalaya on DBFOT Pattern under SARDP NE on BOT Basis. – **JSEL**	61.800
5	Four Laning of paved shoulders of Sambalpur- Rourkela section of SH-10 from Km 4.900 to 167.900 in the state of Odisha to be executed as BOT (toll) project on DBFOT pattern- **SRTL**	161.730

This report deals with the "*Construction of 12.9 m wide bridge between Dhola and Sadia ghats along with 2 lane connecting roads from near about Dhola to islampur tinali in Assam on BOT basis under Arunachal Pradesh package of Roads and Highways - **Dhola***".

1.2 PROJECT AT A GLANCE

The National Highway 115 (old NH-37), starts at Doom Dooma in Assam and Ends at Roing in Arunachal Pradesh.



Map Showing the Project Corridor

The CA and actual existing chainages at site, for the start and the end points are as follows.

Table 1: Project Corridor Chainage System

Referencing system	Project Corridor Start Point (km)	Project Corridor End Point (km)	Length (km)
Design Chainage	0.000	28.511	28.511
Existing Chainage	16.540	45.051	28.511

Photograph showing the start and end point of the project road are presented below



Start Point of Project Road at km 0.000



End Point of Project Road at km 28.511

Following Table highlights the total project at a glance:

Table 2: Project Details

S No.	Description	Remarks
1.	Employer	Ministry of Road Transport & Highways
2.	Concessionaire	Dhola Infra Projects Pvt Ltd *(Formerly known as Dhola Infra Projects Limited)*
3.	NH-No	Old NH-37 (New NH-115)
4.	Mode of the Project	BOT- Annuity
5.	Length of the Project as per CA	28.511 km
6.	Total Project Cost	Rs 876 Crores
7.	Date of Signing the Concession Agreement	03.11.2010
8.	Appointed Date	17.06.2011
9.	Scheduled Project completion	1640 Days (4 ½ Yrs) from Appointed date i.e., 13.12.2015
10.	EOT granted till (746 days)	31.12.2017

S No.	Description	Remarks
11.	Date of issue of Provisional Completion Certificate	31.08.2017
12.	Date of Issue of Final Completion Certificate	13.10.2018
13.	O&M period as per CA	12 ½ years after Schedule Completion
14.	Scheduled End of Concession (17 years from Appointed Date including construction period)	17 years from Appointed date i.e., 17.06.2028 As per MPR: 28.02.2030

Note: a) Total no of Annuities: 25 nos.; b) Annuity Amount: 55.90 Cr; c) 1st /Last Annuity: 28.02.2018/28.02.2030

1.3 DATA COLLECTION AND REVIEW

In brief, following were covered

- ✓ Review of CA and Technical Schedules
- ✓ Review of Concessionaire's MPR's (latest available is Mar-2025)
- ✓ Review of latest Correspondence made available
- ✓ Review of Pavement Design Report.

1.4 REVIEW OF O&M REQUIREMENTS

The O&M requirements related to the Project based on Schedules and Manuals are as follows:

Applicable Manual	Applicable Schedule for O&M	Maximum Roughness Allowed	Minimum Thickness of Mandatory Overlay	Frequency of Roughness Test	Frequency of BBD Test	Remarks
IRC: SP:73-2007	Schedule-K and Manual	2500 mm/Km	-	2 Times in a Year	Once in a 5-Years	Overlay Design shall be done as per IRC:81

From the above table it is clear that the applicable method for overlay design is BBD (Overlay Design shall be done as per IRC: 81). Though BBD is applicable, considering the advantages of FWD Technique compared to BBD Technique, presently overlay assessment has been done by using FWD Technique but when it is required to assess the overlay in due course of time after acquiring the project the same can be done using BBD Technique for submission to IE/Authority.

- No specific Handing Over (Divestment) requirements are mentioned under CA. Clause 7 of Schedule K specifies that, all defects and deficiencies specified in this schedule-K shall be repaired and rectified by the Concessionaire.

1.5 REVIEW OF PAVEMENT DESIGN

❖ **VDF:**

Axle load survey is not carried out for this project as there is no direct traffic. Vehicle damage factor can be considered from the IRC guide lines as mentioned below:

As per clause 3.3.4.4 of IRC:37: 2001, Where sufficient information on axle loads is not available and the project size does not warrant conducting an axle load survey, the indicative values of vehicle damage factor as given in below table may be used.

Initial traffic volume in terms of numbers of commercial vehicles per day	Terrain	
	Rolling / Plain	Hilly
0-150	1.5	0.5
150 – 1500	3.5	1.5
More Than 1500	4.5	2.5

❖ **Main Carriageway:**

For the new pavement, the total thickness required for a subgrade CBR of 7% is found out from design curve of IRC: 37:2001 to be 585 mm and its composition in conformity with the combination block is given below in table

Pavement Design thickness (suggested):

Layer	Thickness (mm)	Remarks
BC	40 mm	10 years Design Period & 11 MSA Traffic
DBM	65 mm	10 years Design Period & 11 MSA Traffic
Base (WMM)	250 mm	15 years Design Period & 20 MSA Traffic
Granular sub base	230 mm	15 years Design Period & 20 MSA Traffic

As per MORTH Clause 401.4.2, Compacted GSB in single layer up to 225mm thickness shall be done. With reference to the above clause, GSB thickness is adopted as 225mm and remaining 5mm thickness (i.e. 230mm – 225mm) is compensating with WMM layer which is stronger layer. With the above criteria adopted pavement design is presented below table which is on conservative side.

Adopted Pavement Design

Layer	Thickness (mm)	Reference Codes
BC	40 mm	IRC: 37-2001
DBM	65 mm	IRC: 37-2001
Base (WMM)	255 mm	WMM conforming to clause 406 of MOSRTH Specifications and IRC: 109.
Granular sub base	225 mm	Granular sub-base conforming to clause 401 of MOSRTH Specifications. Granular sub-base material shall have minimum soaked CBR value of 30%.

CHAPTER 2. SURVEYS AND INVESTIGATIONS

2.1 INTRODUCTION

The main objective of undertaking Surveys and Investigations is to appreciate the existing engineering features along the project corridor and to understand the present condition of the various elements of the project road and to prepare required inputs for various rehabilitation and maintenance strategies.

Following Survey and Investigations have been undertaken as a part of study with an objective to understand the present condition of the road and there by access the quality of construction and as well to prepare requisite rehabilitation/corrective designs where necessary.

- Road Inventory Surveys
- Pavement Condition using NSV
- FWD Surveys
- Roughness Surveys using NSV
- Pavement Composition surveys (Test Pits)
- Subgrade Investigations & Laboratory testing
- Material Investigations
- Core Sample surveys
- Axle Load Survey (Not done)
- Structure Inventory and Condition Surveys

These surveys have been conducted in the month of May 2025.

2.2 ROAD INVENTORY

The project corridor comprises a 2-lane flexible pavement carriageway with a width of 7.0 meters, flanked by 1.5-meter paved shoulders and 1.0 to 1.5-meter earthen shoulders on either side. Of the total 28.511 km project length, a major bridge spanning 9.15 km including viaduct portion on both north/south banks is constructed across the Brahmaputra river.

The project corridor generally traverses through plain terrain towards Dhola side, whereas rolling terrain towards Sadia side. The land use along the project road is mostly Agricultural. It passes through small villages like Beshoni, Mukh, Laopani, Saikhowa, Kundil, Morkel, Boiragi Moth Dangar Bill.

In general, majority of the length passes through high embankments >3m height.

Typical View of Project Road is shown below:



A view of the Project Corridor at Km 4.870



Project Corridor with 10m carriageway at Km 6.800



10.5m carriageway at Km 16.400



10m carriageway at Km 21.900

The Project Road has both major junctions and minor junctions along its length. Photographs showing the junctions are presented below:



Major Junction at km 0.200 LHS



Major Junction at km 27.830 LHS



Minor Junction at km 4.730 LHS



Minor Junction at km 24.570 RHS

Single arm lighting is provided at main bridge location on either side on the carriageway in 20m staggered interval including its approaches. Whereas, single arm solar lighting is provided at Junction locations. Few photos showing highway lighting are presented below:



A view of Single arm lighting at km 15.000 RHS



A view of Single arm Lighting at km 16.350 LHS



A view of Solar lightning at Km 24.260 RHS



A view of Solar lightning at Km 27.830 LHS

The collected Road Inventory Data is presented in **Appendix 1** of this Report

2.3 PAVEMENT CONDITION SURVEYS

The Pavement Condition Data collected through Network Survey Vehicle (NSV) surveys for the main carriageway is presented in **Appendix 2** of this report. The data has been captured at 10-meter intervals in both directions.

It is noted that entire stretch is recently overlaid, except on deck slab of main bridge, as such there are no visible distresses observed. Road marking was in progress during the site visit.

The photographs showing the pavement condition of the Project Road is presented below.

		
Fair Condition at Km 0.180 LHS	**Fair condition 5.460 RHS**	**Fair condition 11.700 RHS**
		
Fair condition 17.460	**Fair condition 22.460**	**Fair condition 26.460**

2.4 FALLING WEIGHT DEFLECTOMETER (FWD) SURVEYS

In order to evaluate the structural strength of the existing pavement, Falling Weight Deflectometer (FWD) survey has been carried out along the project road in Main carriageway in line with IRC: 115-2014.

- ✓ Prior to the start the surveys, Load repeatability tests are performed on each day
- ✓ The target Peak Load of 40 KN (+/- 4 KN) is maintained during survey.
- ✓ At Regular intervals of time Pavement temperature is noted.
- ✓ For every 1 Km of stretch 10 test Points (5 pts- LHS,5 pts-RHS) were taken on Main Carriageway in each direction.
- ✓ Temperature correction equation is applied for back calculated modulus of BT and no seasonal correction factor is applied for the back calculated modulus of granular and Subgrade considering the Monsoon Season (May Month).

The collected FWD Data and Analysis is presented in **Appendix 3** of this Report.

Few photos taken during the progress of FWD Surveys are presented below:



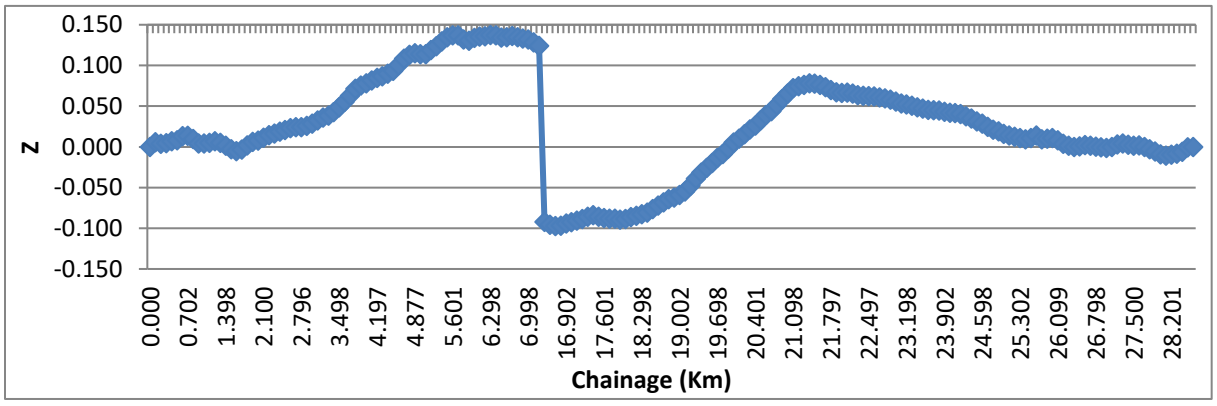
Deflection Measurement in progress



Deflection Measurement in progress

Cumulative Difference Approach (CDA) has been used for the identification of homogeneous sections on the basis of Surface Curvature Index (SCI). SCI is calculated as the difference between D_0 and D_{300}, where D_0 and D_{300} are the peak deflections (mm) measured at the center of loading plate and at a radial distance of 300mm for combined both direction traffic.

For the project stretch, homogeneous sections have been identified by combining the Left-Hand Side (LHS) and Right-Hand Side (RHS) directions, referred to collectively as Both Directions (BHS). These sections are presented in graphical representation, followed by the table below.



Delineation of Homogeneous Sections - BHS, Main Carriageway

Table 3: FWD Data - Homogenous Sections of Main Carriageway - BHS

Homo Sections	From (Km)	To (Km)	Length (Km)	Remarks
1	0.000	1.601	1.60	
2	1.601	4.497	2.90	
3	4.497	7.290	2.79	
4	7.290	16.450	9.16	MJB
5	16.450	17.698	1.25	
6	17.698	19.002	1.30	
7	19.002	20.202	1.20	
8	20.202	22.700	2.50	
9	22.700	24.000	1.30	
10	24.000	25.397	1.40	
11	25.397	27.004	1.61	
12	27.004	28.511	1.51	
Total length			**28.511**	

2.5 ROUGHNESS SURVEYS

The Roughness data has been collected using Network Survey Vehicle and analyzed in terms of International Roughness Index (IRI), considering both directions. Pavement Roughness data collection and computation of IRI for each km length is presented in **Appendix 4** of this Report.

Roughness data has been collected for Main carriageway.

Schedule K of CA specifies that Roughness values exceeding 2500 mm/km in a Km length, needs to be corrected.

Km-wise roughness index obtained is as follows:

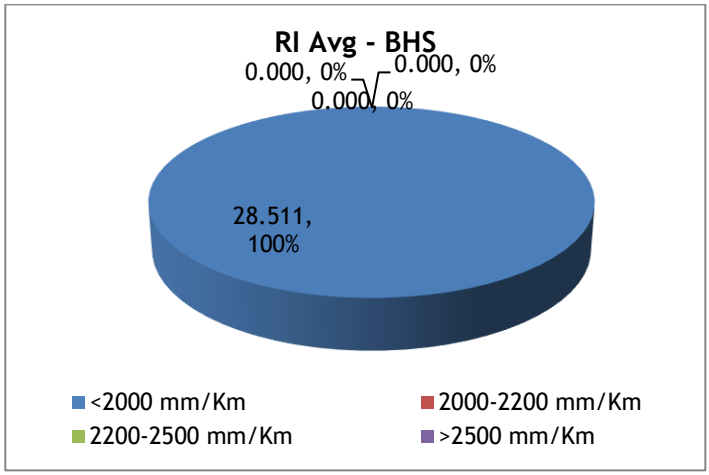
Chainage(km)		Length(km)	Roughness Index (mm/km)		
From	To		LHS	RHS	RI Average of LHS & RHS
0.000	1.000	1.000	1101	1203	1152
1.000	2.000	1.000	768	923	846
2.000	3.000	1.000	658	707	683
3.000	4.000	1.000	658	720	689
4.000	5.000	1.000	696	787	742
5.000	6.000	1.000	947	1030	989
6.000	7.000	1.000	652	758	705
7.000	8.000	1.000	1240	1229	1235
8.000	9.000	1.000	1323	1293	1308
9.000	10.000	1.000	1364	1385	1375
10.000	11.000	1.000	1147	1156	1152
11.000	12.000	1.000	1257	1265	1261
12.000	13.000	1.000	1200	1180	1190
13.000	14.000	1.000	1147	1215	1181
14.000	15.000	1.000	1241	1256	1248
15.000	16.000	1.000	1117	1279	1198
16.000	17.000	1.000	940	1001	970
17.000	18.000	1.000	660	715	687
18.000	19.000	1.000	715	767	741
19.000	20.000	1.000	799	667	733
20.000	21.000	1.000	796	889	842
21.000	22.000	1.000	710	728	719

Chainage(km)		Length(km)	Roughness Index (mm/km)		
From	To		LHS	RHS	RI Average of LHS & RHS
22.000	23.000	1.000	586	657	621
23.000	24.000	1.000	677	602	639
24.000	25.000	1.000	773	888	831
25.000	26.000	1.000	857	905	881
26.000	27.000	1.000	624	758	691
27.000	28.000	1.000	809	935	872
28.000	28.511	0.511	776	801	788

Note: The average roughness varying from 621 mm/km to 1375 mm/km

Average Roughness Index (RI) values along the corridor were grouped in to four categories i.e., RI<=2000mm/km-Excellent, <=2200mm/km-Good, <=2500mm/km-Fair and >2500mm/km-Poor

Pie chart showing the range of RI values in each carriageway of the project road have been presented below:



It can be seen from the above pie charts; Project Road has Excellent riding quality (RI<2000 mm/km) for the entire length in both directions, whereas the threshold limit for roughness should not exceed 2500mm/km.

2.6 PAVEMENT COMPOSITION SURVEYS (TEST PITS)

The composition of the existing pavement crust has been recorded from test pit surveys conducted at every 5 km intervals in staggered pattern across both carriageways. Thus, a total of 6 pits have been dug along the corridor on the Main Carriageway edge.

Table 4: Pavement Composition of Existing Pavement

S No	Test Pit Number	Design Chainage	Direction	BT (mm)	WMM (mm)	GSB (RBM) (mm)	Total (mm)
1	DS-TP-1	28+310	RHS	160	200	220	580

S No	Test Pit Number	Design Chainage	Direction	BT (mm)	WMM (mm)	GSB (RBM) (mm)	Total (mm)
2	DS-TP-2	24+810	LHS	135	160	160	455
3	DS-TP-3	20+980	RHS	160	200	170	530
4	DS-TP-4	17+310	LHS	150	200	250	600
5	DS-TP-5	6+040	RHS	170	150	150	470
6	DS-TP-6	0+280	LHS	140	250	250	640

Total average crust thickness of the MCW pavement is 545mm. Pavement is mainly composed of a BT layer, WMM & GSB base over subgrade.

2.7 MATERIAL INVESTIGATIONS

2.7.1 SUBGRADE INVESTIGATIONS & LABORATORY TESTING

Sub-grade Investigations have been carried out to examine the subgrade soil characteristics along the project road. A total number of 6 test pits have been carefully dug from the pavement surface up to sub-grade level. 6 out of 6 pits done on Main Carriage way edge. Field density tests have been conducted for subgrade samples and a small quantity of sample has also been collected in airtight containers for determining the field moisture content. Upon completion of the field density test, representative sample of sub-grade soil has been collected in bulk, in gunny bags, from each test pit for laboratory testing.

The soil samples collected have been tested for the following properties to assess the existing sub-grade soil properties.

- Sieve analysis
- Atterberg limits
- Heavy compaction
- Four (4) days soaked CBR as per IS standards at 97% of MDD as applicable for sub-grade (Heavy Compaction)
- Free swelling index

Photographs have been taken at all test pit locations depicting the crust thickness and nature of material in the pavement. Few photographs are presented below:



DS-TP-1



DS-TP-2



DS-TP-3



DS-TP-4



DS-TP-5



DS-TP-6

2.7.2 BORROW AREA

Potential borrow areas identified at 2 locations within the vicinity of the project corridor for sub-grade/ embankment within economic haulage leads have been identified. The sources identified as potential borrow sources along all the packages are shown in Table below and certain useful information such as distance from the project road, location, village name, etc., have also been presented in this table below.

Table 5: Borrow area Samples Details

S No	Borrow Area No	Chainage	Side	Offset	Village and contact person	Quantity	Rate	Remarks	Co-ordinates
1	DS-BP-1	23+810	RHS	37.4km	Village: Alubari River Bed Material	Plenty	only Royalty	-	27.838530 96.012061
2	DS-BP-2	28+150	Towards Roing	41.0km	River: Dibang (Devpani) River Bed Material	Plenty	only Royalty	-	28°08'33.3"N 95°41'05.3"E

Photos of the Borrow area samples is as follows.



DS-BP-1



DS-BP-2

2.7.3 AGGREGATE SAMPLES

Aggregates to be used for sub-base, base, surface courses and concrete works have been collected from the crushers under operation in the existing quarries. The locations, estimated quantity, basic cost of material and the approximate distance from each source to the nearest point on the project corridor are compiled in Tables below.

Table 6: Aggregate Samples Details

sample No.	Ex.Chainage (Km.)	Left/ Right	Name of Village	Name of Source/ Crusher	Lead from Nearest Ex.Chainage (Km.)	Approximate Quantity (ton)	Basic cost of the material (Rs.)	Remarks	Co-ordinate
DS-AQ-1	23+810	RHS	Alubari	Crusher - Arunachala shiva Stone Crusher Name: R K Charasi Mob no-6009246843	35.6km	Plenty	40mm-Rs 900/- per cu.m 20mm-Rs 1100/- per cu.m 10mm-Rs 1100/- Per cu.m 6mm-Rs 800/- Per cu.m Dust - Rs 200/- Per cu.m GSB - Rs 280/- Per cu.m	Extra Royalty Rs 200/- per Cu.m and GST 5%	27.844029 96.031209
DS-AQ-2	23+810	LHS	Alubari	Cusher - Namchoom Stone Crusher Name:Apsingh Namchoom Mob no-9101020081 (Raju ghane)	42.4 km	Plenty	40mm-Rs 1000/- per cu.m 20mm-Rs 1200/- per cu.m 10mm-Rs 1000/- Per cu.m 6mm-Rs 800/- Per cu.m Dust - Rs 300/- Per cu.m GSB - Rs 250/- Per cu.m	Extra Royalty Rs 200/- per Cu.m and GST 5%	27.818111 96.029681

Photos of the aggregate crushers samples is as follows.



DS-AQ-1



DS-AQ-2

2.7.4 SAND SAMPLES

Sand samples collected at 2 locations from river source and its details are as presented below.

Table 7: Sand Samples Details

Sample No.	Ex. Chainage (Km.)	Left/ Right	Name of Village	Name of Source/ Crusher	Lead from Nearest Ex. Chainage (Km.)	Approximate Quantity (ton)	Basic cost of the material (Rs.)	Remarks	Co-ordinate
DS-SQ-1	23+810	RHS	Alubari	River:Dibang (Devpani) Name: Apsingh Namchoom Mob no-9774499108	37.4 km	Plenty	River Sand - Rs 400/- Cu.m	Extra Royalty Rs 150/- per cum	27.818111 96.029681
DS-SQ-2	28+150	Towards Roing	Bomjir	River:Dibang (Devpani)	41 km	Plenty	Only Royalty	-	28°08'33.3"N 95°41'05.3"E



DS-SQ-1



DS-SQ-2

2.8 CORE CUTTING SAMPLES

The objective of the core cutting is to examining the engineering properties of the materials relevant to the project as per specifications. Accordingly, 7 Nos. of cores were taken carefully from the project corridor, in which on LHS(MCW): 4 Nos, on RHS(MCW) :3 Nos.

The Core samples collected from these identified locations have been tested for the following properties.

- Density of Core
- Theoretical Maximum Sp. gravity (GMM)
- Air voids
- Compaction

- Extraction and Gradation
- Gradation of Aggregates

The recorded details such as location, lane, condition, depth of core etc. for each core sample are presented below.

Table 8: Core Cutting Samples Details

S No	Core Id	Existing Chainage	Direction	Offset From Pavement Edge (mts)	Thickness (mm)	Hole Depth (mm)	Condition	Remark
1	DS-C-1	0+280	LHS	2.2m	120mm	120mm	Good	
2	DS-C-2	6+240	RHS	3.4m	115mm	120mm	Good	
3	DS-C-3	17+310	LHS	2.9m	130mm	130mm	Good	
4	DS-C-4	20+980	RHS	2.3m	155mm	160mm	Good	Cracks observed in old DBM Layer
5	DS-C-5	24+710	LHS	4.1m	145mm	145mm	Good	
6	DS-C-6	28+310	RHS	2.2m	135mm	135mm	Good	
7	DS-C-6(A)	28+310	LHS	2.3m	120mm	120mm	Good	

The sample photographs of cores are shown below.



DS-C-1



DS-C-2



DS-C-3



DS-C-4



DS-C-5



DS-C-6



DS-C-6A

2.9 AXLE LOAD SURVEYS

From the previous pavement evaluation study report, May 2023 the following VDF values are considered as below:

Table 9: VDF Values Estimated at, Design Chainage km22+500

Mode Type	LHS (Dhola - Sadiya)	RHS (Sadiya- Dhola)	Max VDF
LCV	0.88	0.34	0.88
2 Axle Truck	1.67	24.36	24.36
3 Axle Truck	1.01	33.51	33.51
MAV (4-6 Axle)	5.68	21.93	21.93
Buses	0.59	0.65	0.65

The higher values are observed in the RHS when compare to LHS are due the aggregate/ construction material is being carried from Lohith dist., Arunachal Pradesh towards Assam.

CHAPTER 3. VALIDATION OF EXECUTED WORKS

3.1 ROAD WORKS

The project road has been closely inspected to verify the executed works on ground. The scope works to be executed by the Concessionaire/Contractor as envisaged in CA is compared with the executed work on the ground. Each structure has been inspected to note down its structural configuration and condition. The following table highlights the scope comparison of the executed works on ground.

Table 10: Scope Comparison of Executed works

S. No.	Particulars	Length/ Nos	As per Site	As per Sch-B
1	**Start Chainage (Km)**	Km	16.590	0.000
2	**End Chainage (Km)**	Km	45.101	25.800
3	Length of the Project Corridor	Kms	28.511	25.8
4	Length of Service Road	kms	-	-
5	No of Bypasses and its length	No/km	-	-
	Structures			
1	Flyovers	Nos	-	-
2	ROB	Nos	-	-
3	VUP	Nos	-	-
4	LVUPs/PUPs	Nos	-	-
5	Major Bridges	Nos	2	4
6	Minor Bridges	Nos	2	
7	Culverts (Pipe)	Nos	23	6
8	Culvert (Box)	Nos	3	
	Junctions			
1	Major Junctions	Nos	3	
	Safety/Protection Works			
1	Stone Pitching	Sqm	43,760	
2	Geo Grids/ Green Blanketing	Kms	34.68	
3	Partial RE Wall with Stone Pitching	Kms	0.23	
	Drainage/Utility works			
1	Chutes	Nos	408	
	Project facilities /Road Furniture			
1	Toll Plaza	Nos	NIL	
2	Wayside Amenities	Nos	NIL	
3	O&M centre	Nos	NIL	
4	Route Patrolling Vehicle	Nos	2	
5	Ambulance	Nos	1	
6	Cranes	Nos	1	
7	Towing Vehicle	Nos	1	
8	Busbay with shelter	Nos	-	
9	Truck laybys	Nos	-	
	Highway Lighting			
1	Highway Lighting (length only)	Kms	20.18	
2	Single Arm Lightings poles	Nos	521	
3	Solar Blinkers	Nos	2	
4	Solar Lights with Panel	Nos	16	
	Road Furniture			
1	Road Markings	Kms	28.511	

S. No.	Particulars	Length/ Nos	As per Site	As per Sch-B
2	Delineators	Nos	151	
3	Kilometer Stones	Nos	32	
4	Hectometer Stones	Nos	77	
5	5th Km Stone	Nos	6	
	Safety Barriers			
1	Single Face W-Beam Safety Barriers	Kms	29.014	
2	Rigid Concrete Barriers	Kms	18.680	
3	Concrete Railing	Kms	0.380	
4	Hand Railing on Crash Barriers	Kms	18.680	
	Road Signs			
1	Road Signs	Nos	585	
2	2-Lane Gantry Sign Boards	Nos	2	

The project corridor appears to have been constructed with the cross-sectional elements matching to those given in the manual at the time of execution. The carriageway width of 7.0m plus paved shoulders of 1.5m has been provided throughout the entire length except at structures locations.

Slope protection in the form of RCC walls + stone pitching/ turfing/pitching are found at approaches major bridges and High embankment locations. The summary of slope protection is presented below and the details are presented in **Appendix-5** of this report.

Table 11: Summary of Slope Protection along Project Road

Approach Type	LHS (Kms)	RHS (Kms)	Length (Kms)
Grass turfing	17.87	16.81	**34.68**
Stone Pitching	0.97	2.94	**3.91**
RCC wall with Stone pitching	0.23	-	**0.23**
Length (km)			**38.82**

The Project Road has 3 Major Junctions. The details of these locations are provided in Road items, **Appendix 5** of this Report.

Safety barriers in the form of MBCB, concrete barriers (CCB) etc. are installed along the project road at high embankments and at curve locations. The details of these locations are provided in Road items, **Appendix 5** of this Report. The table below shows the overall summary of Safety Barriers:

Table 12: Summary of Safety Barrier Locations

Summary	MBCB (Km)	Hand Rail on CCB (Km)	CCB (Km)	CHR (Km)	Delineators (km)
As per Site (Kms)	29.014	18.680	18.680	0.380	151
Damaged (Kms)	-	-	-	-	-

Road furniture in the form of Signs/Markings, Gantry signs and traffic safety blinkers, lighting, have been provided along the project road and the details presented in the **Appendix-5** of this Report. The summary of the same is presented in the Tables below:

Table 13: Locations of Highway Lightings

Summary	Nos	Remarks
No of Single-arm Poles as per Site	521	With LED Bulbs
Solar Lights	16	With LED Bulbs
Solar Blinker	2	

Table 14: Summary of Road Signs along Project Road

Summary of Road Signs							Total
Description	LHS	RHS	Junctions	Total	Missing	Damage	Poor
Unit	Nos	Nos	Nos	Nos	Nos	Nos	Nos
Overhead Gantry	2	-	-	2	-	-	-
Cantilever Gantry	-	-	-	-	-	-	-
Toll Boards	-	-	-	-	-	-	-
ADS/RAS	-	-	-	-	-	-	-
Rectangular	17	14	3	34	-	-	-
Triangular	64	61	11	136	-	-	-
Circular	32	38	1	71	-	-	-
Octagonal	3	4	17	24	-	-	-
Flag Type	20	17	-	37	-	-	-
Chevron	127	114	-	241	-	-	-
Hazard	11	7	10	28	-	-	-
Route marker	6	8	-	-	-	-	-
Total	**282**	**263**	**42**	**587**	-	-	-

An Incident Management System (IMS) has been implemented along the project stretch to ensure timely detection, reporting, and resolution of any unforeseen events or emergencies. The details of the Incident Management System established for the project corridor are presented below.

Table 15: Summary of Incident Management Equipment

S. No	Item/Particulars	Unit	Established
1	Medical Aid post	Nos	1
2	Traffic Aid Post	Nos	1
3	Vehicle Rescue Post	Nos	1
4	Residential Quarter	Nos	1
5	Ambulance	Nos	1
6	Recovery Crane	Nos	1
7	Patrolling vehicle	Nos	1

3.2 STRUCTURES

The inventory of structures has been carried for all every individual structure. The overall summary of existing bridges / structures is as presented below:

Table 16: Summary of Structures as per CA & Site

S No	Ty pe of Str	No. of Str's	Total No. of Locations
		BHS	
1	MJB	2	2
2	MNB	2	2
3	Box Culvert	3	3
4	Pipe Culvert	23	23

Table 17: Major Structures Locations Co-ordinates

S.No.	Chainage (Km)	Type of Str.	Span Arrangement (No x Length)	Str site coordinates
1	0+470	PC	1 X1.2	27.740666, 95.595739
2	0+805	MNB	2 x 30	27.742549, 95.598374
3	0+950	PC	1 X1.2	27.743378, 95.599522
4	1+580	PC	1 X1.2	27.746603, 95.604743
5	3+490	PC	1 X1.2	27.751210, 95.623398
6	4+120	PC	2 X 1.2	27.752725, 95.629548
7	4+434	PC	1 X 1.2	27.753466, 95.632625
8	4+950	BC	9 x 6	27.754704, 95.637679
9	5+415	PC	1 X 1.2	27.756043, 95.640843
10	5+732	BC	2 x 6	27.758913, 95.643821
11	5+760	MNB	1 x 35	27.759123, 95.643989
12	5+787	BC	2 x 6	27.759319, 95.644140
13	6+060	PC	1 X 1.2	27.761348, 95.645756
14	6+525	PC	1 X 1.2	27.764701, 95.648425
15	6+720	PC	1 X 1.2	27.766182, 95.649602
16	7+105	PC	2 X 1.2	27.768552, 95.652423
17	11+872	MJB	183 x 50	27.795855, 95.675986
18	16+690	PC	1 X 1.2	27.823086, 95.700734
19	17+330	PC	1 X 1.2	27.824010, 95.707250
20	17+536	PC	1 X 1.2	27.824296, 95.709267
21	18+390	PC	1 X 1.2	27.826297, 95.717624
22	18+600	PC	1 X 1.2	27.827026, 95.719591
23	20+294	PC	2 X 1.2	27.837067, 95.732206
24	21+235	PC	1 X 1.2	27.843243, 95.738782
25	21+904	PC	2 X 1.2	27.846639, 95.744205
26	24+115	PC	1 X1.2	27.856020, 95.763330
27	24+484	PC	2 X 1.2	27.858825, 95.765324
28	25+675	MJB	1 x 45 + 1 x 40 + 1 x 50 + 1 x 45	27.867747, 95.759727
29	26+882	PC	1 X 1.2	27.874692, 95.750508
30	27+108	PC	1 X 1.2	27.875897, 95.748801

Table 18: Details of Major Structures

S No.	Site Chainage (Km)	Type of Structure	Side	Str on	Age of Str	Span Arrangement (m)	Deck Width (m)	Skew (Y/N)	Type of Foundation	Type of Substructure		Type of Superstructure	Type of Bearings
										Abutment	Pier		
1	11+872	MJB	BHS	MCW	New	183 x 50	13.20	No	Pile foundation	Superstructure resting on pile cap	Rectangular column type	PSC Segmental Box Girder	Elastomeric
2	25+675	MJB	BHS	MCW	Old	1 x 45 + 1 x 40 + 1 x 50 + 1 x 45	8.50	No	Well foundation	RCC wall type	RCC wall type	RCC Girder	Rocker Roller
3	0+805	MNB	BHS	MCW	New	2 x 30	13.20	No	Not visible	RCC wall type	RCC wall type	PSC Girder	Pot PTFE
4	5+760	MNB	BHS	MCW	New	1 x 35	13.20	No	Not visible	RCC wall type	-	PSC Girder	Pot PTFE

Table 19: Age of Structures

S No	Type of Str	BHS		Total No. of Str's
		Old	New	
1	MJB	1	1	2
2	MNB	-	2	2
3	Box Culvert	-	3	3
4	Pipe Culvert	-	23	23

Table 20: Summary of Expansion Joints & Bearings

S.No	Type of Str	Expansion joints		Bearings					
				Pot PTFE		Elastomeric		Rocker Roller	
		Old	New	Old	New	Old	New	Old	New
1	MJB	-	184	-	-	-	732	24	-
2	MNB	-	5	-	28	-	-	-	-
Total		**-**	**189**	**-**	**28**	**-**	**732**	**24**	**-**
		189		**28**		**732**		**24**	
				784					

Table 21: Summary & Combination of Superstructures

S. No	Type of Str	PSC Segmental Box Girder	RCC Girder	PSC Girder	Total No. of Structures
1	MJB	1	1	-	2
2	MNB	-	-	2	2
Total		1	1	2	4

Table 22: Summary of Substructures

S. No	Type of Str	Abutment		Pier	
		Superstructure resting on pile cap	RCC wall type	Rectangular column type	RCC wall type
1	MJB	1	1	1	1
2	MNB	-	2	-	1
Total		**1**	**3**	**1**	**2**

4.1 MATERIAL INVESTIGATION INFERENCES

4.1.1 EMBANKMENT

The embankment for project road has been constructed with available soils from nearby areas. The soil appears to be coarse grain soils. No major settlements or depressions have been noted even at high embankment locations. There are no marshy/water logging areas along the length of project road.

Out of 2 borrow area locations only at 1 location, a sample has been collected. This sample belongs to SM type of soil. The percentage distribution of borrow soil and soaked CBR of borrow soil given below. Summary of the test results carried out on these samples are presented in the following tables.

Table 23: Summary of test results of Borrow soils

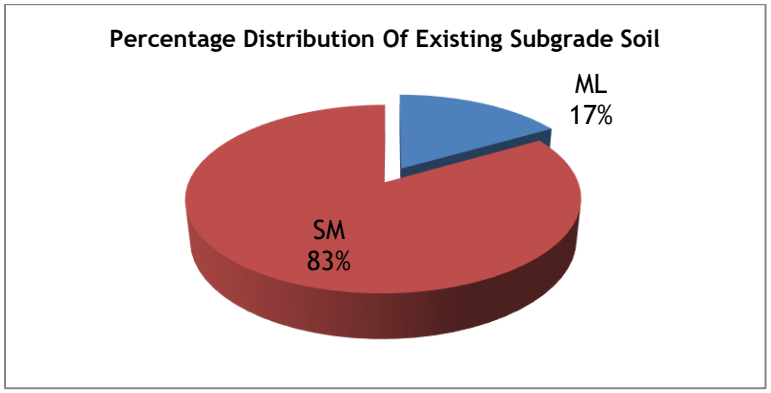
Lab Sample No	Site Identification		Grain Size Analysis					Atterberg Limits (%)			Soil Class	MDD (gm/cc)	OMC (%)	Dry Density at 97% MDD	Soaked CBR 97% MDD	Free Swelling Index (%)
	Location (km)	Up/Dn	Percentage passing from					LL	PL	PI						
			4.75 mm IS Sieve	425 mic IS Sieve	75 mic IS Sieve	Gravel %	Sand %									
DS-BP-1	40+300	RHS	86.14	41.08	11.67	13.86	74.47	-	NP	-	SM	2.09	9.10	2.03	30.41	6

4.1.2 SUBGRADE

The subgrade samples collected from the test pits taken from project road appears to be in fair condition as revealed by test pit investigations. Soil classification has been done according to IS Classification of Soils (ISC) as detailed in IS 1498 - 1978.

Laboratory test results indicate that all the Subgrade soil samples collected belongs to Coarse Grained Soil. Out of 6 test pits, 1 sample belong to ML type of soil and 5 samples belong to SM type of soil.

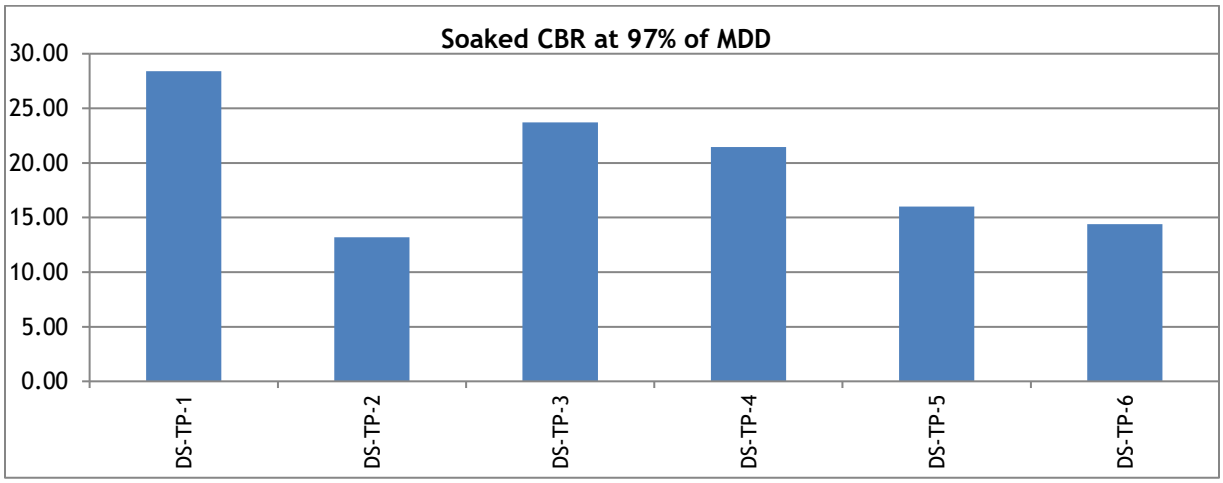
Pie Chart showing the percentage distribution of soil classification of existing subgrade sample is presented below:



Test Results of Subgrade samples are as follows:

Table 24: Summary of test results of Existing Subgrade Soils

Lab Sample No	Location (km)	Up/Dn	4.75 mm IS Sieve	425 mic IS Sieve	75 mic IS Sieve	Gravel %	Sand %	LL	PL	PI	Soil Class	MDD (gm/cc)	OMC (%)	Dry Density at 97% MDD	Soaked CBR 97% MDD	Field Dry Density (FDD) (gm/cc)	Free Swelling Index (%)
DS-TP-1	44+900	RHS	89.30	77.37	22.73	10.70	66.57	-	NP	-	SM	2.04	7.60	1.98	28.40	1.890	5
DS-TP-2	41+300	LHS	96.39	90.29	55.97	3.61	40.42	26	NP	-	ML	1.93	12.80	1.87	13.20	1.928	5
DS-TP-3	37+570	RHS	87.63	71.86	30.77	12.37	56.86	-	NP	-	SM	2.09	9.00	2.03	23.70	1.949	5
DS-TP-4	33+900	LHS	89.86	79.74	37.16	10.14	52.70	-	NP	-	SM	2.02	10.10	1.96	21.46	-	11
DS-TP-5	22+630	RHS	94.84	85.18	46.91	5.16	47.93	24	NP	-	SM	1.95	10.00	1.89	16.00	1.746	5
DS-TP-6	16+870	LHS	99.52	94.90	44.66	0.48	54.86	-	NP	-	SM	1.88	15.20	1.82	14.40	1.721	5



The following observations can be made from the above test results conducted on of existing subgrade samples

- Liquid Limit: All the samples are within the limits (less than 50%).
- Plasticity Index: All the samples are having PI Values within the limits. (less than 25%). All the soil samples have been recorded as Non-Plastic (NP).
- Maximum Dry Density: All samples are having MDD >=1.75 gr/cc. Minimum is 1.82 gm/cc and Maximum is 2.03gm/cc
-
- OMC for existing subgrade samples varies Between 7.60% to 15.2%.
- Free Swell Index: FSI value for all samples are below limiting value (<50%). Minimum is 5 % and Maximum is 11 %
- CBR Values are in the range of 13.20% to 28.40%

On the whole, it can be concluded that the existing subgrade is in fair condition. The laboratory test results for soil samples are presented in **Appendix-6** of this Report.

4.1.3 AGGREGATES

Aggregates to be used for sub-base, base, surface courses and concrete works have been collected from the crushers under operation from the existing quarries. The Table below represents the test results of the Aggregate and Sand Samples.

Table 25: Test Results of Aggregate Samples Details

S. No	Sample	Location (km)	Up/Dn	Aggregate Size	A.I.V (%)	Water Absorption (%)	Specific Gravity	Loose bulk density kg/ltr	Rodded bulk density kg/ltr	Stripping	Remark
1	DS-AQ-1	40+300	RHS	10 MM	20	0.54	2.80	1.42	1.55	< 95% Coating	
				20mm		0.98	2.76	1.44	1.53		
2	DS-AQ-2	40+300	LHS	10mm	20	0.51	2.81	1.44	1.56	< 95% Coating	
				20mm		1.01	2.75	1.43	1.53		

Note: All Aggregates samples are satisfying MoRTH requirements i.e., AIV (max. limit is 24% for Asphalt layer), Water Absorption (max. limit is 2%). As the stripping value is less than 95%, it is suggested to add anti-stripping agent for the case of Bituminous works.

4.1.4 SAND

The test results of the sand samples are as presented below.

Table 26: Test Results of Sand Samples

S No	Sample No	CHAINAGE (KM)	SIDE	10 mm Passing %	4.75 mm Passing %	2.36 mm Passing %	1.18 mm Passing %	600 mic Passing %	300 mic Passing %	150 mic Passing %	FM	ZONE
1	DS-SQ-1	40+300	RHS	100	100.00	99.81	97.82	58.36	11.66	2.77	2.30	ZONE-II
2	DS-SQ-2	44+740	Towards Roing	100	100.00	99.81	97.02	53.80	7.29	1.15	2.41	ZONE-II

Note: These samples belong to Zone-2 and are suitable for construction works.

4.2 CORE RESULTS

The core samples as extracted at 7 locations were tested in the laboratory to find the engineering properties of BC/DBM materials.

The test results of the pavement cores are as presented below

Table 27: Test Results of of Pavement cores-BC Layers

Sl. No.	Name of Material	Core No.	Chainage	Direction	Distance from Pavement Edge (m)	Depth of core in mm	Condition of Road	% of Bitumen Obtained (by extraction of core)		% Agg by Wt. of total Mix	Thickness of Specimen mm	DENSITY %	Maximum Theoretical Sp.Gr. of Mix (GMM) %	% of Air Voids	Filler Asphalt Ratio (%)	% compaction	Gradation as per Morth
								BC	Limits						0.075 mm		
1	OL	DS-C-1	16+870	LHS	2.2m	120mm	Good	5.13	As per MORTH 5th Revision Table no 500-17, Bitumen Content for BC grading - 1 is 5.2%	94.87	26.61	2.448	2.580	5.12	0.77	95	Grade-1
	BC									100.00	35.54	2.439	-	-	-	-	
2	OL	DS-C-2	22+630	RHS	3.4m	115mm	Good	5.04		94.96	33.21	2.433	2.579	5.66	0.87	94	Grade-1
	BC									100.00	40.21	2.449	-	-	-	-	
3	BC	DS-C-3	33+900	LHS	2.9m	130mm	Good	4.98		95.02	39.13	2.461	2.655	7.31	0.73	93	Grade-1
	BC	DS-C-4	37+570	RHS	2.3m	155mm	Good	5.40		94.60	22.89	2.483	2.607	4.76	1.13	95	Grade-1
5	OL	DS-C-5	41+300	LHS	4.1m	145mm	Good	5.15		94.85	29.27	2.47	2.629	6.05	0.78	94	Grade-1
	BC									100.00	42.20	2.372	-	-	-	-	
6	OL	DS-C-6	44+900	RHS	2.2m	135mm	Good			-	20.58	2.467	-	-	-	-	
	BC									100.00	44.81	2.369	-	-	-	-	
7	OL	DS-C-6A	44+900	LHS	2.3m	120mm	Good			-	20.37	2.426	-	-	-	-	
	BC									100.00	44.35	2.333	-	-	-	-	

Observations:

- Binder content for BC: ranging from 4.98% to 5.4%. The MORTH Table 500-17 specifies the Bitumen content range is 5.2 ± 0.3 %. All the sample satisfy for bitumen requirement.
- BC-Gradation results indicate the mix design: Grade I proportion.
- BC-Air Voids: ranging from 4.76% to 7.31% (MORTH Table-11, specifies 3% to 5%)
- Compaction –More than 93% of Compaction is observed.
- Filler Asphalt Ratio– all core samples have Filler –Asphalt ratio is within the specified limit of 0.6-1.2 (refer MORTH clause 505.3 or as per MS-2 (5.10).

Table 28: Test Results of of Pavement cores-BC Layers

Sl. No.	Name of Material	Core No.	Chainage	Direction	Distance from Pavement Edge (m)	Depth of core in mm	Condition of Road	% of Bitumen Obtained (by extraction of core)		% Agg by Wt.of tatol Mix	Thickness of Specimen mm	DENSITY %	Maximum Theoretical Sp.Gr. of Mix (GMM) %	% of Air Voids	Filler Asphalt Ratio (%)	% compaction	Gradation as per Morth
								BC	Limits						0.075 mm		
1	DBM	DS-C-1	16+870	LHS	2.2m	120mm	Good	4.48	As per MORTH 5th Revision Table no 500-10, Bitumen Content for DBM grading - 2 is 4 .5 %	95.52	44.76	2.374	2.524	5.94	0.87	94	Grade-2
2	DBM	DS-C-2	22+630	RHS	3.4m	115mm	Good	4.41		95.59	46.80	2.409	2.544	5.31	0.84	95	Grade-2
3	DBM	DS-C-3	33+900	LHS	2.9m	130mm	Good	4.41		95.59	39.03	2.346	2.513	6.65	1.26	93	Grade-2
4	DBM-2	DS-C-4	37+570	RHS	2.3m	155mm	Good	4.31		95.69	47.54	2.489	2.618	4.93	0.84	95	Grade-2
	DBM-1									100.00	68.74	2.456	-				
5	DBM	DS-C-5	41+300	LHS	4.1m	145mm	Good	4.45		95.55	55.85	2.460	2.565	4.09	0.85	96	Grade-2
6	DBM	DS-C-6	44+900	RHS	2.2m	135mm	Good				64.61	2.397	-				
7	DBM	DS-C-6A	44+900	LHS	2.3m	120mm	Good				56.83	2.45	-				

Observations:

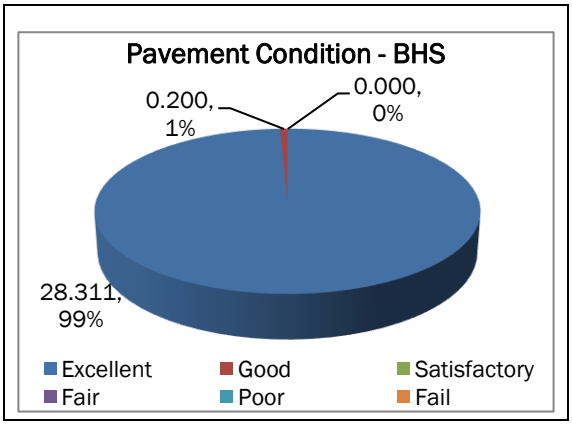
- Binder content for DBM: ranging from 4.31% to 4.48%. The MORTH Table 500-10 specifies the Bitumen content range is 4.5 ± 0.3 %. All samples showing less bitumen content.
- DBM-Gradation results indicate the mix design: Grade II proportion.
- DBM-Air Voids: ranging from 4.09% to 6.65% (MORTH Table-11, specifies 3% to 5%)
- Compaction –More than 94% of Compaction is observed.
- Filler Asphalt Ratio– except 1, remaining all core samples have Filler –Asphalt ratio is within the specified limit of 0.6-1.2 (refer MORTH clause 505.3 or as per MS-2 (5.10)).

4.3 PAVEMENT CONDITION

The distresses in pavement surface have been captured at 10m interval in the project corridor for each lane separately by NSV survey. Pavement Condition rating (PCI) as per IRC:82-2023 from the data collected at every km in each direction and then its average values are presented in the **Annexure-2** of this report.

The project corridor has been provided with flexible pavement.

- **For Main Carriageway:**



The Pavement condition rating (PCI) considering 100m data is presented in Pie-chart indicate road condition is from Excellent to Good.

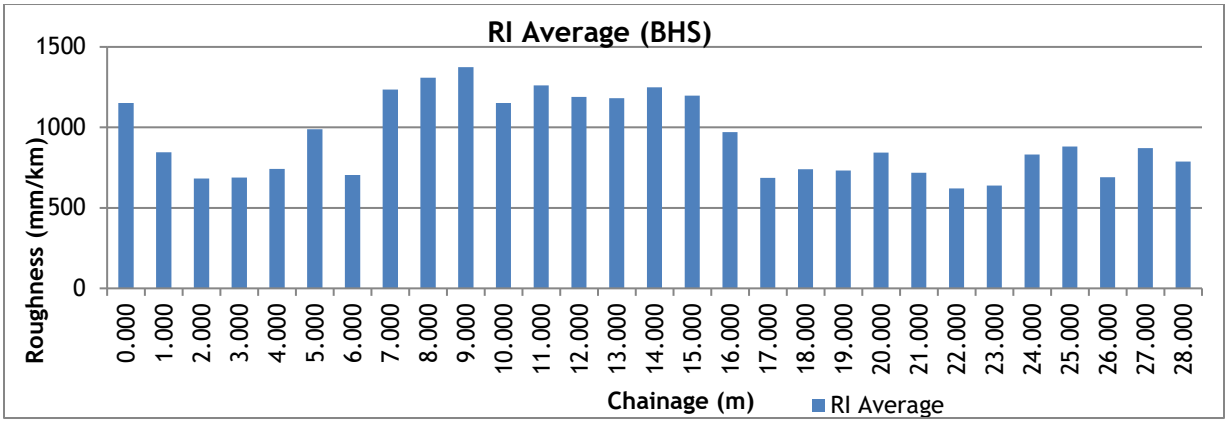
The condition rating for Main carriageway is presented in table as below

Overall PCI		Condition Rating	Length (km)
>	<=		LHS
90	100	Excellent	28.311
80	90	Good	0.200
60	80	Satisfactory	-
40	60	Fair	-
20	40	Poor	-
0	20	Fail	-
Total Length			**28.511**

From NSV pavement condition (PCI) analysis, entire length falls under Excellent to Good.

4.4 ROUGHNESS

The Roughness Bar charts represented for the main carriageway are as follows:



It can be noted from the above, that in the both directions of the project road do not require any functional overlay as Roughness Index (RI) is less than minimum requirement of Schedule-K, i.e., 2500mm/km.

4.5 FWD ANALYSIS AND ASSESSMENT OF OVERLAY REQUIREMENT

By looking at the age and condition and performance of the pavement following different set of ranges have been used while finalizing the modulus values:

Layer	Bituminous Layers	Granular Layer Modulus	Subgrade
Modulus Value (MPa)	750-3000	100-500	50-75

Bituminous layer Moduli obtained from back calculations shall be corrected for a standard pavement temperature of 35°C using given equations. Whereas, for back calculated moduli values obtained for granular and subgrade layer shall be corrected for seasonal variations (using winter and summer equations). As FWD tests, performed, during the monsoon, no seasonal correction factor is applied for granular and subgrade layer. The design moduli (15th percentile moduli) of in-service layers for each homogenous section are given in table below.

Table 29: Summary of Design Moduli of different layers - BHS CW

S.No	Side	From	To	Length (Km)	15th Percentile MR values		
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)
1	BHS	0.00	1.60	1.60	2301	277	75
2	BHS	1.60	4.50	2.90	2815	212	75
3	BHS	4.50	7.29	2.79	2557	237	75
4	BHS	7.29	16.45	9.16	Major Bridge		
5	BHS	16.45	17.70	1.25	2921	282	75
6	BHS	17.70	19.00	1.30	3004	234	75

S.No	Side	From	To	Length (Km)	15th Percentile MR values		
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)
7	BHS	19.00	20.20	1.20	3030	225	75
8	BHS	20.20	22.70	2.50	2629	259	75
9	BHS	22.70	24.00	1.30	2625	330	75
10	BHS	24.00	25.40	1.40	2677	430	75
11	BHS	25.40	27.00	1.61	2656	340	75
12	BHS	27.00	28.51	1.51	2647	485	75
Total Length				**28.511**			

Observations on FWD Results

It can be noticed from the above table that the layer moduli for the three layers are varying along the length and direction. The MR value for BT layer is 2301 Mpa to 3000 Mpa, for Granular Layers is 212 Mpa to 485 Mpa and similarly, for Subgrade layer is 75 MPa BHS Carriageway.

4.6 STRUCTURES

Inventory and asset condition all the existing structures falling within project road have been verified as per IRC: SP-35 procedures and guidelines with following field surveys

- Inventory of existing highway bridges / structures
- Visual condition survey of existing highway bridges / structures

Each and every structure has been verified at site and detailed inventory and condition survey is presented in **Appendix-7** of this report.

Overall condition of few of the major structures are presented on sample basis as below. However, each and every structure detail are presented in **Appendix-7** of this report

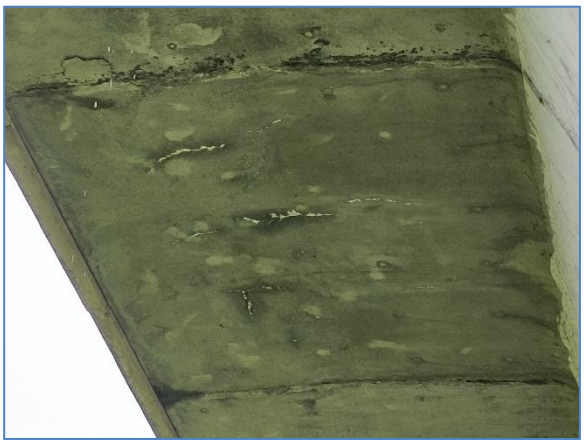
Chainage: 11+872 (7+297 to 16+447)
General Description
BHS MCW (New)

- Type of Structure : MJB
- Span Arrangement : 183 x 50 m
- Total length of Structure : 9150 m
- Total deck width of Structure : 13.2 m
- Type of Foundation : Pile foundation
- Type of Substructure (Abutment & Pier) : Superstructure resting on pile cap & Rectangular column type
- Type of Superstructure : PSC Segmental Box Girder
- Type of Bearing : Elastomeric
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:
> Cracks and Leaching observed on box segment-8 in span-1.
> Cracks and Leaching observed on box segment-12 in span-2.
> Leaching observed on box segment-3 in span-3.
> Cracks and Leaching observed on box segment-10 & 11 in span-6.
> Cracks and Leaching observed on box segment-3 in span-22.
> Cracks and Leaching observed on box segment-4 in span-37.
> Reinforcement exposure observed on box segment-8 in segment -8 in span -36.
> Cracks and Leaching observed on box segment-6 in span -46.
> Cracks observed on box segment-3 & 4 in span-137.
> Honeycomb observed on box segment-5 in span-139.
> Cracks observed on box segment-7 in span-139.
> Cracks and Leaching observed on box segment-10 & 11 in span-140.
> Honeycomb observed on box segment-5 in span-154.
> Cracks and Leaching observed on box segment-5 in span-159.
> Cracks and Leaching observed on box segment-4, 6, 7 & 12 in span-164.
> Cracks and Leaching observed on box segment-9, 10 &13 in span-165.
> Cracks and Leaching observed on box segment-14 in span-166.
> Cracks observed on box segment-4, 7 & 10 in span-168.
> Cracks and Leaching observed on box segment-12, 13 & 14 in span-169.
> Cracks and Leaching observed on box segment-4 & 6 in span-170.
> Cracks and Leaching observed on box segment-12 in span-171.
> Drainage spout down take pipes not provided.
> Rubber sealant damaged at Expansion joint 136 & 147.
> Span 52 to Span 133 are not accessible for inspection due to water flow in the river.

















Chainage: 25+675 (25+585 to 25+765)
General Description
BHS MCW (New)

- Type of Structure : MJB
- Span Arrangement : 1 x 45 + 1 x 40 + 1 x 50 + 1 x 45 m
- Total length of Structure : 180 m
- Total deck width of Structure : 8.5 m
- Type of Foundation : Well foundation
- Type of Substructure (Abutment & Pier) : RCC wall type
- Type of Superstructure : RCC Girder
- Type of Bearing : Rocker Roller
- Type of Railing / Crash Barrier : Hand railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:
> Leaching observed on the girder G1 in span-1.
> Honeycomb observed on the soffit of the girder G1 in span-3.
> Cracks and leaching observed on the soffit of the girder G1, G2 & G3 in span-3.
> Drainage spout down take pipes not provided.






Chainage: 0+805 (0+775 to 0+835)
General Description
BHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 2 x 30 m
- Total length of Structure : 60 m
- Total deck width of Structure : 13.2 m
- Type of Foundation : Not visible
- Type of Substructure (Abutment & Pier) : RCC wall type
- Type of Superstructure : PSC Girder
- Type of Bearing : Pot PTFE
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:
> Concrete portion damaged at Expansion joint EJ-1.
> Drainage spout down take pipes not provided.






Chainage: 5+760 (5+742.5 to 5+777.5)
General Description
BHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 35 m
- Total length of Structure : 35 m
- Total deck width of Structure : 13.2 m
- Type of Foundation : Not visible
- Type of Substructure (Abutment & Pier) : RCC wall type
- Type of Superstructure : PSC Girder
- Type of Bearing : Pot PTFE
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:
> Cracks and leaching observed on soffit of the slab between G1, G2 & G3, G4.
> Drainage spout down take pipes not provided.






General Observations: -

- ✓ The Project stretch has 2 MJBs and 2 MNBs.
- ✓ The structures of the project road have varieties of super structure types such as PSC Segmental Box Girder, RCC Girder & PSC Girder.
- ✓ The girder-type structures are supported on various types of bearings: 732 new Elastomeric bearings, 24 old Rocker-Roller bearings, and 28 new Pot-PTFE bearing
- ✓ Structures are having 189 Expansion joints on new structures.
- ✓ All the Structures are in fair condition expect some locations having minor distresses like Spalling, Reinforcement exposure, Honeycomb, Cracks, leaching, Rubber Sealant Damage, Drainage spout down take pipes not Provided etc. These structures may require immediate intervention for continuous service.

Photos depicting culverts are presented below



Box Culvert at 4+950



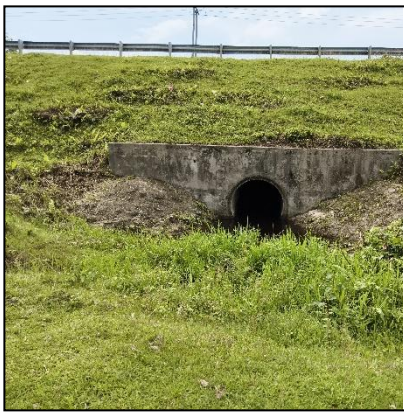
Box Culvert at 5+732



Box Culvert at 5+787



Pipe Culvert at 0+470



Pipe Culvert at 0+950



Pipe Culvert at 1+580

4.7 DRAINAGE AND SLOPE PROTECTION

- ✓ Chutes are provided at high embankment locations are in good condition. No major distress is observed.

4.8 TRAFFIC SAFETY AND ROAD FURNITURE

- ✓ Metal beam crash barriers provided along the project road appear to be intact over entire length except for few locations.
- ✓ Concrete Crash Barriers installed at structures appear to be in fair condition.
- ✓ Street lightings in the form of Single arm lightings are provided at along the major bridge location and Single arm solar LED lights are provided at few junctions and are appears to be good in condition.

CHAPTER 5. REHABILITATION PLANS AND DESIGNS

5.1 DESIGN TRAFFIC LOADING

Design Traffic loading has been estimated by considering the latest traffic (given) and VDFs from previous pavement rehabilitation studies and with minimum 5% growth rates for 10 years, 15 years and 20 years design period as below:

Table 30: Traffic Volume (AADT)

Vehicle/Mode	AADT (both direction) @ TP, Km 22.500
LCV	54
2A truck	107
3A truck	78
MAV truck	100
BUS	86

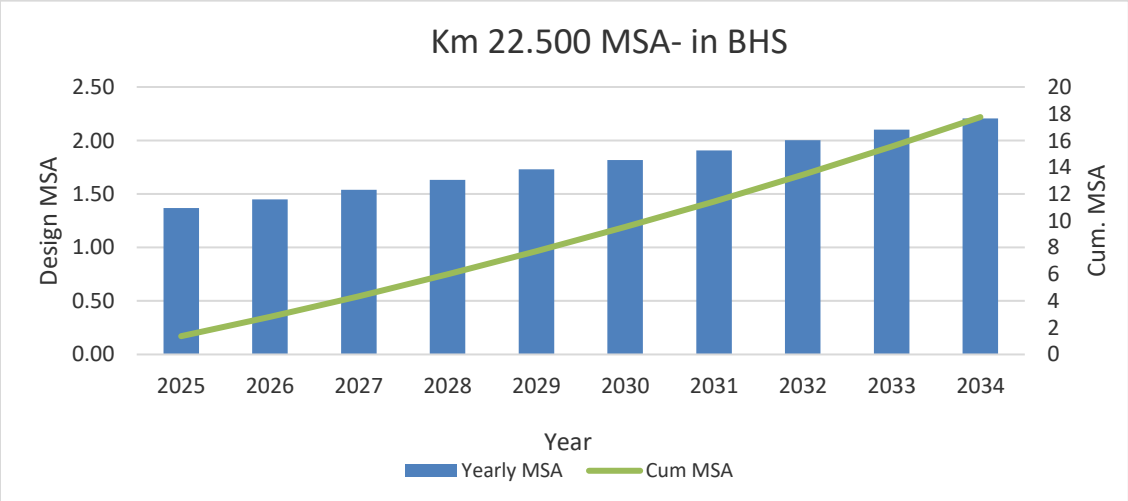
Note: 50:50 Direction Distribution

The MSA calculated considering the above data is as follows.

Table 31: Estimated Design traffic loading

Design Period	AADT (both direction) @ TP, Km 22.500		With Max. VDFs
	LHS	RHS	
End of Concession Yr2030	1	9	10
10 Years	2	18	18

Pictorial representation of MSA is as follows



The computation of traffic loadings is presented in **Appendix 8** of this Report.

5.2 PAVEMENT REHABILITATION AND STRENGTHENING

For Design the Overlay Thickness the following method as suggested in IRC: 115 has been used

- The existing pavement is considered as a 3-layer system consisting of subgrade, granular and bituminous layer. The remaining life of exiting pavement in terms of Fatigue and Rutting life (MSA) are estimated
- The remaining life is compared with design traffic loading. An overlay with assumed thickness is considered on exiting pavement where required.
- The Total system including the proposed Overlay (Trial thickness) is assumed as a four-layer system and considered the relevant MR values for all the four layers namely New BT layer, existing bituminous surface, total existing Granular layers and Subgrade layers.
- The MR value for the New BT is assumed as 3000 MPA (considering VG40 Bituminous grade) for Main Carriageway and 2000 MPA (considering VG30 Bituminous grade) for Service Road and for all the remaining three layers, the MR Values derived and finalized from the FWD Analysis are considered.
- Critical Tensile strains and Vertical strains are found out by using the IIT PAVE Software at the bottom of existing bituminous layer and at the top of the subgrade layer respectively.
- The Fatigue and Rutting equations (equation given in the IRC: 37) have been used to estimate the Fatigue and Rutting Life of the Pavement system considering 80% reliability equation satisfying design philosophy provisions of the IRC 37-2012.
- The Obtained Fatigue and Rutting Life are compared with the required life for the assumed trial overlay thickness.
- Analysis is carried out for individual homogeneous sections as well for minimum and Average Modulus Values on each direction separately.

Remaining life of the existing pavement from the above analysis is presented in the following tables:

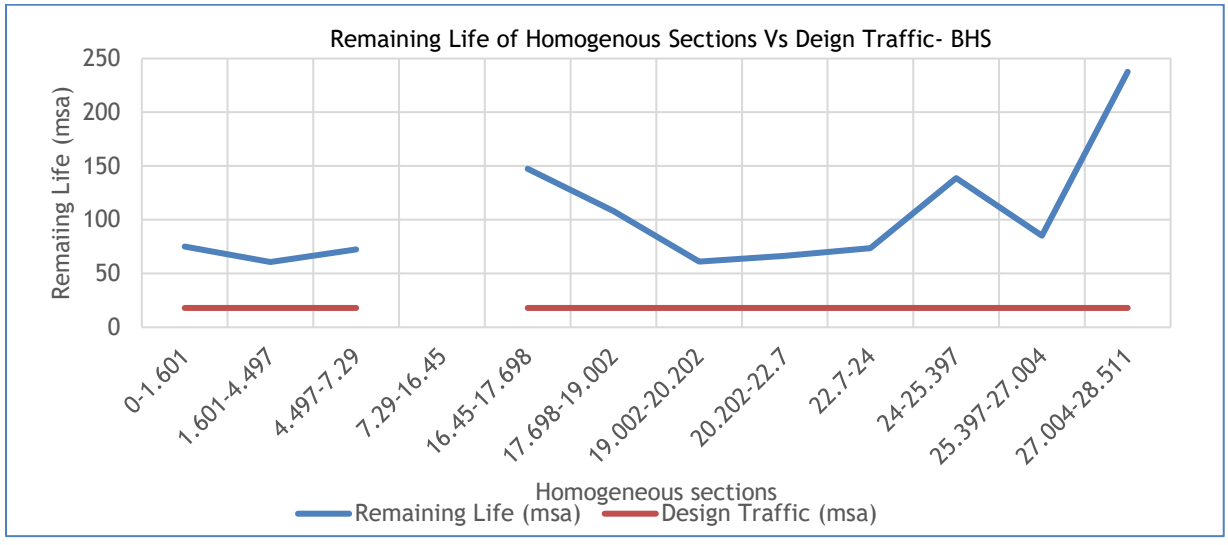


Table 32: Remaining life of the existing pavement LHS Carriageways

S.No	Side	From	To	Length (Km)	15th Percentile MR values			Average Existing Crust		Total Crust (mm)	Adopted MR for BT (Mpa)	Strains From IITPAVE		Remaining Life as per IRC 37-2012 equation for 80% Reliability			
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)	BT (mm)	Granular (mm)			Vertical strain at bottom, epZ	Tangential strain at top, epT	Nf-Fatigue life, mSA	Rutting life,mSA	Target MSA	Remarks
1	BHS	0.00	1.60	1.60	2301	277	75	135	420	555	2301	0.0003208	0.0001984	75	288	18	No Overlay
2	BHS	1.60	4.50	2.90	2815	212	75	140	386	526	2815	0.0003517	0.0002005	61	190	18	No Overlay
3	BHS	4.50	7.29	2.79	2557	237	75	145	350	495	2557	0.0003720	0.0001957	72	147	18	No Overlay
4	BHS	7.29	16.45	9.16													MJB
5	BHS	16.45	17.70	1.25	2921	282	75	155	370	525	2921	0.0003112	0.0001583	148	331	18	No Overlay
6	BHS	17.70	19.00	1.30	3004	234	75	155	370	525	3000	0.0003234	0.0001705	108	278	18	No Overlay
7	BHS	19.00	20.20	1.20	3030	225	75	132	443	575	3000	0.0003122	0.0001974	61	326	18	No Overlay
8	BHS	20.20	22.70	2.50	2629	259	75	130	450	580	2629	0.0003047	0.0001989	66	364	18	No Overlay
9	BHS	22.70	24.00	1.30	2625	330	75	116	358	474	2625	0.0003853	0.0001938	74	125	18	No Overlay
10	BHS	24.00	25.40	1.40	2677	430	75	115	350	465	2677	0.0003580	0.0001639	139	175	18	No Overlay
11	BHS	25.40	27.00	1.61	2656	340	75	117	400	517	2656	0.0003363	0.0001862	85	233	18	No Overlay
12	BHS	27.00	28.51	1.51	2647	485	75	120	500	620	2647	0.0002191	0.0001431	238	1622	18	No Overlay
Total Length				**28.511**													

From the above, **no overlay** is warranted as remaining life is more than Target Traffic (10-year design MSA).

Input data used and the output from the IIT Pave software has been presented as screen shots for ready reference as **Appendix 9** of this Report.

5.3 STRUCTURAL REHABILITATION

All the structure found to be in good to fair condition except little minor treatment like repair of stone pitching, cleaning of drainage spouts, cleaning of vegetation etc. may be required. Detailed structural rehabilitation quantities have been worked out based on the prevailing condition of existing structures. This methodology describes in detail the procedure for the execution of each item of rehabilitation work of the Existing Bridges of the project.

The scope of this methodology covers the items mentioned below for rehabilitation work of all the existing Bridges.

- Repair/ Replacement of Existing Bearings
- Repair / Replacement of Existing Expansion Joints
- Repair / Replacement of Existing Wearing Coat
- Profile Correction for Existing Deck Slab by Cement Concrete
- Sealing of Cracks for Bridges by Epoxy Resin
- Replacement of Spalled Concrete of ECW by Epoxy Mortar
- Cement Grouting for Repair of Existing Bridges
- Guniting / Shotcreting for Repair of Existing Bridges
- Providing & Fixing of Drainage Spouts
- Repair of Substructure Component
- Repair / Replacement of Railing & Crash Barrier
- Epoxy Bonding between New and Old Concrete.

CHAPTER 6. OPERATION AND MAINTENANCE

6.1 INTRODUCTION

Looking at the contractual requirements of maintaining project road under specified level of roughness it is felt that roughness is the most important criterion for finalizing the O&M schedule for the project. Accordingly, the methodology adopted by present consultants includes predicting the roughness year by year under the traffic using a well acknowledged HDH-4 model developed for developing countries like India after lot of research by World Bank. The said model is widely prescribed by MORTH and NHAI during the preparation of detailed project reports for several projects in doing economic analysis for the projects. The economic analysis mainly consists of two parts:

1. Predicting the road deterioration and estimating VOC
2. Estimating Benefits

Considering its importance and present use in India, consultants felt prudent to use the first part, i.e. estimating road deterioration and predicting roughness in HDM 4 model to finalize the O&M schedule for the project. This approach is more scientific as it does not assume hypothetical deflection values at 10^{th} and 20^{th} year and includes main criterion of maintaining roughness at 2500mm/Km as per Schedule K

6.2 CA SPECIFICATIONS FOR MAJOR MAINTENANCE

- Schedule K of CA species that Roughness values exceed 2500mm/km in a length of KM, needs to be corrected within 180 days. Roughness survey has to be done two times in a year.
- BBD survey to be done in every 5years.

6.3 INPUTS FOR MM SCHEDULE

6.3.1 PROJECT SECTIONS

The entire project road is considered as “single section” only based on traffic characteristics.

Then, taking the consideration of Roughness as a key criterion for major maintenance, further the above sub-sections categorized in to four cases below:

- Case 1: Roughness value <2000 mm/Km
- Case 2: Roughness values >2000<2500 mm/Km
- Case 3: Roughness >2500<2750 mm/Km
- Case 4: Roughness >2750 mm/Km

Direction wise analysis has been done separately for LHS (UP)/RHS (DN) along the project.

6.4 HDM INPUTS

FWD, Roughness, Pavement condition values are used as obtained from surveys and investigations for various sections and different cases as below:

Section-1_BHS: No Overlay

No Overlay	<2000	>=2000 and <2200	>=2200 and <2500mm	>=2500
	Case-1	Case-2	Case-3	Case-4
Length, kms	19.361		-	-
Roughness, mm/km	794		-	-
IRI. m/km	1.23		-	-
Deflection, mm	0.48		-	-
Cracking %	0.02		-	-
Raveling %	-		-	-
Rut Depth, mm	1.93		-	-
Patching, %	0.07		-	-
Potholes, %	-		-	-
BT Crust, mm	134		-	-
Granular Crust, mm	398		-	-

6.5 OPTIONS FOR MM SCHEDULES

Based on the requirements of CA, various options have been considered to be used as responsive overlays triggered at specified level of roughness of 2500 mm/km. Micro surfacing has also been considered to examine its feasibility for major maintenance.

The following options were considered in the analysis:

- ✓ Base Case: MCS at Roughness of 2500mm/Km with regular maintenance
- ✓ Opt-1: Responsive Mill & Overlay of 30mm BC whenever roughness is >2500mm/KM with regular maintenance It is pertinent to note that Base alternative is included as "Do nothing Scenario" for the purpose of analysis in model. It is not be reckoned with
- ✓ Opt-2: Responsive Mill & Overlay of 40mm BC whenever roughness is >2500mm/KM with regular maintenance
- ✓ Opt-2: Responsive Mill & Overlay of 50mm BC whenever roughness is >2500mm/KM with regular maintenance

6.6 ROUGHNESS PROGRESSION

Roughness progression under each alternative maintenance option has been done using the deterioration models in HDM-4. Following graphs represents the roughness progression for each alternative:

HDM - 4
HIGHWAY DEVELOPMENT & MANAGEMENT

Average Roughness by Section (Graph)

Study Name: **Dhola-Sadiya**
Run Date: **20-06-2025**

Section Details:

ID: **Dhola-Sadiya<2000-NO** Road Class: Primary or Trunk Rise + Fall: 1.00m/km
Description: **Dhola-Sadiya<2000-NO_OL** Length: 19.36km Curvature: 3.00deg/km
Width: 10.00m

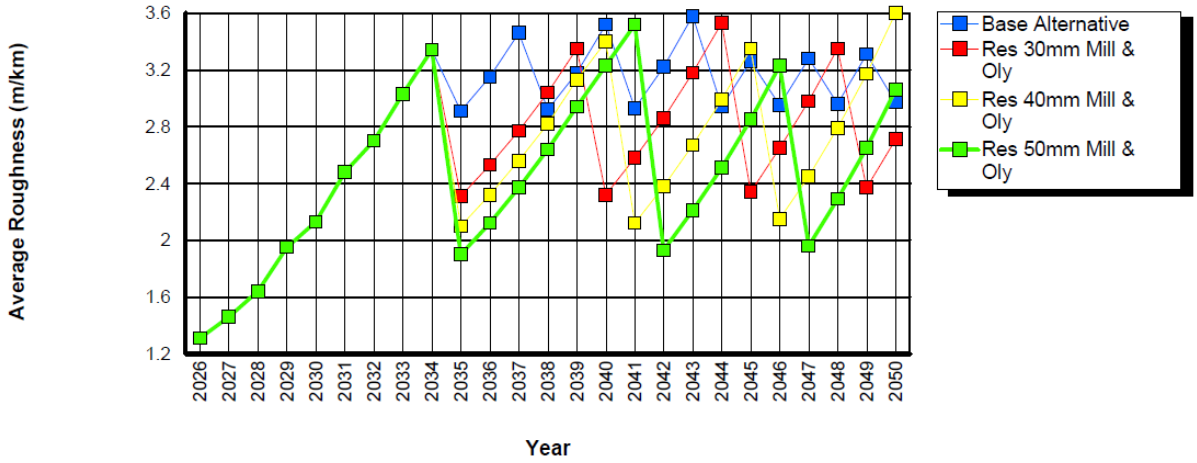


Figure 1: Average Roughness No Overlay (<2000mm/Km)

6.7 ADOPTED M&M SCHEDULE

Looking at the present condition, progression of traffic with actual traffic growth rates, it is felt prudent to consider 30mm BC OL as the preferred option. Adopted MM schedule for the project is as below.

Cycle	Dhola- Sadia	
Planned in Financial Year	***2026***	***2030***
Milling required?	***No***	***No***
BC- 40 mm with VG40		
BC- 30 mm with VG40	28510 mts	
DBM-Variable thickness (50 to 100 mm)		
Micro surfacing (Type 3 with fibre)		19330 mts

6.8 STRUCTURAL PERIODIC MAINTENANCE STRATEGY

Expansion joints:

- Visual inspection is shall be carried out to check for seal breakages, Armor angle, Weld failures, cracks between deck & Expansion joints concrete and Joints filled with debris. However, no damages were observed.
- In the absence of records pertaining to Expansion joint replacements it is highly difficult to predict the date of replacement needed for compliance to IRC codal requirements. However, periodic maintenance is considered.

Bearings:

- All types of Bearings are considered for periodic maintenance.

Wearing Coat:

- Wearing coat is a very weak component on the bridge structure which is subjected to severe deterioration due to Loading, Environment etc. This requires periodic maintenance and is considered in BOQ.

Cost Component for various items and activities have been worked out by considering the best industry practice and most appropriate methods. Detailed quantities for work items have been estimated based on the details presented in previous chapters under various heads as per schedule provisions, roughness criteria (RI<2500mm/km) and other required parameters inline with Concession Agreement provisions.

The gist of the cost components considered are presented below:

- Immediate Repair's Cost
- Routine Maintenance Cost
- Incident Management Cost
- Periodic Maintenance Cost
- Operations Cost
- Year by Year total O&M Costs

7.1 RATE ANALYSIS

Detailed rate analysis has been carried out based on MORTH guidelines to arrive at the unit rates of various items. Material rates and their leads from the project corridor are considered as per the material investigations done on the project road. Summary of unit rates arrived at are presented in table below:

Table 33: Summary of Unit Rates of Basic material

S No	Description	Units	Source	Basic rate excluding Transportation & GST	Lead in Kms
1	VG-40 (CAPEX)	MT	Guwahati	45336	607
2	VG-40 (MMR)	MT	Guwahati	45336	607
3	PMB - CAPEX	MT	Guwahati	57012	607
4	Good earth	Cum	BA	5	10
5	40 mm	Cum	Crusher	950	49
6	20 mm	Cum	Crusher	1150	49
7	12 mm	Cum	Crusher	1050	49
8	6 mm	Cum	Crusher	800	49
9	Dust	Cum	Crusher	250	49
10	M sand	Cum	Crusher	275	49
11	Bitumen 60/70	MT	Guwahati	49050	607
12	Bitumen 80/100	MT	Guwahati	48252	607
13	CRMB-55	MT	Guwahati	51993	607
14	SS1	MT	Guwahati	45000	607
15	Steel	MT	Tinsukia	54000	70
16	HTS Strands	MT	Tinsukia	75000	70
17	Cement	MT	Tinsukia	8800	70

Note: For asphalt pavement rehabilitation works, a discount of 7.5% is applied on Bitumen (VG-40) to the present market rate.

Table 34: Summary of Major Material Rates excluding GST

S No	Item	Unit	Rate (INR) Excluding GST
1	Embankment - borrow	Cum	449
2	Embankment - Excavation	Cum	87
3	SG	Cum	470
4	GSB G-2	Cum	2700
5	WMM	Cum	2786
6	Prime Coat	Sqm	53
7	Tack coat on granular	Sqm	18
8	DBM G-1-VG-40	Cum	9559
9	Tack coat on bituminous surface	Sqm	16
10	BC - G1-VG-40-CAPEX	Cum	11583
11	Road Marking	Sqm	369
12	RE wall	Sqm	3144
13	Select Fill	Cum	517
14	Filter Media	Cum	1532
15	M15	Cum	7312
16	M20	Cum	8319
17	M25	Cum	9079
18	M30	Cum	8963
19	M35	Cum	9343
20	M40	Cum	9503
21	PSC M45	Cum	11411
22	PSC M50	Cum	13914
23	PSC M55	Cum	14110
24	HYSD	MT	78946
25	HT strand	MT	155191
26	CTSB	Cu.m	3737
27	CTB	Cu.m	3877
28	PQC	Cu.m	9240
29	DLC	Cu.m	4863
30	PMB-CAPEX	Cu.m	13348
31	CRMB	Cu.m	12589
32	PMB-MMR-Gr1	Cu.m	13348
33	BC - G1-VG-40-MMR	Cu.m	11583

NOTE: 1. Item rates are considered for Small projects

2. Labour: Central Minimum Wages as on April'2025 for "C Area" Category of construction workers

7.2 IMMEDIATE REPAIRS COSTS

Costs associated with immediate repairs are estimated based on the detailed asset inventory and condition assessment surveys, Pavement condition and structural condition assessment surveys. Items which are not executed as part of scope or in damaged condition have been considered for immediate costs as a part of 1-year Capex. Following items are mainly considered for immediate costs:

- Scope which is not executed
- Road work items
- Bridge Work Items
- Pavement Rehabilitation works
- Structural Rehabilitation works
- Drainage Works
- Slope Protection works
- Safety Works

There is no immediate repair cost envisaged in this project.

7.3 ROUTINE MAINTENANCE & INCIDENT MANAGEMENT COSTS

Routine maintenance costs include general maintenance costs of road elements, bridge elements and road furniture and appurtenances. This can be mainly divided into two parts as:

- ✓ General Maintenance of Works
- ✓ Repairs to Highway & Bridge Elements

7.3.1 General Routine Maintenance

General Routine Maintenance of Roads generally include following items:

- Cleaning of Project facilities
- Structures cleaning,
- Cleaning of ROW
- Cleaning and Maintenance of Toll Plaza
- Unlined Drain Maintenance
- Lined Drain Maintenance
- Maintenance of Highway Lighting at Toll Plaza and other project locations
- Median Plantation maintenance & Avenue plantation maintenance:
- Maintenance of Road Furniture
- Maintenance of Road Safety Items

The above items are estimated by considering the detailed break-up of following items:

- Manpower including Managers/Labour etc.
- Vehicles for Labour Transport/Water Tankers/Sweeping Machines etc.
- Resources/Equipment's such as grass cutters, tools, jet sprayers, hydraulic trimmers etc.

7.3.2 Repairs to Highway & Bridge Works

Repairs to highway and bridge works have been estimated based on the assumed quantities (Percentage basis) of execution for every year.

These items include the following:

A. Roads

1	Providing treatment for sealing of road surface / isolated cracks at scattered locations
	i) covered with 6.7 mm size stone chipping @ 0.1 cum/ 10 sqm.
	ii) covered with dry coarse sand passing through 2.36 mm sieve and retained on 180-micron sieve @ 0.03 cum/10 sqm heated to 600 C
	iii) filling discrete cracks with slow curing bitumen emulsion as per Technical Specification Clause 3004.3.3
2	Providing treatment to bleeding bituminous surface at scattered locations
3	Providing localized repair to rutted portion and edge breaking of bituminous surface
4	Providing treatment and repair to pot-holes and patch work
5	Providing and laying dense bituminous macadam using bitumen grade 60/70 complete as per Technical Specification Clause 507
6	Proving and laying bituminous concrete (asphaltic concrete)
	(a) Using bitumen (VG-40) as per IRC: SP: 53
7	Road Roughness survey
8	Turfing on embankment slopes and at all other Project Facilities
9	Providing repair to stone pitching/apron at scattered locations
10	Rain Cuts Maintenance: Restoration of rain cuts soil, moorum, gravel or a mixture of these
11	Cleaning of Lined Drain
12	Repair of damaged lined drain
13	Unlined drain cleaning
14	Filling in median island with approved materials with all leads and lifts complete as per TS Clause No. 407
15	Replacing damaged / broken railing with new pre-cast / cast-in-situ, concrete railing to match with existing design and pattern.
24	Carrying out repair to road signs including strengthening resetting or otherwise repairing signs and delineators
	a) Road sign board mounted on single post
	b) Road sign board mounted on double post
	c) Overhead/ Gantry Sign boards
	d) Delineator
25	Supplying and fixing at site retro-reflectorized type sign boards/signs
	90cm Equilateral triangle
	60cm circular
	90 cm circular
	90cm high octagon
	80cm x 60cm rectangle
	Chevron signs 60cm x 45cm
	Place identification signs (Fig 15.7 of IRC 67)

	Providing and fixing Object Markers
	Providing and fixing of retro-reflectorized Route Marker signs (size 450mm x 600mm)
26	Hazard Marker Sign:
	a) size 90 x 30 cm
	b) size 30cm triangular side cluster of red reflectors (screen printed)
27	Cats Eyes/Raised pavement marker (NMC Nails Less)
28	Painting two coats on old surface after minor repairs to give an even and smooth surface and printing letters and figures with synthetic enamel paint
	a) Hectometer stones
	b) Kilometer Stone
	c) 5 Kilometer stone
	d) Boundary stone
	e) Guard stone
29	Providing painting lettering and fixing of distance measurement stones including dismantling of old damaged/ broken ones, confirming to TS Clause 804
	a) Hectometer stones
	b) Kilometer Stone
	c) 5 Kilometer stone
	d) Boundary stone
	e) Guard stone
30	Providing and fixing road delineators conforming to TS Clause No. 805 as directed by the Engineer.
31	Repainting the Kerb stones and separation barrier with first quality synthetic enamel paint of approved brand
32	Painting all types of pavement markings including lines, dashes, arrows etc. on roads as per relevant IRC/MOST standards after cleaning the surface complete in all respects as directed by the Engineer.
	a) Hot applied Thermoplastic compound
	(i) Lane / Centre Line / Edge Line
	(ii) Direction Arrows, Diagonal Chevrons Markings, PC etc.,
	(iii) Transverse bar Marking
33	Supplying and laying cast-in-situ cement concrete Kerb without channel section
	a) by Manual/machine including formwork
34	Major repair / replacement of metal beam crash barrier (W profile guard rails)
35	Providing and fixing chain link/ welded mesh fencing / square bars fencing
36	Dismantling the old damaged chain link/welded mesh / square bars fencing and replacing it with new chain link/ welded mesh/square bars fencing
37	Provision of rumble strips
38	Shoulder Maintenance
39	synthetic enamel paint of approved brand on metal pedestrian guard rail
40	Dismantling of wearing course
41	Toll Plaza building repairs, booths, canopy and also maintenance of TP buildings
42	Median plantation maintenance
43	RE wall Maintenance

B. Structures

1. Wearing coat comprising of 50 mm thick BC.
2. Cleaning and adding rubber sealant near expansion joints.
3. Modular Expansion joints.
4. Replacement of Damaged Concrete Railing all complete as per technical specifications and as directed by the Engineer
5. Provision of an RCC crash barrier (0.35sqm cross sectional area) constructed with M-40 grade concrete including reinforcement
6. Cleaning of rocker & roller bearing using high pressure water jet, free from rust scales, re-setting & greasing the bearings using graphite grease including cost of materials, labour etc., complete.
7. POT PTF Bearings greasing and maintaining (sand plastering).
8. Elastomeric Bearings and maintaining.
9. Cutting of groove of 15 mm x 15 mm along crack and sealing the same with epoxy putty including cost of material, labour etc.
10. Carrying out 50 to 60 mm thick shortsheeting using a mix proportion of 1:2:2 (cement: sand:6 mm down aggregate) added with Polypropylene fibers at a dosage rate of 125 gms/bag of cement including cost of labour, material, scaffolding, equipment etc complete.
11. Repair of Floor Aprons, pitching and other protection works
12. Cleaning of Drainage Spouts
13. M-25 Concrete

7.3.3 Incident Management Cost

Incident Management & Safety items include the following:

- ✓ ATMS control room operations,
- ✓ Regular patrolling & reaching accident/incident site,
- ✓ providing relief to injured persons including taking them to nearest hospital and attending to the safety requirements at the location (putting cones, safely guide & manage the traffic using signs, safety barricades, etc.),
- ✓ removal of accident /breakdown vehicles, removing of dead animals/birds lying on the highway and loading, unloading, transportation & disposal of surplus material left over by accidental vehicle or otherwise lying on road (on carriageway) and
- ✓ Encroachment prevention & removal with all lead & lifts complete with proper communication equipment,
- ✓ consumables, materials, suitable Towing vehicles, Ambulance, patrolling vehicles and manpower like drivers, helpers, para-medical staff, labour including deployment of crane and all works shall be done as per requirement and as directed by Client representative and as per Relevant Specifications as applicable.

7.4 OPERATIONS COSTS

Cost towards Operations include the following:

- Electricity Bill of lighting
- Toll Plaza Operation cost
- Operation and management costs of rest areas and lay byes
- SPV Costs
- Survey Costs
- Insurance
- Audit Charges
- IE Fee
- Administrative Cost

Following table presents the summary of Operations & Maintenance cost for the project

Table 35: 1st year O&M Cost for FY2026

S No	Description	Amount in Crores.	GST %	GST Amt	Total Crores	Remarks
	SPV - Expenditure					
1	SPV staff	0.62	-	-	0.62	
2	Highway lighting	-	-	-	-	No lighting SPV scope
3	Tolling and ATMS AMC/ Spare Parts	-	-	-	-	No ATMS/TMS in SPV Scope
4	Surveys & Investigations (BBD, Roughness)	0.16	18%	0.03	0.19	
5	IE fees	0.58	18%	0.10	0.68	
6	Insurance Charges	0.50	18%	0.09	0.59	
7	Audit Charges	0.10	18%	0.02	0.12	
8	Admin cost - Board Meeting Expenses, valuation etc.	0.15	18%	0.03	0.18	
	Agency - Expenditure					
9	Toll Operation - Agency	-	-	-	-	No tolling in SPV Scope
10	Route patrolling	1.34	-	-	1.34	In House, hence no GST
11	TAP & MAP	-	-	-	-	
12	Routine maintenance	1.29	18%	0.23	1.52	
13	Repair of Road - BoQ Items	0.53	18%	0.10	0.63	
14	Repair of Structures	0.11	18%	0.02	0.13	
	Total Amount in Crores	**5.38**		**0.61**	**5.99**	

Note: The amount is Crores inclusive of GST (18%) and without escalation, considering FY2026 rates

Further, O&M Cost for FY2026 has been escalated with 5% and the projected Y-O-Y cost is as presented below:

Year	Total O&M Including GST
FY2026	5.99
FY2027	6.29
FY2028	6.61
FY2029	6.94
FY2030	7.28

7.5 PERIODIC MAINTENANCE COSTS

Cost towards major maintenance include following:

- ✓ Cost of Periodic maintenance of Pavement based on Finalized MM schedule
- ✓ Cost of Periodic Maintenance of Structures
- ✓ Cost of Periodic replacement of Toll Equipment's & Software

As suggested by Client, periodic maintenance cost has been projected with 2% escalation.

Table 36: Periodic Maintenance Costs in Crores

S. No	Financial Year (FY)	Periodic Maintenance				
		Functional +Structural overlay MCW+ S/R	Major Maintenance of Rigid Pavement	Replacement of **ATMS**	Replacement of **TMS**	Structure specified repairs
1	2026	17.73	-			-
2	2027	-	-			-
3	2028	-	-	-	-	-
4	2029	-	-			5.12
5	2030	7.33	-			-
	Total:	**25.06**	**-**	**-**	**-**	**5.12**

Note: The amount is Crores inclusive of GST (18%) and with 2% escalation, considering FY2026 rates

- The Project Road consists of 2LPS flexible pavement with an overall length of 28.511 km with a major bridge spanning 9.15 km including viaduct portion on both north/south banks is constructed across the Brahmaputra River.
- The project road does not have Flyovers, VUPs, Toll plazas and ATMS facilities. However, incident management vehicles are provided.
- The O&M requirements related to the Project based on Schedules and Manuals are as follows:

Applicable Manual	Applicable Schedule for O&M	Maximum Roughness Allowed	Minimum Thickness of Mandatory Overlay	Frequency of Roughness Test	Frequency of BBD Test	Remarks
IRC: SP:73-2007	Schedule-K and Manual	2500 mm/Km	-	2 Times in a Year	Once in a 5-Years	Overlay Design shall be done as per IRC:81

- From the axle load analysis, higher VDF-values are observed in the RHS when compare to LHS are due the aggregate/ construction material is being carried from Lohith dist., Arunachal Pradesh towards Assam
- The Project Road has excellent riding quality (UI<2000 mm/km) based on analysis of Roughness data with combined both directions. However, the threshold limit should not exceed 2500mm/km.
- Based on pavement condition, entire length of the project road is rated as excellent to good.
- From FWD analysis, no overlay is warranted as remaining life is more than Target Traffic.
- The following MMR cycle are considered during the concession period

Cycle	Dhola- Sadia	
Planned in Financial Year	***2026***	***2030***
Milling required?	***No***	***No***
BC- 40 mm with VG40		
BC- 30 mm with VG40	28510 mts	
DBM-Variable thickness (50 to 100 mm)		
Micro surfacing (Type 3 with fibre)		19330 mts

- There is no immediate repair cost envisaged in this project.
- In the Costing, the amount considered is Crores inclusive of GST (18%) considering FY2026 rates

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LIST OF ABBREVIATIONS AND SYMBOLS

AADT	-Average Annual Daily Traffic
AE	-Authority Engineer
AMC	-Annual Maintenance Contract
ATMS	-Advanced Traffic Management System
BBD	-Benkelman Beam Deflection
BC	-Bituminous Concrete
BHS	-Both Hand Side
BOQ	-Bill of Quantities
BOT	-Build, Operate & Transfer
CA	-Concession Agreement
CBR	-California Bearing Ratio
CCB	-Concrete Crash Barrier
CCR	-Cement Concrete Railing
COD	-Commercial Operation Date
COS	-Change of scope
CPI	-Consumer Price Index
CUP	-Cattle Underpass
CVC	-Classified Volume Count
CVPD	-Commercial Vehicles per Day
DBM	-Dense Bituminous Concrete
DPR	-Detailed Project Report
ECB	-Emergency Call Box

EPC	-Engineering, Procurement and Construction
ESI	- Employees' State Insurance
FDD	-Filed Dry Density
FOB	-Foot Over Bridge
FRL	-Finished Road Level
FSI	-Free Swell Index
FWD	-Falling Weight Deflectometer
FY	-Financial Year
GOI	- Government of India
GR	-Growth Rates
GS	-Grade Separated
GSB	-Granular Sub Base
GST	-Goods and Services Tax
HCPT	-Half-cell Potential Test
HPC	-Hume Pipe Culvert
HR	- Human Resources
HTMS	-Highway Traffic Management Systems
IE	-Independent Engineer
IRC	- Indian Roads Congress
IRC SP	- Indian Roads Congress Special Publications
IRI	-International Roughness Index
Km	-kilometer
LHS	-Left Hand Side
LL	-Liquid Limit
LS	-Lumpsum
m	-Meter
MAP	-Medical Aid Post
MBIU	-Mobile Bridge Inspection Unit
MCB	-Metal Beam Crash Barrier
MCS	-Micro Surfacing
MCW	-Main Carriageway
MDD	-Maximum Dry Density
MHR	-Metallic Hand Rail
MJB	-Major Bridge
mm	-Millimeter
MM	-Major Maintenance
MNB	-Minor Bridge
MoRTH	- Ministry of Road Transport & Highways
Mpa	-Mega Pascal
MR	-Resilient Modulus
MSA	-Million Standard Axle

NDT	-Non-Destructive Testing
NHAI	- National Highways Authority of India
NSV	-Network survey Vehicle
O&M	- Operation and Maintenance
OL	-Overlay
PCOD	-Provisional Completion
PF	-Provident Fund
PGR	-Pedestrian Guard Rail
PI	-Plasticity Index
PL	-Plastic Limit
PM	-Periodic Maintenance
PUP	-Pedestrian Underpass
R&R	-Repair and Rehabilitation
RCC	-Reinforced Cement Concrete
RE Wall	-Reinforced Earth Wall
RHS	-Right Hand Side
RHT	-Rebound Hammer Test
RM	-Routine Maintenance
ROB	-Road Over Bridge
RPO	-Route Patrol Officer
RUB	-Road Under Bridge
SDBC	-Semi-Dense Bituminous Concrete
SPV	-Special Purpose Vehicle
SR	-Service Road
SWB	-Static Weigh Bridge
TAP	-Traffic Aid Post
TCS	-Typical cross Section
TDRT	-Transient Dynamic Response test
TMS	-Toll Management System
UI	-Unevenness Index
UPVT	-Ultra Pulse Velocity test
VDF	-Vehicle Damage Factor
VG	-Viscosity Grade
VUP	-Vehicular Underpass
WBM	-Water Bound Macadam
WMM	-Wet Mix Macadam
WPI	-Wholesale Price Index

CHAPTER 1. INTRODUCTION

1.1 INTRODUCTION

The Govt. of India (GOI) through Ministry of Roads & highways (MoRTH) resolved to Construct bridges across Dibang river systems and connecting road between Bomjir-Meka (NH-52) covering length of 18.95 Km & construct bridge across river Lohit at Alubari Ghat and connecting road between Chowkham - Digaru covering length of 12.00 Km in Arunachal Pradesh (total 30.95 Km) on BOT-Annuity basis under Arunachal Pradesh package of Road and Highways.

Accordingly, Authority invited the proposals and awarded the works to **M/s Navayuga Dibang Infra Projects Pvt Ltd**. Authority and M/s Navayuga Dibang Infra Projects Pvt Ltd entered into the Concession Agreement by signing the contract on 3rd November 2010.

IE has issued PCOD on dated 07th December 2018 with **effective date of PCOD as 19th May 2018** and completion certificate received on dated 10th October 2019 with **effective date of Completion certificate as 12th Dec 2018**.

In June 2020, Navayuga Dibang Infra Projects Pvt Ltd (DIPPL) was acquired by M/s Sekura Roads Pvt. Ltd., a portfolio company of EPIC 3, and was subsequently transferred to EPIC Concessions Private Limited. This acquisition was facilitated through an Alternate Investment Fund managed by EAAA India Alternatives Limited (EAAA), formerly known as Edelweiss Alternative Asset Advisors Limited.

We understand that EAAA TransInfra Managers Limited is the Investment Manager, Chennai -Tada Tollway Private Limited ("CTTPL") is the proposed Project Manager and Watrak Infrastructure Private Limited ("WIPL") is the sponsor of the Citius TransNet Investment Trust ("Trust" or "InvIT") and M/s Dibang Infra Projects Pvt Ltd (“DIPPL”) is proposed to be part of the initial portfolio assets of the Trust. The Trust was incorporated on 1st August 2025 with Securities and Exchange Board of India (“SEBI”) as an infrastructure investment trust under the SEBI InVIT Regulations.

M/s Watrak Infrastructure Private Limited (hereinafter “the Client”) as sponsor has appointed M/s Samarth Infraengg Technocrats Pvt Ltd (hereinafter referred as “Technical Consultant”) to carry out Technical Due Diligence of operational asset of “bridges across Dibang river systems and connecting road between Bomjir-Meka (NH-52) covering length of 18.95 Km & construct bridge across river Lohit at Alubari Ghat and connecting road between Chowkham - Digaru covering length of 12.00 Km in Arunachal Pradesh (total 30.95 Km) on BOT-Annuity (herein after refer as “the Project”) which is being operated by “M/s Dibang Infra Projects Pvt Ltd (“DIPPL") (hereinafter refer as “the Concessionaire or Company or “DIPPL”)

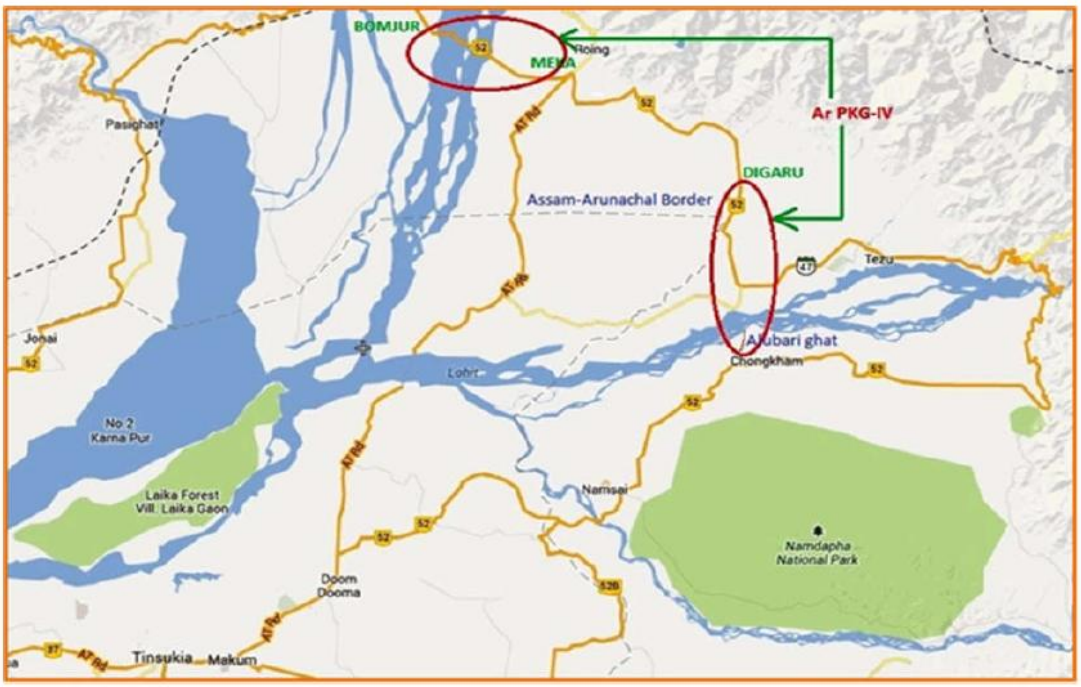
The details of the Road asset (“Project Highway”) are as follows:

S. No	Project Description	Length (Km)
1	Construction of 12.9 m wide bridge between Dhola and Sadia ghats along with 2 lane connecting roads from near about Dhola to islampur tinali in assam on BOT basis under Arunachal Pradesh package of Roads and Highways.- **Dhola**	28.511
2	Construction of bridges across Dibang river system and connecting road between Bomjur-Meka (NH 52) covering length of 18.95 km and construct bridge across river Lohit at alubari ghat and connecting road between Chowkham Digaru covering length of 12 km in Arunachal Pradesh on BOT basis under Arunachal Pradesh package of Roads and Highways- Dibang	29.635
3	Four Laning of Maharashtra/Karnataka Border - Sangareddy section of NH9 (from KM 348.800 to Km 493.000) in the states of Karnataka and Andhra Pradesh to be executed as BOT (Toll project) on DBFOT pattern under NHDP phase IV B.- **DTL**	144.950
4	Four Laning of Jorbat Shillong of NH 40 from Km 0 to Km 61.8 in the state of Assam and Meghalaya on DBFOT Pattern under SARDP NE on BOT Basis. – **JSEL**	61.800
5	Four Laning of paved shoulders of Sambalpur- Rourkela section of SH-10 from Km 4.900 to 167.900 in the state of Odisha to be executed as BOT (toll) project on DBFOT pattern- **SRTL**	161.730

Construction of bridges across Dibang river system and connecting road between Bomjur-Meka (NH 52) covering length of 18.95 km and construct bridge across river Lohit at alubari ghat and connecting road between Chowkham- Digaru covering length of 12 km in Arunachal Pradesh on BOT basis under Arunachal Pradesh package of Roads and Highways- Dibang

1.2 PROJECT AT A GLANCE

National Highway 52 (NH-52) originates from Baihata Chariali near Guwahati and runs along the northern bank of the mighty Brahmaputra River, connecting several important towns and villages such as North Lakhimpur, Banderdewa, Akajan, and Jonai in Assam. From Jonai, the highway enters the state of Arunachal Pradesh, passing through key locations including Pasighat, Bomjur, Roing, Digaru, Tezu, Parshuram Kund, Chowkham, Namsai, and Dirak. It then re-enters Assam at Dirak and terminates at Rupai on National Highway 37 (NH-37).



Project road covers two packages as mentioned below.

1.2.1 Package-I: Bomjur – Meka having length of 17.362 Km

The Bomjur–Meka stretch, spanning approximately 17.362 km, lies within the Dibang Valley district of Arunachal Pradesh. This section plays a crucial role in bridging the challenging terrain across the Dibang River, a major river system in the region. The Dibang River, along with its numerous tributaries, flows through the area in as many as 11 separate channels, covering a combined width of nearly 10 km, and is flanked by dense forest.

The successful completion of this stretch was a significant engineering feat, given the complex topography, multiple river channels, and thick forest cover. With the commissioning of this vital link under the National Highway network, the travel distance between Roing and Pasighat has been dramatically reduced from 300 km to just 90 km, significantly enhancing connectivity and accessibility in this remote region.

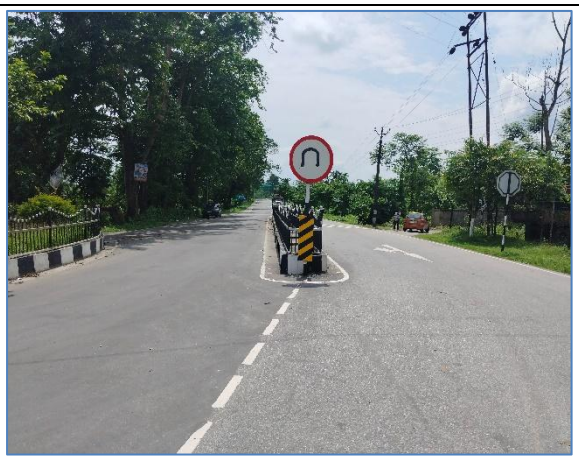


Map Showing the Project Corridor Pkg-I

The existing and design chainage are as follows:

Referencing system	Project Corridor Start Point (km)	Project Corridor End Point (km)	Length (km)
Design Chainage	0.500	17.862	17.362
Existing Chainage	999.500	982.138	17.362

Photograph showing the start and end point of the project road are presented below



Start Point of Project Road at km 0.500



End Point of Project Road at km 17.862

1.2.2 Package-II: Digaru – Chowkham, Length 12.273 km

The Digaru–Chowkham stretch has significantly improved regional connectivity in Arunachal Pradesh. Previously, the route from Alubari Road to Chowkham passed through a circuitous alignment via Parshuram Kund, covering approximately 141 km and traversing multiple ghat sections. With the completion of this stretch, the distance has been drastically reduced to just 12 km, facilitated by the construction of a 2.1 km-long bridge over the Lohit River.

This strategic project has also enabled direct connectivity from Tezu to Namsai and further to Dibrugarh via Tinsukia, creating seamless integration between Arunachal Pradesh and Assam. The project now serves as a vital all-weather link, ensuring 24x7 connectivity between Upper Assam and the eastern region of Arunachal Pradesh. In addition to reducing travel time and improving accessibility, the project has significantly contributed to the socio-economic development of the area and is estimated to save nearly ₹10 lakh per day in fuel costs.



Map Showing the Project Corridor Pkg- 2

The existing and design chainage are as follows:

Referencing system	Project Corridor Start Point (km)	Project Corridor End Point (km)	Length (km)
Design Chainage	0.000	12.273	12.273
Existing Chainage	686.727	699.000	12.273



Start Point of Project Road at km 0.000



End Point of Project Road at km 12.273

Following Table highlights the total project at a glance:

Table 1: Project Details

S No	Description	Date
1.	Employer	Ministry of Road Transport & Highways (MORTH)
2.	Concessionaire	Dibang Infra Projects Limited (DIPL) *(Formerly known as Dibang Infra Projects Pvt.Limited & Navayuga Dibang Infra Projects Private Limited)*
3.	NH No.	Old NH-52 (New NH-13)
4.	Mode of the Project	BOT-Annuity
5.	Length of the Project	29.635 km *(Bomjur-Meka: 17.362km & Chowkham-Digaru: 12.273 km)*
6.	Total Project Cost	Rs. 764 Crores
7.	Date of Signing the Concession Agreement	03.11.2010
8.	Appointed Date	11.06.2011
	Scheduled Project completion	1640 Days (4 ½ Yrs) from Appointed date 06.12.2015
8. 9.	EOT granted 149 days on account of LA, Forest clearances, adverse weather, strike & violence etc.	22.04.2018
10.	Date of Provisional Completion Certificate, PCOD	19.05.2018
11.	Date of Final Completion Certificate	12.12.2018
12.	Scheduled End of Concession (17 years from Appointed date including construction period)	17 years from Appointed Date 10.06.2028 (As per MPR: 28.02.2030) (Revised: 12.11.2030)

Note: a) Total no of Annuities: 25 nos.; b) Annuity Amount: 39.69 Cr; c) 1st /Last Annuity: 15.11.2018/12.11.2030

1.3 REVIEW OF O&M REQUIREMENTS

The O&M requirements related to the Project based on Schedules and Manuals are as follows:

Applicable Manual	Applicable Schedule for O&M	Maximum Roughness Allowed	Minimum Thickness of Mandatory Overlay	Frequency of Roughness Test	Frequency of BBD Test	Remarks
IRC: SP:73-2007	Schedule-K and Manual	2500 mm/km	-	2 Times in a Year	Once in a 5-Years	Overlay Design shall be done as per IRC:81

From the above table it is clear that the applicable method for overlay design is BBD (Overlay Design shall be done as per IRC: 81). Though BBD is applicable, considering the advantages of FWD Technique compared to BBD Technique, presently overlay assessment has been done by using FWD Technique but when it is required to assess the overlay in due course of time after acquiring the project the same can be done using BBD Technique for submission to IE/Authority.

- No specific Handing Over (Divestment) requirements are mentioned under CA. Clause 7 of Schedule K specifies that, all defects and deficiencies specified in this schedule-K shall be repaired and rectified by the Concessionaire.

1.4 REVIEW OF CONCESSIONAIRE'S MPR

From the Concessionaire's Monthly Status Report for the March-2025 are as follows.

- As per the inspections carried out during the month of March 2025, existing condition of Project Highway was satisfactory and in conformance with CA stipulations.
- All Maintenance activities like cleaning of Project Highway, Repairs to Metal Beam Crash Barriers, Regular watering of plantation and Application of pesticides and mortality replacement activities were carried out during this period
- As on date, 13 nos. of semi annuity payment are received by Concessionaire out of 25 nos.
- In this month, no periodic maintenance works were undertaken. However, preventive routine maintenance works were in progress.
- Report indicates Encroachment as; Govt Bus shelters at two locations and Forest check-gate at one location.
- IE made COS recommendations to Authority for already constructed 9 RSP (Repelling Spurs at Posanallah Bridge) and also seek approval for new additional RSPs. Approval is awaited.
- Concessionaire notified about the occurrence of Change in law event for GST show-cause notice issued and seek reimbursement for Rs 21.27 Cr (plus interest and penalty) on BOT-annuities received during period from July-17 to March-21

1.5 REVIEW OF PAVEMENT DESIGN

As per pavement design report, Axle load survey is not carried out for this project as there is no direct traffic. Vehicle damage factor can be considered from the IRC guide lines as mentioned below:

Where sufficient information on axle loads is not available and the project size does not warrant conducting an axle load survey, the indicative values of vehicle damage factor as given in below table may be used (ref IRC 37 – 2001).

Initial traffic volume in terms of numbers of commercial vehicles per day	Terrain	
	Rolling / Plain	Hilly
0-150	1.5	0.5
150 – 1500	3.5	1.5
More Than 1500	4.5	2.5

❖ **Main Carriageway:**

For the new pavement, the total thickness required for a subgrade CBR of 7% is found out from design curve of IRC: 37:2001 to be 545 mm and its composition in conformity with the combination block is given below in table.

Pavement Layer	Thickness (mm) for Pkg-1 & Pkg-2
BT	40
DBM	55
WMM	250
GSB	200
Total	545

CHAPTER 2.SURVEYS AND INVESTIGATIONS

2.1 INTRODUCTION

The main objective of undertaking Surveys and Investigations is to appreciate the existing engineering features along the project corridor and to understand the present condition of the various elements of the project road and to prepare required inputs for various rehabilitation and maintenance strategies.

Following Survey and Investigations have been undertaken as a part of study with an objective to understand the present condition of the road and there by access the quality of construction and as well to prepare requisite rehabilitation/corrective designs where necessary.

- Road Inventory Surveys
- Pavement Condition using NSV
- FWD Surveys
- Roughness Surveys using NSV
- Pavement Composition surveys (Test Pits)
- Subgrade Investigations & Laboratory testing
- Material Investigations
- Core Sample surveys
- Axle Load Survey (Not done)
- Structure Inventory and Condition Surveys

These surveys have been conducted in the month of May 2025.

2.2 PACKAGE-1: BOMJUR – MEKA HAVING LENGTH OF 17.362 KM

2.2.1 ROAD INVENTORY

The project corridor comprises a 2-lane paved shoulder carriageway with a 7.0 m wide flexible pavement, flanked by 1.5 m paved shoulders and 1.5 m earthen shoulders on either side.

The section, Meka design Km 0.500 (Existing Km 999.500) to Bomjir design Km 17.862 (Existing Km 982.138) - having a length of about 17.362 kms of this NH- 13, which falls in the Dibang district of Arunachal Pradesh. The project corridor generally runs in plain terrain. The land use along the project road is mostly Agricultural. There are no built-up sections and Toll Plazas are available in the project corridor. Hence, there is no lighting is observed.

In general, road embankments are in the range of 3m to 5m height.



A view of the Project Corridor with 10m carriage at Km 2.290



A view of the Project Corridor with 10m carriageway at Km 6.800

The Project Road has 1 major junction and 12 minor junctions along its length. Photographs showing the Major Junctions and minor junctions are presented below:



Major Junction at km 0.500 LHS



Minor Junction at km 17.400 LHS

The collected Road Inventory Data is presented in **Appendix 1** of this Report

2.2.2 PAVEMENT CONDITION SURVEYS

The present Pavement condition data has been collected using Network Survey Vehicle (NSV). The Pavement Condition data collected for both directions has been presented in **Appendix 2** of this Report. However, by visual inspection the pavement condition appears to be good in entire length.

The photographs showing the pavement condition of the Project Road is presented below.

		
Fair Condition at Km 1.240	Fair condition at Km 7.100	Fair condition at Km 15.900

2.2.3 FALLING WEIGHT DEFLECTOMETER (FWD) SURVEYS

Falling Weight Deflectometer Survey

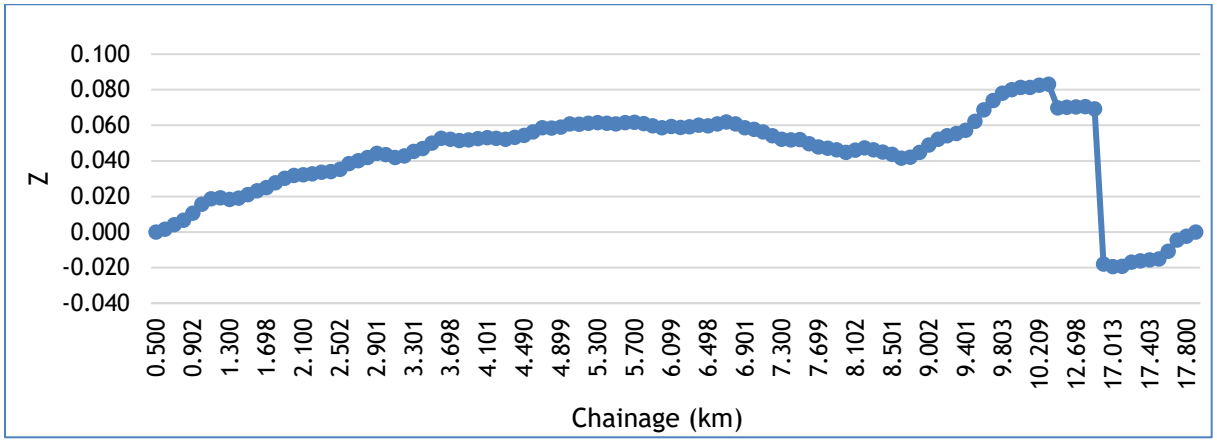
In order to evaluate the structural strength of the existing pavement, Falling Weight Deflectometer (FWD) survey has been carried out along the project road on the Main carriageway. The collected FWD Data and Analysis is presented in **Appendix 3** of this Report.

Few photos taken during the progress of FWD Surveys are presented below:

	
Deflection Measurement in progress In Meka- Bomjir	Deflection Measurement in progress In Meka- Bomjir

Cumulative Difference Approach (CDA) has been used for the identification of homogeneous sections on the basis of Surface Curvature Index (SCI). SCI is calculated as the difference between D0 and D300, where D0 and D300 are the peak deflections (mm) measured at the center of loading plate and at a radial distance of 300mm for combined both direction traffic.

For the project stretch, homogeneous sections have been identified by combining the Left-Hand Side (LHS) and Right-Hand Side (RHS) directions, referred to collectively as Both Directions (BHS). These sections are presented in graphical representation, followed by the table below.



Delineation of Homogeneous Sections – BHS, Main Carriageway

Table 2: FWD Data - Homogenous Sections of Main Carriageway - BHS

Homo Sections	From	To	Length (km)	Remarks
1	0.500	2.002	1.50	
2	2.002	3.601	1.60	
3	3.601	5.002	1.40	
4	5.002	6.702	1.70	
5	6.702	8.806	2.10	
6	8.806	10.300	1.49	
7	10.300	12.450	2.15	MJB
8	12.450	12.950	0.50	
	12.950	16.900	3.95	MJB
	16.900	17.862	0.96	
Total Length			**17.362**	

2.2.4 ROUGHNESS SURVEYS

The Roughness data has been collected using Network Survey Vehicle for main carriageway has been analyzed in terms of International Roughness Index (IRI), separately both direction of travel. Pavement Roughness data collection and computation of IRI for each km length in each direction is presented in **Appendix 4** of this Report.

Schedule K of CA specifies that Roughness values exceeding 2500 mm/km in a Km length, needs to be corrected.

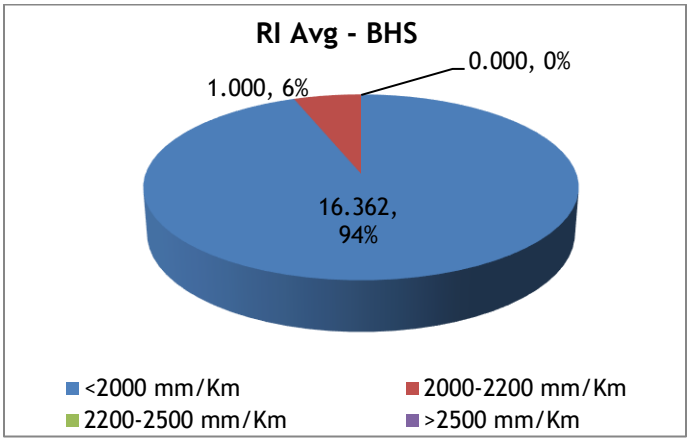
The km-wise roughness index values for both Left-Hand Side (LHS) and Right-Hand Side (RHS) directions are presented below:

Chainage(km)		Length(km)	Roughness Index (mm/km)		
From	To		LHS	RHS	RI Average
0.500	1.000	0.500	965	687	826
1.000	2.000	1.000	599	675	637
2.000	3.000	1.000	642	605	624
3.000	4.000	1.000	660	553	606
4.000	5.000	1.000	1170	853	1012
5.000	6.000	1.000	1032	945	989
6.000	7.000	1.000	1002	798	900
7.000	8.000	1.000	925	807	866
8.000	9.000	1.000	1078	1060	1069
9.000	10.000	1.000	462	539	501
10.000	11.000	1.000	1252	1334	1293
11.000	12.000	1.000	1525	1662	1593
12.000	13.000	1.000	1347	1377	1362
13.000	14.000	1.000	1844	1699	1771
14.000	15.000	1.000	1808	1868	1838
15.000	16.000	1.000	2009	1859	1934
16.000	17.000	1.000	2196	2103	2150
17.000	17.862	0.862	1025	899	962

Note: The average roughness varying from 501 mm/km to 2150 mm/km

Average Roughness Index (RI) values along the corridor were grouped in to four categories i.e., RI<=2000mm/km-Excellent, <=2200mm/km-Good, <=2500mm/km-Fair and >2500mm/km-Poor

Average RI values along the main carriageway were grouped in to four categories, Pie chart showing the range of RI values in each carriageway of the project road have been presented below:



It can be seen from the above pie charts; Entire length Project Road has excellent riding quality (RI<2500 mm/km)

2.2.5 PAVEMENT COMPOSITION SURVEYS (TEST PITS)

The composition of the existing pavement crust has been noted from test pit surveys undertaken at an interval of 10 km in staggered direction. Thus, a total of four (4 no's) pits have been dug along the corridor and the data on composition of pavement has been noted. Photographs have been taken at all test pit locations depicting the crust thickness and nature of material in the pavement. Few photographs are presented below:



MB-TP-1



MB-TP-2



MB-TP-3



MB-TP-4

Results of the test pit survey showing average thickness of pavement layers are presented in the Table below.

Table 3: Pavement Composition of Existing Pavement: Pkg-1

S No	Test Pit Number	Design Chainage	Direction	BT (mm)	WMM (mm)	GSB (RBM)- (mm)	Total (mm)
1	MB-TP-1	0+600	LHS	90	200	430	720
2	MB-TP-2	5+470	RHS	135	200	320	655
3	MB-TP-3	9+550	LHS	110	230	220	560
4	MB-TP-4	17+480	RHS	110	210	250	570

Total average crust thickness of the MCW pavement is 625 mm. Pavement is mainly composed of a BT layer, WMM & GSB base (River bed material) over subgrade.

2.2.6 MATERIAL INVESTIGATIONS

2.2.6.1 Subgrade Samples

Sub-grade Investigations have been carried out to examine the subgrade soil characteristics along the project road. A total of four (4) test pits have been carefully excavated from the pavement surface down to the sub-grade level all located along the edge of the main carriageway. Field density tests have been conducted for subgrade samples and a small quantity of sample has also been collected in airtight containers for determining the field moisture content. Upon completion of the field density test, representative sample of sub-grade soil has been collected in bulk, in gunny bags, from each test pit for laboratory testing.

The soil samples collected have been tested for the following properties to assess the existing sub-grade soil properties.

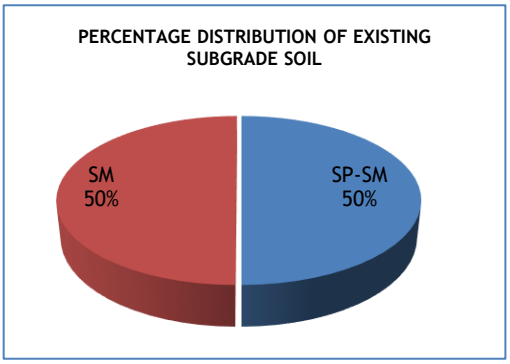
- Sieve analysis
- Atterberg limits
- Heavy compaction
- Four (4) days soaked CBR as per IS standards at 97% of MDD as applicable for sub-grade (Heavy Compaction)
- Free swelling index

Soil classification has been done according to IS Classification of Soils (ISC) as detailed in IS 1498 - 1978. Laboratory test results indicate that all the Subgrade soil samples collected belongs to Coarse Grained Soil. 2 samples belong to SM type of soil and 2 samples belong to SP-SM type of soil.

Pie Chart showing the percentage distribution of soil classification of existing subgrade sample is presented below:

2.2.6.2 Borrow Area Samples

Potential borrow areas are identified at 2 locations for the use of embankment/subgrade construction works within economic haulage leads. The sources identified as potential borrow areas along with certain useful information such as distance from the project road, location, village name, etc., have also been presented in this table below.



S No	Borrow Area No	Chainage	Side	Offset	Village and contact person	Quantity	Rate	Co-ordinates
1	MB-BP-1	12+100	LHS	1.8km	Village: Bomjir River Bed Material	Plenty	Only Royalty	27.838530 96.012061
2	MB-BP-2	0+500	LHS	76.6km	River: Lohith River Bed Material	Plenty	Only Royalty	27.945937 95.993253



MB-BP-1



MB-BP-2

2.2.6.3 Aggregate Samples

Aggregates to be used for sub-base, base, surface courses and concrete works have been collected from the crushers under operation in the existing quarries. The locations, estimated quantity, basic cost of material and the approximate distance from each source to the nearest point on the project corridor are compiled in Tables below.

Table 4: Aggregate Samples Details: Pkg-1

sample No.	Ex.Chainage (Km.)	Left/ Right	Name of Village	Name of Source/ Crusher	Lead from Nearest Ex.Chainage (Km.)	Approximate Quantity (ton)	Basic cost of the material (Rs.)	Remarks	Co-ordinates
MB-AQ-1	0+500	LHS	Alubari	Cusher - Arunachala shiva Stone Crusher Name: R K Charasi Mob no-6009246843	72.6 km	Plenty	40mm-Rs 900/- per cu.m 20mm-Rs 1100/- per cu.m 10mm-Rs 1100/- Per cu.m 6mm-Rs 800/- Per cu.m Dust - Rs 200/- Per cu.m GSB - Rs 280/- Per cu.m	Extra Royalty Rs 200/- per Cu.m and GST 5%	27.844029 96.031209
MB-AQ-2	0+500	LHS	Alubari	Cusher - Namchoom Stone Crusher Name:Apsingh	81.6km	Plenty	40mm-Rs 1000/- per cu.m 20mm-Rs 1200/- per cu.m	Extra Royalty Rs 200/- per	27.818111 96.029681

sample No.	Ex.Chainage (Km.)	Left/ Right	Name of Village	Name of Source/ Crusher	Lead from Nearest Ex.Chainage (Km.)	Approximate Quantity (ton)	Basic cost of the material (Rs.)	Remarks	Co-ordinates
				Namchoom Mob no-9101020081 (Raju ghane)			10mm-Rs 1000/- Per cu.m 6mm-Rs 800/- Per cu.m Dust - Rs 300/- Per cu.m GSB - Rs 250/- Per cu.m	Cu.m and GST 5%	



MB-AQ-1



MB-AQ-2

2.2.6.4 Sand Samples

The sand source locations, estimated quantity, basic cost of material and the approximate distance from each source to the nearest point on the project corridor are compiled in Tables below

Table 5: Sand Samples Details: Pkg-1

Sample No.	Ex.Chainage (Km.)	Left/ Right	Name of Village	Name of Source/ Crusher	Lead from Nearest Ex.Chainage (Km.)	Approximate Quantity (ton)	Basic cost of the material (Rs.)	Remarks	Co-ordinate
MB-SQ-1	12+100	LHS	Bomjir	River:Dibang (Devpani)	1.8 km	Plenty	-	-	28°08'33.3"N 95°41'05.3"E
MB-SQ-2	0+500	LHS	Alubari	River:Lohith Name: Apsingh Namchoom Mob no-9774499108	76.6 km	Plenty	River Sand - Rs 400/- Cu.m	Extra Royalty Rs 150/- per cu.m	27.818111 96.029681



MB-SQ-1



MB-SQ-2

2.2.7 CORE CUTTING SAMPLES

The objective of the core cutting is to examining the engineering properties of the materials relevant to the project as per specifications. 5 cores are taken on Main carriageway and recorded down the details like location, cracks, rutting, and depth of core etc. The core samples were properly packed and sent for laboratory testing for its properties. The photographs of cores are shown below.



MB-C-1



MB-C-2



MB-C-3



MB-C-4

Table 6: Core Cutting Samples Details: Pkg-1

S.NO	Core Id	Existing Chainage	Direction	Offset From Pavement Edge	Thickness (mm)	Hole Depth (mm)	Condition
1	MB-C-1	0+600	LHS	3.7m	90mm	95mm	Good
2	MB-C-2	5+470	RHS	2.4m	105mm	100mm	Good
3	MB-C-3	9+550	LHS	3.5m	80mm	85mm	Good
4	MB-C-4	17+480	RHS	2.1m	80mm	85mm	Good
5	MB-C-4(A)	17+480	LHS	4.75m	90mm	95mm	Cracks

2.2.8 AXLE LOAD SURVEYS

From the previous pavement evaluation study report, May 2023 the following VDF values are considered as below:

Mode Type	LHS (Meka to Bomjir)	RHS (Bomjir to Meka)	Max VDF
LCV	1.46	1.46	1.46
2 Axle Truck	0.23	4.74	4.74
3 Axle Truck	13.66	36.76	36.76
MAV (4-6 Axle)	0.34	34.03	34.03
Buses	0.79	0.68	0.79

2.3 PACKAGE- 2: DIGARU – CHOWKHAM, LENGTH 12.273 KM

2.3.1 ROAD INVENTORY

The project corridor comprises a 2-lane paved shoulder carriageway with a 7.0 m wide flexible pavement, flanked by 1.5 m paved shoulders and 1.5 m earthen shoulders on either side.

The section, Chowkham design Km 0.000 (Existing Km 699.000) to Digaru design Km 12.273 (Existing Km 686.727) - having a length of about 12.273 kms, falls in the Lohith district of Arunachal Pradesh. The project corridor generally runs in plain terrain. The land use along the project road is mostly Agricultural. There are no major built-up sections and Toll Plazas are available in the project corridor. However, small hamlets are observed at Chongkham and Alubari. There are many crushers are available in vicinity of the corridor and abundant river bed material is available for aggregate source.

In general, road embankments are in the range of 3m - 5m height. Embankments higher than 3.0m are observed mainly in the approaches of CD structures.



Project Corridor at Km 0.210



Project Corridor with 10m carriageway at Km 8.350

The Project Road has 1 major junction and 9 minor junctions along its length. Photographs showing the Major Junctions and minor junctions are presented below:



Major Junction at km 0.000 LHS



Minor Junction at km 4.500 LHS

In total, 3 High-mast lightings and 10 solar lightings are provided at junctions. Few photos showing High mast lighting are presented below:



A view of High-mast lighting at km 12.250 RHS



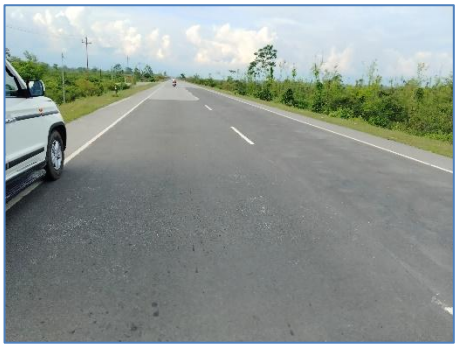
A view of Double arm solar Lighting at km 12.270 LHS

The collected Road Inventory Data is presented in **Appendix 1** of this Report.

2.3.2 PAVEMENT CONDITION SURVEYS

The present Pavement condition data has been collected using Network Survey Vehicle (NSV). The Pavement Condition data collected for both directions has been presented in **Appendix 2** of this Report. However, by visual inspection the pavement condition appears to be good in entire length.

The photographs showing the pavement condition of the Project Road is presented below.

		
Fair Condition at Km 0.210	**Fair condition at Km 4.500**	**Fair condition at Km 10.250**

2.3.3 FALLING WEIGHT DEFLECTOMETER (FWD) SURVEYS

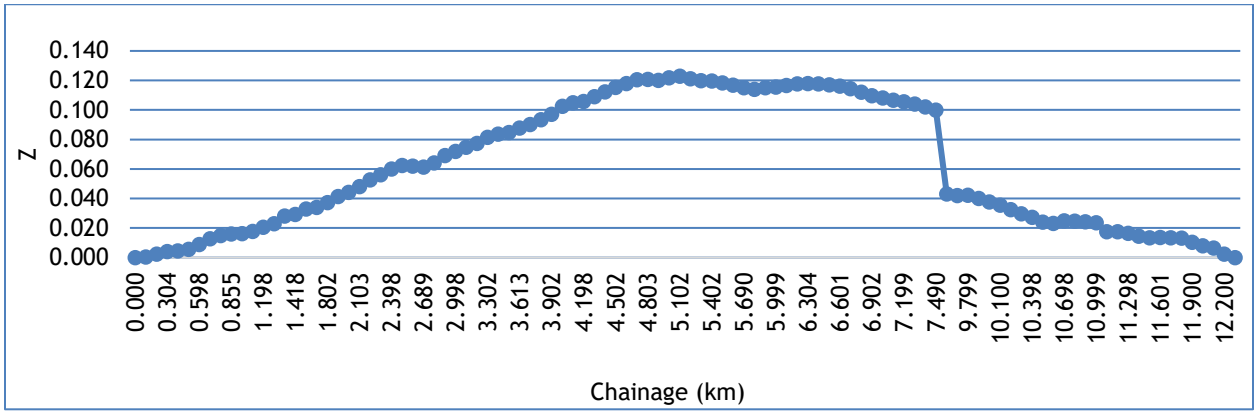
In order to evaluate the structural strength of the existing pavement, Falling Weight Deflectometer (FWD) survey has been carried out along the project road on the Main carriageway. The collected FWD Data and Analysis is presented in **Appendix 3** of this Report.

Few photos taken during the progress of FWD Surveys are presented below:

	
Deflection Measurement in progress	**Deflection Measurement in progress**

Cumulative Difference Approach (CDA) has been used for the identification of homogeneous sections on the basis of Surface Curvature Index (SCI). SCI is calculated as the difference between D0 and D300, where D0 and D300 are the peak deflections (mm) measured at the center of loading plate and at a radial distance of 300mm for combined both direction traffic.

For the project stretch, homogeneous sections have been identified by combining the Left-Hand Side (LHS) and Right-Hand Side (RHS) directions, referred to collectively as Both Directions (BHS). These sections are presented in graphical representation, followed by the table below.



Delineation of Homogeneous Sections - BHS, Main Carriageway

Table 7: FWD Data - Homogenous Sections of Main Carriageway - BHS

S No	From	To	Length (km)	Remarks
1	0.000	1.398	1.40	
2	1.398	2.689	1.29	
3	2.689	4.103	1.41	
4	4.103	5.799	1.70	
5	5.799	7.490	1.69	
6	7.490	9.590	2.10	MJB
7	9.590	10.999	1.41	
8	10.999	12.273	1.27	
Total Length			**12.273**	

2.3.4 ROUGHNESS SURVEYS

The Roughness data has been collected using Network Survey Vehicle for main carriageway has been analyzed in terms of International Roughness Index (IRI), separately both direction of travel. Pavement Roughness data collection and computation of IRI for each km length in each direction is presented in **Appendix** 4 of this Report.

Schedule K of CA specifies that Roughness values exceeding 2500 mm/km in a Km length, needs to be corrected.

The km-wise roughness index values for both Left-Hand Side (LHS) and Right-Hand Side (RHS) directions are presented below:

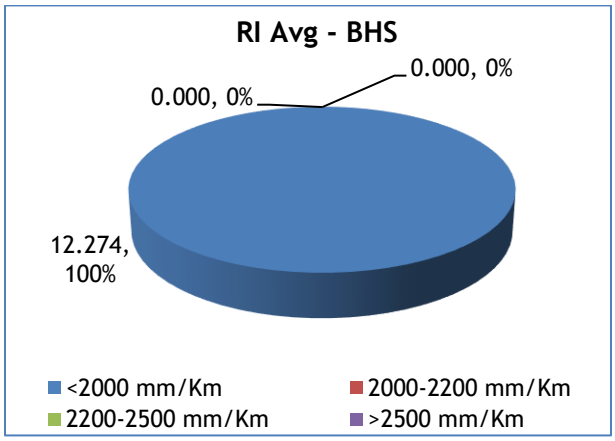
Chainage(km)		Length(km)	Roughness Index (mm/km)		
From	To		LHS	RHS	RI Average
0.000	1.000	1.000	1033	1117	1075
1.000	2.000	1.000	774	730	752
2.000	3.000	1.000	1368	1088	1228

Chainage(km)		Length(km)	Roughness Index (mm/km)		
From	To		LHS	RHS	RI Average
3.000	4.000	1.000	1989	1772	1881
4.000	5.000	1.000	1535	1567	1551
5.000	6.000	1.000	726	710	718
6.000	7.000	1.000	817	979	898
7.000	8.000	1.000	830	1124	977
8.000	9.000	1.000	876	1098	987
9.000	10.000	1.000	804	1068	936
10.000	11.000	1.000	1012	1090	1051
11.000	12.000	1.000	1100	1058	1079
12.000	12.273	0.273	1134	1251	1193

Note: The average roughness varying from 718 mm/km to 1881 mm/km.

Average Roughness Index (RI) values along the corridor were grouped in to four categories i.e., RI<=2000mm/km-Excellent, <=2200mm/km-Good, <=2500mm/km-Fair and >2500mm/km-Poor.

Average RI values along the main carriageway were grouped in to four categories, Pie chart showing the range of RI values in each carriageway of the project road have been presented below:



It can be seen from the above pie charts; Entire length Project Road has excellent riding quality (RI<2500 mm/km).

2.3.5 PAVEMENT COMPOSITION SURVEYS (TEST PITS)

The composition of the existing pavement crust has been noted from test pit surveys undertaken at an interval of 10 km in staggered direction. Thus, a total of four (4 no's) pits have been dug along the corridor and the data on composition of pavement has been noted. Photographs have been taken at all test pit locations depicting the crust thickness and nature of material in the pavement. Few photographs are presented below:



CD-TP-1



CD-TP-2



CD-TP-3



CD-TP-4

Results of the test pit survey showing average thickness of pavement layers are presented in the Table below.

Table 8: Pavement Composition of Existing Pavement: Pkg-2

S No	Test Pit Number	Design Chainage (km)	Direction	BT (mm)	WMM (mm)	GSB (RBM)-(mm)	Total (mm)
1	CD-TP-1	10+900	LHS	125	280	340	745
2	CD-TP-2	6+600	RHS	120	200	300	620
3	CD-TP-3	3+900	LHS	145	200	200	545
4	CD-TP-4	0+160	RHS	120	170	180	470

Total average crust thickness of the MCW pavement is 595mm. Pavement is mainly composed of a BT layer, WMM & GSB base (River bed material) over subgrade.

2.3.6 MATERIAL INVESTIGATIONS

2.3.6.1 Subgrade Samples

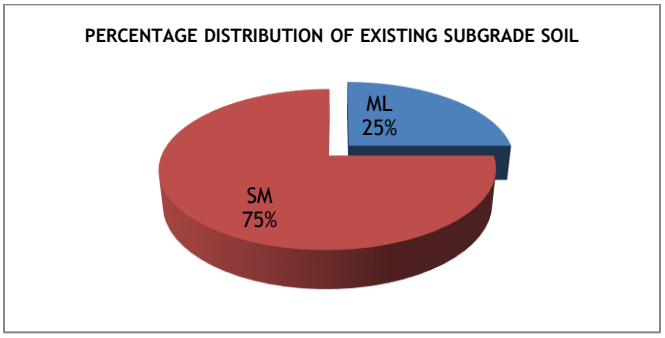
Sub-grade Investigations have been carried out to examine the subgrade soil characteristics along the project road. A total of four (4) test pits have been carefully excavated from the pavement surface down to the sub-grade level all located along the edge of the main carriageway. Field density tests have been conducted for subgrade samples and a small quantity of sample has also been collected in airtight containers for determining the field moisture content. Upon completion of the field density test, representative sample of sub-grade soil has been collected in bulk, in gunny bags, from each test pit for laboratory testing.

The soil samples collected have been tested for the following properties to assess the existing sub-grade soil properties.

- Sieve analysis
- Atterberg limits
- Heavy compaction
- Four (4) days soaked CBR as per IS standards at 97% of MDD as applicable for sub-grade (Heavy Compaction)
- Free swelling index

Soil classification has been done according to IS Classification of Soils (ISC) as detailed in IS 1498 - 1978. Laboratory test results indicate that all the Subgrade soil samples collected belongs to Coarse Grained Soil. Out of 4 test pits, 3 samples belong to SM type of soil and 1 sample belongs to ML type of soil.

Pie Chart showing the percentage distribution of soil classification of existing subgrade sample is presented below:



2.3.6.1.1 BORROW AREA SAMPLES

Potential borrow areas are identified at 2 locations for the use of embankment/subgrade construction works within economic haulage leads. The sources identified as potential borrow areas along with certain useful information such as distance from the project road, location, village name, etc., have also been presented in this table below.

Sl.No	Borrow Area No	Chainage	Side	Offset	Village and contact person	Quantity	Rate	Remarks	Co-ordinates
1	CD-BP-1	5+150	LHS	0.5km	Village: Alubari River Bed Material	Plenty	only Royalty	-	27.838530 96.012061
2	CD-BP-2	12+291	LHS	14.0km	River: Balijan River Bed Material	Plenty	only Royalty	-	27.945937 95.993253



CD-BP-1



CD-BP-2

2.3.6.2 AGGREGATE SAMPLES

Aggregates to be used for sub-base, base, surface courses and concrete works have been collected from the crushers under operation in the existing quarries. The locations, estimated quantity, basic cost of material and the approximate distance from each source to the nearest point on the project corridor are compiled in Tables below.

Table 9: Aggregate Samples Details: Pkg-2

sample No.	Ex.Chainage (Km.)	Left/ Right	Name of Village	Name of Source/ Crusher	Lead from Nearest Ex.Chainage (Km.)	Approximate Quantity (ton)	Basic cost of the material (Rs.)	Remarks	Co-ordinates
CD-AQ-1	7+400	RHS	Alubari	Cusher - Arunachala shiva Stone Crusher Name: R K Charasi Mob no-6009246843	0.3 km	Plenty	40mm-Rs 900/- per cu.m 20mm-Rs 1100/- per cu.m 10mm-Rs 1100/- Per cu.m 6mm-Rs 800/- Per cu.m Dust - Rs 200/- Per cu.m GSB - Rs 280/- Per cu.m	Extra Royalty Rs 200/- per Cu.m and GST 5%	27.844029 96.031209

sample No.	Ex.Chainage (Km.)	Left/ Right	Name of Village	Name of Source/ Crusher	Lead from Nearest Ex.Chainage (Km.)	Approximate Quantity (ton)	Basic cost of the material (Rs.)	Remarks	Co-ordinates
CD-AQ-2	1+320	LHS	Alubari	Cusher - Namchoom Stone Crusher Name:Apsingh Namchoom Mob no-9101020081 (Raju ghane)	0.2 km	Plenty	40mm-Rs 1000/- per cu.m 20mm-Rs 1200/- per cu.m 10mm-Rs 1000/- Per cu.m 6mm-Rs 800/- Per cu.m Dust - Rs 300/- Per cu.m GSB - Rs 250/- Per cu.m	Extra Royalty Rs 200/- per Cu.m and GST 5%	27.818111 96.029681



CD-AQ-1



CD-AQ-2

2.3.7 SAND SAMPLES

The sand source locations, estimated quantity, basic cost of material and the approximate distance from each source to the nearest point on the project corridor are compiled in Tables below

Table 10: Sand Samples Details: Pkg-2

sample No.	Ex.Chainage (Km.)	Left/ Right	Name of Village	Name of Source/ Crusher	Lead from Nearest Ex.Chainage (Km.)	Approximate Quantity (ton)	Basic cost of the material (Rs.)	Remarks	Co-ordinates
CD-SQ-1	5+150	LHS	Alubari	River:Lohith Name: Apsingh Namchoom Mob no-9774499108	0.5 km	Plenty	River Sand - Rs 400/- Cu.m	Extra Royalty Rs 150/- per cu.m	27.818111 96.029681

sample No.	Ex.Chainage (Km.)	Left/ Right	Name of Village	Name of Source/ Crusher	Lead from Nearest Ex.Chainage (Km.)	Approximate Quantity (ton)	Basic cost of the material (Rs.)	Remarks	Co-ordinates
CD-SQ-2	12+290	LHS	Bomjir	River:Dibang (Devpani) Name: Apsingh Namchoom Mob no-9774499108	76.6 km	Plenty	Only Royalty	-	28°09'11.8"N 95°40'57.2"E



CD-SQ-1



CD-SQ-2

2.3.8 CORE CUTTING SAMPLES

The objective of the core cutting is to examining the engineering properties of the materials relevant to the project as per specifications. 5 cores are taken on Main carriageway and recorded down the details like location, cracks, rutting, and depth of core etc. The core samples were properly packed and sent for laboratory testing for its properties. The photographs of cores are shown below.



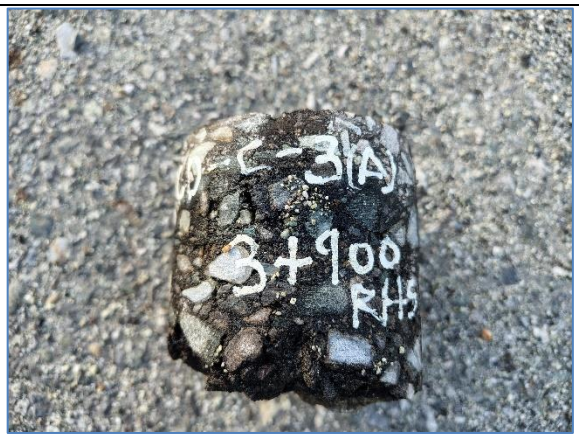
CD-C-1



CD-C-2



CD-C-3



CD-C-3A



CD-C-4

Table 11: Core Cutting Samples Details: Pkg-2

S.NO	Core Id	Existing Chainage	Direction	Offset From Pavement Edge	Thickness (mm)	Hole Depth (mm)	Condition
1	CD-C-1	10+900	LHS	3.2m	85mm	90mm	Fair
2	CD-C-2	6+600	RHS	3.75mm	90mm	95mm	Good
3	CD-C-3	3+900	LHS	3.2m	85mm	90mm	Good
4	CD-C-3(A)	3+900	RHS	1.95m	85mm	90mm	Good
5	CD-C-4	0+160	RHS	3.0m	95mm	100mm	Good

2.3.9 AXLE LOAD SURVEYS

From the previous pavement evaluation study report, May 2023 the following VDF values are considered as below:

Mode Type	LHS (Chowkam to Digaru)	RHS (Digaru to Chowkam)	Max VDF
LCV	0.43	0.60	0.60
2 Axle Truck	0.60	19.49	19.49
3 Axle Truck	0.72	37.44	37.44
MAV (4-6 Axle)	9.13	2.90	9.13
Buses	0.82	0.75	0.82

CHAPTER 3. VALIDATION OF EXECUTED WORKS

3.1 PACKAGE-1: BOMJUR – MEKA HAVING LENGTH OF 17.362 KM

3.1.1 ROAD WORKS

The project road has been closely inspected to verify the executed works on ground.. Each structure has been inspected to note down its structural configuration and condition. The following table highlights the executed works on ground.

Table 12: Executed works

S. No.	Particulars	Length/ Nos		Remarks
			SEC-1	
1	**Start Chainage (Km)**	Km	0.500	
2	**End Chainage (Km)**	Km	17.862	
3	Length of the Project Corridor	Kms	17.362	
4	Length of Service Road	Kms	-	
5	Length of Bypass	Kms	-	
	Structures			
6	Flyovers	Nos	-	
7	ROB	Nos	-	
8	VUP	Nos	-	
9	LVUPs/PUPs	Nos	-	
10	Major Bridges	Nos	3.00	
11	Minor Bridges	Nos		
12	Culverts (Pipe)	Nos	12.00	
13	Culvert (Box)	Nos		
	Junctions			
14	Major Junctions	Nos	1.00	
	Safety/Protection Works			
15	Stone Pitching	Sqm	195,198	
16	Geo Grids/ Green Blanketing	Kms	5.43	
	Drainage/Utility works			
17	RCC Cover Drain	Kms	0.49	
18	Chutes	Nos	44	
	Project facilities /Road Furniture			
	Toll Plaza	Nos	**NIL**	
19	Route Patrolling Vehicle	Nos	1	
20	Ambulance	Nos	1	
21	Cranes	Nos	1	
22	Toeing Vehicle	Nos	1	
23	Busbays with Shelter	Nos	-	
24	Truck laybys	Nos	-	
	Highway Lighting			
25	High Mast Lights	Nos		
26	Solar Blinkers	Nos	1	
	Road Furniture			
27	Road Markings	Kms	17.36	
28	Delineators	Nos	105	
29	Kilometer Stones	Nos	18	
30	Hectometer Stones	Nos	43	
31	5th Km Stone	Nos	4	

S. No.	Particulars	Length/ Nos		Remarks
	Safety Barriers			
32	Single Face W-Beam Safety Barriers	Kms	13.68	
33	Guard Posts	Nos		
34	Rigid Concrete Barriers	Kms	4.72	
35	Concrete Railing	Kms		
36	Hand Railing on Crash Barriers	Kms	4.72	
	Road Signs			
37	Road Signs	Nos	331	
38	2-Lane Gantry Sign Boards	Nos	2	

The project corridor appears to have been constructed with the cross-sectional elements matching to those given in the manual at the time of execution. The carriageway width of 7.0 m wide flexible pavement, flanked by 1.5 m paved shoulders and 1.5 m earthen shoulders on either side.

Slope protection measures such as grass turfing and stone pitching have been provided at High embankments and Bridge approaches along the project corridor. The summary of slope protectionis presented below and the details are presented in **Appendix-5** of this report.

Table 13: Summary of Slope Protection along Project Road

Approach Type	LHS (Kms)	RHS (Kms)	Length (Kms)
Grass turfing	1.83	3.60	**5.43**
Stone Pitching	9.43	8.03	**17.46**
Length (km)			**22.884**

The Project Road has 1 No. of Major Junctions. The List of junctions are provided in **Appendix-5** of this report.

Safety barriers in the form of MBCB, concrete barriers (CCB) are installed along the project road towards the shoulder side. Details of safety barriers provided along the corridor are as follows.

Table 14: Summary of Safety Barrier Locations

Summary	MCB (Km)	Hand Rail on CCB (Km)	CCB (Km)	Delineators(km)
As per Site (Kms)	13.683	4.722	4.722	105
Damaged (Kms)	-	-	-	-

Road furniture in the form of Signs/Markings, Gantry signs and traffic safety blinkers have been provided along the project road the details presented in the **Appendix-5** of this Report. The summary of the same is presented in the Tables below:

Table 15: Summary of Road Signs along Project Road

Description	LHS	RHS	Junctions	Total	Missing	Damage	Poor
Unit	**Nos**	**Nos**	**Nos**	**Nos**	**Nos**	**Nos**	**Nos**
Overhead Gantry	2	-	-	2	-	-	-
Rectangular	7	5	-	12	-	-	-

Description	LHS	RHS	Junctions	Total	Missing	Damage	Poor
Unit	Nos	Nos	Nos	Nos	Nos	Nos	Nos
Triangular	30	29	3	62	-	-	-
Circular	12	12	-	24	-	-	-
Octagonal	1	1	4	6	-	-	-
Flag Type	3	2	-	5	-	-	-
Chevron	106	84	-	19-	-	-	-
Hazard	15	17	-	32	-	-	-
Total	**176**	**150**	**7**	**333**	**-**	**-**	**-**

An Incident Management System (IMS) has been implemented along the project stretch to ensure timely detection, reporting, and resolution of any unforeseen events or emergencies. The details of the Incident Management System established for the project corridor are presented below.

Table 16: Summary of Incident Management Equipment

S. No	Item/Particulars	Unit	Established
1	Ambulance	Nos	1
2	Recovery Crane	Nos	1
3	Patrolling vehicle	Nos	1
4	Toeing Vehicle	Nos	1

3.1.2 STRUCTURES

The inventory of structures has been carried for all every individual structure. The overall summary of existing bridges / structures is as presented below:

Table 17: Summary of Structures as per CA & Site

S.No	Type of Str	No. of Str's	Total No. of Locations
		BHS	
1	MJB	3	3
2	PC	12	12

Table 18: Age of Structures

S.No	Type of Str	BHS		Total No. of Str's
		Old	New	
1	MJB	-	3	3
2	PC	-	12	12

Table 19: Summary of Expansion Joints & Bearings

S.No	Type of Str	Expansion joints		Bearings	
				Elastomeric	
		Old	New	Old	New
1	MJB	-	129	-	500

Table 20: Summary & Combination of Superstructures

S. No	Type of Str	PSC Segmental Box Girder
1	MJB	3

Table 21: Summary of Substructures

S. No	Type of Str	Abutment	Pier	
		Superstructure resting on pile cap	Superstructure resting on pile cap	Rectangular column type
1	MJB	3	1	2

3.2 PACKAGE- 2: DIGARU – CHOWKHAM, LENGTH 12.273 KM

3.2.1 ROAD WORKS

The project road has been closely inspected to verify the executed works on ground. Each structure has been inspected to note down its structural configuration and condition. The following table highlights the executed works on ground.

Table 22: Executed works

S. No.	Particulars	Length/ Nos		Remarks
			SEC-2	
1	**Start Chainage (Km)**	Km	0.000	
2	**End Chainage (Km)**	Km	12.273	
3	Length of the Project Corridor	Kms	12.273	
4	Length of Service Road	Kms	-	
5	Length of Bypass	Kms	-	
	Structures			
6	Flyovers	Nos	-	
7	ROB	Nos	-	
8	VUP	Nos	-	
9	LVUPs/PUPs	Nos	-	
8	Major Bridges	Nos	3.00	
9	Minor Bridges	Nos	7.00	
10	Culverts (Pipe)	Nos	1.00	
11	Culvert (Box)	Nos	14.00	
	Junctions			
12	Major Junctions	Nos	2.00	
13	Minor junctions	Nos	-	
	Safety/Protection Works			
14	Geo Grids/ Green Blanketing	Kms	17.59	
11	**Drainage/Utility works**			
12	RCC Cover Drain	Kms		
13	Chutes	Nos	53	
	Project facilities /Road Furniture			
	Toll Plaza	Nos	**NIL**	
	Route Patrolling Vehicle	Nos	1	

S. No.	Particulars	Length/ Nos		Remarks
14	Ambulance	Nos	1	
15	Cranes	Nos	1	
16	Toeing Vehicle	Nos	1	
17	Busbays with Shelter	Nos	-	
18	Truck laybys	Nos	-	
	Highway Lighting			
19	High Mast Lights	Nos	36	
20	Solar Blinkers	Nos	3	
	Road Furniture			
20	Road Markings	Kms	12.27	
21	Delineators	Nos	182	
22	Kilometer Stones	Nos	19	
23	Hectometer Stones	Nos	37	
24	5th Km Stone	Nos	1	
	Safety Barriers			
25	Single Face W-Beam Safety Barriers	Kms	8.25	
26	Guard Posts	Nos	110	
27	Rigid Concrete Barriers	Kms	5.12	
28	Concrete Railing	Kms	0.16	
29	Hand Railing on Crash Barriers	Kms	4.26	
	Road Signs			
30	Road Signs	Nos	262	
31	2-Lane Gantry Sign Boards	Nos	2	

The project corridor appears to have been constructed with the cross-sectional elements matching to those given in the manual at the time of execution. The carriageway width of 7.0 m wide flexible pavement, flanked by 1.5 m paved shoulders and 1.5 m earthen shoulders on either side.

Slope protection measures in the form of grass turfing has been provided at High embankments and Bridge approaches along the project corridor. The summary of slope protection is presented below and the details are presented.

Table 23: Summary of Slope Protection along Project Road

Approach Type	LHS (Kms)	RHS (Kms)	Length (Kms)
Grass turfing	9.24	8.35	**17.59**
Length (km)			**17.59**

The Project Road has 2 No. of Major Junctions. The List of junctions are provided in **Appendix-5** of this report.

Safety barriers in the form of MBCB, concrete barriers (CCB) are installed along the project road towards the shoulder side. Details of safety barriers provided along the corridor are as follows

Table 24: Summary of Safety Barrier Locations

Summary	MCB (Km)	Hand Rail on CCB (Km)	CCB (Km)	CHR (Km)	Delineators (km)
As per Site (Kms)	8.254	4.260	5.120	0.160	182
Damaged (Kms)	-	-	-	-	-

Road furniture in the form of Signs/Markings, Gantry signs, Junction lighting, high masts and traffic safety blinkers have been provided along the project road the details presented in the **Appendix-5** of this Report. The summary of the same is presented in the Tables below:

Table 25: Highway Lightings details

Summary	Nos	Remarks
No of solar double arm post	10	With LED Bulbs
High-mast post	3	With LED Bulbs

Table 26: Summary of Road Signs along Project Road

Description	LHS	RHS	Junctions	Total
Unit	**Nos**	**Nos**	**Nos**	**Nos**
Overhead Gantry	2	-	-	2
Rectangular	5	4	-	9
Triangular	36	34	-	70
Circular	13	16	-	29
Octagonal	-	2	1	3
Flag Type	3	2	-	5
Chevron	41	41	-	82
Hazard	31	31	-	62
Route marker	2	-	-	2
Total	**133**	**130**	**1**	**264**

An Incident Management System (IMS) has been implemented along the project stretch to ensure timely detection, reporting, and resolution of any unforeseen events or emergencies. The details of the Incident Management System established for the project corridor are presented below.

Table 27: Summary of Incident Management Equipment

S. No	Item/Particulars	Unit	Established
1	Ambulance	Nos	-
2	Recovery Crane	Nos	1
3	Patrolling vehicle	Nos	-
4	Toeing Vehicle	Nos	1

3.2.2 STRUCTURES

The inventory of structures has been carried for all every individual structure. The overall summary of existing bridges / structures is as presented below:

Table 28: Summary of Structures as per CA & Site

S. No	Type of Str	No. of Str's	Total No. of Locations
		BHS	
1	MJB	3	3
2	MNB	7	7
3	Box culvert (BC)	14	14
4	Pipe culvert (PC)	1	1

Table 29: Age of Structures

S. No	Type of Str	BHS		Total No. of Str's
		Old	New	
1	MJB	1	2	3
2	MNB	-	7	7
3	BC	-	14	14
4	PC	-	1	1

Table 30: Summary of Expansion Joints & Bearings

S. No	Type of Str	Expansion joints		Bearings			
				Elastomeric		Rocker Roller	
		Old	New	Old	New	Old	New
1	MJB	3	48	-	200	12	-
Total		51		200		12	

Table 31: Summary & Combination of Superstructures

S. No	Type of Str	PSC Segmental Box Girder	RCC Girder	PSC Girder	RCC Box	Total No. of Structures
1	MJB	1	1	1	-	3
2	MNB	-	-	-	7	7
Total		1	1	1	7	10

Table 32: Summary of Substructures

S. No	Type of Str	Abutment		Pier		
		Superstructure resting on pile cap	RCC wall type	Rectangular column type	RCC wall type	RCC wall type
1	MJB	2	1	1	1	1

4.1 PACKAGE-1: BOMJUR – MEKA HAVING LENGTH OF 17.362 KM

4.1.1 MATERIAL INVESTIGATIONS

4.1.1.1 Borrow Area Samples

The embankment for project road has been constructed with available soils from nearby areas. The soil appears to be sandy clay in nature and embankment appears to be in good condition over the entire length of project. No major settlements or depressions have been noted even at high embankment locations. There are no marshy/water logging areas along the length of project road.

Out of 2 borrow area samples, only 1no sample has been collected, 1 sample belongs to SM type of soil. The percentage distribution of borrow soil and soaked CBR of borrow soil given below. Summary of the test results carried out on these samples are presented in the following tables.

Table 33: Summary of test results of Borrow soils

Lab Sample No	Site Identification		Grain Size Analysis					Atterberg Limits (%)			Soil Class	MDD (gm/cc)	OMC (%)	Soaked CBR 97% MDD	Free Swelling Index (%)
	Location (km)	Up/Dn	Percentage passing from					LL	PL	PI					
			4.75 mm IS Sieve	425 mic IS Sieve	75 mic IS Sieve	Gravel %	Sand %								
MB-BP-1	12+100	LHS	86.14	41.08	11.67	13.86	74.47	-	NP	-	SM	2.09	9.10	30.41	6

4.1.1.2 Subgrade Samples

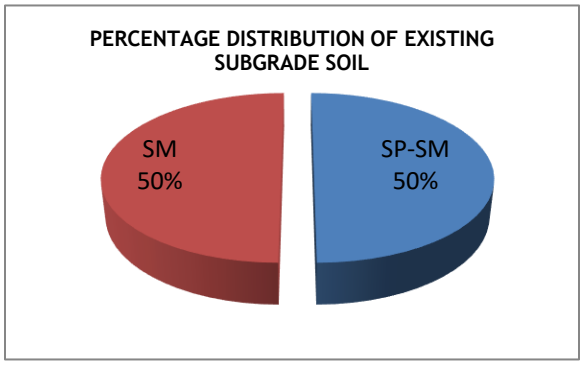
The subgrade samples collected from the test pits taken from project road appears to be in fair condition as revealed by test pit investigations. Soil classification has been done according to IS Classification of Soils (ISC) as detailed in IS 1498 - 1978.

Laboratory test results indicate that majority of the Subgrade soil samples collected belongs to Coarse Grained Soil. Out of 4 subgrade samples, 2 samples belong to SM type of soil and 2 Samples belongs to SP-SM type of Soil.

Summary of the test results carried out on these samples are presented in the following tables whilst the complete details are presented as **Appendix 6** of this report.:

Table 34: Summary of test results of Existing Subgrade Soils

Lab Sample No	Site Identification		Grain Size Analysis					Atterberg Limits (%)			Soil Class	MDD (gm/cc)	OMC (%)	Dry Density at 97% MDD	Soaked CBR 97% MDD	% Compaction	Free Swelling Index
	Location (km)	Up/Dn	Percentage passing from					LL	PL	PI							
			4.75 mm IS Sieve	425 mic IS Sieve	75 mic IS Sieve	Gravel %	Sand %										
MB-TP-1	0+600	LHS	80.97	49.61	16.95	19.03	64.02	-	NP	-	SM	2.10	8.60	2.04	17.80	-	5
MB-TP-2	5+470	RHS	93.54	58.92	9.01	6.46	84.53	-	NP	-	SP-SM	1.97	11.50	1.91	22.20	97	5
MB-TP-3	9+550	LHS	67.20	37.75	11.50	32.80	55.70	24	NP	-	SP-SM	2.15	9.20	2.09	28.20	95	5
MB-TP-4	17+480	RHS	56.61	15.96	1.67	43.39	54.94	-	NP	-	SM	2.07	8.80	2.01	16.30	93	6



The following observations can be made from the above test results conducted on of existing subgrade samples

- Maximum Dry Density for all subgrade samples varies between 1.97 and 2.15 gm/cc. All the Samples are satisfying the MDD criterion (MDD>=1.75 gm/cc).
- OMC for existing subgrade samples varies Between 8.60 to 11.50.
- Free Swelling Index for existing subgrade samples varies from 5 & 6. All samples satisfying the FSI criterion (FSI<=50%)
- Compaction levels are in the range of 93% to 97%
- CBR Values are in the range of 16.30% to 28.20%
- The Liquid Limit (LL) values for one sample is 24%, while the remaining three samples are classified as non-plastic. All the samples satisfy the requirement of having Liquid Limit values less than 50%.
- All the soil samples have been classified as non-plastic. And all the samples are satisfying the PI limits <25%

On the whole, it can be concluded that the existing subgrade is in fair condition. The laboratory test results for soil samples are presented in **Appendix-6** of this Report.

4.1.1.3 Aggregate Test Results

Aggregates to be used for sub-base, base, surface courses and concrete works have been collected from the crushers under operation from the existing river bed quarries. The Table below represents the test results of the Aggregate.

Table 35: Test Results of Aggregate Samples Details

S. No	Sample	Location (km)	Up/Dn	Aggregate Size	A.I.V (%)	Water Absorption (%)	Specific Gravity	Loose bulk density kg/ltr	Rodded bulk density kg/ltr	Stripping
1	MB-AQ-1	0+500	LHS	10 MM	20	0.54	2.80	1.42	1.55	< 95% Coating
				20mm		0.98	2.76	1.44	1.53	
2	MB-AQ-2	0+500	LHS	10mm	20	0.51	2.81	1.44	1.56	< 95% Coating
				20mm		1.01	2.75	1.43	1.53	

Note: All Aggregates samples are satisfying MoRTH requirements i.e., AIV (max. limit is 24% for Asphalt layer), Water Absorption (max. limit is 2%) except stripping test.

4.1.1.4 Sand Test Results

The test results of the sand samples are as presented below.

Table 36: Test Results of Sand Samples Details

S No	Sample No	CHAINAGE (KM)	SIDE	10 mm Passing %	4.75 mm Passing %	2.36 mm Passing %	1.18mm Passing %	600mic Passing %	300mic Passing %	150mic Passing %	FM	ZONE
1	MB-SQ-1	12+100	LHS	100	100.00	99.81	97.82	58.36	11.66	2.77	**2.30**	**ZONE-II**
2	MB-SQ-2	0+500	LHS	100	100.00	99.81	97.02	53.80	7.29	1.15	**2.41**	**ZONE-II**

Note: These sample are suitable for construction works.

4.1.2 PAVEMENT CORES

The core samples as extracted at 5 locations and 3 were tested in the laboratory to find the engineering properties of BC/DBM materials.

The test results of the pavement cores are as presented below.

Table 37: Test Results of Pavement cores-BC Layers

Sl. No.	Name of Material	Core No.	Chainage	Direction	Distance from Pavement Edge (m)	Depth of core in mm	Condition of Road	% of Bitumen Obtained (by extraction of core)		% Agg by Wt. of tatol Mix	Thickness of Specimen mm	DENSITY %	Mixiumum Theoretical Sp.Gr.of Mix (GMM) %	% of Air Voids	Filler Asphalt Ratio (%)	% compaction	Gradation as per Morth	Remarks
								BC	Limits						0.075 mm			
1	BC	MB-C-1	0+600	LHS	3.7m	90mm	Good	5.18	As per MORTH 5th Revision Table no 500-17, Bitumen Content for BC	94.82	38.68	2.286	2.408	5.07	0.89	95	Grade-2	
2	BC	MB-C-2	5+470	RHS	2.4m	105mm	Good	5.40		94.60	50.38	2.421	2.540	4.69	0.73	95	Grade-1	
3	BC	MB-C-3	9+550	LHS	3.5m	80mm	Good	5.03		94.97	41.91	2.399	2.573	6.76	0.97	93	Grade-1	
	BC	MB-C-4	17+480	RHS	2.1m	80mm	Good	ITS		-	30.19	2.418	-	-	-	-		ITS
4	BC	MB-C-4A	17+480	LHS	4.75m	90mm	Cracks	ITS		-		-	-	-	-	-		ITS

Observations:

- 3 out of 5 samples have been tested
- Binder content for BC: ranging from 5.03% to 5.40%. The MORTH Table 500-17 specifies the Bitumen content range is 5.2 ± 0.3 %. All the sample satisfy for bitumen requirement.
- BC-Gradation results indicate the mix design: 2 samples for Grade I proportion and 1 sample for Grade- 2 proportion.
- BC-Air Voids: ranging from 4.69% to 6.76% (MORTH Table-11, specifies 3% to 5%)
- Compaction –More than 93% of Compaction is observed.
- Filler Asphalt Ratio– all samples have Filler –Asphalt ratio is within the specified limit of 0.6-1.2 (refer MORTH clause 505.3 or as per MS-2 (5.10).

Table 38: Test Results of Pavement cores-DBM Layers

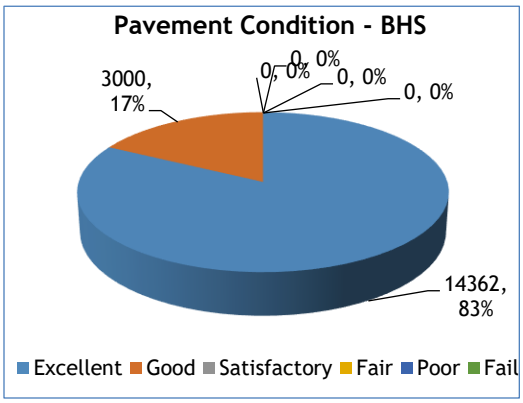
Sl. No.	Name of Material	Core No.	Chainage	Direction	Distance from Pavement Edge (m)	Depth of core in mm	Condition of Road	% of Bitumen Obtained (by extraction of core)		% Agg by Wt. Of total Mix	Thickness of Specimen mm	DENSITY %	Maximum Theoretical Sp.Gr.of Mix (GMM) %	% of Air Voids	Filler Asphalt Ratio (%)	% compaction	Gradation as per Morth	Remarks
								BC	Limits						0.075 mm			
1	DBM	MB-C-1	0+600	LHS	3.7m	90mm	Good	4.42	As per MORTH 5th Revision Table no 500-10, Bitumen Content for DBM grading - 2 is 4.5 %	95.58	52.09	2.431	2.525	3.72	0.45	96	Grade-2	
2	DBM	MB-C-2	5+470	RHS	2.4m	105mm	Good	4.44		95.56	59.19	2.391	2.522	5.19	0.8	95	Grade-2	
3	DBM	MB-C-3	9+550	LHS	3.5m	80mm	Good	4.06		95.94	38.66	2.384	2.533	5.88	0.97	94	Grade-2	
	DBM	MB-C-4	17+480	RHS	2.1m	80mm	Good	ITS		-	47.7	2.369	-	-	-	-	-	ITS
4	DBM	MB-C-4A	17+480	LHS	4.75m	90mm	Cracks	ITS		-	58.1	2.399	-	-	-	-	-	ITS

Observations:

- 3 out of 5 samples are tested have been tested
- Binder content for DBM: ranging from 4.06% to 4.44%. The MORTH Table 500-10 specifies the Bitumen content range is 4.5 ± 0.3 %.
- DBM-Gradation results indicate the mix design: Grade II proportion.
- DBM-Air Voids: ranging from 3.72% to 5.88% (MORTH Table-11, specifies 3% to 5%).
- Compaction –More than 94% of Compaction is observed.
- Filler Asphalt Ratio– all samples have Filler –Asphalt ratio is within the specified limit of 0.6-1.2 (refer MORTH clause 505.3 or as per MS-2 (5.10)).

4.1.3 PAVEMENT CONDITION

The distresses in pavement surface have been captured at 10m interval on the project corridor for both directions separately by NSV survey. Pavement Condition rating (PCI) as per IRC:82-2023 from the data collected at every km by combining the both direction data has been presented in the **Annexure-2** of this report.



The project corridor has been provided with flexible pavement over entire length.

The Pavement condition rating (PCI) is presented in Pie-chart from Excellent to Fail are as below.

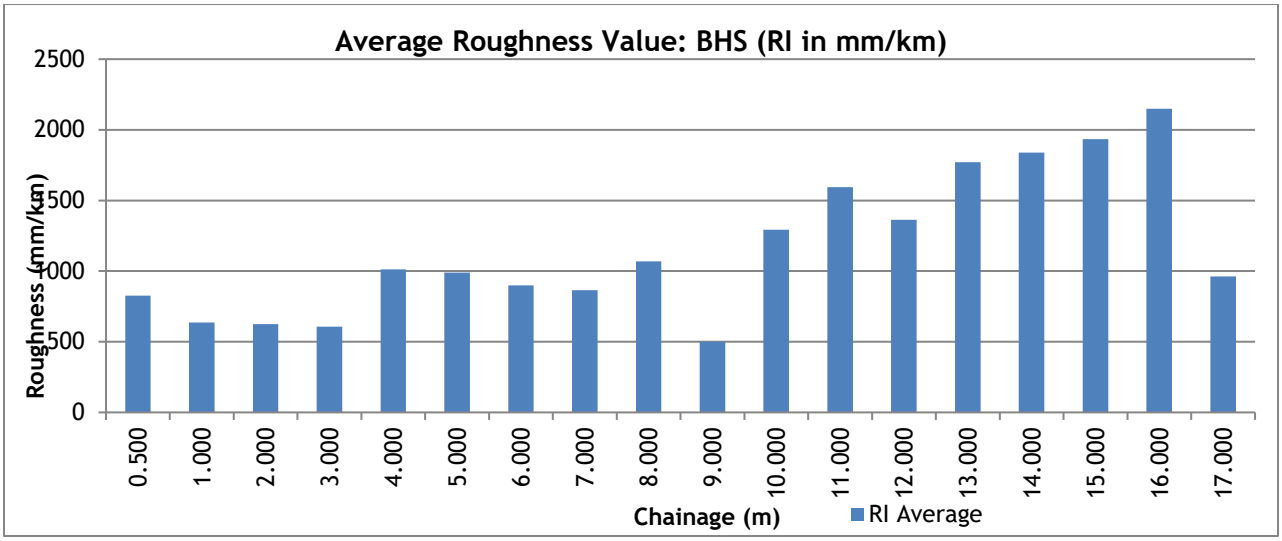
The condition rating for Main carriageway is presented in table as below:

Overall PCI		Condition Rating	Length (km)
>	<=		**BHS**
90	100	Excellent	**14.362**
80	90	Good	**3.000**
60	80	Satisfactory	-
40	60	Fair	-
20	40	Poor	-
0	20	Fail	-

From NSV pavement condition (PCI) analysis, entire length falls under Excellent to Good.

4.1.4 ROUGHNESS

The Roughness represented in Bar charts for the main carriageway are as presented below:



From the above charts, in the both directions of the project road do not require any functional overlay as roughness Index (RI) is Less than minimum requirement of Schedule-K, i.e., 2500mm/km.

4.1.5 FWD ANALYSIS AND ASSESSMENT OF OVERLAY REQUIREMENT

The FWD data collected has been analyzed as per IRC-115 guidelines with the suggested ranges for in-service pavements

- Subgrade Modulus---------- -- 5 CBR to 20 CBR
- Granular Layer Modulus---------- - 100 MPa to 500 MPa
- Bituminous Layers –Thick without distress--- 750 MPa to 3000 MPa
- Bituminous Layers in distressed condition----- 400 MPa to 1500 MPa

The above suggested ranges for guidance only and pavement engineer shall use his judgment based on available data while fixing the above ranges. By looking at the age and condition and performance of the pavement following different set of ranges have been used while finalizing the modulus values:

Layer	Bituminous Layers	Granular Layer Modulus	Subgrade
Modulus Value (MPa)	750-3000	100-500	50-75

Bituminous layer Moduli obtained from back calculations shall be corrected for a standard pavement temperature of 35oC using given equations. Whereas, for back calculated moduli values obtained for granular and subgrade layer shall be corrected for seasonal variations (using winter and summer equations). As FWD tests, performed, during the monsoon, no seasonal correction factor is applied for granular and subgrade layer. The design moduli (15^{th} percentile moduli) of in-service layers for each homogenous section are given in table below.

Table 39: Summary of Design Moduli of different layers – BHS CW

S No	Side	From	To	Length (Km)	15th Percentile MR values (Mpa)		
					MR for BT	MR for Granular	MR for Subgrade
1	2LPS	-.50	2.00	1.50	2604	492	75
2	2LPS	2.00	3.60	1.60	2596	475	75
3	2LPS	3.60	5.00	1.40	2640	486	75
4	2LPS	5.00	6.70	1.70	2595	490	75
5	2LPS	6.70	8.81	2.10	2619	487	75
6	2LPS	8.81	10.30	1.49	2742	449	75
7	2LPS	10.30	12.45	2.15			
8	2LPS	12.45	12.95	0.50	2702	487	75
9	2LPS	12.95	16.90	3.95			
10	2LPS	16.90	17.86	0.96			
Total Length				**17.362**			

Observations on FWD Results

It can be noticed from the above table that the layer moduli for the three layers are varying along the length and direction. The MR value for BT layer is 2595 Mpa to 2742 Mpa in Main Carriageway. The MR value for Granular Layers is 475 Mpa to 492 Mpa inMain Carriageway. Similarly, the MR value for Subgrade Layer is 75 Mpa in BHS Carriageway.

4.1.6 PAVEMENT COMPOSITION

The Pavement Design Report from vendor indicates the following crust composition for the main carriageway:

Concessionaire Pavement Design	
Pavement Layer	**Thickness (mm)**
Bituminous Concrete	40
Dense Bituminous Macadam	55
Wet Mix Macadam	250
Granular Sub-base	200
Total	**545**

However, from the test pits dug at 4 locations along the main carriageway, the crust observed is as

	BT, mm	Granular layers, mm	Total Crust, mm
Average	110	460	570

4.1.7 STRUCTURES

Inventory and asset condition all the existing structures falling within project road have been verified as per IRC: SP-35 procedures and guidelines with following field surveys

- Inventory of existing highway bridges / structures
- Visual condition survey of existing highway bridges / structures

Each and every structure has been verified at site and detailed inventory and condition survey is presented in **Appendix-7** of this report.

There are only minor repairs are suggested for the following distresses.

Minor Repairs works includes:

Honeycomb, Cracks, leaching, Rubber Sealant Damage, Drainage spout down take pipes not Provided etc.

Overall condition of few of the major structures are presented on sample basis as below. However, each and every structure detail are presented in **Appendix-7** of this report:

Chainage: 8+625 (8+550 to 8+700)
General Description
BHS MCW (New)

- Type of Structure : MJB
- Span Arrangement : 3 x 50 m
- Total length of Structure : 150 m
- Total deck width of Structure : 13.2 m
- Type of Foundation : Pile
- Type of Substructure (Abutment & Pier) : Superstructure Resting on pile cap
- Type of Superstructure : PSC Segmental Box Girder
- Type of Bearing : Elastomeric
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:
> Rubber sealant damaged at Expansion joints EJ-1, 2 & 4.
> Drainage spout down take pipes not provided.









Chainage: 11+375 (10+300 to12+450)
General Description
BHS MCW (New)

- Type of Structure : MJB
- Span Arrangement : 43 x 50 m
- Total length of Structure : 2150 m
- Total deck width of Structure : 13.2 m
- Type of Foundation : Pile
- Type of Substructure (Abutment & Pier) : Superstructure Resting on pile cap & Rectangular column type
- Type of Superstructure : PSC Segmental Box Girder
- Type of Bearing : Elastomeric
- Type of Railing / Crash Barrier : Hand railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:
> Cracks and leaching observed on box segment-4 in span-3.
> Honeycomb observed on box segment-4 in span-4.
> Concrete portion damaged at edge of the box segment-5 in span-9.
> Cracks and leaching observed on box segment-14 in span-11.
> Cracks and leaching observed on concrete portion and box segment-6 in span-17.
> Cracks and leaching observed on box segment-3 in span-22.
> Cracks and leaching observed on box segment-4 in span-43.
> Rubber sealant damaged at all Expansion joints.
> Drainage spout down take pipes not provided.












Chainage: 14+925 (12+950 to 16+900)
General Description
BHS MCW (New)

- Type of Structure : MJB
- Span Arrangement : 79 x 50 m
- Total length of Structure : 3950 m
- Total deck width of Structure : 13.2 m
- Type of Foundation : Pile
- Type of Substructure (Abutment & Pier) : Superstructure Resting on pile cap & Rectangular column type
- Type of Superstructure : PSC Segmental Box Girder
- Type of Bearing : Elastomeric
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:
> Quadrant pitching damaged at Embankment A-2 side.
> Rubber sealant damaged at all Expansion joints.
> Drainage spout down take pipes not provided.






General Observations: -

- ✓ The Project stretch have 3 No's of major bridges.
- ✓ The Project Road has Segmental Box Girder type of superstructure in all major bridges.
- ✓ There are Elastomeric (New- 500 No's) observed in Girder type Structures
- ✓ Structures are having 129 No's of Expansion joints on new structures.
- ✓ All the Structures are in fair condition expect some locations having minor distresses like Honeycomb, Cracks, leaching, Rubber Sealant Damage, Drainage spout down take pipes not Provided etc. These structures may require immediate intervention for continuous service.

Sample Photos of Pipe Culverts



Pipe Culvert at Km 1+030



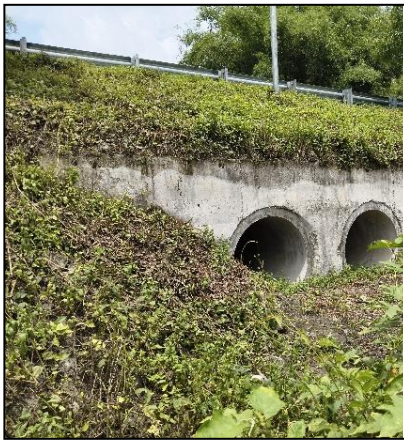
Pipe Culvert at Km 4+155



Pipe Culvert at Km 6.559



Pipe Culvert at Km 7+260



Box Culvert at Km 7+940



Box Culvert at Km 17+440

4.1.8 DRAINAGE AND SLOPE PROTECTION

- ✓ Lined covered drains have been provided are functional.

4.1.9 TRAFFIC SAFETY AND ROAD FURNITURE

- ✓ Metal beam crash barriers provided along the project road appear to be intact over entire length except for few locations where it got damaged.
- ✓ Concrete Crash Barriers installed at different locations appear to be in fair condition.
- ✓ Solar Blinker is observed at start point of the project corridor.

4.1.10 ROAD USER FACILITIES

- ✓ There is no provision of road user facilities such as busbays, truck laybyes etc in project corridor.

4.2 PACKAGE- 2: DIGARU – CHOWKHAM, LENGTH 12.273 KM

4.2.1 MATERIAL INVESTIGATIONS

4.2.1.1 EMBANKMENT

The embankment for project road has been constructed with available soils from nearby areas. The soil appears to be sandy clay in nature and embankment appears to be in good condition over the entire length of project. No major settlements or depressions have been noted even at high embankment locations. There are no marshy/water logging areas along the length of project road.

Out of 2 borrow area samples, only 1no sample has been collected, 1 sample belongs to SM type of soil. The percentage distribution of borrow soil and soaked CBR of borrow soil given below. Summary of the test results carried out on these samples are presented in the following tables.

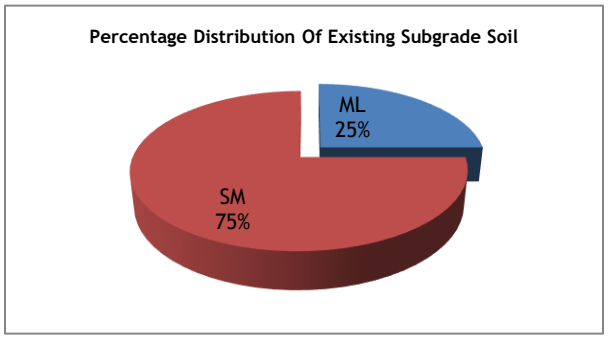
Table 40: Summary of test results of Borrow soils

Lab Sample No	Site Identification		Grain Size Analysis					Atterberg Limits (%)			Soil Class	MDD (gm/cc)	OMC (%)	Dry Density at 97% MDD	Soaked CBR 97% MDD	Free Swelling Index (%)
			Percentage passing from													
	Location (km)	Up/Dn	4.75 mm IS Sieve	425 mic IS Sieve	75 mic IS Sieve	Gravel %	Sand %	LL	PL	PI						
CD-BP-1	5+150	LHS	86.14	41.08	11.67	13.86	74.47	-	NP	-	SM	2.09	9.10	2.03	30.41	6

4.2.1.2 SUBGRADE

The subgrade samples collected from the test pits taken from project road appears to be in fair condition as revealed by test pit investigations. Soil classification has been done according to IS Classification of Soils (ISC) as detailed in IS 1498 - 1978.

Laboratory test results indicate that majority of the Subgrade soil samples collected belongs to Coarse Grained Soil. Out of 4 subgrade samples, 3 samples belong to SM type of soil, 1 Samples belongs to ML type of Soil.



Pie Chart showing the percentage distribution of soil classification of existing subgrade sample is presented below:

Table 41: Test results of Existing Subgrade Soils

Lab Sample No	Site Identification		Grain Size Analysis					Atterberg Limits (%)			Soil Class	MDD (gm/cc)	OMC (%)	Dry Density at 97% MDD	Soaked CBR 97% MDD	Field Dry Density (FDD) (gm/cc)	Compaction (%)	Free Swelling Index (%)
	Location (km)	Up/Dn	Percentage passing from					LL	PL	PI								
			4.75 mm IS Sieve	425 mic IS Sieve	75 mic IS Sieve	Gravel %	Sand %											
CD-TP-1	10+900	LHS	81.00	69.20	19.29	19.00	61.71	-	NP	-	SM	1.98	9.10	1.92	16.90	1.969	99	5
CD-TP-2	6+600	RHS	85.77	40.88	11.21	14.23	74.56	-	NP	-	SM	2.15	9.00	2.09	23.00	2.030	94	5
CD-TP-3	3+900	LHS	98.53	84.81	32.9	1.47	65.63	24	NP	-	SM	1.94	11.40	1.88	17.20	1.775	91	5
CD-TP-4	0+160	RHS	96.17	93.39	80.36	3.83	15.81	-	NP	-	ML	1.81	12.70	1.76	10.20	1.733	96	5

The following observations can be made from the above test results conducted on of existing subgrade samples

- The Liquid Limit (LL) values for one sample is 24%, while the remaining three samples are classified as non-plastic. All the samples satisfy the requirement of having Liquid Limit values less than 50%.
- All the soil samples have been classified as non-plastic. And all the samples are satisfying the PI limits <25%
- Maximum Dry Density for all subgrade samples varies between 1.81 and 2.15 gm/cc. All the Samples are satisfying the MDD criterion (MDD>=1.75 gm/cc).
- OMC for existing subgrade samples varies Between 9.00 to 12.70.
- Free Swelling Index for existing subgrade samples is 5. All samples satisfying the FSI criterion (FSI<=50%)
- Compaction levels are in the range of 91% to 99%
- CBR Values are in the range of 16.83% to 23.00%

On the whole, it can be concluded that the existing subgrade is in fair condition. The laboratory test results for soil samples are presented in **Appendix-6** of this Report.

4.2.1.3 Aggregate Test Results

Aggregates to be used for sub-base, base, surface courses and concrete works have been collected from the crushers under operation from the existing quarries. The Table below represents the test results of the Aggregate and Sand Samples.

Table 42: Test Results of Aggregate Samples Details

S. No	Sample	Location (km)	Up/Dn	Aggregate Size	A.I.V (%)	Water Absorption (%)	Specific Gravity	Loose bulk density kg/ltr	Rodded bulk density kg/ltr	Stripping
1	CD-AQ-1	7+400	RHS	10 MM	20	0.54	2.80	1.42	1.55	< 95% Coating
				20mm		0.98	2.76	1.44	1.53	
2	CD-AQ-2	1+320	LHS	10mm	20	0.51	2.81	1.44	1.56	< 95% Coating
				20mm		1.01	2.75	1.43	1.53	

Note: All Aggregates samples are satisfying MoRTH requirements i.e., AIV (max. limit is 24% for Asphalt layer), Water Absorption (max. limit is 2%) except stripping test.

4.2.1.4 Sand Test Results

The test results of the sand samples are as presented below.

Table 43: Test Results of Sand Samples Details

S No	Sample No	CHAINAGE (KM)	SIDE	10 mm Passing %	4.75 mm Passing %	2.36 mm Passing %	1.18mm Passing %	600mic Passing %	300mic Passing %	150mic Passing %	FM	ZONE
1	CD-SQ-1	5+150	LHS	100	100.00	99.81	97.82	58.36	11.66	2.77	**2.30**	**ZONE-II**
2	CD-SQ-2	12+290	LHS	100	100.00	99.81	97.02	53.80	7.29	1.15	**2.41**	**ZONE-II**

Note: These sample are suitable for construction works.

4.2.2 PAVEMENT CORES

The core samples as extracted at 5 locations and 3 were tested in the laboratory to find the engineering properties of BC/DBM materials.

The test results of the pavement cores are as presented below.

Table 44: Test Results of Pavement cores-BC Layers

Name of Material	Core No.	Chainage	Direction	Distance from Pavement Edge (m)	Depth of core in mm	Condition of Road	% of Bitumen Obtained (by extraction of core)		% Agg by Wt. Of total Mix	Thickness of Specimen mm	DENSITY %	Maximum Theoretical Sp.Gr.of Mix (GMM) %	% of Air Voids	Filler Asphalt Ratio (%)	% compaction	Gradation as per Morth	Remarks
							BC	Limits						0.075 mm			
BC	CD-C-1	10+900	LHS	3.2m	85mm	Fair	5.16	As per MORTH 5th Revision Table no 500-17, Bitumen Content for BC grading - 1 is 5.2%	94.84	27.71	2.373	2.522	5.91	1.17	94	Grade-1	
BC	CD-C-2	6+600	RHS	3.75m	90mm	Good	5.33		94.67	34.71	2.416	2.545	5.07	0.5	95	Grade-1	
BC	CD-C-3	3+900	LHS	3.2m	85mm	Good	**ITS**			33.42	2.367						**ITS**
BC	CD-C-3A		RHS	1.95m	85mm	Good	**ITS**			36.99	2.484						**ITS**
BC	CD-C-4	0+160	RHS	3.0m	95mm	Good	5.33		94.67	39.54	2.464	2.608	5.52	0.53	94	Grade-1	

Observations:

- 3 out of 5 samples have been tested
- Binder content for BC: ranging from 5.16% to 5.33%. The MORTH Table 500-17 specifies the Bitumen content range is 5.2 ± 0.3 %. All the sample satisfy for bitumen requirement.
- BC-Gradation results indicate the mix design: Grade I proportion.
- BC-Air Voids: ranging from 5.07% to 5.91% (MORTH Table-11, specifies 3% to 5%)
- Compaction –More than 94% of Compaction is observed.
- Filler Asphalt Ratio– all samples Filler –Asphalt ratio is within the specified limit of 0.6-1.2 (refer MORTH clause 505.3 or as per MS-2 (5.10).

Table 45: Test Results of Pavement cores-DBM Layers

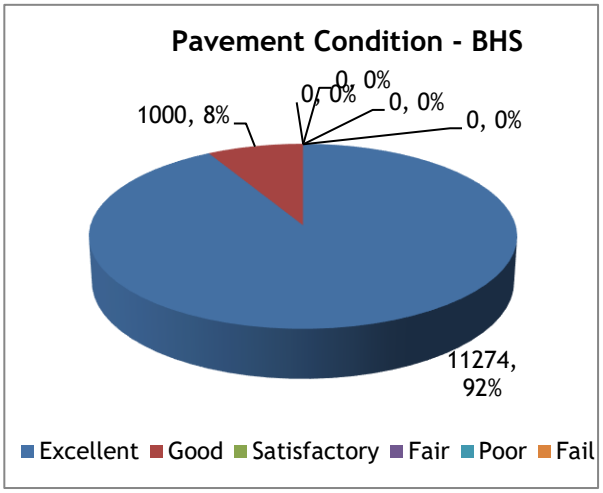
Sl. No.	Name of Material	Core No.	Chainage	Direction	Distance from kerb (mm)	Depth of core in mm	Condition of Road	% of Bitumen Obtained (by extraction of core)		% Agg by Wt.of tatol Mix	Thickness of Specimen mm	DENSITY %	Miximum Theoretical Sp.Gr.of Mix (GMM) %	% of Air Voids	Filler Asphalt Ratio (%)	% compaction	Gradation as per Morth	Remarks
								BC	Limits						0.075 mm			
1	BC	CD-C-1	10+900	LHS	3.2m	85mm	Fair	4.55	As per MORTH 5th Revision Table no 500-10, Bitumen Content for DBM grading - 2 is 4.5 %	95.45	54.08	2.340	2.513	6.88	0.42	93	Grade-2	
2	BC	CD-C-2	6+600	RHS	3.75mm	90mm	Good	4.51		95.49	62.41	2.469	2.615	5.58	0.50	94	Grade-2	
3	BC	CD-C-3	3+900	LHS	3.2m	85mm	Good	ITS			49.25	2.404						ITS
4	BC	CD-C-3A		RHS	1.95m	85mm	Good	ITS			49.54	2.414						ITS
5	BC	CD-C-4	0+160	RHS	3.0m	95mm	Good	4.16		95.84	-	-	2.598	-	0.67	-	Grade-2	

Observations:

- 3 out of 5 samples are tested have been tested
- Binder content for DBM: ranging from 4.16% to 4.55%. The MORTH Table 500-10 specifies the Bitumen content range is 4.5 ± 0.3 %.
- DBM-Gradation results indicate the mix design: Grade II proportion.
- DBM-Air Voids: ranging from 5.58% to 6.88% (MORTH Table-11, specifies 3% to 5%).
- Compaction –More than 93% of Compaction is observed.
- Filler Asphalt Ratio– All samples have Filler –Asphalt ratio is within the specified limit of 0.6-1.2 (refer MORTH clause 505.3 or as per MS-2 (5.10)).

4.2.3 PAVEMENT CONDITION

The distresses in pavement surface have been captured at 10m interval on the project corridor for both directions separately by NSV survey. Pavement Condition rating (PCI) as per IRC:82-2023 from the data collected at every km by combining the both direction data has been presented in the **Annexure-2** of this report.



The project corridor has been provided with flexible pavement over entire length.

The Pavement condition rating (PCI) is presented in Pie-chart from Excellent to Fail are as below.

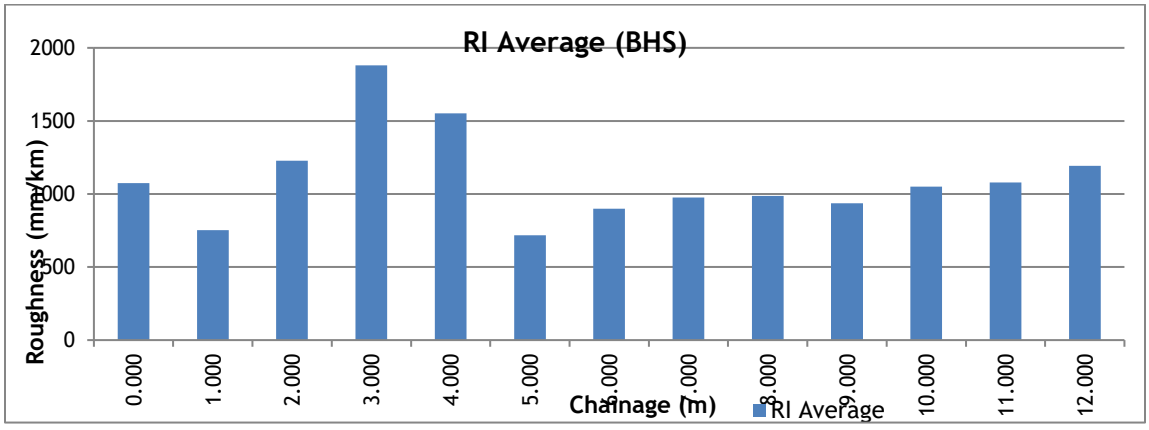
The condition rating for Main carriageway is presented in table as below:

Overall PCI		Condition Rating	Length (km)
>	<=		**BHS**
90	100	Excellent	**11.274**
80	90	Good	**1.000**
60	80	Satisfactory	-
40	60	Fair	-
20	40	Poor	-
0	20	Fail	-

From NSV pavement condition (PCI) analysis, entire length falls under Excellent to Good.

4.2.4 ROUGHNESS

The roughness surveys conducted along the corridor indicate satisfactory riding quality over the length of project corridor. Bar diagrams showing the Kilometer wise roughness along the project road are presented below:



From the above charts, in the both directions of the project road do not require any functional overlay as unevenness Index (UI) is Less than minimum requirement of Schedule-K, i.e., 2500mm/km.

4.2.5 FWD ANALYSIS AND ASSESSMENT OF OVERLAY REQUIREMENT

The FWD data collected has been analyzed as per IRC-115 guidelines with the suggested ranges for in-service pavements

- Subgrade Modulus---------- 5 CBR to 20 CBR
- Granular Layer Modulus---------- - 100 MPa to 500 MPa
- Bituminous Layers –Thick without distress------ 750 MPa to 3000 MPa
- Bituminous Layers in distressed condition------ 400 MPa to 1500 MPa

The above suggested ranges for guidance only and pavement engineer shall use his judgment based on available data while fixing the above ranges. By looking at the age and condition and performance of the pavement following different set of ranges have been used while finalizing the modulus values:

Layer	Bituminous Layers	Granular Layer Modulus	Subgrade
Modulus Value (MPa)	750-3000	100-500	50-75

Bituminous layer Moduli obtained from back calculations shall be corrected for a standard pavement temperature of 35^{o}C using given equations. Whereas, for back calculated moduli values obtained for granular and subgrade layer shall be corrected for seasonal variations (using winter and summer equations). As FWD tests, performed, during the monsoon, no seasonal correction factor is applied for granular and subgrade layer. The design moduli (15th percentile moduli) of in-service layers for each homogenous section are given in table below.

Table 46: Summary of Design Moduli of different layers – BHS CW

S No	Side	From	To	Length (Km)	15th Percentile MR values		
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)
1	2LPS	0.00	1.40	1.40	2817	477	75
2	2LPS	1.40	2.69	1.29	2776	425	75
3	2LPS	2.69	4.10	1.41	2780	390	75
4	2LPS	4.10	5.80	1.70	2774	474	75
5	2LPS	5.80	7.49	1.69	2675	486	75
6	2LPS	7.49	9.59	2.10			
7	2LPS	9.59	11.00	1.41	2706	490	75
8	2LPS	11.00	12.27	1.28	2722	491	75
Total Length				**12.274**			

Observations on FWD Results

It can be noticed from the above table that the layer moduli for the three layers are varying along the length and direction. The MR value for BT layer is 2675 Mpa to 2817 Mpa in Main Carriageway. The MR value for Granular Layers is 390 Mpa to 491 Mpa inMain Carriageway. Similarly, the MR value for Subgrade Layer is 75 Mpa in BHS Carriageway.

4.2.6 PAVEMENT COMPOSITION

As per Previous Pavement Design Report from vendor crust composition for the main carriageway and service road as follows:

Concessionaire Pavement Design	
Pavement Layer	**Thickness (mm)**
Bituminous Concrete	40
Dense Bituminous Macadam	55
Wet Mix Macadam	250
Granular Sub-base	200
Total	**545**

However, from the test pits dug at 4 locations along the main carriageway, the crust observed is as

	BT, mm	Granular layers, mm	Total Crust, mm
Average	**130**	**470**	**595**

4.2.7 STRUCTURES

Inventory and asset condition all the existing structures falling within project road have been verified as per IRC: SP-35 procedures and guidelines with following field surveys

- Inventory of existing highway bridges / structures
- Visual condition survey of existing highway bridges / structures

Each and every structure has been verified at site and detailed inventory and condition survey is presented in **Appendix-7** of this report.

There are only minor repairs are suggested for the following distresses.

Minor Repairs works includes:

Spalling, Reinforcement exposure, Honeycomb, Cracks, leaching, Rubber Sealant Damage, Drainage spout down take pipes not Provided.

Overall condition of few of the major structures are presented on sample basis as below. However, each and every structure detail are presented in **Appendix-7** of this report

Chainage: 0+925 (0+885 to 0+965)
General Description
BHS MCW (Old)

- Type of Structure : MJB
- Span Arrangement : 2 x40 m
- Total length of Structure : 80 m
- Total deck width of Structure : 8.5 m
- Type of Foundation : Well foundation
- Type of Substructure (Abutment & Pier) : RCC wall type
- Type of Superstructure : RCC Girder
- Type of Bearing : Rocker Roller
- Type of Railing / Crash Barrier : Hand railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:
> Rubber sealant damaged at Expansion joint EJ-1 & 3.
> Expansion joint damaged at EJ-2.
> Reinforcement exposure on intermediate cross girder in span-2.









Chainage: 1+495 (1+420 to 1+570)
General Description
BHS MCW (New)

- Type of Structure : MJB
- Span Arrangement : 4 x 30 m
- Total length of Structure : 120 m
- Total deck width of Structure : 13.2 m
- Type of Foundation : Pile foundation
- Type of Substructure (Abutment & Pier) : Superstructure resting on pile cap
- Type of Superstructure : PSC Girder
- Type of Bearing : Elastomeric
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:
> Structure is in fair condition.






Chainage: 8+540 (7+490 to 9+590)
General Description
BHS MCW (New)

- Type of Structure : MJB
- Span Arrangement : 42 x 50 m
- Total length of Structure : 2100 m
- Total deck width of Structure : 13.2 m
- Type of Foundation : Pile foundation
- Type of Substructure (Abutment & Pier) : Superstructure resting on pile cap & Rectangular column type
- Type of Superstructure : PSC Segmental Box Girder
- Type of Bearing : Elastomeric
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:
> Rubber sealant damaged at all Expansion joints.
> Gratings damaged in span-3, 11, 13, 16, 27, 28, 31 & 35.
> Drainage spout down take pipes not provided.
> Cracks and leaching observed on Pier cap P2 in span-2.
> Cracks and leaching observed on box segment-3, 9 & 10 in span 31.
> Cracks and leaching observed on box segment-2 in span-32.
> Cracks and leaching observed on box segment-7 & 10 in span-35.
> Concrete spalling observed on box segment-5 in span-37.
> Leaching observed on box segment-2 in span-38.
> Bearing distress observed at bearing B2 damaged at pier-39 in span-39.
> Previous repair works done.



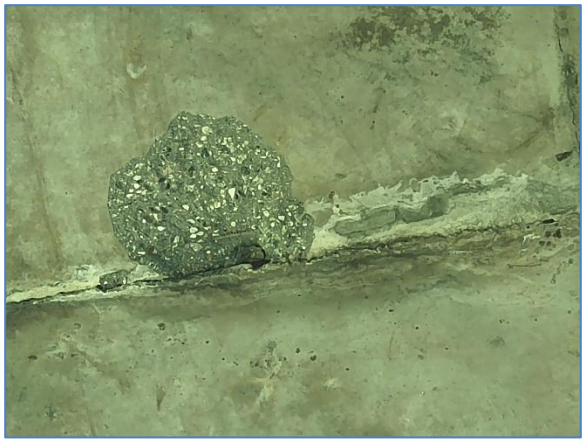














Chainage: 3+399
General Description
BHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 10.5 m
- Total length of Structure : 10.5 m
- Total deck width of Structure : 13.2 m
- Type of Superstructure : RCC Box
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:
> Cracks observed on the soffit of the slab.









Chainage: 4+260
General Description
BHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 2 x 10 m
- Total length of Structure : 20 m
- Total deck width of Structure : 13.2 m
- Type of Superstructure : RCC Box
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:
> Structure is in fair condition.






Chainage: 9+845
General Description
BHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 2 x 12 m
- Total length of Structure : 24 m
- Total deck width of Structure : 13.2 m
- Type of Superstructure : RCC Box
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : Crash barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:
> Cracks observed on the soffit of the slab in span-1 & 2.
> Honeycomb observed on the haunch portion in span-1.

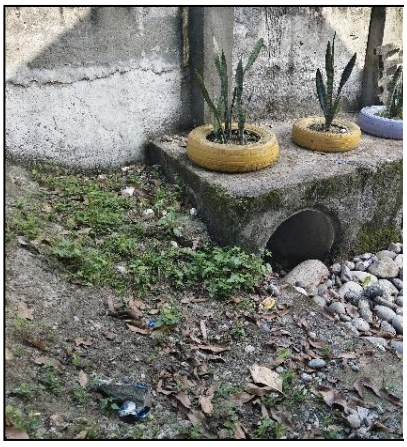





General Observations: -

- ✓ The Project stretch have 10 No's of major structures, in that 3 MJB's & 7 MNB's.
- ✓ The Project Road has varieties of super structure types for various structures such as RCC Girder, PSC Girder, PSC Segmental Box Girder & RCC Box.
- ✓ In this Project stretch, there are Rocker Roller (Old-12 No's) & Elastomeric (New-200No's) observed in Girder type Structures.
- ✓ Structures are having 51 No's of Expansion joints in that 3 No's on old structures and 48 No's on new structures.
- ✓ All the Structures are in fair condition expect some locations having minor distresses like Spalling, Reinforcement exposure, Honeycomb, Cracks, leaching, Rubber Sealant Damage, Drainage spout down take pipes not Provided etc. These structures may require immediate intervention for continuous service

Sample Photos of Culverts:



Pipe Culvert at Km 0+320



Box Culvert at Km 1+925



Box Culvert at Km 3+818



Box Culvert at Km 5+936



Box Culvert at Km 10+548



Box Culvert at Km 11+035

4.2.8 TRAFFIC SAFETY AND ROAD FURNITURE

- ✓ Metal beam crash barriers provided along the project road appear to be intact over entire length except for few locations where it got damaged.
- ✓ Concrete Crash Barriers installed at different locations appear to be in fair condition.
- ✓ Solar Blinkers are observed in junctions. Street lightings in the form of Double arm lightings with solar panels are provided at start point and end point of the project corridor and appears to be good in condition.

4.2.9 ROAD USER FACILITIES

- ✓ There is no provision of road user facilities such as bus-bays, truck lay-byes etc in project corridor.

CHAPTER 5. REHABILITATION PLANS AND DESIGNS

5.1 DESIGN TRAFFIC LOADING

Design Traffic loading has been estimated by considering the latest traffic (given) and VDFs from previous pavement rehabilitation studies and with minimum 5% growth rates for 10 years, 15 years and 20 years design period as below:

Table 47: Traffic Volume (AADT)

Vehicle/Mode	AADT (both direction) @ Km. 0+750	AADT (both direction) @ Km. 1+750
PKG:	PACKAGE-1: BOMJUR – MEKA HAVING LENGTH OF 17.362 KM	PACKAGE- 2: DIGARU – CHOWKHAM, LENGTH 12.273 KM
LCV	4	69
Bus	6	57
2-axle truck	62	208
3-axle truck	35	58
MAV	19	54

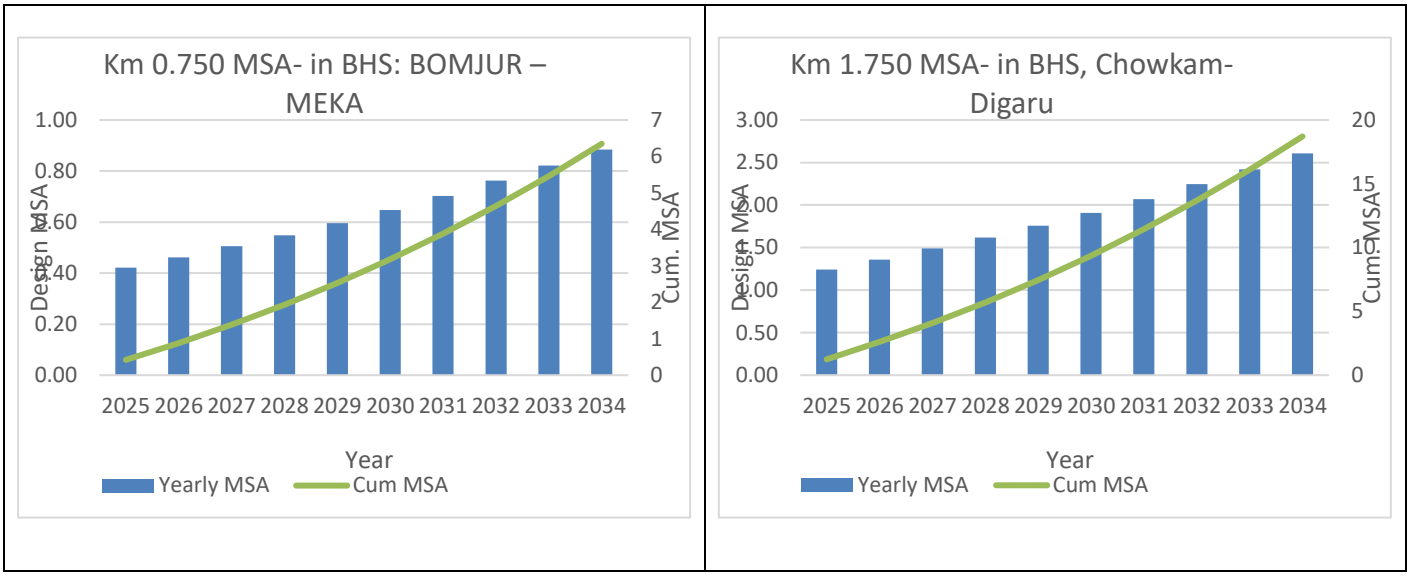
*Note: 50:50 Direction Distribution

Table 48: Estimated Design traffic loading

Design Period	PACKAGE-1: BOMJUR – MEKA		With Max VDF
	LHS	RHS	
End of Concession Yr2031	1	4	4
10 Years	2	7	7

Design Period	PACKAGE- 2: DIGARU – CHOWKHAM,		With Max VDF
	LHS	RHS	
End of Concession Yr2031	1	11	11
10 Years	2	19	20

Pictorial representation of MSAs are as presented below.



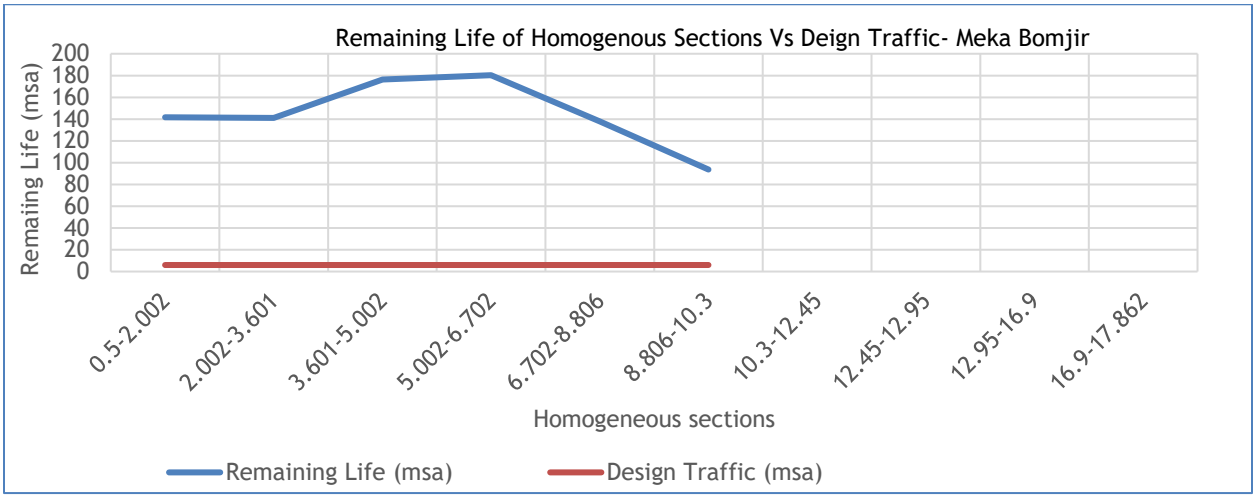
The computation of traffic loadings is presented in **Appendix 8** of this Report.

5.1.1 PAVEMENT REHABILITATION AND STRENGTHENING

For Design the Overlay Thickness the following method as suggested in IRC: 115 has been used

- The existing pavement is considered as a 3-layer system consisting of subgrade, granular and bituminous layer. The remaining life of exiting pavement in terms of Fatigue and Rutting life (MSA) are estimated
- The remaining life is compared with design traffic loading. An overlay with assumed thickness is considered on exiting pavement where required.
- The Total system including the proposed Overlay (Trial thickness) is assumed as a four-layer system and considered the relevant MR values for all the four layers namely New BT layer, existing bituminous surface, total existing Granular layers and Subgrade layers.
- The MR value for the New BT is assumed as 3000 MPA (considering VG40 Bituminous grade) for Main Carriageway and 2000 MPA (considering VG30 Bituminous grade) for Service Road and for all the remaining three layers, the MR Values derived and finalized from the FWD Analysis are considered.
- Critical Tensile strains and Vertical strains are found out by using the IIT PAVE Software at the bottom of existing bituminous layer and at the top of the subgrade layer respectively.
- The Fatigue and Rutting equations (equation given in the IRC: 37) have been used to estimate the Fatigue and Rutting Life of the Pavement system considering 80% reliability equation satisfying design philosophy provisions of the IRC 37-2001.
- The Obtained Fatigue and Rutting Life are compared with the required life for the assumed trial overlay thickness.
- Analysis is carried out for individual homogeneous sections as well for minimum and Average Modulus Values on each direction separately.

Remaining life of the existing pavement from the above analysis is presented in the following tables:



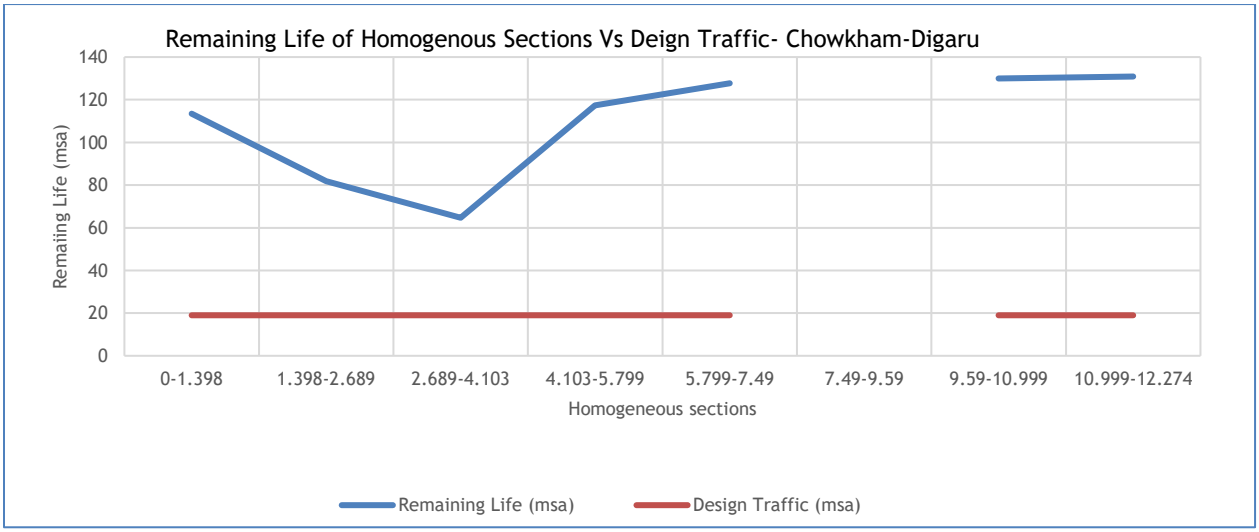


Table 49: Remaining life of the existing pavement BHS Carriageways: PKG-1

S.No	Side	From	To	Length (Km)	15th Percentile MR values			Average Existing Crust		Total Crust (mm)	Adopted MR for BT (Mpa)	Strains From IITPAVE		Remaining Life as per IRC 37-2012 equation for 80% Reliability			
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)	BT (mm)	Granular (mm)			Vertical strain at bottom, epZ	Tangential strain at top, epT	Nf-Fatigue life, mSA	Rutting life,mSA	Target MSA	Remarks
1	2LPS	0.50	2.00	1.50	2604	492	75	90	630	720	2604	0.0001762	0.0001640	142	4357	7	No Overlay
2	2LPS	2.00	3.60	1.60	2596	475	75	96	589	684	2596	0.0001940	0.0001643	141	2816	7	No Overlay
3	2LPS	3.60	5.00	1.40	2640	486	75	105	520	625	2640	0.0002205	0.0001546	176	1576	7	No Overlay
4	2LPS	5.00	6.70	1.70	2595	490	75	105	520	625	2595	0.0002200	0.0001543	180	1592	7	No Overlay
5	2LPS	6.70	8.81	2.10	2619	487	75	90	478	568	2619	0.0002622	0.0001650	138	719	7	No Overlay
6	2LPS	8.81	10.30	1.49	2742	449	75	80	450	530	2742	0.0003067	0.0001804	94	353	7	No Overlay
7	2LPS	10.30	12.45	2.15													MJB
8	2LPS	12.45	12.95	0.50	2702	487	75	87	457	544	2702	0.0002809	0.0001659	131	526	7	No Overlay
9	2LPS	12.95	16.90	3.95													MJB
10	2LPS	16.90	17.86	0.96													No Overlay
Total Length				**17.362**													

From the above, for the main carriageway there is NO overlay requirement in both sections for the entire length as the obtained remaining life of the pavement is more than Target MSA.

Input data used and the output from the IIT Pave software has been presented as screen shots for ready reference as **Appendix 9** of this Report.

Table 50: Remaining life of the existing pavement BHS Carriageways: PKG-2

S.No	Side	From	To	Length (Km)	15th Percentile MR values			Average Existing Crust		Total Crust (mm)	Adopted MR for BT (Mpa)	Strains From IITPAVE		Remaining Life as per IRC 37-2012 equation for 80% Reliability			
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)	BT (mm)	Granular (mm)			Vertical strain at bottom, epZ	Tangential strain at top, epT	Nf-Fatigue life, mSA	Rutting life,mSA	Target MSA	Remarks
1	2LPS	0.00	1.40	1.40	2817	477	75	86	350	436	2817	0.0003940	0.0001700	115	113	20	No Overlay
2	2LPS	1.40	2.69	1.29	2776	425	75	85	377	462	2776	0.0003833	0.0001863	82	128	20	No Overlay
3	2LPS	2.69	4.10	1.41	2780	390	75	85	400	485	2780	0.0003706	0.0001978	65	150	20	No Overlay
4	2LPS	4.10	5.80	1.70	2774	474	75	85	435	520	2774	0.0003054	0.0001698	117	360	20	No Overlay
5	2LPS	5.80	7.49	1.69	2675	486	75	85	500	585	2675	0.0002514	0.0001675	128	870	20	No Overlay
6	2LPS	7.49	9.59	2.10													MJB
7	2LPS	9.59	11.00	1.41	2706	490	75	85	620	705	2706	0.0001834	0.0001663	130	3633	20	No Overlay
8	2LPS	11.00	12.27	1.28	2722	491	75	85	620	705	2722	0.0001831	0.0001658	131	3660	20	No Overlay
Total Length				**12.274**													

From the above, for the main carriageway there is NO overlay requirement in both sections for the entire length as the obtained remaining life of the pavement is more than Target MSA.

Input data used and the output from the IIT Pave software has been presented as screen shots for ready reference as **Appendix 9**of this Report.

5.1.2 STRUCTURAL REHABILITATION

All the structure found to be in good to fair condition except little minor treatment like repair of stone pitching, cleaning of drainage spouts, cleaning of vegetation etc. may be required. Detailed structural rehabilitation quantities have been worked out based on the prevailing condition of existing structures. This methodology describes in detail the procedure for the execution of each item of rehabilitation work of the Existing Bridges of the project.

The scope of this methodology covers the items mentioned below for rehabilitation work of all the existing Bridges.

- Repair/ Replacement of Existing Bearings
- Repair / Replacement of Existing Expansion Joints
- Repair / Replacement of Existing Wearing Coat
- Profile Correction for Existing Deck Slab by Cement Concrete
- Sealing of Cracks for Bridges by Epoxy Resin
- Replacement of Spalled Concrete of ECW by Epoxy Mortar
- Cement Grouting for Repair of Existing Bridges
- Guniting / Shotcreting for Repair of Existing Bridges
- Providing & Fixing of Drainage Spouts
- Repair of Substructure Component
- Repair / Replacement of Railing & Crash Barrier
- Epoxy Bonding between New and Old Concrete.

CHAPTER 6. OPERATION AND MAINTENANCE

6.1 INTRODUCTION

Looking at the contractual requirements of maintaining project road under specified level of roughness it is felt that roughness is the most important criterion for finalizing the O&M schedule for the project. Accordingly, the methodology adopted by present consultants includes predicting the roughness year by year under the traffic using a well acknowledged HDH-4 model developed for developing countries like India after lot of research by World Bank. The said model is widely prescribed by MORTH and NHAI during the preparation of detailed project reports for several projects in doing economic analysis for the projects. The economic analysis mainly consists of two parts:

1. Predicting the road deterioration and estimating VOC
2. Estimating Benefits

Considering its importance and present use in India, consultants felt prudent to use the first part, i.e. estimating road deterioration and predicting roughness in HDM 4 model to finalize the O&M schedule for the project. This approach is more scientific as it does not assume hypothetical deflection values at 10^{th} and 20^{th} year and includes main criterion of maintaining roughness at 2500mm/Km as per Schedule K

6.2 CA SPECIFICATIONS FOR MAJOR MAINTENANCE

- Schedule K of CA species that Roughness values exceed 2500mm/km in a length of KM, needs to be corrected within 180 days. Roughness survey has to be done two times in a year.
- BBD survey to be done in every 5years.

6.3 INPUTS FOR MM SCHEDULE

6.3.1 PROJECT SECTIONS

Project road is divided into 2 packages:

- PACKAGE-1: BOMJUR – MEKA, HAVING LENGTH OF 17.362 KM
- PACKAGE- 2: DIGARU – CHOWKHAM, LENGTH 12.273 KM

Then, taking the consideration of Roughness as a key criterion for major maintenance, further the above sub-sections categorized in to four cases below:

- Case 1: Roughness value <2000 mm/Km
- Case 2: Roughness values 2000<UI in mm/Km <2200
- Case 3: Roughness values 2200< UI in mm/Km <2500
- Case 4: Roughness values >2500 mm/Km

6.4 HDM INPUTS

FWD, Roughness, Pavement condition values are used as obtained from surveys and investigations for various sections and different cases as below:

Pkg-1_ BHS: No Overlay

BHS				
No Overlay	<2000	>=2000 and <2200	>=2200 and <2500mm	>=2500
	Case-1	Case-2	Case-3	Case-4
Length, km	11.262	-	-	-
Roughness, mm/km	933	-	-	-
IRI	1.41	-	-	-
Deflection, mm	0.41	-	-	-
Cracking, %	0.00	-	-	-
Ravelling, %	0.00	-	-	-
Rut Depth, mm	2.26	-	-	-
Patching, %	0.00	-	-	-
Potholes, %	0.00	-	-	-
BT Crust, mm	92	-	-	-
Granular Crust, mm	514	-	-	-

Pkg-2_ BHS: No Overlay

BHS				
No Overlay	<2000	>=2000 and <2200	>=2200 and <2500mm	>=2500
	case-1	case-2	case-3	case-4
Length, km	10.174	-	-	-
Roughness, mm/km	1116	-	-	-
IRI	1.66	-	-	-
Deflection, mm	0.41	-	-	-
Cracking, %	0.00	-	-	-
Ravelling, %	0.00	-	-	-
Rut Depth, mm	3.08	-	-	-
Patching, %	0.00	-	-	-
Potholes, %	0.00	-	-	-
BT Crust, mm	85	-	-	-
Granular Crust, mm	488	-	-	-

6.5 OPTIONS FOR MM SCHEDULES

Based on the requirements of CA, various options have been considered to be used as responsive overlays triggered at specified level of roughness of 2500 mm/km. Micro surfacing has also been considered to examine its feasibility for major maintenance.

In BHS direction following options were considered in the analysis:

- ✓ Base Case: MCS at Roughness of 2500mm/Km with regular maintenance. It is pertinent to note that Base alternative is included as "Do nothing Scenario" for the purpose of analysis in model. It is not be reckoned with
- ✓ Opt-1: Responsive Mill & Overlay of 30mm BC whenever roughness is >2500mm/KM with regular maintenance
- ✓ Opt-2: Responsive Mill & Overlay of 40mm BC whenever roughness is >2500mm/KM with regular maintenance

6.6 ROUGHNESS PROGRESSION

Roughness progression for each section under each alternative maintenance option has been done using the deterioration models in HDM-4. Following graphs represents the roughness progression for each alternative:

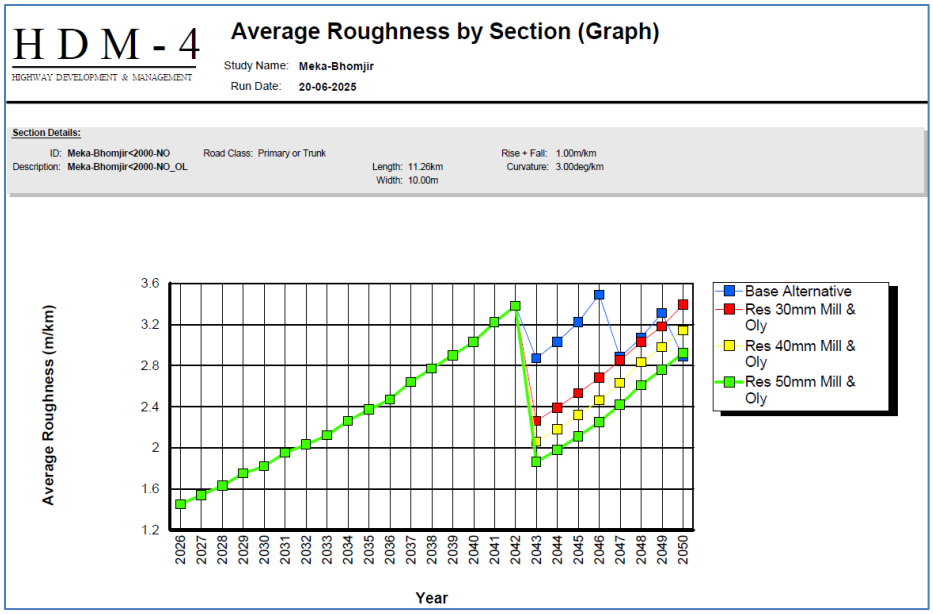


Figure 1: Average Roughness in BHS Carriageway PKG-1: No Overlay (BHS<2000mm/Km)

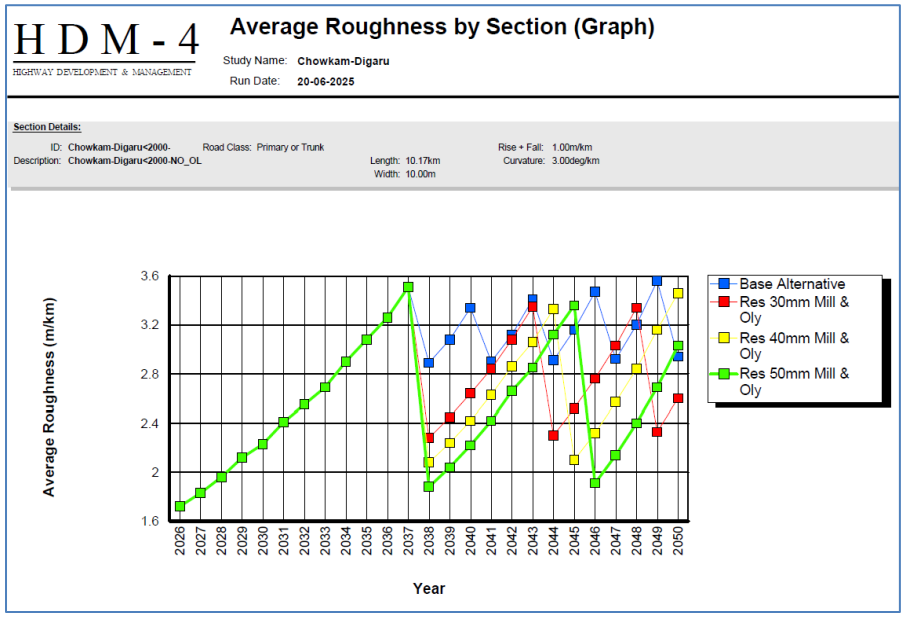


Figure 2: Average Roughness in BHS Carriageway PKG-2: No Overlay (BHS<2000mm/Km)

6.7 ADOPTED M&M SCHEDULE

Looking at the present condition, progression of traffic with actual traffic growth rates, it is felt prudent to consider 30mm OL as the preferred option, with certain percentage of additional DBM in subsequent cycles. Adopted MM schedule for the project is as below.

Cycle	Meka – Bomjir Section, Length in mts	
Planned in Financial Year	***2027***	***2030***
Milling required?	***No***	***No***
BC- 40 mm with VG40		
BC- 30 mm with VG40		11242
DBM-50 mm		
Micro surfacing (Type 3 with fibre)	5621	

Cycle	Chowkham Digaru Section, Length in mts	
Planned in Financial Year	***2027***	***2030***
Milling required?	***No***	***No***
BC- 40 mm with VG40		
BC- 30 mm with VG40		10150
DBM-50 mm		
Micro surfacing (Type 3 with fibre)	5075	

6.8 STRUCTURAL PERIODIC MAINTENANCE STRATEGY

Expansion joints:

- Visual inspection is shall be carried out to check for seal breakages, Armor angle, Weld failures, cracks between deck & Expansion joints concrete and Joints filled with debris. However, no damages were observed.
- In the absence of records pertaining to Expansion joint replacements it is highly difficult to predict the date of replacement needed for compliance to IRC codal requirements. However, periodic maintenance is considered.

Bearings:

- All types of Bearings are considered for periodic maintenance.

Wearing Coat:

- Wearing coat is a very weak component on the bridge structure which is subjected to severe deterioration due to Loading, Environment etc. This requires periodic maintenance and is considered in BOQ.

Cost Component for various items and activities have been worked out by considering the Best Industry practice and most appropriate methods. Detailed quantities for work items have been estimated based on the details presented in previous chapters for various heads as per schedule provisions, roughness criteria (RI<2500mm/km) and other required parameters inline with Concession Agreement provisions.

The gist of the cost components considered are presented below:

- Immediate Repair's Cost
- Routine Maintenance Cost
- Incident Management Cost
- Periodic Maintenance Cost
- Operations Cost
- Year by Year total O&M Costs

7.1 RATE ANALYSIS

Detailed rate analysis has been carried out based on MORTH guidelines to arrive at the unit rates of various items. Material rates and their leads from the project corridor are considered as per the material investigations done on the project road. Summary of unit rates arrived at are presented in table below:

Table 51: Summary of Unit Rates of Basic material

S No	Description	Units	Source	Basic rate excluding Transportation & GST	Lead in Kms
1	VG-40 (CAPEX)	MT	Guwahati	45336	662
2	VG-40 (MMR)	MT	Guwahati	45336	662
3	PMB - CAPEX	MT	Guwahati	57012	662
4	Good earth	Cum	BA	5	4
5	40 mm	Cum	Crusher	950	13
6	20 mm	Cum	Crusher	1150	13
7	12 mm	Cum	Crusher	1050	13
8	6 mm	Cum	Crusher	800	13
9	Dust	Cum	Crusher	250	13
10	M sand	Cum	Crusher	300	13
11	Bitumen 60/70	MT	Guwahati	49050	662
12	Bitumen 80/100	MT	Guwahati	48252	662
13	CRMB-55	MT	Guwahati	51993	662
14	SS1	MT	Guwahati	45000	662
15	Steel	MT	Tinsukia	54000	130
16	HTS Strands	MT	Tinsukia	75000	130
17	Cement	MT	Tinsukia	8800	130

Note: *For asphalt pavement rehabilitation works, a discount of 7.5% is applied on Bitumen (VG-40) to the present market rate.

Table 52: Summary of Major Material Rates excluding GST

Sl.no	Item	Unit	Rate (INR) Excluding GST
1	Embankment - borrow	Cum	354
2	Embankment - Excavation	Cum	90
3	SG	Cum	364
4	GSB G-2	Cum	2142
5	WMM	Cum	2202
6	Prime Coat	Sqm	54
7	Tack coat on granular	Sqm	18
8	DBM G-1-VG-40	Cum	9008
9	Tack coat on bituminous surface	Sqm	17
10	BC - G1-VG-40-CAPEX	Cum	11039
11	Road Marking	Sqm	369
12	RE wall	Sqm	3085
13	Select Fill	Cum	401
14	Filter Media	Cum	1251
15	M15	Cum	6845
16	M20	Cum	7870
17	M25	Cum	8644
18	M30	Cum	8528
19	M35	Cum	8912
20	M40	Cum	9074
21	PSC M45	Cum	10891
22	PSC M50	Cum	13315
23	PSC M55	Cum	13515
24	HYSD	MT	79217
25	HT strand	MT	155790
26	CTSB	Cum	3197
27	CTB	Cum	3329
28	PQC	Cum	8860
29	DLC	Cum	4393
30	PMB-CAPEX	Cum	12805
31	CRMB	Cum	12046
32	PMB-MMR-Gr1	Cum	12805
33	BC - G1-VG-40-MMR	Cum	11039

NOTE: 1. Item rates are considered for small projects

2. Labour: Central Minimum Wages as on April'2025 for "C-Area" Category of construction workers

7.2 IMMEDIATE REPAIRS COSTS

Costs associated with immediate repairs are estimated based on the detailed asset inventory and condition assessment surveys, Pavement condition and structural condition assessment surveys. Items which are not executed as part of scope or in damaged condition have been considered for immediate costs as a part of 1-year Capex. Following items are mainly considered for immediate costs:

- Scope which is not executed
- Road work items
- Bridge Work Items
- Pavement Rehabilitation works
- Structural Rehabilitation works
- Drainage Works
- Slope Protection works
- Safety Works

Immediate repair costs assessed by the Consultants have not been included, as the Concessionaire is undertaking the rehabilitation works at site.

7.3 ROUTINE MAINTENANCE & INCIDENT MANAGEMENT COSTS

Routine maintenance costs include general maintenance costs of road elements, bridge elements and road furniture and appurtenances. This can be mainly divided into two parts as:

- ✓ General Maintenance of Works
- ✓ Repairs to Highway & Bridge Elements

7.3.1 General Routine Maintenance

General Routine Maintenance of Roads generally include following items:

- Cleaning of Project facilities
- Structures cleaning,
- Cleaning of ROW
- Cleaning and Maintenance of Toll Plaza
- Unlined Drain Maintenance
- Lined Drain Maintenance
- Maintenance of Highway Lighting at Toll Plaza and other project locations
- Median Plantation maintenance & Avenue plantation maintenance:
- Maintenance of Road Furniture
- Maintenance of Road Safety Items

The above items are estimated by considering the detailed break-up of following items:

- Manpower including Managers/Labour etc.
- Vehicles for Labour Transport/Water Tankers/Sweeping Machines etc.
- Resources/Equipment's such as grass cutters, tools, jet sprayers, hydraulic trimmers etc.

7.3.2 Repairs to Highway & Bridge Works

Repairs to highway and bridge works have been estimated based on the assumed quantities (Percentage basis) of execution for every year.

These items include the following:

A. Roads

1	Providing treatment for sealing of road surface / isolated cracks at scattered locations
	i) covered with 6.7 mm size stone chipping @ 0.1 cum/ 10 sqm.
	ii) covered with dry coarse sand passing through 2.36 mm sieve and retained on 180-micron sieve @ 0.03 cum/10 sqm heated to 600 C
	iii) filling discrete cracks with slow curing bitumen emulsion as per Technical Specification Clause 3004.3.3
2	Providing treatment to bleeding bituminous surface at scattered locations
3	Providing localized repair to rutted portion and edge breaking of bituminous surface
4	Providing treatment and repair to pot-holes and patch work
5	Providing and laying dense bituminous macadam using bitumen grade 60/70 complete as per Technical Specification Clause 507
6	Proving and laying bituminous concrete (asphaltic concrete)
	(a) Using bitumen (VG-40) as per IRC: SP: 53
7	Road Roughness survey
8	Turfing on embankment slopes and at all other Project Facilities
9	Providing repair to stone pitching/apron at scattered locations
10	Rain Cuts Maintenance: Restoration of rain cuts soil, moorum, gravel or a mixture of these
11	Cleaning of Lined Drain
12	Repair of damaged lined drain
13	Unlined drain cleaning
14	Filling in median island with approved materials with all leads and lifts complete as per TS Clause No. 407
15	Replacing damaged / broken railing with new pre-cast / cast-in-situ, concrete railing to match with existing design and pattern.
24	Carrying out repair to road signs including strengthening resetting or otherwise repairing signs and delineators
	a) Road sign board mounted on single post
	b) Road sign board mounted on double post
	c) Overhead/ Gantry Sign boards
	d) Delineator
25	Supplying and fixing at site retro-reflectorized type sign boards/signs
	90cm Equilateral triangle
	60cm circular

	90 cm circular
	90cm high octagon
	80cm x 60cm rectangle
	Chevron signs 60cm x 45cm
	Place identification signs (Fig 15.7 of IRC 67)
	Providing and fixing Object Markers
	Providing and fixing of retro-reflectorized Route Marker signs (size 450mm x 600mm)
26	Hazard Marker Sign:
	a) size 90 x 30 cm
	b) size 30cm triangular side cluster of red reflectors (screen printed)
27	Cats Eyes/Raised pavement marker (NMC Nails Less)
28	Painting two coats on old surface after minor repairs to give an even and smooth surface and printing letters and figures with synthetic enamel paint
	a) Hectometer stones
	b) Kilometer Stone
	c) 5 Kilometer stone
	d) Boundary stone
	e) Guard stone
29	Providing painting lettering and fixing of distance measurement stones including dismantling of old damaged/ broken ones, confirming to TS Clause 804
	a) Hectometer stones
	b) Kilometer Stone
	c) 5 Kilometer stone
	d) Boundary stone
	e) Guard stone
30	Providing and fixing road delineators conforming to TS Clause No. 805 as directed by the Engineer.
31	Repainting the Kerb stones and separation barrier with first quality synthetic enamel paint of approved brand
32	Painting all types of pavement markings including lines, dashes, arrows etc. on roads as per relevant IRC/MOST standards after cleaning the surface complete in all respects as directed by the Engineer.
	a) Hot applied Thermoplastic compound
	(i) Lane / Centre Line / Edge Line
	(ii) Direction Arrows, Diagonal Chevrons Markings, PC etc.,
	(iii) Transverse bar Marking
33	Supplying and laying cast-in-situ cement concrete Kerb without channel section
	a) by Manual/machine including formwork
34	Major repair / replacement of metal beam crash barrier (W profile guard rails)
35	Providing and fixing chain link/ welded mesh fencing / square bars fencing
36	Dismantling the old damaged chain link/welded mesh / square bars fencing and replacing it with new chain link/ welded mesh/square bars fencing
37	Provision of rumble strips
38	Shoulder Maintenance
39	synthetic enamel paint of approved brand on metal pedestrian guard rail
40	Dismantling of wearing course

41	Toll Plaza building repairs, booths, canopy and also maintenance of TP buildings
42	Median plantation maintenance
43	RE wall Maintenance

B. Structures

1. Wearing coat comprising of 50 mm thick BC.
2. Cleaning and adding rubber sealant near expansion joints.
3. Modular Expansion joints.
4. Replacement of Damaged Concrete Railing all complete as per technical specifications and as directed by the Engineer
5. Provision of an RCC crash barrier (-.35sqm cross sectional area) constructed with M-40 grade concrete including reinforcement
6. Cleaning of rocker & roller bearing using high pressure water jet, free from rust scales, re-setting & greasing the bearings using graphite grease including cost of materials, labour etc., complete.
7. POT PTF Bearings greasing and maintaining (sand plastering).
8. Elastomeric Bearings and maintaining.
9. Cutting of groove of 15 mm x 15 mm along crack and sealing the same with epoxy putty including cost of material, labour etc.
10. Carrying out 50 to 60 mm thick shortsheeting using a mix proportion of 1:2:2 (cement: sand:6 mm down aggregate) added with Polypropylene fibers at a dosage rate of 125 gms/bag of cement including cost of labour, material, scaffolding, equipment etc complete.
11. Repair of Floor Aprons, pitching and other protection works
12. Cleaning of Drainage Spouts
13. M-25 Concrete

7.3.3 Incident Management Cost

Incident Management & Safety items include the following:

- ✓ ATMS control room operations,
- ✓ Regular patrolling & reaching accident/incident site,
- ✓ providing relief to injured persons including taking them to nearest hospital and attending to the safety requirements at the location (putting cones, safely guide & manage the traffic using signs, safety barricades, etc.),
- ✓ removal of accident /breakdown vehicles, removing of dead animals/birds lying on the highway and loading, unloading, transportation & disposal of surplus material left over by accidental vehicle or otherwise lying on road (on carriageway) and
- ✓ Encroachment prevention & removal with all lead & lifts complete with proper communication equipment,
- ✓ consumables, materials, suitable Towing vehicles, Ambulance, patrolling vehicles and manpower like drivers, helpers, para-medical staff, labour including deployment of crane and all works shall be done as per requirement and as directed by Client representative and as per Relevant Specifications as applicable.

7.4 OPERATIONS COSTS

Cost towards Operations include the following:

- Electricity Bill of lighting
- Toll Plaza Operation cost
- Operation and management costs of rest areas and lay byes
- SPV Costs
- Survey Costs
- Insurance
- Audit Charges
- IE Fee
- Administrative Cost

Following table presents the summary of Operations & Maintenance cost for the project

Table 53: 1st Year O&M Cost, FY2026

S No	Description	Amount in Crs.	GST %	GST Amt	Total	Remarks
	SPV - Expenditure					
1	SPV staff	1.10	-	-	1.10	No lighting SPV scope
2	Highway lighting	-	-	-	-	No ATMS/TMS in SPV Scope
3	Tolling and ATMS AMC/ Spare Parts	-	-	-	-	
4	Surveys & Investigations (BBD, Roughness)	0.19	18%	0.04	0.23	
5	IE fees	0.57	18%	0.10	0.67	
6	Insurance Charges	0.39	18%	0.07	0.45	
7	Audit Charges	0.10	18%	0.02	0.12	
8	Admin cost - Board Meeting Expenses, valuation etc.	0.14	18%	0.03	0.17	
	Agency - Expenditure		-	-	-	
9	Toll Operation - Agency	-	-	-	-	No tolling in SPV Scope
10	Route patrolling	1.78	-	-	1.78	In House, hence no GST
11	TAP & MAP	-	-	-	-	
12	Routine maintenance	1.02	18%	0.18	1.21	
13	Repair of Road - Boq Items	0.23	18%	0.04	0.27	
14	Repair of Structures	0.11	18%	0.02	0.12	
	Total Amount in CRs	**5.63**		**0.49**	**6.12**	

***Note**: The amount is Crores inclusive of GST (18%) and without escalation, considering FY2026 rates*

Further, O&M Cost for FY2026 has been escalated with 5% and the projected Y-O-Y cost is as presented below:

Year (FY)	Y-O-Y O&M Cost in Crore Including GST
FY2026	6.12
FY2027	6.43
FY2028	6.75
FY2029	7.09
FY2030	7.44
FY2031	7.82

7.5 PERIODIC MAINTENANCE COSTS

Cost towards major maintenance include following:

- ✓ Cost of Periodic maintenance of Pavement based on Finalized MM schedule
- ✓ Cost of Periodic Maintenance of Structures
- ✓ Cost of Periodic replacement of Toll Equipment's & Software

As suggested by Client, periodic maintenance cost has been projected with 2% escalation.

Table 54: Periodic Maintenance Costs in Crores

S. No	Financial Year (FY)	Periodic Maintenance				
		Functional +Structural overlay MCW+ S/R	Major Maintenance of Rigid Pavement	Replacement of **ATMS**	Replacement of **TMS**	Structure specified repairs
1	2026	-	-			-
2	2027	3.87	-			-
3	2028	-	-			1.93
4	2029	-	-			-
5	2030	13.07	-			4.02
6	2031					
	Total:	**16.94**	**-**	**-**	**-**	**5.96**

***Note**: The amount is Crores inclusive of GST (18%) and with 2% escalation, considering FY2026 rates*

CHAPTER 8. CONCLUSIONS

- The Project Road consists of 2 road stretches as mentioned below:
    - Package-I: Bomjur – Meka having length of 17.362 km
    - Package-II: Digaru – Chowkham, Length of 12.273 km.
- Both stretches are provided with 2LPS flexible pavement, covering a total length of 29.636 km. Package-1 includes the major bridge across the Dibang River, while Package-2 includes the major bridge across the Lohit River.
- The project road does not have Flyovers, VUPs, Toll plazas and ATMS facilities. However, incident management vehicles are provided.
- The O&M requirements related to the Project based on Schedules and Manuals are as follows:

Applicable Manual	Applicable Schedule for O&M	Maximum Roughness Allowed	Minimum Thickness of Mandatory Overlay	Frequency of Roughness Test	Frequency of BBD Test	Remarks
IRC: SP:73-2007	Schedule-K and Manual	2500 mm/Km	-	2 Times in a Year	Once in a 5-Years	Overlay Design shall be done as per IRC:81

- The Project Road has excellent riding quality (UI<2000 mm/km) based on analysis of Roughness data with combined both directions. However, the threshold limit should not exceed 2500mm/km.
- Based on pavement condition, entire length of the project road is rated as excellent to good.
- From FWD analysis, no overlay is warranted as remaining life is more than Target Traffic.
- The following MMR cycle are considered during the concession period

• Cycle	Meka – Bomjir Section, Length in mts	
Planned in Financial Year	***2027***	***2030***
Milling required?	***No***	***No***
BC- 40 mm with VG40		
BC- 30 mm with VG40		11242
DBM-50 mm		
Micro surfacing (Type 3 with fibre)	5621	

Cycle	Chowkham Digaru Section, Length in mts	
Planned in Financial Year	***2027***	***2030***
Milling required?	***No***	***No***
BC- 40 mm with VG40		
BC- 30 mm with VG40		10150
DBM-50 mm		
Micro surfacing (Type 3 with fibre)	5075	

- There is no immediate repair cost envisaged in this project.
- In the Costing, the amount considered is Crores inclusive of GST (18%) considering FY2026 rates

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TECHNICAL REPORT



Four Laning of Jorabat-Shillong (Barapani) Section of NH-40 From Km. 0/000 To 61/800 In the State of Assam and Meghalaya on DBFOT Pattern on an Annuity basis under SARDP-NE : (JSEL)

SAMARTH INFRAENGG Technocrats Private Limited

SAMARTH
committed competence

SAMARTH INFRAENGG TECHNOCRATS PVT. LTD.

September 2025

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LIST OF ABBREVIATIONS AND SYMBOLS

AADT	-Average Annual Daily Traffic
AE	-Authority Engineer
AMC	-Annual Maintenance Contract
ATMS	-Advanced Traffic Management System
BBD	-Benkelman Beam Deflection
BC	-Bituminous Concrete
BHS	-Both Hand Side
BOQ	-Bill of Quantities
BOT	-Build, Operate & Transfer
CA	-Concession Agreement
CBR	-California Bearing Ratio
CCB	-Concrete Crash Barrier
CCR	-Cement Concrete Railing
COD	-Commercial Operation Date
COS	-Change of scope
CPI	-Consumer Price Index
CUP	-Cattle Underpass
CVC	-Classified Volume Count
CVPD	-Commercial Vehicles per Day
DBM	-Dense Bituminous Concrete
DPR	-Detailed Project Report
ECB	-Emergency Call Box
EPC	-Engineering, Procurement and Construction

ESI	- Employees' State Insurance
FDD	-Filed Dry Density
FOB	-Foot Over Bridge
FRL	-Finished Road Level
FSI	-Free Swell Index
FWD	-Falling Weight Deflectometer
FY	-Financial Year
GOI	- Government of India
GR	-Growth Rates
GS	-Grade Separated
GSB	-Granular Sub Base
GST	-Goods and Services Tax
HCPT	-Half-cell Potential Test
HPC	-Hume Pipe Culvert
HR	- Human Resources
HTMS	-Highway Traffic Management Systems
IE	-Independent Engineer
IRC	- Indian Roads Congress
IRC SP	- Indian Roads Congress Special Publications
IRI	-International Roughness Index
Km	-kilometer
LHS	-Left Hand Side
LL	-Liquid Limit
LS	-Lumpsum
m	-Meter
MAP	-Medical Aid Post
MBIU	-Mobile Bridge Inspection Unit
MCB	-Metal Beam Crash Barrier
MCS	-Micro Surfacing
MCW	-Main Carriageway
MDD	-Maximum Dry Density
MHR	-Metallic Hand Rail
MJB	-Major Bridge
mm	-Millimeter
MM	-Major Maintenance
MNB	-Minor Bridge
MoRTH	- Ministry of Road Transport & Highways
Mpa	-Mega Pascal
MR	-Resilient Modulus
MSA	-Million Standard Axle
NDT	-Non-Destructive Testing

NHAI	- National Highways Authority of India
NSV	-Network survey Vehicle
O&M	- Operation and Maintenance
OL	-Overlay
PCOD	-Provisional Completion
PF	-Provident Fund
PGR	-Pedestrian Guard Rail
PI	-Plasticity Index
PL	-Plastic Limit
PM	-Periodic Maintenance
PUP	-Pedestrian Underpass
R&R	-Repair and Rehabilitation
RCC	-Reinforced Cement Concrete
RE Wall	-Reinforced Earth Wall
RHS	-Right Hand Side
RHT	-Rebound Hammer Test
RM	-Routine Maintenance
ROB	-Road Over Bridge
RPO	-Route Patrol Officer
RUB	-Road Under Bridge
SDBC	-Semi-Dense Bituminous Concrete
SPV	-Special Purpose Vehicle
SR	-Service Road
SWB	-Static Weigh Bridge
TAP	-Traffic Aid Post
TCS	-Typical cross Section
TDRT	-Transient Dynamic Response test
TMS	-Toll Management System
UI	-Unevenness Index
UPVT	-Ultra Pulse Velocity test
VDF	-Vehicle Damage Factor
VG	-Viscosity Grade
VUP	-Vehicular Underpass
WBM	-Water Bound Macadam
WMM	-Wet Mix Macadam
WPI	-Wholesale Price Index

CHAPTER 1. INTRODUCTION

1.1 INTRODUCTION

The Govt. of India (GOI) through National Highways Authority of India (NHAI) as "Authority" undertook the construction and augmentation of the Jorabat–Shillong (Barapani) section of NH 40, spanning from km 0.000 to km 61.800 traversing the states of in Assam and Meghalaya. The project was implemented under the Design–Build–Finance–Operate–Transfer (DBFOT) model on an Annuity basis, as part of the Special Accelerated Road Development Programme for the North Eastern Region (SARDP-NE).

Pursuant to a competitive bidding process, the Authority awarded the project to a consortium comprising M/s IL&FS Transportation Networks Ltd (ITNL) and Ramky Infrastructure Ltd and issued Letter of Award (LOA) on 20th May 2010.

Subsequent to this, Consortium had promoted and incorporated "M/s Jorabat Shillong Expressway Limited (JSEL)" as "Concessionaire" or "SPV" for the implementation of the Project under BOT-Annuity with a Concession Period of 20 years from Appointed Date, including construction period of 1095 days (3 years). The Concession Agreement was signed on 16th July 2010.

Following the satisfactory completion of construction works, Independent Engineer (IE) issued the PCOD with effect from on 28th January 2016. The Final Completion Certificate was later issued on 30th August 2019.

In October–November 2023, the entire equity stakes of this SPV were acquired by M/s Sekura Roads Private Limited, a road infrastructure platform managed by Edelweiss Infrastructure Yield Plus, an alternative investment fund managed by Edelweiss Infrastructure.

We understand that EAAA TransInfra Managers Limited is the Investment Manager, Chennai -Tada Tollway Private Limited ("CTTPL") is the proposed Project Manager and Watrak Infrastructure Private Limited ("WIPL") is the sponsor of the Citius TransNet Investment Trust ("Trust" or "InvIT") and M/s Jorabat Shillong Expressway Limited ("JSEL") is proposed to be part of the initial portfolio assets of the Trust. The Trust was incorporated on 1st August 2025 with Securities and Exchange Board of India ("SEBI") as an infrastructure investment trust under the SEBI InVIT Regulations.

M/s Watrak Infrastructure Private Limited (hereinafter "the Client") as sponsor has appointed M/s Samarth Infraengg Technocrats Pvt Ltd (hereinafter referred as "Technical Consultant") to carry out Technical Due Diligence of operational asset of "Four laning of Jorabat-Shillong (Barapani) section of NH-40 from KM. 0.000 to KM. 61.800 in the state of Assam and Meghalaya on DBFOT (herein after refer as "the Project") which is being operated by "M/s Jorabat Shillong Expressway Limited ("JSEL") (hereinafter refer as "the Concessionaire or Company or "JSEL")

The details of the Road asset ("Project Highway") are as follows:

S. No	Project Description	Length (Km)
1	Construction of 12.9 m wide bridge between Dhola and Sadia ghats along with 2 lane connecting roads from near about Dhola to islampur tinali in assam on BOT basis under Arunachal Pradesh package of Roads and Highways. - **Dhola**	28.511
2	Construction of bridges across Dibang river system and connecting road between Bomjur-Meka (NH 52) covering length of 18.95 km and construct bridge across river Lohit at alubari ghat and connecting road between Chowkham Digaru covering length of 12 km in Arunachal Pradesh on BOT basis under Arunachal Pradesh package of Roads and Highways- Dibang	29.635
3	Four Laning of Maharashtra/Karnataka Border - Sangareddy section of NH9 (from KM 348.800 to Km 493.000) in the states of Karnataka and Andhra Pradesh to be executed as BOT (Toll project) on DBFOT pattern under NHDP phase IV B.- **DTL**	144.950
4	Four Laning of Jorbat Shillong of NH 40 from Km 0 to Km 61.8 in the state of Assam and Meghalaya on DBFOT Pattern under SARDP NE on BOT Basis. – **JSEL**	61.800
5	Four Laning of paved shoulders of Sambalpur- Rourkela section of SH-10 from Km 4.900 to 167.900 in the state of Odisha to be executed as BOT (toll) project on DBFOT pattern- **SRTL**	161.730

This report deals with the "*Four Laning of Jorbat Shillong of NH 40 from Km 0 to Km 61.8 in the state of Assam and Meghalaya on DBFOT Pattern under SARDP NE on BOT Basis. – **JSEL***".

1.2 PROJECT AT A GLANCE

This stretch of NH-40 (now part of NH 6) provides a critical link from Guwahati to Shillong, further connecting to Tripura, Mizoram, and access towards the India–Myanmar border via the East Khasi Hills. This expressway traverses challenging terrain characterized by hilly topography, dense vegetation, and one of India's highest rainfall zones and thus supporting regional commerce, mobility, and socio-economic development.



Map Showing the Project Corridor

As per the CA, the design chainage at start point of the project road shall be km 0.000 and the design chainage at end point of the project road shall be km 61.800 with a total length of 61.800 kms.

Table 1: Project Corridor Chainage System

Referencing system	Project Corridor Start Point (km)	Project Corridor End Point (km)	Length (km)
Design Chainage	0.000	61.800	61.800
Existing Chainage	0.000	61.800	61.800

Photograph showing the start and end point of the project road are presented below



Start Point of Project Road at km 0.000



End Point of Project Road at km 61+800

Following Table highlights the total project at a glance:

Table 2: Project Details

Description	Date
Employer	National Highways Authority of India
Concessionaire	M/s Jorabat Shillong Expressway Ltd (JSEL)
Mode of Execution	DBFOT (BOT- Annuity basis)
NH Nos.	Old NH-40 (New NH-06)
Length of the Project as per CA	61.8 km
Total Project Cost	Rs. 536 Crores
Date of Signing of Concession Agreement	16.07.2010
Appointed Date	12.01.2011
Schedule Project Completion Date	11.01.2014
(1095 Days from Appointed Date)	
Date of Provisional Completion	28.01.2016
Date of Final Completion	30.08.2019
Schedule End of Concession (20 Years from Appointed Date)	11.01.2031

Note: a) Total no of Annuities: 30 nos.; b) Annuity Amount: 72.51 Cr; c) 1st /Last Annuity: 27.07.2016/11.01.2031

1.3 REVIEW OF CONCESSIONAIRE'S MPR

Based on the latest available Concessionaire's Report for the month of March 2025, the following key points have been noted:

- Condition of the Project Highway; as per the inspections carried out during the month of March 2025, is satisfactory and in conformance to CA provision

- All Maintenance activities as planned and submitted to the Authority & IE i.e. cleaning of Project Highway including main carriageway, bus shelter, truck lay bay, vegetation overgrowth trimming etc. drain cleaning, Earthen shoulder repair, maintenance of structure including expansion joint, drainage spout etc., median kerb repairing, Cleaning of chute drain, cleaning of culverts, PGR installation at damage location, replacement of damage guard post, pot hole repair, replacement of damage metal beam crash barrier, Regular watering of median plantation, hoeing and basin making and application of pesticides and mortality replacement activities were carried out during this period.
- LA issues
    - For service road construction, Dispute at several places over limit of old ROW and non- receipt of compensation to the Landowners.
    - From km 13.450 to km13.700 RHS: At the newly constructed 3 lanes at the toll plaza, suggested Protection measures can be taken up only after providing adequate land which is presently not available.
- Until March-2025, 9 years of semi annuity payment are received by Concessionaire out of 15 years.
- Major maintenance works are completed for full project length.
- COS works for construction of RCC Drain and Box culvert @ km80+600, pending payment of Rs 28.94 lakhs.
- The overall summary of Change of Scope (COS) works are as follows:

S. NO	**Description of claim/COS**	**Amount of claim/COS Submitted by Concessionaire (in Crore)**	**Recommended by IE (in Crore)**	**Approved by Authority (in Crore)**	
1	Canopy board	0.03	0.03	0.04	Concessionaires vide letter no 5948 dated 22.08.2023 resubmit to IE for requesting to release the pending amount)
2	RCC Drain+ Box Culvert (80+60 rmt)	1.67	0.74	0.74	Approval for EOT and the release of the balance payment are still pending with RO-NHAI
3	Installation of SWB				Kept on hold by Authority as additional land is required for SWB and Stock Yard
4	Drain Construction at Ch 3+330 LHS	9.05			Revised COS proposal has been submitted to IE vide our letter no 5909 dated 13th June 2023 amounting to Rs.9.05 cr. Same is recommended by IE to PD-NHAI vide letter no 295 dated 17.06.2023. • Concessionaire submitted its representation PD-NHAI & IE vide letter no 03 dated 23.11.2023 • Approval from Authority is pending
5	Highway Lighting & FOB		2.72 7.00		IE has submitted to PD-NHAI for in principal approval vide letter no 295 dated 17.6.2023. Concessionaire submitted its representation PD-NHAI & IE vide letter no 03 dated 23.11.2023 • Approval from Authority is pending

S. NO	Description of claim/COS	Amount of claim/COS Submitted by Concessionaire (in Crore)	Recommended by IE (in Crore)	Approved by Authority (in Crore)	
6	Construction of Steel footpath at Ch 58+420 LHS	0.63	0.57		Proposal submitted by Concessionaire-5898 dated 25.05.2023, IE submitted its recommendation vide letter no 295 dated 17.6.2023 to PD-NHAI. • Concessionaire submitted its representation PD-NHAI & IE vide letter no 03 dated 23.11.2023 • Approval from Authority is pending
7	Construction of Service Road from Km. 4+800 to 6+550 LHS		14.43		IE has submitted recommendation to for in principal approval vide letter no 295 dated 17.6.2023 to NHAI PD ▫ Concessionaire submitted its representation PD-NHAI & IE vide letter no 03 dated 23.11.2023 ▫ Approval from Authority is pending
8	Installation of Rumble Strip at accident Spots	0.105			Accordingly, Concessionaire submitted COS proposal to IE for installing of rumble strip at the accident-prone locations for an amount of Rs. 10,51,812/ vide our letter no. 198 dated 17.01.2025 ▫ Proposal under review with the IE.

1.4 REVIEW OF PAVEMENT DESIGN

Based on IRC:37-2001 guidelines, Proof check Pavement Design report is submitted by IIT-Guwahati in Oct 2011. The VDF Values from the report are as follows

Vehicle Type	VDF considered
Bus	0.35
LCV	1.16
2-Axle	5.06
3-Axle	4.84
MAV	6.56

The thickness of respective pavement layers for main carriageway and service road are as given below

MSA	***100 MSA***	***5 MSA***
Design Period	***20 Years***	***20 Years***
CBR	***10%***	***10%***
	Approved Crust Thickness (mm)	
Pavement Composition	**For Main carriageway**	**Service Road (Flexible)**
Wearing Coat	BC: 50 mm	SDBC: 25 mm
DBM	130 mm	50 mm
WMM	250 mm	250 mm
GSB	200 mm	150 mm
Subgrade	500	500

For the rigid pavement at Toll Plaza following pavement composition is given

Pavement Composition	Minimum Crust Thickness
PQC	300 mm
DLC	150 mm
GSB	150 mm

1.5 REVIEW OF O&M REQUIREMENTS

Applicable O&M Requirements for the Project under consideration are presented in the following table.

Applicable Manual	Applicable Schedule for O&M	Maximum Roughness Allowed	Minimum Thickness of Mandatory Overlay	Frequency of Roughness Test	Frequency of BBD Test	Remarks
4-lane manual for BOT projects, Published by MOSRTH on 11.03.2008 *(as Shared in Vol-III of CA)*	Schedule-K and Manual	2500 mm/Km	-	2 Times in a Year	Once in a 5Years	Overlay Design shall be done as per IRC:81-1997

From the above table it is clear that the applicable method for overlay design is BBD method, in accordance with the provisions of IRC:81-1997. While BBD is the prescribed methodology, the current overlay assessment has been carried out using the Falling Weight Deflectometer (FWD) technique, owing to its inherent advantages over the BBD method. Nevertheless, if required at a later stage, for submission to the Independent Engineer (IE)/Authority—the overlay design can be reassessed using the BBD technique to ensure alignment with the mandated guidelines.

Considering the above, the initial overlay assessment has been carried out based on 80% reliability, in line with the original pavement design that followed IRC:37-2001, which also adopted an 80% reliability criterion.

CHAPTER 2. SURVEYS AND INVESTIGATIONS

2.1 INTRODUCTION

The main objective of undertaking Surveys and Investigations is to appreciate the existing engineering features along the project corridor and to understand the present condition of the various elements of the project road and to prepare required inputs for various rehabilitation and maintenance strategies.

Following Survey and Investigations have been undertaken as a part of study with an objective to understand the present condition of the road and there by access the quality of construction and as well to prepare requisite rehabilitation/corrective designs where necessary.

- Road Inventory Surveys
- Pavement Condition using NSV
- FWD Surveys
- Roughness Surveys using NSV
- Pavement Composition surveys (Test Pits)
- Subgrade Investigations & Laboratory testing
- Material Investigations
- Core Sample surveys
- Axle Load Survey
- Structure Inventory and Condition Surveys

These surveys have been performed in the month of May 2025.

2.2 ROAD INVENTORY

The project corridor comprises a 4-lane divided carriageway, predominantly passing through hill-cut sections all along its length. The carriageway is constructed with flexible pavement of 7.0-meter-wide carriageway and 0.25m Shyness on either-side of the median, flanked by 0.5 to 1.5m paved shoulder plus1m-2m Earthen Shoulder on either side. However, at Toll Plaza location, a rigid pavement is provided.

In general, the median width is about 1.5m-2m considering the hilly terrain locations. However, in few built-up locations its width is varying from 4m to 8m.

In the initial reach of the project corridor passes through plain and rolling terrain and then the major length of the project stretch falls in mountainous terrain. The alignment includes a number of horizontal sharp curves along with mild to steep vertical gradients geometry. The land use along the project road is mostly Forest lands and intermittent Built-up urban settlement like Jorabat, Byrnihat, Umling, NongponTown, Umsning, Barpani lake etc.

Typical View of Project Road is shown below:



A view of the Project Corridor with 8m median at Km 6.800



A view of the Project Corridor with MBCB 2.0m median at Km 1.800



A view of the Project Corridor with 1.5m median at Km 50.000



A view of the Project Corridor with Single Arm lights at Km 13.000

Service/slip roads are constructed with 7 meters wide carriageway. These are constructed with flexible pavement. Photos depicting the service road pavement surface type, Condition and the other associated features like drain. Few photos taken at service/slip road locations are presented below



Service Road @ km 29.800 on RHS



Slip Road @ km 61+100 on RHS

The Project Road has both Major junction and Minor junctions. Photographs showing the Major Junctions and minor junctions are presented below:



Major Junction at km 4+650 LHS



Major Junction at km 27+550 LHS



Minor Junction at km 57+700 LHS



Minor Junction at km 60+250 RHS

Single arm highway lighting is provided near minor junctions and Built-up locations, whereas High-masts are provided at Toll Plazas and Major Junction locations. Few photos showing High mast and highway lighting are presented below



A view of High mast lighting at km 0+000 LHS



A view of High mast lighting at km 13+600 LHS



A view of Single arm Lighting at km 13.000



A view of Single arm Solar lightning's at 29+150.

The cut/fill slopes are protected with Breast wall/Gabion wall/ Rock bolting/ Retaining wall etc.

Road user facilities such as Bus-bays and Truck lay-byes have been provided along the corridor. The Bus-bays are constructed with flexible pavement, while the Truck lay-byes are laid with paving tiles and are appear to be in fair condition. A physical separator has been installed between the main carriageway and Truck lay bye area. Additionally, lighting facility is available at Laybys and at Toilet blocks. A few photos taken at the Bus Shelter and Truck lay-byes are presented below:



Bus Shelter at km 48+900-LHS



Bus bay with Shelter at km 55+900-RHS



Truck Lay bye at km 3+600 LHS



Toilet block at TLB at km 3+600 LHS

The Project Road features a Toll Plaza located at Km 13.530 (Pahammawlein Toll plaza). This toll plaza is constructed with Rigid pavement including its approach taper sections. The overall condition of the toll plaza is observed to be fair. It comprises 4+1 lanes in each direction. Additionally, 4 High mast lighting poles have installed at the plaza to ensure adequate illumination at night.

The details of Toll Plaza are as follows.

S No	Type	Units	Details
1	Chainage	*Km*	13.530
2	Toll plaza name		Pahammawlein Toll Plaza, Meghalaya
3	Pavement Type		Rigid
4	Pavement Type Central Portion		Rigid
5	No of lanes	*Nos*	8+2
6	Canopy		yes
7	Toll office		yes

S No	Type	Units	Details
8	Toll booths		yes
9	Fast tag lanes	*Nos*	8
10	Total Toll Plaza length	*Rmt*	440
11	Toll plaza width	*m*	55
12	Toll lanes width	*m*	3.5
13	Extra Wide Lane width	*m*	5.5
14	Bike Lane width	*m*	-
15	Separator width at Toll booths	*m*	2
16	Static Weigh bridges	*Nos*	No
17	WIMS	*Nos*	5
18	High mast lights	*Nos*	4
19	Ambulances	*Nos*	1
20	Cranes	*Nos*	1
21	Highway Patrolling Vehicles	*Nos*	1
22	Toeing Vehicle	*Nos*	1
23	Elevated walk Way		-
24	Tunnel		yes
25	Toilets		yes



A view of the Existing Toll Plaza near km 13+530
(Pahammawlein Toll Plaza, Meghalaya)

The collected Road Inventory Data is presented in **Appendix 1** of this Report

2.3 PAVEMENT CONDITION SURVEYS

The collected Pavement Condition Data using NSV surveys for main carriageway and service road is presented in **Appendix 2** of this Report.

The photographs showing the pavement condition of the Project Road is presented below.

 Fair Condition at km 9+100 LHS	 Patch work at 31.300 LHS	 Wheel path cracking at 37.300 LHS
 Fair condition 57+900 RHS	 Ravelling & Rutting at km 32.900 RHS	 Patching at km 32.500 RHS

2.4 FALLING WEIGHT DEFLECTOMETER (FWD) SURVEYS

In order to evaluate the structural strength of the existing pavement, Falling Weight Deflectometer (FWD) survey has been carried out along the project road in Main carriageway and Service Road in line with IRC: 115-2014.

- ✓ Prior to the start the surveys, Load repeatability tests are performed on each day
- ✓ The target Peak Load of 40 KN (+/- 4 KN) is maintained during survey.
- ✓ At Regular intervals of time Pavement temperature is noted.
- ✓ For every 1 Km of stretch 6test Points (3 pts- Outer, ,3 pts-inner) were taken on Main Carriageway in each direction. Whereas, for service road minimum 3 points are taken in a km length.
- ✓ Temperature correction equation is applied for back calculated modulus of BT and no seasonal correction factor is applied for the back calculated modulus of granular and Subgrade considering the monsoon Season (May Month).

The collected FWD Data and Analysis is presented in **Appendix 3** of this Report.

Few photos taken during the progress of FWD Surveys are presented below:



Deflection Measurement in progress

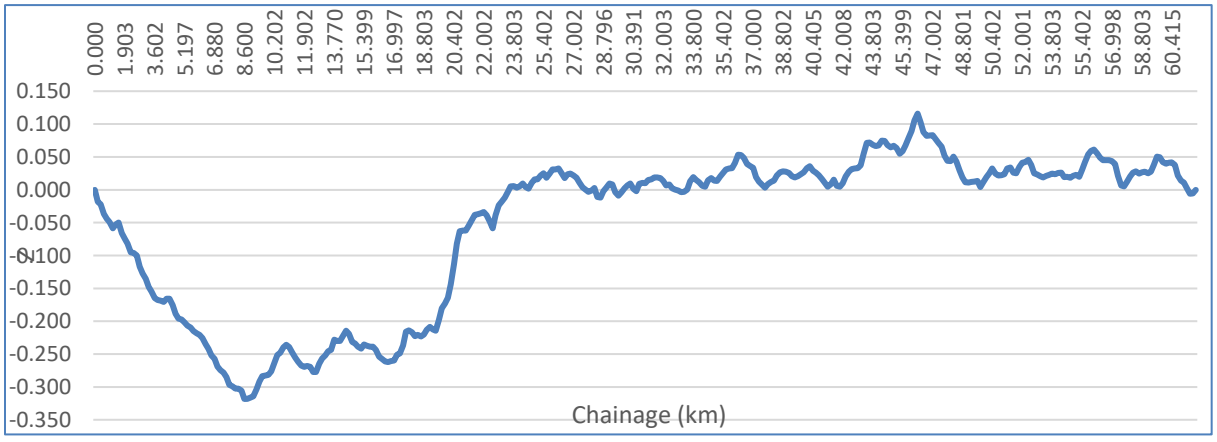


Deflection Measurement in progress

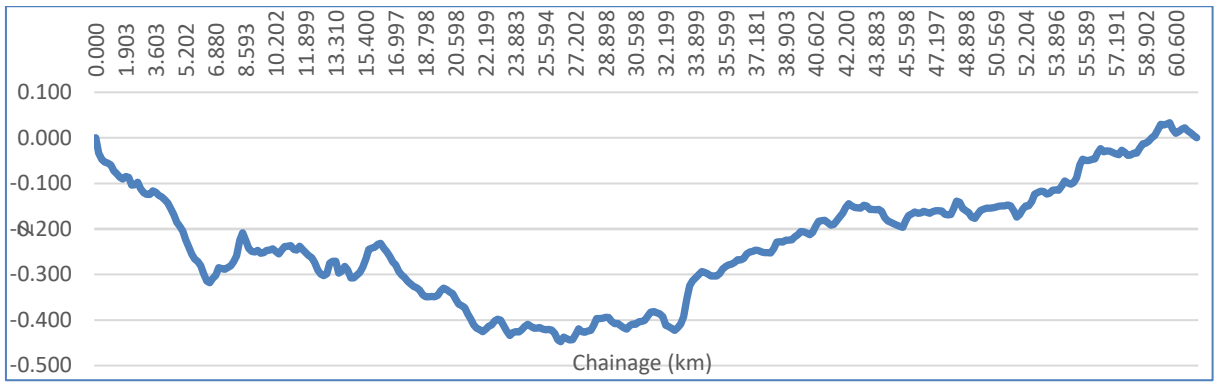
Cumulative Difference Approach (CDA) has been used for the identification of homogeneous sections on the basis of Surface Curvature Index (SCI). SCI is calculated as the difference between D_0 and D_{300}, where D_0 and D_{300} are the peak deflections (mm) measured at the center of loading plate and at a radial distance of 300mm.

The homogenous sections in each direction of traffic (i.e., LHS & RHS and service road) for the project stretch have been identified for Main carriageway is presented in graphical representation of followed by tables.

- ***For Main Carriageway:***

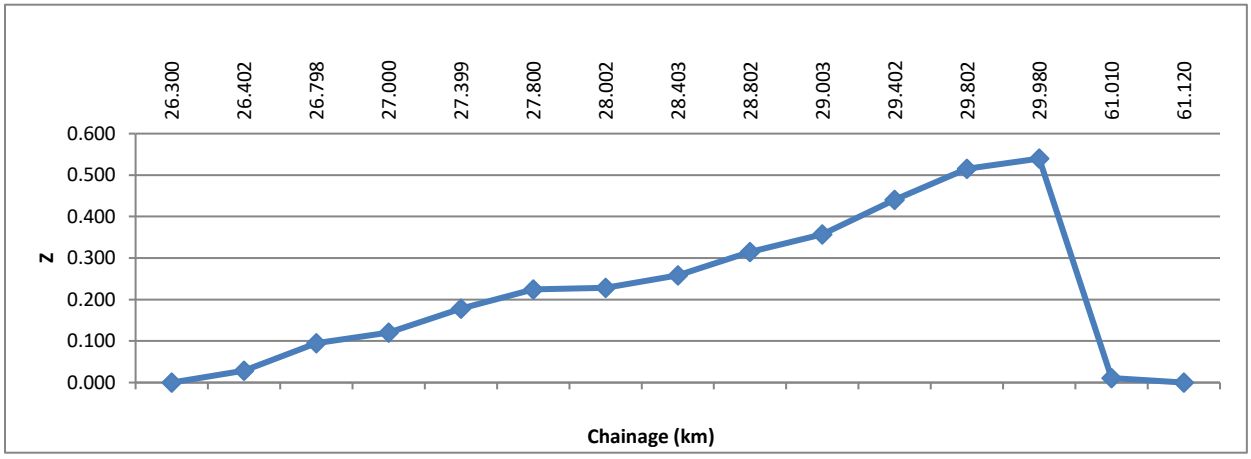


Delineation of Homogeneous Sections – LHS, Main Carriageway

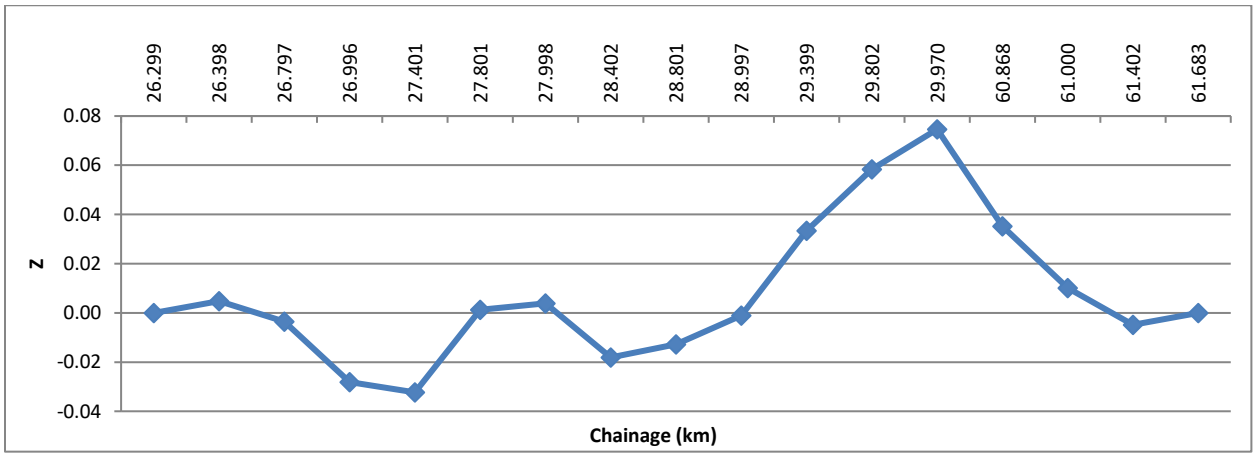


Delineation of Homogeneous Sections – RHS, Main Carriageway

- ***For Service Carriageway:***



Delineation of Homogeneous Section – LHS Service Road



Delineation of Homogeneous Section – RHS Service Road

Based on the above graphs, the Main carriageway and service roads are sub-divided into homogeneous section for LHS and RHS as given below.

Table 3: FWD Data - Homogenous Sections of Main Carriageway - LHS

LHS				
Homo Sections	**From (Km)**	**To (Km)**	**Length (Km)**	**Remarks**
1	0.000	2.398	2.398	
2	2.398	4.397	1.999	
3	4.397	7.091	2.694	
4	7.091	8.997	1.906	
5	8.997	11.280	2.283	
6	11.280	13.310	2.030	
7	13.310	13.770	0.460	Toll Plaza
8	13.770	16.596	2.826	
9	16.596	19.198	2.602	
10	19.198	21.800	2.602	
11	21.800	23.898	2.098	
12	23.898	26.402	2.504	
13	26.402	28.903	2.501	
14	28.903	31.200	2.297	
15	31.200	33.200	2.000	
16	33.200	35.802	2.602	
17	35.802	38.002	2.200	
18	38.002	40.201	2.199	
19	40.201	42.804	2.603	
20	42.804	44.902	2.098	
21	44.902	47.400	2.498	
22	47.400	49.601	2.201	
23	49.601	51.597	1.996	
24	51.597	53.998	2.401	
25	53.998	56.000	2.002	
26	56.000	58.013	2.013	
27	58.013	61.800	3.787	
Total length			**61.800**	

Table 4: FWD Data - Homogenous Sections of Main Carriageway -RHS

RHS				
Homo Sections	**From (Km)**	**To (Km)**	**Length (Km)**	**Remarks**
1	0.000	3.003	3.00	
2	3.003	5.904	2.90	
3	5.904	8.404	2.50	
4	8.404	11.598	3.19	
5	11.598	13.310	1.71	
6	13.310	13.770	0.46	Toll Plaza
7	13.770	16.198	2.43	
8	16.198	18.598	2.40	
9	18.598	21.798	3.20	
10	21.798	26.398	4.60	
11	26.398	26.599	0.20	
12	26.599	28.801	2.20	
13	28.801	30.798	2.00	
14	30.798	32.898	2.10	
15	32.898	34.898	2.00	
16	34.898	37.001	2.10	

RHS				
Homo Sections	**From (Km)**	**To (Km)**	**Length (Km)**	**Remarks**
17	37.001	40.002	3.00	
18	40.002	42.200	2.20	
19	42.200	44.998	2.80	
20	44.998	47.896	2.90	
21	47.896	50.403	2.51	
22	50.403	52.598	2.20	
23	52.598	54.601	2.00	
24	54.601	56.596	2.00	
25	56.596	58.602	2.01	
26	58.602	61.800	3.20	
Total length			**61.800**	

- ***For Service Carriageway:***

Table 5: Summary of Homogenous Section – LHS-Service Road

Homo Sections	From	To	Length (km)	Remarks
1	26.300	29.980	3.68	
	61.010	61.120	0.11	

Table 6: Summary of Homogenous Section – RHS-Service Road

Homo Sections	From	To	Length (Km)	Remarks
1	26.299	29.970	3.67	
	60.868	61.683	0.81	

2.5 ROUGHNESS SURVEYS

The Roughness data has been collected using Network Survey Vehicle for main carriageway and service road and analyzed in terms of International Roughness Index (IRI), separately for each lane, for both direction of travel. Pavement Roughness data collection and computation of IRI for each km length in each direction is presented in Appendix 4 of this Report.

Schedule K of CA specifies that Roughness values exceeding 2500 mm/km in a Km length, needs to be corrected.

The km-wise roughness index values for both Left-Hand Side (LHS) and Right-Hand Side (RHS) directions are presented below:

- **Main carriageway**

Chainage (Km)		Length (Km)	Roughness Index (mm/km)		
From	To		Inner Lane	Outer Lane	RI Average (LHS)
LHS Carriageway					
0.000	1.000	1.000	1642	1233	1437
1.000	2.000	1.000	1435	1261	1348
2.000	3.000	1.000	1171	1079	1125
3.000	4.000	1.000	1277	1185	1231
4.000	5.000	1.000	1409	1290	1349
5.000	6.000	1.000	1274	1498	1386
6.000	7.000	1.000	1512	1371	1442
7.000	8.000	1.000	1791	1675	1733
8.000	9.000	1.000	1455	1394	1424
9.000	10.000	1.000	1476	1399	1437
10.000	11.000	1.000	1715	1574	1645
11.000	12.000	1.000	1726	1736	1731
12.000	13.000	1.000	1805	1654	1729
13.000	13.310	0.310	1709	1401	1555
13.310	13.770	0.460	Toll Plaza		
13.770	14.000	0.230	1491	1583	1537
14.000	15.000	1.000	1487	1300	1394
15.000	16.000	1.000	1358	1310	1334
16.000	17.000	1.000	1430	1187	1308
17.000	18.000	1.000	1634	1338	1486
18.000	19.000	1.000	1828	1730	1779
19.000	20.000	1.000	1882	1734	1808
20.000	21.000	1.000	1990	1689	1840
21.000	22.000	1.000	1723	1546	1634
22.000	23.000	1.000	1987	1990	1988
23.000	24.000	1.000	1693	1884	1789
24.000	25.000	1.000	1466	1305	1386
25.000	26.000	1.000	1293	1297	1295
26.000	27.000	1.000	1198	1270	1234
27.000	28.000	1.000	1304	1242	1273
28.000	29.000	1.000	1228	1205	1217
29.000	30.000	1.000	1467	1359	1413
30.000	31.000	1.000	1222	1248	1235
31.000	32.000	1.000	1425	1324	1374
32.000	33.000	1.000	1448	1211	1330
33.000	34.000	1.000	1371	1175	1273
34.000	35.000	1.000	1607	1358	1483
35.000	36.000	1.000	1970	1481	1726
36.000	37.000	1.000	1379	1276	1327
37.000	38.000	1.000	1728	1656	1692
38.000	39.000	1.000	2083	1907	1995
39.000	40.000	1.000	1994	1824	1909
40.000	41.000	1.000	1793	1731	1762
41.000	42.000	1.000	1973	1876	1924
42.000	43.000	1.000	2047	1927	1987
43.000	44.000	1.000	2127	1785	1956
44.000	45.000	1.000	1749	1598	1673
45.000	46.000	1.000	1681	1444	1562
46.000	47.000	1.000	1775	1618	1696
47.000	48.000	1.000	1783	1594	1688
48.000	49.000	1.000	1726	1303	1515
49.000	50.000	1.000	1695	1169	1432
50.000	51.000	1.000	1788	1414	1601

Chainage (Km)		Length (Km)	Roughness Index (mm/km)		
From	To		Inner Lane	Outer Lane	RI Average (LHS)
LHS Carriageway					
51.000	52.000	1.000	1531	1432	1482
52.000	53.000	1.000	1417	1398	1407
53.000	54.000	1.000	1854	1700	1777
54.000	55.000	1.000	1990	1998	1994
55.000	56.000	1.000	2075	1911	1993
56.000	57.000	1.000	2097	1890	1993
57.000	58.000	1.000	1997	1889	1943
58.000	59.000	1.000	1982	1931	1956
59.000	60.000	1.000	2036	1763	1899
60.000	61.000	1.000	1807	1691	1749
61.000	61.800	0.800	1991	1982	1986

Note: The average roughness varying from 1125 mm/km to 1995 mm/km

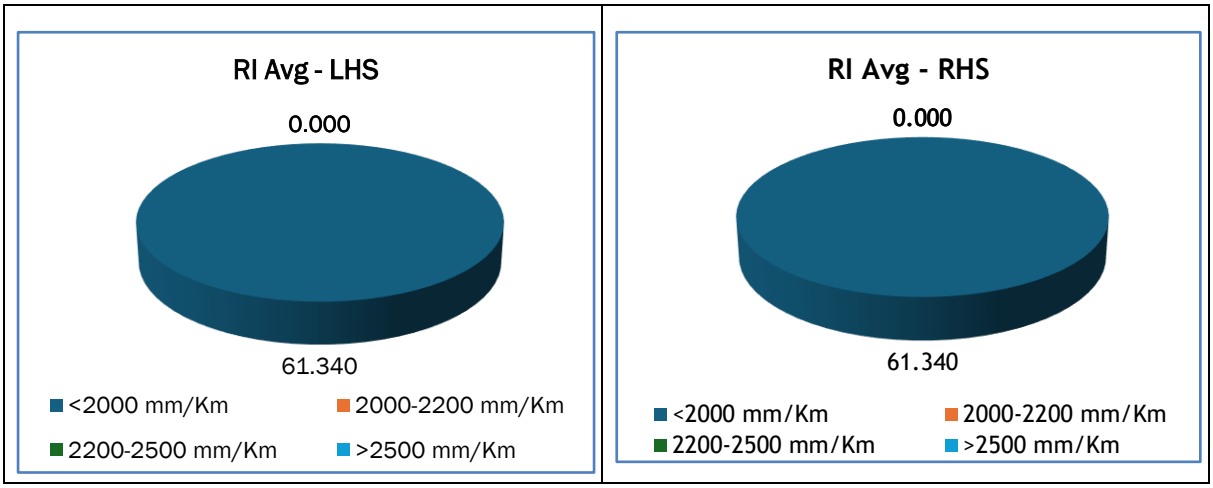
Chainage (Km)		Length (Km)	Roughness Index (mm/km)		
From	To		Inner Lane	Outer Lane	RI Average (RHS)
RHS Carriageway					
0.000	1.000	1.000	1605	1280	1442
1.000	2.000	1.000	1518	1199	1359
2.000	3.000	1.000	1180	1059	1119
3.000	4.000	1.000	1190	1012	1101
4.000	5.000	1.000	1244	1128	1186
5.000	6.000	1.000	1182	997	1090
6.000	7.000	1.000	1509	1173	1341
7.000	8.000	1.000	1685	1592	1638
8.000	9.000	1.000	1623	1460	1542
9.000	10.000	1.000	1492	1363	1428
10.000	11.000	1.000	1580	1543	1561
11.000	12.000	1.000	1467	1228	1348
12.000	13.000	1.000	1615	1412	1513
13.000	13.310	0.310	1421	1071	1246
13.310	13.770	0.460	Toll Plaza		
13.770	14.000	0.230	1892	1553	1723
14.000	15.000	1.000	1590	1681	1635
15.000	16.000	1.000	1687	1505	1596
16.000	17.000	1.000	1715	1547	1631
17.000	18.000	1.000	1740	1642	1691
18.000	19.000	1.000	1994	2001	1998
19.000	20.000	1.000	1986	1888	1937
20.000	21.000	1.000	2033	1961	1997
21.000	22.000	1.000	1395	1228	1311
22.000	23.000	1.000	1742	1360	1551
23.000	24.000	1.000	1611	1499	1555
24.000	25.000	1.000	1828	1229	1529
25.000	26.000	1.000	1194	1116	1155
26.000	27.000	1.000	1455	1423	1439
27.000	28.000	1.000	1397	1542	1470
28.000	29.000	1.000	1332	1312	1322
29.000	30.000	1.000	1310	1479	1394
30.000	31.000	1.000	1545	1212	1378

Chainage (Km)		Length (Km)	Roughness Index (mm/km)		
From	To		Inner Lane	Outer Lane	RI Average (RHS)
RHS Carriageway					
31.000	32.000	1.000	1536	1220	1378
32.000	33.000	1.000	1822	1213	1517
33.000	34.000	1.000	1808	1339	1574
34.000	35.000	1.000	1869	1831	1850
35.000	36.000	1.000	1746	1626	1686
36.000	37.000	1.000	1659	1573	1616
37.000	38.000	1.000	1690	1657	1674
38.000	39.000	1.000	1858	1672	1765
39.000	40.000	1.000	1689	1573	1631
40.000	41.000	1.000	1664	1645	1654
41.000	42.000	1.000	1626	1461	1544
42.000	43.000	1.000	1715	1619	1667
43.000	44.000	1.000	1892	1673	1782
44.000	45.000	1.000	1448	1512	1480
45.000	46.000	1.000	1822	1622	1722
46.000	47.000	1.000	1805	1920	1863
47.000	48.000	1.000	2005	1922	1964
48.000	49.000	1.000	1763	1348	1555
49.000	50.000	1.000	1556	1356	1456
50.000	51.000	1.000	1355	1229	1292
51.000	52.000	1.000	1756	1611	1683
52.000	53.000	1.000	1313	1345	1329
53.000	54.000	1.000	1539	1766	1653
54.000	55.000	1.000	1727	1903	1815
55.000	56.000	1.000	1816	2150	1983
56.000	57.000	1.000	1674	1928	1801
57.000	58.000	1.000	1657	1950	1803
58.000	59.000	1.000	1661	1883	1772
59.000	60.000	1.000	1768	1898	1833
60.000	61.000	1.000	1918	1934	1926
61.000	61.800	0.800	1770	2183	1977

Note: The average roughness varying from 1090 mm/km to 1998 mm/km

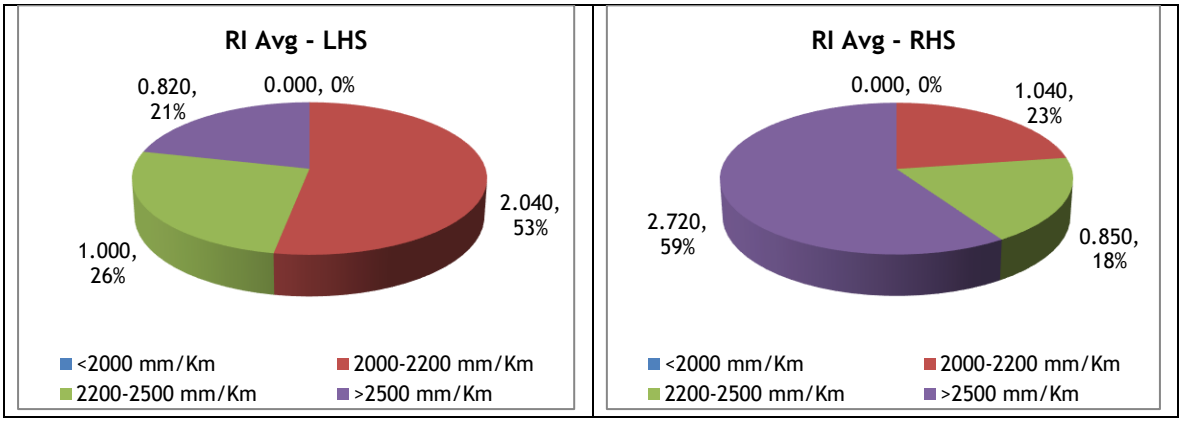
Average Roughness Index (RI) values along the corridor were grouped in to four categories i.e., RI<=2000mm/km-Excellent, <=2200mm/km-Good, <=2500mm/km-Fair and >2500mm/km-Poor

Average Roughness Index (RI) values along the corridor were grouped in to four categories, Pie chart showing the range of RI values in each carriageway of the project road have been presented below:



It can be seen from the above pie-charts, that the entire length of the Project Road considered to be having excellent riding quality.

- **Service Road**



It can be seen from the above pie-charts, that the service roads roughness is exceeded the threshold limit by 21% in LHS & 59% in RHS.

2.6 PAVEMENT COMPOSITION SURVEYS (TEST PITS)

The composition of the existing pavement crust has been recorded from test pit surveys at every 10 km intervals in staggered direction carriageway. Thus, total of 15 Nos. of pits were dug along the corridor, in which, 13 are from Main carriageway and 2 are from Service Road.

Results of the test pit survey showing average thickness of pavement layers are presented in the Table below.

Table 7: Pavement Composition of Existing Pavement along Project Road

S No	Test Pit Number	Design Chainage	Direction	BT, mm	WMM, mm	GSB, mm	Total, mm
1	JS-TP-1	1+400	LHS	260	180	200	640
2	JS-TP-2	10+000	LHS	230	240	240	710
3	JS-TP-3	21+160	LHS	210	200	200	610
4	JS-TP-4	30+840	LHS	270	200	270	740
5	JS-TP-5	40+080	LHS	220	220	230	670
6	JS-TP-6	49+860	LHS	190	200	200	590
7	JS-TP-7	60+880	RHS	220	200	230	650
8	JS-TP-8	55+420	RHS	180	230	220	630
9	JS-TP-9	45+270	RHS	220	210	190	620
10	JS-TP-10	35+230	RHS	230	200	200	630
11	JS-TP-11	24+900	RHS	230	200	200	630
12	JS-TP-12	15+240	RHS	220	210	200	630
13	JS-TP-13	4+860	RHS	230	250	200	680
Service road							
14	JS-SR-TP-1	29+600	RHS	90	150	200	440
15	JS-SR-TP-2	29+650	LHS	100	150	200	450

Pavement composition of Main Carriageway consists of asphalt wearing course, granular and subgrade layers. Asphalt layer thickness varying from 180mm to 260 mm, Granular thickness varying from 380mm to 480mm.

The average thickness of Service Road is about 445mm. Pavement is mainly composed of a BT layer, WMM & GSB base over subgrade.

2.7 MATERIAL INVESTIGATIONS

2.7.1 SUBGRADE INVESTIGATIONS & LABORATORY TESTING

Sub-grade Investigations have been carried out to examine the subgrade soil characteristics along the project road. A total 15 Nos. test pits have been carefully dug from the pavement surface up to sub-grade level. In which, 13 Nos. have been dug on Main Carriageway edge, 2 Nos. on Service Road edge. Field density tests have been conducted for subgrade samples and a small quantity of sample has also been collected in airtight containers for determining the field moisture content. Upon completion of the field density test, representative sample of sub-grade soil has been collected in bulk, in gunny bags, from each test pit for laboratory testing.

The soil samples collected have been tested for the following properties to assess the existing sub-grade soil properties.

- Sieve analysis
- Atterberg limits
- Heavy compaction

- Four (4) days soaked CBR as per IS standards at 97% of MDD as applicable for sub-grade (Heavy Compaction)
- Free swelling index

Some sample photographs have been taken at all test pit locations depicting the crust thickness and type of material in the pavement are presented below.



JS-TP-1



JS-TP-3



JS-TP-9



JS-SR-TP-1

2.7.1 BORROW AREA

The sources identified as potential borrow areas along with certain useful information such as distance from the project road, location, village name, etc., have also been presented in this table below

Table 8: Borrow Area Details

S No	Borrow Area No	Chainage	Side	Offset	Village and contact person	Quantity	Rate	Remarks	Co-ordinate
1	JS-BP-1	48+800	RHS	0.4km	Name: Bajith Cell: 9863093144	Plenty	Rate: Rs 400/- per Dumper	Pvt Land	25.749553 91.882835



JS-BP-1

2.7.2 AGGREGATE SAMPLES

Aggregates to be used for sub-base, base, surface courses and concrete works have been collected from the crushers under operation in the existing quarries. The locations, estimated quantity, basic cost of material and the approximate distance from each source to the nearest point on the project corridor are compiled in Tables below.



JS-AQ-1

Table 9: Aggregate Samples Details

Sample No.	Ex. Chainage (Km.)	Name of Village	Name of Source/ Crusher	Lead from Nearest Ex. Chainage (Km.)	Approximate Quantity (ton)	Basic cost of the material (Rs.)	Remarks	Co-ordinate
JS-AQ-1	0+000 RHS	Maikhuli	Cusher - Pristan Stone Crusher Name: Abhinar Surekha Mr.Borva Mob no-8011594513	17.0 km	Plenty	65mm-Rs 1250/- per cum 20mm-Rs 1500/- per cum 10mm-Rs 1200/- Per cum Dust - Rs 200/- Per cum GSB - Rs 700/- Per cum	Including Royalty and GST 5%	26.103100 91.815632
JS-AQ-2	0+000 RHS	Udalguri	-	120 km	Plenty	Rate not told	-	26.740994 92.086743

2.7.3 SAND SAMPLES

The sand source location along with estimated quantity, basic cost of material and the approximate distance from source to the nearest point on the project corridor are compiled in Tables below.



JS-SQ-1

Table 10: Sand Samples Details

sample No.	Ex. Chainage (Km.)	Name of Village	Name of Source/ Crusher	Lead from Nearest Ex. Chainage (Km.)	Approximate Quantity (ton)	Basic cost of the material (Rs.)	Remarks	Co-ordinate
JS-SQ-1	0+000 RHS	Nongpoh	Material Supplier Name: Mohris Mob no-9774499108	90 km	Plenty	River Sand - Rs 1700/- Cu.m	Including Royalty and GST 5%	25.892595 91.883478

2.8 CORE CUTTING SAMPLES

The objective of the core cutting is to examining the engineering properties of the materials relevant to the project as per specifications. Accordingly, 17 Nos. of cores were taken carefully from the project corridor, in which 15 cores on MCW and on Service Road 2 Nos.

The Core samples collected from these identified locations have been tested for the following properties.

- Density of Core
- Theoretical Maximum Sp. gravity (GMM)
- Air voids
- Compaction
- Extraction and Gradation
- Gradation of Aggregates

The recorded details such as location, lane, condition, depth of core etc. for each core sample are presented below

Table 11: Core Cutting Samples Details

S NO	Core Id	Existing Chainage	Direction	Lane	Offset From Kerb (in M)	Thickness (mm)	Hole Depth (mm)	Condition	Remark
1	JS-C-1	1+400	LHS	Outer Lane	5.9m	190mm	200mm	Fair	
2	JS-C-2	10+000	LHS	Inner Lane	1.55m	230mm	230mm	Minor Cracks	
3	JS-C-3	21+160	LHS	Outer Lane	5.0m	200mm	220mm	Good	
4	JS-C-4	30+840	LHS	Inner Lane	2.90m	Broken	270mm	Good	Received 3 Pieces
5	JS-C-5	40+080	LHS	Outer Lane	5.9m	220mm	220mm	Good	Existing BT
6	JS-C-6	49+860	LHS	Inner Lane	3.7m	190mm	190mm	Cracks & Rutting	
7	JS-C-7(A)	60+880	LHS	Outer Lane	6.0m	195mm	220mm	Good	
8	JS-C-7(B)	60+800	LHS	Inner Lane	2.10m	200mm	200mm	Good	
9	JS-C-8	55+420	RHS	Inner Lane	1.1m	120mm	150mm	Good	Bottom 30mm core not Received
10	JS-C-9	45+270	RHS	Outer Lane	5.7m	220mm	220mm	Good	
11	JS-C-10	35+200	RHS	Outer Lane	5.4m	150mm	230mm	Ravelling	Existing BT
12	JS-C-10(A)	35+200	RHS	Inner Lane	1.6m	50mm	190mm	140mm Core Broken	Overlay
13	JS-C-11	24+900	RHS	Outer Lane	5.8m	226mm	235mm	Ravelling	
14	JS-C-12	15+240	RHS	Inner Lane	1.0m	120mm	245mm	Ravelling Remaining 125mm Core Broken	
15	JS-C-13	4+810	RHS	Outer Lane	5.2m	210mm	230mm	Fair	
16	JS-SR-C-1	29+650	LHS	Outer Lane	4.3m	80mm	90mm	Fair	
17	JS-SR-C-2	29+600	RHS	Outer Lane	3.4m	65mm	90mm	Fair	

The sample photos of Core sample are as presented below.



JS-C-1



JS-C-2



JS-C-3



JS-C-4



JS-C-5



JS-C-6



JS-C-7A



JS-C-7B



JS-C-8



JS-C-9



JS-C-10



JS-C-10(A)



JS-C-11



JS-C-11



JS-C-13



JS-SR-C-1



JS-SR-C-2

2.9 AXLE LOAD SURVEYS

Traffic loading has a significant impact on pavement performance and design. This is because the damage that vehicles create to a road depends very strongly on the axle loads of the vehicles. The exact relationship is influenced by the type of road structure and the way the road deteriorates but a "fourth power" damage law gives a good approximation.

Axle load study has been conducted using portable axle load pads. The survey was conducted near Toll Plaza at km 13+530 for 48 hrs. duration on 19th May 2025. The survey has been conducted in both the directions. The measurements have been made on random sampling basis. The collected axle load data and analysis is presented in **Appendix 5** of this Report.

The vehicle damage factors have been calculated using the standard axle loadings given in IRC: 37-2018. The standard axle loadings adopted have been presented in the following table.

Table 12: Details of Standard Axles Used

Axle Configuration	Standard Axle load (Tonnes)/ KN	Remarks
Single Wheel, Single Axle	6.60/ 65	As per IR:37-2018
Dual Wheel, Single Axle	8.16/ 80	As per IR:37-2018
Dual Wheel, Tandem Axle group	15.10/ 148	As per IR:37-2018
Dual Wheel, Tridem Axle group	22.90/ 224	As per IR:37-2018

Few photographs illustrating the survey locations and axle load measurements are presented below.



Survey in Progress



Survey in Progress

Direction wise VDF for each mode of commercial traffic has been estimated. Results of axle load surveys have been presented in the following table.

Table 13: VDF Values Estimated

Mode Type	Pahammawlein TP (Km. 13.500)	
	UP (Jorabat- Shillong)	DOWN (Shillong - Jorabat)
LCV	0.66	2.75
2 Axle Truck	2.33	1.96
3 Axle Truck	7.25	13.21
MAV (4-6 Axle)	11.79	13.24

CHAPTER 3. VALIDATION OF EXECUTED WORKS

3.1 ROAD WORKS

The project road has been closely inspected to verify the executed works on ground. The inventory details of every item of works executed by the Concessionaire/Contractor are recorded along with the damages if any. Each structure has been inspected to note down its structural configuration and condition. The following table highlights the executed works on ground.

Table 14: Inventory details of the Project Road

S.no	Particulars	Length/ Nos	As per site	Remarks
1	Start Chainage (Km)	Km	0	
2	End Chainage (Km)	Km	61.80	
3	Length of the Project Corridor	Kms	61.80	
4	Service Road / Slip Road	Kms	7.3	
5	Length of Bypass	Kms	5.27	Umsning bypass
6	Flyovers	Nos	1	
7	ROB	Nos	-	
8	VUPs	Nos	1	
9	Major Bridges	Nos	1	
10	Minor Bridges	Nos	13	
11	Culverts (Pipe)	Nos	310	
12	Culvert (Slab)	Nos	89	
13	Major Junctions	Nos	6	
14	Minor junctions	Nos	21	
15	High Embankments	Kms	2.770	
16	Stone Pitching	Sqm	1,006	
17	Concrete Lining / Grouting	Sqm	0.55	
18	RCC Wall-Full Height	Kms	1.240	
19	Gabion Wall	Kms	6.07	
20	RCC Cover Drain	Kms	10.130	
21	RCC Open Lined Drain	Kms	68.44	
22	Masonry Drain	Kms	0.20	
23	Median Cuts	Nos	6,932	
24	Chutes	Nos	128	
25	Toll Plaza	Nos	1	
26	No. of Lanes	Nos	10	each side 4+1
27	ECB - Emergency Call Box	Nos	53	
28	Route Patrolling Vehicle	Nos	1	
29	Ambulance	Nos	1	
30	Cranes	Nos	1	
31	SWB	Nos	-	
32	Toeing Vehicle	Nos	1	
33	High Mast Lights	Nos	96	
34	Highway Lighting (length only)	Kms	1.41	
35	Single Arm Lightnings poles	Nos	32	
36	Solar Blinkers	Nos	68	
37	Solar Lights with Panel	Nos	19	
38	Bus Bays with Shelter	Nos	20	

S.no	Particulars	Length/ Nos	As per site	Remarks
39	Truck Lay bye	Nos	2	
40	Median Opening	Nos	41	
41	Median Plantation Functional	Kms	55.88	
42	Median Plantation	Nos	55,880	
43	Road Markings	Kms	123.60	
44	Delineators	Nos	205	
45	Kilo-metre Stones	Nos	98	
46	Hectometre Stones	Nos	496	
47	5th Km Stone	Nos	26	
48	Single Face W-Beam Safety Barriers	Kms	23.010	
49	Guard Posts	Nos	2,683	
50	Rigid Concrete Barriers	Kms	1.640	
51	Concrete Railing	Kms	0.805	
52	Pedestrian Guard Rails	Kms	4.400	
53	Hand Railing on Crash Barriers	Kms	1.070	
54	Road Signs	Nos	1,530	
55	4-Lane Gantry Sign Boards	Nos	3	
56	Cantilever Sign Boards	Nos	19	
57	Toll Plaza Sign Boards	Nos	9	
58	RRM Protection wall	Kms	2.61	
59	Breast wall	Kms	2.04	
60	RRM Retaining wall	Kms	0.06	
61	Wire Mesh& Wire Rope Fencing	Kms	0.08	
62	Rock bolt	Kms	0.20	

The project corridor appears to have been constructed with the cross-sectional elements matching to those given in the manual at the time of execution. The carriageway width of 7.0m plus paved shoulders of 0.5m to 1.5, shyness of 0.25m has been provided over the entire length except at structures.

In the project stretch, the Service Roads/Slip Roads with an overall length of 7.3Km is observed along the project corridor. The summary of service roads and slip roads are presented as below the details are provided in Road items, **Appendix 6** of this Report.

Table 15: Summary of Service Roads/Slip Roads along Project Road

Description	LHS	RHS	Total
	Flexible	Flexible	
Units	Kms	Kms	Kms
Service Road as per CA	3.65 X2		7.3

RCC Lined Covered drains and Median drain are provided along the project road. It is observed that a few locations cover slab is damaged and cleaning need to be required. These sections are presented in the Table below. The details are provided in Road items, **Appendix 6** of this Report.

Table 16: Summary of Drain

S No	Description	Open lined drains (Kms)	RCC Cover lined drain (Kms)	Masonary Drains (Kms)
1	As per CA			
2	As per Site	68.44	10.130	0.20

On curved sections with super-elevation, Median drain cuts are provided and summary are presented below details are provided in **Appendix-6** of this report.

Table 17: Summary of Median drain cuts

Summary	Site
As per CA	
As Per Site	6932

Approaches to the structures are provided with full height RE-wall with panels and at other high embankments locations are protected with grouting and stone pitching. Whereas, Hill/cut sections protected with RRM masonry walls/ Gabions/Breast walls/Retaining walls rock bolting etc. which account for a total length of 13.830 km. The summary of slope protection is presented below and the details are presented in **Appendix-6** of this report.

Table 18: Summary of Slope Protection along Project Road

Approach Type	LHS (Kms)	RHS (Kms)	Length (Kms)
High Embankment(>6m)	1.79	0.98	**2.77**
RE Wall	0.62	0.62	**1.24**
Grouting on Soil EMB	0.27	0.28	**0.55**
Stone Pitching	0.09	-	**0.09**
RRM Protection wall	0.685	1.925	**2.610**
Gabion wall	3.848	2.220	**6.068**
Breast wall	1.645	0.397	**2.042**
RRM Retaining wall	0.060	-	**0.060**
Wire Mesh& Wire Rope Fencing	0.080	-	**0.080**
Rock bolting	0.200	-	**0.200**
Length (km)			**13.830**

A total of 41 median openings has been observed along the project road, none of which are provided with designated standing lanes. Out of these, 5 median openings are considered unauthorized. Solar blinkers have been installed at all median opening locations. Detailed location-wise information of these median openings is provided under Road Items in **Appendix 6** of this report.

Table 19: Summary of Median Openings

Summary	As per site (Nos.)
Total Nos	41
Normal Lane	36
Un-Authorized	5

The Project Road has 6 Nos. of Major Junctions and 24 Nos. of Minor Junctions. The List of Major & Minor junctions are provided. The details of these locations are provided in Road items, **Appendix 6** of this Report.

Safety barriers in the form of metal beam, concrete barriers are installed have been provided along the project road at high embankments and at sharp curve locations, at approaches of grade separated and cross drainage Structures. The details of these locations are provided in Road items, **Appendix 6** of this Report. The table below shows the summary of Safety Barriers provided along the project corridor are provided below:

Table 20: Summary of Safety Barrier Locations

Summary	MCB (Km)	MHR (Km)	CCB (Km)	PGR (Km)	CHR (Km)	Delineators(km)
As per Site (Kms)	23.010	1.070	1.640	4.400	0.805	205
Damaged (Kms)	0.083	-	-	0.012		-

Road furniture in the form of Signs/Markings, Gantry signs and traffic safety blinkers, lighting, high mast lights have been provided along the project road the details presented in the **Appendix-6** of this Report. The summary of the same is presented in the Tables below:

Table 21: Locations of Highway Lightings

Summary	Nos	Remarks
High masts poles at site	12	Average 8 no of Bulbs Per single pole
Single-arm Poles as per Site	51	LED Bulbs
Solar Lights	19	

Table 22: Summary of Road Signs along Project Road

Description	LHS	RHS	Junctions	Total	Missing	Damage	Poor
Unit	Nos	Nos	Nos	Nos	Nos	Nos	Nos
Overhead Gantry	1	1	1	3	-	-	-
Cantilever Gantry	7	12	-	19	-	-	1
Toll Boards	6	3	-	9	-	-	-
ADS/RAS	-	-	-	-	-	-	-
Rectangular	42	40	-	82	-	-	-
Triangular	164	154	5	323	-	-	-
Circular	44	32	-	76	-	-	-
Octagonal	1	1	3	5	-	-	-
Flag Type	-	1	-	1	-	-	-
Chevron	418	387	-	805	-	3	-
Hazard	107	95	3	205	-	1	-
Route marker	1	-		3	-	-	-
Cluster	21	-		37	-	-	-
Total	**812**	**744**	**12**	**1568**	-	**4**	**1**

Road user facilities such as Bus Bays with Shelter and Truck Lay byes have been provided along the corridor. The project Road has total 19 no's of Bus Bay with Bus Shelter and 2 number of Truck lay byes along the project Road. The details of the Bus Bay with Bus shelter and Truck lay byes are provided in **Appendix-6** of this report.

An Incident Management System (IMS) has been implemented along the project stretch to ensure timely detection, reporting, and resolution of any unforeseen events or emergencies. The details of the Incident Management System established for the project corridor are presented below.

Table 23: Summary of Incident Management Equipment

S. No	Item/Particulars	Unit	Established
1	Ambulance	Nos	1
2	Recovery Crane	Nos	1
3	Patrolling vehicle	Nos	1
4	Toeing Vehicle	Nos	1

3.2 STRUCTURES

The inventory of structures has been carried for all every individual structure. The overall summary of existing bridges / structures is as presented below:

Table 24: Number of Structures as per Site

S. No.	Type of Str	No. of Structures As per CA	As per site				
			No. of Structures			Total No. of Str's	Total No.of Locations
			LHS	RHS	BHS		
1	MJB	1	1	1	-	2	1
2	MNB	12	13	13	-	26	13
3	Flyover	1	-	1	-	1	1
4	VUP	-	1	1	-	2	1
5	SC	84	-	-	89	89	89
6	PC	307	-	-	310	310	310

Table 25: Age of Structures

S. No.	Type of Str	LHS		RHS		Total (Nos)		Total no. of Str's
		Old	New	Old	New	Old	New	
1	MJB	-	1	1	-	1	1	2
2	MNB	4	9	7	6	11	15	26
3	Flyover	-	-	-	1	-	1	1
4	VUP	-	1	-	1	-	2	2

Table 26: Summary of Expansion Joints & Bearings

S. No.	Type of Str	Expansion joints		Bearings							
				Pot PTFE		Elastomeric		Metallic		Rocker Roller	
		Old	New	Old	New	Old	New	Old	New	Old	New
1	MJB	5	6	-	42	24	-	-	-	-	-
2	MNB	14	12	-	60	18	-	18	-	6	-
3	Flyover	-	2	-	10	-	-	-	-	-	-

Table 27: Summary & Combination of Superstructures

S. No.	Type of Str	RCC Girder		RCC Slab	RCC Girder	PSC Girder	RCC Box	Steel Girder	Total no. of Structures

		& Steel Girder	RCC Slab & PSC Girder						
1	MJB	1	1	-	-	-	-	-	2
2	MNB	-	-	10	12	1	3	-	26
3	Flyover	-	-	-	-	-	-	1	1
4	VUP	-	-	-	-	-	2	-	2

Table 28: Summary of Substructures

S No.	Type of Str	ABUTMENT			PIER		
		RCC Wall	Spill Through	RCC Circular	RCC Circular	RCC Circular & Trestle Type	RCC Wall
1	MJB	1	1	-	1	1	-
2	MNB	26	-	-	-	-	3
3	Flyover	-	-	1	-	-	-
4	VUP	2	-	-	-	-	-

Table 29: Details of Major Bridges

S.No.	Structure Coordinates	Site Chainage (Km)	Inventory Chainage (Km)	Type of Structure	Side	Str on	Age of Structure	Span Arrangement (No x Length)	Deck Width (m)	Remarks
1	26°02'31.3"N 91°52'03.8"E	6+990	6+990	MJB	LHS	MCW	New	1 x 15.64 + 1 x 35.20 + 1 x 36.87 + 1 x 36.90 + 1 x 37.00	12.00	-
2	26°02'31.3"N 91°52'03.8"E	6+990	6+990	MJB	RHS	MCW	Old	1 x 7.98 + 1 x 7.75 + 1 x 36.48 + 1 x 37.35 + 1 x 36.28 + 1 x 35.88	8.40	-
3	26°05'09.3"N 91°52'35.9"E	1+834	1+834	MNB	LHS	MCW	Old	1 x 8.7	8.50	-
4	26°05'09.3"N 91°52'35.9"E	1+834	1+834	MNB	RHS	MCW	New	1 x 9	12.00	-
5	26°04'23.2"N 91°52'28.6"E	3+292	3+292	MNB	LHS	MCW	New	1 x 12	12.00	-
6	26°04'23.2"N 91°52'28.6"E	3+292	3+292	MNB	RHS	MCW	Old	1 x 11.4	8.50	-
7	25°57'53.1"N 91°51'27.7"E	16+761	16+800	MNB	LHS	MCW	Old	1 x 13.2	8.40	-
8	25°57'53.1"N 91°51'27.7"E	16+761	16+800	MNB	RHS	MCW	New	1 x 13.5	12.00	-
9	25°52'30.1"N 91°52'58.7"E	31+662	31+690	MNB	LHS	MCW	New	1 x 9	12.00	-
10	25°52'30.1"N 91°52'58.7"E	31+662	31+690	MNB	RHS	MCW	Old	1 x 8.7	8.40	-
11	25°51'48.5"N 91°52'49.2"E	33+037	33+080	MNB	LHS	MCW	New	1 x 9	12.00	-
12	25°51'48.5"N 91°52'49.2"E	33+037	33+080	MNB	RHS	MCW	New	1 x 9	8.20	-
13	25°49'49.1"N 91°52'33.3"E	37+143	37+185	MNB	LHS	MCW	Old	1 x 16.3	8.60	-

S.No.	Structure Coordinates	Site Chainage (Km)	Inventory Chainage (Km)	Type of Structure	Side	Str on	Age of Structure	Span Arrangement (No x Length)	Deck Width (m)	Remarks
14	25°49'49.1"N 91°52'33.3"E	37+143	37+185	MNB	RHS	MCW	New	1 x 16.5	12.00	-
15	25°49'01.7"N 91°52'27.6"E	39+214	39+270	MNB	LHS	MCW	New	1 x 12	12.00	-
16	25°49'01.7"N 91°52'27.6"E	39+214	39+270	MNB	RHS	MCW	Old	1 x 11	8.40	-
17	25°47'59.0"N 91°52'30.2"E	41+256	41+525	MNB	LHS	MCW	New	1 x 9	12.00	-
18	25°47'59.0"N 91°52'30.2"E	41+256	41+525	MNB	RHS	MCW	Old	1 x 7.8	8.40	-
19	25°46'14.7"N 91°52'29.3"E	45+458	45+530	MNB	LHS	MCW	New	1 x 25	12.00	-
20	25°46'14.7"N 91°52'29.3"E	45+458	45+530	MNB	RHS	MCW	Old	1 x 25	8.50	-
21	25°44'07.0"N 91°52'34.5"E	50+540	50+600	MNB	LHS	MCW	New	1 x 12.5	12.50	-
22	25°44'07.0"N 91°52'34.5"E	50+540	50+600	MNB	RHS	MCW	New	1 x 12.5	12.50	-
23	25°43'11.3"N 91°53'24.5"E	53+962	53+190	MNB	LHS	MCW	New	1 x 16.5	12.00	-
24	25°43'11.3"N 91°53'24.5"E	53+962	53+190	MNB	RHS	MCW	Old	1 x 16.4	8.40	-
25	25°41'52.3"N 91°54'09.6"E	57+955	57+215	MNB	LHS	MCW	New	2 x 6.32	12.00	-
26	25°41'52.3"N 91°54'09.6"E	57+955	57+215	MNB	RHS	MCW	Old	1 x 13.5	8.50	-
27	25°41'39.3"N 91°54'17.2"E	58+419	57+775	MNB	LHS	MCW	Old	2 x 5.5	8.50	-
28	25°41'39.3"N 91°54'17.2"E	58+419	57+775	MNB	RHS	MCW	New	2 x 5.58	12.00	-
29	25°40'26.9"N 91°54'02.9"E	61+840	61+130	Flyover	RHS	MCW	New	1 x 25	12.00	-
30	25°43'53.9"N 91°52'40.9"E	51+040	51+115	VUP	LHS	MCW	New	1 x 10.5	12.25	-
31	25°43'53.9"N 91°52'40.9"E	51+040	51+115	VUP	RHS	MCW	New	1 x 10.5	12.25	-

Overall details of all Major and Minor structures is as follows:

S.No.	Inventory Chainage (Km)	Type of Structure	Side	Str on	Age of Structure	Span Arrangement (No x Length)	Deck Width (m)	Type of Foundation	Type of Substructure		Type of Superstructure	Type of Bearings
									Abutment	Pier		
1	6+990	MJB	LHS	MCW	New	1 x 15.64 + 1 x 35.20 + 1 x 36.87 + 1 x 36.90 + 1 x 37.00	12.00	Well Foundation	RCC Wall	RCC Circular	RCC Girder & Steel Girder	Pot PTFE
2	6+990	MJB	RHS	MCW	Old	1 x 7.98 + 1 x 7.75 + 1 x 36.48 + 1 x 37.35 + 1 x 36.28 + 1 x 35.88	8.40	Well Foundation	Spill Through	RCC Circular & Trestle Type	RCC Slab & PSC Girder	Elastomeric
3	1+834	MNB	LHS	MCW	Old	1 x 8.7	8.50	Open	RCC Wall	-	RCC Slab	-
4	1+834	MNB	RHS	MCW	New	1 x 9	12.00	Open	RCC Wall	-	RCC Slab	-
5	3+292	MNB	LHS	MCW	New	1 x 12	12.00	Not Visible	RCC Wall	-	RCC Girder	Pot PTFE

S.No.	Inventory Chainage (Km)	Type of Structure	Side	Stron	Age of Structure	Span Arrangement (No x Length)	Deck Width (m)	Type of Foundation	Type of Substructure		Type of Superstructure	Type of Bearings
									Abutment	Pier		
6	3+292	MNB	RHS	MCW	Old	1 x 11.4	8.50	Not Visible	RCC Wall	-	RCC Girder	Metallic
7	16+800	MNB	LHS	MCW	Old	1 x 13.2	8.40	Not Visible	RCC Wall	-	RCC Girder	Metallic
8	16+800	MNB	RHS	MCW	New	1 x 13.5	12.00	Not Visible	RCC Wall	-	RCC Girder	Pot PTFE
9	31+690	MNB	LHS	MCW	New	1 x 9	12.00	Open	RCC Wall	-	RCC Slab	-
10	31+690	MNB	RHS	MCW	Old	1 x 8.7	8.40	Open	RCC Wall	-	RCC Slab	-
11	33+080	MNB	LHS	MCW	New	1 x 9	12.00	Open	RCC Wall	-	RCC Slab	-
12	33+080	MNB	RHS	MCW	New	1 x 9	8.20	Open	RCC Wall	-	RCC Slab	-
13	37+185	MNB	LHS	MCW	Old	1 x 16.3	8.60	Not Visible	RCC Wall	-	RCC Girder	Elastomeric
14	37+185	MNB	RHS	MCW	New	1 x 16.5	12.00	Not Visible	RCC Wall	-	RCC Girder	Pot PTFE
15	39+270	MNB	LHS	MCW	New	1 x 12	12.00	Not Visible	RCC Wall	-	RCC Girder	Pot PTFE
16	39+270	MNB	RHS	MCW	Old	1 x 11	8.40	Not Visible	RCC Wall	-	RCC Girder	Elastomeric
17	41+525	MNB	LHS	MCW	New	1 x 9	12.00	Open	RCC Wall	-	RCC Slab	-
18	41+525	MNB	RHS	MCW	Old	1 x 7.8	8.40	Open	RCC Wall	-	RCC Slab	-
19	45+530	MNB	LHS	MCW	New	1 x 25	12.00	Not Visible	RCC Wall	-	PSC Girder	Pot PTFE
20	45+530	MNB	RHS	MCW	Old	1 x 25	8.50	Well Foundation	RCC Wall	-	RCC Girder	Elastomeric
21	50+600	MNB	LHS	MCW	New	1 x 12.5	12.50	Open	RCC Wall	-	RCC Slab	-
22	50+600	MNB	RHS	MCW	New	1 x 12.5	12.50	Open	RCC Wall	-	RCC Slab	-
23	53+190	MNB	LHS	MCW	New	1 x 16.5	12.00	Not Visible	RCC Wall	-	RCC Girder	Pot PTFE
24	53+190	MNB	RHS	MCW	Old	1 x 16.4	8.40	Not Visible	RCC Wall	-	RCC Girder	Rocker Roller
25	57+215	MNB	LHS	MCW	New	2 x 6.32	12.00	Raft	RCC Wall	RCC Wall	RCC Box	-
26	57+215	MNB	RHS	MCW	Old	1 x 13.5	8.50	Not Visible	RCC Wall	-	RCC Girder	Metallic
27	57+775	MNB	LHS	MCW	Old	2 x 5.5	8.50	Raft	RCC Wall	RCC Wall	RCC Box	-
28	57+775	MNB	RHS	MCW	New	2 x 5.58	12.00	Raft	RCC Wall	RCC Wall	RCC Box	-
29	61+130	Flyover	RHS	MCW	New	1 x 25	12.00	Not Visible	RCC Circular	-	Steel Girder	Pot PTFE
30	51+115	VUP	LHS	MCW	New	1 x 10.5	12.25	Raft	RCC Wall	-	RCC Box	-
31	51+115	VUP	RHS	MCW	New	1 x 10.5	12.25	Raft	RCC Wall	-	RCC Box	-

4.1 MATERIAL INVESTIGATION INFERENCES

4.1.1 EMBANKMENT & SUBGRADE

❖ **Embankments**

The embankment for project road has been constructed with available soils from nearby areas. The soil appears to be sandy clay, silty clay & gravel clay in nature and embankment appears to be in good condition over the entire length of project. No major settlements or depressions have been noted even at high embankment locations. There are no marshy/water logging areas along the length of project road.

Borrow area sample has been collected at one location and this belongs to CI type of soil. The percentage distribution of borrow soil and soaked CBR of borrow soil given below. Summary of the test results carried out on these samples are presented in the following tables.

Table 30: Summary of test results of Borrow soils

Lab Sample No	Site Identification		Grain Size Analysis					Atterberg Limits (%)			Soil Class	MDD (gm/cc)	OMC (%)	Dry Density at 97% MDD	Final Soaked CBR 97% MDD	Free Swelling Index (%)
	Location (km)	Up/Dn	Percentage passing from					LL	PL	PI						
			4.75 mm IS Sieve	425 mic IS Sieve	75 mic IS Sieve	Gravel %	Sand %									
JS-BP-1	48+800	RHS	100.00	95.55	82.62	0.00	17.38	42	30	12	CI	1.88	12.30	1.82	9.38	18

❖ **Subgrade**

The subgrade samples collected from the test pits taken from project road appears to be in fair condition as revealed by test pit investigations. Soil classification has been done according to IS Classification of Soils (ISC) as detailed in IS 1498 - 1978.

Laboratory test results indicate that all the Subgrade soil samples collected belongs to both Coarse- and Fine-Grained Soils. Out of 15 test pits, 7 sample belong to CI type of soil, 7 samples belong to SC type of soil and 1 sample belongs to SM-SC type of soil.

Pie Chart showing the percentage distribution of soil classification of existing subgrade sample is presented below:

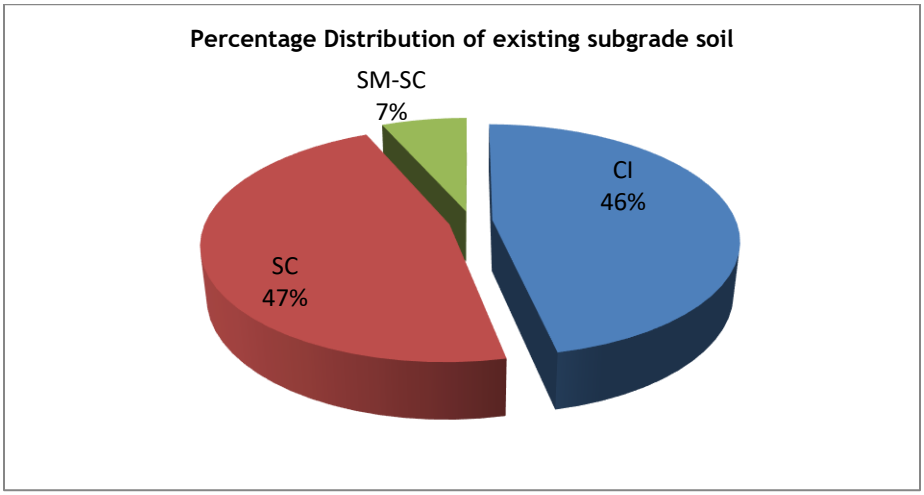
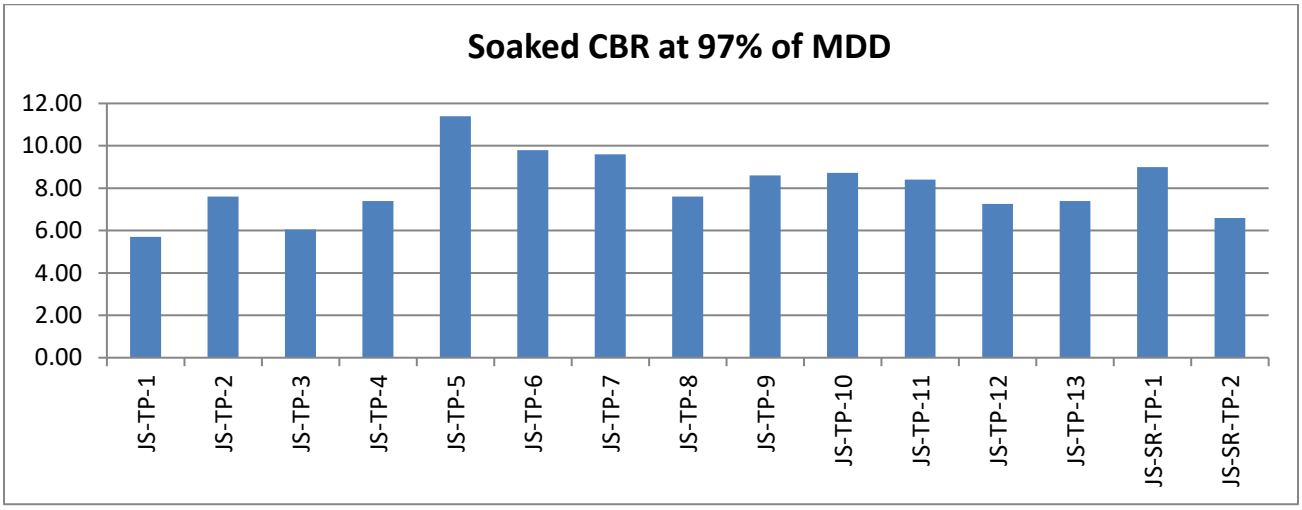


Table 31: Summary of test results of Existing Subgrade Soils

Lab Sample No	Site Identification		Grain Size Analysis					Atterberg Limits (%)			Soil Class	MDD (gm/cc)	OMC (%)	Soaked CBR 97% MDD	FDD (gm/cc)	Free Swelling Index (%)
	Location (km)	Up/Dn	Percentage passing from					LL	PL	PI						
			4.75 mm IS Sieve	425 mic IS Sieve	75 mic IS Sieve	Gravel %	Sand %									
JS-TP-1	1+400	LHS	98.20	70.63	57.63	1.80	40.57	49	34	15	CI	1.75	15.40	5.70	1.55	11
JS-TP-2	10+000	LHS	96.12	74.67	63.24	3.88	32.88	42	29	13	CI	1.83	14.00	7.60	1.81	4
JS-TP-3	21+160	LHS	100	95.91	81.41	0.00	18.59	48	26	22	CI	1.76	15.60	6.05	1.59	16
JS-TP-4	30+840	LHS	96.34	76.25	64.95	3.66	31.39	43	28	15	CI	1.79	14.20	7.39	1.59	22
JS-TP-5	40+080	LHS	94.24	47.49	35.00	5.76	59.24	35	27	8	SC	1.97	10.30	11.40	1.79	7
JS-TP-6	49+860	LHS	85.58	69.59	49.61	14.42	35.97	29	22	7	SM-SC	1.88	10.20	9.80	1.74	8
JS-TP-7	60+880	RHS	78.78	64.20	46.04	21.22	32.74	30	21	9	SC	1.93	13.00	9.60	1.74	4
JS-TP-8	55+420	RHS	92.44	78.56	70.08	7.56	22.36	38	26	12	CI	1.80	14.10	7.60	1.61	18
JS-TP-9	45+270	RHS	85.35	75.57	48.43	14.65	36.92	34	24	10	SC	1.78	10.00	8.60	1.69	8
JS-TP-10	35+230	RHS	94.64	62.77	49.10	5.36	45.54	37	27	10	SC	1.84	13.70	8.72	1.65	15
JS-TP-11	24+900	RHS	95.91	65.87	45.85	4.09	50.06	34	22	12	SC	1.82	10.20	8.40	1.77	8
JS-TP-12	15+240	RHS	96.54	70.36	45.12	3.46	51.42	38	24	14	SC	1.75	16.40	7.25	1.70	8
JS-TP-13	4+860	RHS	97.79	69.59	51.41	2.21	46.38	40	21	19	CI	1.79	16.60	7.39	1.63	12
JS-SR-TP-1	29+600	RHS	91.65	76.48	40.13	8.35	51.52	40	25	15	SC	1.85	13.40	9.00	-	5
JS-SR-TP-2	29+650	LHS	95.56	71.26	58.79	4.44	36.77	46	28	18	CI	1.81	15.40	6.60	1.60	5

List of the FDD test results carried out existing subgrade are presented in the following table.



The following observations can be made from the above test results conducted on of existing subgrade samples

- Liquid limit Values are in the range of 29% to 49%. All the samples are satisfying the LL limits <50%
- Plastic index ranges of 7% to 22%. All the samples satisfying the PL limits <25%.
- Maximum Dry Density for all subgrade samples varies between 1.75 and 1.97 gm/cc. All the Samples satisfying the MDD criterion (MDD>=1.75 gm/cc)
- OMC for existing subgrade samples varies Between 10.20 to 16.60.
- Free Swelling Index for existing subgrade samples varies from 4 to 22. All samples satisfying the FSI criterion (FSI<=50%)
- CBR Values are in the range of 5.70% to 11.40%

On the whole, it can be concluded that the existing subgrade is in fair condition. The laboratory test results for soil samples are presented in **Appendix-7** of this Report.

4.1.2 AGGREGATES

Aggregates to be used for sub-base, base, surface courses and concrete works have been collected from the crushers under operation from the existing quarries. The Table below represents the test results of the Aggregate and Sand Samples

Table 32: Test Results of Aggregate Samples Details

S. No	Sample	Location (km)	Up/Dn	Aggregate Size	A.I.V (%)	Water Absorption (%)	Specific Gravity	Loos bulk density (kg/ltr)	Rodded bulk density (kg/ltr)	Remark
1	JS-AQ-1	0+000	RHS	10 MM	23	0.62	2.61	1.38	1.58	
				20 MM		0.38	2.64	1.36	1.55	
2	JS-AQ-2	0+000	RHS	10 MM	19	1.15	2.63	1.50	1.68	

Note: All Aggregates samples are satisfying MoRTH requirements i.e., AIV (max. limit is 24% for Asphalt layer), Water Absorption (max. limit is 2%)

4.1.1 SAND

The test results of the Sand samples are as presented below.

Table 33: Test Results of Sand Samples Details

S No	Sample No	Chainage (KM)	SIDE	10 mm Passing %	4.75 mm Passing %	2.36 mm Passing %	1.18mm Passing %	600mic Passing %	300mic Passing %	150mic Passing %	FM	ZONE
1	JS-SQ-1	0+000	RHS	100	99.60	96.80	87.70	56.40	21.40	4.50	2.34	ZONE-II

This sample is suitable for construction works.

4.2 CORE RESULTS

The core samples as extracted at 17 locations were tested in the laboratory to find the engineering properties of BC/DBM materials.

The test results of the pavement cores are as presented below.

Table 34: Test Results of Pavement cores-BC Layers

Core No.	Chainage	Direction	Carriage way lane	Distance from kerb (mm)	Depth of core in mm	Condition of Road	% of Bitumen Obtained (by extraction of		% Agg by Wt. of total Mix	Thickness of Specimen mm	DENSITY %	Miximum Theoretical Sp.Gr.of Mix	% of Air Voids	Filler Asphalt Ratio (%		Gradation as per Morth	Remarks
							BC	Limits						0.075 mm	% compaction		
JS-C-1	1+400	LHS	Outer Lane	5.9m	190mm	Fair	4.73	As per MORTH 5th Revision Table no 500-17, Bitumen Content for BC grading - 1 is 5.2%	95.27	48.2	2.268	2.424	6.44	0.79	94	Grade-1	
JS-C-2	10+000	LHS	Inner Lane	1.55m	230mm	Minor Cracks	5.01		94.99	46.58	2.316	2.450	5.47	0.58	95	Grade-1	
JS-C-3	21+160	LHS	Outer Lane	5.0m	200mm	Good			Broken								
JS-C-4	30+840	LHS	Inner Lane	2.90m	Broken	Good	4.82		95.18	45.22	2.321	2.517	7.79	0.72	92	Grade-1	
JS-C-5	40+080	LHS	Outer Lane	5.9m	220mm	Good	5.09		94.91	33.42	2.237	2.392	6.48	0.54	94	Grade-1	
JS-C-6	49+860	LHS	Inner Lane	3.7m	190mm	Cracks & Rutting			Broken								
JS-C-7(A)	60+880	LHS	Outer Lane	6.0m	195mm	Good	ITS				2.372						
							ITS				2.305						
JS-C-7(B)	60+800	LHS	Inner Lane	2.10m	200mm	Good	ITS				2.359						
							ITS				2.289						
JS-C-8	55+420	RHS	Inner Lane	1.1m	120mm	Good	5.19		94.81	24.91	2.333	2.450	4.78	0.53	95	Grade-1	
JS-C-9	45+270	RHS	Outer Lane	5.7m	220mm	Good	5.30		94.70	55.95	2.206	2.397	7.97	0.71	92	Grade-1	
JS-C-10	35+200	RHS	Outer Lane	5.4m	150mm	Ravelling	ITS			37.25	2.245						
JS-C-10(A)	35+200	RHS	Inner Lane	1.6m	50mm	140mm Core Broken	ITS		Broken								
JS-C-11	24+900	RHS	Outer Lane	5.8m	226mm	Ravelling	5.27		94.73	47.46	2.380	2.503	4.91	0.59	95	Grade-1	
JS-C-12	15+240	RHS	Inner Lane	1.0m	120mm	Ravelling Remaining 125mm Core Broken	5.17		94.83	54.63	2.337	2.456	4.85	0.47	95	Grade-1	
JS-C-13	4+810	RHS	Outer Lane	5.2m	210mm	Fair	5.2		94.80	40.27	2.214	2.39	7.36	0.42	93	Grade-1	
JS-SR-C-1	29+650	LHS	Outer Lane	4.3m	80mm	Fair			Broken								
JS-SR-C-2	29+600	RHS	Outer Lane	3.4m	65mm	Fair	5.26		94.74	28.29	2.460	2.594	5.17	1.20	95	Grade-1	

Observations:

- Binder content for BC: ranging from 5.17% to 5.30%. The MORTH Table 500-17 specifies the Bitumen content range is 5.2 ± 0.3 %. All the sample satisfy for bitumen requirement.
- BC-Gradation results indicate the mix design: Grade I proportion.
- BC-Air Voids: ranging from 4.77% to 7.97% (MORTH Table-11, specifies 3% to 5%)
- Compaction –More than 92% of Compaction is observed.
- Filler Asphalt Ratio– should be within the specified limit of 0.6-1.2 (refer MORTH clause 505.3 or as per MS-2 (5.10).

Table 35: Test Results of Pavement cores-DBM Layers

Sl. No.	Name of Material	Core No.	Chainage	Direction	Carriage way lane	Distance from kerb (mm)	Depth of core in mm	Condition of Road	% of Bitumen Obtained (by extraction of core)		% Agg by Wt. of total Mix	Thickness of Specimen mm	DENSITY %	Maximum Theoretical Sp. Gr.of Mix (GMM) %	% of Air Voids	Filler Asphalt Ratio (%)	% compaction	Gradation as per Morth	Remarks
									BC	Limits						0.075 mm			
1	DBM-2	JS-C-1	1+400	LHS	Outer Lane	5.9m	190mm	Fair	4.14	As per MORTH 5th Revision Table no 500-10, Bitumen Content for DBM grading - 2 is 4 .5 %	95.86	62.44	2.427	2.554	4.97	0.34	95	Grade-2	
2	DBM	JS-C-2	10+000	LHS	Inner Lane	1.55m	230mm	Minor Cracks			Broken								
3	DBM-2	JS-C-3	21+160	LHS	Outer Lane	5.0m	200mm	Good	4.14		95.86	72.72	2.433	2.549	4.55	0.49	95	Grade-2	
4	DBM	JS-C-4	30+840	LHS	Inner Lane	2.90m	Broken	Good	4.67		95.33	61.74	2.272	2.418	6.04	0.81	94	Grade-2	
5	DBM	JS-C-5	40+080	LHS	Outer Lane	5.9m	220mm	Good	4.22		95.78	52.02	2.298	2.483	7.45	0.61	93	Grade-2	
6	DBM	JS-C-6	49+860	LHS	Inner Lane	3.7m	190mm	Cracks & Rutting			Broken								
7	DBM-2	JS-C-7(A)	60+880	LHS	Outer Lane	6.0m	195mm	Good	ITS				2.636						
	DBM-1								ITS				2.622						
8	DBM-2	JS-C-7(B)	60+800	LHS	Inner Lane	2.10m	200mm	Good	ITS				2.672						
	DBM-1								ITS				2.658						
9	DBM	JS-C-8	55+420	RHS	Inner Lane	1.1m	120mm	Good	4.18		95.82	45.93	2.381	2.530	5.89	0.79	94	Grade-2	
10	DBM	JS-C-9	45+270	RHS	Outer Lane	5.7m	220mm	Good	4.22		95.78	57.70	2.675	2.763	3.18	1.01	97	Grade-2	
11	DBM-2	JS-C-10	35+200	RHS	Outer Lane	5.4m	150mm	Ravelling	ITS				2.327						
12	BC	JS-C-10(A)	35+200	RHS	Inner Lane	1.6m	50mm	140mm Core Broken	ITS		Broken								
13	DBM-2	JS-C-11	24+900	RHS	Outer Lane	5.8m	226mm	Ravelling	4.43		95.57	61.87	2.377	2.502	5.00	0.29	95	Grade-2	
14	DBM	JS-C-12	15+240	RHS	Inner Lane	1.0m	120mm	Ravelling Remaining 125mm Core Broken	4.36		95.64	77.28	2.498	2.603	4.03	0.33	96	Grade-2	
15	DBM-2	JS-C-13	4+810	RHS	Outer Lane	5.2m	210mm	Fair	4.16		95.84	50.85	2.468	2.532	2.53	0.50	97	Grade-2	
16	DBM	JS-SR-C-1	29+650	LHS	Outer Lane	4.3m	80mm	Fair	4.25		95.75	50.70	2.401	2.577	6.83	0.45	93	Grade-2	
17	DBM	JS-SR-C-2	29+600	RHS	Outer Lane	3.4m	65mm	Fair	4.19		95.81	32.93	2.547	2.720	6.36	0.85	94	Grade-2	

Observations:

- Binder content for DBM: ranging from 4.16% to 4.43%. The MORTH Table 500-10 specifies the Bitumen content range is 4.5 ± 0.3 %.
- DBM-Gradation results indicate the mix design: Grade II proportion.
- DBM-Air Voids: ranging from 2.52% to 6.83% (MORTH Table-11, specifies 3% to 5%)
- Compaction –More than 93% of Compaction is observed.
- Filler Asphalt Ratio– should be within the specified limit of 0.6-1.2 (refer MORTH clause 505.3 or as per MS-2 (5.10)).

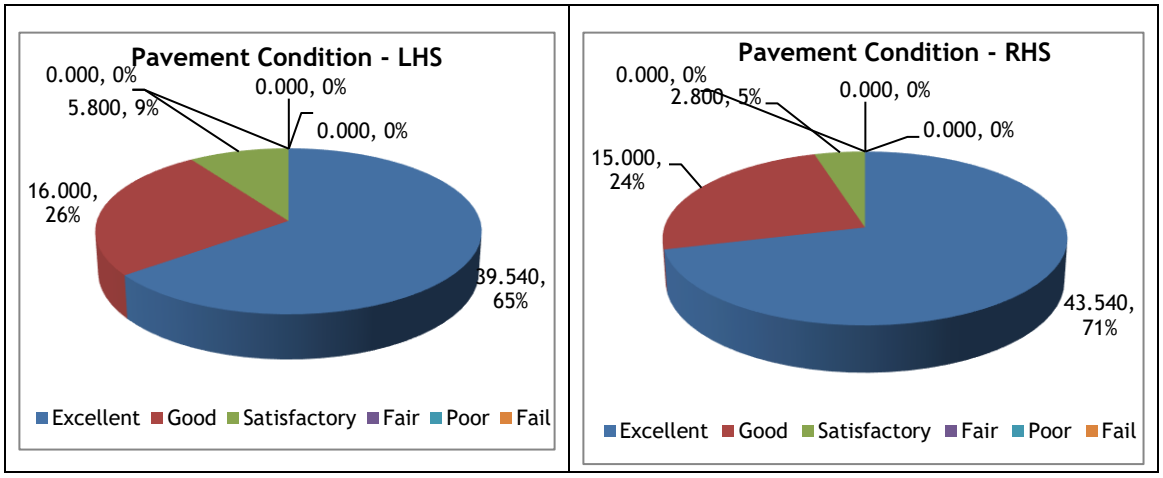
4.3 PAVEMENT CONDITION

The distresses in pavement surface have been captured at 10m interval on the project corridor for each lane separately by NSV survey. Pavement Condition rating (PCI) as per IRC:82-2023 from the data collected at every km in each direction has been presented in the **Annexure-2** of this report.

The project corridor has been provided with flexible pavement over entire length including service roads. Rigid pavement is only provided at Toll Plaza.

- **For Main Carriageway:**

The Pavement condition rating (PCI) is presented in Pie-chart from Excellent to Fail are as below:



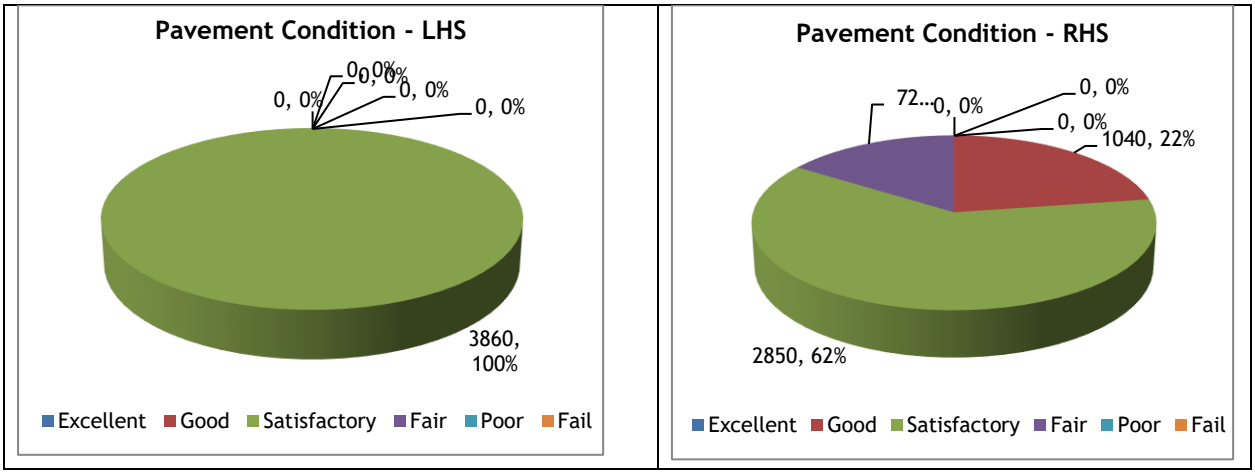
The condition rating for Main carriageway is presented in table as below

Overall PCI		Condition Rating	Length (km)	
>	<=		LHS	RHS
90	100	Excellent	**39.540**	**43.540**
80	90	Good	**16.000**	**15.000**
60	80	Satisfactory	**5.800**	**2.800**
40	60	Fair	-	-
20	40	Poor	-	-
0	20	Fail	-	-
Toll Plaza			**0.310**	**0.460**
Total Length			**30.000**	**61.800**

From NSV pavement condition (PCI) analysis, project road falls under Excellent to satisfactory.

- **Service Road**

The Pavement condition rating (PCI) is presented in Pie-chart from Excellent to Fair are as below



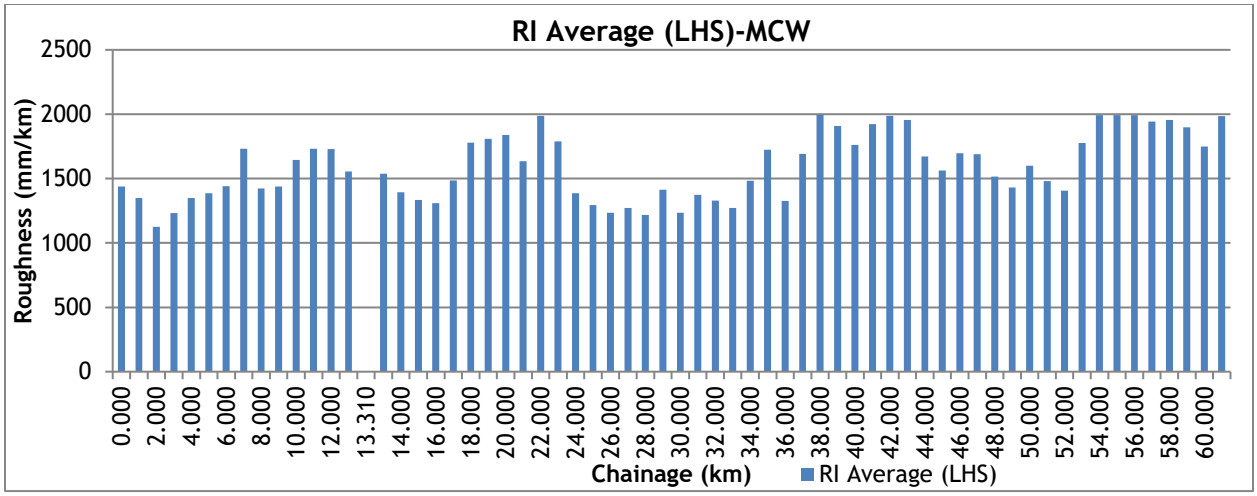
The condition rating for service Road is presented in table as below

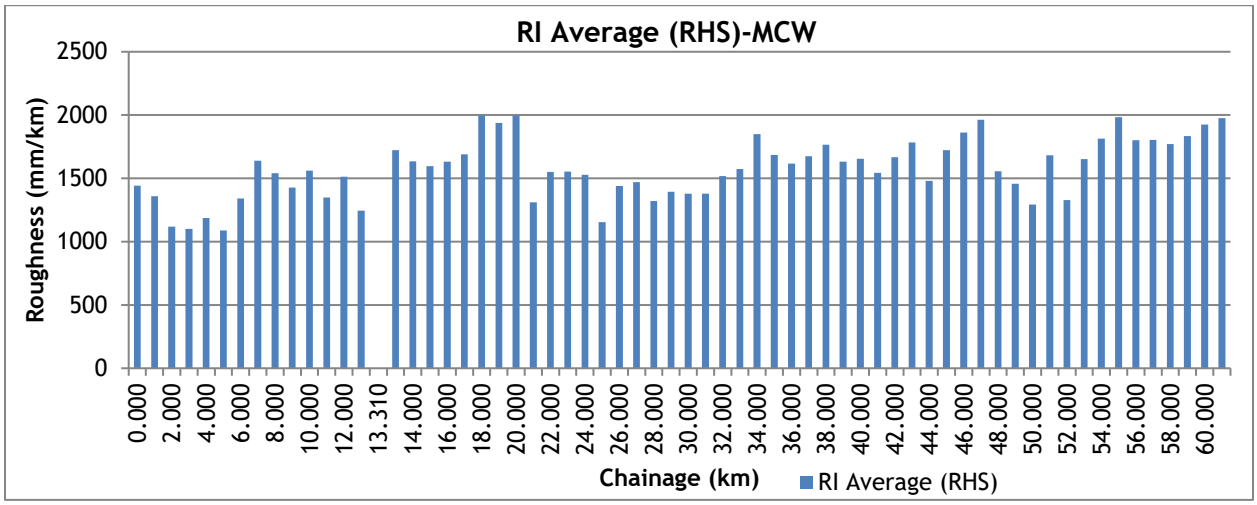
Overall PCI		Condition Rating	Length (km)	
>	<=		LHS	RHS
90	100	Excellent	-	-
80	90	Good	-	1.040
60	80	Satisfactory	3.860	2.850
40	60	Fair	-	0.720
20	40	Poor	-	-
0	20	Fail	-	-

From NSV pavement condition (PCI) analysis, entire length falls under Good to Fair.

4.4 ROUGHNESS

The Roughness represented in Bar charts for the main carriageway are as presented below:





Based on the above, considering the km-stone reference system the summary of direction-wise km lengths having varying roughness values are as presented below:

Roughness Range (mm/km)	Length in Km	
	LHS	RHS
Less than 2000	61.340	61.340
2000 - 2200	-	-
2200 -2500	-	-
More Than 2500	-	-
Toll Plaza	0.460	0.460

It can be inferred from the above, that project road does not require any functional overlay, as the roughness Index (RI) remains within Schedule-K requirement, i.e., less than 2500mm/km.

➢ **Service Road**

Similar exercise has been done for service road and the roughness values are as presented below.

Roughness Range (mm/km)	Service Length in Km	
	LHS	RHS
Less than 2000	-	-
2000 – 2200	2.040	1.040
2200 -2500	1.000	0.850
More Than 2500	0.820	2.720

4.5 FWD ANALYSIS AND ASSESSMENT OF OVERLAY REQUIREMENT

By looking at the age and condition and performance of the pavement following different set of ranges have been used while finalizing the modulus values:

Layer	Bituminous Layers	Granular Layer Modulus	Subgrade
Modulus Value (MPa)	750-3000	100-500	50-75

Bituminous layer Moduli obtained from back calculations shall be corrected for a standard pavement temperature of 35ºC using given equations. Whereas, for back calculated moduli values obtained for granular and subgrade layer shall be corrected for seasonal variations (using winter and summer equations). As FWD tests, performed, during the monsoon, no seasonal correction factor is applied for granular and subgrade layer. The design moduli (15^{th} percentile moduli) of in-service layers for each homogenous section are given in table below.

Table 36: Summary of Design Moduli of different layers – LHS MCW

S No	Side	From	To	Length (Km)	15th Percentile MR values (MPa)		
					for BT	for Granular	for Subgrade
1	LHS	0.000	2.398	2.40	2610	488	75
2	LHS	2.398	4.397	2.00	2633	351	75
3	LHS	4.397	7.091	2.69	2615	487	75
4	LHS	7.091	8.997	1.91	2659	491	75
5	LHS	8.997	11.280	2.28	2566	478	75
6	LHS	11.280	13.310	2.03	2539	314	75
7	LHS	13.310	13.770	0.46	Toll Plaza		
8	LHS	13.770	16.596	2.83	2885	488	75
9	LHS	16.596	19.198	2.60	2768	477	75
10	LHS	19.198	21.800	2.60	2264	305	75
11	LHS	21.800	23.898	2.10	2829	490	75
12	LHS	23.898	26.402	2.50	2718	472	75
13	LHS	26.402	28.903	2.50	2700	494	75
14	LHS	28.903	31.200	2.30	2662	489	75
15	LHS	31.200	33.200	2.00	2963	493	75
16	LHS	33.200	35.802	2.60	2828	494	75
17	LHS	35.802	38.002	2.20	2899	477	75
18	LHS	38.002	40.201	2.20	3005	482	75
19	LHS	40.201	42.804	2.60	2935	480	75
20	LHS	42.804	44.902	2.10	3025	492	75
21	LHS	44.902	47.400	2.50	2823	490	75
22	LHS	47.400	49.601	2.20	2836	492	75

S No	Side	From	To	Length (Km)	15th Percentile MR values (MPa)		
					for BT	for Granular	for Subgrade
23	LHS	49.601	51.597	2.00	2587	301	75
24	LHS	51.597	53.998	2.40	2401	445	75
25	LHS	53.998	56.000	2.00	2643	475	75
26	LHS	56.000	58.013	2.01	2562	488	75
29	LHS	58.013	61.800	3.79	2682	485	75
Total Length				**61.800**			

Table 37: Summary of Design Moduli of different layers – RHS MCW

S No	Side	From	To	Length (Km)	15th Percentile MR values (Mpa)		
					for BT	for Granular	for Subgrade
1	RHS	0.00	3.00	3.00	2640	313	75
2	RHS	3.00	5.90	2.90	2862	493	75
3	RHS	5.90	8.40	2.50	777	198	75
4	RHS	8.40	11.60	3.19	2688	400	75
5	RHS	11.60	13.31	1.71	2311	349	75
6	RHS	13.31	13.77	0.46	Toll Plaza		
7	RHS	13.77	16.20	2.43	1005	220	75
8	RHS	16.20	18.60	2.40	2749	489	75
9	RHS	18.60	21.80	3.20	2700	480	75
10	RHS	21.80	26.40	4.60	2697	481	75
11	RHS	26.40	26.60	0.20	2654	493	75
12	RHS	26.60	28.80	2.20	2665	420	75
13	RHS	28.80	30.80	2.00	2764	483	75
14	RHS	30.80	32.90	2.10	2722	483	75
15	RHS	32.90	34.90	2.00	1205	188	75
16	RHS	34.90	37.00	2.10	2780	345	75
17	RHS	37.00	40.00	3.00	2472	486	75
18	RHS	40.00	42.20	2.20	2725	375	75
19	RHS	42.20	45.00	2.80	2404	304	75
20	RHS	45.00	47.90	2.90	2532	443	75
21	RHS	47.90	50.40	2.51	1635	189	75
22	RHS	50.40	52.60	2.20	2386	210	75
23	RHS	52.60	54.60	2.00	2600	478	75
24	RHS	54.60	56.60	2.00	1784	212	75
25	RHS	56.60	58.60	2.01	2562	382	75
26	RHS	58.60	61.80	3.20	1118	153	75
Total Length				**61.800**			

Observations on FWD Results

It can be noticed from the above table that the layer moduli for the three layers are varying along the length and direction. The MR value for BT layer is 2264 MPa to 3000 MPa in LHS & 777 MPa to 2862 MPa in RHS Carriageway. The MR value for Granular Layers is 301 MPa to 494 MPa in LHS & 153 MPa to 493 MPa in RHS Carriageway. Similarly, the MR value for Subgrade Layer is 75 MPa in both LHS & RHS Carriageway.

Table 38: Summary of Design Moduli of different layers – LHS Service Road

S.No	Side	From	To	Length (Km)	15th Percentile MR values (MPa)			Remarks
					for BT	for Granular	for Subgrade	
1	LHS	0.00	26.30	26.30	2662	101	75	No Service Road
2	LHS	26.30	29.98	3.68				Service Road
3	LHS	29.98	61.01	31.03				No Service Road
4	LHS	61.01	61.12	0.11				Service Road
5	LHS	61.12	61.80	0.68				No Service Road
Total length				**61.800**				

Table 39: Summary of Design Moduli of different layers – RHS Service Road

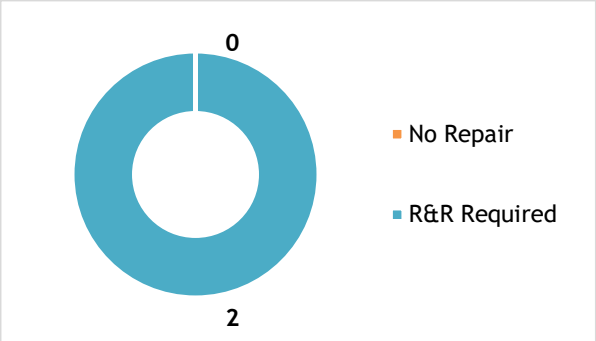
S.No	Side	From	To	Length (Km)	15th Percentile MR values			Remarks
					for BT	for Granular	for Subgrade	
1	RHS	0.00	26.30	26.30	2816	134	75	No Service Road
2	RHS	26.30	29.97	3.67				Service Road
3	RHS	29.97	60.87	30.90				No Service Road
4	RHS	60.87	61.68	0.81				Service Road
5	RHS	61.68	61.80	0.12				No Service Road
Total length				**61.800**				

4.6 STRUCTURES

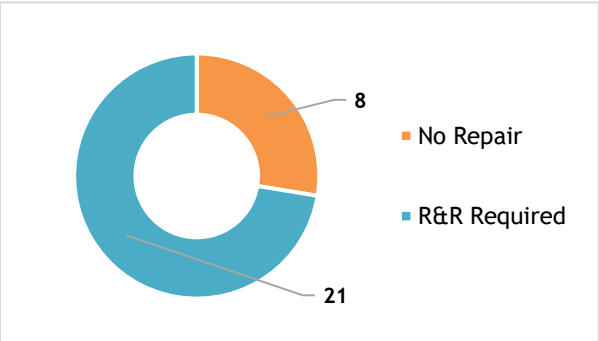
Inventory and asset condition of all the existing structures falling within project road have been verified as per IRC: SP-35 procedures and guidelines with following field surveys

- Inventory of existing highway bridges / structures
- Visual condition survey of existing highway bridges / structures

Based on these surveys following structural rehabilitation measures have been considered:

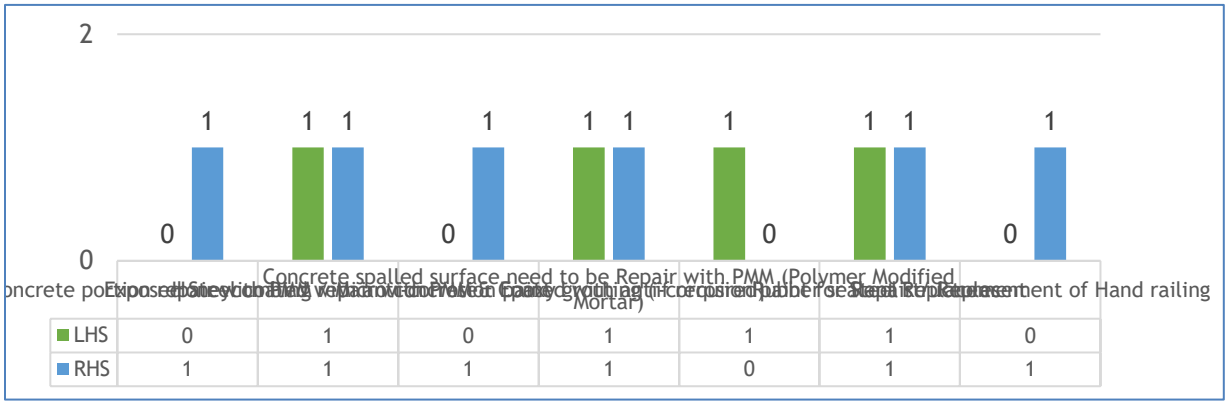


Maintenance of major structures
(Length >60m)



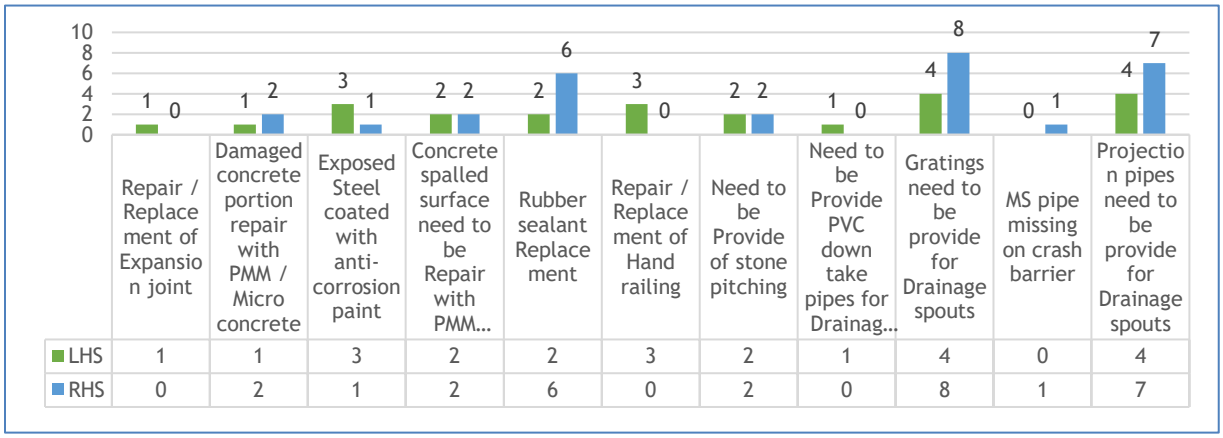
Maintenance of minor structures
(Length <60m)

Type of repairs at number of locations for major structures



LHS	0	1	0	1	1	1	0
RHS	1	1	1	1	0	1	1

Type of repairs at number of locations for minor structures



	Repair / Replacement of Expansion joint	Damaged concrete portion repair with PMM / Micro concrete	Exposed Steel coated with anti-corrosion paint	Concrete spalled surface need to be Repair with PMM...	Rubber sealant Replacement	Repair / Replacement of Hand railing	Need to be Provide of stone pitching	Need to be Provide PVC down take pipes for Drainag...	Gratings need to be provide for Drainage spouts	MS pipe missing on crash barrier	Projection pipes need to be provide for Drainage spouts
LHS	1	1	3	2	2	3	2	1	4	0	4
RHS	0	2	1	2	6	0	2	0	8	1	7

➢ Structural Rehabilitation works includes:

- ✓ Repair / Replacement of Expansion joint
- ✓ Damaged concrete portion repair with PMM / Micro concrete
- ✓ Exposed Steel coated with anti-corrosion paint
- ✓ Honeycombing repair with PMM & Epoxy grouting (if required)
- ✓ Concrete spalled surface needs to be Repair with PMM (Polymer Modified Mortar)
- ✓ Coated with anti-corrosion paint for Steel structures
- ✓ Rubber sealant Replacement
- ✓ Repair / Replacement of Hand railing
- ✓ Need to be Provide of stone pitching
- ✓ Need to be Provide PVC down take pipes for Drainage spouts
- ✓ Gratings need to be provided for Drainage spouts
- ✓ MS pipe missing on crash barrier
- ✓ Projection pipes need to be provide for Drainage spouts

Overall condition of few of the major structures are presented on sample basis as below. However, each and every structure detail are presented in **Appendix-8** of this report.

Chainage: 6+990
General Description
LHS MCW (New)

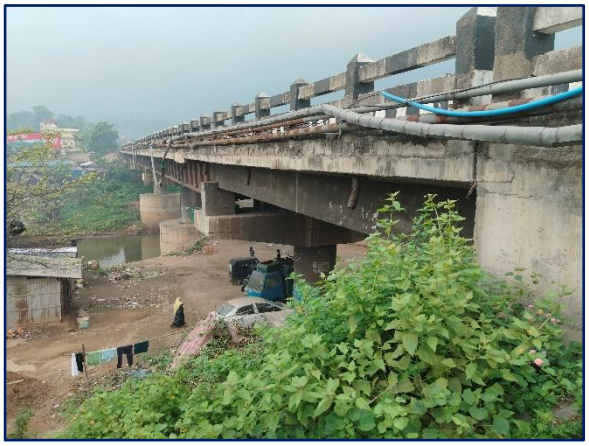
- Type of Structure : MJB
- Span Arrangement : 1 x 15.64 + 1 x 35.20 + 1 x 36.87 + 1 x 36.90 + 1 x 37.00 m
- Total length of Structure : 161.61 m
- Total deck width of Structure : 12 m
- Type of Foundation : Well Foundation
- Type of Substructure (Abutment & Pier) : RCC Wall & RCC Circular
- Type of Superstructure : RCC Girder & Steel Girder
- Type of Bearing : Pot PTFE
- Type of Railing / Crash Barrier : Crash Barrier & Hand Railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Expansion joint Rubber sealant damaged on Pier P2, P3, P4 & Abutment A2.
- ✓ Spalling & Reinforcement exposed on Abutment cap A2.
- ✓ Corrosion stains observed on all steel girders.





















Chainage: 6+990
General Description
RHS MCW (Old)

- Type of Structure : MJB
- Span Arrangement : 1 x 7.98 + 1 x 7.75 + 1 x 36.48 + 1 x 37.35 + 1 x 36.28 + 1 x 35.88 m
- Total length of Structure : 161.72 m
- Total deck width of Structure : 8.4 m
- Type of Foundation : Well Foundation
- Type of Substructure (Abutment & Pier) : Spill Through & RCC Circular & Trestle Type
- Type of Superstructure : RCC Slab & PSC Girder
- Type of Bearing : Elastomeric
- Type of Railing / Crash Barrier : Hand Railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Expansion joint Rubber sealant damaged on Pier P6 & Abutment A2.
- ✓ Expansion joint concrete portion damaged near Abutment A2.
- ✓ Spalling & Reinforcement exposed on pier cap P2 in Span S2 & S3.
- ✓ Spalling & Reinforcement exposed on deck slab side face in all spans at Median side & Shoulder side.
- ✓ Honeycomb & Reinforcement exposed on Pier cap P3 at Median side.
- ✓ Hand railing damaged & Reinforcement exposed in all spans at Median side & Shoulder side.
- ✓ Drainage spouts were clogged.
- ✓ Vegetation growth observed on structure.

















Chainage: 1+834
General Description
LHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 1 x 8.7 m
- Total length of Structure : 8.7 m
- Total deck width of Structure : 8.5 m
- Type of Foundation : Open
- Type of Substructure (Abutment & Pier) : RCC Wall
- Type of Superstructure : RCC Slab
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : Hand Railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Spalling & Reinforcement exposed on soffit of deck slab.
- ✓ Hand railing damaged & Reinforcement exposed at A2 Median side.
- ✓ Insufficient free board.









Chainage: 1+834
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 9 m
- Total length of Structure : 9 m
- Total deck width of Structure : 12 m
- Type of Foundation : Open
- Type of Substructure (Abutment & Pier) : RCC Wall
- Type of Superstructure : RCC Slab
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ MS pipe missing on crash barrier at A1 shoulder side.
- ✓ Quadrant pitching not provided at A1 & A2 side.
- ✓ Structure is in fair condition.









Chainage: 61+130
General Description
RHS MCW (New)

- Type of Structure : Flyover
- Span Arrangement : 1 x 25 m
- Total length of Structure : 25 m
- Total deck width of Structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure (Abutment & Pier) : RCC Circular
- Type of Superstructure : Steel Girder
- Type of Bearing : Pot PTFE
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Expansion joint Rubber sealant damaged on A1 & A2.
- ✓ Spalling & Reinforcement exposed on Abutment cap A1.









Chainage: 51+115
General Description
LHS MCW (New)

- Type of Structure : VUP
- Span Arrangement : 1 x 10.5 m
- Total length of Structure : 10.5 m
- Total deck width of Structure : 12.25 m
- Type of Foundation : Raft
- Type of Substructure (Abutment & Pier) : RCC Wall
- Type of Superstructure : RCC Box
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Structure is in fair condition.
- ✓ PVC down take pipes are not provided for drainage spouts.






Chainage: 51+115
General Description
RHS MCW (New)

- Type of Structure : VUP
- Span Arrangement : 1 x 10.5 m
- Total length of Structure : 10.5 m
- Total deck width of Structure : 12.25 m
- Type of Foundation : Raft
- Type of Substructure (Abutment & Pier) : RCC Wall
- Type of Superstructure : RCC Box
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Structure is in fair condition.





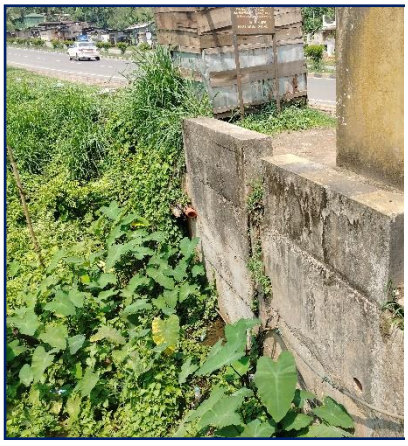

Photos depicting the existing culvert are presented below



Slab Culvert @ Km 1+025



Pipe Culvert @ Km 8+010



Slab Culvert @ 16+415



Pipe Culvert @ Km 22+160



Slab Culvert @ Km 43+793



Slab Culvert @ 51+100

General Observations: -:

- The Project stretch comprises a total of 16 major structures, which include: 1 MJB, 13 MNBs, 1 Flyover & 1 VUP.
- For different structures of the project road have varieties of superstructures such as RCC girders, steel girders, PSC girders, RCC slabs, and RCC box structures.
- In this Project stretch, there are Pot PTFE (New-112No's), Elastomeric (Old-42 No's), Metallic (Old-18 No's) & Rocker Roller (Old-6 No's). observed in Girder type Structures.
- Structures are having 39 No's of Expansion joints in that 19 No's on old structures and 20 No's on new structures.
- There are 12 No's of old bridges existing on left side 4 No's & right side 8 No's. (1 MJB's & 11 MNB's)
- Debris accumulation observed on Abutment & pier cap at couple of locations, Cleaning of expansion joints, drainage spouts need to be done regularly.
- Some structures are already repaired and it would be necessary to closely examine these structures for further distress during the maintenance period/Project duration, by way of close inspection and testing.
- Monitoring the condition does not require advanced NDT techniques. Standard methods like UPV, Half-Cell Potential, Rebound Hammer, Cover Meter Survey, and Carbonation Depth are sufficient for condition assessment. The following old bridges require **non-destructive testing**.

S.No.	Inventory Chainage (Km)	Type of Str.	Side	Structure on	Span As per Site	Deck width	Type of Superstructure	Type of Bearings
1	6+990	MJB	RHS	MCW	1 x 7.98 + 1 x 7.75 + 1 x 36.48 + 1 x 37.35 + 1 x 36.28 + 1 x 35.88	8.4	RCC Slab & PSC Girder	Elastomeric
2	3+292	MNB	RHS	MCW	1 x 11.4	8.5	RCC Girder	Metallic
3	16+800	MNB	LHS	MCW	1 x 13.2	8.4	RCC Girder	Metallic
4	37+185	MNB	LHS	MCW	1 x 16.3	8.6	RCC Girder	Elastomeric
5	39+270	MNB	RHS	MCW	1 x 11	8.4	RCC Girder	Elastomeric
6	45+530	MNB	RHS	MCW	1 x 25	8.5	RCC Girder	Elastomeric
7	53+190	MNB	RHS	MCW	1 x 16.4	8.4	RCC Girder	Rocker Roller
8	57+215	MNB	RHS	MCW	1 x 13.5	8.5	RCC Girder	Metallic

4.7 DRAINAGE AND SLOPE PROTECTION

- ✓ Lined Covered drains and opened lined drains are observed along the corridor.
- ✓ Median Cuts at curve locations are in good condition. No major distress is observed on the carriageway on downstream side.

4.8 TRAFFIC SAFETY AND ROAD FURNITURE

- ✓ Metal beam crash barriers provided along the project road appear to be intact over entire length except for few locations where it got damaged.
- ✓ Pedestrian guard rails installed at service road locations.
- ✓ Concrete Crash Barriers installed at different locations appear to be in fair condition.
- ✓ Solar Blinker are observed in few median opening locations. Street lightings in the form of Single arm lightings are provided at built-up location along the project corridor.

4.9 ROAD USER FACILITIES

The project Road has been provided with Bus-bays with bus-shelters and Truck laybyes.

CHAPTER 5. REHABILITATION PLANS AND DESIGNS

5.1 DESIGN TRAFFIC LOADING

Design Traffic loading has been estimated by considering the client shared traffic data for FY2023 (projected to FY26 with 5% growth) and VDFs as estimated from the latest axle load survey data and with 5% growth rates for 10 years, 15 years and 20 years design period as below:

Table 40: Traffic Volume (AADT) -FY2026

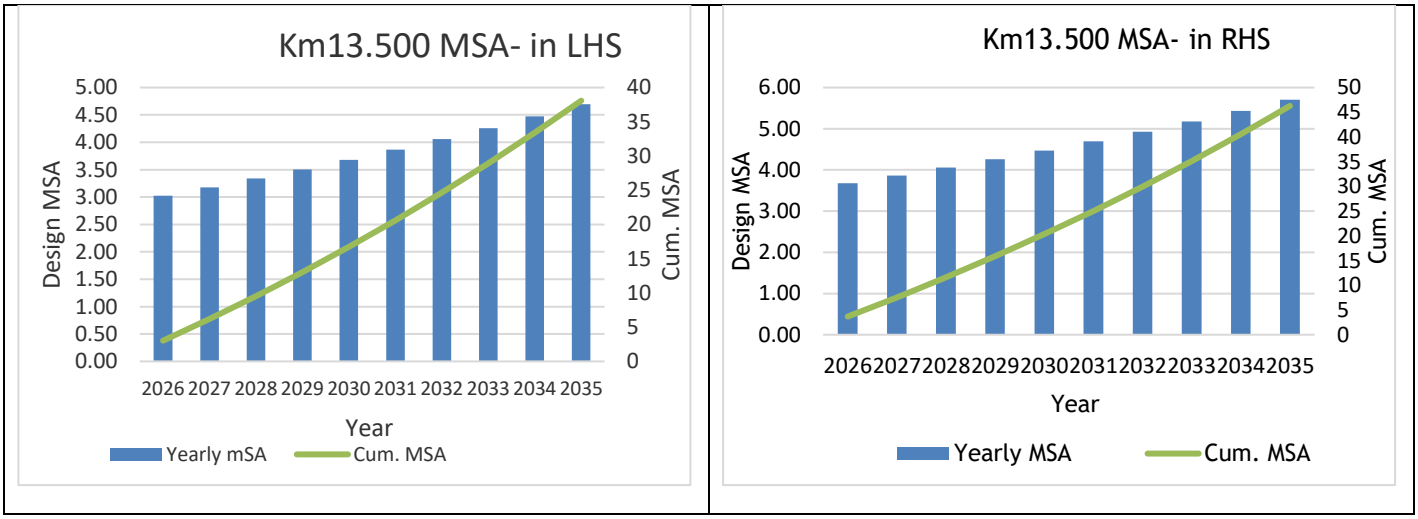
Vehicle/Mode	AADT @ Toll Plaza, Km 13.500	
	LHS	RHS
LCV	506	495
2A truck	489	423
3A truck	206	162
MAV truck	680	683
BUS	157	124

The MSA calculated considering the above data is as follows.

Table 41: Estimated Design traffic loading

Design Period	Pahammawlein TP (Km. 13.500)	
	LHS	RHS
End of Concession, Yr20231	**21**	**25**
10 YEARS	38	46

Pictorial representation of MSA is as follows.



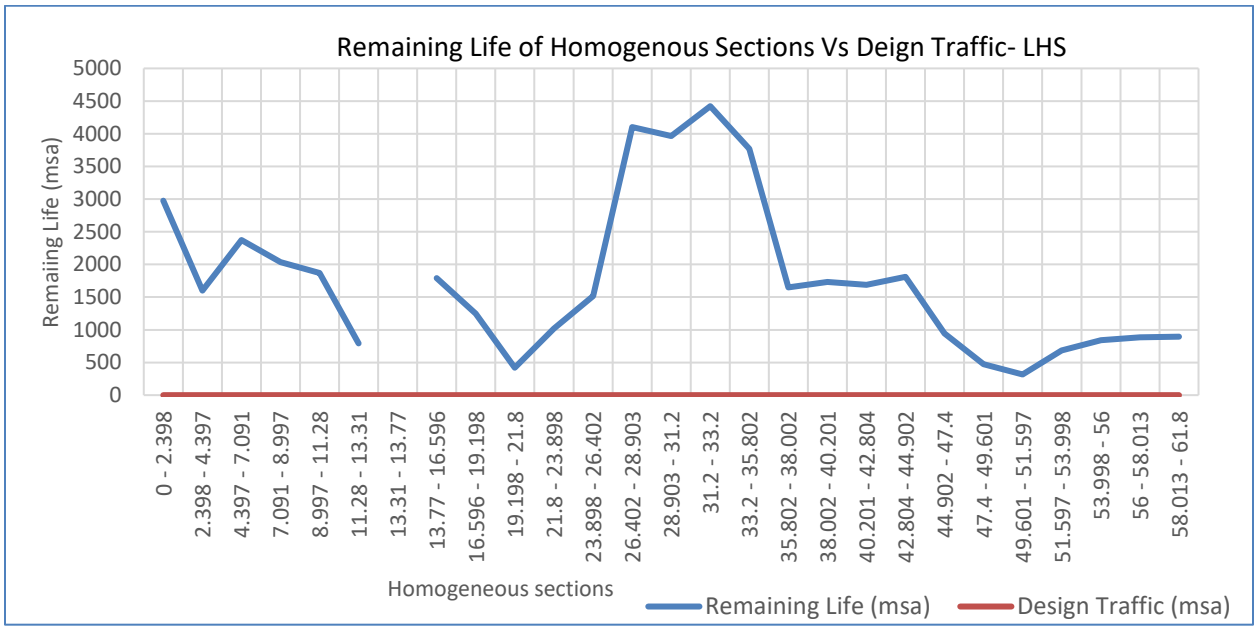
The computation of traffic loadings is presented in **Appendix 9** of this Report.

5.2 PAVEMENT REHABILITATION AND STRENGTHENING

For Design the Overlay Thickness the following method as suggested in IRC: 115 has been used

- The existing pavement is considered as a 3-layer system consisting of subgrade, granular and bituminous layer. The remaining life of exiting pavement in terms of Fatigue and Rutting life (MSA) are estimated
- The remaining life is compared with design traffic loading. An overlay with assumed thickness is considered on exiting pavement where required.
- The Total system including the proposed Overlay (Trial thickness) is assumed as a four-layer system and considered the relevant MR values for all the four layers namely New BT layer, existing bituminous surface, total existing Granular layers and Subgrade layers.
- The MR value for the New BT is assumed as 3000 MPA (considering VG40 Bituminous grade) for Main Carriageway and for Service Road and for all the remaining three layers, the MR Values derived and finalized from the FWD Analysis are considered.
- Critical Tensile strains and Vertical strains are found out by using the IIT PAVE Software at the bottom of existing bituminous layer and at the top of the subgrade layer respectively.
- The Fatigue and Rutting equations (equation given in the IRC: 37) have been used to estimate the Fatigue and Rutting Life of the Pavement system considering 80% reliability equation satisfying design philosophy provisions of the IRC 37-2012.
- The Obtained Fatigue and Rutting Life are compared with the required life for the assumed trial overlay thickness.

Remaining life of the existing pavement from the above analysis is presented in the following tables:



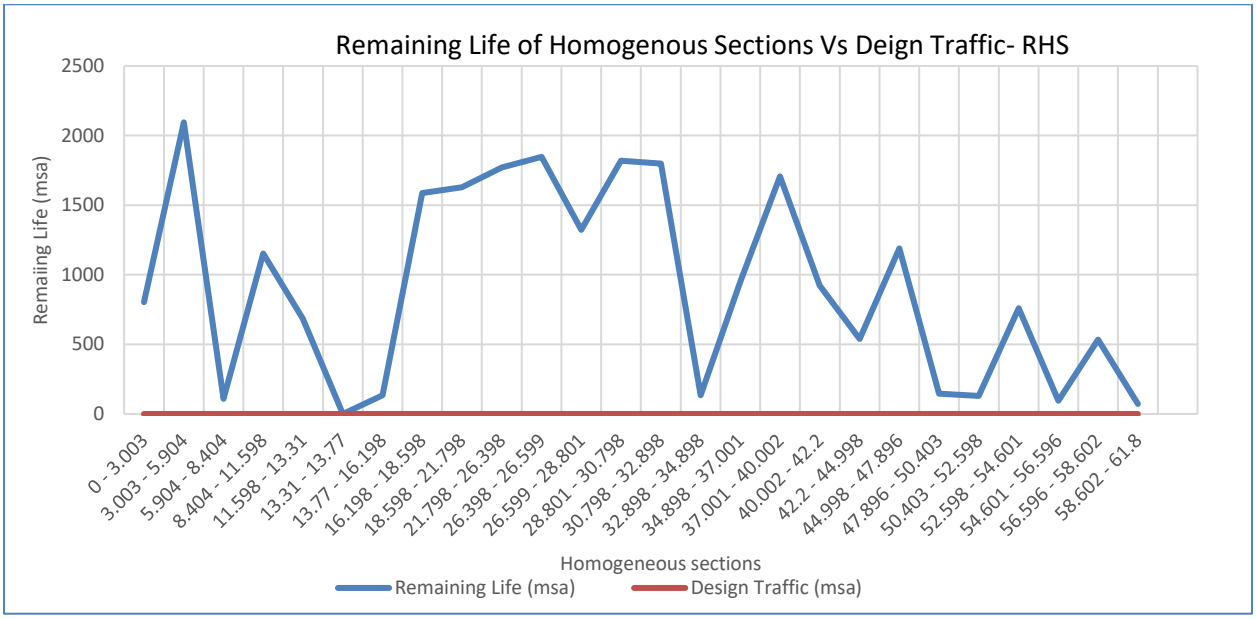

Remaining Life of Homogenous Sections Vs Deign Traffic- RHS
Remaing Life (msa)
2500
2000
1500
1000
500
0
0 - 3.003
3.003 - 5.904
5.904 - 8.404
8.404 - 11.598
11.598 - 13.31
13.31 - 13.77
13.77 - 16.198
16.198 - 18.598
18.598 - 21.798
21.798 - 26.398
26.398 - 26.599
26.599 - 28.801
28.801 - 30.798
30.798 - 32.898
32.898 - 34.898
34.898 - 37.001
37.001 - 40.002
40.002 - 42.2
42.2 - 44.998
44.998 - 47.896
47.896 - 50.403
50.403 - 52.598
52.598 - 54.601
54.601 - 56.596
56.596 - 58.602
58.602 - 61.8
Homogeneous sections
Remaining Life (msa)
Design Traffic (msa)

Table 42: Remaining life of the existing pavement LHS Carriageway

S.No		From	To	Length (Km)	15th Percentile MR values			Average Existing Crust		Total Crust (mm)	Adopted MR for BT (Mpa)	Strains From IITPAVE		Remaining Life as per IRC 37-2012 equation for 80% Reliability			
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)	BT (mm)	Granular (mm)			Vertical strain at bottom, epZ	Tangential strain at top, epT	Nf-Fatigue life, mSA	Rutting life,mSA	Target MSA	Remarks
1	LHS	0.000	2.398	2.40	2610	488	75	260	400	660	2610	0.0001610	0.0000750	2974	6558	38	No Overlay
2	LHS	2.398	4.397	2.00	2633	351	75	260	400	660	2633	0.0001754	0.0000877	1602	4448	38	No Overlay
3	LHS	4.397	7.091	2.69	2615	487	75	243	445	688	2615	0.0001556	0.0000794	2372	7655	38	No Overlay
4	LHS	7.091	8.997	1.91	2659	491	75	230	480	710	2659	0.0001503	0.0000823	2035	8958	38	No Overlay
5	LHS	8.997	11.280	2.28	2566	478	75	230	480	710	2566	0.0001530	0.0000848	1868	8263	38	No Overlay
6	LHS	11.280	13.310	2.03	2539	314	75	230	480	710	2539	0.0001749	0.0001059	794	4505	38	No Overlay
7	LHS	13.310	13.770	0.46													Toll Plaza
8	LHS	13.770	16.596	2.83	2885	488	75	222	449	671	2885	0.0001627	0.0000836	1789	6253	38	No Overlay
9	LHS	16.596	19.198	2.60	2768	477	75	210	400	610	2768	0.0001940	0.0000925	1247	2816	38	No Overlay
10	LHS	19.198	21.800	2.60	2264	305	75	210	400	610	2264	0.0002327	0.0001278	422	1235	38	No Overlay
11	LHS	21.800	23.898	2.10	2829	490	75	210	400	610	2829	0.0001995	0.0000971	1016	2481	38	No Overlay
12	LHS	23.898	26.402	2.50	2718	472	75	222	414	636	2718	0.0001804	0.0000883	1518	3915	38	No Overlay
13	LHS	26.402	28.903	2.50	2700	494	75	270	470	740	2700	0.0001327	0.0000685	4101	15755	38	No Overlay
14	LHS	28.903	31.200	2.30	2662	489	75	270	470	740	2662	0.0001336	0.0000693	3967	15279	38	No Overlay
15	LHS	31.200	33.200	2.00	2963	493	75	270	470	740	2963	0.0001296	0.0000658	4422	17537	38	No Overlay
16	LHS	33.200	35.802	2.60	2828	494	75	263	467	731	2828	0.0001351	0.0000693	3771	14525	38	No Overlay
17	LHS	35.802	38.002	2.20	2899	477	75	220	450	670	2899	0.0001647	0.0000852	1651	5916	38	No Overlay
18	LHS	38.002	40.201	2.20	3005	482	75	220	450	670	3000	0.0001628	0.0000835	1734	6236	38	No Overlay
19	LHS	40.201	42.804	2.60	2935	480	75	220	450	670	2935	0.0001639	0.0000845	1690	6048	38	No Overlay
20	LHS	42.804	44.902	2.10	3025	492	75	220	450	670	3000	0.0001617	0.0000826	1813	6431	38	No Overlay
21	LHS	44.902	47.400	2.50	2823	490	75	190	400	590	2823	0.0002079	0.0000990	942	2058	38	No Overlay
22	LHS	47.400	49.601	2.20	2836	492	75	190	400	590	2836	0.0002873	0.0000986	954	475	38	No Overlay
23	LHS	49.601	51.597	2.00	2587	301	75	190	400	590	2587	0.0002468	0.0001336	317	946	38	No Overlay
24	LHS	51.597	53.998	2.40	2401	445	75	190	400	590	2401	0.0002228	0.0001114	684	1504	38	No Overlay
25	LHS	53.998	56.000	2.00	2643	475	75	190	400	590	2643	0.0002133	0.0001034	842	1832	38	No Overlay
26	LHS	56.000	58.013	2.01	2562	488	75	190	400	590	2562	0.0002127	0.0001028	885	1856	38	No Overlay
29	LHS	58.013	61.800	3.79	2682	485	75	190	400	590	2682	0.0002110	0.0001015	894	1924	38	No Overlay
Total Length				**61.800**													

Table 43: Remaining life of the existing pavement RHS Carriageways

S No	Side	From	To	Length (Km)	15th Percentile MR values			Average Existing Crust		Total Crust (mm)	Adopted MR for BT (Mpa)	Strains From IITPAVE		Remaining Life as per IRC 37-2012 equation for 80% Reliability			
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)	BT (mm)	Granular (mm)			Vertical strain at bottom, epZ	Tangential strain at top, epT	Nf-Fatigue life, mSA	Rutting life,mSA	Target MSA	Remarks
1	RHS	0.00	3.00	3.00	2640	313	75	230	450	680	2640	0.0001839	0.0001047	803	3589	46	No Overlay
2	RHS	3.00	5.90	2.90	2862	493	75	230	450	680	2862	0.0001573	0.0000804	2095	7287	46	No Overlay
3	RHS	5.90	8.40	2.50	777	198	75	230	450	680	777	0.0002755	0.0002287	109	574	46	No Overlay
4	RHS	8.40	11.60	3.19	2688	400	75	225	431	656	2688	0.0001814	0.0000950	1152	3819	46	No Overlay
5	RHS	11.60	13.31	1.71	2311	349	75	220	410	630	2311	0.0002095	0.0001124	683	1988	46	No Overlay
6	RHS	13.31	13.77	0.46													Toll plaza
7	RHS	13.77	16.20	2.43	1005	220	75	220	410	630	1005	0.0002883	0.0002050	134	467	46	No Overlay
8	RHS	16.20	18.60	2.40	2749	489	75	220	410	630	2749	0.0001809	0.0000871	1587	3867	46	No Overlay
9	RHS	18.60	21.80	3.20	2700	480	75	225	405	630	2700	0.0001813	0.0000869	1629	3828	46	No Overlay
10	RHS	21.80	26.40	4.60	2697	481	75	230	400	630	2697	0.0001797	0.0000851	1770	3985	46	No Overlay
11	RHS	26.40	26.60	0.20	2654	493	75	230	400	630	2654	0.0001790	0.0000844	1846	4056	46	No Overlay
12	RHS	26.60	28.80	2.20	2665	420	75	230	400	630	2665	0.0001879	0.0000919	1322	3255	46	No Overlay
13	RHS	28.80	30.80	2.00	2764	483	75	230	400	630	2764	0.0001784	0.0000840	1818	4118	46	No Overlay
14	RHS	30.80	32.90	2.10	2722	483	75	230	400	630	2722	0.0001791	0.0000845	1798	4046	46	No Overlay
15	RHS	32.90	34.90	2.00	1205	188	75	230	400	630	1205	0.0002802	0.0001971	134	532	46	No Overlay
16	RHS	34.90	37.00	2.10	2780	345	75	230	400	630	2780	0.0001959	0.0000991	950	2695	46	No Overlay
17	RHS	37.00	40.00	3.00	2472	486	75	230	400	630	2472	0.0001831	0.0000875	1706	3660	46	No Overlay
18	RHS	40.00	42.20	2.20	2725	375	75	221	400	621	2725	0.0001997	0.0001003	924	2470	46	No Overlay
19	RHS	42.20	45.00	2.80	2404	304	75	220	400	620	2404	0.0002196	0.0001184	539	1606	46	No Overlay
20	RHS	45.00	47.90	2.90	2532	443	75	220	400	620	2532	0.0001950	0.0000955	1188	2751	46	No Overlay
21	RHS	47.90	50.40	2.51	1635	189	75	217	403	621	1635	0.0002540	0.0001804	146	830	46	No Overlay
22	RHS	50.40	52.60	2.20	2386	210	75	180	450	630	2386	0.0002577	0.0001711	130	777	46	No Overlay
23	RHS	52.60	54.60	2.00	2600	478	75	180	450	630	2600	0.0001970	0.0001066	759	2627	46	No Overlay
24	RHS	54.60	56.60	2.00	1784	212	75	180	450	630	1784	0.0002748	0.0001969	96	581	46	No Overlay
25	RHS	56.60	58.60	2.01	2562	382	75	190	445	635	2562	0.0002081	0.0001170	535	2049	46	No Overlay
26	RHS	58.60	61.80	3.20	1118	153	75	220	430	650	1118	0.0002880	0.0002358	71	470	46	No Overlay
Total Length				**61.800**													

From the above, **no overlay** is warranted as remaining life is more than Target Traffic (10-year design MSA). in both LHS and RHS.

Input data used and the output from the IIT Pave software has been presented as screen shots for ready reference in **Appendix 10** of this Report.

Similar type of exercise has been done for the service road to ascertain its remaining life and the results are as presented below.

Table 44: Remaining life of the existing pavement on Service Road, LHS

S.No	Side	From	To	Length (Km)	15th Percentile MR values			Average Existing Crust		Total Crust (mm)	Adopted MR for BT (Mpa)	Strains From IITPAVE		Remaining Life as per IRC 37-2012 equation for 80% Reliability			
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)	BT (mm)	Granular (mm)			Vertical strain at bottom, epZ	Tensile strain at top, epT	Nf-Fatigue life, mSA	Rutting life,mSA	Target MSA	Remarks
1	LHS	0.00	26.30	26.30	2662	101	75	100	350	450	2662						No Service Road
2	LHS	26.30	29.98	3.68								0.0005672	0.0003844	5	22	5	No Overlay
3	LHS	29.98	61.01	31.03													No Service Road
4	LHS	61.01	61.12	0.11													No Overlay
5	LHS	61.12	61.80	0.68													No Service Road
Total length				61.800													

Table 45: Remaining life of the existing pavement on Service Road, RHS

S.No	Side	From	To	Length (Km)	15th Percentile MR values			Average Existing Crust		Total Crust (mm)	Adopted MR for BT (Mpa)	Strains From IITPAVE		Remaining Life as per IRC 37-2012 equation for 80% Reliability			
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)	BT (mm)	Granular (mm)			Vertical strain at bottom, epZ	Tensile strain at top, epT	Nf-Fatigue life, mSA	Rutting life,mSA	Target MSA	Remarks
1	RHS	0.00	26.30	26.30	2816	134	75	90	350	440	2816						No Service Road
2	RHS	26.30	29.97	3.67								0.0005828	0.0003607	6	19	5	No Overlay
3	RHS	29.97	60.87	30.90													No Service Road
4	RHS	60.87	61.68	0.81													No Overlay
5	RHS	61.68	61.80	0.12													No Service Road
Total length				61.800													

From the above, for the Service Road there is **no overlay** requirement in LHS and RHS as the obtained remaining life of the pavement is more than Target MSA.

5.3 STRUCTURAL REHABILITATION

All the structure found to be in fair condition except little minor treatment like repair of stone pitching, cleaning of drainage spouts, cleaning of vegetation etc. may be required. Detailed structural rehabilitation quantities have been worked out based on the prevailing condition of existing structures. This methodology describes in detail the procedure for the execution of each item of rehabilitation work of the Existing Bridges of the project.

The scope of this methodology covers the items mentioned below for rehabilitation work of all the existing Bridges.

- ✓ Repair / Replacement of Expansion joint
- ✓ Damaged concrete portion repair with PMM / Micro concrete
- ✓ Exposed Steel coated with anti-corrosion paint
- ✓ Honeycombing repair with PMM & Epoxy grouting (if required)
- ✓ Concrete spalled surface needs to be Repair with PMM (Polymer Modified Mortar)
- ✓ Coated with anti-corrosion paint for Steel structures
- ✓ Rubber sealant Replacement
- ✓ Repair / Replacement of Hand railing
- ✓ Need to be Provide of stone pitching
- ✓ Need to be Provide PVC down take pipes for Drainage spouts
- ✓ Gratings need to be provided for Drainage spouts
- ✓ MS pipe missing on crash barrier
- ✓ Projection pipes need to be provide for Drainage spouts

CHAPTER 6. OPERATION AND MAINTENANCE

6.1 INTRODUCTION

Looking at the contractual requirements of maintaining project road under specified level of roughness it is felt that roughness is the most important criterion for finalizing the O&M schedule for the project. Accordingly, the methodology adopted by present consultants includes predicting the roughness year by year under the traffic using a well acknowledged HDH-4 model developed for developing countries like India after lot of research by World Bank. The said model is widely prescribed by MORTH and NHAI during the preparation of detailed project reports for several projects in doing economic analysis for the projects. The economic analysis mainly consists of two parts:

1. Predicting the road deterioration and estimating VOC
2. Estimating Benefits

Considering its importance and present use in India, consultants felt prudent to use the first part, i.e. estimating road deterioration and predicting roughness in HDM 4 model to finalize the O&M schedule for the project. This approach is more scientific as it does not assume hypothetical deflection values at 10^{th} and 20^{th} year and includes main criterion of maintaining roughness at 2500mm/Km as per Schedule K

6.2 CA SPECIFICATIONS FOR MAJOR MAINTENANCE

- Schedule K of CA species that Roughness values exceed 2500mm/km in a length of KM, needs to be corrected within 180 days. Roughness survey has to be done two times in a year.
- BBD survey to be done in every 5years.

6.3 INPUTS FOR MM SCHEDULE

6.3.1 PROJECT SECTIONS

The entire project road is considered as “single section” only based on traffic characteristics.

As there is no overlay requirement from FWD analysis, considering the roughness as a key criterion for major maintenance, it is categorized in to four cases below:

- Case 1: Roughness value <2000 mm/Km
- Case 2: Roughness values 2000<UI in mm/Km <2200
- Case 3: Roughness values 2200< UI in mm/Km <2500
- Case 4: Roughness values >2500 mm/Km

6.4 HDM INPUTS

FWD, Roughness, Pavement condition values are used as obtained from surveys and investigations for various sections and different cases as below:

- **LHS & RHS:**

LHS						RHS			
Roughness Range ----------→	<2000	>=2000 and <2200	>=2200 and <2500	>=2500		<2000	>=2000 and <2200	>=2200 and <2500	>=2500
	Case-1	Case-2	Case-3	Case-4		Case-1	Case-2	Case-3	Case-4
Length, km	61.800	-	-	-		61.800	-	-	-
Roughness, mm/km	1602	-	-	-		1582	-	-	-
IRI	2.30	-	-	-		2.27	-	-	-
Deflection, mm	0.42	-	-	-		0.45	-	-	-
Cracking, %	2.16	-	-	-		1.16	-	-	-
Ravelling, %	0.20	-	-	-		0.08	-	-	-
Rut Depth, mm	2.37	-	-	-		2.64	-	-	-
Patching, %	0.88	-	-	-		0.74	-	-	-
Potholes, %	0.05	-	-	-		0.31	-	-	-
BT Crust, mm	223	-	-	-		220	-	-	-
Granular Crust, mm	431	-	-	-		418	-	-	-

6.5 OPTIONS FOR MM SCHEDULES

Based on the requirements of CA, various options have been considered to be used as responsive overlays triggered at specified level of roughness of 2500 mm/km. Micro surfacing has also been considered to examine its feasibility for major maintenance.

In LHS direction following options were considered in the analysis:

- ✓ Base Case: MCS at Roughness of 2500mm/Km with regular maintenance with regular maintenance It is pertinent to note that Base alternative is included as "Do nothing Scenario" for the purpose of analysis in model. It is not be reckoned with.
- ✓ Opt-1: Responsive Mill & Overlay of 30mm BC whenever roughness is >2500mm/KM with regular maintenance
- ✓ Opt-2: Responsive Mill & Overlay of 40mm BC whenever roughness is >2500mm/KM with regular maintenance

6.6 ROUGHNESS PROGRESSION

Roughness progression for each section under each alternative maintenance option has been done using the deterioration models in HDM-4. Following graphs represents the roughness progression for each alternative:

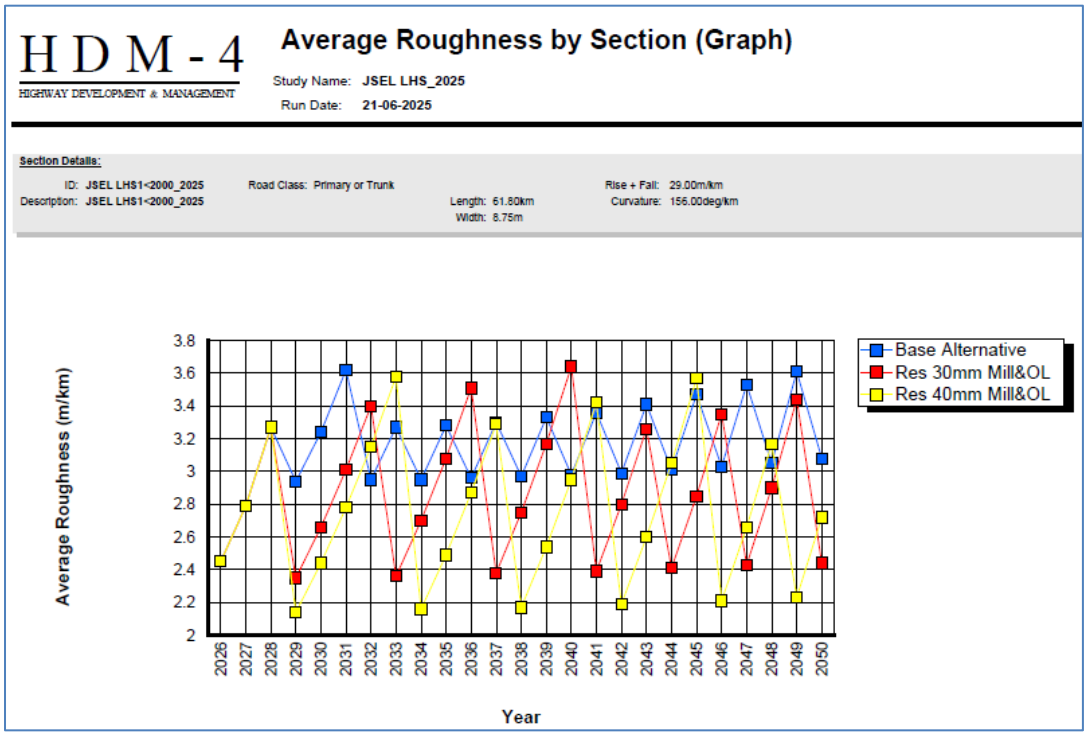


Figure 1: Average Roughness in LHS Carriageway (LHS<2000mm/Km)

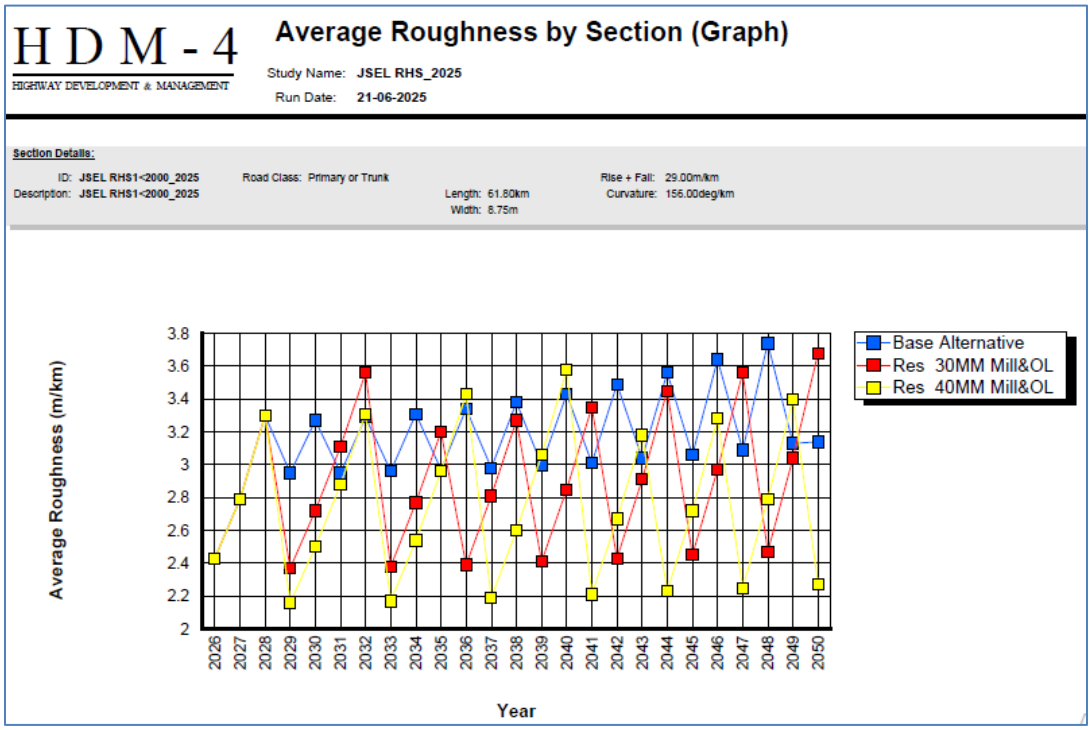


Figure 2: Average Roughness in RHS Carriageway (RHS<2000mm/Km)

6.7 ADOPTED M&M SCHEDULE

Looking at the present condition, progression of traffic with actual traffic growth rates, it is felt prudent to consider 30mm OL as the preferred option. Adopted MM schedule for the project is as below:

	LHS, Length in 'm"			RHS, Length in 'm"	
Cycle	*Base Year*	1st		*Base Year*	1st
Planned in Financial Year	***2026***	***2030***		***2026***	***2030***
Milling required?		***Yes***			***Yes***
BC- 40 mm with VG40					
BC- 30 mm with VG40		46875			46875
DBM-50 mm					
Micro surfacing Type III		15625			15625

6.8 STRUCTURAL PERIODIC MAINTENANCE STRATEGY

Expansion joints:

- Visual inspection is shall be carried out to check for seal breakages, Armor angle, Weld failures, cracks between deck & Expansion joints concrete and Joints filled with debris. However, no damages were observed.
- In the absence of records pertaining to Expansion joint replacements it is highly difficult to predict the date of replacement needed for compliance to IRC codal requirements. However, periodic maintenance is considered.

Bearings:

- All types of Bearings are considered for periodic maintenance.

Wearing Coat:

- Wearing coat is a very weak component on the bridge structure which is subjected to severe deterioration due to Loading, Environment etc. This requires periodic maintenance and is considered in BOQ.

Cost Component for various items and activities have been worked out by considering the Best Industry practice and most appropriate methods. Detailed quantities for work items have been estimated based on the details presented in previous chapters for various heads as per schedule provisions, roughness criteria (RI<2500mm/km) and other required parameters inline with Concession Agreement provisions.

The gist of the cost components considered are presented below:

- Immediate Repair's Cost
- Routine Maintenance Cost
- Incident Management Cost
- Periodic Maintenance Cost
- Operations Cost
- Year by Year total O&M Costs

7.1 RATE ANALYSIS

Detailed rate analysis has been carried out based on MORTH guidelines to arrive at the unit rates of various items. Material rates and their leads from the project corridor are considered as per the material investigations done on the project road. Summary of unit rates arrived at are presented in table below:

Table 46: Summary of Unit Rates of Basic material

S No	Description	Units	Source	Basic rate excluding Transportation & GST	Lead in Kms
1	VG-40 (CAPEX)	MT	Guwahati	45336	63
2	VG-40 (MMR)	MT	Guwahati	45336	63
3	PMB - CAPEX	MT	Guwahati	57012	63
4	Good earth	Cu.m	BA	41	10
5	40 mm	Cu.m	Crusher	937	150
6	20 mm	Cu.m	Crusher	1187	150
7	12 mm	Cu.m	Crusher	887	150
8	6 mm	Cu.m	Crusher	887	150
9	Dust	Cu.m	Crusher	200	150
10	M sand	Cu.m	Crusher	240	150
11	Bitumen 60/70	MT	Guwahati	49050	63
12	Bitumen 80/100	MT	Guwahati	48252	63
13	CRMB-55	MT	Guwahati	51993	63
14	SS1	MT	Guwahati	45000	63
15	Steel	MT	Guwahati	52250	54
16	HTS Strands	MT	Guwahati	75000	54
17	Cement	MT	Guwahati	7400	54

Note: For asphalt pavement rehabilitation works, a discount of 7.5% is applied on Bitumen (VG-40) to the present market rate.

Table 47: Summary of Major Material Rates excluding GST

Sl.no	Item	Unit	Rate (INR) Excluding GST
1	Embankment - borrow	Cum	621
2	Embankment - Excavation	Cum	102
3	SG	Cum	644
4	GSB G-2	Cum	3909
5	WMM	Cum	4081
6	Prime Coat	Sqm	50
7	Tack coat on granular	Sqm	17
8	DBM G-1-VG-40	Cum	10451
9	Tack coat on bituminous surface	Sqm	15
10	BC - G1-VG-40-CAPEX	Cum	12332
11	Road Marking	Sqm	369
12	RE wall	Sqm	3251
13	Select Fill	Cum	709
14	Filter Media	Cum	2179
15	M15	Cum	8398
16	M20	Cum	9225
17	M25	Cum	9873
18	M30	Cum	9778
19	M35	Cum	10100
20	M40	Cum	10244
21	PSC M45	Cum	12308
22	PSC M50	Cum	14946
23	PSC M55	Cum	15115
24	HYSD	MT	76564
25	HT strand	MT	154390
26	CTSB	Cum	4884
27	CTB	Cum	5101
28	PQC	Cum	9865
29	DLC	Cum	5890
30	PMB-CAPEX	Cum	14098
31	CRMB	Cum	13339
32	PMB-MMR-Gr1	Cum	14098
33	BC - G1-VG-40-MMR	Cum	12332

NOTE: 1. Item rates are considered for Small projects

2. Labour: Central Minimum Wages as on April'2025 for "C Area" Category of construction workers

7.2 IMMEDIATE REPAIRS COSTS

Costs associated with immediate repairs are estimated based on the detailed asset inventory and condition assessment surveys, Pavement condition and structural condition assessment surveys. Items which are not executed as part of scope or in damaged condition have been considered for immediate costs as a part of 1-year Capex. Following items are mainly considered for immediate costs:

- Scope which is not executed
- Road work items
- Bridge Work Items
- Pavement Rehabilitation works
- Structural Rehabilitation works
- Drainage Works
- Slope Protection works
- Safety Works

Immediate repair costs assessed by the Consultants have not been included, as the Concessionaire is undertaking the rehabilitation works at site.

7.3 ROUTINE MAINTENANCE & INCIDENT MANAGEMENT COSTS

Routine maintenance costs include general maintenance costs of road elements, bridge elements and road furniture and appurtenances. This can be mainly divided into two parts as:

- ✓ General Maintenance of Works
- ✓ Repairs to Highway & Bridge Elements

7.3.1 General Routine Maintenance

General Routine Maintenance of Roads generally include following items:

- Cleaning of Project facilities
- Structures cleaning,
- Cleaning of ROW
- Cleaning and Maintenance of Toll Plaza
- Unlined Drain Maintenance
- Lined Drain Maintenance
- Maintenance of Highway Lighting at Toll Plaza and other project locations
- Median Plantation maintenance & Avenue plantation maintenance:
- Maintenance of Road Furniture
- Maintenance of Road Safety Items

The above items are estimated by considering the detailed break-up of following items:

- Manpower including Managers/Labour etc.
- Vehicles for Labour Transport/Water Tankers/Sweeping Machines etc.
- Resources/Equipment's such as grass cutters, tools, jet sprayers, hydraulic trimmers etc.

7.3.2 Repairs to Highway & Bridge Works

Repairs to highway and bridge works have been estimated based on the assumed quantities (Percentage basis) of execution for every year.

These items include the following:

A. Roads

1	Providing treatment for sealing of road surface / isolated cracks at scattered locations
	i) covered with 6.7 mm size stone chipping @ 0.1 cum/ 10 sqm.
	ii) covered with dry coarse sand passing through 2.36 mm sieve and retained on 180-micron sieve @ 0.03 cum/10 sqm heated to 600 C
	iii) filling discrete cracks with slow curing bitumen emulsion as per Technical Specification Clause 3004.3.3
2	Providing treatment to bleeding bituminous surface at scattered locations
3	Providing localized repair to rutted portion and edge breaking of bituminous surface
4	Providing treatment and repair to pot-holes and patch work
5	Providing and laying dense bituminous macadam using bitumen grade 60/70 complete as per Technical Specification Clause 507
6	Proving and laying bituminous concrete (asphaltic concrete)
	(a) Using bitumen (VG-40) as per IRC: SP: 53
7	Road Roughness survey
8	Turfing on embankment slopes and at all other Project Facilities
9	Providing repair to stone pitching/apron at scattered locations
10	Rain Cuts Maintenance: Restoration of rain cuts soil, moorum, gravel or a mixture of these
11	Cleaning of Lined Drain
12	Repair of damaged lined drain
13	Unlined drain cleaning
14	Filling in median island with approved materials with all leads and lifts complete as per TS Clause No. 407
15	Replacing damaged / broken railing with new pre-cast / cast-in-situ, concrete railing to match with existing design and pattern.
24	Carrying out repair to road signs including strengthening resetting or otherwise repairing signs and delineators
	a) Road sign board mounted on single post
	b) Road sign board mounted on double post
	c) Overhead/ Gantry Sign boards
	d) Delineator
25	Supplying and fixing at site retro-reflectorized type sign boards/signs
	90cm Equilateral triangle

	60cm circular
	90 cm circular
	90cm high octagon
	80cm x 60cm rectangle
	Chevron signs 60cm x 45cm
	Place identification signs (Fig 15.7 of IRC 67)
	Providing and fixing Object Markers
	Providing and fixing of retro-reflectorized Route Marker signs (size 450mm x 600mm)
26	Hazard Marker Sign:
	a) size 90 x 30 cm
	b) size 30cm triangular side cluster of red reflectors (screen printed)
27	Cats Eyes/Raised pavement marker (NMC Nails Less)
28	Painting two coats on old surface after minor repairs to give an even and smooth surface and printing letters and figures with synthetic enamel paint
	a) Hectometer stones
	b) Kilometer Stone
	c) 5 Kilometer stone
	d) Boundary stone
	e) Guard stone
29	Providing painting lettering and fixing of distance measurement stones including dismantling of old damaged/ broken ones, confirming to TS Clause 804
	a) Hectometer stones
	b) Kilometer Stone
	c) 5 Kilometer stone
	d) Boundary stone
	e) Guard stone
30	Providing and fixing road delineators conforming to TS Clause No. 805 as directed by the Engineer.
31	Repainting the Kerb stones and separation barrier with first quality synthetic enamel paint of approved brand
32	Painting all types of pavement markings including lines, dashes, arrows etc. on roads as per relevant IRC/MOST standards after cleaning the surface complete in all respects as directed by the Engineer.
	a) Hot applied Thermoplastic compound
	(i) Lane / Centre Line / Edge Line
	(ii) Direction Arrows, Diagonal Chevrons Markings, PC etc.,
	(iii) Transverse bar Marking
33	Supplying and laying cast-in-situ cement concrete Kerb without channel section
	a) by Manual/machine including formwork
34	Major repair / replacement of metal beam crash barrier (W profile guard rails)
35	Providing and fixing chain link/ welded mesh fencing / square bars fencing
36	Dismantling the old damaged chain link/welded mesh / square bars fencing and replacing it with new chain link/ welded mesh/square bars fencing
37	Provision of rumble strips
38	Shoulder Maintenance

39	synthetic enamel paint of approved brand on metal pedestrian guard rail
40	Dismantling of wearing course
41	Toll Plaza building repairs, booths, canopy and also maintenance of TP buildings
42	Median plantation maintenance
43	RE wall Maintenance

B. Structures

1. Wearing coat comprising of 50 mm thick BC.
2. Cleaning and adding rubber sealant near expansion joints.
3. Modular Expansion joints.
4. Replacement of Damaged Concrete Railing all complete as per technical specifications and as directed by the Engineer
5. Provision of an RCC crash barrier (0.35sqm cross sectional area) constructed with M-40 grade concrete including reinforcement
6. Cleaning of rocker & roller bearing using high pressure water jet, free from rust scales, re-setting & greasing the bearings using graphite grease including cost of materials, labour etc., complete.
7. POT PTF Bearings greasing and maintaining (sand plastering).
8. Elastomeric Bearings and maintaining.
9. Cutting of groove of 15 mm x 15 mm along crack and sealing the same with epoxy putty including cost of material, labour etc.
10. Carrying out 50 to 60 mm thick shortsheeting using a mix proportion of 1:2:2 (cement: sand:6 mm down aggregate) added with Polypropylene fibers at a dosage rate of 125 gms/bag of cement including cost of labour, material, scaffolding, equipment etc complete.
11. Repair of Floor Aprons, pitching and other protection works
12. Cleaning of Drainage Spouts
13. M-25 Concrete

7.3.3 Incident Management Cost

Incident Management & Safety items include the following:

- ✓ ATMS control room operations,
- ✓ Regular patrolling & reaching accident/incident site,
- ✓ providing relief to injured persons including taking them to nearest hospital and attending to the safety requirements at the location (putting cones, safely guide & manage the traffic using signs, safety barricades, etc.),
- ✓ removal of accident /breakdown vehicles, removing of dead animals/birds lying on the highway and loading, unloading, transportation & disposal of surplus material left over by accidental vehicle or otherwise lying on road (on carriageway) and
- ✓ Encroachment prevention & removal with all lead & lifts complete with proper communication equipment,
- ✓ consumables, materials, suitable Towing vehicles, Ambulance, patrolling vehicles and manpower like drivers, helpers, para-medical staff, labour including deployment of crane and all works shall be done as per requirement and as directed by Client representative and as per Relevant Specifications as applicable.

7.4 OPERATIONS COSTS

Cost towards Operations include the following:

- SPV Costs
- Highway Electricity lighting cost
- Toll Plaza & ATMS Operation cost
- Operation and management costs of rest areas and lay byes
- Survey Costs
- IE Fee
- Insurance
- Audit Charges
- Administrative Cost

Following table presents the summary of Operations & Maintenance cost for the project

Table 48: 1st Year O&M Cost, FY2026

S No	Description	Amount in Crores.	GST %	GST Amt	Total Crore	Remarks
	SPV - Expenditure					
1	SPV staff	0.99	-	-	0.99	
2	Highway lighting	0.18	-	-	0.18	
3	Tolling and ATMS AMC/ Spare Parts	-	-	-	-	
4	Surveys & Investigations (BBD, Roughness)	0.15	18%	0.03	0.18	
5	IE fees	0.60	18%	0.11	0.71	
6	Insurance Charges	0.74	18%	0.13	0.88	
7	Professional Fee (Audit/Valuation, LIE, Legal etc.	0.15	18%	0.03	0.18	
8	Admin cost - Board Meeting Expenses, valuation etc.	0.13	18%	0.02	0.15	
	Agency - Expenditure		-	-	-	
9	Toll Operation - Agency	-	-	-	-	Annuity Project
10	Route patrolling	1.55	-	-	1.55	In House, hence no GST
11	TAP & MAP	-	-	-	-	
12	Routine maintenance	2.87	18%	0.52	3.39	
13	Repair of Road - Boq Items	2.30	18%	0.41	2.72	
14	Repair of Structures	0.17	18%	0.03	0.20	
	Total Amount in CRs	**9.83**		**1.28**	**11.11**	

Note: The amount is Crores, inclusive of GST @18% and without escalation, considering FY2026 rates

Further, O&M Cost for FY2026 has been escalated with 5% and the projected Y-O-Y cost is as presented below:

Year (FY)	Y-O-Y O&M Including GST in crore
FY2026	11.11
FY2027	11.67
FY2028	12.25
FY2029	12.87
FY2030	13.51
FY2031	14.19

Note: The Above numbers including GST and escalation

7.5 PERIODIC MAINTENANCE COSTS

Cost towards major maintenance include following:

- ✓ Cost of Periodic maintenance of Pavement based on Finalized MM schedule
- ✓ Cost of Periodic Maintenance of Structures
- ✓ Cost of Periodic replacement of ATMS/TMS Equipment's & Software
- ✓ Following table includes the cost of Major Maintenance works for the project:

As suggested by Client, periodic maintenance cost has been projected with 2% escalation.

Table 49: Major Maintenance Cost

S. No	Financial Year	MM – Flexible Pavement	MM- Rigid Pavement	Replacement of ATMS	Replacement of TMS	MM - Structures
1	2026	-	-			-
2	2027	-	-			0.71
3	2028	-	-			-
4	2029	-	0.04	0.36	1.23	0.92
5	2030	59.82	-			-
6	2031	-	-			-
-	**Total:**	**59.82**	**0.04**	**0.36**	**1.23**	**1.63**

Note: The amount is Crores inclusive of GST (18%) and with 2% escalation, considering FY2026 rates

- The project corridor has 4-lane divided carriageway with Flexible pavement with an overall length of 61.8 km.
- There is 1 Toll Plaza provided within the Project Stretch.
- The O&M requirements related to the Project based on Schedules and Manuals are as follows:

Applicable Manual	Applicable Schedule for O&M	Maximum Roughness Allowed	Minimum Thickness of Mandatory Overlay	Frequency of Roughness Test	Frequency of BBD Test	Remarks
4-lane manual for BOT projects, Published by MOSRTH on 11.03.2008 (as Shared in Vol-III of CA)	Schedule-K and Manual	2500 mm/Km	-	2 Times in a Year	Once in a 5-Years	Overlay Design shall be done as per IRC:81

- The Project Road has excellent riding quality (UI<2000 mm/km) based on analysis of Roughness data with combined both directions. However, the threshold limit should not exceed 2500mm/km.
- Based on pavement condition, entire length of the project road is rated as excellent to good, except for a 9km length which is rated as satisfactory.
- From FWD analysis, no overlay is warranted as remaining life is more than Target Traffic.
- The following MMR cycle are considered during the concession period

	LHS, Length in 'm"			RHS, Length in 'm"	
Cycle	*Base Year*	1st		*Base Year*	1st
Planned in Financial Year	***2026***	***2030***		***2026***	***2030***
Milling required?		***Yes***			***Yes***
BC- 40 mm with VG40					
BC- 30 mm with VG40		46875			46875
DBM-50 mm					
Micro surfacing Type III		15625			15625

- There is no immediate repair cost envisaged in this project as the Concessionaire is undertaking the rehabilitation works at site.
- In the Costing, the amount considered is Crores inclusive of GST (18%) considering FY2026 rates.

Intended for

WATRAK INFRASTRUCTURE PRIVATE LIMITED

Document type

Technical Advisory Report

Date

October 2025

TECHNICAL DUE DILIGENCE REPORT

SIX LANE WITH ELEVATED STRUCTURE FROM KM 86 TO KM 96 COVERING PANIPAT CITY ON NH-1 (NOW NH-44) (LENGTH KM 10), IN THE STATE OF HARYANA ON BOT TOLL BASIS



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TECHNICAL DUE DILIGENCE REPORT

SIX LANE WITH ELEVATED STRUCTURE FROM KM 86 TO KM 96 COVERING PANIPAT CITY ON NH-1 (NOW NH-44) (LENGTH KM 10), IN THE STATE OF HARYANA ON BOT TOLL BASIS

Project name	**SIX LANE WITH ELEVATED STRUCTURE FROM KM 86 TO KM 96 COVERING PANIPAT CITY ON NH-1 (NOW NH-44) (LENGTH KM 10), IN THE STATE OF HARYANA ON BOT TOLL BASIS**
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Acronyms and Abbreviations

BBD	Benkelman Beam Deflection	LCV	Light Commercial Vehicle
BOQ	Bill of Quantities	LHS	Left hand side
BC	Bituminous Concrete	LIE	Lenders' Independent Engineer
BOT	Build, Operate and Transfer	LT	Low Tension
CA	Concession Agreement	MOEF	Ministry of Environment and Forest
CAPEX	Capital Expenditure	MORT&H	Ministry of Road Transport & Highways
COD	Commercial Operation Date	MPRDC	Madhya Pradesh Road Development Corporation
CRPF	Central Reserve Police Force	MSA	Million Standard Axle
C & G	Clearing and grubbing	NCR	Non-Compliance Report
CRMB	Crumb Rubber Modified Bitumen	NH	National Highways
CUP	Cattle Under Pass	NHAI	National Highways Authority of India
DBM	Dense Bitumen Macadam	NHDP	National Highway Development Programme
DLC	Dense Lean Concrete	NRMB	Natural Rubber Modified Bitumen
DFO	Divisional Forest Office	NOC	No Objection Certificate
DG	Diesel Generator	OFC	Optical Fibre Cable
DLP	Defect liability period	OPEX	Operation Expenditure
DPR	Detailed Project Report	O&M	Operation and Maintenance
EIA	Environment Impact Assessment	PPE	Personal Protection Equipment
EMP	Environment Management Plan	PPP	Public-Private/Public Sector Partnership
EPC	Engineering Procurement & Construction	PQC	Pavement Quality Concrete
FCI	Food Corporation of India	PUP	Pedestrian Under pass
FRL	Formation Road Level	PWD	Public Works Department

FWD	Falling Weight Deflectometer	PCC	Plain Cement Concrete
GAD	General Arrangement Drawing	PD	Project Director
GFC	Good for Construction	PIU	Project Implementation Unit
GOI	Government of India	PLR	Prime lending rate
GSB	Granular Subbase	PMB	Polymer Modified Bitumen
HT	High Tension	PMC	Project Management Consultant
HMP	Hot Mix Plant	PUP	Pedestrian Under Pass
HDM	Highway Development & Management	QA/QC	Quality Assurance / Quality Control
IC	Independent Consultant	SDBC	Semi-dense Bitumen Concrete
IE	Independent Engineer	SPV	Special Purpose Vehicle
IPC	Interim Payment Certification	VDF	Vehicle Damage Factor
IRC	Indian Road Congress		

1. EXECUTIVE SUMMARY

1.1 General

We understand that **EAAA TransInfra Managers Limited** is the **Investment Manager, Chennai - Tada Tollway Private Limited ("CTTPL")** is the proposed **Project Manager** and **Watrak Infrastructure Private Limited ("WIPL")** is the **sponsor** of the **Citius Transnet Investment Trust ("Trust"** or **"InvIT")** and **M/s Panipat Elevated Corridor Limited ("PECL")** is proposed to be part of the initial portfolio assets of the Trust. The Trust is registered with **Securities and Exchange Board of India ("SEBI")** as an infrastructure investment trust under the SEBI InVIT Regulations.

M/s Watrak Infrastructure Private Limited (hereinafter **"**the **Client"**) as sponsor has appointed **M/s Ramboll India Private Limited** (hereinafter referred as **"Technical Consultant"**) to carry out Technical Due Diligence of operational asset of 6 lane stretch from Km 86 to km 96 covering Panipat city with elevated corridor and Peripheral lanes in the state of Haryana on BOT Toll Basis (herein after refer as "the **Project**") which is being operated by **"M/s Panipat Elevated Corridor Limited "** (hereinafter refer as **"**the **Concessionaire** or **Company** or **PECL"**).

1.2 Project Introduction

The Government of India had entrusted to National Highways Authority of India (NHAI) for development, maintenance, and management of National Highway No. 44 (old NH-1) which includes.

- Widening of existing 4 lane portion from KM 86 to KM 96, covering Panipat City on National Highway No. 1 (NH1) in Haryana, to 6 lanes elevated structure covering Gohana Road, Sanauli Road, Asandh Road Crossings, City Bus Stand and Skylark Tourist Complex and widening and construction of Peripheral Lanes on BOT basis.

The National Highways Authority of India (NHAI) invited proposals through notice dated November 2007 for the implementation of the project. Following the evaluation of bids received, the Authority accepted the proposal of a selected bidder, M/s Larsen and Toubro Limited along with its associate L&T Transco Pvt. Ltd. Accordingly, Letter of Acceptance (LOA) NHAI/20030/1/Pani/Pro/2K/Tech/619 was issued to the selected bidder on 22 June 2005.

M/s Larsen and Toubro Limited subsequently promoted and incorporated the Concessionaire, L&T Panipat Elevated Corridor Private Limited, for the implementation of the project. The Concession Agreement was executed on 27 July 2005. The Appointed Date for the project was declared as 23 January 2006, marking the commencement of the 20-year Concession Period from that date.

The Project Highway is currently under the Operation and Maintenance (O&M) phase, in accordance with the provisions of the existing Concession Agreement. The concession period, originally scheduled to conclude on 23 January 2026, has been extended to 31 January 2027. This revision follows approvals from NHAI, as communicated in letters SO/29/NHAI/AMB/3481 (dt. 29 February 2023) and SO-82/NHAI/AMB/457 (dt. 15 May 2023), which granted extensions of 24.625 and 350 days, respectively.

Sekura India Management Limited completed the acquisition of the project and has been operating the project road in the name - Panipat Elevated Corridor Limited (PECL).

Sl. No.	Feature	Details
1	Project Name	Widening of existing 4 lane portions from KM 86 to KM 96, covering Panipat City on NH-1 (New NH 44) in Haryana, to 6

		lanes elevated structure covering Gohana Road, Sanauli Road, Asandh Road Crossings, City Bus Stand and Skylark Tourist Complex and widening and construction of Peripheral Lanes on BOT basis
2	Mode of the Execution (BOT Toll/ BOT Annuity/ EPC/ HAM/ Others)	Build, Operate and Transfer (BOT) Toll Basis
3	Project Phase	Tolling, Operation, Maintenance and Transfer
4	No. of Lanes/ Configuration	6 lanes
5	Length of the Project (in Km)	10 km
6	Authority	National Highways Authority of India (NHAI)
7	Concessionaire	Panipat Elevated Corridor Limited (PECL)
8	Independent Engineer	TPF Getinsa Eurostudios, S.L. in association with Segmental Consulting & Infrastructure Advisory
9	Date of Signing of CA	27 July 2005
10	Letter of Acceptance	22 June 2005
11	Appointed Date	23 January 2006
12	Construction Period	906 days
13	Total Project Cost as per CA	Rs. 325.00 Cr
14	Concession Agreement signed on	27 July 2005
15	Provisional Completion Certificate	15 July 2008
16	Completion certificate issued on	17 March 2011
17	Concession Period	20 Years
18	Concession End Date	31 January 2027

1.3 Project Description

The Panipat Elevated Corridor Project is a major infrastructure initiative aimed at decongesting traffic and ensuring smooth flow of vehicles along the Delhi–Ambala section of National Highway-44 (old NH-1), one of the busiest arterial highways in North India. NH-44 is a heavily trafficked corridor carrying long-distance freight, intercity, and local traffic simultaneously. Severe traffic congestion, bottlenecks at junctions, and frequent delays were observed within the city stretch. The elevated corridor provides segregation of through traffic from local traffic, ensuring faster transit, improved safety, and reduced pollution

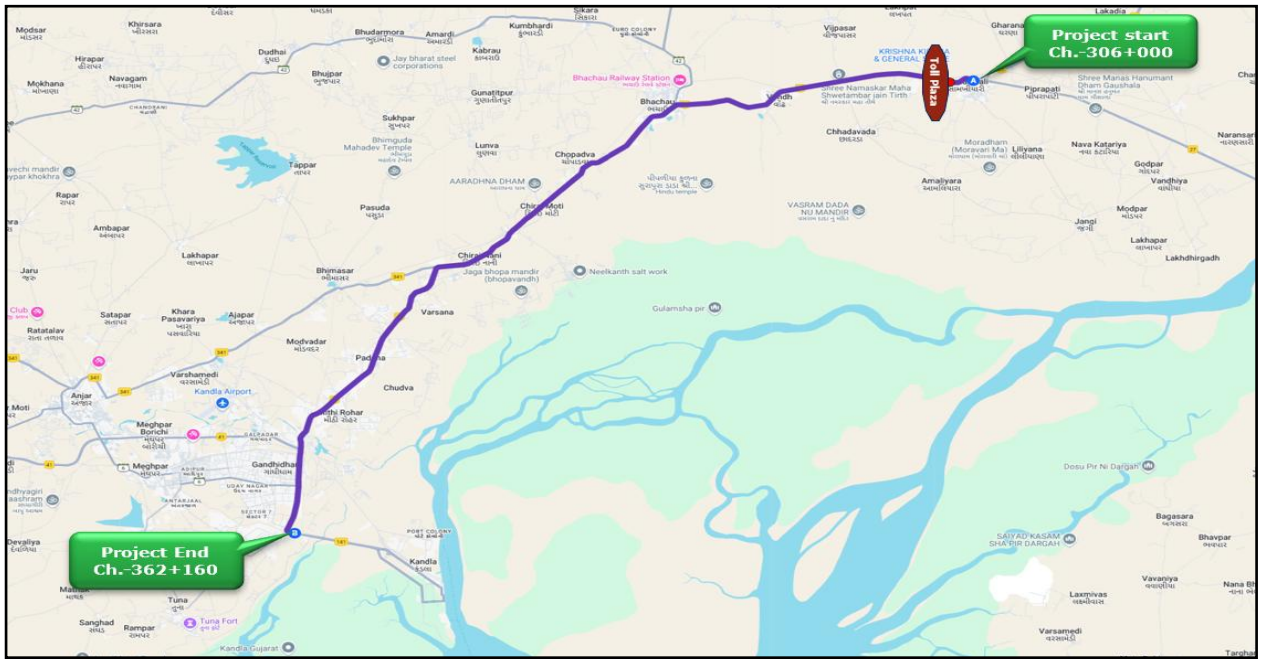
Terrain and Land Use

The Panipat Elevated Corridor (NH-44) traverses through the urban stretch of Panipat city in Haryana, characterized by mixed land use with dense commercial, residential, and industrial development along both sides of the highway. The alignment being largely elevated, the land acquisition requirement is

minimal, restricted mainly to ramps, service roads, and junction improvements. Major commercial establishments, shopping complexes, hotels, and local markets are located along the highway.

The Panipat Elevated Corridor project lies in the Indo-Gangetic alluvial plains of Haryana, along the Delhi–Ambala section of NH-44. The terrain in this stretch is generally flat to gently sloping, with no significant undulations or natural barriers.

Project Location Map



1.4 Scope of work

This report is prepared as per scope of work defined in Work Order and project information provided to us. Ramboll work, which is summarized in this Due Diligence Report, has been limited to matters which have been identified that would appear to be of significance within the context of scope of work.

This report is prepared based on visual condition survey of highway, structures, site investigations and evaluation of test results and project information and direction provided by the Client. In this report, Ramboll provides an overview of the asset based on site survey on 2025 from technical perspective, and executed at site, Review of available documents and site visit, Field inspection, investigations, and Analysis, Operations and Maintenance assessment, Major Maintenance strategy and assessment, Estimation of Opex and CapEx of the project, Preparation of presentation and project report.

1.5 Key Findings

The key findings of the project are mentioned below,

H	**High Priority:** Critical activities that will have material impact on cost of project during balance concession period
M	**Medium Priority:** Moderate likelihood of impact on cost of project during balance concession period
L	**Low Priority:** Low level of impact on cost of project during balance concession period

Diligence Area	Findings	Priority level
Completion Certificate (COD)	Project Road entered the commercial operation after, PCOD was issued on 17th July 2008, and Final Completion certificate was issued on 17th Mar 2011. End of Concession is 31 January 2027 as per approval granted by NHAI for extension of Concession period from original date of 23 January 2026.	**L**
Operation and Maintenance	As per Section XVIII of CA, the Concessionaire shall maintain project highway in conformity with Maintenance Requirements, the Maintenance Manuals or any schedules made as per plan. All the maintenance requirements shall be as per Sch-L	**H**
Maintenance Manual and Yearly Program	As per Article 18.2 of Concession Agreement, not later than 180 days prior to scheduled 4-laning date, the concessionaire shall in consultation with IE develop O&M Manual. While the maintenance programme not later than 45days prior to start of financial year during operation period the concessionaire shall provide the authority and IE its annual plan covering immediate, periodic and scheduled maintenance activities.	**H**
Pavement Design	The submitted pavement design report approved by IE Consultant for 20 years of design period as per IRC 37-2001 considering a min.7 % CBR. Key facts of pavement design are as follows: No Stage construction is considered. Pavement design period is for 20 years The final proposed flexible pavement as per CA is BC-50mm, DBM-165mm, WMM-250mm and GSB-230mm. In case of rigid pavement at toll plaza section shall include PQC of 350mm with M40 grade along with 150mm DLC and 75mm WMM followed by 150mm GSB and subgrade below with 7% design CBR	**L**
Pavement Condition	PECL pavement condition is GOOD to FAIR as per the visual inspection. MCW has intermittent fine to medium severity cracking on all lanes. It may be rectified through planned maintenance before handover.	-
Toll Plaza	The Concession Agreement mandates the establishment of a toll plaza at Km 94.800. The section has 21 hybrid lanes (with one POS lane backside toll plaza). The overall condition of the toll plazas is good, with infrastructure and systems functioning as intended.	**M**

Diligence Area	Findings	Priority level
TMS and HTMS	As Per Schedule C, there is requirement of TMS following equipment's status of all equipment's is as follows: The TMS installation was done by M/s Kent ITS in the year 2018 and since last six years is running under AMC by the same system integrator till date for all lanes at Toll Plaza. Toll Plaza is installed with Slow Speed Weigh in Motion (SSWIM) systems in 18 lanes and Medium Speed Weigh in Motion (MSWIM) systems in 2 reversible lanes. No Static Weigh Bridge are installed at the Toll Plazas and overload penalties are not being collected.	H
Road Safety	Referring to 11 December 2024 audit report all the issues are resolved / completed as per the status.	M
Geometric Design	The project road is as per Schedule D, appendix. -D-2. Key parameters of design are as follows: Ruling design speed is 100 km/hr while the min. is 80km/hr. The absolute minimum radius of horizontal curve is 250m, while K value minimum for summit and valley curves is 70m and 45m respectively.	-
As-Built Drawings	As per Schedule -I, Annex-A, the Concessionaire is to deliver relevant records and reports pertaining to the Project Highway and its design, engineering, construction, operation and maintenance including all and all operation and maintenance records and programs and manuals pertaining thereto and complete As-Built Drawing on the Date of Divestment.	M
Hand back Requirement	As per the CA all project assets including the road, pavement, structure and equipment shall have been renewed and cured of all defects and deficiencies as necessary so that project highway is compliant with the Specification and standards set forth in this Agreement. All sections of traffic lane shall have a roughness value not more than 3000 mm/km. All Lamps shall be in working condition It is understood that the maintenance and replacement of all lamps shall be covered by the annual O&M estimates. Additionally, all other defects and rectification relating to the asset is covered under the O&M and MMR estimate	H

1.6 Assessment of Project Assets

Projects asset inventory and their condition assessment is prepared through visual inspection during site visits, review and analysing the reports shared by the client, by field investigations validating the findings and by NSV survey. All the elements and components pertaining to project asset are reported in subsequent Chapter 5, 6 & 7 of this report and their assessment is used to prepare the strategy for preventive, routine, and periodic maintenance. Salient features of the project are given in Table 3-2. The overall condition of the project and its assets are satisfactory. Salient features of the project are given below.

S.no	Description	Units	Total Quantities
1	Section from Sonipat (km 86.000) to Panipat (km 96.000) of NH-44	Km	10.000
2	Peripheral Road (Service Road)	Km	10 km (LHS & RHS)
	Slip Road		5.320

S.no	Description		Units	Total Quantities
3	Bypasses		Km	NIL
4	Major Intersections		Nos	14
5	Minor Intersection		Nos	50
6	Bus Bay & Shelters		Nos	9
7	Truck lay bye		Nos	2
8	Rest Area		Nos	NIL
9	Toll Plaza		Nos	1
10	Median Openings		Nos	2
11	High Mast Light Locations		Nos	6
12	Solar LED Blinkers		Nos	12
	Traffic signal lights		Nos	22
13	Streetlights	Single Arm poles	Nos	255
		Double Arm poles	Nos	408
14	Fuel Stations		Nos	8
15	Pedestrian guard rail		Km	12.756
16	ECB (SOS Facility)		Nos	NIL
17	Gantry Boards	Cantilever Over Head	Nos	2
		Half Width Over Head	Nos	1
18	Sign Boards		Nos	392
19	Variable message sign (VMS)		Nos	NIL
20	Entry & Exit		Nos	2
21	5th / Ordinary Kilometer stones		Nos	22
22	Hectometer stones		Nos	67
23	Drainage	Median Drain	Km	NIL
		Shoulder drain	Km	24.961
		Earthen Drain	Km	0.000
		Cut Drains	Km	4.300
		Chute Drain	Km	0.000
24	Median Plantation		Km	4.807
25	Avenue Plantation		Km	8.790
26	Metal Beam Crash Barrier (MBCB)	W-beam One Side	Km	0.922
		W-beam Two Side	Km	0.000

S.no	Description		Units	Total Quantities
		Thrie beam one side	Km	0.077
27	Concrete Crash Barrier		Km	10.827
28	Land Use	Mixed (Commercial, Residential)	Km	20.000
29	Kerb		Km	67.026
30	Chevron Signs		Nos	49
31	Road Studs		Nos	44
32	OHM		Nos	18
33	Delineators		Nos	64
34	Footpath		Km	21.784
35	FOB (Foot over bridge)		Nos	2
36	RCC railing		Km	0.177
37	Antiglare Screens		Nos	2229

1.7 Assessment of Structures

Comprehensive visual inspection is carried out for inventory and assessing condition of Major bridges, Minor Bridges, Grade separators, underpasses ROBs and culverts. During the inspection and condition survey few Distresses are seen and are detailed in Chapter 6 of this project report.

Total nos. of structures on the Project Highway are given in the table below.

Structure Type	Units	Structure as per Monthly Progress Report April 2025	Structure as per site
MNB	Nos	2	2
VUP	Nos	2	2
Flyover	Nos	1	1
PUP	Nos	1	1
FOB	Nos	2	2
Culverts	Nos	10	10 (HP 2 nos & BC 8 nos)
Total	**Nos**	**18**	**18**

1.8 Toll Management System (TMS)

The project has one toll plaza with 20 Hybrid lanes at the toll plaza, and an additional lane constructed at the back side of the toll plaza named as POS lane thereby totalling it to 21 Hybrid ETC lanes, separate two-wheeler lanes are provided adjacent to the extra-wide lanes

No Static Weigh Bridge are installed at the Toll Plazas and overload penalties are not being collected.

Installed with Slow Speed Weigh in Motion (SSWIM) systems in 18 lanes and Medium Speed Weigh in Motion (MSWIM) systems in 2 reversible lanes.

TMS maintenance is in the AMC since last 6 years. Lane hardware is provided as per the industry standards however is at the end of its life. AVC and TLC panels are installed inside the tunnel and caged to prevent any unauthorized access. SS-WIMs and MS-WIMs to detect and collect overload penalty as per the government norms are not functional and all overloaded vehicles are moving through the lanes freely The network is Ethernet based and is provisioned with a backbone connectivity through OFC in parallel, this is provisioned to prevent any data loss. Fastag integration is done through IDFC.

1.9 Soil and Material investigation

Soil and Material investigation are done with the samples collected from pit investigation and the results are narrated in Chapter 8.

Along the project stretch it is evident that subsoil is generally consistent throughout the project road and is predominantly Sandy soil. The evaluated engineering properties are within the MoRTH prescribed limits.

Summary of strength parameters in the soil investigation is shown below.

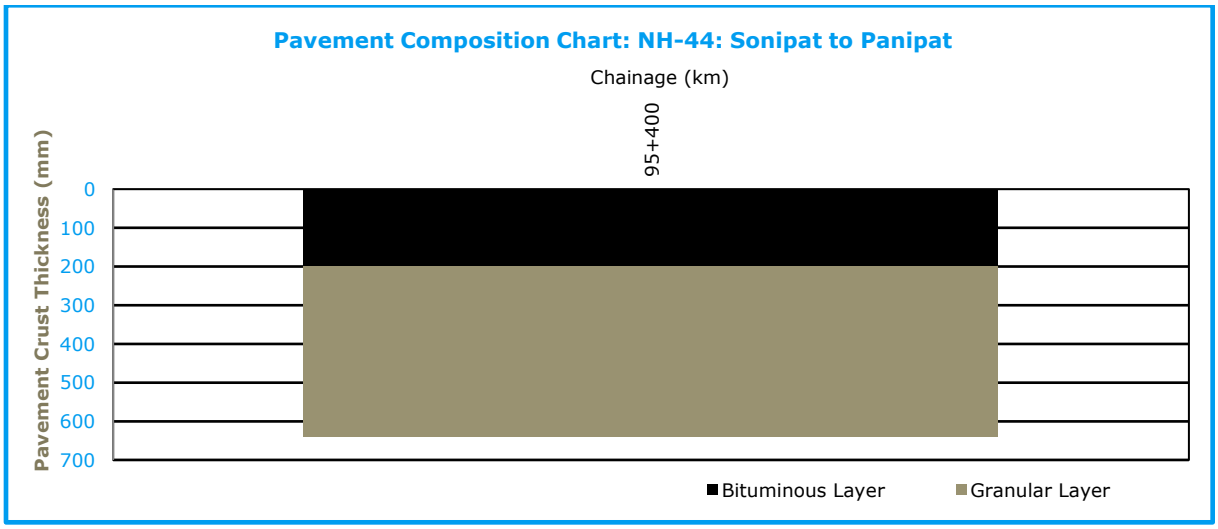
Description	Liquid Limit	Plasticity Index	Free Swell Index	4-days soaked CBR	Degree of compaction
Project - KM 86 TO KM 96 COVERING PANIPAT CITY ON NH-1	23%	NP	12.50%	12.30%	95.5%
MoRTH Limits	**<50%**	**<25%**	**<50%**		

*Variance between MDD and FDD is converted in-terms of degree of compaction

Pavement composition

The existing pavement along the project corridor is bituminous pavement. The pavement composition comprises of bituminous layer and aggregate subbase. Summary of existing pavement crust thickness is presented in an illustrative bar graph below.

For the project road it possesses consistent bituminous/ granular layer thickness of 200mm bituminous layer over the Granular course of 440mm were observed.



Granular layer testing

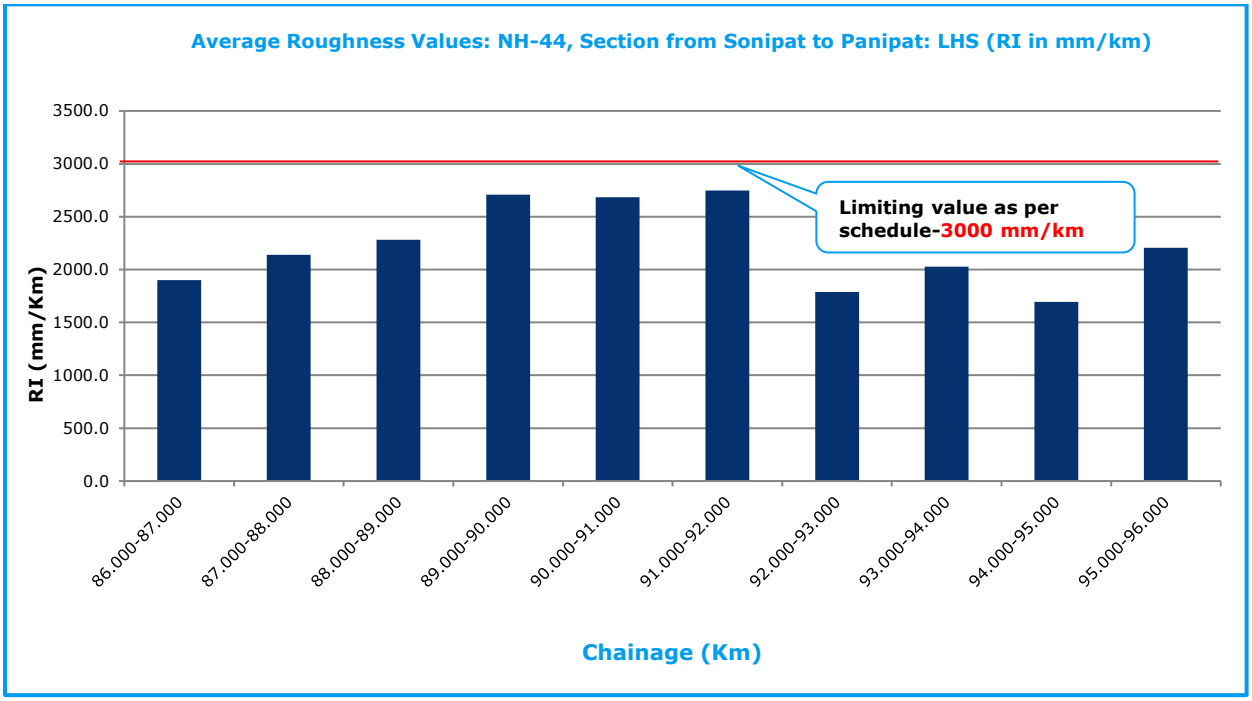
At the site around the GSB sample is collected, the gradation of the sample conforms to GSB Grade-IV as per MoRTH (5th Revision). The PT, LL, AIV are within the limits of MoRTH specifications.

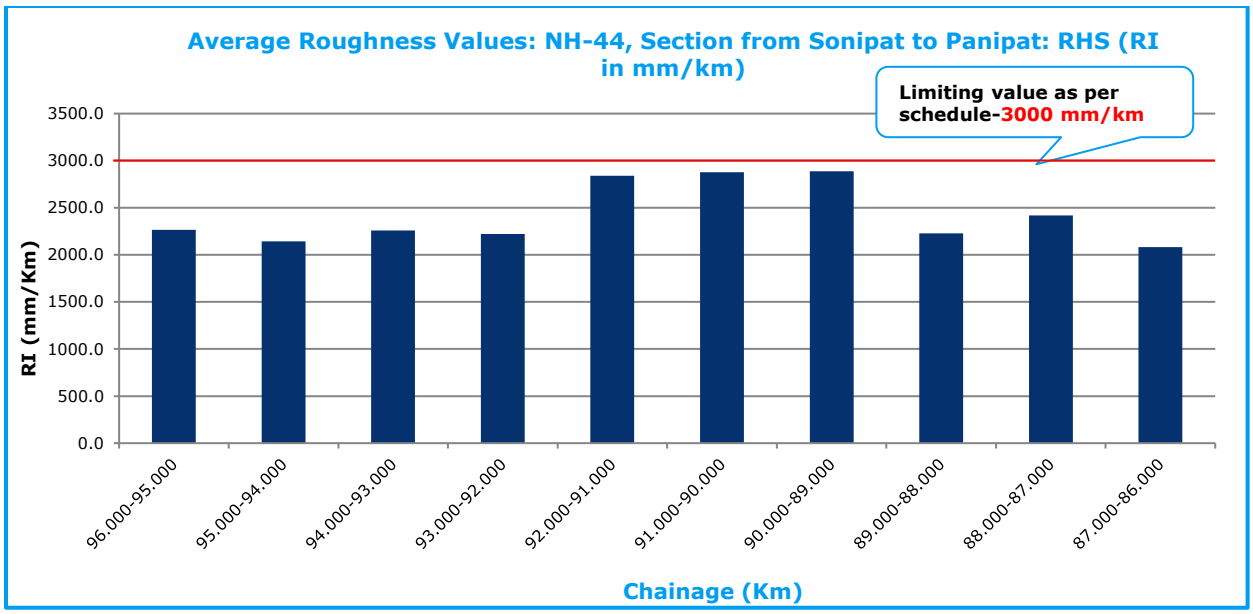
Bituminous core samples

Bituminous layer samples were extracted using a core cutting drilling machine with a 100 mm diameter bit to obtain representative bituminous core specimens. The core samples of BC refer to Grade-I, while DBM as Grade-I/II on MCW. On the Peripheral Road (SR), the BC is not conforming to MoRTH grade -I, while the DBM mix is in accordance with Grade-I

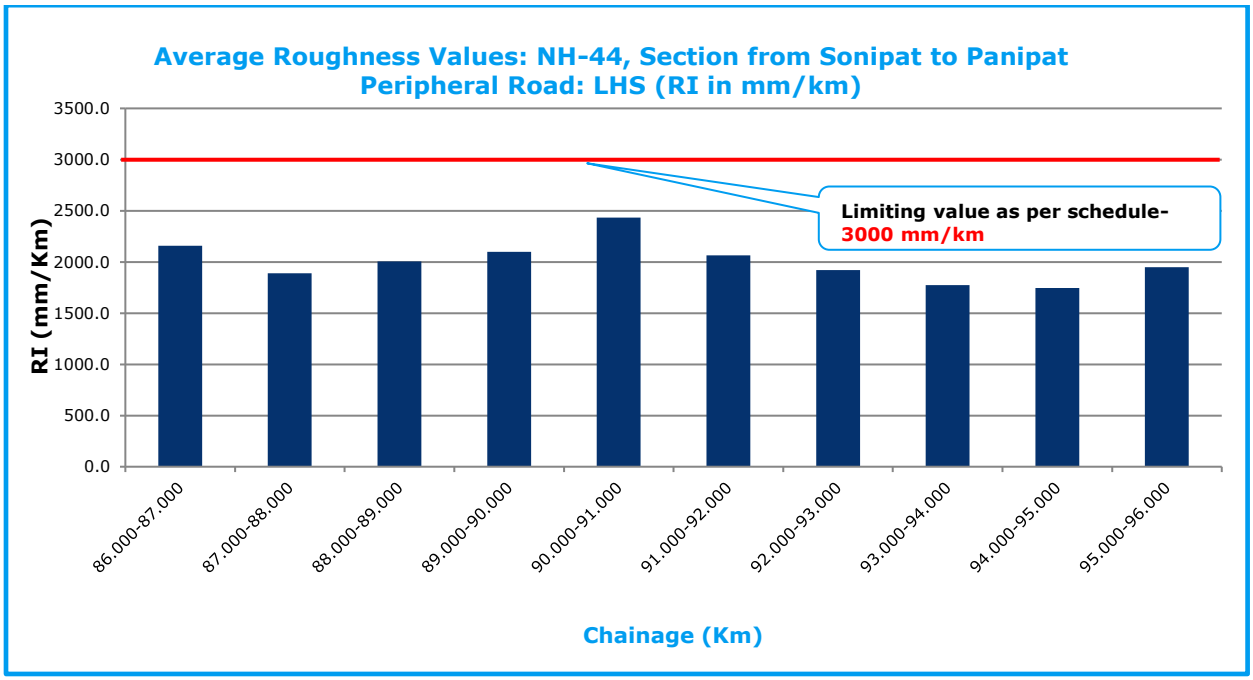
1.10 Pavement Evaluation

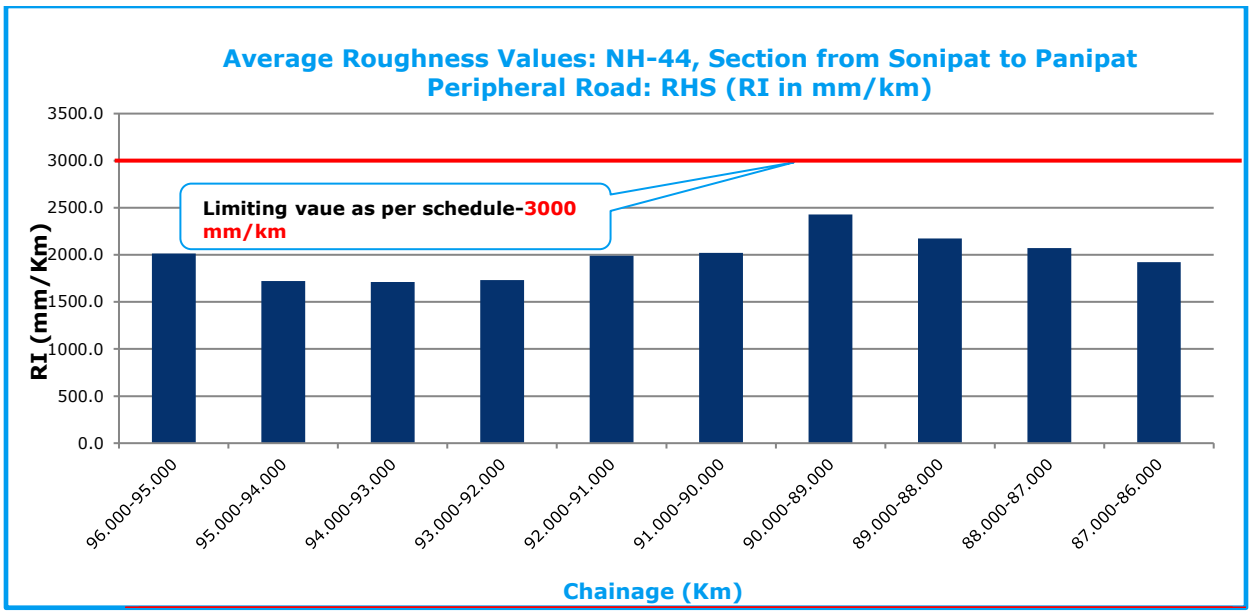
Pavement condition survey was carried out on each lane of each carriage way with NSV. The obtained lane wise Roughness summary in terms of RI (mm/km) is illustrated below and in Chapter 9 for Main carriage way and Peripheral roads. The summarized roughness is presented below.





Illustrative summary of roughness for MCW both directions

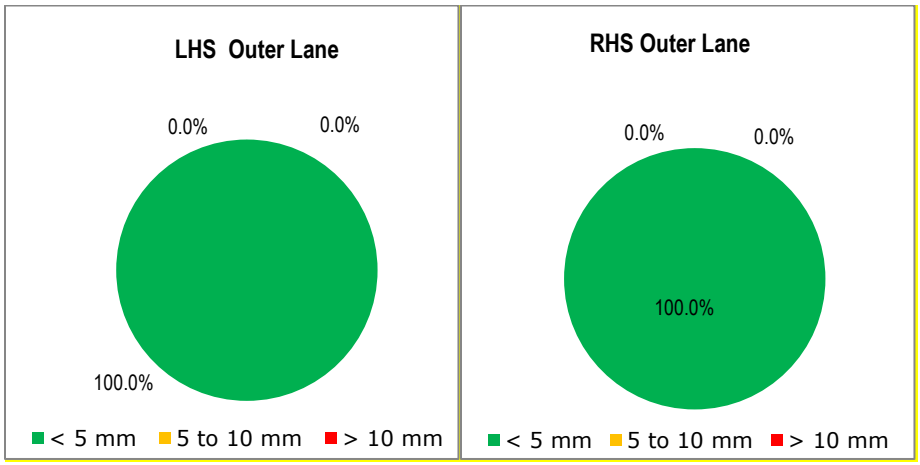


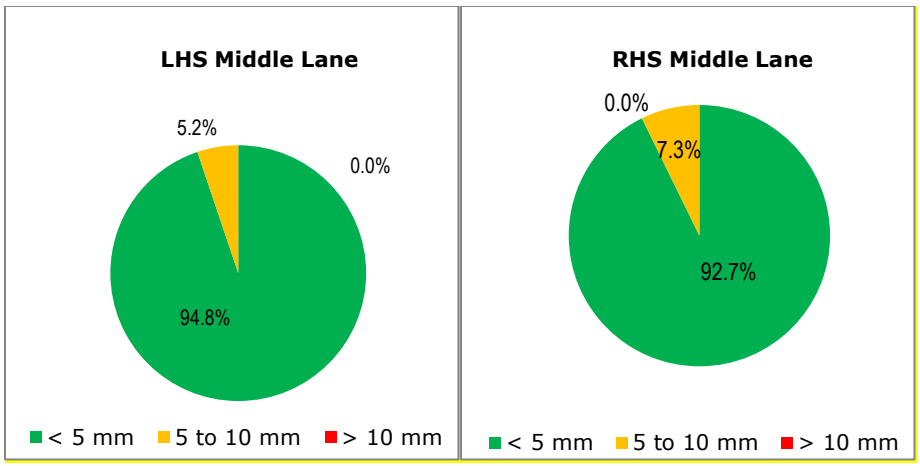


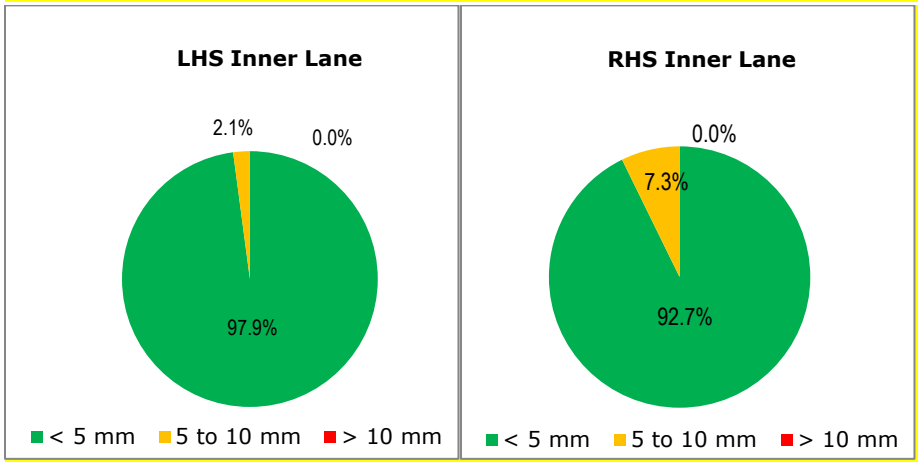
Illustrative summary of roughness for Peripheral roads in both directions

Rutting

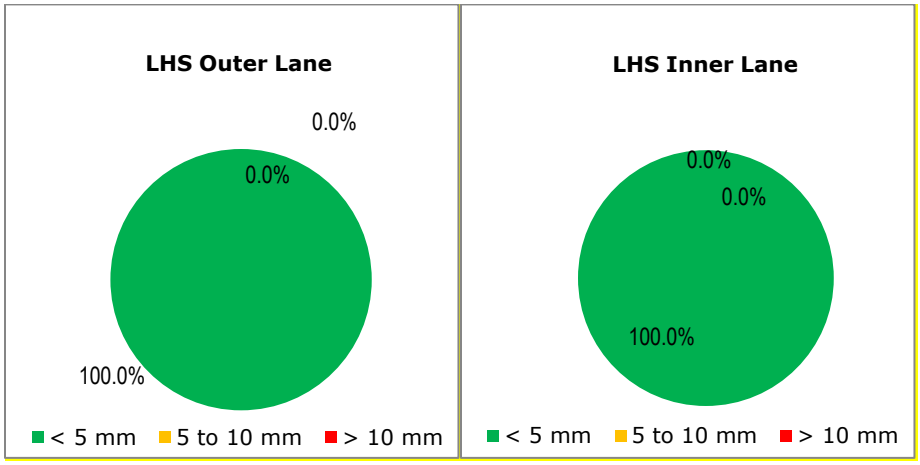
Rutting data of flexible pavement section is also collected through Digital Laser Profilers System (DLP). The obtained lane wise rutting summary is graphically represented for both LHS & RHS direction for both MCW and Peripheral roads as below and detailed in Chapter 9. In Main Carriageway (MCW) and Peripheral roads the rutting values were within the desirable limits.

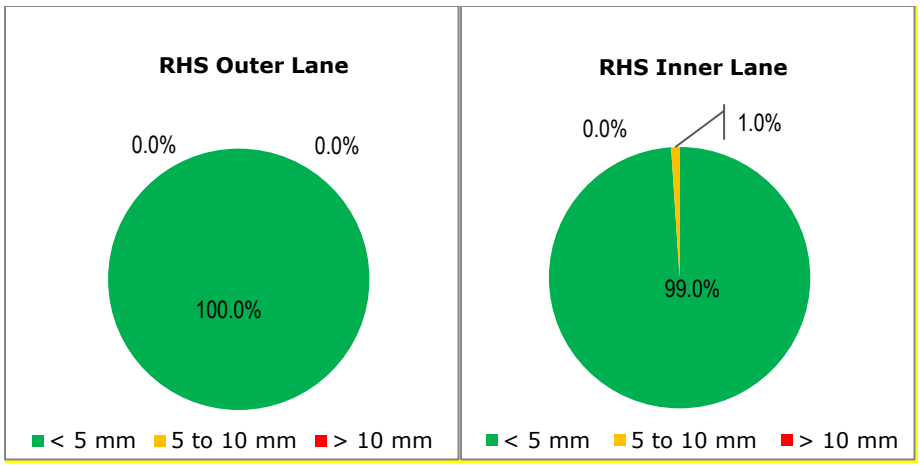






Illustrative summary of MCW rutting





Illustrative summary of Peripheral Road rutting

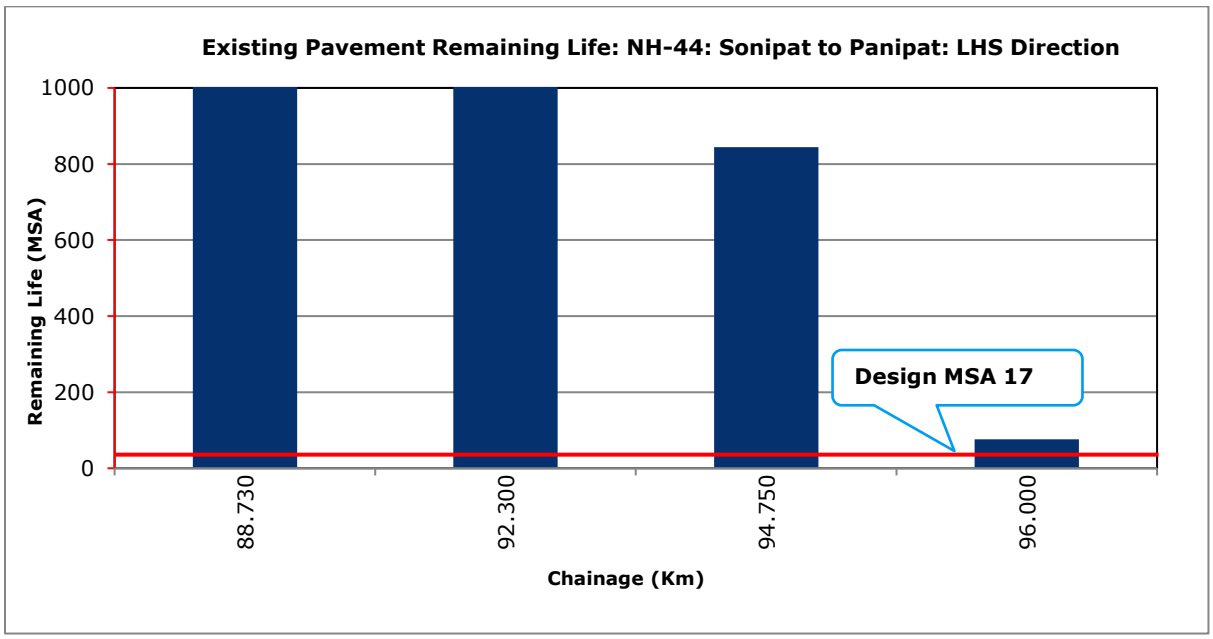
FWD deflection measurement

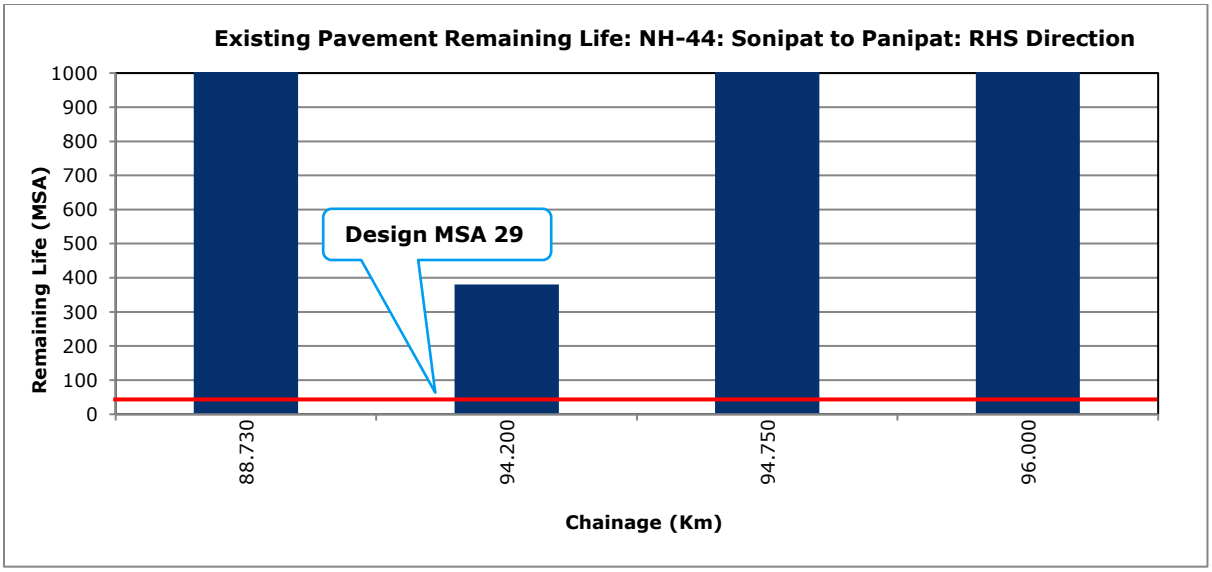
The survey has been carried out for each carriageway to evaluate the pavement structural strength and analysis of remaining life of project is carried out in conformity with IRC: 115-2014 and presented in Chapter 9 of this report.

Analysis of Flexible Pavement and graphical presentation:

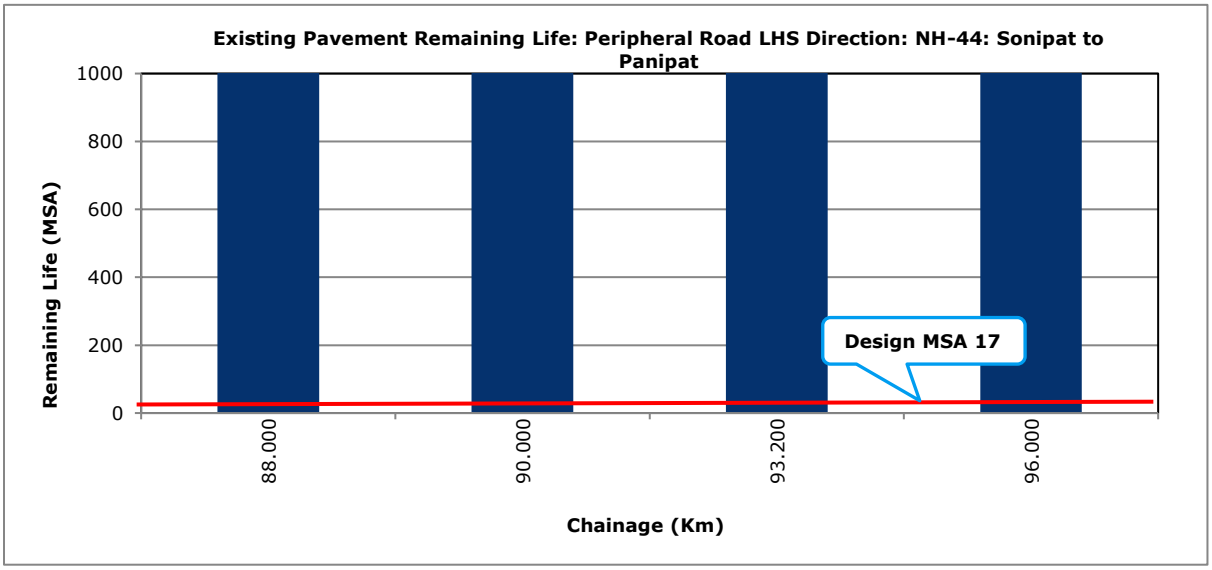
The in-service 3-layer pavement system has been analysed with the back-calculated corrected layer moduli and layer thicknesses. From the performance criteria equations, the residual/remaining rutting and fatigue life have been estimated. Remaining life is calculated as per 80% reliability on Main carriageway and Peripheral roads sections.

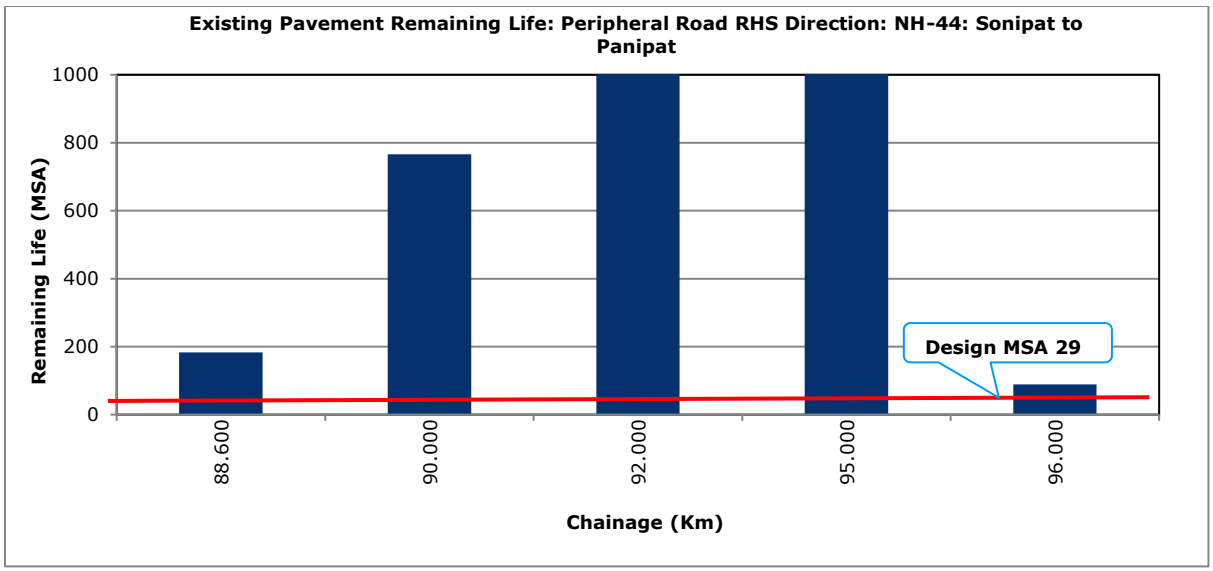
The detailed analysis is presented direction wise in Chapter 9 and the obtained remaining life are graphically presented below:





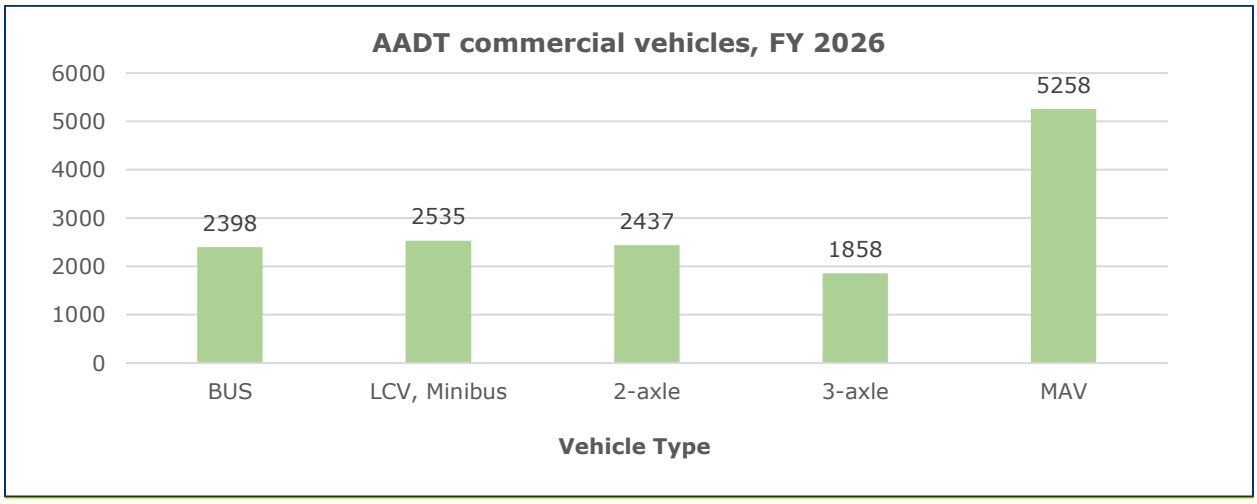
Illustrative summary of remaining life of MCW





Illustrative summary of remaining life of Peripheral Roads

Team for Technical Due Diligence conducted a 48-hr axle load survey at the toll plaza location. The Annual Average Daily Traffic (AADT) of all commercial class vehicles as provided by the client is shown below



VDF values are obtained as per the analysis of 48-hr axle load survey are presented below:

Location/ Vehicle Type		BUS	LCV	2axle	3axle	MAV
Samakhiali Toll Plaza	LHS	1.069	0.618	2.838	5.090	10.118
	RHS	1.118	0.772	2.774	5.779	19.518

AADT and 5% growth rates are provided by client, and the design traffic was projected to end of concession period (FY 2027). Design traffic for flexible pavement design is computed and shown below

Location	Design Traffic (MSA) up to FY 2027	
	LHS	RHS
Samakhiali Toll Plaza	17	29

From FWD analysis the obtained pavement (msa) life is greater than the forecasted traffic msa up to the end of the concession period (FY 2027), Hence No Overlay is required for Main carriage way and Peripheral Roads by FWD analysis.

1.11 Operation and Maintenance Requirements and Strategy

The Contractor and concessionaire shall always maintain that during the Operation Period, the Project Highway conforms to the maintenance requirements set forth in Schedule L

The recommended Major Maintenance Strategy till the end of concession period is presented below and also elaborated in Chapter 10.

Major/Periodic Maintenance Strategy

In the PECL project, the concession period is about to complete on 4th February 2027. As per the concession agreement one overlay (after milling) needs to be provided during the handing over time. MM schedule for the main carriageway and peripheral road is presented below,

Year	MM - LHS of MCW	MM - RHS of MCW	MM - of Peripheral Road	Remarks
YR 2025 - YR 2026				Base Year
YR 2026 - YR 2027	40 mm BC On 100% length	40 mm BC On 100% length	40 mm BC On 100% length	1st Cycle MCW

Note: VG 40 is considered.

1.12 Cost Estimate

The cost estimate is worked out for expenses on Immediate Works, periodic renewals (CAPEX) and expenses on operations and maintenance (OPEX) at present rates considering 2025-26 as the base year and is detailed in Chapter 11. Cost Estimate is worked out for expenses on

i. The costs for the restoration / improvement of the Toll Plaza pavement, highway flexible pavement, structural repairs, and replacement of few TMS equipment. These costs are accounted for Capex (Initial Improvement works).

ii. Cost for Installation/restoration of Sign Board, Thermoplastic Marking on pavement, Installation/restoration of 5th, KM, HM, Boundary Stone, Painting of Kerb Stone, etc. are taken as Preventive Maintenance. Routine Maintenance and Repairs are also considered and evaluated till end of concession period.

iii. Highway Lighting, Tolling operations, Survey, Insurance Charges, Administrative Expenses, Incident management, AMC cost for TMS is included as Operational cost for the Concessionaire.

iv. Bitumen has been assumed to be sourced from IOCL Panipat Refinery. PMB 76E-10 grade bitumen and VG-40 grade bitumen is considered in cost estimate. Rates of Tata steel is taken from Panipat.

OPEX and CAPEX of the project is estimated till end of Concession period and presented in Table 11-2 and represented here below.

- Initial improvement works is estimated as INR 0.63 Crore.
- Periodic Maintenance is estimated as INR 30.46 Cr.
- Routine and preventive maintenance cost will be INR 3.17 Cr. and overall OPEX till end of concession for this 10 km stretch is INR 24.00 Cr.

CAPEX and OPEX for this corridor are estimated till end FY 2027 as INR 55.10 Cr. This estimate includes 18% GST and annual escalation of 5% on Opex and 2% on Major Maintenance.

2. INTRODUCTION, APPROACH AND METHODOLOGY

Ramboll India Private Limited is engaged to conduct a Technical Due Diligence (TDD) study for 10 Km long Panipat Elevated Corridor section of NH-44 (old NH-1) in the state of Haryana.

Accordingly, Ramboll team has undertaken the work of preparing Technical Due Diligence Report based on study of project related reports and documents, visual inspections, and field investigations.

2.1 Scope of Work and Compliances

The scope of work agreed with Watrak Infrastructure Private Limited for conducting the technical due diligence study is presented in Table 2-1. The table also presents the chapters of the Technical Due Diligence Report where different items of scope of work are covered.

Table 2-1: Scope of Work and Compliances

SN	Scope of Work	Discussed At
1	**Site Visit and condition Survey – Visual Assessment** Site visit will be undertaken by Highway and Structural Engineers, Tunnel Expert, Pavement Expert, Quantity Surveyor, TMS & HTMS Expert and engineers to have visual assessment done for the project stretch. Observations will be recorded and critical issues for the Project will be identified. Project Structural integrity issues that require rectification / re-mediation will be observed and recorded along with possible risk mitigation strategy & costing thereof. The Consultant shall carry out a detailed reconnaissance of the project area and shall record and highlight important features and point out any issue that may be of importance to the Client in terms of operation and maintenance of the project.	Chapter 1, 3, 5, 6, 7, 11
2	**Conducting inventory, condition surveys and Field Investigations for Project Road** Inventory and detailed condition surveys will be conducted for project highway, bridges & cross drainage structures, project assets, safety appurtenances, TMS & ATMS system including recommendation for either strengthening / rehabilitation or reconstruction / replacement. *Requirements for NDT tests will be identified and informed. Based on the preliminary investigations and walk-through along the stretch, the Consultant shall prepare a project road map indicating the following elements Inventory of existing project assets Existing pavement condition – kilometer-wise (along with Photographs thereof) Intersecting/Crossroads (along with Photographs thereof); Inventory and condition assessment of CD structures (along with Photographs thereof).	Chapter 1, 3, 5, 6, 7, 8, 9

SN	Scope of Work	Discussed At
	Condition assessment of pavement. Condition assessment of structures. Review the extent of balance work. The Consultant should prepare a photo-documentation (Soft copy) of the mentioned areas and any other important findings. The Consultant shall assess the adequacy of Operations & Maintenance, Toll Management System and Advanced Toll Management system. The following field investigations will be carried out for the project stretch. Falling Weight Deflectometer (FWD) Surveys NSV Survey Test Pit investigations. Core samples from pavement Axle Load Surveys	
3	**Review of available Project Documents and Reports** The available reports (Concession Agreements, Approved Pavement design report, Monthly Progress Reports, As-built Drawings, Correspondences of stake holders, Asset Management Contracts, Maintenance Manuals, Maintenance history etc) will be reviewed. The Consultant shall assess the completion status of work Vis-à-vis compared with schedule B, C and Schedule D	Chapter 4, 10
4	**Review of construction material and quality, Rehabilitation Plans by Developing strategy for immediate/periodic maintenance.** The Consultant should review of Quality of construction and compaction based on available data and from Laboratory testing of samples collected from trial pits, and cores The Consultant should conduct visual inspection of expansion joints, wearing coat, pitching, bearings, retaining structures, etc of the structures to assess the condition and requirements for its repair, replacements and / or rehabilitation. The pavement stretches along with the type of distresses will be identified analysing NSV and FWD data. The Consultant should assess maintenance cycles for pavements using HDM analysis. Repair techniques will be suggested for stretches requiring immediate rehabilitation measures. Pavement maintenance strategy (functional overlay/ structural overlay) will be developed for the entire concession period to bring back riding quality of each lane of the carriageway to maximum permissible as stipulated in the Concession Agreement.	Chapter 5, 6, 7, 9, 10, 11

SN	Scope of Work	Discussed At
5	**Preparation of BoQ and Cost Estimate** Bill of Quantities will be prepared for Immediate repairs, Routine maintenance, Periodic/major maintenance, O&M Cost, and Improvement works as per Schedule B of the CA. O&M cost will involve Routine maintenance and Incident Management, Tolling Operations, Admin Expenses and Preventive Maintenance. The Consultant should provide cost till the end of the concession period including any expected extension of Concession periods as informed by the Client. For assessing the cost, Ramboll will use rates available in the market or from the inhouse data base.	Chapter 12

2.2 Deliverables and Timelines

The deliverables and the timelines for the study are as under:

SN	Deliverables	Time period
1	Project Appreciation Report (PAR)	Within 15 days from date of receipt of Agreement from the Company.
2	Draft Report	Within 30 days from date of receipt of Agreement from the Company.
3	Final Report all-inclusive along with Preventive / Major Maintenance and yearly O&M Cost estimates	Within 15 days from draft report or within 7 days from the comments received from client on Draft report, whichever is earlier

The above timelines assume that all project related data are available at the start of work.

2.3 Structure of the Report

In line with the requirements of agreed scope of work, this Technical Due Diligence Report is being submitted. The report is organised in the following fashion.

Chapter 1	**Executive Summary:** The chapter presents an overview of the project after review & study of documents, site investigations and estimates for maintenance.
Chapter 2	**Introduction, Approach and Methodology:** The chapter presents a brief approach and methodology adopted for carrying out the Due Diligence Study.
Chapter 3	**Project Description:** The chapter summarises the project features based on Concession Agreement requirements.

Chapter 4	**Review of Concession Agreement:** This chapter contains a short review of the existing HAM CA of the package.
Chapter 5	**Assessment of Project Assets - Highway:** The chapter presents the details of various essential features of the project highway recorded through reconnaissance survey and data obtained through NSV Survey.
Chapter 6	**Assessment of Project Assets - Structures:** The chapter presents the details of various essential features of the structures recorded through visual inspection.
Chapter 7	**Assessment of Project Assets – Toll Systems:** The chapter presents the details of various essential features of the Toll Plaza Systems and associated facilities recorded through visual inspection.
Chapter 8	**Soil and Material Investigations:** This chapter describes the tests carried out for soil and material samples collected from site and analysis of the test results.
Chapter 9	**Pavement Evaluation Studies:** This chapter describes the tests carried for pavement evaluation and analyses of the test results.
Chapter 10	**Development of O&M Strategy:** The chapter presents the details of O&M strategy developed based on the Pavement evaluation studies and analysis described in Chapter 10.
Chapter 11	**Cost Estimate:** The chapter outlines the key assumption considered for cost estimate and provides details of cost estimates under various heads viz immediate, O&M and major maintenance for the concession period

2.4 List of Shared Documents of the project.

Documents shared by Watrak Infrastructure Private Limited for Technical Due Diligence of the project and Ramboll reviewed the information are given below.

- Concession Agreement of the projects
- Pavement Design Report (Dated 13 Dec 2005)
- O&M Subcontracts agreement
- Road Safety Audit Report for January 2024
- Monthly Progress Report for March 2025
- Project Cross sections and Plan and Profile
- Project Manpower and Insurance fees

- Electricity Charges
- PECL Organogram
- AMC for TMS with SLA

2.5 Approach and Methodology

Our approach and method to address the requirements defined in terms of reference are briefly presented below.

- Identification of objectives of Client through detailed study of scope of work and discussions with the Client.
- Identification of Assignment specific team of professionals covering all the skills and specializations required and involving with the assignment from day one.
- A Team Leader is assigned to coordinate various events / activities of various team members.
- Assessment of data / information required is made at the time of Proposal / Engagement letter and the list is shared with the Client.

2.6 Study

The following briefly presents the process followed for the present study.

- The data available for the project are collected from site offices of PIU – NHAI and of respective Independent Engineers of three packages.
- The data is reviewed by the study team and information collated in different categories e.g., asset inventory, contracts, change of scope, communications from NHAI, maintenance strategy and maintenance costs etc.
- Data gaps are found through the above process and communicated to the Client.
- Detailed review of all the available data is carried out.
- Site visit is made by team of experts to understand the project features and observations are recorded.
- Field tests are carried out as per agreed scope of work.
- The test results are analysed in detail and maintenance strategies are developed.
- Inferences are made on various items of scope of work based on the available data and compared with the requirements of existing concession Agreement. Issues are flagged wherever needed.
- The costs associated with the project under various head (immediate, routine operation and maintenance and Major Maintenance) are worked out in accordance with the requirements of existing Concession Agreement under current scenario.
- Finally, a comprehensive report is prepared covering all aspects of the agreed scope of work.

2.7 Delivery

Delivery follows the following flow:

- Formats of agreed deliverables are formalized and shared with Client, wherever required.

- Deliverables are shared with the Client within agreed timelines.

2.8 Feedback

Regular and end-of-the-assignment feedback are obtained from the client for further enhancing the quality of service.

3. PROJECT DESCRIPTION

The Government of India had entrusted to National Highways Authority of India (NHAI) for development, maintenance, and management of National Highway No. 44 (old NH-1) which includes.

- Widening of existing 4 lane portion from KM 86 to KM 96, covering Panipat City on National Highway No. 1 (NH1) in Haryana, to 6 lanes elevated structure covering Gohana Road, Sanauli Road, Asandh Road Crossings, City Bus Stand and Skylark Tourist Complex and widening and construction of Peripheral Lanes on BOT basis.

The National Highways Authority of India (NHAI) invited proposals through notice dated November 2007 for the implementation of the project. Following the evaluation of bids received, the Authority accepted the proposal of a selected bidder, M/s Larsen and Toubro Limited along with its associate L&T Transco Pvt. Ltd. Accordingly, Letter of Acceptance (LOA) NHAI/20030/1/Pani/Pro/2K/Tech/619 was issued to the selected bidder on 22 June 2005.

M/s Larsen and Toubro Limited subsequently promoted and incorporated the Concessionaire, L&T Panipat Elevated Corridor Private Limited, for the implementation of the project. The Concession Agreement was executed on 27 July 2005. The Appointed Date for the project was declared as 23 January 2006, marking the commencement of the 20-year Concession Period from that date.

The Project Highway is currently under the Operation and Maintenance (O&M) phase, in accordance with the provisions of the existing Concession Agreement.

Sekura India Management Limited completed the acquisition of the project and has been operating the project road in the name - Panipat Elevated Corridor Limited (PECL).

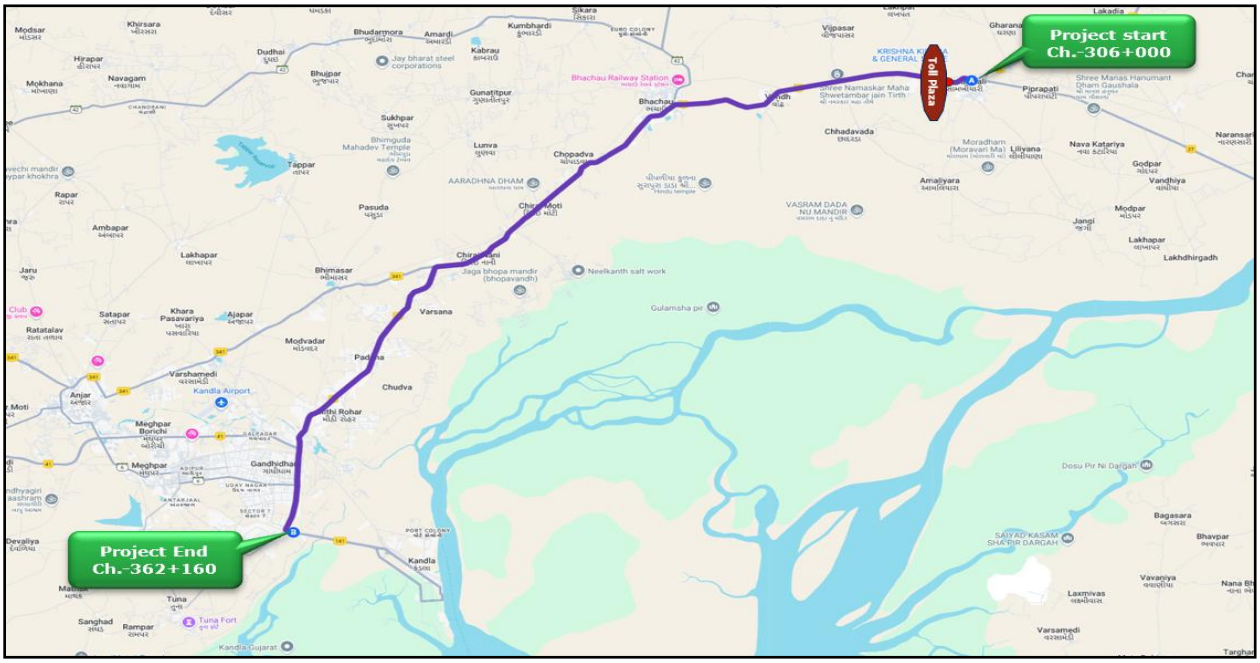
The Panipat Elevated Corridor Project is a major infrastructure initiative aimed at decongesting traffic and ensuring smooth flow of vehicles along the Delhi–Ambala section of National Highway-44 (old NH-1), one of the busiest arterial highways in North India. NH-44 is a heavily trafficked corridor carrying long-distance freight, intercity, and local traffic simultaneously. Severe traffic congestion, bottlenecks at junctions, and frequent delays were observed within the city stretch. The elevated corridor provides segregation of through traffic from local traffic, ensuring faster transit, improved safety, and reduced pollution

3.1 Land use and Terrain

The Panipat Elevated Corridor (NH-44) traverses through the urban stretch of Panipat city in Haryana, characterized by mixed land use with dense commercial, residential, and industrial development along both sides of the highway. The alignment being largely elevated, the land acquisition requirement is minimal, restricted mainly to ramps, service roads, and junction improvements. Major commercial establishments, shopping complexes, hotels, and local markets are located along the highway.

The Panipat Elevated Corridor project lies in the Indo-Gangetic alluvial plains of Haryana, along the Delhi–Ambala section of NH-44. The terrain in this stretch is generally flat to gently sloping, with no significant undulations or natural barriers.

Figure 3-1: Location Map of Project Stretch



3.2 Administrative Details of the Project

Administrative details of the project are listed below.

Table 3-1: Administrative Details of the Project

Sl. No.	Feature	Details
1	Project Name	Widening of existing 4 lane portions from KM 86 to KM 96, covering Panipat City on NH-1 (New NH 44) in Haryana, to 6 lanes elevated structure covering Gohana Road, Sanauli Road, Asandh Road Crossings, City Bus Stand and Skylark Tourist Complex and widening and construction of Peripheral Lanes on BOT basis
2	Mode of the Execution (BOT Toll/ BOT Annuity/ EPC/ HAM/ Others)	Build, Operate and Transfer (BOT) Basis
3	Project Phase	Tolling, Operation, Maintenance and Transfer
4	No. of Lanes/ Configuration	6 lanes
5	Length of the Project (in Km)	10 km
6	Authority	National Highways Authority of India (NHAI)
7	Concessionaire	Panipat Elevated Corridor Limited (PECL)
8	Independent Engineer	TPF Getinsa Eurostudios, S.L. in association with Segmental Consulting & Infrastructure Advisory

Sl. No.	Feature	Details
9	Date of Signing of CA	27 July 2005
10	Letter of Acceptance	22 June 2005
11	Appointed Date	23 January 2006
12	Construction Period	906 days
13	Total Project Cost as per CA	Rs. 325.00 Cr
14	Concession Agreement signed on	27 July 2005
15	Provisional Completion Certificate	15 July 2008
16	Completion certificate issued on	17 March 2011
17	Concession Period	20 Years
18	Concession End Date	31 January 2027

3.3 Salient Features of the Project and Scope of Work

The salient features of the project are presented in Table 3-2.

Table 3-2: Salient Features of the Project

S.no	Description		Units	Total Quantities
1	Section from Sonipat (km 86.000) to Panipat (km 96.000) of NH-44		Km	10.000
2	Peripheral Road		Km	19.300
	Service Road & Slip Road			5.320
3	Bypasses		Km	NIL
4	Major Intersections		Nos	14
5	Minor Intersection		Nos	50
6	Bus Bay & Shelters		Nos	9
7	Truck lay bye		Nos	2
8	Rest Area		Nos	NIL
9	Toll Plaza		Nos	1
10	Median Openings		Nos	2
11	High Mast Light Locations		Nos	6
12	Solar LED Blinkers		Nos	12
	Traffic signal lights		Nos	22
13	Streetlights	Single Arm poles	Nos	255
		Double Arm poles	Nos	408

S.no	Description		Units	Total Quantities
14	Fuel Stations		Nos	8
15	Pedestrian guard rail		Km	12.756
16	ECB (SOS Facility)		Nos	NIL
17	Gantry Boards	Cantilever Over Head	Nos	2
		Half Width Over Head	Nos	1
18	Sign Boards		Nos	392
19	Variable message sign (VMS)		Nos	NIL
20	Entry & Exit		Nos	2
21	5th / Ordinary Kilometer stones		Nos	22
22	Hectometer stones		Nos	67
23	Drainage	Median Drain	Km	NIL
		Shoulder drain	Km	24.961
		Earthen Drain	Km	0.000
		Cut Drains	Km	4.300
		Chute Drain	Km	0.000
24	Median Plantation		Km	4.807
25	Avenue Plantation		Km	8.790
26	Metal Beam Crash Barrier (MBCB)	W-beam One Side	Km	0.922
		W-beam Two Side	Km	0.000
		Thrie beam one side	Km	0.077
27	Concrete Crash Barrier		Km	10.827
28	Land Use	Mixed (Commercial, Residential)	Km	20.000
29	Kerb		Km	67.026
30	Chevron Signs		Nos	49
31	Road Studs		Nos	44
32	OHM		Nos	18
33	Delineators		Nos	64
34	Footpath		Km	21.784
35	FOB (Foot over bridge)		Nos	2
36	RCC railing		Km	0.177
37	Antiglare Screens		Nos	2229

3.4 Specification and Standards

The codes and standards applicable for the design of the project section and project section facilities are.

- Indian Road Congress (IRC) codes and standards
- Ministry of Road Transport and Highways (MORTH) Specifications

4. REVIEW OF CONCESSION AGREEMENT

This chapter contains a short review of the concession agreement

4.1 Brief Review of Concession Agreement

It may be noted that The Concession Agreement is primarily divided into 44 Chapters and 15 Schedules that are available at the end of the CA. Contents of each of the Articles and the Schedules is briefly mentioned below.

CHAPTER I Preliminary

Concession Agreement

Clause 1 Definitions and Interpretations

Addresses - the Definition and Interpretation, measurements and arithmetic conventions, priority of agreements, clauses and schedules

CHAPTER II The Concession

Clause 2 Scope of the Project

Addresses- the project concession

Clause 3 Grant of concession

Addresses- the concession

Clause 4 Conditions precedent

Addresses-conditions precedent, damages for delay by the authority, damages for delay by the concessionaire.

Clause 5 Performance Security

Addresses-performance security, appropriation of performance security, release of performance security.

Clause 6 Fees

Addresses- fee that the concessionaire is entitled to during the Operations Period to levy, collect and appropriate from uses of the Project Section.

Clause 7 Concession fee

Addresses-concession fee, additional concession fee, determination of concession fee, payment of concession fee, verification of reliable fee.

Clause 8 Competing Facility

Addresses-Compete facility shall not be opened to traffic before expiry of 8 years from the Appointed Date or before achievement of a traffic level of 80,000 PCUs per day on the main carriageway (i.e. 6 lanes) of the project section, whichever is later.

CHAPTER III Operations and Undertakings

Clause 9 Obligation of the concessionaire

Addresses-obligations of the concessionaire, obligations relating to project agreements, obligations relating to change in ownership, employment of foreign nationals, employment of trained personnel, sole purpose of the concessionaire, branding of project highway, facilities for physically challenged and elderly persons, obligations during construction and operation period.

Clause 10 Obligation of NHAI

Addresses- enable access to the site, permit peaceful use of site, assist in obtaining permits, assist in obtaining access to necessary infrastructure facilities and utilities, including water, electricity, telecommunication etc.

Clause 11 Representation and Warranties

Addresses- representation and warranties of the concessionaire, representation and warranties of the authority, disclosure.

Clause 12 Disclaimer

Addresses - Disclaimer

CHAPTER IV Project Development and Operations

Clause 13 Use and Development of the Site

Addresses- access to the site for carrying out surveys, investigations, soil tests etc y.

Clause 13.5. Existing Right of way

Addresses-the site, license, access and right of way, procurement of site, site to be free from encumbrances, protection of site from encroachments, special temporary right of way, access to authority and independent engineer.

Clause 14 Monitoring and Supervision of construction

Addresses- monthly progress reports, inspection, tests, delays during construction, suspension of unsafe construction works, video recording.

Clause 15 Completion

Addresses- completion certificate, provisional certificate, completion of punch list items withholding of provisional certificate, rescheduling of tests.

Clause 16 Tests

Addresses- all tests to be conducted in accordance with Schedule J.

Clause 17 Change of scope

Addresses- change of scope, procedure for change of scope, payment for change of scope, restriction on certain works, power of authority to undertake works, reduction in scope of the project.

Clause 18 Operation and maintenance

Addresses-all and Maintenance obligations of the concessionaire, maintenance requirements, maintenance manual, maintenance program, safety vehicle breakdowns and accidents, decommissioning due to emergency, lane closure, damages for breach of maintenance obligations, authorities right to take remedial measures, overriding power of the authority, restoration of loss or

damage to project highway, modifications to project highway, excuse from performance of obligations, barriers and diversions, advertising on the site.

Clause 19 Monitoring of operation and maintenance

Addresses- monthly status reports, inspection, tests, remedial measures, monthly fee statement.

Clause 20 Independent Consulting Engineer

Addresses- appointment of independent engineer, duties and functions, remuneration, termination of appointment, authorized signatories, dispute resolution.

Clause 21 Traffic Sampling

Addresses- NHAI shall inspect traffic records and shall be entitled to undertake traffic sampling.

CHAPTER V Financing Arrangements

Clause 22 Financial Close

Financial closure-financial closure, domination due to failure to achieve financial closure

Clause 23 Negative Grant

Addresses-grant equity support, O&M support.,

Clause 24 Revenue shortfall loan

Addresses-repayment of shortfall loan, repayment of shortfall revenue loan

Clause 25 Escrow account

Addresses -escrow account, deposits into escrow account, withdrawals during concession., withdrawals upon termination.

Clause 26 State Support Agreement

Addresses – The nature and scope of support and services required are detailed in Schedule R of the CA.

Clause 27 Insurance

Addresses-insurance during concession., notice to the authority, evidence of insurance cover, remedy for failure to ensure, waiver for subrogation, concessionaires' waiver, application of insurance proceeds.

Clause 28 Accounts and Audit

Addresses- audited accounts, appointment of auditors, certification of claims by statutory auditors, dispute resolution.

CHAPTER VI Force Majeure and Termination

Clause 29 Force Majeure

Addresses force majeure, nonpolitical event, indirect political event, political event, duty to report force measure event effect force measure event on the concession, allocation of cost arising out of force measure, termination notice for force measure event, termination payment for force majeure event, dispute resolution, excuse from performance of obligations.

CHAPTER VII Suspension and Termination

Clause 31 Compensation for Breach of Agreement

Addresses-compensation for default by concessionaire, compensation for default by the authority, extension of concession., compensation for competing roads, compensation to be in addition.

Clause 32 Termination

Addresses- Concessionaire Event of Default, NHAI event of default, Termination Payments, Mode of Payment.

Clause 33 Divestment of rights and interest

Addresses- the investment requirements, inspection and cure, vesting certificate, additional facilities, divestment costs etc

Clause 34 Defects liability after termination

Addresses-liability for defects after termination, retention in escrow account.

Clause 35 Assignment and Charges-

Addresses-restriction on assignment and charges, permitted assignment and charges, substitution agreement, assignment by the authority

Clause 46 Change in law

Addresses - increase in costs, reduction in costs, protection of NPV, restriction on cash compensation, no claim in the event of recovery from users

Clause 37 Liability and indemnity

Addresses -general indemnity, indemnity by the concessionaire, notice and context of claims, defense of claims, no consequential claims, survival on termination.

Clause 38 Rights and title over the site

Addresses- License rights, access rights of the authority and others, property taxes, restriction on subletting

Clause 39 Dispute resolution

Addresses -dispute resolution, conciliation, arbitration, adjudication by regulatory authority or Commission

Clause 40 Disclosure

Addresses - disclosure of specified documents, disclosure of documents relating to safety.

Clause 41 Redressal of public grievances

Addresses- complaints register, redressal of complaints

Clause 42 Advertising on the site

Addresses- complaints register, redressal of complaints

Clause 43 Governing Law and Jurisdiction

Addresses- complaints register, redressal of complaints

Clause 44 Miscellaneous

Addresses – Video Recording, Waiver, Severability, No partnership, Language, Exclusion of Implied Warranties etc, Counterparts

Schedules

Schedule A: Site of the Project,

Schedule B: Scope of the Project

Schedule C: Project Facilities

Schedule D: Specifications and Standards

Schedule E: Applicable Permits

Schedule F: Performance Security

Schedule G: Schedule of User Fee

Schedule H: Project Completion Schedule

Schedule I: Drawings

Schedule J: Tests to be conducted

Schedule K: Completion Certificate

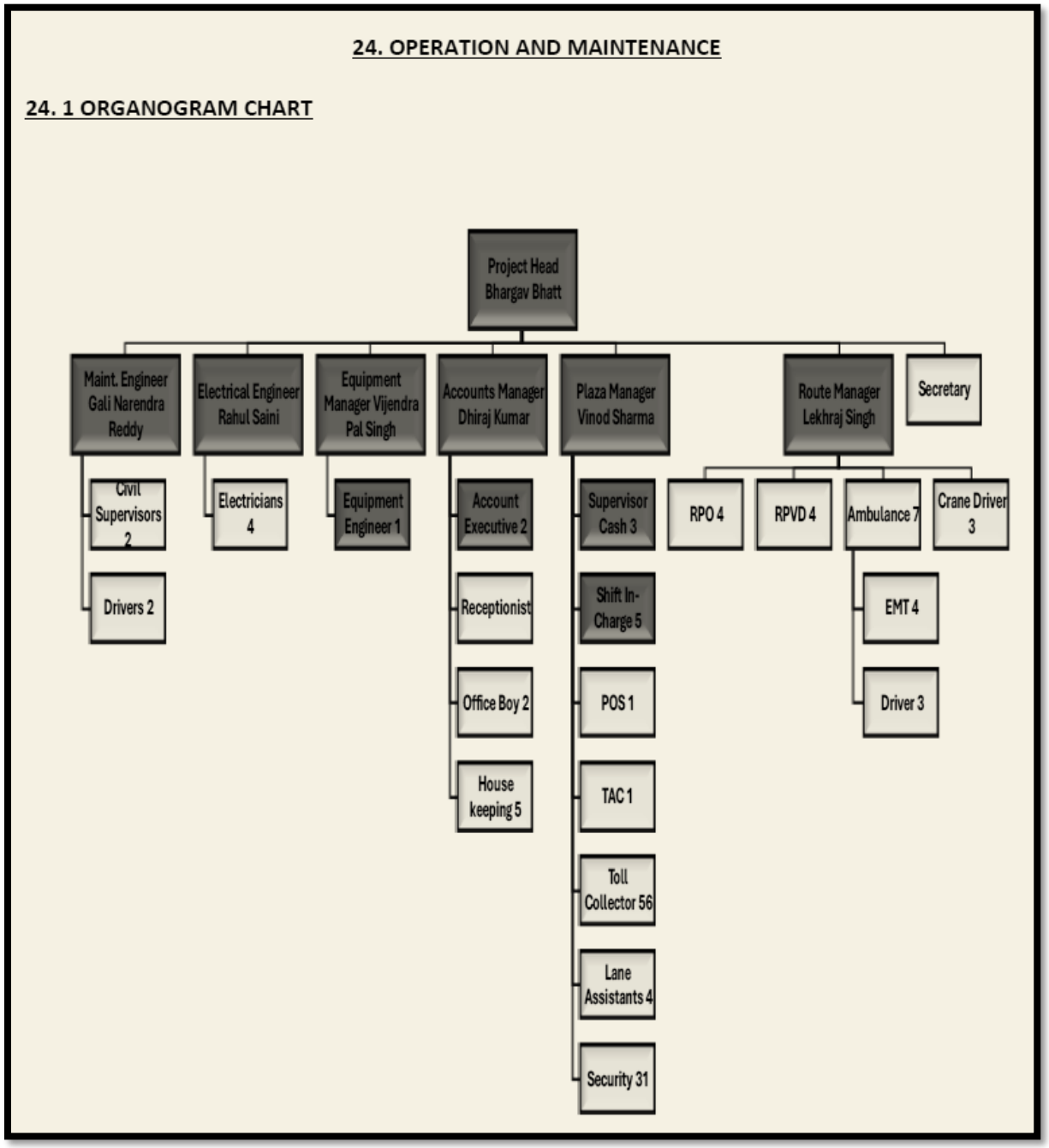
Schedule L: Operation & Maintenance (O&M)

Schedule M: Monthly Fee Statement

Schedule N: Selection of Independent Engineer

Schedule O: Independent Consultant's Services

O&M Organization Chart of Concessionaire



4.2 Operation and Maintenance activities being undertaken by the Concessionaire:

Routine Maintenance

Emergency Maintenance

Other Maintenance

Corridor Maintenance

Safety &Traffic Management

Accident Reporting

Site inspection and Action taken report

Emergency Services

Conformance to Performance Standards

Encroachment Reporting

Critical issues Reporting**:**

4.3 Details of Subcontracts

S No	Scope	Company Name
1	Manpower Supply & Payroll	
	Contract Sourcing & supply of Manpower End to end payrolling and managing and employee life cycle	Innovsource Services Pvt Limited
2	Car Hire	
2.1	Supply of Vehicles	Setia Tour & Travels141/5, Geeta Colony, Panipat, Haryana
2.1	Supply of Vehicles	Jai Hanuman Tour & Travels, Sai Colony, Ujha Road, Panipat, 132103 Haryana
3	Energy	
	Supply of Led fixtures	SIPANI Energy Limited, 10/1, Queens Road, Bangalore 560052
4	Crane Supply & Hire	G.S. Enterprises, Babarpur Road, PO Kabri, Panipat, 132103, Haryana
5	Cleaning	
	MCW, Drainage Spout, Road Furniture, Sign Boards, Kerb Cleaning, ROW, BT edge to Boundary Pillar, Vegetation etc	Future Vision Creation
6	Manpower Supply	
	Supply of manpower for house keeping	S.K. Power Group, House No 331, Sector 7, Huda, Panipat, 132103, Haryana
7	Misc Civil Works	
	Dismantling of existing 200 mm dia GI pipes P&F of 6 kg pressure PVC down take pipe	Shivam Concrete Technology & Consulting Pvt Limited
8	Security Staff	

	Providing security personnel	Future vision creations
9	Ambulance Service	
	Supply ambulance and ambulance services to transport patients to hospital	UNM Life care Private Limited, Anurag Palace, Pune - 411044

5. ASSESSMENT OF PROJECT ASSETS – HIGHWAY

Ramboll team reviewed the documents shared for Panipat Elevated Corridor project. After reviewing the documents, Ramboll team visited the site to observe the condition of the Road and Road assets. The main Carriageway and Peripheral Road has flexible pavement. On both sides of the road including elevated corridor, there are service roads termed as Peripheral Road. Overall condition of the Road assets is fair to good.

Project Start point: The corridor begins at approximately km 86.00 on National Highway 1 (now NH-44), passing through the heart of Panipat.

Project End point: It ends around km 96.00 on the same highway.

Elevated Flyover Section: A 3.5 km stretch within the 10 km corridor is an elevated flyover—the longest six-lane flyover in India at the time of its construction

The important road features and Assets inspected during the visit include:

- Road and Other Traffic Appurtenances: Peripheral roads, road junctions, and road markings.
- Safety and Roadside Items: Signboards, metal crash barriers, pedestrian Guard Rail, traffic blinkers, slope protection works, side drains, and plantation areas like medians.
- Highway Facilities: Streetlights, truck Lay bays, rest areas, bus shelters, toll plazas, and pedestrian Facilities.

5.1 Service Roads/ Slip Roads

Peripheral Road and Service roads along the project corridor have been constructed using flexible pavement. At a few isolated spots, potholes have been observed which can be addressed through routine maintenance. Loose debris and dust on the shoulder areas indicate the need for regular cleaning. Overall, the Peripheral Road and Service roads are mostly in good condition. With periodic upkeep, including minor repairs and cleaning, their functionality and safety will be sustained over time.

Some Photographs of Peripheral Road and Service roads are provided below.







Figure 5-1: Service roads.

5.2 Intersections

Along the stretch, there are at-grade junctions. including both major and minor configurations. There are a total of 65 junctions along the project road, consisting of 15 major and 50 minor junctions. All junctions have been constructed using flexible pavement.

This junction is equipped with essential safety features such as sign boards, solar blinkers, Traffic signals, streetlights, and pavement markings. The surface is smooth and well-maintained, ensuring safe and efficient traffic movement. Other minor junctions along the stretch are also in good condition and have been provided with similar traffic safety features.

Some reference photographs are provided below.





Figure 5-2: Major Intersections



Figure 5-3: Minor Intersections

5.3 Toll Plaza

As per the Concession Agreement, one toll plaza is provided at km 94+800. The toll plaza consists of 10 lanes in each direction (10+10 configuration) and is operational with a Hybrid ETC (Electronic Toll Collection) system. The plaza is equipped with necessary facilities including canopy lighting, high mast lighting, administrative building, toilet blocks, tow-away cranes, paramedical booth, and ambulance services. The overall condition of the toll plaza and its facilities is observed to be good. Canopy of toll plaza requires repair at ceiling level. Few photographs are presented below.



Figure 5-4: Toll Plaza

5.4 Fuel Station

There are a total of 08 fuel stations — 5 on the left-hand side (LHS) and 3 on the right-hand side (RHS) of the carriageway. Photographs are presented below.



Figure 5-5: Fuel stations.

5.5 Bus bay and Bus Shelter

There are 09 Bus bays and Bus Shelter and 02 Bus bays only (without bus shelter) along the project road. All bus shelters are in fair to good condition as per Site inspection. These bays and shelters are located on the peripheral roadside to provide safe and convenient access for local passengers. Roof of few bus shelters requires repair. Overall, the condition of the bus shelters is fair, with proper structure and accessibility. Representative photographs are provided below.



Figure 5-6:Bus shelters.

5.6 Truck lay-byes.

There are 2 truck lay-byes, 01 on each side. These lay byes have flexible pavement. Toilet blocks are also provided at these lay byes for the convenience of drivers and travellers While the overall condition of the truck lay-byes and associated facilities is good, and they appear to be properly maintained. Representative photographs are presented below.



Figure 5-7: Truck Lay bye.

5.7 Entry/ Exit Ramp

Entry and exit points are provided at 2 locations to facilitate smooth access between the main carriageway and service roads, one on each side. Representative photographs provided below.



Figure 5-8: Entry/ Exit Ramp

5.8 Drainage System

The road drainage system along the project highway comprises lined covered drains along the Peripheral Road shoulders. The overall condition of the drainage system is fair to good, but some drain covers are found damaged or missing at isolated locations. Routine / preventive maintenance by cleaning debris and vegetations to make the arrangement working. Representative photographs are presented below for reference.





Figure 5-9: Drainage system.

5.9 Metal Beam Crash Barriers

Metal Beam Crash Barriers (MBCBs) are installed along the shoulder side and median of the main carriageway across the project stretch. Overall, the condition of the metal beam crash barriers is good, and they are functioning effectively. Representative photographs are presented below for reference





Figure 5-10: Metal Beam Crash Barriers

5.10 Traffic Signage

Road signage along the project highway includes Regulatory, Warning, and Informatory signs, as well as overhead gantry-mounted signs. 392 signboards and 3 gantry signs have been installed across the project stretch. Condition of these signs are good. Representative photographs are presented below for reference.





Figure 5-11: Traffic Signs

5.11 Highway lighting

Highway lighting is provided at VUP's, elevated section, Toll Plaza, and at Built-up Locations with single and double arm light poles. High Mast lightings are provided at Toll Plazas. Lighting here is properly maintained and are in good working condition. Traffic signal lights are provided at Intersections locations. Photographs are presented below.





Figure 5-12: Highway Lighting

5.12 Plantation

Landscaping and median plantations are provided along the project corridor, enhancing the visual appeal of the highway. During the site visit, it was observed that in few shrubs and plants are either overgrown and require pruning or have dried out and need regular watering, maintenance, or replacement. Representative photographs are presented below for reference.





Figure 5-13: Plantation.

5.13 Pedestrian guard rail

Pedestrian Guard Rails (PGR) are installed along the edge of the service road, primarily at the start and end of the approach sections, and in some locations between the main carriageway and the service road. The overall condition of the PGR is good along the stretch. Representative photographs are presented below for reference.





Figure 5-14: Pedestrian Guard Rails

5.14 Kilometre stone/Hectometre stones

Kilometre and hectometre stones are generally present and visible along most sections of the project stretch. However, during the site visit, it was observed that some stones are either missing or have faded markings, which require routine maintenance and repainting to ensure proper visibility and functionality. Representative photographs are presented below for reference.





Figure 5-15: Kilometre Stones & Hectometre Stones

6. ASSESSMENT OF PROJECT ASSETS – STRUCTURES

6.1 Structural Inventory

The visual condition survey of all the structures is carried out by Structural Expert/Bridge Engineer of the consultant team with an inspection is aimed at identifying and quantifying deterioration, which may be caused by applied loads and factors such as deadload, live load, wind load and physical (e.g. wear, abrasion) / chemical (e.g. corrosion due to environmental exposure) influences. Apart from inspection of bridge damage caused by unpredictable natural phenomena (e.g. earthquake, flood) or collision by vehicles or vessels, inspection is also needed to identify or follow up the effect of any built-in imperfections. Inspection can also provide insights into the structural condition to address issues proactively, helps in devising necessary remedial measures to enhance safety and performance, contributes to extending the service life of bridges through prompt intervention and maintenance strategies.

Table 6-1: Summary of Structures

Structure Type	Units	Structure as per Monthly Progress Report - April 2025	Structure as per site
MNB	Nos	2	2
VUP	Nos	2	2
Flyover	Nos	1	1
PUP	Nos	1	1
FOB	Nos	2	2
culvert	Nos	10	10 (HP 2 nos & BC 8 nos)
Total	**Nos**	**18**	**18**

There are 01 elevated flyover, 02 minor bridges, 02 VUP, 01 PUP, 2 FOB and 10 culverts in this project corridor. All the structures are generally in satisfactory condition but in fair state of maintenance. The survey of structures involves visual inspection to identify any cracking, spalling, staining, deformation, leaching, exposed reinforcement, honeycombing, condition of expansion joints, condition of bearings, approach slabs, drainage, damaged railings, and validation of structure data, etc

During the condition survey, no major structural failures or serious distress were observed, with only minor attention needed for optimal performance, including repairing exposed reinforcement at pier caps, repairing minor damaged crash barriers, improving the sealing material at expansion joints, and ensuring drainage spouts are clear and present, alongside routine maintenance to clear debris accumulation under culverts and within waterway sections, managing vegetation growth and removing unwanted materials around bearings of superstructures, and regularly removing vegetation around culverts and RE walls.

These findings show the need for regular maintenance and minor repairs to ensure the long-term durability, functionality, and safety of the structures.

Following codes are used for the condition rating of the structural members.

Code	Description
N	NOT APPLICABLE
9	EXCELLENT CONDITION

Code	Description
8	VERY GOOD CONDITION - no problems noted
7	GOOD CONDITION – some minor problems
6	SATISFACTORY CONDITION - structural elements show some minor deterioration
5	FAIR CONDITION - all primary structural elements are sound but may have minor section loss, cracking, spilling or scour
4	POOR CONDITION - advanced section loss, deterioration, Spalling or scour
3	SERIOUS CONDITION - loss of section, deterioration, spelling or scour have seriously affected primary structural components Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present
2	CRITICAL CONDITION - advanced deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely checked it may be necessary to close the bridge until corrective action is taken
1	IMMINENT' FAILURE CONDITION - major deterioration or section loss present in critical structural components or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic, but corrective action may put back in light service.
0	FAILED CONDITION - out of service - beyond corrective action

6.2 Minor bridge

There are two minor bridges found along this stretch. These bridges are in satisfactory condition. Ramboll unable to inspect the minor bridge at Ch. 91+410 properly, as the area under the bridge is blocked with debris and garbage accumulation, making it difficult to access for inspection.

For the minor bridge at Ch. 95+930, significant issues were discovered, including debris around the bearings such as soil, leaves, and small plants, which could cause malfunction and affect their proper function. There are several cracks in the RCC slabs and girders that have been treated with epoxy grouting. The assessment of the bridges is presented below.

Table 6-2: Detailed Distresses of Minor Bridge

S. No	Chainage	Observation
1	95+930	**1. Debris Accumulation around bearings:** There is a significant accumulation of debris, including soil, leaves, and small plants around the bearing area. This could lead to malfunction or hinder the proper functioning of the bearings. **2. Rust and Corrosion in steel structure:** The steel structure in contact with the POT-PTFE bearings exhibits visible rust and corrosion. This could be due to prolonged exposure to moisture and insufficient protection or coating. Rust can compromise the integrity of the bearing and overall structural stability. **3. Cracks in RCC Slabs and girders:** • Multiple cracks maintained with epoxy grouting; surface appears rough and worn. • Mostly cracked marks have been made on the slab which will be repaired.

S. No	Chainage	Observation
	NOTE	**Environmental Condition:** The water under the bridge is covered with algae and floating debris, including plastic bottles and other waste materials. This indicates poor water quality and environmental neglect.

Table 6-3: Detail List of Minor Bridges

S.NO	Chainage (Km)	Structure	Location	Str On	Deck Width (m)	Span Arrangement (m)	POT-PTFE Bearings (Nos)	Rocker cum roller bearing (Nos)	Elastomeric bearing (Nos)	Type of Expansion joint	Expansion joint (Nos)	Type of Super-str
1	95+930	MNB	LHS	MCW	12	4X15	40	0	0	strip seal	5	RCC Slab and T girder
		MNB SR	LHS	MCW	12	2X15+1 x30	16	0	10	strip seal	4	Steel I section
		MNB SR	RHS	MCW	12	2X15+1 x30	16	0	10	strip seal	4	Steel I section
		MNB	RHS	MCW	12	4X15	0	40	0	strip seal	5	RCC Slab and T girder
2	91+410	MNB	BHS	MCW	66.55	2X5	0	0	0	NA	0	RCC box

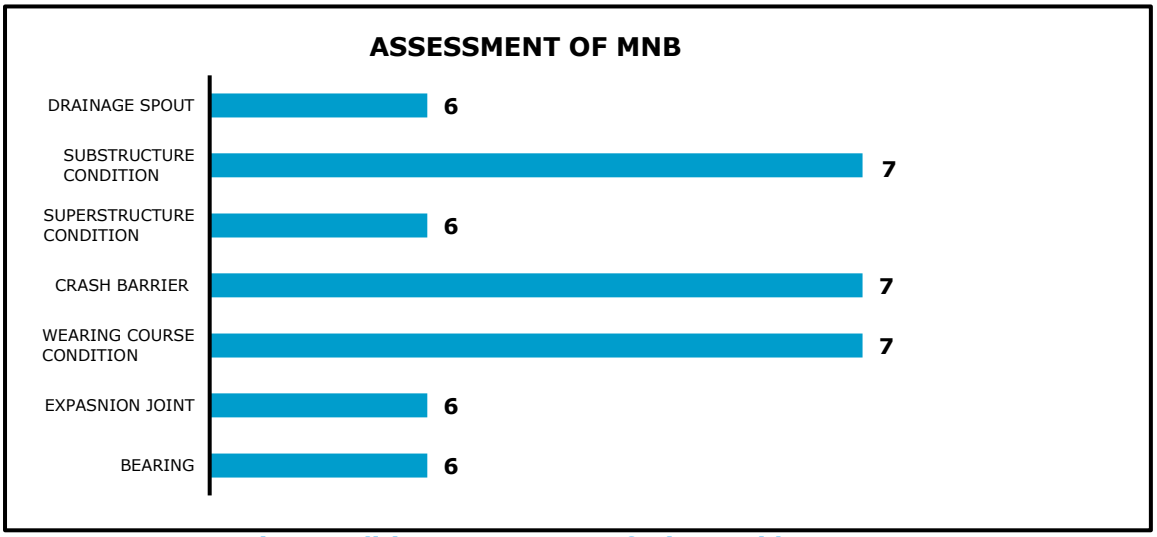


Figure 6-1: Comparative condition assessment of Minor Bridge





MNB at Ch. 91+410 Blocked with debris and garbage accumulation



MNB 95+930



MNB 95+930




Debris and soils around the bearing area at MNB 95+930 (Bearing at Outer Girder)



MNB 95+930



MNB 95+930





Vegetation Overgrowth in the waterway at MNB 95+930



MNB at Ch. 95+930



MNB at Ch. 95+930

Figure 6-6-2: Site Photographs of Minor Bridge

6.3 Flyover

There is 01 flyover (Elevated Structure) on this stretch, this bridge is in satisfactory condition. Due to the height of the bridge, a close inspection of the bearings was not feasible; however, from accessible visual observations, the bearings appeared to be in satisfactory condition. Visible cracks along the surface of the PSC girder G-3 suggest potential problems related to thermal expansion, contraction, or prestress forces. At some location, cracks in the RCC slab have been maintained with epoxy grouting. Minor honeycombing has been observed in the diaphragms on various piers and girders. The assessment of the structure is presented in the Figure 6-3.

Table 6-4: Detailed Distresses of Flyovers

S. No	Chainage	Assessment
2	325+317	**1. Crack Patterns:** There are visible cracks along the surface of the PSC girder G-3 from outer girder at left -hand side near pier P-1. These cracks appear in a relatively regular pattern, and vertical suggesting possible issues related to thermal expansion, contraction, or prestress forces. **2. Crack in RCC slab:** • Multiple cracks maintained with epoxy grouting. S-02,04,07,15,20,25,49,50,70, 59,86,88,89,91,94,95,97. • Epoxy has been applied throughout the visible cracks, forming a bonding agent in the damaged areas. • Mostly cracked marks have been made on the slab which will be repaired. **3. Honeycombing:** Minor Honeycombing observed in diaphragm on pier P-5, P-8, P-7, P-13 P-15, P-24, P-31, P-34, P-42, P-48, P-61, P-71, P-80, P-93 left and Right -hand side. Girder G-6 (LHS Span S-35), Girder G-5 (LHS Span S-25) span S-61 near diaphragm. **4. Discoloration:** There are areas of dark discoloration on the slab surface, which might indicate moisture ingress or the presence of contaminants. These discolored patches could be contributing to the deterioration. Water stain on girders and slab of span S-5,12,14,52,56,57,58 (LHS&RHS).

Table 6-5: Details List of Flyover

S.NO	Chainage	Structure	Location	Deck Width (m)	Span Arrangement (m)	POT-PTFE Bearings (Nos)	Type of Expansion joint	Expansion joint (Nos)	Type of Super-structure
1	88+750 to 91+820	Flyover	LHS	12	100X30.48	240	Strip Seal	21	PSC Girders
			RHS	12	100X30.48	240	Strip Seal	21	PSC Girders

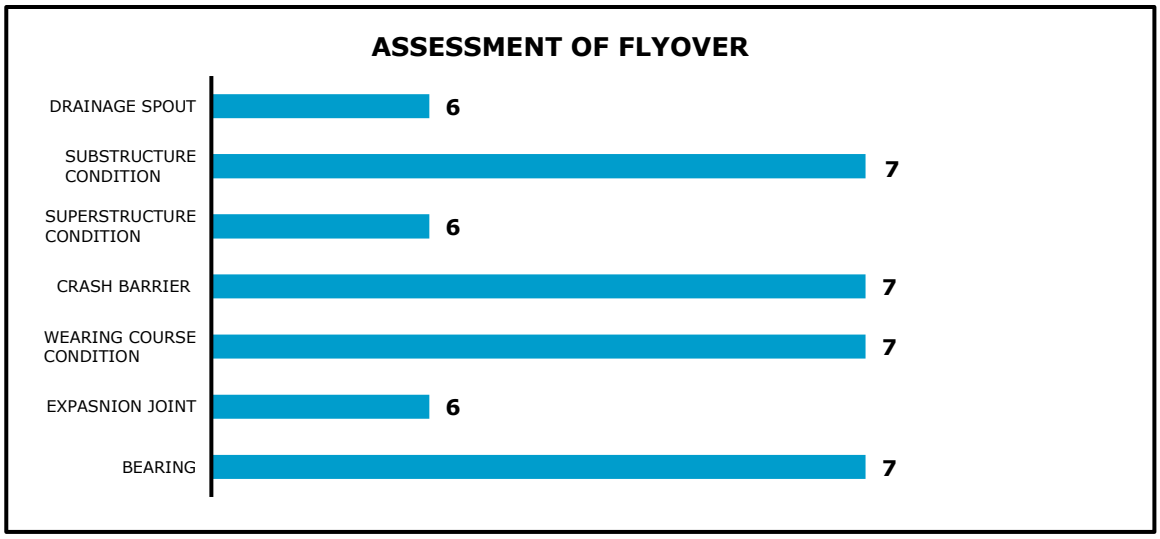


Figure 6-3: Comparative condition assessment of flyovers.



Flyover at Ch. 325+317



Flyover at Ch. 325+317



Flyover at Ch. 325+317



Flyover at Ch. 325+317



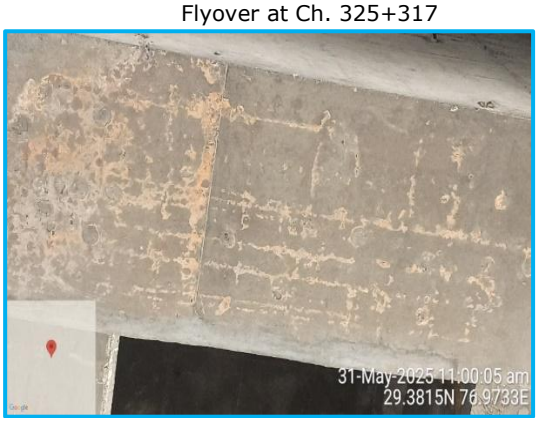
Flyover at Ch. 325+317



Flyover at Ch. 325+317



Leaching at joint Flyover at Ch. 325+317



Honey combing on diaphgram at flyover Ch.325+317



Cracks marks for repairing



Rubber siling dmaged at expanison joint E-4





Cracks repaied at many location of flyover Ch. 325+317



flyover Ch. 325+317



flyover Ch. 325+317



flyover Ch. 325+317



flyover Ch. 325+317

Figure 6-6-4: Site Photographs of flyovers

6.4 Underpass

The project road has 2 VUP and 1 Nos of PUP, which are in satisfactory condition. Due to the height of the bridge, a close inspection of the bearings was not feasible; however, from accessible visual observations, the bearings appeared to be in satisfactory condition. There were cracks in the slabs that were repaired using epoxy grouting, and some areas of the slab showed leaching as well. Most of the cracked marks on the slab have been addressed and will undergo further repairs. Overall, the structure demonstrates a good level of maintenance with effective measures being implemented to preserve its integrity and ensure long-term durability. The comparative assessment of the underpasses is presented in the Figure 6-5.

Table 6-6: Detailed distresses of underpasses

S. No	Chainage	Assessment
1	**87+230, 93+290 91+890**	**1. Drainage spout not in function: (Complained by local public)** • The drainage spout is not functioning on the underpasses, which is detrimental to proper drainage. • Non-functional drainage spouts compromise the safety of bridge users, both vehicular and pedestrian. **2. Strip seal joint:** • The bitumen-covered strip seal expansion joint (E-1) is not fulfilling its intended function, leading to potential structural stress, accelerated wear, and compromised safety. Immediate efforts to uncover or repair the expansion joint are necessary to ensure the bridge can accommodate thermal movements. **3. Cracks in RCC Slabs:** • Multiple cracks maintained with epoxy grouting; surface appears rough and worn. • Mostly cracked marks have been made on the slab which will be repaired.

Table 6-7: Details List of underpasses

S.NO	Chainage (Km)	Structure	Location	Str On	Deck width	Span Arrangement (m)	POT-PTFE Bearings (Nos)	Type of Expansion joint	Expansion joint (Nos)	Type of Super-structure
1	87+230	VUP	LHS	MCW	12	1X20	4	Strip Seal	2	RCC Voided slab
		VUP	RHS	MCW	12	1X20	4	Strip Seal	2	RCC Voided slab
2	93+290	VUP	LHS	MCW	12	1X20	4	Strip Seal	2	RCC Voided slab
		VUP	RHS	MCW	12	1X20	4	Strip Seal	2	RCC Voided slab
3	91+890	PUP	LHS	MCW	12	1X15	0	NA	0	RCC Solid slab
		PUP	RHS	MCW	12	1X15	0	NA	0	RCC Solid slab

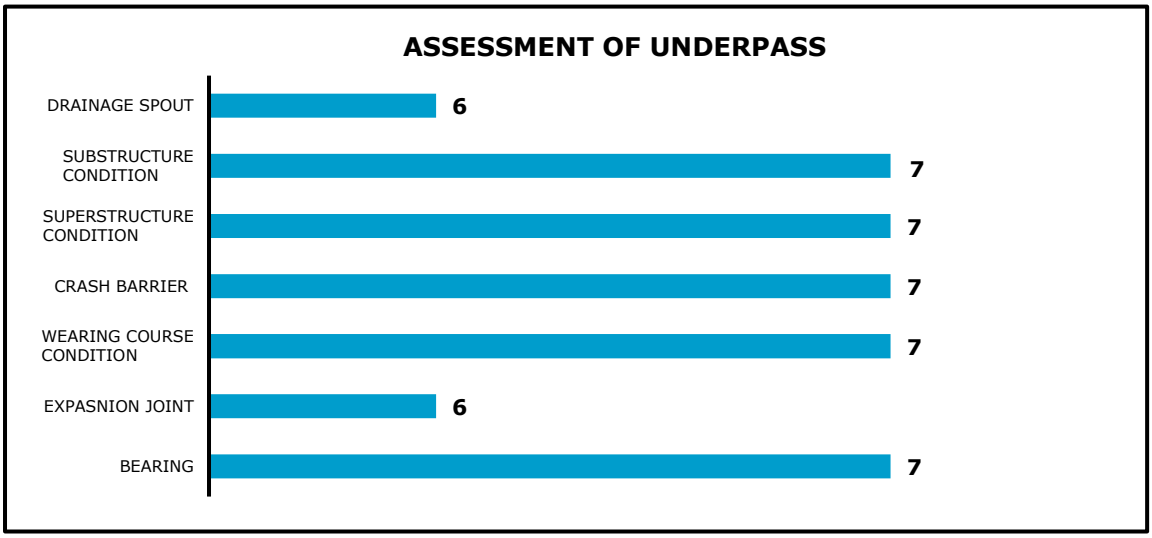


Figure 6-5: Comparative condition assessment of underpass.





VUP at Ch. 87+365



Covered expansion joint (E-1) at VUP Ch.



Repaired cracks on slab



VUP at Ch. 93+900



Repaired cracks on slab

Figure 6-6-6: Site Photographs of underpass

6.5 Culverts

There are 16 culverts along the project stretch, which includes RCC box culverts, slab culverts, and Hume pipe culverts. Visual inspection shows that the culverts are structurally satisfactory, but maintenance is needed to clear debris, vegetation blockages, and ensure proper waterway drainage.

Representative photographs of the culverts are provided below to illustrate their current condition and maintenance.

Table 6-8: Detailed distresses of culvert

S. No	Assessment
1	Additionally, during the survey, we observed that some culverts have become covered making it difficult to access them for inspection or maintenance purposes.

Table 6-9: Details List of underpasses

S.NO	Site Chainage (Km)	Structure	Location
1	86+120	SC	2X2.0
2	86+273	SC	2X2.0
3	86+489	SC	2X1.5+1X2.0
4	86+984	SC	3X1.8
5	87+267	HPC	1x0.9
6	87+817	HPC	1x0.9
7	88+398	HPC	2x0.8
8	88+798	HPC	1x0.8
9	92+634	BC	2x3
10	93+024	BC	1x2

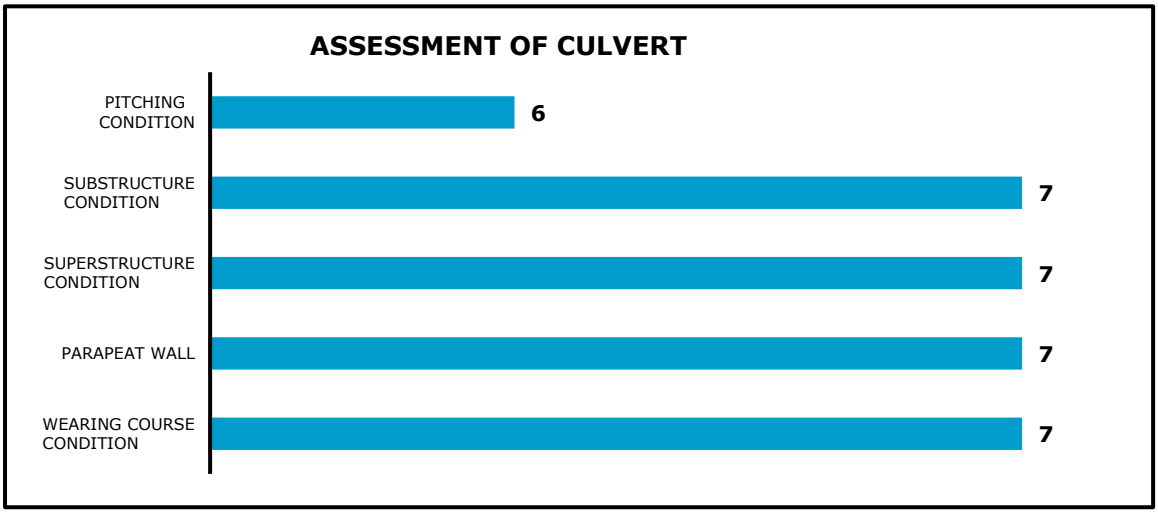


Figure 6-7: Comparative assessment of Culverts.



Box Culvert at Ch. 340+000



HPC at Ch.361+151





Box culvert at Ch.93+024

Figure 6-6-8: Site Photographs of culverts

6.6 Routine maintenance and Remedial measures

According to IRC SP 35 and IRC SP 40, routine maintenance for structures involves periodic inspections, cleaning, minor repairs, lubrication of movable parts, application of protective coatings, and updates to safety systems to ensure the ongoing integrity, performance, and safety of the structure.

Spalling of concrete, which often requires patching, is typically caused by corrosion of steel reinforcement. Honeycombing, on the other hand, occurs due to inadequate compaction of concrete during casting. While patching is a common repair method for spalled areas, it is considered a temporary solution unless all chloride-contaminated concrete is removed first.

Table 6-10: Remedial Measure

S.No.	Name of Component	Type of Distress as per IRC: SP:35 -1990	Remedial measures as per IRC: SP:40-2019	Repair Action (Required / Not Required)
1	Girders Beams, crash barrier, sub-structure and Slabs etc.	Cracking Delamination Spalling Disintegration	• Sealing of crack / porous concrete with Epoxy Grout by injection. • Applying epoxy mortar over leached, honey combed and spalled concrete surface and exposed steel reinforcement.	Required.

S.No.	Name of Component	Type of Distress as per IRC: SP:35 -1990	Remedial measures as per IRC: SP:40-2019	Repair Action (Required / Not Required)
2	Abutment, Pier Abutment caps and Pier caps	Disintegration cracks, spalling, honey combing etc.	• Crack filling, • Concrete restoration (The surface honeycomb can mitigate by removing the honeycomb part and grouting) • Structural Strengthening (Jacketing, CFRP etc.)	Required
3	Elastomeric	Damages including embrittlement of elastomer, Cracking and tearing, Displacement	• Replacement	Required.
4	Girders Beams and Slabs	Cracking (dead / dormant), spalling and damage to Concrete, Displacement, Rusting & Corrosion on steel members.	• Corrosion preventative paint • Shuttering removes • Treatment by grouting and/or filler material micro concrete.	Required.
6	Expansion Joints	Non-functioning of joints due to Clogging or wearing out and failure of anchoring system,	• Cleaning Replacement • Covered expansion joint need to be open.	Required
7	Handrails, Parapets & Crash Barriers	Damage (Spalling, Disintegration and cracking etc).	• Repair & Replacement	Required.
8	Drainage Spouts and Vest Holes	Damage and non-functioning	• Cleaning required.	Required.
9	Footpaths	Damage and non-functioning.	• Cleaning required	Required

7. ASSESSMENT OF PROJECT ASSETS - TOLL SYSTEMS

7.1 General

Technical Due Diligence of the TMS (Toll Management System), ETC (Electronic Toll Collection System) and WIM (Weigh-in-Motion) System (as available) along the Panipat Elevated Section of NH-1 in the state of Haryana is done through site visits, site surveys, interactions at site and review of documents and reports.

7.2 Project Information

Toll Plaza Km 94+100

No. of Lanes at Toll Plaza

- TP is with 20 Hybrid lanes at the toll plaza, and an additional lane constructed at the back side of the toll plaza named as POS lane thereby totalling it to 21 Hybrid ETC lanes, separate two-wheeler lanes are provided adjacent to the extra-wide lanes.

7.3 Toll System Maintenance

The TMS installation was done by M/s Kent ITS in the year 2018 and since last six years is running under AMC by the same system integrator till date for all lanes at Toll Plaza.

7.4 WIM system

Toll Plaza is installed with Slow Speed Weigh in Motion (SSWIM) systems in 18 lanes and Medium Speed Weigh in Motion (MSWIM) systems in 2 reversible lanes through M/s Vishwakarma Scales and none of them are functional, the installation date of these WIMs is not known and are recommended for replacement.

No stamping certificate present at any site for Weigh in Motion Systems installed at Toll Plaza and is in direct non-compliance to the Weight and Measurements department norms and can have legal implications.

7.5 SWB (Static Weigh Bridge)

No Static Weigh Bridge are installed at the Toll Plazas and overload penalties are not being collected.

7.6 Review and Assessment of TMS (incl. AVCC Systems)

1. TMS maintenance at the toll plaza is being done by i.e. M/s Kent ITS, for all the toll equipment with open tolling technology and is in the AMC since last 6 years.
2. Lane hardware is provided as per the industry standards however is end of life, critical components required to check the vehicle classification e.g. AVC in all lanes are getting old, the AVC and TLC panels are installed inside the tunnel and caged to prevent any unauthorized access.
3. The SS-WIMs and MS-WIMs to detect and collect overload penalty as per the government norms are not functional and all overloaded vehicles are moving through the lanes freely.
4. The network is Ethernet based and is provisioned with a backbone connectivity through OFC in parallel, this is provisioned to prevent any data loss in case the primary link from plaza to lanes becomes faulty and which will further prevent any data loss.
5. Fastag integration is done through IDFC as an Acquirer bank and ILL is established for round the clock connectivity through M/s Ishan with 25 Mbps and M/s Airtel with 14 Mbps bandwidth.

7.7 Assessment of Toll Operation and integration with TMS

The AVC is profiler based with independent storage but not sending data if the lane controller if put down for maintenance and in such cases the control room staff is completely dependent on toll collectors' input for validation of all discrepancies, Violations etc.

The LSDU i.e. Lane Status Display Unit to monitor the entire hardware of each lane is provided which is an essential part for monitoring of the toll equipment on day-to-day basis and generating all alerts.

7.8 Backoffice TMS review

a. The TMS is controlled through the control room which is housed with the validator performing real time transaction validations.

b. LSDU as stated above is working properly and equipment status / failures are well known to the shift supervisor.

c. As per the guidelines of IHMCL, the plaza server has to be installed with a hot-standby server arrangement and provided accordingly.

d. A backup server is installed separately to run daily backup sets.

e. No fake note detectors installed in the lane to detect counterfeit currency.

7.9 Conclusion

The complete TMS systems need to be replaced as the equipment is obsolete at the toll plaza.

The WIMs need replacements as none of them are found functional and information to the weights and measurements department has to be given about nonfunctional WIMs to avoid any penal action on account of no stamping done for any WIMs till date.

Figure 7-1: Typical Site Photographs of Toll Plaza & Equipment

Toll Plaza



Control Room



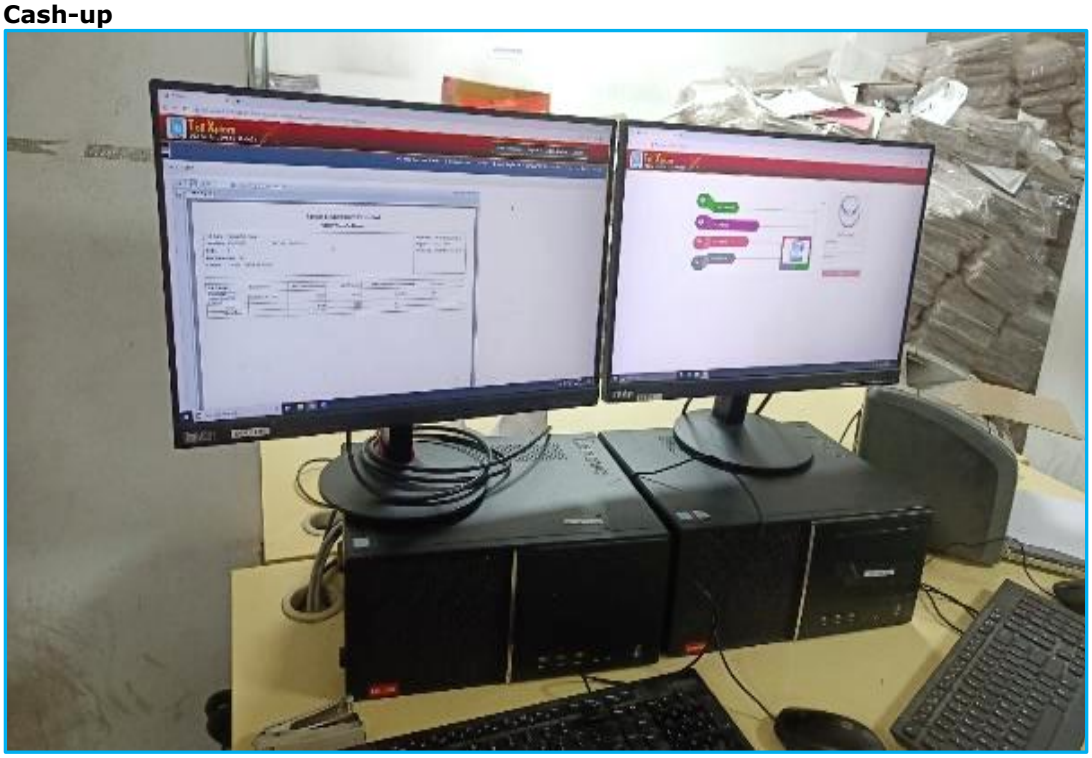


Server Room





Cash-up



Tunnel Equipment Arrangement



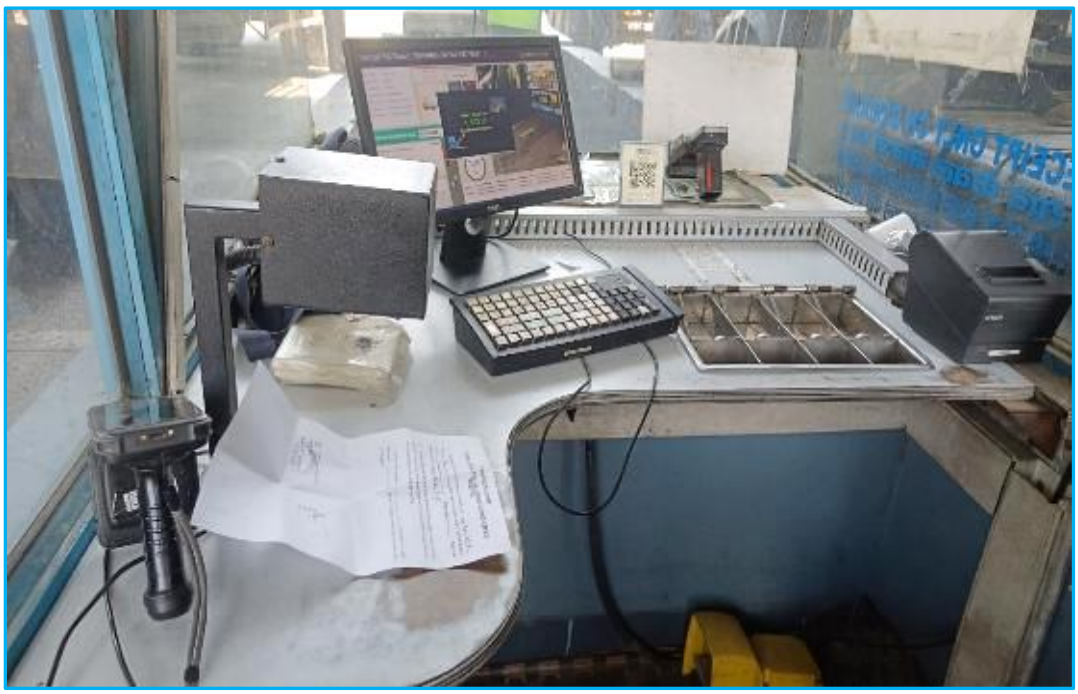
WIM Controller



Lane UPS



Equipment Installation in the Island and Toll Booth





Weigh In Motion



8. SOIL AND MATERIAL INVESTIGATION

8.1 General

As part of the soil and material investigation report, the consultants conducted tests on subgrade soils, granular layers, and bituminous layers along the project corridor to evaluate the properties and performance characteristics of the existing pavement materials.

8.2 Field Investigation – Sampling and Testing

Field investigations were carried out on the subgrade soils, and representative pavement material samples were collected for laboratory analysis. The Table 8-1 outlines the sampling methodology, the list of tests performed, and the corresponding testing protocols employed for both field and laboratory evaluations.

Table 8-1: Site sampling and testing criteria

S. No.	Type of Soil Sample	Sampling Criteria	Testing Criteria	
			Description of Test	Standard Code Applicable
Existing subgrade and pavement materials				
i)	**Subgrade Strength Test Pits**	Minimum of one subgrade soil sample was obtained at an interval directed by the client & Material Engineer based on site condition.	In-situ Density	IS 2720 (Part – 29)
			In-situ moisture content	IS 2720 (Part – 2)
			Soil Classification	IS 1498
			Sieve Analysis	IS 2720 (Part – 4)
			Atterberg Limits	IS 2720 (Part – 5)
			Laboratory Compaction Test (using heavy compaction)	IS 2720 (Part – 8)
			Field Compaction	IS 2720 (Part-29)
			4-days soaked CBR	IS 2720 (Part – 16)
			Free swell Index	IS 2720 (Part-40)
ii)	**Existing Granular Layers**	Existing granular layer materials was collected from each subgrade test pit at an interval directed by client	Gradation	MoRTH Table: 400-1 & 400-13
			Atterberg Limits	IS 2720 (Part – 5)
			Specific Gravity and Water Absorption	IS 2386 (Part – 3)
			Aggregate Impact Value (AIV)	IS 2386 (Part – 4)
iii)	**Existing Bituminous Layers**	Existing bituminous layer's material was collected through core cutting process at specific intervals as directed by the pavement engineer	Gradation	MoRTH Table: 500-10 & 500-17
			Density of core	ASTM D 2726
			Bitumen extraction	ASTM–D 2172

8.3 Subgrade Sampling and Testing

Subgrade investigations were undertaken to evaluate the strength characteristics of the in-situ soil. As outlined in Table 8-1, subgrade strength test pits were excavated at intervals determined by the client and the materials engineer, considering prevailing site conditions. A combination of in-situ and laboratory tests were conducted on the collected soil samples in accordance with the relevant standards summarized in Table 8-1.

The test results and discussion are described in the section below.

Field tests were conducted as per the project requirement to determine the subgrade characteristics and strength. The field testing for subgrade soil at each test pit includes the following,

- In-situ density determination using Core-cutter method
- Field moisture content determination using Rapid moisture meter
- In-situ CBR Determination using the Dynamic Cone Penetrometer testing

8.3.1 In-Situ CBR (Dynamic Cone Penetration Test)

Dynamic Cone Penetration tests were conducted at subgrade strength test pit locations to assess in-situ CBR on existing soil. The CBR value was calculated based on different soil layers encountered. The slope change in the graph (Penetration Vs Number of Blows) indicates the interface of two layers of different penetration resistance. From the graph, thickness of layer and slope (penetration mm/blow) were calculated. The following equation given in IRC: 37-2012 has been used to calculate the layer DCP-CBR value for each layer:

$$log_{10}\, CBR = 2.465 - 1.12 \times log_{10}(mm/blow)$$

Once the DCP-CBR calculated for each layer, the overall CBR (Weighted average) of all sub-layers will be converted into single DCP-CBR values by using Japan road association formula 1989 as given below:

$$Overall\ CBR = \left\{ \sum layer\ thickness \times (DCP - CBR)^{1/3} \Big/ \sum layer\ thickness \right\}^3$$

Dynamic Cone Penetration test results showing penetration of cone in cm and number of blows at each pit are plotted.

- A summary of the DCP-derived CBR values is provided in Table 8-2, and an illustrative bar diagram depicting the spatial variation of DCP values across the project corridor is presented in Figure 8-1

In general variations in DCP-CBR values are expected due to the influence of several site-specific factors. The penetration resistance of the DCP cone can be significantly affected by the prevailing in-situ moisture content, the presence of underlying layers beneath the subgrade, and obstructions such as boulders or tree roots. Typically, DCP-CBR values tend to increase with a reduction in in-situ moisture content, and conversely, higher moisture levels can result in lower CBR values. Additionally, if the DCP cone encounters obstructions such as stones or boulders, the measured resistance increases, leading to abnormally high CBR estimations.

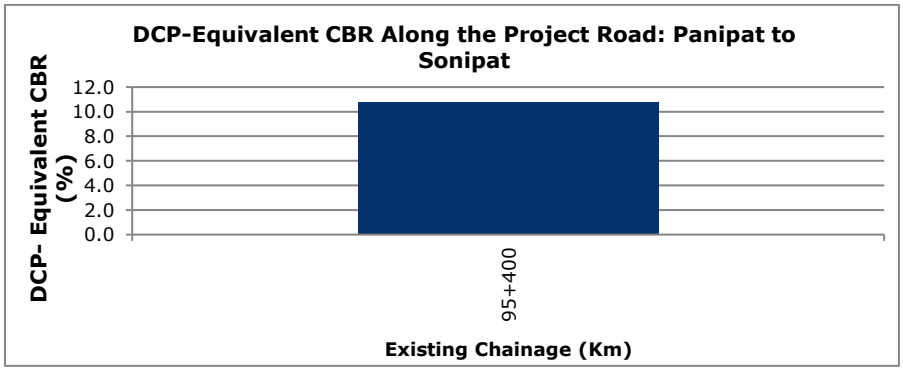


Figure 8-1:Illustrative summary of DCP-Equivalent CBR along the project corridor

8.3.2 Field Density & Moisture Content

In-situ density (field dry density) and moisture content of the subgrade were determined in accordance with the applicable standards listed in Table 8-1.

The field density measurements were utilized to assess the degree of compaction achieved in the existing subgrade, and to determine the in-situ California Bearing Ratio (CBR) under field density conditions. A consolidated summary of the field test results for the entire project corridor is presented in Table 8-2. Representative photographs of the field investigation are in Figure 8-2



Figure 8-2: Field Investigations photographs of field density and moisture

Table 8-2: Statistical summary of field tests in soil

Chainage (km)			FMC (%)	FDD (gm/cc)	DCP-CBR (%)
Road Name	From	To			
NH-44	86.000	96.000	8.0	1.92	10.8

8.3.3 Subgrade test results

Approximately 50 kg of subgrade soil samples were collected in damp-proof bags to facilitate the necessary laboratory testing. The required tests, as specified in Table 8-1 were subsequently conducted in accordance with relevant standards. A summary of the laboratory test results is presented in Table 8-3.

Table 8-3: Summary of subgrade test results-Service Road

S. No	Type of carriage way	Existing Chainage (Km.)	Side (LHS / RHS)	Soil Classification as per IS: 1498	Gravel content %	Sand content %	Clay & silt content %	Atterberg Limits [IS :2720-Pt-V]			Modified Proctor Test (IS:2720-Pt-VIII)		Field Density		4-Days Soaked CBR at MDD (%)	Free Swell Index (%)	Degree of Compaction (%)
								Liquid Limit (LL) %	Plastic Limit (PL) %	Plasticity Index (PI)	Max. dry density (gm/cc)	OMC (%)	Field Dry Density (gm/cc)	FMC (%)			
1	MCW	95+40	LHS	SM	1.6	52.7	45.7	23	NP	NP	2.01	8.8	1.92	8.0	12.3	12.5	95.5

8.3.4 Summary of Soil Test results

Soil Classification and Distribution:

From Table 8 3, it is evident that subsoil is generally consistent throughout the project road and is predominantly Sandy in nature. The Liquid Limit (LL) of this soil is 23%, and this value is within the limit as per MoRTH specifications (<50%).

The obtained maximum Plasticity Index (PI) of the subgrade soils is NP and the degree of free swell (FSI) is 12.5%. All the measured PI and FSI values are also within the acceptable limits as per MoRTH guidelines, of 25% and 50% respectively.

Strength parameters:

Variance between MDD and FDD is converted in-terms of degree of compaction. The degree of compaction along the project corridor is 95.5%. The 4-days soaked CBR along the project corridor is 12.30%.

8.4 Existing Pavement Composition

Existing pavement composition (pavement course, material type, and thickness) were recorded at an interval directed by the client & material engineer based on the site condition along the project road.

The summary of existing pavement crust thickness is presented in Table 8-4 and some of the field investigation photographs shared in the Figure 8-3, The pavement crust summary presented in an illustrative bar graph of Figure 8-4

Table 8-4: Summary of pavement crust along the project corridor

S. No.	Location (Km.)	Side (LHS/ RHS)	Pavement Composition (mm)		
			Bituminous Layer	Granular layer	Total Thickness
1	95+400	LHS	200	440	640



Figure 8-3: Pavement Crust Thickness measuring photographs

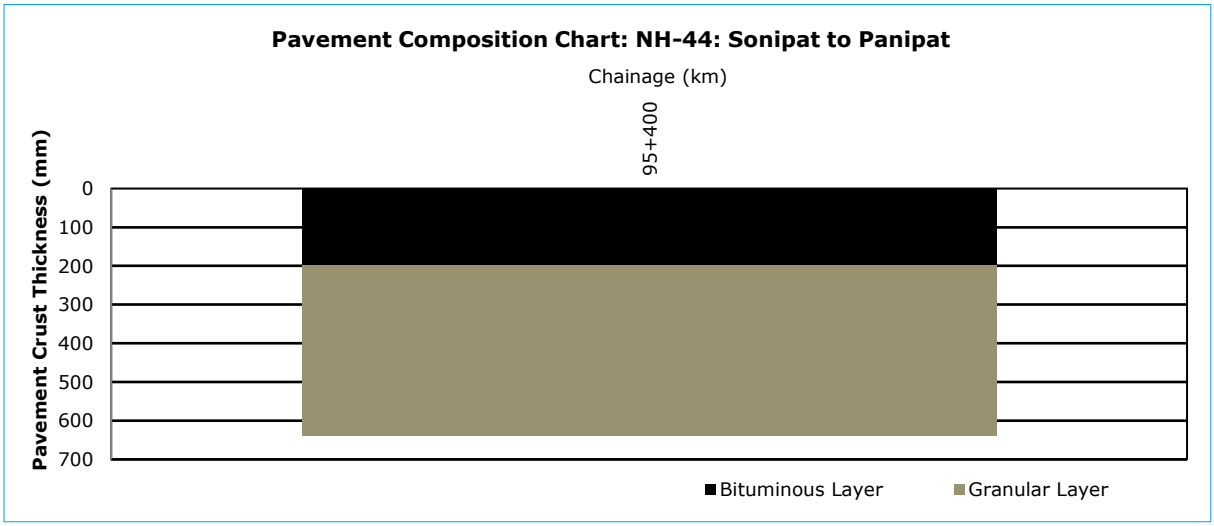


Figure 8-4: Existing pavement crust summary along the project road

8.4.1 Summary of Pavement test pit results

- The existing pavement along the project corridor is bituminous pavement. The pavement composition comprises of bituminous layer, granular layer.
- Throughout the project road it possesses consistent bituminous/ granular layer thickness of 200mm bituminous layer over the Granular course of 440mm were observed.

8.5 Existing Granular Layers Testing

Granular layer's samples were collected at an interval directed by the client & Material Engineer based on the site condition along the project road. Care has been taken to collect the appropriate granular layer like WMM/ GSB separately from the excavated test pit. Sufficient sample is collected for testing as mentioned in Table 8-1.

The granular material test results are presented in Table 8-5.

Table 8-5: Summary of Granular layers Test Results

S. No	Chainage (km)	Side (LHS/ RHS)	Type of Sample collected	Gradation Conformation as per MoRTH 5th Revision	Atterberg Limits			Specific Gravity	Water Absorption (%)	Aggregate Impact Value (%)
					Liquid Limit (LL) %	Plastic Limit (PL) %	Plasticity Index (PI)			
1	95+400	LHS	GSB	26.5mm IS sieve material finer side in GSB grade-IV	21	NP	NP	2.662	0.6	20.2

8.5.1 Summary of granular layers testing:

The existing granular layer material was tested for determination of its gradation and all other parameters. The observations are given below

- The GSB sample, is marginally finer than the permissible range defined for grade-IV.
- The LL and PI as per MoRTH Specifications.
- The Aggregate Impact Value of Granular material is within the limit (Max. 40% for GSB) as per MoRTH Specifications.

8.6 Existing Bituminous Layers Testing

Bituminous layer samples were extracted using a core cutting drilling machine with a 100 mm diameter bit to obtain representative bituminous core specimens. The locations of all core extractions

are listed in Table 8-6. Laboratory tests, as specified in Table 8-1, were conducted on the recovered bituminous cores. The corresponding test results are presented in Table 8-7. Some of the core samples extracted at site are shown in Figure 8-5.

Table 8-6: Bituminous Layers Core cutting locations

S. No	Existing Road	Location (km)	Side (LHS/ RHS)	Lane	Wheel path	Height of Core (mm)
1	MCW	NH-44	86+050	LHS	Outer	IWP
2	MCW	NH-44	88+150	RHS	Outer	IWP
3	MCW	NH-44	92+400	LHS	Inner	IWP
4	MCW	NH-44	92+700	RHS	Inner	OWP
5	MCW	NH-44	94+580	RHS	Middle	OWP
6	MCW	NH-44	95+750	LHS	Outer	OWP
7	Service Road	NH-44	88+800	LHS	Outer	OWP
8	Service Road	NH-44	93+800	RHS	Inner	OWP



Figure 8-5: Core cutting investigation photographs

Table 8-7: Summary of bituminous layers test results from core samples

S. No	Type of Carriage way	Location (Km.)	Side (LHS/ RHS)	Lane	Wheel path	Type of Material Tested	Bitumen Content (%)	Gradation Confirming to MoRTH 5th Revision
1	MCW	86+050	LHS	Outer	IWP	DBM	4.58	26.5mm IS sieve material finer side and 4.75mm, 2.36mm IS sieves material coarser side in DBM grade-I & 19.0mm IS sieve material finer side and 4.75mm, 2.36mm IS sieves material coarser side in DBM grade-II
2	MCW	88+150	RHS	Outer	IWP	DBM	4.54	26.5mm IS sieve material finer side in DBM grade-I & 19.0mm IS sieve material finer side in DBM grade-II
3	MCW	92+400	LHS	Inner	IWP	BC	5.30	13.2mm, 9.5mm IS sieves material finer side in BC grade-I
4	MCW	92+700	RHS	Inner	OWP	BC	5.25	13.2mm, 9.5mm IS sieves material finer side in BC grade-I
5	MCW	94+580	RHS	Middle	OWP	DBM	4.37	26.5mm, 13.2mm IS sieves material finer side in DBM grade-I & 19.0mm, 13.2mm IS sieves IS sieve material finer side in DBM grade-II
6	MCW	95+750	LHS	Outer	OWP	BC	4.89	13.2mm, 9.5mm IS sieves material finer side in BC grade-I
7	Service Road	88+800	LHS	Outer	OWP	BC	4.79	Not confirming to any BC gradation
8	Service Road	93+800	RHS	Inner	OWP	DBM	5.08	26.5mm IS sieve material finer side and 4.75mm, 2.36mm IS sieves material coarser side in DBM grade-I

8.6.1 Summary of Core samples testing

For Main Carriage way:

- Three BC core samples were tested for aggregate gradation and binder content. The results indicate that all samples fall slightly on the finer side of the specified limits for BC Grade-I, as per MoRTH (5th Revision) specifications.
- Similarly, five DBM core samples were tested for gradation and binder content. All samples exhibit gradation slightly finer or coarser than the specified limits for DBM Grade-I & II in accordance with MoRTH (5th Revision) specifications.

For Peripheral Road:

- One BC core sample is tested for aggregate gradation and binder content. The result indicates that, it is not confirming to specified limits for BC Gradation, as per MoRTH (5th Revision) specifications.
- Similarly, One DBM core sample is tested for gradation and binder content. The result indicates that, it is slightly finer and coarser side of DBM grade-I in accordance with MoRTH (5th Revision) specifications.

9. PAVEMENT EVALUATION STUDIES

9.1 Pavement Condition Survey with Network Survey Vehicle

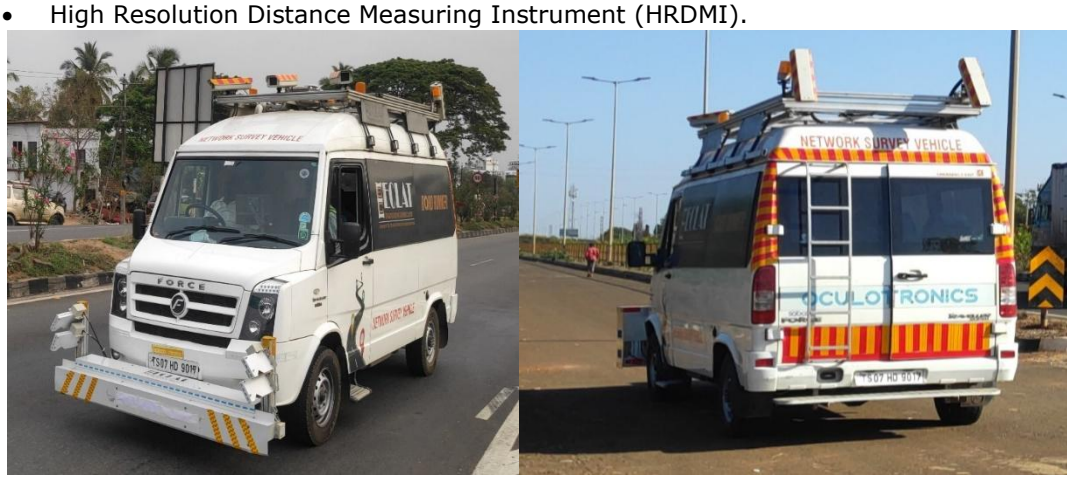
9.1.1 Network Survey Vehicle Description

Road Runner NSV was used for collection of condition data for this assignment. Road Runner (NSV) is multi-faceted road survey equipment which could be configured to collect a wide range of pavement condition data and asset data.

Road Runner NSV is capable of collecting roughness, rutting, pavement distresses, assets along with GPS coordinates and project chainage.

The main components which are integrated into Road Runner NSV are

- Digital Laser Profilers (DLP) -Road roughness and rutting.
- Digital Imaging System (DIS) -Pavement distresses and road assets data.
- Differential Global Positioning System (DGPS).
- High Resolution Distance Measuring Instrument (HRDMI).



1. Digital Laser Profiler (DLP)

- DLP is integrated into the NSV consisting of 11 lasers to collect Road Roughness and Rutting.
- This inertial profiler is capable of recording the data continuously along each wheel path.

a) Roughness

Road Runner NSV equipment fitted with dual wheel path laser profilometer to collect the roughness data. The roughness data was collected and reported for 100 m interval.

The outputs of the lasers and accelerometers located in each wheel path (750 mm either side of the Centre line of the vehicle) are sampled every 25 mm of longitudinal travel and used to calculate the longitudinal profile of the road.

The profile is then passed through the quarter car model to calculate the International Roughness Index (IRI) lane roughness as per the methodologies specified in the ASTM E-950.

b) Rutting

Rutting will be measured and reported through DLP, and the data will be recorded at every 100m interval on both the wheel paths.

2. Digital Imaging System (DIS)

Digital Imaging System (DIS) in Network Survey Vehicle (NSV) consist of 5 high resolution roof mounted cameras to capture pavement distresses and road assets data. These cameras are oriented in a certain configuration to ensure that the information of interest, such as inventory or pavement

condition, is being recorded in the camera field of view. Three cameras are forward facing and mounted on front side of vehicle (Left corner, Centre and Right corner), covers 160o angle images and are set to sample at every 10m interval. Another two cameras are mounted on back side of the vehicle (Left corner, Right corner) to capture the distress image of pavement 10m*4m (length*width) i.e., captures at 10m interval.

Digital image system is capable of

- Collecting real time digital images.
- Achieving a sampling rate of at least one set per 2.5 meters for Distress camera's and one set per 10 meters for Asset cameras.
- Incorporating real time differentially corrected GPS (DGPS).
- Capturing & recording at highway speeds.
- Providing real time on-screen displays for operator verification during collection.
- Storing images straight to PC's / NAS (Network Attached Storage).
- Linking into the client's referencing system via distance and GPS.

3. Geo Referencing (DGPS Data)

The Road Runner NSV is equipped with a Differential GPS (DGPS) system, enabling accurate geo-referencing of collected data. All pavement condition data and images are captured along with corresponding spatial coordinates. Each image is tagged with precise latitude and longitude values, allowing direct referencing and correlation with specific locations on the roadway.

4. Distance Measuring Instrument (DMI)

Road Runner NSV is equipped with DMI, and it is fitted to rear tyre of the network survey vehicle.





The distance and speed measurement performed by the distance measuring instrument, which is a distance transducer and it's highly accurate providing GPS distance and speed.

Methodology for NSV Field Testing

Usually, 4 members are assigned for site to collect the field data. Two of the trained/ experienced field engineers and two drivers during the collection phases of projects. During the survey, engineer is responsible for operating the vehicle's acquisition systems. Road Runner NSV dashboard tool is used to for data acquisition.

The survey will be carried out by lane wise, and the following steps will be followed during the survey;

- Engineer will setup the equipment and check the data collection system prior to the survey.
- Prior to the survey field engineer do set the project name, direction, lane number and starting chainage with increasing or decreasing (as per direction) details.

- The vehicle will run in middle of the lane and collects data up to a vehicle running speed of 80 Kmph.
- Digital Laser Profiler (DLP), Digital Imaging System (DIS) collect the data with GPS co-ordinates and chainage reference.
- Field Engineer will review the data collection and specifies any remarks/ details in observation column.
- At the end of project chainage, engineer will stop that particular survey and save all the recorded and the same process is followed for all other lanes of the project stretch.



9.2 Analysis of NSV Survey Data

Pavement condition survey was carried out on each lane of each carriage way with NSV. The NSV survey was conducted on the project corridor from 25/05/2025 to 26/05/2025, data was processed, analyzed and presented in 100m interval. Summary of NSV data is presented below.

9.2.1 Roughness

As stated in the earlier section, NSV collected the roughness data at 100m interval on each lane in terms of IRI (International Roughness Index) value.

In Indian context, the IRI values were converted to RI as per IRC: SP:16-2019 "Guidelines on Measuring Road Roughness and Norms" with the following equation.

$$RI = 630*(IRI)^{\wedge 1.12}$$

Where,

RI = Roughness in mm/km

IRI = International Roughness Index.

Roughness data of the pavement is collected through Digital Laser Profilers System (DLP) for each section of the Main Carriageway (MCW) and Peripheral Roads.

MCW:
The obtained lane-wise kilometer roughness summary, expressed in terms of RI (mm/km) is presented in Table 9-1 and Table 9-2. The corresponding graphical representations for the LHS and RHS directions are illustrated in Figure 9-1 and Figure 9-2, respectively.

PERIPHERAL ROADS:
The obtained lane-wise kilometer roughness summary, expressed in terms of RI (mm/km) is presented in Table 9-3 and Table 9-4. The corresponding graphical representations for the LHS and RHS directions are illustrated in Figure 9-3 and Figure 9-4, respectively.

Table 9-1: Summary of MCW roughness data on LHS direction

Chainage (km)		LHS Direction			
		Avg. RI (mm/km)			
From	To	Outer Lane	Middle Lane	Inner Lane	Average
86.000	87.000	2056.1	1901.6	1745.8	1901.2
87.000	88.000	2170.9	2109.0	2137.8	2139.2
88.000	89.000	2181.5	2352.1	2306.8	2280.1
89.000	90.000	2612.9	2830.8	2682.6	2708.7
90.000	91.000	2529.7	2652.0	2873.3	2685.0
91.000	92.000	2818.7	2618.5	2806.8	2748.0
92.000	93.000	1980.8	1798.6	1582.2	1787.2
93.000	94.000	1997.2	2169.0	1918.7	2028.3
94.000	95.000	1778.6	1914.7	1393.4	1695.6
95.000	96.000	2208.9	2210.0	2196.1	2205.0

Table 9-2: Summary of MCW roughness data on RHS direction

Chainage (km)		RHS Direction			
		Avg. BI (mm/km)			
From	To	Outer Lane	Middle Lane	Inner Lane	Average
96.000	95.000	2226.9	2335.5	2235.5	2266.0
95.000	94.000	2106.6	2304.6	2016.7	2142.7
94.000	93.000	2020.4	2414.5	2341.7	2258.8
93.000	92.000	2023.5	2358.2	2286.4	2222.7
92.000	91.000	3036.7	2670.6	2809.4	2838.9
91.000	90.000	2822.3	2805.2	3008.3	2878.6
90.000	89.000	2735.1	3024.3	2903.4	2887.6
89.000	88.000	2102.3	2250.5	2327.1	2226.7
88.000	87.000	2308.2	2408.8	2536.1	2417.7
87.000	86.000	1843.2	2133.8	2268.9	2082.0

Table 9-3: Summary of Peripheral Road roughness data on LHS Direction

Chainage (km)		LHS Direction		
		Avg. BI (mm/km)		
From	To	Outer Lane	Inner Lane	Average
86.000	87.000	2022.0	2292.7	2157.3
87.000	88.000	1908.4	1872.6	1890.5
88.000	89.000	1990.8	2018.3	2004.6
89.000	90.000	2104.5	2093.5	2099.0
90.000	91.000	2456.2	2412.3	2434.2
91.000	92.000	2069.4	2057.5	2063.5
92.000	93.000	1915.9	1927.4	1921.6
93.000	94.000	1810.2	1735.0	1772.6
94.000	95.000	1784.9	1705.8	1745.4
95.000	96.000	2108.6	1790.9	1949.8

Table 9-4: Summary of Peripheral Road roughness data on RHS Direction

Chainage (km)		RHS Direction		
		Avg. BI (mm/km)		
From	To	Outer Lane	Inner Lane	Average
96.000	95.000	2009.0	2018.5	2013.8
95.000	94.000	1682.4	1763.8	1723.1
94.000	93.000	1666.0	1757.9	1712.0
93.000	92.000	1755.1	1711.7	1733.4
92.000	91.000	1994.0	1983.6	1988.8
91.000	90.000	2038.7	2004.5	2021.6
90.000	89.000	2419.0	2435.2	2427.1
89.000	88.000	2219.8	2127.4	2173.6
88.000	87.000	2272.5	1874.1	2073.3
87.000	86.000	2060.4	1786.1	1923.2

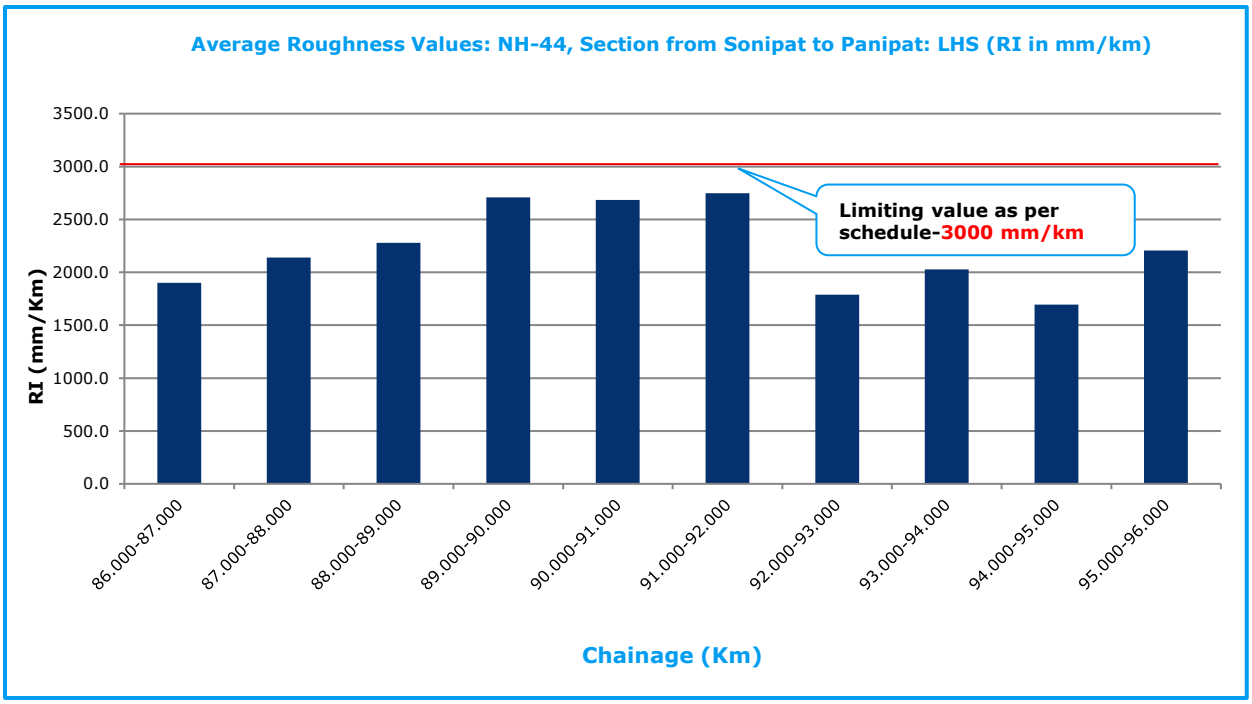


Figure 9-1: Illustrative summary of MCW roughness on LHS direction

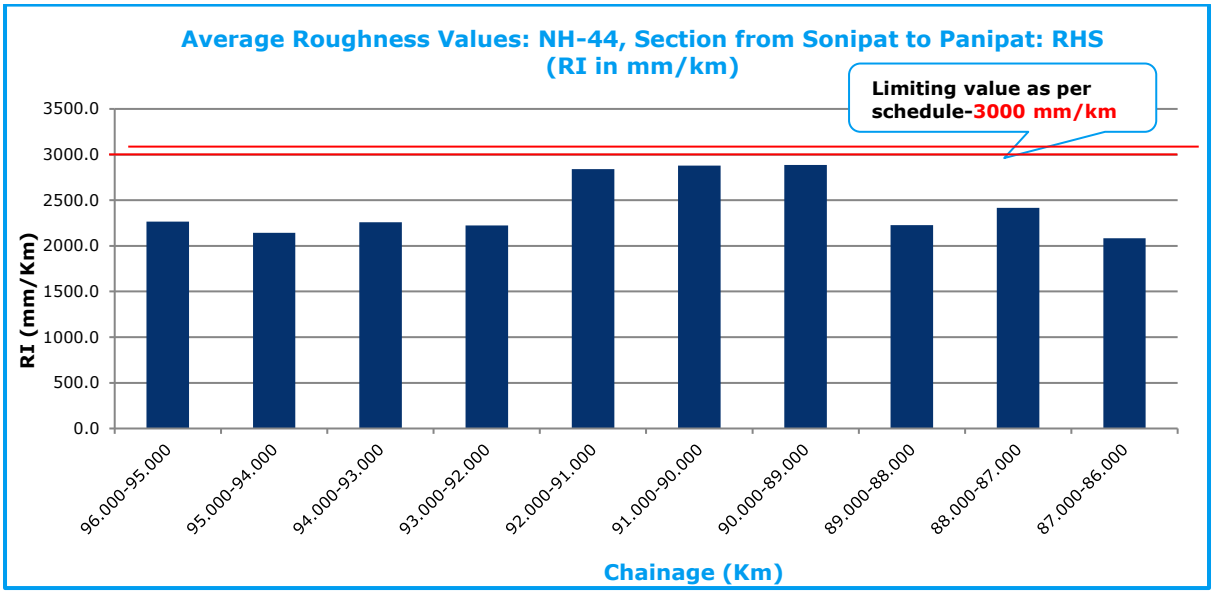


Figure 9-2: Illustrative summary of MCW roughness on RHS direction

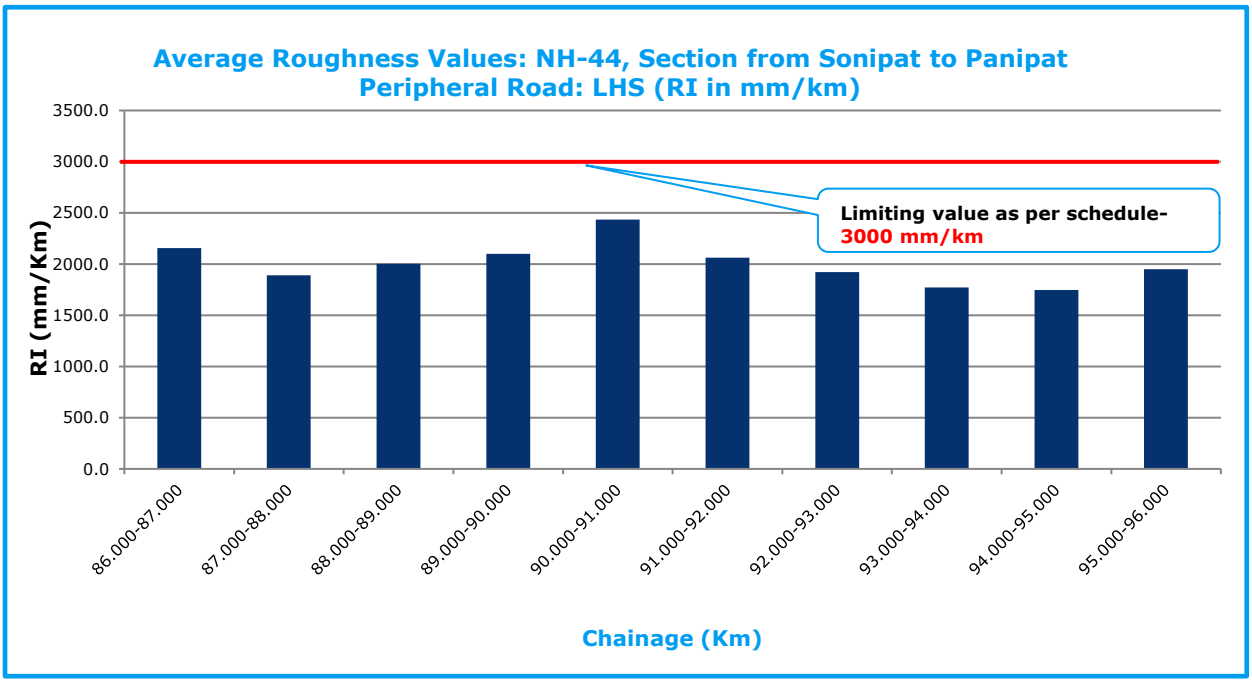


Figure 9-3: Illustrative summary of Peripheral Road roughness on LHS direction

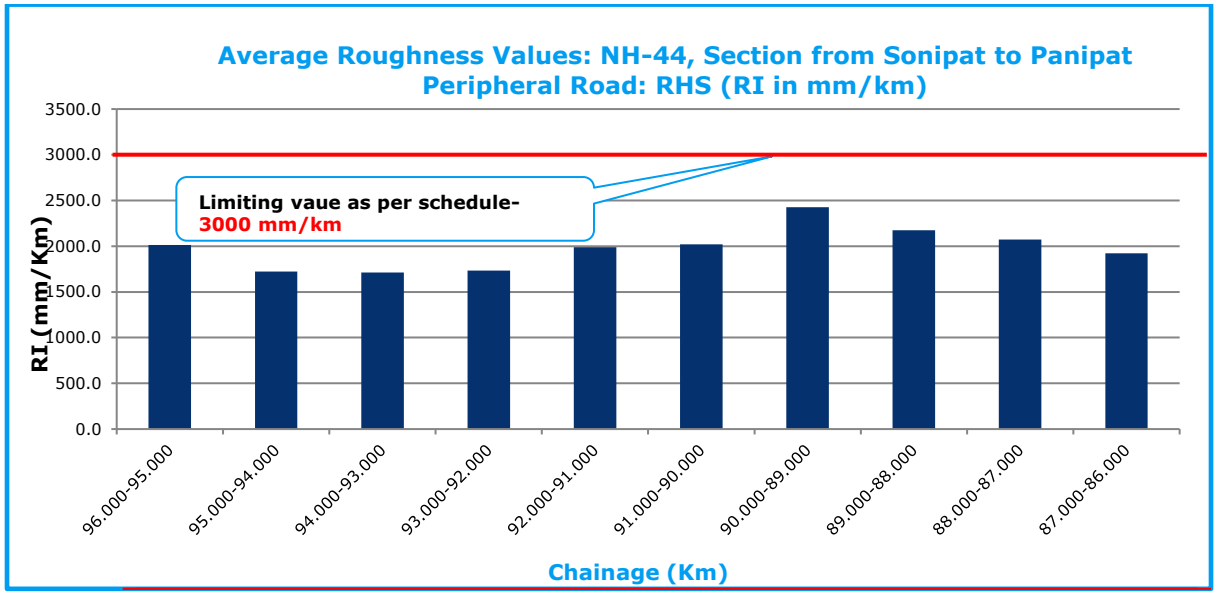


Figure 9-4: Illustrative summary of Peripheral Road roughness on RHS direction

9.2.2 Rutting

Rutting data of flexible pavement section is collected through digital laser profilers' system.

The obtained lane wise rutting summary is presented in Table 9-5 & Table 9-6 for both MCW & Peripheral Roads. The graphical representation of rutting data is presented in Figure 9-5 & Figure 9-6 for MCW & Peripheral Roads.

Table 9-5: Summary of MCW rutting data on both directions

Summary of Rutting Analysis of LHS & RHS direction													
Distress	Depth (in mm)	Length of the Road Effected with Rutting											
		LHS (Length in Km)			LHS (Length in %)			RHS (Length in Km)			RHS (Length in %)		
		Outer Lane	Middle Lane	Inner Lane	Outer Lane	Middle Lane	Inner Lane	Outer Lane	Middle Lane	Inner Lane	Outer Lane	Middle Lane	Inner Lane
Rutting	< 5 mm	9.650	9.150	9.330	100.0%	94.8%	97.9%	9.550	8.950	8.950	100.0%	92.7%	92.7%
	5- 10 mm	0.000	0.500	0.200	0.0%	5.2%	2.1%	0.000	0.700	0.700	0.0%	7.3%	7.3%
	> 10 mm	0.000	0.000	0.000	0.0%	0.0%	0.0%	0.000	0.000	0.000	0.0%	0.0%	0.0%
Total Length surveyed (in km)		9.650	9.650	9.530	100.0%	100.0%	100.0%	9.550	9.650	9.650	100.0%	100.0%	100.0%

Table 9-6: Summary of Peripheral Roads rutting data on both directions

Summary of Rutting Analysis of LHS & RHS direction									
Distress	Depth (in mm)	Length of the Road Effected with Rutting							
		LHS (Length in Km)		LHS (Length in %)		RHS (Length in Km)		RHS (Length in %)	
		Outer Lane	Inner Lane	Outer Lane	Inner Lane	Outer Lane	Inner Lane	Outer Lane	Inner Lane
Rutting	< 5 mm	9.450	9.650	100.0%	100.0%	9.620	9.550	100.0%	99.0%

Summary of Rutting Analysis of LHS & RHS direction									
Distress	Depth (in mm)	Length of the Road Effected with Rutting							
		LHS (Length in Km)		LHS (Length in %)		RHS (Length in Km)		RHS (Length in %)	
		Outer Lane	Inner Lane	Outer Lane	Inner Lane	Outer Lane	Inner Lane	Outer Lane	Inner Lane
	5- 10 mm	0.000	0.000	0.0%	0.0%	0.000	0.100	0.0%	1.0%
	> 10 mm	0.000	0.000	0.0%	0.0%	0.000	0.000	0.0%	0.0%
Total Length surveyed (in km)		9.450	9.650	100.0%	100.0%	9.620	9.650	100.0%	100.0%

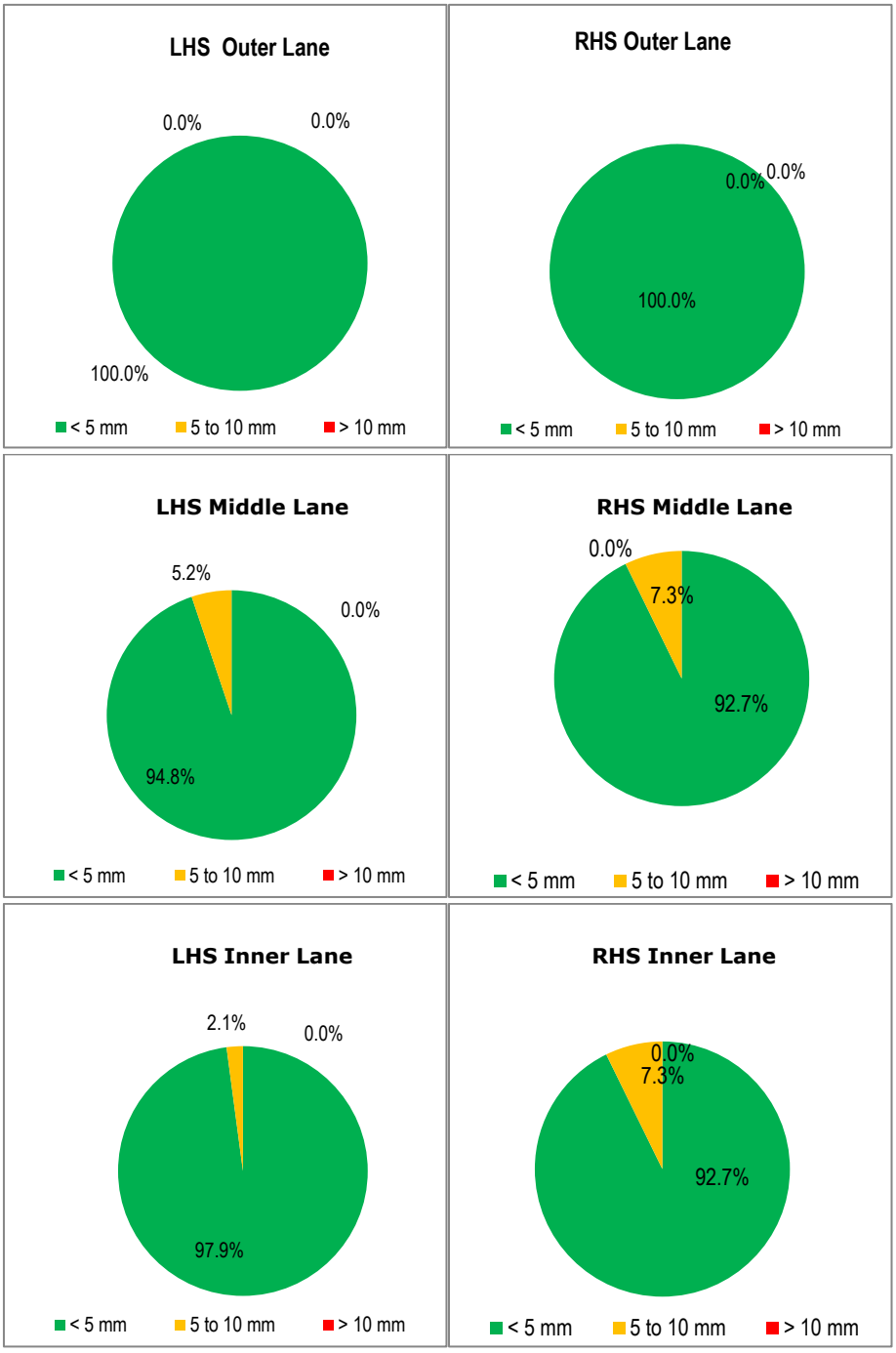


Figure 9-5: Illustrative summary of MCW rutting

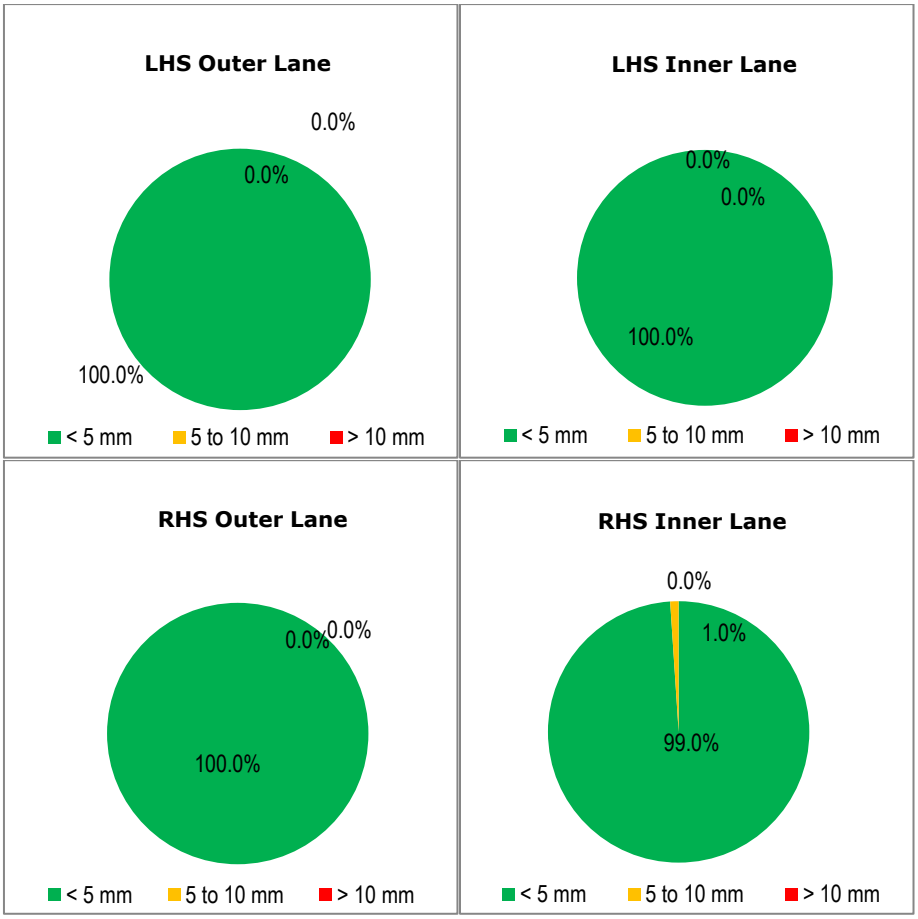


Figure 9-6: Illustrative summary of Peripheral rutting

Observations:

The desirable limit for rutting is not more than 10 mm

- In Main Carriageway (MCW) and Peripheral roads, the rutting values were within the desirable limit.

9.2.3 Pavement distress data of Flexible Pavement

The NSV software processes the collected data and automatically geotags each image and measurement with the corresponding GPS coordinates and chainage. It further classifies pavement distresses by type, location, magnitude, and severity, enabling precise mapping and assessment of roadway conditions.

Pavement distress data of Flexible pavement- Main carriageway and Peripheral Roads

The following Pavement distresses are considered for assessing the flexible pavement condition as per IRC: 82-2023 "Code of Practice for Maintenance of Bituminous Road Surfaces".

- Cracking
  - Longitudinal cracks
  - Transverse cracks
  - Alligator cracks/ Crocodile cracks
  - Multiple cracks
- Ravelling

- Shoving
- Bleeding
- Slippage/ Delamination
- Potholes
    - Area: Surface Area of the Pothole.
    - Numbers
- Edge break
- Patching
- Settlements, Depressions

All the above pavement distress will be provided at 100 m interval.

The detailed pavement condition analysis and distress rating is carried out as per Table 5.1 given in IRC 82:2023. The pavement distress summary is presented in Table 9-5 & Table 9-6 for both MCW & Peripheral Roads respectively. Site investigated photographs shown in Figure 9-7

Table 9-7: Summary of MCW Flexible pavement distresses

Distress	Severity (% of Area)	% Length of the Road Effected			% Length of the Road Effected		
		LHS			RHS		
		Inner Lane	Middle Lane	Outer Lane	Inner Lane	Middle Lane	Outer Lane
		Length in %	Length in %	Length in %	Length in %	Length in %	Length in %
Cracking	< 5%	29.38	28.50	70.47	33.16	16.58	64.40
	5% to 10%	19.83	18.65	17.10	31.61	17.62	20.52
	> 10%	50.79	52.85	12.44	35.23	65.80	15.08
Ravelling	< 1%	100.00	100.00	100.00	100.00	100.00	100.00
	1% to 10%	0.00	0.00	0.00	0.00	0.00	0.00
	> 10%	0.00	0.00	0.00	0.00	0.00	0.00
Potholes	Nil	100.00	100.00	100.00	100.00	100.00	100.00
	1 to 2	0.00	0.00	0.00	0.00	0.00	0.00
	>2	0.00	0.00	0.00	0.00	0.00	0.00
Patching	< 1%	96.85	94.82	100.00	97.93	97.93	97.91
	1% to 10%	3.15	5.18	0.00	2.07	2.07	2.09
	> 10%	0.00	0.00	0.00	0.00	0.00	0.00
Rut depth	< 5	97.90	94.82	96.89	92.75	92.75	100.00
	5 to 10	2.10	5.18	3.11	7.25	7.25	0.00
	> 10	0.00	0.00	0.00	0.00	0.00	0.00
IRI	< 2.55	34.94	20.73	100.00	5.18	4.66	20.42
	2.55 to 3.3	23.08	37.31	0.00	38.86	36.27	29.32
	> 3.3	41.97	41.97	0.00	55.96	59.07	50.26

Table 9-8: Summary of PERIPHERAL roads Flexible pavement distresses

Distress	Severity (% of Area)	% Length of the Road Effected		% Length of the Road Effected	
		LHS		RHS	
		Inner Lane	Outer Lane	Inner Lane	Outer Lane
		Length in %	Length in %	Length in %	Length in %
Cracking	< 5%	87.56	97.88	68.91	94.28
	5% to 10%	6.22	0.00	20.73	4.16
	> 10%	6.22	2.12	10.36	1.56
Ravelling	< 1%	100.00	100.00	100.00	98.96
	1% to 10%	0.00	0.00	0.00	1.04
	> 10%	0.00	0.00	0.00	0.00
Potholes	Nil	100.00	100.00	100.00	100.00
	1 to 2	0.00	0.00	0.00	0.00
	>2	0.00	0.00	0.00	0.00
Patching	< 1%	100.00	100.00	98.96	97.19
	1% to 10%	0.00	0.00	1.04	2.81
	> 10%	0.00	0.00	0.00	0.00
Rut depth	< 5	100.00	100.00	98.96	100.00
	5 to 10	0.00	0.00	1.04	0.00
	> 10	0.00	0.00	0.00	0.00
IRI	< 2.55	32.12	25.93	33.68	24.95
	2.55 to 3.3	52.33	58.20	52.85	60.50
	> 3.3	15.54	15.87	13.47	14.55

9.2.4 Pavement distress data of Rigid Pavement (Toll Plaza)

The following Pavement distresses are considered for assessing the rigid pavement condition as per IRC SP: 83-2018 (Guidelines for Maintenance, Repair and Rehabilitation of Cement concrete pavements);

- Cracking
  - Longitudinal cracks
  - Transverse cracks/ Diagonal Cracks
  - Corner cracks/ Corner breaks
  - Multiple cracks
- Spalling of Joints
- Joint seal defects
- Joint Faulting/ Stepping
- Joint Separation
- Blow up/ Buckling
- Ravelling/ Scaling
- Potholes/ Pop outs

All the above pavement distresses will be provided at 10 m interval.

The existing distresses are measured in five level distress rating system as specified in IRC: SP: 83-2018. The five-level distress rating system is given in Table 9-9 below.

Table 9-9: Five-level distress rating system for the Rigid Pavement

Distress Rating	Slab Condition	Severity (Defects) Rating
0	Excellent	No Discernible

1	Very Good	Minor
2	Good/Average	Moderate
3	Fair	Major
4	Poor	Extreme
5	Very Poor	Unsafe/ Unserviceable

The condition survey of the rigid pavement was carried out by observing all the listed distresses as specified in IRC: SP: 83-2018 in conformity with proforma given code. Type of distresses and assessment rating as given in Table 4.5 of IRC: SP: 83-2018 is followed and the same is listed in Table 9-10 below. The rigid pavement investigation pictures presented in Figure 9-9

Table 9-10: Type of distresses and its assessment rating

S. No	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating
1	**CRACKING**			
	Single Discrete Cracks Not interaction with Any joint	w=width of crack L=length of crack d=depth of crack D=depth of slab	0	Nil, not discernible
			1	w<0.2 mm, hair cracks
			2	w= 0.2 -0.5 mm, discernible from slow-moving car
			3	w=0.5-1.5 mm, discernible from fast-moving car
			4	w=1.5-3.00 mm
			5	w>3 mm
2	Single Transverse (or Diagonal) Crack intersecting with one or more joints	w=width of crack L=length of crack d=depth of crack D=depth of slab	0	Nil, not discernible
			1	w<0.2 mm, hair cracks
			2	w=0.2 -0.5 mm, discernible from slow vehicle
			3	w=0.5-3.0 mm, discernible from fast vehicle
			4	w=3.0-6.0 mm
			5	w>6mm, usually associated with spalling, and/or slab rocking under traffic
3	Single Longitudinal Crack intersecting with one or more joints	w=width of crack L=length of crack d=depth of crack D=depth of slab	0	Nil, not discernible
			1	w<0.5 mm, discernible from slow vehicle
			2	w= 0.5 -3.0 mm. discernible from fast vehicle
			3	w=3.0-6.0 mm
			4	w=6.0-12. mm
			5	w>12mm, usually associated with spalling, and/or slab rocking under traffic
4	Multiple Cracks Intersecting with one or more joints or cracks	w=width of crack	0	Nil, not discernible
			1	w<0.2 mm, hair cracks
			2	w=0.2 - 0.5 mm, discernible from slow vehicle
			3	w=0.5-3.0 mm, discernible from fast vehicle
			4	w=3.0 - 6.0 mm panel broken into 2 or 3 pieces
			5	w > 6 mm and/or panel broken into more than 4 pieces

S. No	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating
5	Corner Break	w=width of crack L=length of crack	0	Nil, not discernible
			1	w<0.5 mm only one corner broken
			2	w< 1.5 mm, L<0.6 m, only one corner broken
			3	w< 1.5 mm. L <0.6 m, two corners broken
			4	w>1.5 mm, L >0.6 m, or Three corners broken
			5	Three or four corners broken
6	Punchout (Applicable to CRCP only)	w=width of crack L=length (m/m^2)	0	Nil, not discernible
			1	w< 0.5 mm; L< 3 m/m^2
			2	either w>0.5 mm or L<3 m/m^2
			3	w> 1.5 mm and L< 3 m/m^2
			4	w>3 mm, L<3 m/m^2 and deformation
			5	w>3 mm, L>3 m/m^2 and deformation
7	**SURFACE DEFECTS**			
	Ravelling or Honeycomb type surface	r= area damaged surface / total surface of slab (%) h=maximum depth of damage	0	Nil, not discernible
			1	r < 2 %
			2	r =2-10%
			3	r=10-25%
			4	r=25-50%
			5	r >50% and h>25 mm
8	Scaling	r= area damaged surface / total surface of slab (%) h=maximum depth of damage	0	Nil, not discernible
			1	r < 2 %
			2	r =2-10%
			3	r=10-20%
			4	r=20-30%
			5	r >30% and h>25 mm
9	Polished Surface/ Glazing	t=texture depth sand patch test	0	
			1	t > 1mm
			2	t=1-0.6 mm
			3	t=0.6-0.3 mm
			4	t=0.3-0.1 mm
			5	t<0.1 mm
10	Pop out (small Hole), Pothole Refer Para 8.4	n=number/m2 d=diameter h= maximum depth		
			0	d<50 mm; h<25 mm; n <1 per 5 m^2
			1	d=50-100 mm: h<50 mm: n<1 per 5 m^2
			2	d=50-100 mm: h>50 mm: n<1 per 5 m^2
			3	d=100-300 mm: h<100 mm: n<1 per 5 m^2

S. No	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating
			4	d=100-300 mm: h>100 mm: n<1 per 5 m^2
			5	d>300 mm: h>100 mm: n>1 per 5 m^2
	JOINT DEFECTS			
11	Joint Seal Defects	Loss or damage L=Length as % total joint length	0	Difficult to discern.
			1	Discernible, L<25% but of little immediate consequence eighth regard to ingress of water or trapping incompressible material.
			3	Notable, L>25% insufficient protection against ingress of water and trapping in incompressible material.
			5	Severe; w>3 mm negligible protection against ingress of water and trapping in incompressible material.
12	Spalling of Joints	w= width on either side of the joint L= Length as % total joint length		
			0	Nil, not discernible
			1	w<10 mm
			2	w=10-20 mm, L<25%
			3	w=20-40 mm, L >25%
			4	w=40-80mm, L >25%
			5	w>80mm, and L>25%
13	Faulting (or stepping) in Cracks or Joints	f=difference of level	0	Not discernible, f< 1 mm
			1	f< 3 mm
			2	f=3-6 mm
			3	f=6-12 mm
			4	f=12-18 mm
			5	f>18 mm
14	Blow up or buckling	h=vertical displacement from normal profile	0	Nil, not discernible
			1	h< 6 mm
			2	h=6-12 mm
			3	h=12-25 mm
			4	h>25 mm
			5	shattered slabs, i.e., 4 or more pieces
15	Depression	h= negative vertical displacement from profile L= Length		
			0	Nil, not discernible, h<5 mm
			1	h=5-15 mm
			2	h=15-30 mm. Nos < 20% joints
			3	h=30-50 mm
			4	h>50mm or >20% joints
			5	h>100 mm
16	Heave		0	Nil, not discernible, h<5 mm

S. No	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating
		h= positive vertical displacement from profile L= Length	1	h=5-15 mm
			2	h=15-30 mm. Nos < 20% joints
			3	h=30-50 mm
			4	h>50 mm or >20% joints
			5	h>100 mm
17	Bump	h=vertical displacement from normal profile	0	h<4 mm
			1	h=4-7 mm
			3	h= 7 - 15 mm
			5	h>15 mm
			0	Nil, not discernible f<5 mm
18	Lane to Shoulder Dropoff	f=difference of level	1	f=3-10 mm
			2	f=10-25 mm.
			3	f=25-50 mm
			4	f=50-75 mm
			5	f >75 mm
19	**DRAINAGE**			
	Pumping	quantity of fines and water expelled through open joints and cracks Nos/ 100 m stretch	0	Not discernible
			1 to 2	slight / occasional Nos <10%
			3 to 4	appreciable / Frequent 10-25%
			5	Abundant, crack development>25%
20	Ponding	Ponding on slabs due to blockage of drains	0-2	No discernible problem
			3 to 4	Blockages observed in drains, but water flowing
			5	Ponding, accumulation of water observed

The rigid pavement condition summary of each section in lane wise is presented from Table 9-11.

Table 9-11: Rigid Pavement Distress Summary (Toll Plaza):

Rigid Distress Summary			
Distress	**Unit**	**Toll LHS**	**Toll RHS**
Single discrete Cracks	Rm.	0.000	0.000
Transverse Cracks	Rm.	0.000	1.750
Longitudinal Cracks	Rm.	10.000	0.000
Multiple Cracks	Rm.	0.000	15.750
Corner Cracks	Rm.	4.000	0.750
Joint Seal Defects	Rm.	21.500	41.000
Joint Separation	Rm.	0.000	0.000

Joint Spalling	Rm.	6.000	1.750
Ravelling/ Scaling	Sq.m	0.000	6.500
Pothole	Sq.m	0.000	0.000

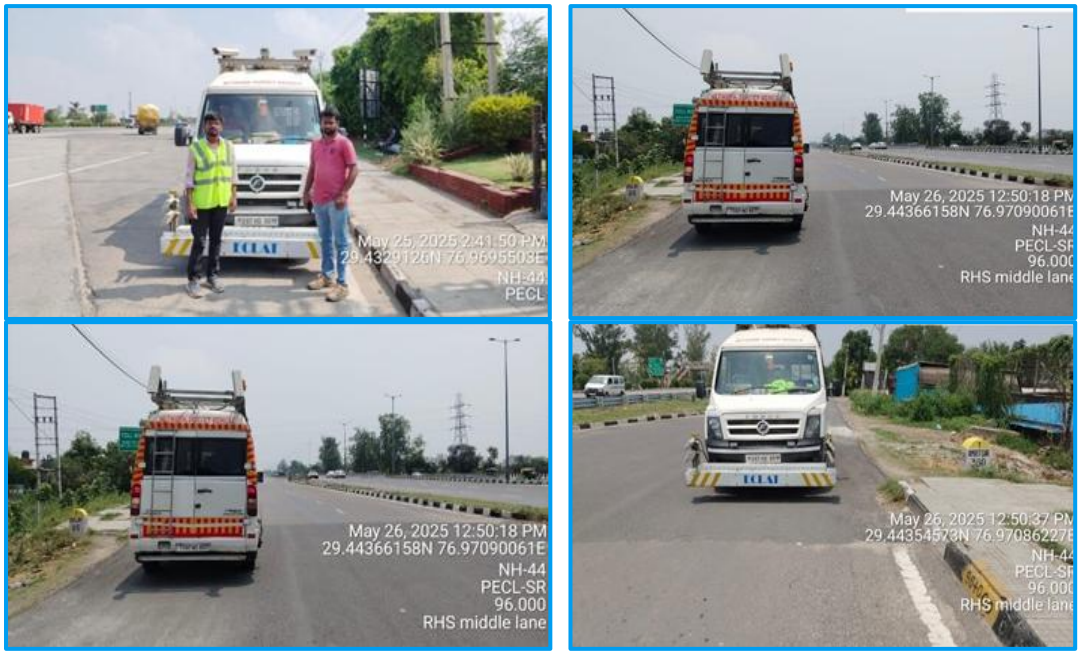


Figure 9-7:Field testing photographs captured during the NSV survey

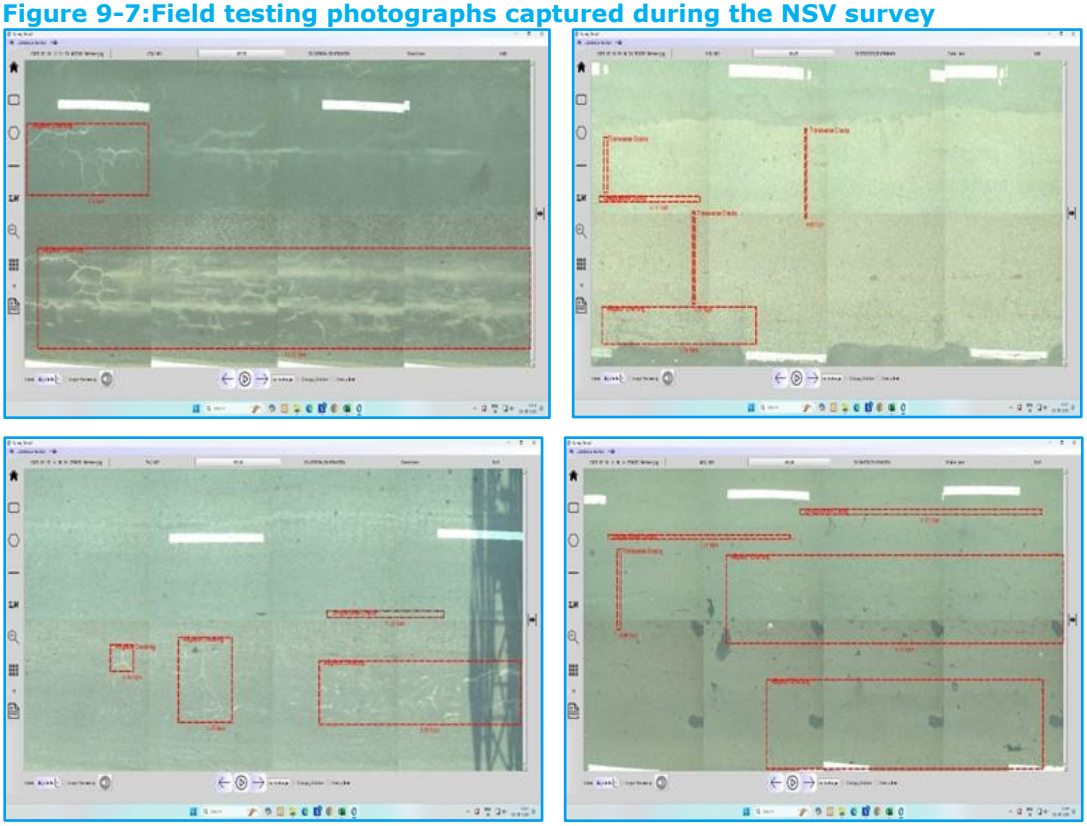


Figure 9-8:Distress Mapping Photographs- Flexible Pavement



Figure 9-9:Investigation Photographs- Rigid Pavement (Toll Plaza)Investigation Photographs- Rigid Pavement (Toll Plaza)



9.3 Structural Evaluation of Flexible Pavement by Using FWD

9.3.1 Equipment Description and Test Methodology

Principle of Pavement Evaluation Using FWD

Performance of flexible pavements can be evaluated by applying loads on the pavements that simulate the actual traffic loading conditions, The recording of such responses is made by measuring the elastic deflection under such loads. The collected deflection data from survey is duly analysed considering the factors influencing the performance of pavement such as subgrade strength, thickness and quality of each of the pavement layers, drainage conditions, pavement surface temperature etc.

Among the equipment available for structural evaluation of pavements, the Falling Weight Deflectometer (FWD) is extensively used world-wide because it simulates, to a large extent, the actual loading conditions of the pavement. When a moving wheel load passes over the pavement it produces load pulses. Normal stresses (vertical as well as horizontal) at a location in the pavement will increase in magnitude from zero to a peak value as the moving wheel load approaches the location. The time taken for the stress pulse to vary from zero to peak value is termed as 'rise time of the pulse'. As the wheel moves away from the location, magnitude of stress reduces from peak value to zero. The time period during which the magnitude of stress pulse varies from 'zero-to-peak-to-zero' is the pulse duration. Peak load and the corresponding pavement responses are of interest for pavement evaluation.

The resulting load-deflection data can be interpreted through appropriate analytical techniques, such as back calculation technique, to estimate the elastic moduli of the pavement layers. The computed moduli are, in turn, used for (i) the strength evaluation of different layers of in-service pavements (ii) the estimation of the remaining life of in-service pavement (iii) determination of strengthening requirement, if any and (iv) evaluation of different rehabilitation alternatives (overlay, recycling, partial reconstruction, etc

Brief Description of Falling Weight Deflectometer (FWD)

Falling Weight Deflectometer is an impulse-generating device with a guide system. This device allows a variable weight to be dropped from a variable height. The apparatus has a loading plate which is used for uniform force distribution on the test layer. When the weight affects this plate, this loading plate ensures that the resulting force is applied perpendicularly to the test layer's surface. It also has a load cell for measuring the actual applied impulse. It also has one or more deflection sensors. (Note: Deflection basin tests require at least seven sensors). It also has a system for collecting, processing, and storing deflection data. Structural evaluation of pavements involves application of a standard load to the pavement and measuring its response in terms of stress, strain or deflection.

The basic working principle of the impulse loading equipment is to drop a mass on the pavement to produce an impulse load and measure the surface deflections. The mass is dropped on a spring system, which in turn transmits the load to the pavement through a loading plate. The resulting deflection bowl characteristics are observed and used in the back calculation of pavement material properties. The principle is illustrated in Figure 9-10

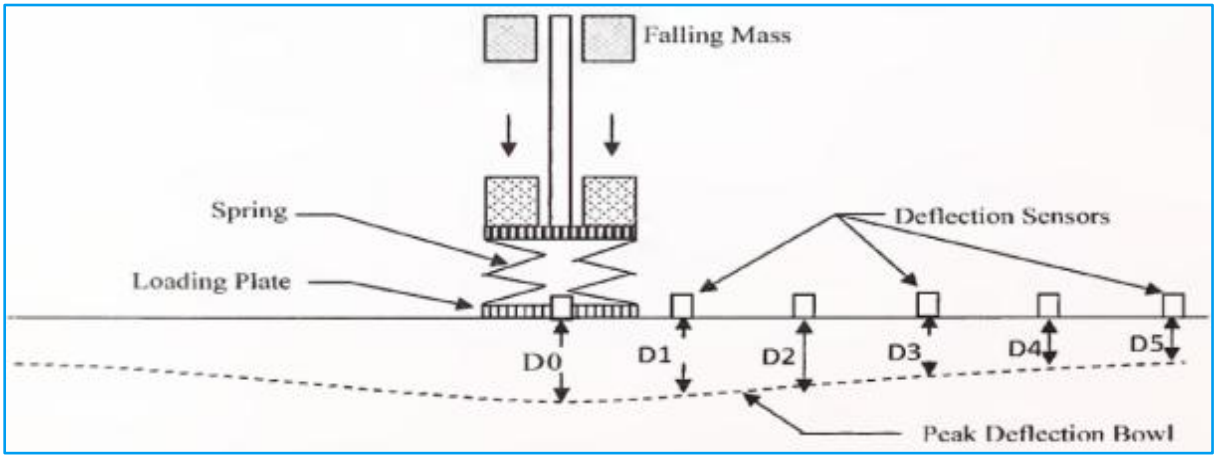


Figure 9-10: Working Principle of FWD

FWD Instrument Used for the Deflection Survey: DYNATEST 8002 FWD

For the purpose of conducting FWD survey on the project road DYNATEST 8002 FWD Fully Automatic Vehicle-mounted FWD. The FWD machines can apply a loading in the range of 12-150 kN, enabling them to simulate all type of vehicle loads on pavement surface. This model is equipped with a battery back-up and vehicle mounted set-up with all other accessories required for evaluation of pavement.

Testing Procedure and Methodology

The detailed test methodology and procedure was described in IRC: 115-2014 "Guidelines for Structural Evaluation and Strengthening of Flexible Road Pavements Using Falling Weight Deflectometer (FWD) Technique". However, as per the client's requirement the sampling procedure was customized in this project. In adherence to the same, structural evaluation of the existing 'pavement and subgrade system' by measuring its response in terms of deflection was carried out using FWD for the project road in the month of May 2025 (13/05/2025 to 15/05/2025) for Main Carriage Way and Peripheral Roads respectively. Evaluation of pavement structural strength is carried out in accordance with requirements of TOR and IRC: 115-2014.

Testing Equipment

The equipment used for the testing is:

- ERAY-20VM FWD Vehicle Mounted Falling Weight Deflectometer with 1 loading plate and 9 numbers of geophones placed at the spacing of 0, 200, 300, 450, 600, 900, 1200, 1500 and 1800mm from the centre of the loading plate.
- Air Temperature and Pavement Surface Temperature sensors as part of the FWD instrument.
- Glycerol and digital thermometer.

- Red flags and red cones and flashing lamps for traffic arrangement.

FWD Deflection Testing Points and Measurement

FWD deflection measurement has been carried out for each lane in both directions. FWD deflection measurement has been carried out at a test point along outer wheel path of each lane which is at an offset of 0.75m from the outer edge of outer lane, at 4.2m from the outer edge of outer lane as specified in section 5.4.5 of IRC: 115-2014. At every measurement location, four drops were made, such that the first drop is neglected as 'seating drop' and the rest three drops' deflections are recorded. Photographs of FWD test under progress at some locations are shown in Figure 9-11

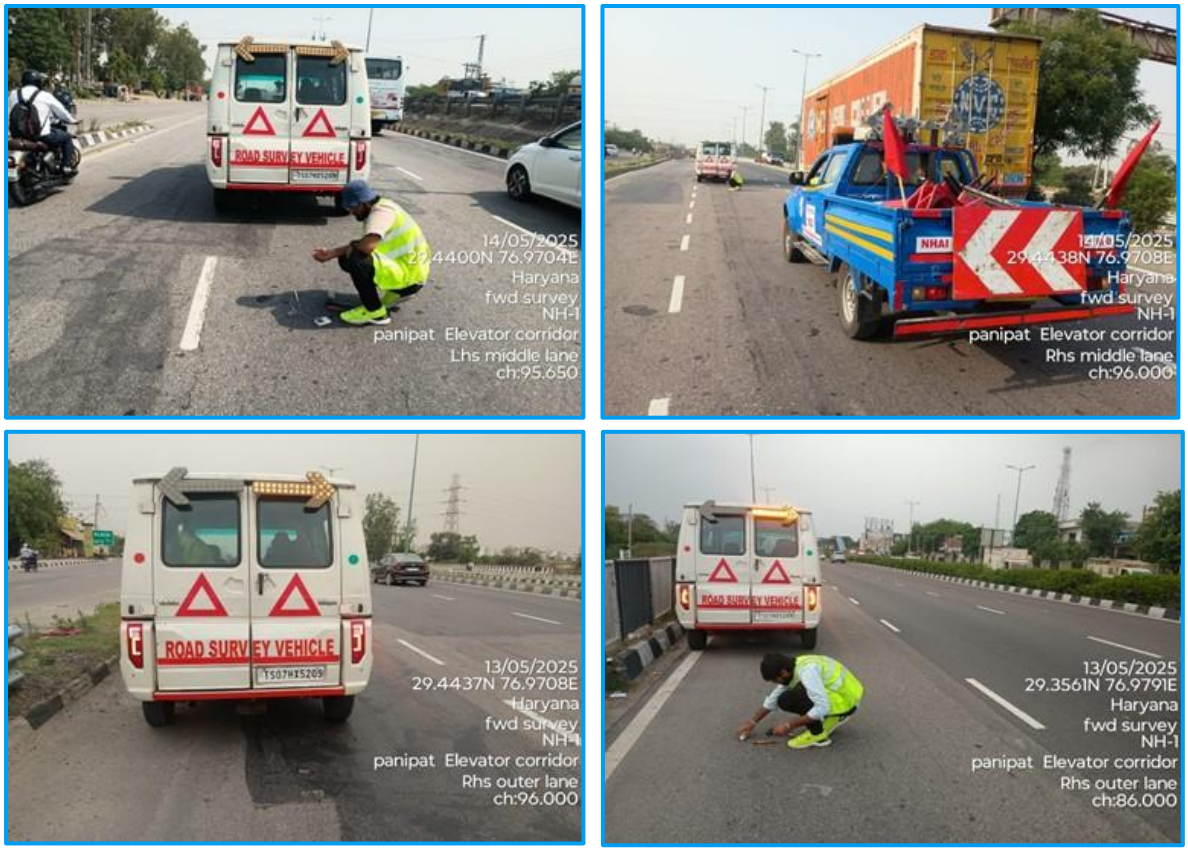


Figure 9-11: Photographs showing FWD survey under progress

Also, during survey pavement temperature of bituminous layer was recorded as per the procedure specified in section 5.4.7, xiii of IRC: 115-2014.

The following steps are carried out for measuring deflections at a test point:

i. Mark the test point on the pavement
ii. Centre the load plate over the test point
iii. Lower the loading plate onto the pavement ensuring there should be no standing water on the pavement surface. The loading plate should be in proper contact with pavement surface. The longitudinal and transverse slope of the pavement should not exceed 10 percent at the test location.
iv. Lower the frame holding the geophones so that the transducers are in contact with pavement surface.
v. Raise the mass to a pre-determined height required for producing a target load of 40 kN (+10%).
vi. Drop one seating load. The load and deflection data for this seating load is not recorded.

vii. Raise the mass and drop. Record the load and deflection data into the computer through data acquisition system. While peak load and peak deflections at different selected radial positions must be recorded. At least 2 drops should be made at one location for precision.

viii. If, during previous 2 steps, the deflections measured are giving variations or the deflections/load pulses are not proper, repeat the test drop.

ix. Raise the geophone frame and load plate and move to the next test location

x. Deflection measurements should not be made when the pavement temperature is more than 45°C.

9.3.2 Existing Pavement Composition Details

The crust composition details considered for analysis of MCW and Peripheral Roads are presented in Table 9-12 to Table 9-15.

Table 9-12: Details of BT Thickness for MCW in LHS Direction

BT Thickness from Core Cutting								
Inner			Middle			Outer		
From	To	BT thicknesses (mm)	From	To	BT thicknesses (mm)	From	To	BT thicknesses (mm)
86.000	96.000	295	86.000	96.000	295	86.000	90.900	390
						90.900	96.000	280

Note: Since Core Cutting wasn't done in the LHS middle lane, thickness was taken from the inner lane.

Table 9-13: Details of BT Thickness for MCW in RHS Direction

BT Thickness from Core Cutting				
Chainage (Km)		BT thicknesses (mm)		
From	To	Inner	Middle	Outer
86.000	96.000	290	280	290

Table 9-14: Details of BT Thickness for Peripheral Road in BHS Directions

BT Thickness from Core Cutting			
Chainage (Km)		thicknesses (mm)	
From	To	LHS	RHS
86.000	96.000	310	240

Table 9-15: Details of Granular Thickness for MCW and Peripheral Road in BHS Directions

Granular thicknesses from PDR		
Chainage (Km)		Granular thicknesses (mm)
From	To	BHS
86.000	96.000	480

9.3.3 Pavement Condition

Pavement Condition considered for analysis of MCW and Peripheral Roads are presented in Table 9-16 to Table 9-19.

Table 9-16: Pavement Condition for LHS Direction

Chainage (Km)		Pavement Condition		
From	To	Inner	Middle	Outer
86.000	87.000	Fair	Fair	Good
87.000	88.000	Fair	Fair	Good
88.000	89.000	Fair	Fair	Good

Chainage (Km)		Pavement Condition		
From	To	Inner	Middle	Outer
89.000	90.000	Fair	Fair	Good
90.000	91.000	Poor	Fair	Fair
91.000	92.000	Fair	Fair	Fair
92.000	93.000	Fair	Poor	Good
93.000	94.000	Fair	Fair	Good
94.000	95.000	Good	Good	Good
95.000	96.000	Fair	Poor	Fair

Table 9-17: Pavement Condition for RHS Direction

Chainage (Km)		Pavement Condition		
From	To	Inner	Middle	Outer
86.000	87.000	Good	Good	Good
87.000	88.000	Fair	Poor	Poor
88.000	89.000	Poor	Poor	Good
89.000	90.000	Fair	Poor	Good
90.000	91.000	Fair	Poor	Fair
91.000	92.000	Good	Poor	Good
92.000	93.000	Fair	Poor	Fair
93.000	94.000	Good	Fair	Good
94.000	95.000	Fair	Poor	Fair
95.000	96.000	Fair	Poor	Fair

Table 9-18: Pavement Condition for Peripheral Roads LHS Direction

Chainage (Km)		Pavement Condition	
From	To	Inner	Outer
86.000	88.000	Poor	Good
88.000	96.000	Good	Good

Table 9-19: Pavement Condition for Peripheral Roads RHS Direction

Chainage (Km)		Pavement Condition	
From	To	Inner	Outer
86.000	87.000	Fair	Good
87.000	88.000	Fair	Good
88.000	93.000	Good	Good
93.000	94.000	Fair	Good
94.000	95.000	Good	Good
95.000	96.000	Fair	Good

9.3.4 In-put Data for BACK Calculation Analysis

(a) Processing of Load and Deflection data

The FWD test data collected from different drops at each test point primarily consists of peak load and peak deflections at different radial locations. Unrealistic deflection values and obviously erroneous data must be removed.

Average values of load and deflections are calculated from the three drop test data collected. FWD tests were carried out using 40 kN impulse load. However, since the FWD equipment does not impart exactly the same load at every test point, normalization of all measured deflections was carried out

to a common test load of 40 kN. Such 'normalization' of the data was carried out using the following formula:

$D_n = 40kN/L_m \times D_m$

were,

D_n = Normalized Deflection.

L_m = Imparted Load and

D_m = Measured Deflection

The "normalized deflection data" was then used for determining deflections, deflection bowl and finally in framing of homogeneous sections and calculation of overlay requirements.

(b) Back-calculation of Layer Moduli

Layer moduli have been back calculated using KGPBACK program. The pavement has been modelled as a three-layer system with bituminous layer, granular layer and subgrade. The following inputs have been provided for back analysis.

- Single wheel load 40 kN and contact pressure 0.56 MPa
- No. of deflection sensors: 9
- Radial Distances of the Geophones i.e., 0, 200, 300, 450, 600, 900, 1200, 1500 and 1800mm
- Measured Surface Deflections normalized to 40kN in mm
- Pavement Layer Thicknesses
- Poisson's ratio of 0.35 is considered for bituminous, granular and subgrade layers.
- Range of Possible modulus value (Lower and Upper limits) of bituminous layer, granular layer and subgrade

Range of different layers moduli given as input to KGPBACK for back-calculation. These ranges selected judiciously by an experienced pavement engineer taking into considerations about approximate age of pavement, visual assessment of the condition of bituminous layer, prevailing climatic conditions during deflection measurements and also based on information available from test pits, laboratory tests conducted as detailed in the sections below:

(c) Range of modulus for existing subgrade:

The range of moduli of existing subgrade layers is taken as 50-100 MPa.

(d) Range of modulus value of existing granular layers i.e., base and subbase:

The range of moduli of existing granular layers is based on clause II.8.4 of IRC 115-2014.The range for combined (base and sub-base) is taken as 100-500 MPa.

(e) Range of modulus value of existing bituminous layers:

The range of moduli of existing thick bituminous layer has been determined on the basis of condition data. If the road condition is good the range is considered as 750MPa to 3000MPa, for sections with pavement condition is Fair- Poor, the range specified for thick bituminous layer 400 MPa to 1500 MPa as stipulated in section III.8.4 of IRC: 115-2014 has been taken into consideration.

9.3.5 Correction for data analysis

Correction for Temperature

Back-calculated moduli values of the bituminous layers evaluated by FWD survey are influenced by the pavement temperature. The standard pavement temperature for India is recommended as 35°C, hence the back-calculated moduli obtained at temperatures other than the identified standard temperature will have to be corrected using a suitable correction factor using equations 4 and 5 of IRC:115-2014 and the same is extracted below for ready reference.

ET1 = λ ET2

Where,

λ, temperature correction factor, is given as

λ = (1-0.238 lnT1) / (1-0.238 lnT2)

Were,

ET1 = Back-calculated modulus (MPa) at temperature T1 (°C)

ET2 = Back-calculated modulus (MPa) at temperature T2 (°C)

Correction for Seasonal Variation

Moisture content affects the strength of subgrade and granular subbase/base layers. The below equations are provided for Summer and Winter Seasonal reference.

$$E_{sub_mon} = 3.351 * (E_{sub_win})^{0.7688} - 28.9 \ldots (6)$$

$$E_{sub_mon} = 0.8554 * (E_{sub_sum}) - 8.461 \ldots (7)$$

were,

E_{sub_mon} = subgrade modulus in monsoon (MPa)

E_{sub_sum} = subgrade modulus in Summer (MPa)

E_{sub_win} = subgrade modulus in Winter (MPa)

$$E_{gran_mon} = -0.0003 * (E_{gran_sum})^2 + 0.9584 * (E_{gran_sum}) - 32.989 \ldots (8)$$

$$E_{gran_mon} = 10.5523 * (E_{gran_win})^{0.624} - 113.857 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (9)$$

were,

E_{gran_mon} = granular layer modulus in monsoon (MPa)

E_{gran_sum} = granular layer modulus in Summer (MPa)

E_{gran_win} = granular layer modulus in Winter (MPa)

Since the deflection measurements have been carried out during Monsoon, hence no seasonal correction factors are applied in this analysis.

9.4 Remaining life estimation

The in-service three-layer pavement system has been analysed with the back-calculated corrected layer moduli and layer thicknesses. The critical strains have been calculated by IITPAVE program. From the performance criteria equations, the residual/remaining rutting and fatigue life have been estimated.

Performance Criteria

The layer moduli of in-service pavement back calculated from FWD deflection data are used to analyses the pavement for critical strains which are indicators of pavement performance in terms of rutting and fatigue cracking. The following approach is proposed for design of bituminous overlays for existing flexible pavements. The mechanistic criteria (fatigue and rutting) adopted in the Indian Roads Congress guidelines (IRC:115-2014) for design of flexible pavements forms the basis for the overlay design method. Performance models adopted in these guidelines are given below.

a) Fatigue in Bituminous layer:

As specified in IRC:37-2012, the fatigue model corresponding to 80 percent reliability was used and is given below:

$$N_f = 2.21 * 10^{-04} x [1/\varepsilon_t]^{3.89} * [1/M_R]^{0.854}$$

Where,

N_f = fatigue life in cumulative standard axle load repetitions, in msa

ε_t = Maximum Tensile strain at the bottom of the bituminous layer;

M_R= Resilient modulus of the bituminous layer, in MPa

b) Rutting in Subgrade:

As specified in IRC:37-2012, the rutting model corresponding to 80 percent reliability was used and is given below:

$$N = 4.1656 \times 10^{-08} [1/\varepsilon_v]^{4.5337}$$

Where,

N=Subgrade rutting life in cumulative standard axle load repetitions, in MSA

ε_v= Maximum Vertical strain in the subgrade

Obtained remaining life are presented in Table 9-20 to Table 9-23. The graphical representation of the remaining life is presented in Figure 9-12 & Figure 9-13for MCW & Peripheral Roads respectively.

Table 9-20: Obtained remaining life of MCW on LHS direction

Chainage (km)		Remaining life as per 80% reliability in LHS Direction
From	To	
86.000	88.730	3974.72
91.870	92.300	1191.99
92.300	94.750	844.54
95.099	96.000	76.20

Table 9-21: Obtained remaining life of MCW on RHS direction

Chainage (km)		Remaining life as per 80% reliability in RHS Direction
From	To	
86.000	88.730	1187.82
91.870	94.200	380.00
94.200	94.750	1885.66
95.099	96.000	1648.26

Table 9-22: Obtained remaining life of Peripheral Roads on LHS direction

Chainage (km)		Remaining life as per 80% reliability in LHS Direction
From	To	
86.000	88.000	1594.04
88.000	90.000	4093.36
90.000	93.200	4127.38
93.200	96.000	4082.19

Table 9-23: Obtained remaining life of Peripheral Roads on RHS direction

Chainage (km)		Remaining life as per 80% reliability in RHS Direction
From	To	
86.000	88.600	183.29
88.600	90.000	766.10
90.000	92.000	1244.43
92.000	95.000	1255.90
95.000	96.000	88.70

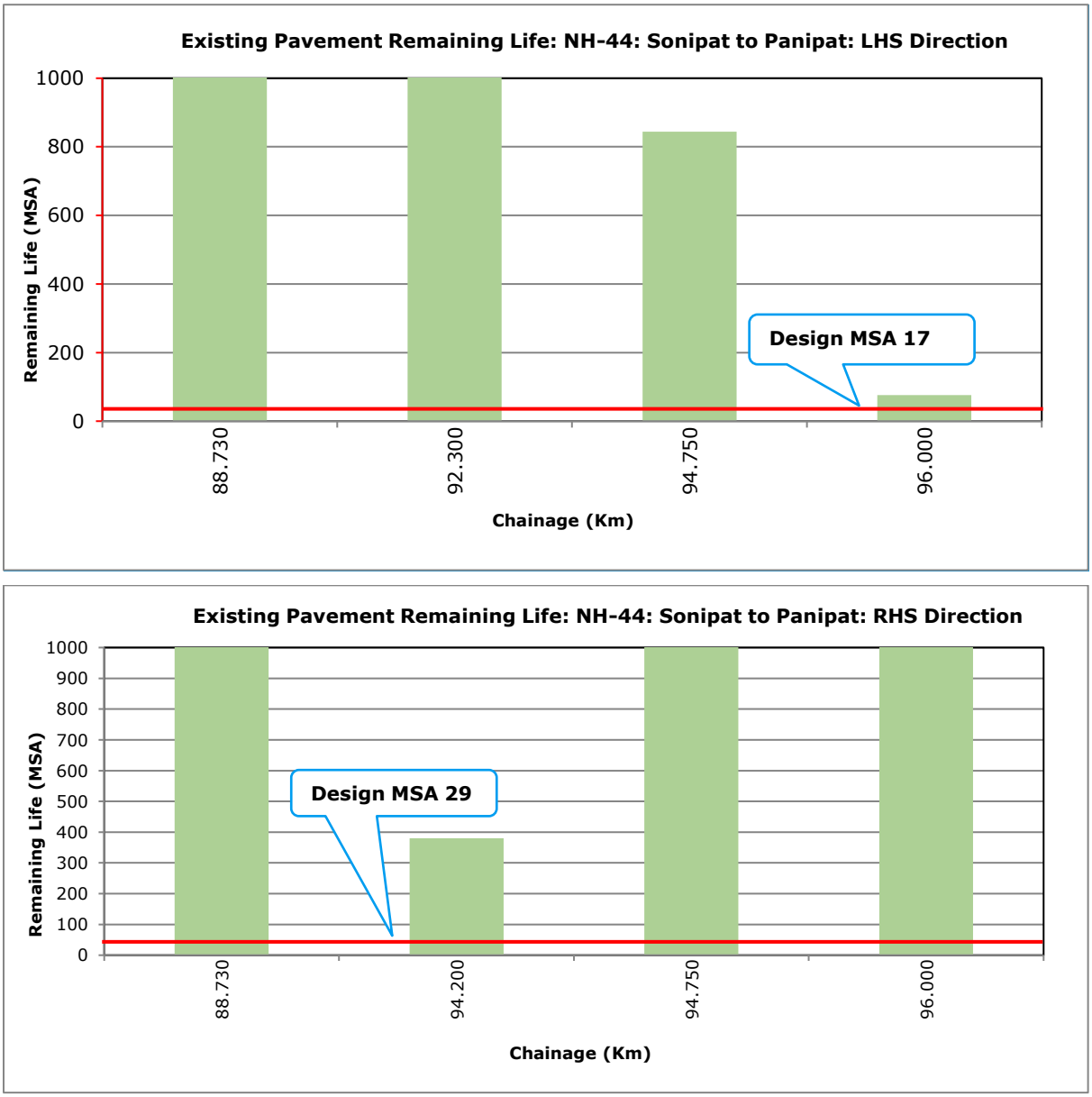


Figure 9-12: Illustrative summary of remaining life on both Directions (MCW)

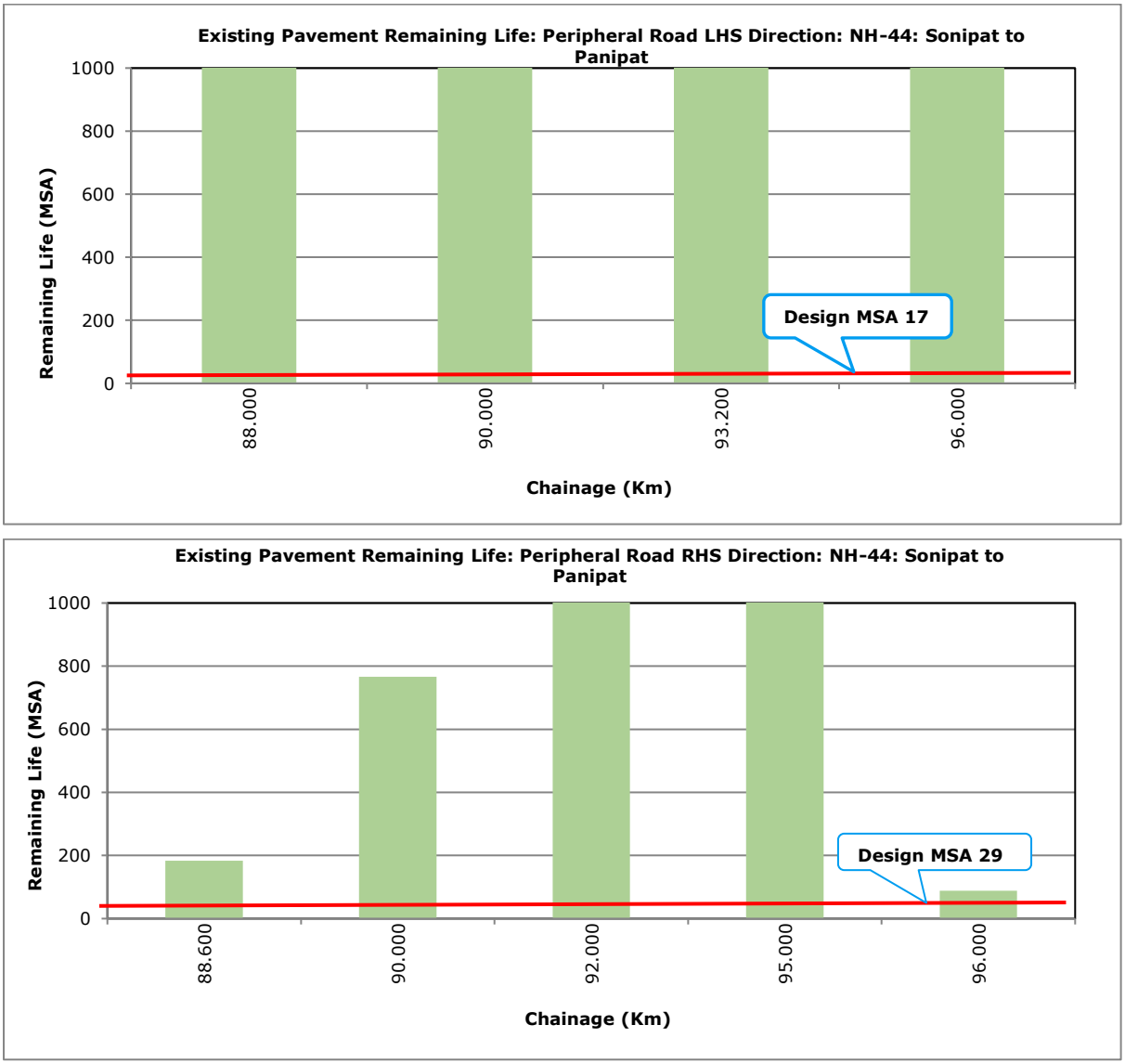


Figure 9-13: Illustrative summary of remaining life on both Directions (Peripheral Roads)

9.5 Traffic Survey and Analysis

Axle load survey of 48 hrs has been conducted at Toll Plaza location. The AADT and growth rates required for the further computations are provided by the client.

9.5.1 Annual Average Daily Traffic

The Annual Average Daily Traffic (AADT) in the FY 2026 are presented in Table 9-24.

Table 9-24: AADT of commercial vehicles at toll plaza in both directions (FY 2026)

Vehicle Type	BUS	LCV + Minibus	2-axle	3-axle	MAV
AADT	2398	2535	2437	1858	5258

*For MSA calculation purposes, a direction distribution of 50% is considered for both LHS and RHS direction.

9.5.2 Vehicle Damage Factor

The axle load survey was conducted at toll plaza (Samakhiali); the number of equivalent 8.16 t standard axles for the different categories of commercial vehicles have been determined on the basis of the axle load surveys.

The equations for computing equivalency factor for single, tandem and tridem axles given below is used as directed in the IRC: 37-2018 for converting different axle load repetitions into equivalent standard axle load repetitions.

- Single axle with single wheel on either side = {axle load in kN / 65}^{4}
- Single axle with dual wheel on either side = {axle load in kN / 80}^{4}
- Tandem axle with single wheel on either side = {axle load in kN /148}^{4}
- Tridem axle with dual wheel on either side = {axle load in kN /224}^{4}

Referring to section 4.4.3 of IRC 37-2018, some tandem axles have only one (single) wheel on each side of the axle. In such cases, each axle of the tandem axle set may be considered as two separate single axles (with single wheels). Similarly, if the axle spectrum has a tridem axle with single wheels, it may be considered as three separate single axles having single wheels.

VDF values are obtained as per the analysis of 48hrs axle load data and presented in Table 9-25.

The sample photographs of axle load survey are shown in Figure 9-14

Table 9-25: Summary of Vehicle Damage Factor

Location	Direction	BUS	LCV	2axle	3axle	MAV
Panipat Toll Plaza	LHS	1.069	0.618	2.838	5.090	10.118
	RHS	1.118	0.772	2.774	5.779	19.518



Figure 9-14: Photographs showing Axle load Survey

9.5.3 Design Traffic (Cumulative Number of Standard Axles)

The traffic loading in terms of the cumulative number of standard axles for the given period has been computed using the following relationship as given in IRC: 37-2018.

$$N = \frac{365 \times \left\{(1+r)^n - 1\right\}}{r} \times A \times D \times F$$

Where,

N = Cumulative number of standard axles to be catered for the design life in terms of MSA.

r = Annual growth rate of commercial vehicles

n = Design life in years

A = Initial traffic in the year of completion of construction in terms of number of commercial vehicles per day exceeding 3 ton

D = Lane distribution factor

F = Vehicle Damage Factor

Based on the preceding discussions, the traffic loading in terms of cumulative number of equivalent 8.16 t standard axle loads, the AADT was provided by concessionaire and considering 5% growth rates, the design traffic was projected for end of concession period FY 2027. Design traffic for flexible pavement design is computed and summarized in Table 9-26.

Table 9-26: Design Traffic (MSA) till end of the Concession Period (FY 2027)

Location	Design Traffic (MSA) up to FY- YR 2027	
	LHS	RHS
Samakhiali Toll Plaza	17	29

9.6 Required Overlay Calculation as per FWD Analysis

From FWD analysis the obtained pavement (msa) life is greater than the forecasted traffic msa up to the end of the concession period (FY 2027), Hence No Overlay is required for Main carriage way and Peripheral Roads by FWD analysis.

10. DEVELOPMENT OF O&M STRATEGY

10.1 General

The Concessionaire is responsible for Operation & Maintenance of the Project Highway in accordance with the provisions of the Concession Agreement.

10.2 Maintenance Requirements as per Schedule L.

The concessionaire shall always maintain that during the Operation Period, the Project Highway conforms to the maintenance requirements set forth in Schedule L.

Repair/ Rectification of Defects and deficiencies specified in Schedule L within time limit set forth hereunder.

Table 10-1: Maintenance requirements with timelines

Schedule L			
S. No.	**Nature of Defect/ Deficiency**	**Level1 (Desirable)**	**Level2 (Acceptable)**
1	Potholes/km (max)		
	i) Up to 75 mm deep	Nil	5 Nos. of size < 5 sq.m
	ii) More than 75 mm deep	Nil	Nil
2	Percent Cracking	Nil	No unsealed cracks > 6 mm wide on 95% project section
3	Rut Depth not exceeding 10 mm	Length not more than 10% of the Project section	Length up to 20% of Project section
4	User Information	All road signs, Km post & road marking in good condition	All road signs, Km post & road marking in good condition
5	Percentage Defective Bridge Deck area and bump at approach	Nil	Nil
6	Drainage (including shoulders)	No visible water pool within the ROW	No visible water pool within the ROW

S. No.	**Criteria**	**Level1 (Desirable)**	**Level2 (Acceptable)**
1	Roughness by Bump Integrator (max. permissibility)	2000 mm/km (Allowable Tolerance: +5%)	3000 mm/km
2	Potholes /km (max)		
	i) less than 75 mm deep	Nil	2 nos. of size < 5 sq.m
	ii) more than 75 mm deep	Nil	Nil

S. No.	Criteria	Level1 (Desirable)	Level2 (Acceptable)
3	Percent Cracking	Nil	No unsealed cracks > 5 mm wide on 95% project section
4	Rut Depth not exceeding 10mm	Length not more than 5% of the project section	Upto 10% length of project section
5	User Information	All road signs, Km post and road marking in good condition in 3 language formula	All road signs, Km post and road marking in good condition in 3 language formula
6	Percentage Defective bridge deck area and bump at approach	Nil	Nil
7	Camber – i) Mainline	(+ or -) 0.05% variation from the camber as per design requirements	
8	Drainage (including shoulders)	No visible water pool within the project section	No visible water pool within the project section
9	Characteristic Deflection as per IRC:81-1997	Upto 0.50 mm	Upto 0.80 mm

10.3 Immediate Repair/ Rehabilitation-Combined (Surface Distress)

Functional evaluation of pavement is conducted with NSV equipment to assess the present condition of the road, and it is found that a few minor distresses are observed on pavement and also if any locations roughness (BI) exceeding the limiting value (>3,000mm/km) specified in Schedule-L. All appropriate technical and contractual parameters are carefully reviewed to assess and formulate the strategy of immediate repair. The quantities of flexible pavement immediate repair are presented in Table 10-2 and Table 10-3 for both MCW & Peripheral road respectively. The quantities of rigid pavement Immediate repair are presented in Table 10-4.

Table 10-2: Recommended immediate repairing as per NSV in conformity with Schedule for MCW

Immediate Repairs/ Rehabilitation: PECL: MCW																
Summary				Proposed Pavement Thickness (m)				Obtained Pavement Materials Quantity								
	Area (Sq.m)	Proposed Milling Depth (m)	Scarification Depth (m)	BC	DBM	WMM	GSB	Milling Area (sq.m)	Scarification (Cu.m)	Soil/ Granular material for shoulder drops off (Cu.m)	GSB (Cu.m)	WMM (Cu.m)	Prime Coat (Sq.m)	DBM (Cu.m)	Tack Coat (Sq.m)	BC (cu.m)
Quantities due to Settlements																
40mm milling & Inlay at settlement part	0.00	0.040		0.040				0.0							0.0	0.0
Quantities due to Rutting																
40mm Milling & Inlay	0.00	0.040		0.040				0.0							0.0	0.0
Quantities due to Cracking excluding Rutting locations																
Crack Sealing	21371															
Quantities due to Only Ravelling																
Slurry seal treatment	0.00															
Quantities due to Only Pothole Filling																
Fill Potholes with premix material	0.00														0.0	0.0
Quantities due to Roughness excluding Rutting locations																
40mm BC Overlay	0.00			0.040												0.00
Quantities due to Edge break																
New BC layer	0.00			0.050											0.0	0.0

Immediate Repairs/ Rehabilitation: PECL: MCW																
Summary				Proposed Pavement Thickness (m)				Obtained Pavement Materials Quantity								
	Area (Sq.m)	Proposed Milling Depth (m)	Scarification Depth (m)	BC	DBM	WMM	GSB	Milling Area (sq.m)	Scarification (Cu.m)	Soil/ Granular material for shoulder drops off (Cu.m)	GSB (Cu.m)	WMM (Cu.m)	Prime Coat (Sq.m)	DBM (Cu.m)	Tack Coat (Sq.m)	BC (cu.m)
Quantities due to Slippage/ Delamination																
Patching area with premix material	64.13														64.1	0.51
Quantities due to Bleeding																
Application of Heated Coarse Sand (Passing 1.18mm sieve) with light rolling	1.31															
Quantities due to Shoulder drop off.																
Soil/ Granular material	0.00									0.0						

Table 10-3: Recommended immediate repairing as per NSV in conformity with Schedule for Peripheral Road

Immediate Repairs/ Rehabilitation: PECL: Peripheral																
Summary				Proposed Pavement Thickness (m)				Obtained Pavement Materials Quantity								
	Area (Sq.m)	Proposed Milling Depth (m)	Scarification Depth (m)	BC	DBM	WMM	GSB	Milling Area (sq.m)	Scarification (Cu.m)	Soil/ Granular material for shoulder drops off (Cu.m)	GSB (Cu.m)	WMM (Cu.m)	Prime Coat (Sq.m)	DBM (Cu.m)	Tack Coat (Sq.m)	BC (cu.m)
Quantities due to Settlements																

Immediate Repairs/ Rehabilitation: PECL: Peripheral																
Summary				**Proposed Pavement Thickness (m)**				**Obtained Pavement Materials Quantity**								
	Area (Sq.m)	**Proposed Milling Depth (m)**	**Scarification Depth (m)**	**BC**	**DBM**	**WMM**	**GSB**	**Milling Area (sq.m)**	**Scarification (Cu.m)**	**Soil/ Granular material for shoulder drops off (Cu.m)**	**GSB (Cu.m)**	**WMM (Cu.m)**	**Prime Coat (Sq.m)**	**DBM (Cu.m)**	**Tack Coat (Sq.m)**	**BC (cu.m)**
40mm milling & Inlay at settlement part	0.00	0.040		0.040				0.0							0.0	0.0
Quantities due to Rutting																
40mm Milling & Inlay	0.00	0.040		0.040				0.0							0.0	0.0
Quantities due to Cracking excluding Rutting locations																
Crack Sealing	1915.77															
Quantities due to Only Ravelling																
Slurry seal treatment	0.00															
Quantities due to Only Pothole Filling																
Fill Potholes with premix material	0.00														0.0	0.0
Quantities due to Roughness excluding Rutting locations																
40mm BC Overlay	0.00			0.040											0.0	0.0
Quantities due to Edge break																
New BC layer	0.00			0.050											0.0	0.0

Immediate Repairs/ Rehabilitation: PECL: Peripheral																
Summary				**Proposed Pavement Thickness (m)**				**Obtained Pavement Materials Quantity**								
	Area (Sq.m)	**Proposed Milling Depth (m)**	**Scarification Depth (m)**	**BC**	**DBM**	**WMM**	**GSB**	**Milling Area (sq.m)**	**Scarification (Cu.m)**	**Soil/ Granular material for shoulder drops off (Cu.m)**	**GSB (Cu.m)**	**WMM (Cu.m)**	**Prime Coat (Sq.m)**	**DBM (Cu.m)**	**Tack Coat (Sq.m)**	**BC (cu.m)**
Quantities due to Slippage/ Delamination																
Patching area with premix material	36.37			0.008											36.4	0.29
Quantities due to Bleeding																
Application of Heated Coarse Sand (Passing 1.18mm sieve) with light rolling	0.00															
Quantities due to Shoulder drop off																
Soil/ Granular material	0.00									0.0						

Table 10-4: Recommended immediate repairing for Rigid pavement (Toll Plaza)

Treatment strategy	Units	Qty.		
		Toll LHS	Toll RHS	Overall Qty.
Seal with low viscosity epoxy to secure broken parts	Rm.	4.00	0.75	4.75
Route and Seal	Rm.	0.00	1.75	1.75
Seal and stitch	Rm.	0.00	0.00	0.00
Apply low viscosity epoxy resin/ mortar in cracked portion	Rm.	6.00	2.25	8.25
PDR/PWR 50mm deep	Cu.m	0.00	0.00	0.00
Local repair of areas damaged and liable to damage (Ravelling/ Scaling)	Sq.m	0.00	6.50	6.50
Bonded Inlay	Sq.m	0.00	0.00	0.00
Full Depth Repair	Cu.m	0.00	15.75	15.75
Seal without Delay	Rm.	0.00	0.00	0.00
Slot stitching	Rm.	0.00	0.00	0.00
Clean Joint and reapply the sealant at selected locations	Rm.	17.50	62.50	80.00

10.4 Periodic Maintenance Strategy

In the PECL project, the concession period is above to complete on 04th February 2027. Based on the TDD, NSV, and FWD assessments, no overlay was deemed necessary until the end of the period, Hence, HDM-4 analysis was not performed. However, as per the concession agreement one overlay (after milling) is need to be provide during the handing over time.The adjusted MM schedule for the main carriageway is presented in **Table 10-5**, and the corresponding schedule for the Peripheral road is presented in **Table 10-6**.

Table 10-5: Periodic/ Maintenance Strategy-MCW

PECL MMR cycles (Main carriageway)				
End of Concession Date: 04 Feb. 2027				
	LHS		**RHS**	
Cycle	Base year	**1st**	Base year	**1st**
Planned in:	**FY 2026**	**FY 2027**	**FY 2026**	**FY 2027**
Milling for BC		**Yes**		**Yes**
BC- 50 mm				
BC- 40 mm		10000		10000
BC- 30 mm				
DBM-50 mm				
Micro Surfacing				

Table 10-6: Periodic/ Maintenance Strategy-Peripheral Road

PECL MMR cycles (Peripheral Road)				
End of Concession Date: 04 Feb. 2027				
	LHS		**RHS**	
Cycle	**Base year**	**1st**	**Base year**	**1st**
Planned in:	**FY 2026**	**FY 2027**	**FY 2026**	**FY 2027**
Milling for BC		**Yes**		**Yes**
BC- 50 mm				
BC- 40 mm		10000		10000
BC- 30 mm				
DBM-50 mm				
Micro Surfacing				

Values mentioned in the table is length in 'm'.

11. COST ESTIMATE

11.1 General

Cost Estimates have been worked out for expenses on Immediate Works (CAPEX) and expenses on operations and maintenance (OPEX). The cost estimates have been worked out at present rates considering 2024-25 as the base year.

11.2 Assumptions

The cost estimates are based on the following assumptions:

(a) Bitumen has been assumed to be sourced from IOCL Panipat Refinery. The distance (to & fro) from the midpoint of Project Highway is taken as 25 km. Modified Bitumen and VG-40 grade bitumen is considered in our cost estimate.

(b) Hire charges for the Machinery have been considered following Standard Data Book - 2020 and escalation have been considered. Rates for various items of works have been arrived at based on 'Standard Data Book for Analysis of Rates' published by MORT&H.

(c) Manpower rates have been taken from Central Wages Order, Government of India, Ministry of Labour and Employment issued on 28 March 2025.

(d) Material Rates are obtained from are obtained from Local vendor of the project.

(e) Sand and Aggregate are considered to be sourced from the nearest source Yamunanagar.

(f) Cement is considered to be procured from the nearest local market of Panipat.

(g) Rate of steel is taken from Tata Steel.

(h) Some of the rates are based on Consultant's experience on the similar ongoing projects in adjacent locations.

(i) Overheads and profits have been considered based on MORT&H Standard Data Book. Applicable taxes have been considered in the Rate Analysis

(j) Applicable taxes have been considered in the Rate Analysis.

11.3 CAPEX

Details of CAPEX are worked out under the following categories.

- Immediate maintenance / defect rectification.
- O&M maintenance

11.3.1 Immediate Maintenance

As per site investigation we have considered for immediate maintenance. A few items noticed are covered under routine maintenance.

11.4 O&M Estimates

Operation and Maintenance estimates have been worked out under the following heads:

(a) Preventive Maintenance / Routine Maintenance

(b) Operations

(c) Major Maintenance

11.4.1 Routine Maintenance - Categories

Routine Maintenance covers all activities needed to keep the road in traffic worthy condition to provide desired comforts to the road users. Routine Maintenance can be classified into following three categories:

(a) Routine or day to day maintenance

(b) Pre-monsoon maintenance

(c) Post monsoon maintenance.

11.4.1.1 Routine or day to day maintenance

Routine maintenance is needed continuously on the road stretch and structures and covers the following activities:

(a) Cleaning of the Road

(b) Pavement maintenance to include crack sealing and pothole repairs.

(c) Shoulder repairs

(d) Maintenance of avenue plantation, horticulture, and median plantation

(e) Maintenance of signage, gantry boards and road furniture.

(f) Maintenance of culverts, bridge drainage spouts, expansion joints, side slopes and verges

(g) Surface cleaning, dust or vegetation control, sand removal from structures

(h) Reporting any damage caused to bridges by traffic accidents.

(i) Maintenance of guard rails and crash barrier etc.

11.4.1.2 Pre-monsoon Maintenance

This is carried out prior to the monsoons and includes the following:

(a) Inspection of channels/streams to ensure that there are no accumulation of logs, trees and other debris in the vicinity of piers and abutments.

(b) Cleaning of roadside / median drains.

(c) Removal of vegetation growth on sub structures.

(d) Cleaning of culverts.

11.4.1.3 Post-monsoon Maintenance

This includes maintenance that is carried out immediately after the monsoons and includes the following:

(a) Inspection of all structures for any damages and taking proper actions.

(b) Cleaning of roadside drains, culverts etc.

11.5 Operations Estimates

11.5.1 Toll Plaza

This cost includes the following:

(a) Maintenance of Toll Plaza building, booths, and tolling equipment.

(b) Security of the booths, lanes, and toll plazas.

(c) Collection of toll and handling of cash till bank deposit.

(d) Provision of IT in-charge, IT supervisor, other staff at Toll Plaza location.

(e) Administration and essential facilities for the staff and road users.

(f) Maintenance of Toll Plaza equipment and replacement of expendable and short life items.

(g) Electricity cost including standby generator.

11.5.2 Highway

This cost includes the following:

(a) Providing one patrolling vehicle including operating cost for round-the-clock patrolling of the Project Highway.

(b) Providing of one ambulance at Toll Plaza for accident victims.

(c) Provision of one crane with 30 MT and tow truck facilities for clearing the highway and evacuating the breakdown vehicles at Toll Plaza.

(d) Provision of one Broomer for cleaning of the highway.

(e) Expenditure on medical aid and provision of nursing staff.

(f) Cost of tests and surveys.

11.5.3 Energy

As per the Concession agreement, electrification is to be provided at the toll plaza and priority intersections. Streetlight luminaries, high mast lights with electricity tariff, provision of standby Genset are considered in the cost estimate.

11.5.4 Miscellaneous

(a) We have taken IE cost as per Industry norms.

(b) Insurance expenses have been taken as per Industry norms.

11.6 Summary of O&M Cost

Summary of yearly O&M cost at present rate is presented in Table 11-1:

Table 11-1: Summary of OPEX (without escalation)

Sl. No.	Item Head	Unit	Rate (in Rs.) (Per Km /Per Month) for 4 Lane	Monthly Cost	Annual Cost in (Rs.) For FY 2026
				For FY 2026	
1	Preventive Maintenance During Operation	Per Month	27,865	278,655	3,343,855
2	Routine Maintenance During Operation	Per Month	112,500	1,125,000	13,500,000
3	Highway Lighting	Per Month		1,002,201	12,026,414
4	Head Office, Admin Office and Toll Operation manpower cost				
(a)	On roll & off roll staff	Per Month		4,916,667	59,000,000

Sl. No.	Item Head	Unit	Rate (in Rs.) (Per Km /Per Month) for 4 Lane	Monthly Cost For FY 2026	Annual Cost in (Rs.) For FY 2026
5	Incident management expenses	Per Month		878,098	10,537,173
6	Toll system & AMC	Per Month		543,665	6,523,981
7	Admin Expenses	Per Month		266,990	3,203,883
8	Professional Fee Expense	Per Month		1,155,417	13,865,000
9	Insurance Fee	Per Month		450,000	5,400,000
10	Survey & Investigation charges	Per Month		20,060	240,720
	Total Annual Cost in Rs.			**10,636,752**	**127,641,028**
	Total Annual Cost in Crore.			**1.06**	**12.76**

11.7 Year Wise Summary of CAPEX & OPEX

Year-wise summary of CAPEX & OPEX for the balance concession period till FY 2033 is estimated and presented in Table 11-2:

Table 11-2: Summary of Year wise CAPEX & OPEX – PECL

Year			CAPEX				Major Maintenance				OPEX											(CAPEX + MMR +OPEX)
Year in Nos	From	To	Pavement Repair	Structure Repair	TMS & HTMS Repair	Sub Total (A)	Periodic Maintenance (Highways)	Periodic Maintenance (Structures)	TMS & ATMS Replacement (Every 6 years)	Sub Total (B)	Preventive Maintenance	Routine Maintenance	Highway Lighting	SPV office Staff (On & Off Roll)	Incident Management	AMC for HTMS & TMS	Professional Fee	Insurance Fee	Survey & Investigation charges	Admin Expenses	Sub Total (C)	Grand Total (D) = (A)+(B)+(C)
1	1-Apr-25	31-Mar-26	-	0.63	-	0.63				-	0.33	1.35	1.20	5.90	1.05	0.65	1.39	0.54	0.02	0.32	12.76	13.40
2	1-Apr-26	31 Jan-27				-	24.94	5.20	0.33	30.46	0.29	1.19	1.06	5.19	0.93	0.57	1.22	0.48	0.02	0.28	11.24	41.70
		Total Cost (INR Crore)	**-**	**0.63**	**-**	**0.63**	**24.94**	**5.20**	**0.33**	**30.46**	**0.63**	**2.54**	**2.26**	**11.09**	**1.98**	**1.23**	**2.61**	**1.02**	**0.05**	**0.60**	**24.00**	**55.10**

Note: Cost includes 18% GST. An annual escalation of 5% for Opex and 2% for Major Maintenance is applied in projections.

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RAJKOT-JAMNAGAR-VADINAR SECTION OF SH-25 (KM 3+000 – KM 129+000 & 5+300 KM (SPUR ROAD), LENGTH 131.650 KM, IN THE STATE OF GUJARAT ON BOT BASIS



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Acronyms and Abbreviations

BBD	Benkelman Beam Deflection	LCV	Light Commercial Vehicle
BOQ	Bill of Quantities	LHS	Left hand side
BC	Bituminous Concrete	LIE	Lenders' Independent Engineer
BOT	Build, Operate and Transfer	LT	Low Tension
CA	Concession Agreement	MOEF	Ministry of Environment and Forest
CAPEX	Capital Expenditure	MORT&H	Ministry of Road Transport & Highways
COD	Commercial Operation Date	MPRDC	Madhya Pradesh Road Development Corporation
CRPF	Central Reserve Police Force	MSA	Million Standard Axle
C & G	Clearing and grubbing	NCR	Non-Compliance Report
CRMB	Crumb Rubber Modified Bitumen	NH	National Highways
CUP	Cattle Under Pass	NHAI	National Highways Authority of India
DBM	Dense Bitumen Macadam	NHDP	National Highway Development Programme
DLC	Dense Lean Concrete	NRMB	Natural Rubber Modified Bitumen
DFO	Divisional Forest Office	NOC	No Objection Certificate
DG	Diesel Generator	OFC	Optical Fibre Cable
DLP	Defect liability period	OPEX	Operation Expenditure
DPR	Detailed Project Report	O&M	Operation and Maintenance
EIA	Environment Impact Assessment	PPE	Personal Protection Equipment
EMP	Environment Management Plan	PPP	Public-Private/Public Sector Partnership
EPC	Engineering Procurement & Construction	PQC	Pavement Quality Concrete
FCI	Food Corporation of India	PUP	Pedestrian Under pass
FRL	Formation Road Level	PWD	Public Works Department

FWD	Falling Weight Deflectometer	PCC	Plain Cement Concrete
GAD	General Arrangement Drawing	PD	Project Director
GFC	Good for Construction	PIU	Project Implementation Unit
GOI	Government of India	PLR	Prime lending rate
GSB	Granular Subbase	PMB	Polymer Modified Bitumen
HT	High Tension	PMC	Project Management Consultant
HMP	Hot Mix Plant	PUP	Pedestrian Under Pass
HDM	Highway Development & Management	QA/QC	Quality Assurance / Quality Control
IC	Independent Consultant	SDBC	Semi-dense Bitumen Concrete
IE	Independent Engineer	SPV	Special Purpose Vehicle
IPC	Interim Payment Certification	VDF	Vehicle Damage Factor
IRC	Indian Road Congress		

1. EXECUTIVE SUMMARY

1.1 General

We understand that **EAAA TransInfra Managers Limited** is the **Investment Manager, Chennai - Tada Tollway Private Limited ("CTTPL")** is the proposed **Project Manager** and **Watrak Infrastructure Private Limited ("WIPL")** is the **sponsor** of the **Citius Transnet Investment Trust ("Trust"** or **"InvIT")** and **M/s Rajkot - Vadinar Tollway Ltd ("RVTL")** is proposed to be part of the initial portfolio assets of the Trust. The Trust is registered with **Securities and Exchange Board of India ("SEBI")** as an infrastructure investment trust under the SEBI InVIT Regulations.

M/s Watrak Infrastructure Private Limited (hereinafter **"**the **Client"**) as sponsor has appointed **M/s Ramboll India Private Limited** (hereinafter referred as **"Technical Consultant"**) to carry out Technical Due Diligence of operational asset of 4-lane stretch of SH-25 from Rajkot to Jamnagar to Vadinar in the state of Gujarat on BOT Basis (herein after refer as "the **Project**") which is being operated by **"M/s Rajkot - Vadinar Tollway Ltd "** (hereinafter refer as **"**the **Concessionaire** or **Company** or **RVTL"**).

1.2 Project Introduction

The Government of Gujarat had proposed to augment existing SH-25 from Rajkot to Jamnagar to Vadinar Km 3.000 to Km 129.350 including spur road of length 5.300 km to four lane divided carriageway on build operate and transfer basis (BOT).

The Gujarat State Road Development Corporation Limited (GSRDC), set up by the Government of Gujarat initiated implementation of the project inviting Tender Notice no. 12/06-07 dated 09 October 2006. Following the evaluation of bids received, GSRDC accepted the bid of Larsen & Toubro Limited and issued Letter of Acceptance No. GMP/RJV/LOA/1812/2008 dated 07 August 2008.

Larsen & Toubro Limited subsequently promoted and incorporated the Concessionaire, L&T Rajkot Vadinar Tollway Private Limited, for the implementation of the project. The Concession Agreement was executed on 17 September 2008. The Appointed Date for the project was declared on 12 September 2009, marking the commencement of the 20-year Concession Period from that date.

The Project achieved Provisional Commercial Operation Date (PCOD) on 27 January 2012. COD of the project is achieved on 17 June 2023. The Project Highway is currently under the Operation and Maintenance (O&M) phase, in accordance with the provisions of the existing Concession Agreement and shall continue to operate and maintain the project highway until the end of the Concession Period. The concession period, originally scheduled to conclude on 11 September 2029, has been extended to 20 February 2030. This extension is pursuant to three Supplementary Agreements executed on 09 November 2015, 16 September 2021 and 27 April 2023, which granted extensions of 47, 38, and 77 days, respectively

Sekura India Management Limited completed the acquisition of the project and has been operating the project road in the same name as the former Concessionaire i.e. M/s Rajkot - Vadinar Tollway Ltd (RVTL).

Sl. No.	Feature	Details
1	Project Name	Four laning of Rajkot-Jamnagar- Vadinar Road (SH-25) Including Spur Road

Sl. No.	Feature	Details
2	Mode of the Execution (BOT Toll/ BOT Annuity/ EPC/ HAM/ Others)	Build, Operate and Transfer (BOT) Basis
3	Project Phase	Tolling, Operation, Maintenance and Transfer
4	No. of Lanes/ Configuration	4 lanes
5	Length of the Project (in Km)	131.650 km
6	Authority	National Highways Authority of India (NHAI)
7	Concessionaire	Rajkot Vadinar Toll Way Limited (RVTL)
8	Independent Engineer	LSR Engineering Consultancy Services
9	Letter of Acceptance	07 August 2008
10	Date of signing of CA	17 September 2008
11	Appointed Date	12 September 2009
12	Provisional Certificate issued on	27 January 2012
13	Completion certificate issued on	17 June 2023
14	Total Project Cost as per CA	Rs. 774.80 Cr
15	Concession Period	20 Years
16	Concession end date	20 February 2030

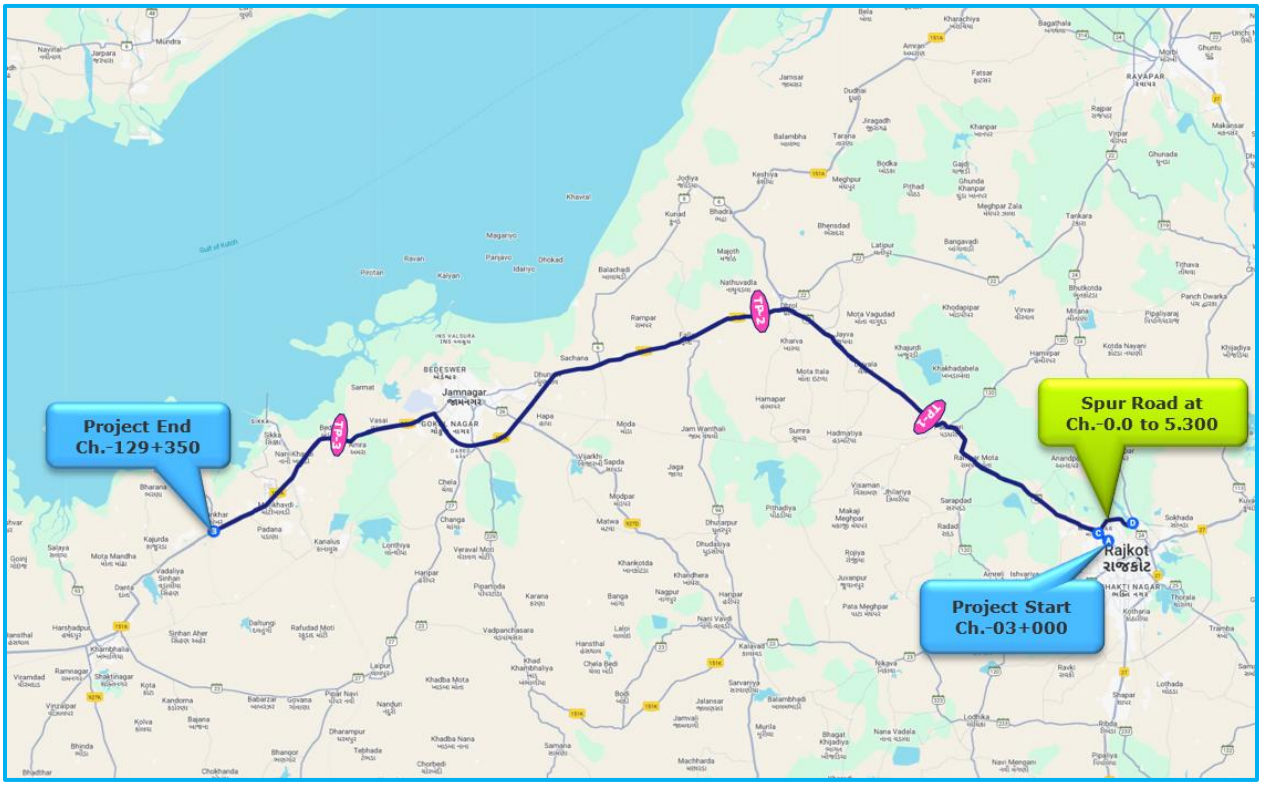
1.3 Project Description

The project corridor comprises a 131.650 km long stretch of the Rajkot–Vadinar Highway, forming a vital segment of State Highway-25 (SH-25) in Gujarat. The alignment originates at Rajkot, a key commercial and industrial hub, and traverses through key urban and semi-urban settlements including Dhrol, Kalavad, Jamnagar, Sikka, and Digvijaygram before terminating at the port and industrial cluster at Vadinar. The corridor serves heavy industries (refining, petrochemicals, engineering), logistics parks, fisheries, and port operations, and provides connectivity to tourist and pilgrimage circuits in Dwarka district.

Terrain and Land Use

The project corridor of SH-25 from Rajkot to Jamnagar to Vadinar traverses predominantly through plain terrain with low and gently undulating topography, typical of the Saurashtra region of Gujarat. The subgrade comprises alluvial and residual soils with patches of hard rock in certain cut sections near Jamnagar. The soil is generally clayey–silty with moderate to low permeability. The land use along the alignment reflects a mix of agricultural, industrial, urban, and coastal landscapes.

Project Location Map



1.4 Scope of work

This report is prepared as per scope of work defined in Work Order and project information provided to us. Ramboll work, which is summarized in this Due Diligence Report, has been limited to matters which have been identified that would appear to be of significance within the context of scope of work.

This report is prepared based on visual condition survey of highway, structures, site investigations and evaluation of test results and project information and direction provided by the Client. In this report, Ramboll provides an overview of the asset based on site survey on 2025 from technical perspective, and executed at site, Review of available documents and site visit, Field inspection, investigations, and Analysis, Operations and Maintenance assessment, Major Maintenance strategy and assessment, Estimation of Opex and CapEx of the project, Preparation of presentation and project report.

1.5 Key Findings

The project has some key findings which are listed out in the table below,

H	**High Priority:** Critical activities that will have material impact on cost of project during balance concession period
M	**Medium Priority:** Moderate likelihood of impact on cost of project during balance concession period
L	**Low Priority:** Low level of impact on cost of project during balance concession period

Diligence Area	Findings	Priority level
Completion Certificate (COD)	Project Road entered the commercial operation after PCOD was issued on 27th Jan 2012, and COD was issued on 22nd June 2023. End of Concession period of the project is 20 February 2030 pursuant to granted extension of concession period by GSRDC through three Supplementary Agreements.	L
Operation and Maintenance	As per Section XVII of CA, the Concessionaire shall maintain project highway in conformity with Maintenance Requirements, the Maintenance Manuals or any schedules made as per plan. All the maintenance requirements shall be as per Sch-L No other additional details in present year are available	H
Maintenance Manual and Yearly Program	As per Article 17.3 of Concession Agreement, not later than 180 days prior to scheduled 4-laning date, the concessionaire shall in consultation with IE develop O&M Manual. While the maintenance programme not later than 45days prior to start of financial year during operation period the concessionaire shall provide the GSRDC and IE its annual plan covering immediate, periodic and scheduled maintenance activities.	H
Pavement Design	As per CA Section 2, new pavement is designed as per IRC 37: 2001.The average growth rate is 5.2% considered. In the direction of Rajkot-Dhrol with min CBR of 12% and design traffic of 200msa and direction Dhrol to Vadinar it was 350msa with CBR 7%. The crust recommended has 50mm BC and 100mm DBM. A WMM thickness of 360mm and 400mm for LHS and RHS respectively, while GSB of 200mm and 230mm for LHS and RHS respectively. The suggested rigid pavement thickness of 320mm PQC with 8% Approved pavement design report is not provided	L
Pavement Condition	The pavement condition of the entire project road is observed to be in GOOD to FAIR condition. In the flexible pavement milling and inlay are carried out. Slippage of pavement, rutting and high severity cracks are observed in few locations.	H
Change of Scope	As per MSR March 2025 report, an amount of 5.11 Cr. was submitted by the concessionaire during the joint visit to the black spot locations ended in YR 2022, but COS is not approved yet.	L
Toll Plaza	The Concession Agreement mandates the establishment of 3 toll plazas at Km.3+050, Km.58+325, Km.110.472. A straight-line toll plaza with 12 physical Lanes, however only 10 lanes (5 lanes in each direction) are equipped with Hybrid ETC equipment. Toll Plaza lanes are equipped with Weigh in Motion (WIM) systems. Toll Plazas are not equipped with Static Weigh Bridge (SWB) for detection and collection of overload penalties. In TP-03 (Bed Toll Plaza) micro surfacing is carried out over the rigid pavement. However, due to traffic movements, delamination and scaling is visible.	M

Diligence Area	Findings	Priority level
TMS and HTMS	As Per Schedule C, there is requirement of TMS. TMS installation was done by M/s LOGICMO Systems in the year 2022 and since last two years is running under AMC The complete TMS systems is working in good condition and does not need any replacement except the automatic boom barriers which need immediate replacements due to poor condition. No ECBs operational only foundations are found installed at few locations ATCC which are installed at toll plazas are not providing any input to the control room and found faulty, at TP2 one VMS are installed at 6 locations and found working Met Station Installed in TP1 and TP3 and found equipment working only at TP3.	H
Geometric Design	The project road is to be designed as per Specifications and Standards provided in Schedule D. Key parameters of design is as follows: Ruling design speed is 100 km/hr while the minimum design speed is 80km/hr. The minimum sight distances for ruling design speed are 180m, 360m and 640m for SSD, ISD and OSD respectively.	-
As-Built Drawings	As per Schedule -H, Annex-I, the Concessionaire is to deliver relevant records and reports pertaining to the Project Highway and its design, engineering, construction, operation and maintenance including all and all operation and maintenance records and programs and manuals pertaining thereto and complete As-Built Drawing on the Date of Divestment. The signed soft copies of the as-built drawings and typical cross-sections has been provided for the reference	M
Hand back Requirement	As per the CA all project assets including the road, pavement, structure and equipment shall have been renewed and cured of all defects and deficiencies as necessary so that project highway is compliant with the Specification and standards set forth in this Agreement. All sections of traffic lane shall have a roughness value not more than 2500 mm/km. All Lamps shall be in working condition It is understood that the maintenance and replacement of all lamps shall be covered by the annual O&M estimates. Additionally, all other defects and rectification relating to the asset is covered under the O&M and MMR estimate	H

1.6 Assessment of Project Assets

Projects asset inventory and their condition assessment is prepared through visual inspection during site visits, review and analysing the reports shared by the client, by field investigations validating the findings and by NSV survey. All the elements and components pertaining to project asset are reported in subsequent Chapter 5, 6 & 7 of this report and their assessment is used to prepare the strategy for preventive, routine, and periodic maintenance. Salient features of the project are given in Table 3-2. The overall condition of the project and its assets are satisfactory.

S.no	Description	Units	Total Quantities
1	Section from Rajkot (km 3.000) to Vadinar (km 129.060) MCW of SH-25 with 5.240 Spur Road	Km	131.650
2	Service Road & Slip Road	Km	7.565
3	Bypasses	Km	24.800
4	Major Intersections	Nos	9

S.no	Description		Units	Total Quantities
5	Minor Intersection		Nos	117
6	Bus Bay & Shelters		Nos	54
7	Truck lay bye		Nos	50
8	Rest Area		Nos	NIL
9	Toll Plaza		Nos	3
10	Median Openings	Authorized	Nos	101
		Unauthorized	Nos	48
11	High Mast Light Locations		Nos	21
12	Solar LED Blinkers		Nos	166
13	Streetlights	Single Arm poles	Nos	16
		Double Arm poles	Nos	626
		Triple Arm poles	Nos	3
14	Fuel Stations		Nos	90
15	Pedestrian guard rail		Km	0.528
16	ECB (SOS Facility)		Nos	36
17	Gantry Boards	Cantilever Over Head	Nos	15
		Half Width Over Head	Nos	8
18	Sign Boards		Nos	1145
19	Variable message sign (VMS)	Cantilever Over Head	Nos	0
		Half Width Over Head	Nos	6
20	Entry & Exit		Nos	NIL
21	5th / Ordinary Kilometer stones		Nos	252
22	Hectometer stones		Nos	965
23	Drainage	Median Drain	Km	2.219
		Shoulder drain	Km	8.373
		Earthen Drain	Km	168.748
		Cut Drains	Km	24.572
		Chute Drain	Km	5.331
24	Median Plantation		Km	105.946
25	Avenue Plantation		Km	56.817
26	Metal Beam Crash Barrier (MBCB)	W-beam One Side	Km	3.363
		W-beam Two Side	Km	7.747
		Single side double beam	Km	39.416

S.no	Description		Units	Total Quantities
27	Concrete Crash Barrier		Km	15.432
28	Land Use	Agriculture	Km	180.404
		Residential	Km	16.193
		Commercial	Km	45.035
		Water Bodies	Km	4.132
		Industrial	Km	4.280
		Mixed	Km	12.556
29	Kerb		Km	260.689
30	Chevron Signs		Nos	220
31	Road Studs		Nos	36028
32	OHM		Nos	78
33	Delineators		Nos	91
34	Footpath		Km	9.310
35	Guard post		Nos	1858
36	Pipe railing		Km	0.242
37	Parapet wall		Km	1.024
38	Handrail		Km	2.588
39	RCC railing		Km	0.708
40	Fencing		Length (km/m)	0.040
41	CCTV		Nos	58
42	Pavement Marking		Length (km/m)	131.650

1.7 Assessment of Structures

Comprehensive visual inspection is carried out for inventory and assessing condition of Major bridges, Minor Bridges, Grade separators, underpasses ROBs and culverts. During the inspection and condition survey few Distresses are observed and are detailed in Chapter 6 of this project report.

Total nos. of structures on the Project Highway are given in the table below.

Sl. No.	Item	Total
1	Major Bridges	14
2	Minor Bridges	60
3	ROB	4
4	VUP	2
5	SVUP	2
6	PUP/CUP	6
7	Culvert	223 (HP 147 nos & BC 76 nos)

1.8 Toll Management System (TMS)

The project has three toll plazas each with 12 physical Lanes, however only 10 lanes (5 lanes in each direction) are equipped with Hybrid ETC equipment, two lanes are provisioned for future expansion, separate two-wheeler lanes provided adjacent to the extra-wide lane in each direction.

Further it is also found that none of the directions of the toll plaza are equipped with Static Weigh Bridges.

TMS maintenance is in the AMC since last 2 years. Lane hardware is provided as per the industry standards, in all lanes are working in good condition. AVC and TLC panels are installed inside the tunnel and caged to have the access to the TMS in a controlled way. Fastag integration is done through IDFC. The network is Ethernet based and is provisioned with a backbone connectivity through OFC in parallel till the toll plaza building. AVC and TLC panels are installed inside the tunnel and caged to have the access to the TMS in a controlled way

1.9 Soil and Material investigation

Soil and Material investigation are done with the samples collected from pit investigation and the results are narrated in Chapter 8.

Subsoil along the project corridor is generally consistent and predominantly sandy and gravel in nature. At one location clay soil with low compressibility soil is observed.

Summary of strength parameters in the soil investigation is shown below.

Description	Liquid Limit	Plasticity Index	Free Swell Index	4-days soaked CBR	Degree of compaction
Rajkot - Vadinar (RVTL) section of SH-25 (From Km 3.000 to Km 129.060)	17%-38%	Max 15%	Max 33.3%	8.0%-31.7%	92.3%-96.7%
MoRTH Limits	**<50%**	**<25%**	**<50%**		

**Variance between MDD and FDD is converted in-terms of degree of compaction*

All the measured LL, PI and FSI values are within the acceptable limits as per MoRTH guidelines.

The existing pavement along the project corridor is flexible in nature.

Pavement composition

The pavement composition comprises of bituminous layer, granular base over the granular sub-base. Summary of existing pavement crust thickness is presented in an illustrative bar graph below.

Granular layer testing

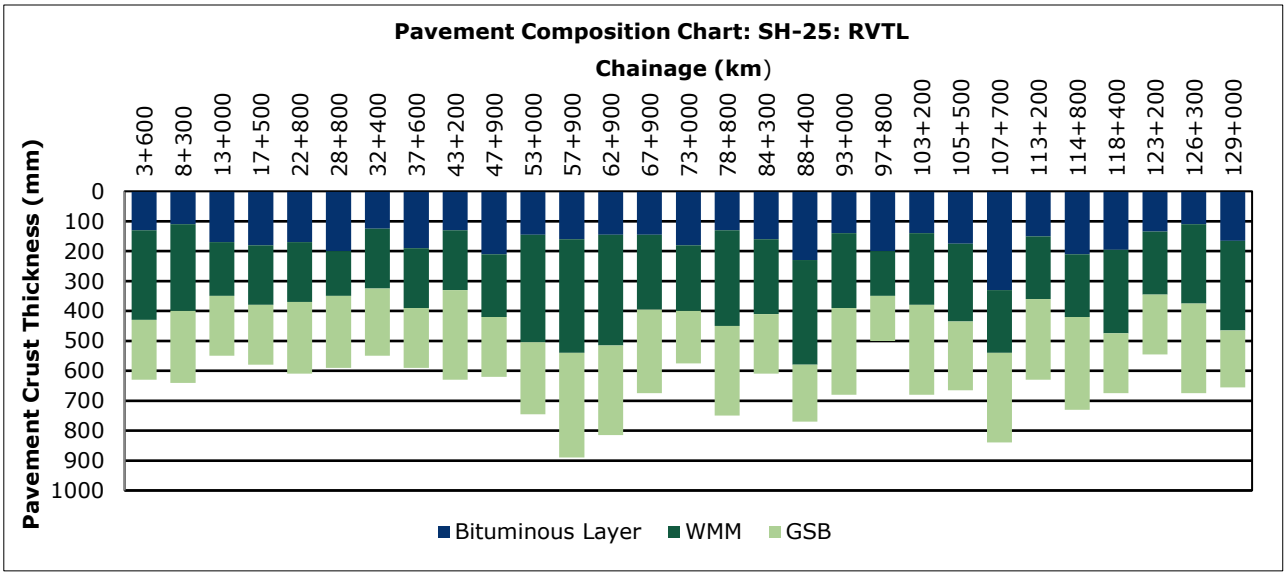
The GSB samples collected conform to the gradation III/IV of MoRTH specifications. The WMM samples collected are conforming to MoRTH gradation except one sample at Km.126.300 is not as per MoRTH guidelines. The Aggregate Impact Value and PI of Granular materials are within the limit as per MoRTH Specifications.

Bituminous core samples

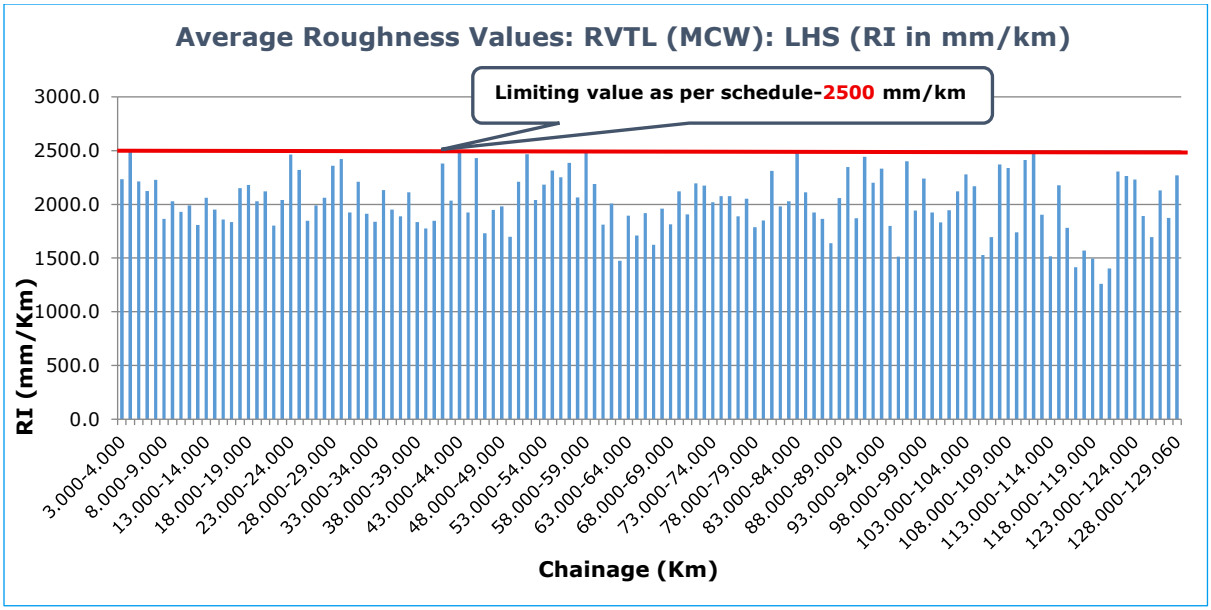
Bituminous layer samples were extracted using a core cutting drilling machine with a 100 mm diameter bit to obtain representative bituminous core specimens. The detailed core locations extracted, and their testing results are described in the Chapter 8 of this report. As per this sampling the BC samples conform to Grade-I, while the DBM refer to Grade I or II as per MoRTH specifications, only one sample at Km.65.400 the gradation of DBM layer is not as per MoRTH.

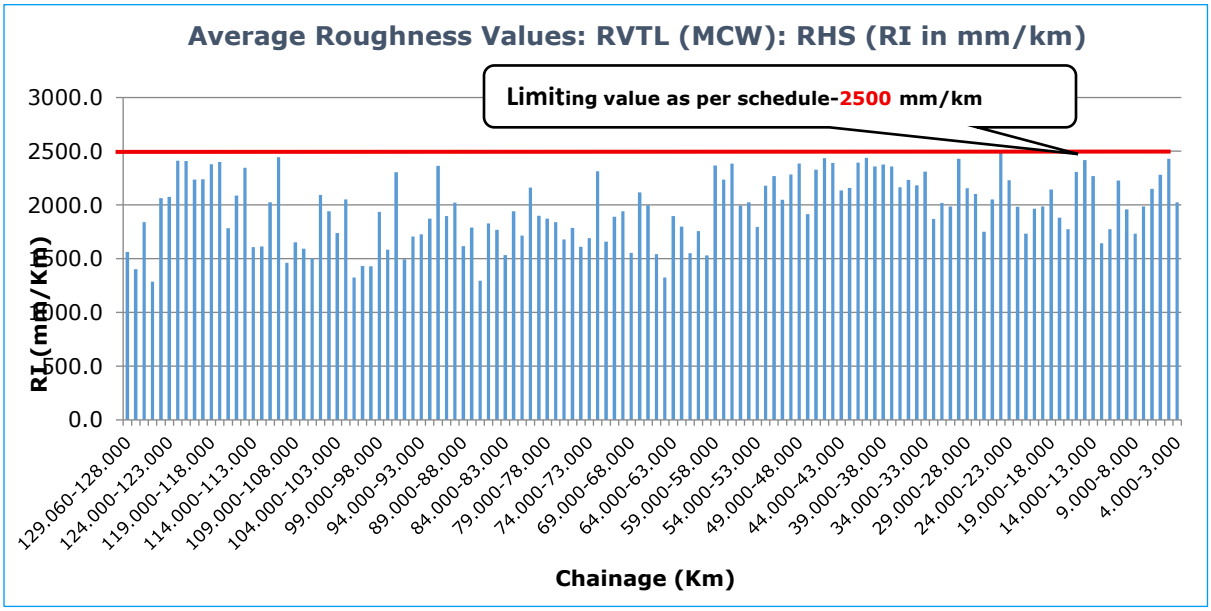
1.10 Pavement Evaluation

Pavement condition survey was carried out using NSV. The obtained lane wise Roughness summary in terms of BI (mm/km) is illustrated below for both MCW and SPUR road, details are in Chapter 9.



Illustrative summary of roughness for MCW both directions



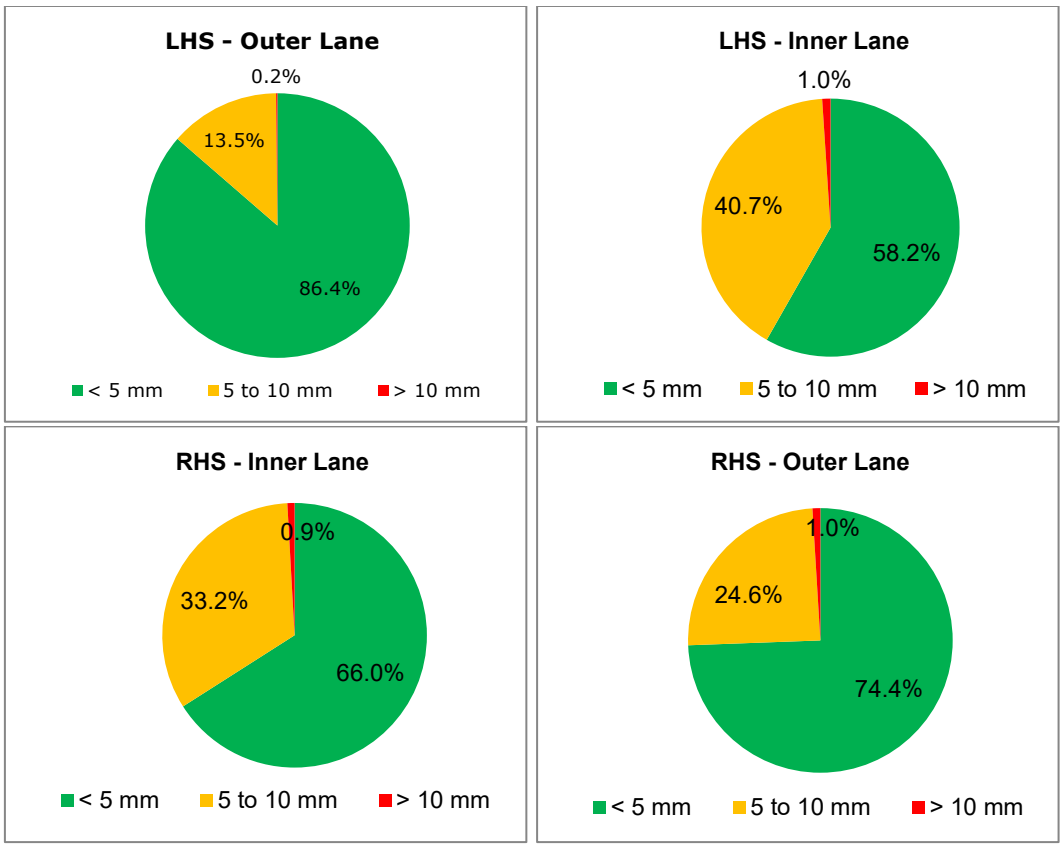


Illustrative summary of roughness for SPUR road both direction

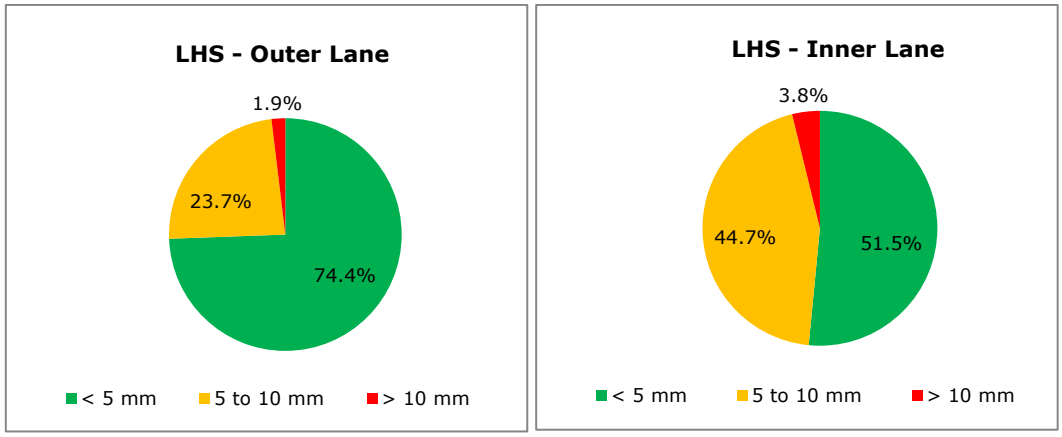
Rutting

Rutting data of flexible pavement section for MCW and SPUR road is also collected through Digital Laser Profilers System (DLP). The obtained lane wise rutting summary is graphically represented below and detailed in Chapter 9. In MCW rutting exceeded 10mm for a length of 1.5km on LHS and 2.3Km on RHS.

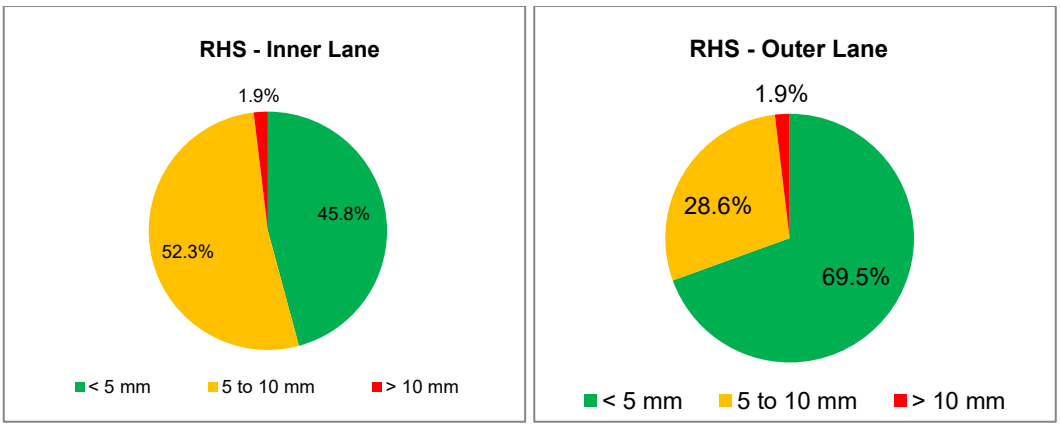
On the SPUR road the rutting exceeded the limits for length of 300m on LHS and 200m on RHS.



Illustrative Summary of MCW Rutting



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Illustrative Summary of Spur Road Rutting

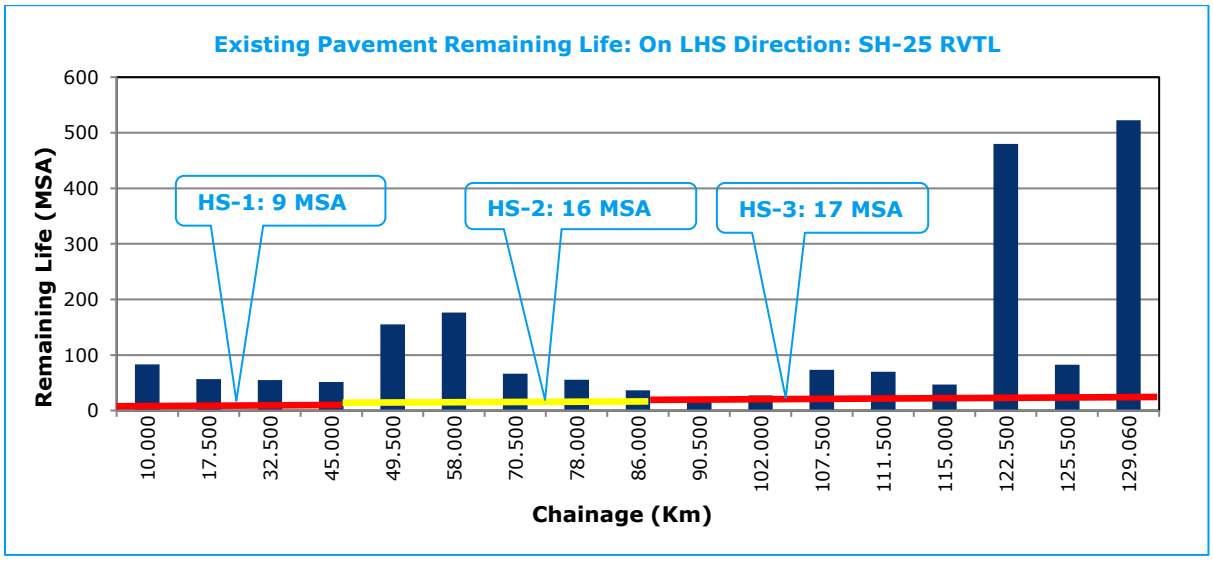
FWD deflection measurement

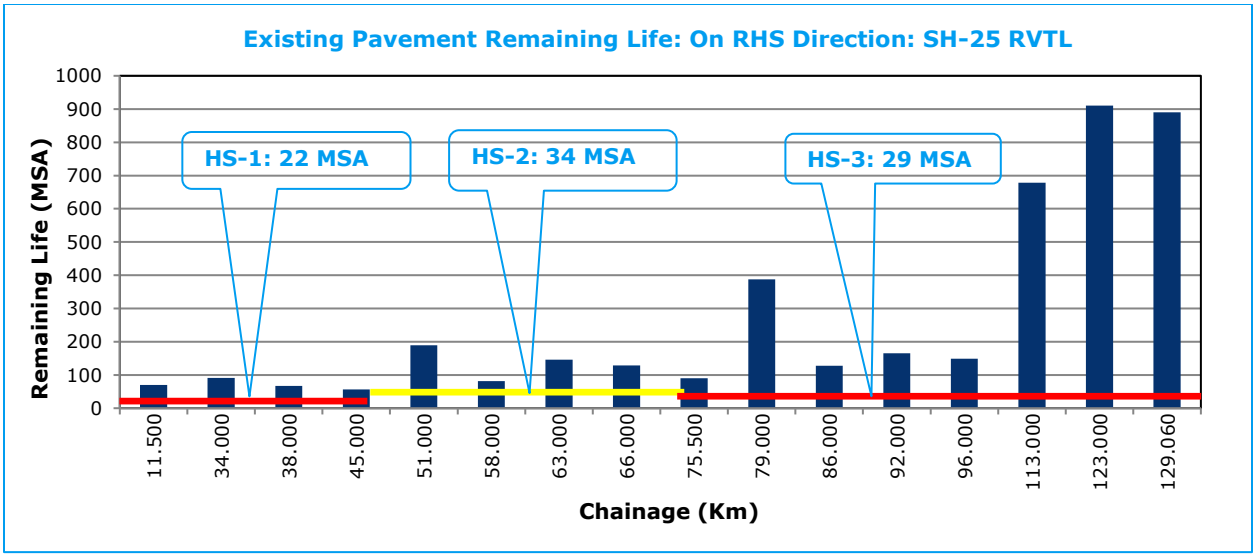
A survey has been carried out for each carriageway to evaluate the pavement structural strength and analysis of remaining life of project is carried out in conformity with IRC: 115-2014 and presented in Chapter 9 of this report.

Analysis of Flexible Pavement and graphical presentation:

In-service 3-layer pavement system has been analysed with the back-calculated corrected layer moduli and layer thicknesses. From the performance criteria equations, the residual/remaining rutting and fatigue life have been estimated. Remaining life and required overlay are calculated.

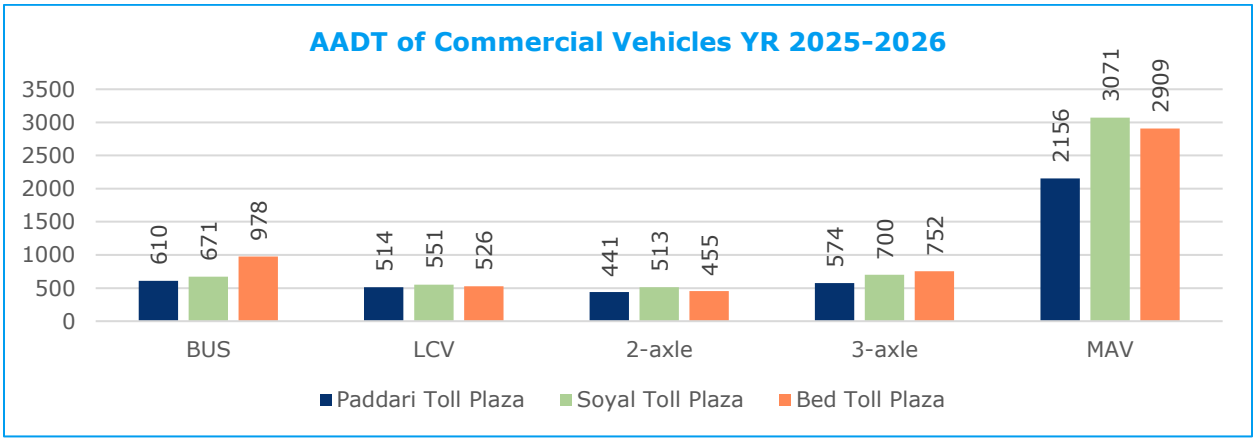
The detailed analysis is presented direction wise in Chapter 10 and the obtained remaining life are graphically presented below:



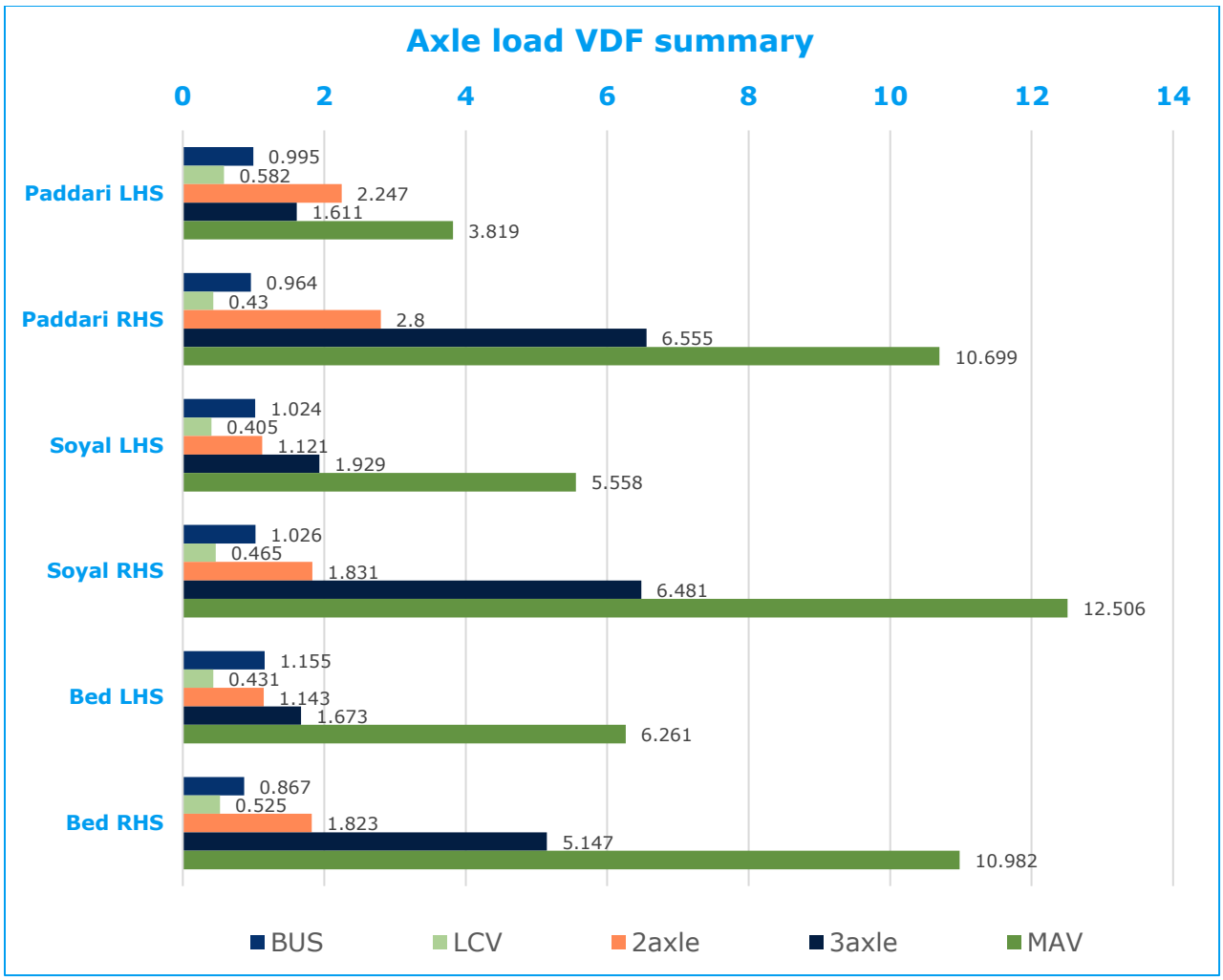


Illustrative summary of remaining life of MCW both directions

Team for Technical Due Diligence conducted a 48-hr axle load survey at the toll plaza location. The Annual Average Daily Traffic (AADT) of all commercial class vehicles as provided by the client is shown below



VDF values are obtained as per the analysis of 48 hr axle load survey are presented below:



AADT and growth rates provided by client, and the design traffic was projected for 5 years (YR 2030) which is end of concession period. Design traffic for flexible pavement design is computed and shown below

Location	Design Traffic (MSA) up to FY- YR 2030	
	LHS	RHS
Paddari Toll Plaza (TP-1)	9	22
Soyal Toll Plaza (TP-2)	16	34
Bed Toll Plaza (TP-3)	17	29

Based on the remaining life assessment, it is observed that all the sections of the existing pavement have sufficient remaining life to remain serviceable for the next 5 years (i.e., up to the end of the concession period YR 2030) in both LHS and RHS direction; therefore, no overlay has been recommended.

1.11 Operation and Maintenance Requirements and Strategy

The Contractor and concessionaire shall always maintain that during the Operation Period, the Project Highway conforms to the maintenance requirements set forth in Schedule L

Distresses develop in rigid pavement of toll plazas are estimated and provided in Table 10-2.

The Major Maintenance Strategy is assessed in 2 scenarios based on engineering practice and HDM-4 model. The recommended Major Maintenance Strategy till the end of concession period is presented below and elaborated in Chapter 10.

Major/Periodic Maintenance Strategy

Flexible Pavement -Main carriageway

Year	MM LHS of MCW	MM RHS of MCW	Remarks
YR 2027 - YR 2028	30 mm BC On 50% length	40 mm BC On 25% length 30 mm BC On 25% length	1st Cycle MCW
YR 2028 - YR 2029	40 mm BC On 35% length	40 mm BC On 40% length	

Note VG-40 Grade Bitumen considered.

1.12 Cost Estimate

The cost estimate is worked out for expenses on Immediate Works, periodic renewals (CAPEX) and expenses on operations and maintenance (OPEX) at present rates considering 2025-26 as the base year and is detailed in Chapter 11. Cost Estimate is worked out for expenses on

i. The costs for the restoration / improvement of the Toll Plaza pavement, structural repairs, and replacement of few TMS equipment. These costs are accounted for Capex (Initial Improvement works).
ii. Cost for Installation/restoration of Sign Board, Thermoplastic Marking on pavement, Installation/restoration of 5th, KM, HM, Boundary Stone, Painting of Kerb Stone, etc. are taken as Preventive Maintenance. Routine Maintenance and Repairs are also considered and evaluated till end of concession period.
iii. Highway Lighting, Tolling operations, Survey, Insurance Charges, Administrative Expenses, Incident management, AMC cost for TMS is included as Operational cost for the Concessionaire.
iv. Bitumen has been assumed to be sourced from IOCL Koyali Refinery. VG-40 grade bitumen is considered in cost estimate. Rates of Tata steel for June 2025 is taken for costing.

OPEX and CAPEX of the project is estimated till end of Concession period and presented in Table 11-2 and represented here below.

- Initial improvement works is estimated as INR 0.16 Crore.
- Periodic Maintenance is estimated as INR 170.32 Cr.
- Routine and preventive maintenance cost will be INR 30.86 Cr. and overall OPEX till end of concession for this stretch is INR 124.40 Cr.

CAPEX and OPEX for this 4-lane corridor are estimated till end FY 2029 as INR 294.88 Cr. This estimate includes 18% GST and annual escalation of 5% on Opex and 2% on Major Maintenance.

2. INTRODUCTION, APPROACH AND METHODOLOGY

Ramboll India Private Limited is engaged to conduct a Technical Due Diligence (TDD) study for the Rajkot - Vadinar section of SH-25 in the state of Gujarat.

Accordingly, Ramboll team has undertaken the work of preparing Technical Due Diligence Report based on study of project related reports and documents, visual inspections, and field investigations.

2.1 Scope of Work and Compliances

The scope of work agreed with Watrak Infrastructure Private Limited for conducting the technical due diligence study is presented in Table 2-1. The table also presents the chapters of the Technical Due Diligence Report where different items of scope of work are covered.

Table 2-1: Scope of Work and Compliances

SN	Scope of Work	Discussed At
1	**Site Visit and condition Survey – Visual Assessment** Site visit will be undertaken by Highway and Structural Engineers, Tunnel Expert, Pavement Expert, Quantity Surveyor, TMS & HTMS Expert and engineers to have visual assessment done for the project stretch. Observations will be recorded and critical issues for the Project will be identified. Project Structural integrity issues that require rectification / re-mediation will be observed and recorded along with possible risk mitigation strategy & costing thereof. The Consultant shall carry out a detailed reconnaissance of the project area and shall record and highlight important features and point out any issue that may be of importance to the Client in terms of operation and maintenance of the project.	Chapter 1, 3, 5, 6, 7, 11
2	**Conducting inventory, condition surveys and Field Investigations for Project Road** Inventory and detailed condition surveys will be conducted for project highway, bridges & cross drainage structures, project assets, safety appurtenances, TMS & ATMS system including recommendation for either strengthening / rehabilitation or reconstruction / replacement. *Requirements for NDT tests will be identified and informed. Based on the preliminary investigations and walk-through along the stretch, the Consultant shall prepare a project road map indicating the following elements Inventory of existing project assets Existing pavement condition – kilometer-wise (along with Photographs thereof) Intersecting/Crossroads (along with Photographs thereof); Inventory and condition assessment of CD structures (along with Photographs thereof).	Chapter 1, 3, 5, 6, 7, 8, 9

SN	Scope of Work	Discussed At
	Condition assessment of pavement. Condition assessment of structures. Review the extent of balance work. The Consultant should prepare a photo-documentation (Soft copy) of the mentioned areas and any other important findings. The Consultant shall assess the adequacy of Operations & Maintenance, Toll Management System and Advanced Toll Management system. The following field investigations will be carried out for the project stretch. Falling Weight Deflectometer (FWD) Surveys NSV Survey Test Pit investigations. Core samples from pavement Axle Load Surveys	
3	**Review of available Project Documents and Reports** The available reports (Concession Agreements, Approved Pavement design report, Monthly Progress Reports, As-built Drawings, Correspondences of stake holders, Asset Management Contracts, Maintenance Manuals, Maintenance history etc) will be reviewed. The Consultant shall assess the completion status of work Vis-à-vis compared with schedule B, C and Schedule D	Chapter 4, 10
4	**Review of construction material and quality, Rehabilitation Plans by Developing strategy for immediate/periodic maintenance.** The Consultant should review of Quality of construction and compaction based on available data and from Laboratory testing of samples collected from trial pits, and cores The Consultant should conduct visual inspection of expansion joints, wearing coat, pitching, bearings, retaining structures, etc of the structures to assess the condition and requirements for its repair, replacements and / or rehabilitation. The pavement stretches along with the type of distresses will be identified analysing NSV and FWD data. The Consultant should assess maintenance cycles for pavements using HDM analysis. Repair techniques will be suggested for stretches requiring immediate rehabilitation measures. Pavement maintenance strategy (functional overlay/ structural overlay) will be developed for the entire concession period to bring back riding quality of each lane of the carriageway to maximum permissible as stipulated in the Concession Agreement.	Chapter 5, 6, 7, 9, 10, 11

SN	Scope of Work	Discussed At
5	**Preparation of BoQ and Cost Estimate** Bill of Quantities will be prepared for Immediate repairs, Routine maintenance, Periodic/major maintenance, O&M Cost, and Improvement works as per Schedule B of the CA. O&M cost will involve Routine maintenance and Incident Management, Tolling Operations, Admin Expenses and Preventive Maintenance. The Consultant should provide cost till the end of the concession period including any expected extension of Concession periods as informed by the Client. For assessing the cost, Ramboll will use rates available in the market or from the inhouse data base.	Chapter 12

2.2 Deliverables and Timelines

The deliverables and the timelines for the study are as under:

SN	Deliverables	Time period
1	Project Appreciation Report (PAR)	Within 15 days from date of receipt of Agreement from the Company.
2	Draft Report	Within 30 days from date of receipt of Agreement from the Company.
3	Final Report all-inclusive along with Preventive / Major Maintenance and yearly O&M Cost estimates	Within 15 days from draft report or within 7 days from the comments received from client on Draft report, whichever is earlier

The above timelines assume that all project related data are available at the start of work.

2.3 Structure of the Report

In line with the requirements of agreed scope of work, this Technical Due Diligence Report is being submitted. The report is organised in the following fashion.

Chapter 1	**Executive Summary:** The chapter presents an overview of the project after review & study of documents, site investigations and estimates for maintenance.
Chapter 2	**Introduction, Approach and Methodology:** The chapter presents a brief approach and methodology adopted for carrying out the Due Diligence Study.
Chapter 3	**Project Description:** The chapter summarises the project features based on Concession Agreement requirements.

Chapter 4	**Review of Concession Agreement:** This chapter contains a short review of the existing HAM CA of the package.
Chapter 5	**Assessment of Project Assets - Highway:** The chapter presents the details of various essential features of the project highway recorded through reconnaissance survey and data obtained through NSV Survey.
Chapter 6	**Assessment of Project Assets - Structures:** The chapter presents the details of various essential features of the structures recorded through visual inspection.
Chapter 7	**Assessment of Project Assets – Toll Systems:** The chapter presents the details of various essential features of the Toll Plaza Systems and associated facilities recorded through visual inspection.
Chapter 8	**Soil and Material Investigations:** This chapter describes the tests carried out for soil and material samples collected from site and analysis of the test results.
Chapter 9	**Pavement Evaluation Studies:** This chapter describes the tests carried for pavement evaluation and analyses of the test results.
Chapter 10	**Development of O&M Strategy:** The chapter presents the details of O&M strategy developed based on the Pavement evaluation studies and analysis described in Chapter 10.
Chapter 11	**Cost Estimate:** The chapter outlines the key assumption considered for cost estimate and provides details of cost estimates under various heads viz immediate, O&M and major maintenance for the concession period

2.3.1 List of Shared Documents of the project.

Documents shared by Watrak Infrastructure Private Limited for Technical Due Diligence of the project and reviewed by Ramboll is given below.

- Concession Agreement of the projects
- Pavement Reports
- Monthly Progress Report for March 2025
- Project Cross sections and Plan and Profile
- Project Manpower and Insurance fees
- Electricity Charges
- O&M Sub-Contracts for Road Maintenance
- RVTL Organogram
- AMC for TMS

2.4 Approach and Methodology

Our approach and methodology to address the requirements defined in terms of reference are briefly presented below.

- Identification of objectives of Client through detailed study of scope of work and discussions with the Client.
- Identification of Assignment specific team of professionals covering all the skills and specializations required and involving with the assignment from day one.
- A Team Leader is assigned to coordinate various events / activities of various team members.
- Assessment of data / information required is made at the time of Proposal / Engagement letter and the list is shared with the Client.

2.5 Study

The following briefly presents the process followed for the present study.

- The data available for the project are collected from site offices of PIU – NHAI and of respective Independent Engineers of three packages.
- The data is reviewed by the study team and information collated in different categories e.g., asset inventory, contracts, change of scope, communications from NHAI, maintenance strategy and maintenance costs etc.
- Data gaps are identified through the above process and communicated to the Client.
- Detailed review of all the available data is carried out.
- Site visit is made by team of experts to understand the project features and observations are recorded.
- Field tests are carried out as per agreed scope of work.
- The test results are analysed in detail and maintenance strategies are developed.
- Inferences are made on various items of scope of work based on the available data and compared with the requirements of existing concession Agreement. Issues are flagged wherever required.
- The costs associated with the project under various head (immediate, routine operation and maintenance and Major Maintenance) are worked out in accordance with the requirements of existing Concession Agreement under current scenario.
- Finally, a comprehensive report is prepared covering all aspects of the agreed scope of work.

2.6 Delivery

Delivery follows the following flow:

- Formats of agreed deliverables are formalized and shared with Client, wherever required.
- Deliverables are shared with the Client within agreed timelines.

2.7 Feedback

Regular and end-of-the-assignment feedback are obtained from the client for further enhancing the quality of service.

3. PROJECT DESCRIPTION

The project involves development of SH-25 starts from Rajkot to Vadinar Km. 3.000 to Km. 129.350 including spur road length 5.300 km to 4-lane divided carriageway in Gujarat. It has been undertaken under the Viability Gap Funding (VGF) scheme of the Government of India on a Build -Operate- Transfer (BOT) Basis, with Gujarat State Road Development Corporation (GSRDC) as the implementing agency.

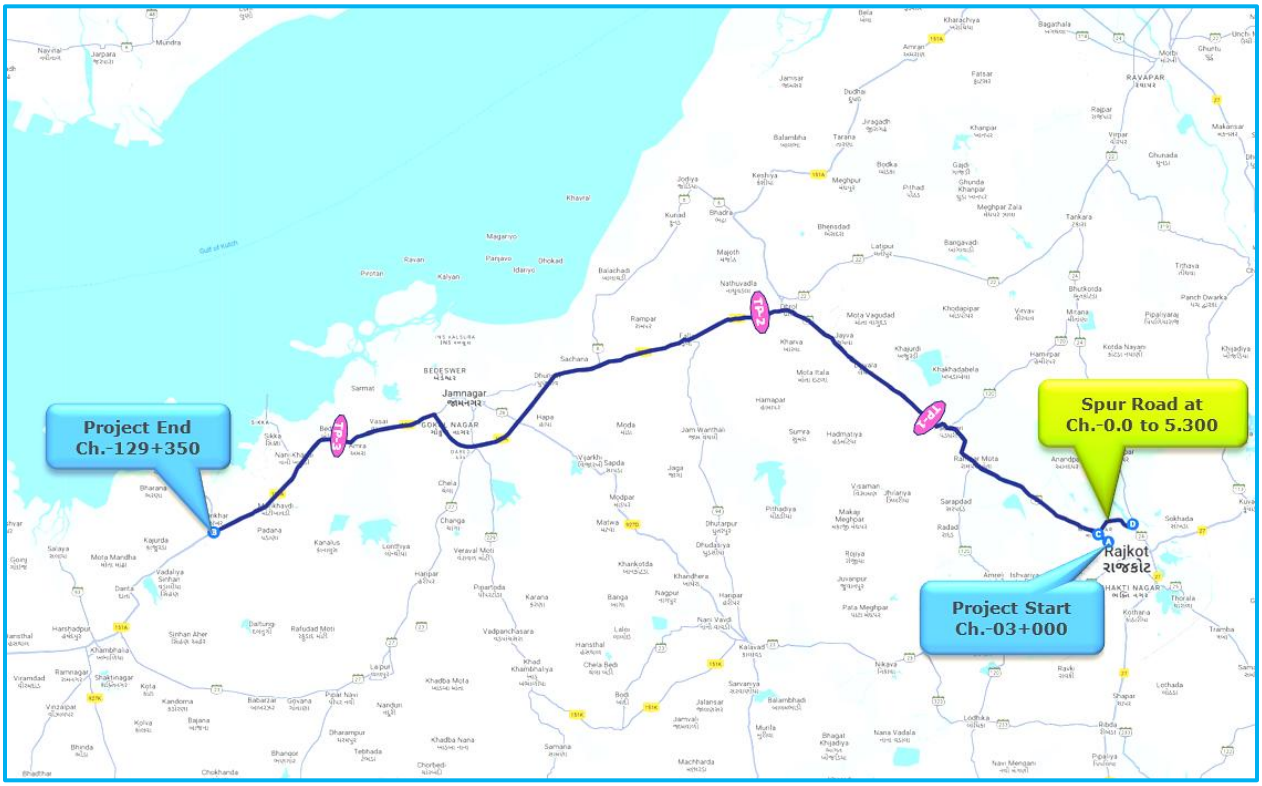
The Gujarat State Road Development Corporation Limited (GSRDC), set up by the Government of Gujarat initiated implementation of the project inviting Tender Notice no. 12/06-07 dated 09 October 2006. Following the evaluation of bids received, GSRDC accepted the bid of Larsen & Toubro Limited and issued Letter of Acceptance No. GMP/RJV/LOA/1812/2008 dated 07 August 2008.

Larsen & Toubro Limited subsequently promoted and incorporated the Concessionaire, L&T Rajkot Vadinar Tollway Private Limited, for the implementation of the project. The Concession Agreement was executed on 17 September 2008. The Appointed Date for the project was declared on 12 September 2009, marking the commencement of the 20-year Concession Period from that date.

The Project achieved Provisional Commercial Operation Date (PCOD) on 27 January 2012. COD of the project is achieved on 17 June 2023. The Project Highway is currently under the Operation and Maintenance (O&M) phase, in accordance with the provisions of the existing Concession Agreement and shall continue to operate and maintain the project highway until the end of the Concession Period.

Sekura India Management Limited completed the acquisition of the project and has been operating the project road in the same name as the former Concessionaire i.e. M/s Rajkot - Vadinar Tollway Ltd (RVTL).

Figure 3-1: Location Map of Project Stretch



3.1 Land use and Terrain

This State Highway-25 forms a primary east–west spine in Saurashtra, linking the regional growth center of Rajkot with the coastal industrial and port cluster spanning Jamnagar–Sikka–Vadinar. The corridor serves heavy industries (refining, petrochemicals, engineering), logistics parks, fisheries, and port operations, and provides connectivity to tourist and pilgrimage circuits in Dwarka district.

The project corridor of SH-25 from Rajkot to Jamnagar to Vadinar traverses predominantly through plain terrain with low and gently undulating topography, typical of the Saurashtra region of Gujarat. The subgrade comprises alluvial and residual soils with patches of hard rock in certain cut sections near Jamnagar. The soil is generally clayey–silty with moderate to low permeability. The land use along the alignment reflects a mix of agricultural, industrial, urban, and coastal landscapes.

3.2 Administrative Details of the Project

Administrative details of the project are listed below.

Table 3-1: Administrative Details of the Project

Sl. No.	Feature	Details
1	Project Name	Four laning of Rajkot-Jamnagar- Vadinar Road (SH-25) Including Spur Road
2	Mode of the Execution (BOT Toll/ BOT Annuity/ EPC/ HAM/ Others)	Build, Operate and Transfer (BOT) Basis
3	Project Phase	Tolling, Operation, Maintenance and Transfer
4	No. of Lanes/ Configuration	4 lanes
5	Length of the Project (in Km)	131.650 km
6	Authority	National Highways Authority of India (NHAI)
7	Concessionaire	Rajkot Vadinar Toll Way Limited (RVTL)
8	Independent Engineer	LSR Engineering Consultancy Services
9	Letter of Acceptance	07 August 2008
10	Date of signing of CA	17 September 2008
11	Appointed Date	12 September 2009
12	Provisional Certificate issued on	27 January 2012
13	Completion certificate issued on	22 June 2023
14	Concession end date	22 February 2030
13	Completion certificate issued on	17 June 2023
14	Total Project Cost as per CA	Rs. 774.80 Cr
15	Concession Period	20 Years

16	Concession end date	20 February 2030

3.3 Salient Features of the Project and Scope of Work

The salient features of the project are presented in Table 3-2.

Table 3-2: Salient Features of the Project

S.no	Description		Units	Total Quantities
1	Section from Rajkot (km 3.000) to Vadinar (km 129.060) MCW of SH-25 with 5.240 Spur Road		Km	131.650
2	Service Road & Slip Road		Km	7.565
3	Bypasses		Km	24.800
4	Major Intersections		Nos	9
5	Minor Intersection		Nos	117
6	Bus Bay & Shelters		Nos	54
7	Truck lay bye		Nos	50
8	Rest Area		Nos	NIL
9	Toll Plaza		Nos	3
10	Median Openings	Authorized	Nos	101
		Unauthorized	Nos	48
11	High Mast Light Locations		Nos	21
12	Solar LED Blinkers		Nos	166
13	Streetlights	Single Arm poles	Nos	16
		Double Arm poles	Nos	626
		Triple Arm poles	Nos	3
14	Fuel Stations		Nos	90
15	Pedestrian guard rail		Km	0.528
16	ECB (SOS Facility)		Nos	36
17	Gantry Boards	Cantilever Over Head	Nos	15
		Half Width Over Head	Nos	8
18	Sign Boards		Nos	1145
19	Variable message sign (VMS)	Cantilever Over Head	Nos	0
		Half Width Over Head	Nos	6
20	Entry & Exit		Nos	NIL
21	5th / Ordinary Kilometer stones		Nos	252
22	Hectometer stones		Nos	965
23	Drainage	Median Drain	Km	2.219
		Shoulder drain	Km	8.373

S.no	Description		Units	Total Quantities
		Earthen Drain	Km	168.748
		Cut Drains	Km	24.572
		Chute Drain	Km	5.331
24	Median Plantation		Km	105.946
25	Avenue Plantation		Km	56.817
26	Metal Beam Crash Barrier (MBCB)	W-beam One Side	Km	3.363
		W-beam Two Side	Km	7.747
		Single side double beam	Km	39.416
27	Concrete Crash Barrier		Km	15.432
28	Land Use	Agriculture	Km	180.404
		Residential	Km	16.193
		Commercial	Km	45.035
		Water Bodies	Km	4.132
		Industrial	Km	4.280
		Mixed	Km	12.556
29	Kerb		Km	260.689
30	Chevron Signs		Nos	220
31	Road Studs		Nos	36028
32	OHM		Nos	78
33	Delineators		Nos	91
34	Footpath		Km	9.310
35	Guard post		Nos	1858
36	Pipe railing		Km	0.242
37	Parapet wall		Km	1.024
38	Handrail		Km	2.588
39	RCC railing		Km	0.708
40	Fencing		Length (km/m)	0.040
41	CCTV		Nos	58
42	Pavement Marking		Length (km/m)	131.650

3.4 Specification and Standards

Four Laning of the Project shall comply with the Specifications and Standards set forth in Schedule D of the CA in Annex-I for construction.

The Manual for Specifications and Standards for Four Laning is applicable is for this State Highways on BOT Basis under VGH projects by GSRDC.

4. REVIEW OF CONCESSION AGREEMENT

This chapter contains a short review of the concession agreement

4.1 Brief Review of Concession Agreement

It may be noted that The Concession Agreement is primarily divided into 8 Parts and 25 Schedules that are available at the end of the CA. Contents of each of the Articles and the Schedules is briefly mentioned below.

Chapter I

Preliminary

Definition and Interpretation,

Scope of Project

Chapter II

The Concession

Grant of Concession

Conditions Precedent

Performance Security

User Fee

Concession Fee, Other Fees and Excess Revenue Sharing

Chapter III

Obligations of the concessionaire

Obligation of the concessionaire

Obligation of the GSDR

Representation and Warranties

Disclaimer

Chapter IV

Project Development and Operations

Use and development of the site monitoring and supervision of construction project completion

Test

Change of scope

Operation and maintenance monitoring and supervision during operations independent engineer

Traffic sampling

Chapter V

Financial Arrangements

Financial flows

Grant

Escrow account

State support agreement

Insurance

Accounts and audit

Chapter VI

Force Majeure

Force Majure

Chapter VII

Suspension and termination

Material breach and suspension

Compensation for breach of agreement

Termination

Divestment of rights and interests

Chapter VIII Miscellaneous

Defects liability

Assignments and charges

Change in law

Liability and indemnity

Right and title over the side

Dispute resolution

Disclosure

Redressal of public grievances

Advertising on the site

Governing law and jurisdiction

Miscellaneous

Definitions

Schedules

Schedule A: Site of the Project,

Schedule B: Development of the Project Highway

Schedule C: Project Facilities

Schedule D: Specifications and Standards

Schedule E: Applicable Permits

Schedule F: Performance Security

Schedule G: Fee Notification

Schedule H: Project Completion Schedule

Schedule I: Drawings

Schedule J: Tests

Schedule K: Completion Certificate

Schedule L: Maintenance Requirements

Schedule M: Monthly Fee Statement

Schedule N: Selection of Independent Engineer

Schedule O: Terms of Reference for Independent Engineer

Schedule P: Traffic Sampling

Schedule Q: Escrow Agreement

Schedule R: State Support Agreement

Schedule S: Safety Requirement

Schedule T: Panel of Chartered Accountants

Schedule U: Vesting Certificate

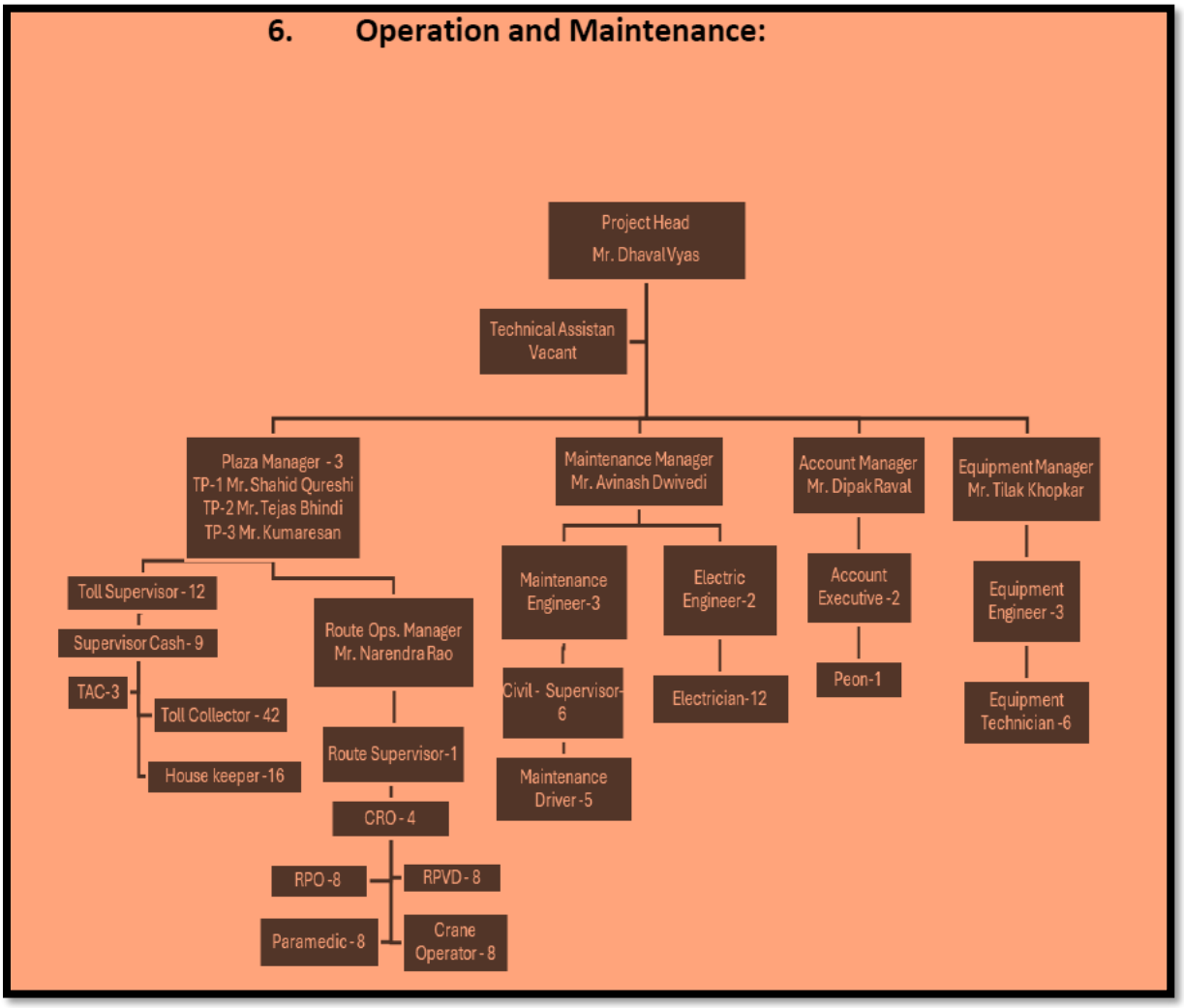
Schedule V: Substitution Agreement

Schedule W: Passenger Car Unit Factors

Schedule X: Tripartite Agreement

Schedule Y: Excess Revenue Sharing

O&M Organization Chart of Concessionaire



4.2 Operation and Maintenance activities being undertaken by the Concessionaire:

Routine Maintenance

Emergency Maintenance

Other Maintenance

Corridor Maintenance

Safety &Traffic Management

Accident Reporting

Site inspection and Action taken report

Emergency Services

Conformance to Performance Standards

Encroachment Reporting

Critical issues Reporting**:**

Details of Subcontracts

Note: No further details provided.

5. ASSESSMENT OF PROJECT ASSETS – HIGHWAY

Rajkot – Jamnagar - Vadinar corridor is a strategic state highway route in Gujarat comprising State Highway-25 (SH-25). This corridor has been upgraded from a two-lane carriageway to a four-lane divided highway to meet growing transport demands, improve safety, and support economic development.

Project Start point: The project corridor originates at Rajkot, a major commercial, industrial, and logistics hub of Saurashtra, where SH-25 interfaces with NH-27 and other regional road networks. The starting location lies on the western periphery of Rajkot city limits, providing connectivity to the city center and Rajkot International Airport.

Intermediate towns / nodes: The corridor passes through Rajkot, Jamnagar, and Devbhumi Dwarka districts, intersecting key urban centres such as Dhrol, Kalavad, Jamnagar, and Sikka, and providing linkages to feeder roads toward industrial estates, agricultural mandis, fisheries, and tourist destinations.

Project End point: The alignment terminates at Vadinar on the Gulf of Kutch coast, in Dwarka district. This end point directly serves the Vadinar Port and Refinery–Petrochemical Complex (Reliance, Nayara, and other port-based facilities), enabling high-volume freight movement to and from the hinterland.

The main carriageway comprises four lanes with a flexible pavement structure. It has been recently overlaid and is generally in good condition. However, it was observed that the overlay works have not been extended to the paved shoulders, acceleration/deceleration lanes, and bus bays.

5.1 Service Roads/ Slip Roads

Service roads have been constructed along the project corridor using flexible pavement. The overall pavement condition is satisfactory, with smooth riding quality and adequate surface integrity. Construction of service roads is still in progress at certain locations, and the sections completed to date are in good condition. Photographic evidence illustrating their current condition is presented below for reference.







Figure 5-1: Service roads.

5.2 Intersections

Intersections include both major intersections, which connect to significant regional or national routes, and minor intersections, which connect to local roads and access ways. Along the project corridor, there are a total of 195 junctions, comprising: 13 major junctions and 182 minor junctions. All junctions have been constructed using flexible pavement.

Photographic evidence of representative junctions is provided below for reference.





Figure 5-2: Major Intersections







Figure 5-3: Minor Intersections

5.3 Toll Plaza

As per the Concession Agreement, three toll plazas are located within the project corridor at the following chainages: Km 29+400 near Pada Dhari Village, Km 58+300 near Falla, and at Km 110+400.

All toll plazas are operational with Open System of Toll Collection. They operate with Hybrid ETC (Electronic Toll Collection) systems and are equipped with the following facilities - Canopy lighting, High mast lighting, administrative building, Toilet blocks and appropriate Associated safety and traffic management infrastructure. The overall condition of the toll plazas is good, with all major systems and facilities functional. Photographic evidence is presented below for reference.











Figure 5-4: Toll Plaza

5.4 Fuel Station

Fuel stations located along the project corridor, along with their respective access and egress arrangements, have been documented during the inventory and visual inspection exercise. Some photos are presented below for reference.





Figure 5-5: Fuel stations.

5.5 Bus bay and Bus Shelter

A total of 67 bus shelters are provided along both sides of the project road. However, not all shelters are equipped with dedicated bus bays, which may affect passenger safety and traffic flow at certain locations. Overall, the bus shelters are in good condition, with structural integrity and basic passenger amenities maintained. Representative photographs are presented below for reference.





Figure 5-6:Bus shelters.

5.6 Drainage System

The road drainage system along the project highway comprises the following components: Main carriageway drains, Median longitudinal lined drains, Earthen drains, Chute drains

The overall condition of these drains is good; however, regular routine and preventive maintenance—including the removal of debris, silt, and vegetation—is necessary to ensure their continued effective performance, particularly during the monsoon season. Illustrative photographs are presented below for reference.





Figure 5-7: Drainage system.

5.7 Median opening

Median openings along the project highway have been provided. However, during the site inspection, numerous unauthorized median cuts were observed. These unapproved openings pose significant road safety hazards by creating uncontrolled turning and crossing movements and therefore require closure or appropriate traffic management interventions. Representative photographs are presented below for reference





Figure 5-8: Median Opening

5.8 Metal Beam Crash Barriers

Metal Beam Crash Barriers have been provided along the main carriageway of the project, specifically at locations with high embankments and built-up area. In built-up areas, W-Beam double-facing crash barriers have been installed, while at high embankment locations, single-post double W-beam barriers have been installed along the outer shoulder. All installed barriers are observed to be in good condition. Relevant photographs of the metal beam crash barriers are also enclosed below for reference.







Figure 5-9: Metal Beam Crash Barriers

5.9 Traffic Signage

The road signage system along the project highway comprises a combination of roadside signs, overhead gantry-mounted signs, cantilever-mounted signs, kerb-mounted signs, and median signs. The inventory includes: 1,145 roadside sign boards, 15 cantilever overhead signs, 8 overhead gantry-mounted signs. All signs are generally in good condition, with satisfactory visibility, legibility, and retro-reflectivity. Few photographs are presented below for reference.













Figure 5-10: Traffic Signs

5.10 Highway lighting

Highway lighting along the project corridor is provided at built-up locations using single-arm and double-arm light poles. High mast lighting is installed at toll plazas and major intersections to ensure adequate illumination and enhance safety. All lighting systems are properly maintained and are in good working condition. In addition, solar blinker signals are installed at median openings and intersection locations to provide advance warning and improve night-time visibility. Some photographs are presented below for reference.







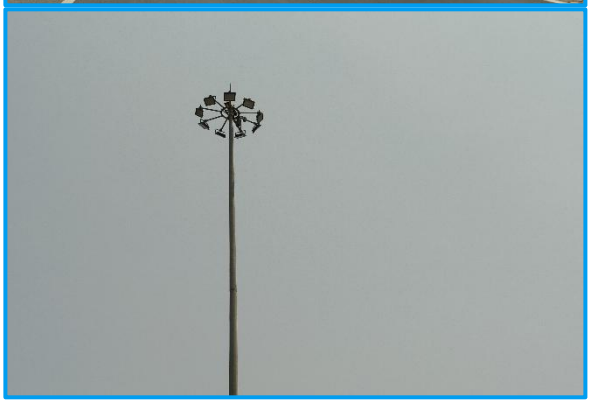






Figure 5-11: Highway Lighting

5.11 Plantation

Median and avenue plantations are provided along the project corridor as part of the landscaping works. These plantations not only enhance the aesthetic appeal of the highway but also serve functional purposes, including Reducing glare from oncoming headlights, controlling vehicle speeds through visual narrowing of the carriageway, Moderating Road surface temperatures, Contributing to improved air quality. During the site inspection, it was observed that while most locations are well-maintained, some shrubs and plants show signs of overgrowth requiring pruning, while others have dried out and require regular watering, maintenance, or replacement. Representative photographs are presented below for reference.











Figure 5-12: Avenue and Median Plantation

5.12 Kilometre stone/Hectometre stones

Kilometre and hectometre stones are mostly visible along most of the stretch however some of them found uprooted / damaged or script is faded which requires routine maintenance. Photographs are shown below.





Figure 5-13: Kilometre Stones & Hectometre Stones

6. ASSESSMENT OF PROJECT ASSETS – STRUCTURES

6.1 Structural Inventory

The project involves a 131.65 km stretch of State Highway 25 (SH-25), starting from chainage 03+000 at Rajkot and ending at chainage 129+000 near Vadinar, Gujarat. This includes a 5.300 km spur road. The visual condition survey of all the structures is carried out by Structural Expert/Bridge Engineer of the consultant team with an inspection is aimed at identifying and quantifying deterioration, which may be caused by applied loads and factors such as deadload, live load, wind load and physical (e.g. wear, abrasion) / chemical (e.g. corrosion due to environmental exposure) influences. Apart from inspection of bridge damage caused by unpredictable natural phenomena (e.g., earthquake, flood) or collision by vehicles or vessels, inspection is also needed to identify or follow up the effect of any built-in imperfections. Inspection can also provide insights into the structural condition to address issues proactively, helps in devising necessary remedial measures to enhance safety and performance, contributes to extending the service life of bridges through timely intervention and maintenance strategies.

Table 6-1: Summary of Structures

Sl. No.	Item	Total
1	Major Bridges	14
2	Minor Bridges	60
3	ROB	4
4	VUP	2
5	SVUP	2
6	PUP/CUP	6
7	Culvert	223 (HP 147 nos & BC 76 nos)

The survey did not reveal any major structural failures; however, several minors to moderate deficiencies were noted. These include surface cracks, exposed reinforcement, honeycombing in concrete components, clogged drainage spouts, and vegetation growth on superstructure and substructures. Issues such as damaged or missing filler material in expansion joints between abutments and return walls and between old and new structures, along with visible water stains indicating leakage, were also observed on several bridges. Cracks were identified in the walls, beams, and slabs of both minor and major bridges; while spalling and exposed reinforcement were noted at construction joints, pier and abutment edges, and longitudinal slab edges. Additionally, several expansion joints were found clogged, compromising their performance. Return walls were checked for separation from abutments, and potential differential settlement was assessed through cracking patterns in return and wing walls. The condition of stone pitching near abutments was also reviewed to verify slope protection and slope stability.

RCC and metal crash barriers, parapets, and railings were found damaged at several locations, indicating the need for safety-related repair or replacement. Uncontrolled vegetation growth was observed around culverts, bridges, and ROBs, potentially affecting drainage and accelerating deterioration. Vertical, horizontal, and inclined cracks were also observed in the walls and slabs of minor bridges and vehicle underpasses (VUPs), particularly in abutment walls, indicating the need for preventive maintenance measures. Overall, the overall condition of the structures was found to be generally sound and in a fair state of maintenance based on the observations made during the survey.

Following codes are used for the condition rating of the structural members.

Code	Description
N	NOT APPLICABLE
9	EXCELLENT CONDITION
8	VERY GOOD CONDITION - no problems noted
7	GOOD CONDITION – some minor problems
6	SATISFACTORY CONDITION - structural elements show some minor deterioration
5	FAIR CONDITION - all primary structural elements are sound but may have minor section loss, cracking, spilling or scour
4	POOR CONDITION - advanced section loss, deterioration, Spalling or scour
3	SERIOUS CONDITION - loss of section, deterioration, spelling, or scour have seriously affected primary structural components Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present
2	CRITICAL CONDITION - advanced deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken
1	IMMINENT' FAILURE CONDITION - major deterioration or section loss present in critical structural components or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic, but corrective action may put back in light service.
0	FAILED CONDITION - out of service - beyond corrective action

6.2 Major Bridge

There are 14 major bridges along this road stretch. During the visual inspection, it was found that the main structural parts like abutments, piers, girders, and slabs are mostly found to be sound condition. However, several minors to moderate issues were observed that need attention. Vegetation growth was seen on side slopes and pier caps, which can cause erosion and affect durability. Many expansion joints were found clogged or damaged, and drainage spouts were choked at multiple locations, which may lead to water stagnation and leakage onto the substructure.

Table 6-2: Detailed Distresses of Major Bridges

S.no	Assessment
1	There are several concrete-related defects like spalling, honeycombing, and cracks noticed in deck slabs, crash barriers, and girders. In bridges such as CH-51+850 and CH-89+100, multiple transverse and inclined cracks were observed in girder soffits and bottom bulbs, which could lead to structural weakening if left untreated. Honeycombs and exposed reinforcement were noted on pier caps, abutment caps, and seismic restrainers. These issues reduce the protective cover over reinforcement, making the reinforcement prone to corrosion and subsequent deterioration of the structure. There are also signs of water leakage and erosion. In locations like CH-56+600 and CH-80+650, water was leaking between the deck slab and drainpipes. Stone pitching, which helps prevent soil erosion near bridge ends, was found partially damaged at several chainages. Behind abutments at CH-91+880 and CH-127+500, soil erosion and void formation were observed, which can affect the stability of approach sections and the substructure if not repaired. There are safety concerns as well. Crash barriers were cracked and had exposed reinforcement in many locations such as CH-4+800 and CH-128+300. Footpaths were found damaged or uneven, and railings had deep spalling. In few places, such as CH-91+880, utilities were clamped directly to the side face of slabs, which is not ideal. Although the overall structural stability of the bridges is good, these maintenance and safety issues must be addressed quickly to avoid long-term damage and ensure road user safety.

Details of major bridge structures on the Project Highway are as per Table 6.23: as given below.

Table 6-3: Detail List of Major Bridges

S.no	Chainage (Km)	Str On	Type of Structure	Deck Width (m)	Span Arrangement (m)	POT-PTFE Bearings (Nos)	Elastomeric bearings (Nos)	Nos Strip seal Expansion joint	Type of Super-structure
1	28+264	MCW	Old	12	19X13.5	0	152	20	RC Girder with RCC Slab
		MCW	New	12	9x27+1x13.5	0	80	11	Precast PSC girders with RC slab with sacrificial form work
2	51+850	MCW	New	12	6x20.6	48	0	7	Precast PSC girders with RC slab with sacrificial form work
		MCW	Old	12	12x10.3	0	0	0	RCC Slab
3	56+600	MCW	New	12	7x26.6	56	0	8	Precast PSC girders with RC slab with sacrificial form work
		MCW	Old	12	14x13.3	0	112	15	RC Girder with RCC Slab
4	57+166	MCW	New	12	6x24.6	48	0	7	Precast PSC girders with RC slab with sacrificial form work
		MCW	Old	12	6x24.6	0	48	7	Cast-in-situ-RCC girder and slab
5	63+680	MCW	Old	12	8x10.2	0	0	0	RCC Slab
		MCW	New	12	4x20.4	32	0	5	Precast PSC girders with RC slab with sacrificial form work
6	80+650	MCW	Old	12	3x25	24	0	4	Precast PSC girders with RC slab with sacrificial form work
		MCW	New	12	3x25	24	0	4	Precast PSC

S.no	Chainage (Km)	Str On	Type of Structure	Deck Width (m)	Span Arrangement (m)	POT-PTFE Bearings (Nos)	Elastomeric bearings (Nos)	Nos Strip seal Expansion joint	Type of Super-structure
									girders with RC slab with sacrificial form work
7	89+100	MCW	Old	12	6x25	48	0	7	Precast PSC girders with RC slab with sacrificial form work
		MCW	New	12	6x25	48	0	7	Precast PSC girders with RC slab with sacrificial form work
8	91+880	MCW	New	12	10x8	80	0	11	Precast PSC girders with RC slab with sacrificial form work
		MCW	Old	9	10x8	0	0	0	RCC Slab
9	102+150	MCW	Old	12	7x12	32	0	0	RCC Slab
		MCW	New	12	4x21	0	192	5	PSC Girder with RCC Slab
10	108+600	MCW	New	12	3x21.5+1x10.5	32	0	5	PSC Girder with RCC Slab
		MCW	Old	12	7x10.5	0	168	0	RCC Slab
11	111+400	MCW	New	12	13x10	104	0	14	I Girder
		MCW	Old	12	13x10	0	0	0	RCC Slab
12	127+500	MCW	New	12	5x20	40	0	6	I Girder
		MCW	Old	12	10x10	0	0	0	RCC Slab
13	128+300	MCW	New	12	3x24	24	0	4	I Girder
		MCW	Old	12	6x12	0	0	0	RCC Slab
14	4+800	MCW	New	11.5	8x21.5	0	64	9	Precast PSC Girder with RCC Slab
		MCW	Old	8.25	8x12.5	0	48	9	RCC Girder with RCC Slab

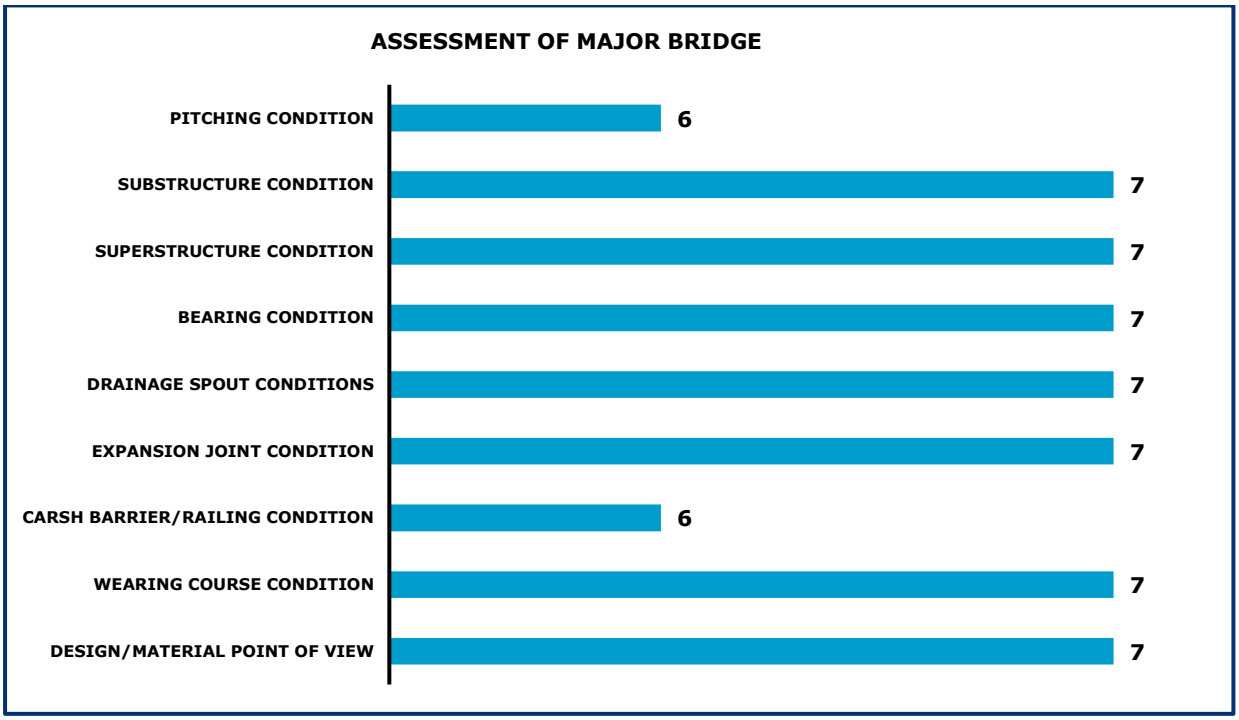


Figure 6-1: Comparative assessment of Major Bridges

Photographs of Major Bridge are presented here under.



Piers of a Structure at Chainage 28+264



Crack in Soffit of Bridge Girder Chainage 51+850



Reinforcement Exposed in Slab at Chainage 56+600



Top View of MJB at Chainage 57+166



Major Bridge Pier at Chainage 63+680



Stone Pitching damaged at Chainage 80+650



Edge Crack on Pier Cap at Chainage 89+100



Heaving Observed near Abutment of a Major Bridge at Chainage 91+880



MJB at Chainage 102+150



Major Bridge at Chainage 108+600





Reinforcement Exposed at Pier Cap at Chainage 111+400



MJB at Chainage 128+300

MJB at Chainage 127+500



Railing damage at chainage 4+800 (Spur Road)

Figure 6-2: Site Photographs of Major Bridges

6.3 Minor Bridge

There are 60 minor bridges along the project corridor that were thoroughly inspected to assess their current condition, structural integrity, and maintenance requirements. This detailed condition survey was carried out to identify any visible damages, functional deficiencies, or safety concerns that could affect the long-term performance and serviceability of these structures.

Most of the bridges are currently functioning and in serviceable condition; however, varying degrees of deterioration were observed across several structures. The key issues identified during the assessment include foundation scouring, concrete deterioration, safety barrier damage, drainage problems, vegetation growth, and general lack of preventive maintenance.

Table 6-4: Detailed Distresses of Minor Bridges

S. No	Assessment
1	Foundation protection emerged as a major area of concern. At several locations — such as Ch. 4+632, 4+855, and 12+795 — significant scour was observed beneath bottom slabs of box culverts and around abutments, indicating erosion caused by water flow. Missing or damaged stone pitching and apron protections were recorded at multiple locations like Ch. 13+063, 17+669, 74+410, and 82+300, leaving embankments vulnerable to further erosion, especially during high flow or flood conditions. In terms of structural deterioration, several bridges exhibited spalling of concrete, exposing reinforcement steel which can accelerate corrosion. Such conditions were found at locations including Ch. 7+386, 29+789, 41+217, 42+470, 74+680, and 82+950. Honeycombing due to poor compaction during construction was observed at Ch. 46+535, 71+120, 73+210, and 77+500. Various cracks, — both longitudinal and transverse, — were noted in the deck slabs and girders, allowing water infiltration which may lead to further deterioration if left unaddressed. Safety features were also found to be deficient at many locations. Damaged or missing RCC crash barriers and metal beam crash barriers were observed at Ch. 7+036, 18+193, 27+201, and 47+930, posing a serious risk to vehicular safety. Vegetation growth was commonly observed on structural elements at locations like Ch. 24+600, 105+680, and 112+320, which can lead to moisture retention, further concrete damage, and root-induced cracking. Drainage systems were often found clogged or damaged at locations such as Ch. 22+150, 100+950, 123+920, and 128+690, leading to water accumulation on deck surfaces that accelerates material and structural

S. No	Assessment
	deterioration. Clogged or broken expansion joints were also noted, which may restrict thermal movements and induce additional stresses in the structure. While none of the bridges show immediate risk of collapse, several are exhibiting progressive deterioration that requires prompt attention. Without timely maintenance interventions, these minor issues could escalate into major structural failures, significantly increasing future rehabilitation costs. It is strongly recommended to undertake urgent repairs on structures exhibiting exposed reinforcement, severe spalling, and active scour conditions. Medium-term maintenance actions such as repairing damaged crash barriers, cleaning and repairing drainage spouts, removing vegetation, sealing cracks, and restoring protection works should be carried out in a planned and phased manner. Regular inspections and monitoring should also be institutionalized to ensure early detection of any future deterioration. In cases where advanced damage is observed, further detailed structural investigations may be necessary to assess the requirement for strengthening or rehabilitation measures. Proactive and timely maintenance will ensure the safe functioning of these structures while optimizing long-term maintenance costs.

Details of minor bridge structures on the Project Highway are as per Table 6.35.

Table 6-5: Detail List of Minor Bridges

S. No.	Existing (km)	Side	Span Arrangement (m)	Deck Width (m)	Type of Super Structure	Type of Sub Structure
1	4+374	LHS SR	3X4	21	RCC Box	RCC Wall
		RHS SR	3X4	21		
2	4+632	LHS SR	7X4	21	RCC Box	RCC Wall
		RHS SR	7X4	21		
3	4+855	LHS SR	2X4	21	RCC Box	RCC Wall
		RHS SR	2X4	21		
4	7+036	LHS MCW	6X4	10.8	RCC Box	RCC Wall
		RHS MCW	6X4	10.8		
5	7+386	LHS MCW	3X6.25	10.8	RCC Box	RCC Wall
		RHS MCW	3X6.25	10.8		
6	12+795	LHS MCW	4X4	12.45	RCC Box	RCC Wall
		RHS MCW	4X4	11.2		
7	13+063	LHS MCW	5X4	12.2	RCC Box	RCC Wall
		RHS MCW	5X4	12.2		
8	17+669	LHS MCW	3X3	12.2	RCC Box	RCC Wall
		RHS MCW	3X3	12.2		
9	18+193	LHS MCW	3X2.5	13.5	RCC Box	RCC Wall
		RHS MCW	3X2.5	13.5		
10	22+150	LHS MCW	1X25	12	PSC Girder	RCC Wall
		RHS MCW	1X25	12		

S. No.	Existing (km)	Side	Span Arrangement (m)	Deck Width (m)	Type of Super Structure	Type of Sub Structure
11	23+385	LHS MCW	4X7	12.5	RCC Box	RCC Wall
		RHS MCW	4X7	12.5		
12	24+600	LHS MCW	3X6	12.5	RCC Box	RCC Wall
		RHS MCW	3X6	12.5		
13	26+131	LHS MCW	3X9.5	12.5	RCC Box	RCC Wall
		RHS MCW	3X9.5	12.5		
14	27+201	LHS MCW	4X6	9	RCC Box	RCC Wall
		RHS MCW	4X6	9		
15	29+052	LHS MCW	3X4	13.7	RCC Box	RCC Wall
		RHS MCW	3X4	13.7		
16	29+789	LHS MCW	3X6	12.5	RCC Box	RCC Wall
		RHS MCW	3X6	12.5		
17	31+441	LHS MCW	2X6	11.5	RCC Box	RCC Wall
		RHS MCW	2X6	11.5		
18	32+576	LHS MCW	4X3	14.2	RCC Box	RCC Wall
		RHS MCW	4X3	14.2		
19	33+100	LHS MCW	2X3.15	14.5	RCC Box	RCC Wall
		RHS MCW	2X3.15	14.5		
20	37+145	LHS MCW	4X3	12.5	RCC Box	RCC Wall
		RHS MCW	4X3	12.5		
21	41+217	LHS MCW	4X4	13.5	RCC Box	RCC Wall
		RHS MCW	4X4	13.5		
22	42+470	LHS MCW	3X4	12.5	RCC Box	RCC Wall
		RHS MCW	3X4	12.5		
23	45+756	LHS MCW	3X4	12.5	RCC Box	RCC Wall
		RHS MCW	3X4	12.5		
24	46+535	LHS MCW	4X2.5	12.5	RCC Box	RCC Wall
		RHS MCW	4X2.5	12.5		
25	46+706	LHS MCW	4X2.5	12.5	RCC Box	RCC Wall
		RHS MCW	4X2.5	12.5		
26	47+763	LHS MCW	3X2.5	12.5	RCC Box	RCC Wall
		RHS MCW	3X2.5	12.5		
27	47+930	LHS MCW	3X2.5	12.5	RCC Box	RCC Wall
		RHS MCW	3X2.5	12.5		
28	53+076	LHS MCW	4X4	12.5	RCC Box	RCC Wall
		RHS MCW	4X4	12.5		

S. No.	Existing (km)	Side	Span Arrangement (m)	Deck Width (m)	Type of Super Structure	Type of Sub Structure
29	53+179	LHS MCW	8X4	12	RCC Box	RCC Wall
		RHS MCW	8X4	12		
30	54+858	LHS MCW	3X6	12	RCC Box	RCC Wall
		RHS MCW	3X6	12		
31	55+223	LHS MCW	10X4	12.5	RCC Box	RCC Wall
		RHS MCW	10X4	12.5		
32	55+354	LHS MCW	2X20.4	12.5	PSC Girder	RCC Wall
		RHS MCW	4X10.4	12.5	RCC Slab	
33	70+800	LHS MCW	2X6	12.5	RCC Slab	RCC Wall
		RHS MCW	2X6	12.5		
34	71+050	LHS MCW	2X6	12.5	RCC Slab	RCC Wall
		RHS MCW	2X6	12.5		
35	71+120	LHS MCW	2X21	12	PSC girder	RCC Wall
		RHS MCW	4X10.5	12	RCC Slab	
36	72+200	LHS MCW	2X18.8	12	PSC girder	RCC Wall
		RHS MCW	4X9.4	12	RCC Slab	
37	73+210	LHS MCW	3X4	12	RCC Slab	RCC Wall
		RHS MCW	3X4	12		
38	73+380	LHS MCW	3X4	11.2	RCC Slab	RCC Wall
		RHS MCW	3X4	11.2		
39	74+410	LHS MCW	2X3	12	RCC Slab	RCC Wall
		RHS MCW	2X3	12		
40	74+680	LHS MCW	3X3	13	RCC Slab	RCC Wall
		RHS MCW	3X3	13		
41	77+500	LHS MCW	2x3	12	RCC Box	RCC Wall
		RHS MCW	2x3	12		
42	77+740	LHS MCW	2x4	12.75	RCC Slab	RCC Wall
		RHS MCW	2x4	12.75		
43	78+915	LHS MCW	2x3	12	RCC Slab	RCC Wall
		RHS MCW	2x3	12		

S. No.	Existing (km)	Side	Span Arrangement (m)	Deck Width (m)	Type of Super Structure	Type of Sub Structure
44	79+100	LHS MCW	2x3	12	RCC Box	RCC Wall
		RHS MCW	2x3	12	RCC Box	
45	79+600	LHS MCW	3x6	12	RCC Slab	RCC Wall
		RHS MCW	3x6	12	RCC Box	
46	80+390	LHS MCW	1x5	12	RCC Slab	RCC Wall
		RHS MCW	1x5	12		
47	81+050	LHS MCW	1x7	12	RCC Slab	RCC Wall
		RHS MCW	1x7	12		
48	81+610	LHS MCW	1x7	12	RCC Slab	RCC Wall
		RHS MCW	1x7	12		
49	82+300	LHS MCW	3x7	12	RCC Box	RCC Wall
		RHS MCW	3x7	12		
50	82+950	LHS MCW	1x25	12	PSC Girder	RCC Wall
		RHS MCW	1x25	12		
51	83+250	LHS MCW	1x5	12	RCC Slab	RCC Wall
		RHS MCW	1x5	12		
52	100+950	LHS MCW	2x20	12	PSC Girder	RCC Wall
		RHS MCW	4x10	12	RCC Slab	
53	105+680	LHS MCW	2x4	12.5	RCC Box	RCC Wall
		RHS MCW	2x4	12.5		
54	105+800	LHS MCW	3x4	12.5	RCC Box	RCC Wall
		RHS MCW	3x4	12.5		
55	105+980	LHS MCW	2x4	12.5	RCC Box	RCC Wall
		RHS MCW	2x4	12.5		
56	109+200	LHS MCW	3x10	12	RCC Slab	RCC Wall
		RHS MCW	3x10	12		
57	109+850	LHS MCW	6x5	13.5	RCC Box	RCC Wall
		RHS MCW	6x5	13.5		
58	112+320	LHS MCW	2x4	13.5	RCC Box	RCC Wall
		RHS MCW	2x4	13.5		
59	116+250	LHS MCW	2x11	12.5	RCC Box	RCC Wall
		RHS MCW	2x11	12.5		

S. No.	Existing (km)	Side	Span Arrangement (m)	Deck Width (m)	Type of Super Structure	Type of Sub Structure
60	123+920	LHS MCW	2x10.5	12	PSC Girder	RCC Wall
		RHS MCW	1x21	12	RCC Slab	
61	126+050	LHS MCW	2x24	16	PSC Girder	RCC Wall
		RHS MCW	4x12	16		
62	128+690	LHS MCW	2x24	13	PSC Girder	RCC Wall
		RHS MCW	3x16	13	RCC Slab	
63	5+150(SPUR Rd.)	LHS MCW	2x7	12	RCC Slab	RCC Wall
		RHS MCW	2x7	11.5		

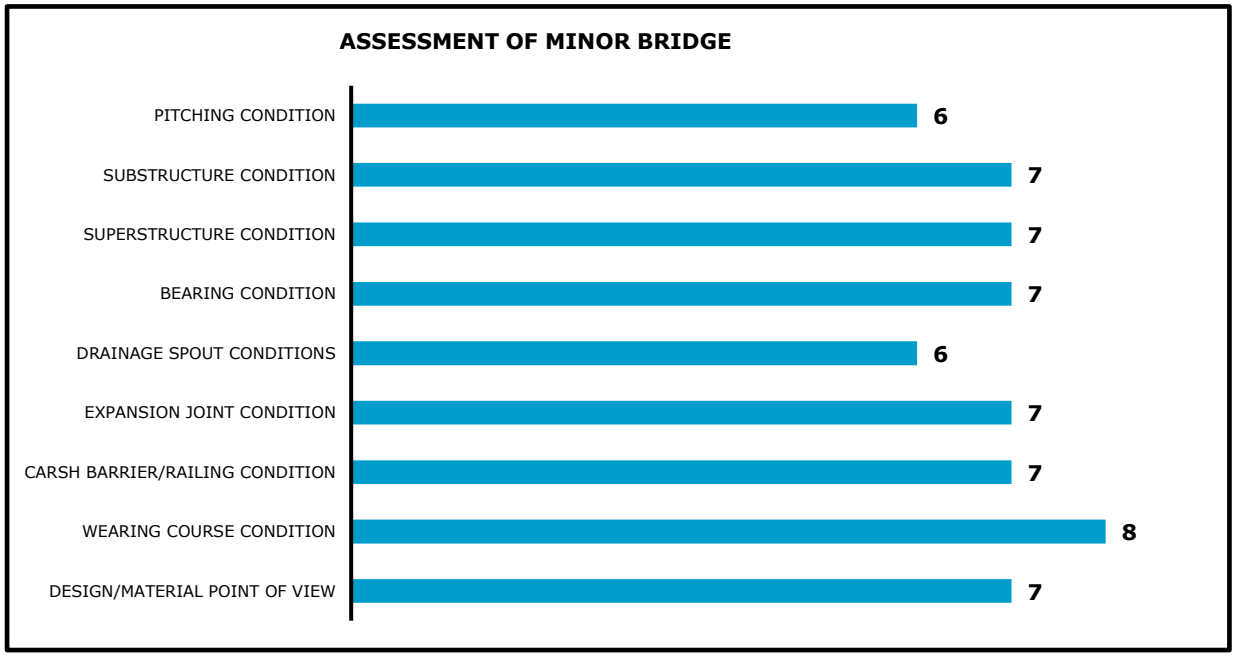


Figure 6-3: Comparative assessment of Minor Bridges

Photographs of Minor Bridge are presented here under.



Bottom Scouring at Chainage 4+632



MNB at Chainage 7+036



Vegetation Growth at Chainage 7+386



MNB at Chainage 13+63



Stone Pitching damage at Chainage 17+669



Water flow blockage observed at Chainage 18+193





Honeycombing, wide and long cracks observed on girder soffit at Chainage 22+150



MNB at Chainage 24+600



MNB at Chainage 26+131



Vegetation observed on MNB at Chainage 27+201



MNB at Chainage 29+052



Crack on wall at MNB at Chainage 29+789



Joint leakage at MNB at Chainage 32+576



Reinforcement Exposed at chainage 42+470



Honey combing, lack of filler in the joint gap at MNB at Chainage 45+756



Reinforced exposed on pier at Chainage 55+223



MNB at Chainage 71+050



Honeycombing on pier at Chainage 73+210



Crack on pier at Chainage 74+680

Pitching damage at MNB at Chainage 47+930



Vertical Crack at Chainage 70+800



Spalling on pier at Chainage 71+120



Honeycombing on slab at Chainage 74+410



Reinforcement exposed on slab at Chainage 77+500



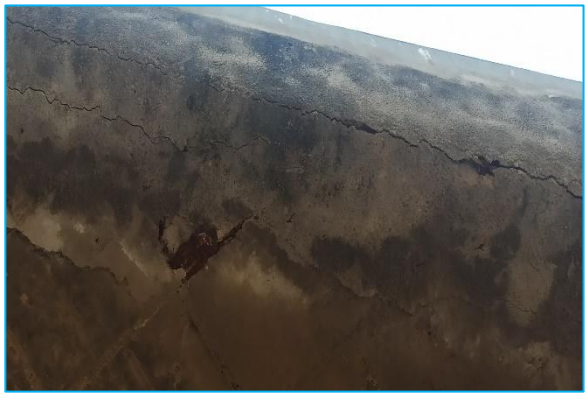
Reinforcement exposed on edge slab at Chainage 79+600



Reinforcement exposed on joint slab at Chainage 80+390



Reinforcement exposed on pier at Chainage 82+300



Cracks observed on deck slab edge at Chainage 126+050



Clogged expansion joint at Chainage 128+690



Pitching damaged at chainage 5+150 (Spur Rd)

Figure 6-6-4: Site Photographs of Minor bridge

6.4 ROB (Railway Over Bridge)

There are 4 Railway Over Bridges (ROBs) along the project stretch, generally in fair to satisfactory condition with localized distresses.

Table 6-6: Detailed Distresses of ROB

S. No	Assessment
1	At Ch. 24+400, vertical cracks, spalling, exposed reinforcement on pedestals, rotated bearing, and clogged expansion joints are observed. At Ch. 83+550, wide cracks, spalling with exposed reinforcement at abutments and deck slab edges, damaged footpath, and approach slab cuts are noted. At Ch. 96+700, vegetation growth, spalling on RE panels and pier cap soffit, crash barrier

S. No	Assessment
	damage. At Ch. 0+800, minor cracks with vegetation growth are seen, though the structure remains sound.

Table 6-7: Detail List of ROB

No	Chainage (km)	Side	Span Arrangement (m)	Deck Width (m)	POT-PTFE Bearings (Nos)	Nos of Elastomeric bearings	Type of Super Structure	Type of Sub Structure
1	24+400	LHS	1x25+1x12.5	11.8	10	10	Steel I Girder & PSC Girder	RCC Wall
		RHS	1x25+1x12.5	11.8	10	10		
2	83+550	LHS	1x30	11.8	10	0	Steel Girder	RCC Wall
		RHS	1x20	8	8	0		
3	96+700	LHS	1x15+1x20+1x10	11.25	0	20	Steel Girder	RCC Wall
		RHS	1x15	11.25	0	6	PSC girder	
4	0+800(Spur Rd.)	LHS	1x25	11.25	10	0	Steel Girder	RCC Wall
		RHS	1x25	11.25	10	0		

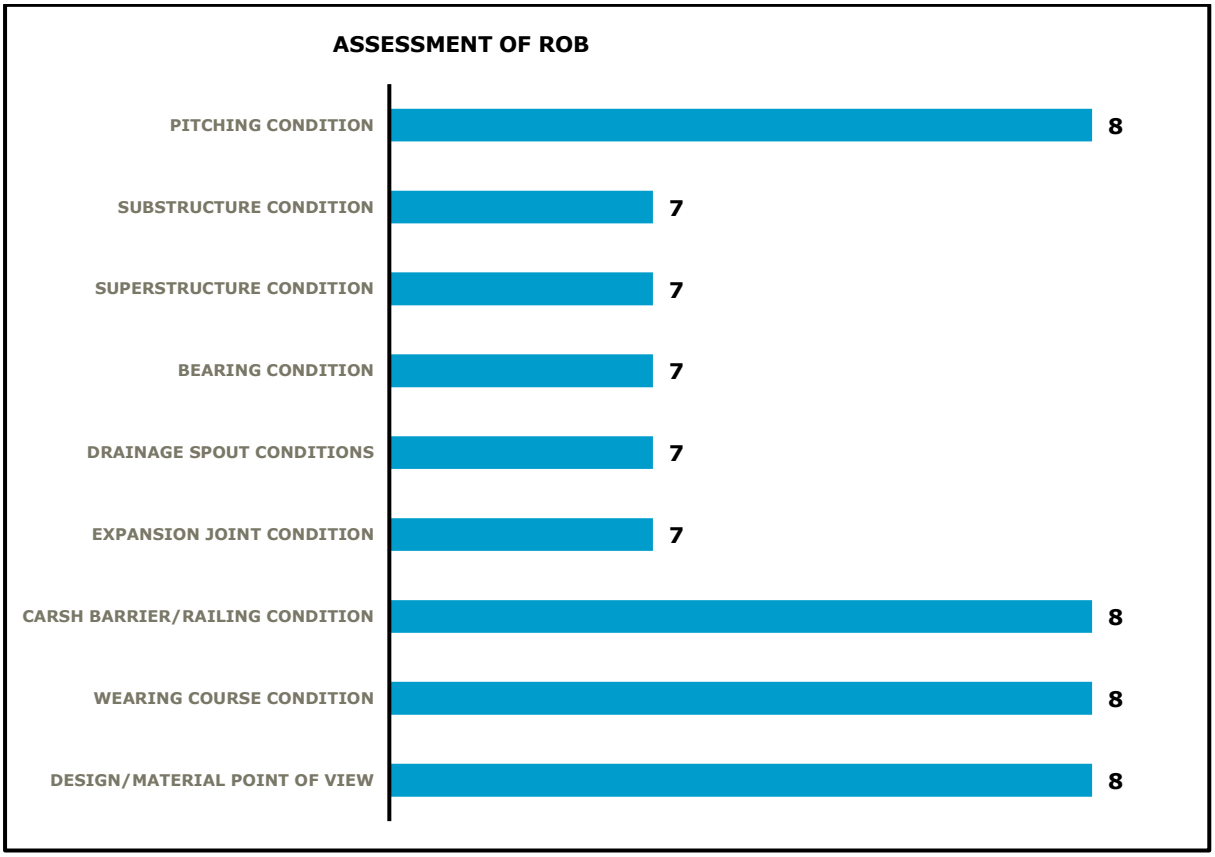


Figure 6-5: Comparative assessment of ROB.

Typical Photographs of ROB are presented hereunder.



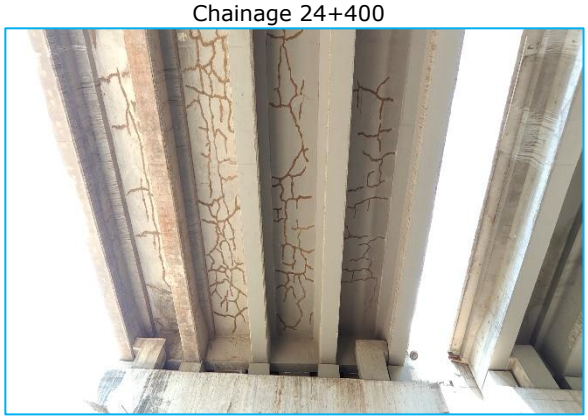
ROB at Chainage 24+400



Wide multiple cracks observed on pdestral at Chainage 24+400



Bearing in Good Condition at Chainage 24+400



Crack filled with epoxy on slab at Chainage 24+400



Crack Observed on abutment side at Chainage 83+550



Spalling on deck slab at Chainage 83+550





Pitching damage at Chainage 83+550



Footpath damage at Chainage 83+550



Bearings are in good condition at ROB 96+700

Vegetation Growth on RE Wall at Chainage 96+700





ROB at Chainage 0+800(Spur Rd)

Vegetation Growth on RE Wall at Chainage 0+800(Spur Rd)

Figure 6-6-6: Site Photographs of ROB

6.5 Vehicular Underpass

There are 2 Vehicular Underpasses (VUPs) along the project stretch. Overall, the structural condition of these underpasses is good. Minor maintenance works, such as cleaning of the carriageway, expansion joints, and removal of vegetation, are required. Several cracks observed on the slab have been epoxy grouted, and the structures remain in good condition at both locations.

Table 6-8: Detail List of Vehicular Underpass

S. No.	Existing (km)	Side	Span Arrangement (m)	vertical Clearance	Deck Width	Type of Super Structure	Type of Sub Structure
1	96+550	LHS	1x7	5.5	12	RCC Slab	RCC Wall
		RHS	1x7	5.5	12	RCC Slab	RCC Wall
2	96+680	LHS	1x7	5.5	12	RCC Slab	RCC Wall
		RHS	1X7	5.5	12	RCC Slab	RCC Wall

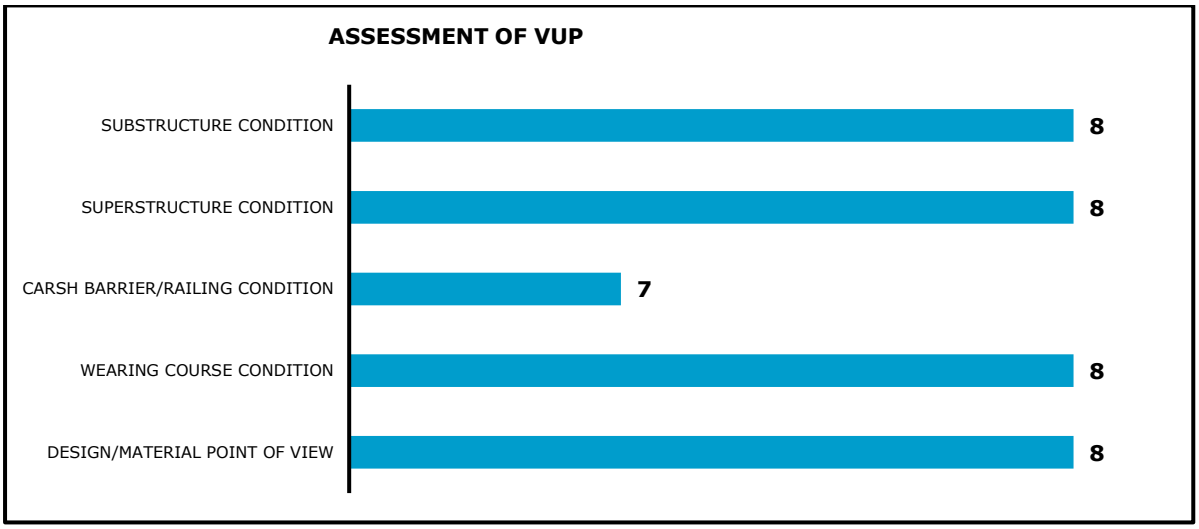


Figure 6-7: Comparative assessment of VUP.

Photographs of VUP are presented here under.



VUP at Chainage 96+550



VUP at Chainage 96+680

Figure 6-6-8: Site Photographs of VUP

6.6 Small Vehicular Underpass

There are three Small Vehicular Underpasses (SVUPs) at Ch. 0+650, 0+950, and 52+475 along the project stretch. The SVUPs at Ch. 0+650 and 0+950 are in good condition. However, at Ch. 52+475, multiple cracks are observed in both the slab and walls, including transverse, longitudinal, and inclined cracks. A list of these SVUPs, along with their configurations and respective locations, is provided in the table below.

Table 6-9: Detail List of Small Vehicular Underpass

Sl. No	Existing (km)	Side	Span Arrangement (m)	vertical Clearance	Deck Width (m)	Type of Super Structure	Type of Sub Structure
1	52+475	LHS	1x10	4	12.5	RCC Slab	RCC Wall
		RHS	1x10	4	12.5	RCC Slab	RCC Wall
2	0+545(Spur Rd)	LHS	1x10	4	12.5	RCC Slab	RCC Wall
		RHS	1x10	4	12.5	RCC Slab	RCC Wall
3		LHS	1x10	4	12.5	RCC Slab	RCC Wall

Sl. No	Existing (km)	Side	Span Arrangement (m)	vertical Clearance	Deck Width (m)	Type of Super Structure	Type of Sub Structure
	1+120(Spur Rd)	RHS	1x10	4	12.5	RCC Slab	RCC Wall

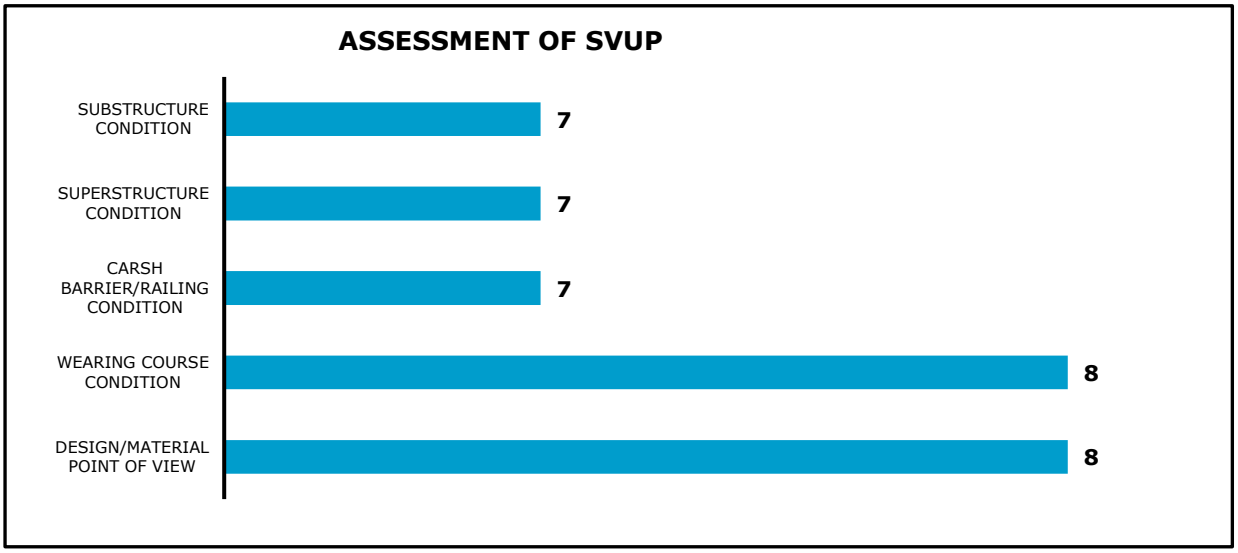


Figure 6-9: Comparative assessment of SVUP.

Typical Photographs of LVUP are presented hereunder.



SVUP at Chainage 52+475



SVUP at Chainage 52+475



SVUP at Chainage 0+545 (Spur Rd)



SVUP at Chainage 1+120 (Spur Rd)

Figure 6-6-10: Site Photographs of SVUP

6.7 Pedestrian/Cattle Underpass

There are 6 PUPs/CUPs along the project stretch. Overall, the structural condition of these underpasses is good.

Table 6-10: Detailed Distresses of PUP & CUP

S. No	Assessment
1	The PUPs located at Ch. 54+780, Ch. 63+250, and Ch. 71+750 are generally in satisfactory condition; however, reinforcement exposure is observed on abutment at Ch. 54+780, and vegetation growth is present on top of the slabs at all locations. The CUPs located at Ch. 71+550 and Ch. 71+450 are in good condition, though honeycombing and cracks at construction joints are observed on abutment and long transverse cracks in the slab on RHS have been epoxy grouted.

Table 6-11: Detail List of Pedestrian/Cattle Underpass

Existing (km)	Side	Span Arrangement (m)	Deck Width (m)	Type of Super Structure	Type of Sub Structure
54+780	LHS	1x6	12	RCC Slab	RCC Wall
	RHS	1x6	12	RCC Slab	RCC Wall
63+250	LHS	1x3	8.5	RCC Slab	RCC Wall
	RHS	1x3	8.5	RCC Slab	RCC Wall
71+750	LHS	1x3	12	RCC Slab	RCC Wall
	RHS	1x3	12	RCC Slab	RCC Wall
71+450	LHS	1x3	12	RCC Slab	RCC Wall
	RHS	1x3	12	RCC Slab	RCC Wall
71+550	LHS	1x4	12	RCC Slab	RCC Wall
	RHS	1x4	12	RCC Slab	RCC Wall

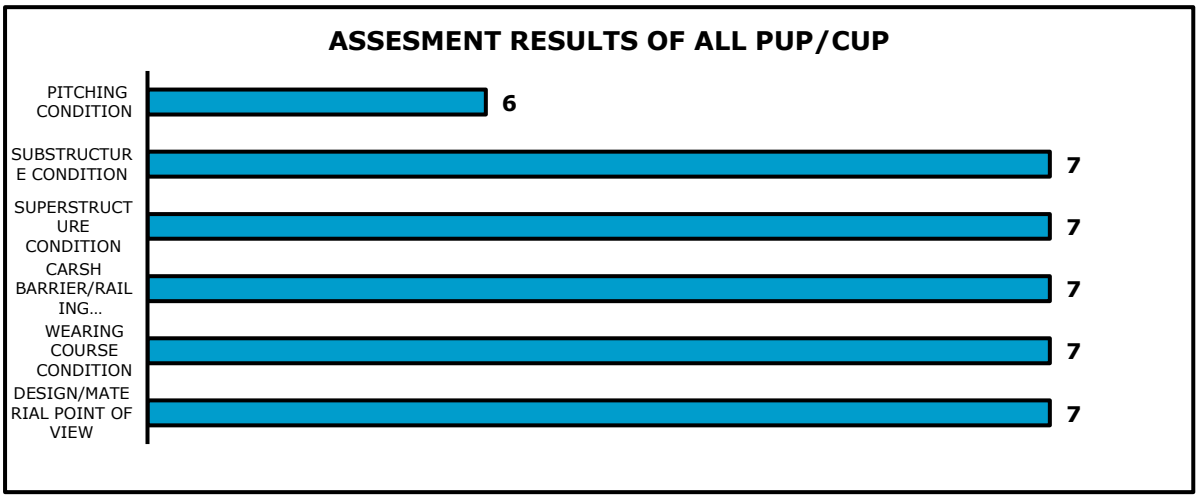


Figure 6-11: Comparative assessment of PUP/CUP

Typical Photographs of PUP/CUP are presented hereunder.



PUP at Chainage 63+250



PUP at Chainage 71+750



PUP at Chainage 54+780



CUP at Chainage 71+550



CUP at Chainage 71+450

Figure 6-6-12: Site Photographs of PUP/CUP

6.8 Culvert

There are 223 culverts along the project stretch, comprising 75 box-type culverts, 133 Hume pipe culverts, and 15 slab-type culverts. The overall condition of these culverts is satisfactory; however,

routine maintenance is required, including repair of scouring, cleaning of waterway obstructions, removal of vegetation growth, and repair of damaged slope pitching.

Table 6-12: Detail List of Culverts

S. No	Chainage	Type of culvert	Location	Span
1	005+420	Box culvert	BHS	1x3
2	005+750	Box culvert	BHS	1x3
3	006+120	Box culvert	BHS	1x3
4	006+280	Pipe culvert	BHS	1x1.2
5	006+530	Pipe culvert	BHS	1x1.2
6	008+090	Box culvert	BHS	1x3
7	008+320	Pipe culvert	BHS	1x1.2
8	008+760	Pipe culvert	BHS	1x1.2
9	009+050	Pipe culvert	BHS	1x1.2
10	009+400	Pipe culvert	BHS	1x1.2
11	010+980	Box culvert	BHS	1x3
12	011+250	Box culvert	BHS	1x3
13	011+780	Slab culvert	BHS	1x3
14	012+580	Box culvert	BHS	1x3
15	013+210	Box culvert	BHS	1x3
16	013+680	Slab culvert	BHS	1x3
17	014+100	Slab culvert	BHS	1x3
18	014+420	Box culvert	BHS	1x3
19	014+850	Box culvert	BHS	1x3
20	015+160	Box culvert	BHS	1x3
21	015+980	Pipe culvert	BHS	1x1.2
22	016+210	Slab culvert	BHS	1x3
23	016+820	Box culvert	BHS	1x3
24	018+450	Slab culvert	BHS	1x3
25	020+680	Box culvert	BHS	1x3
26	021+230	Box culvert	BHS	1x3
27	021+380	Box culvert	BHS	1x3
28	023+870	Pipe culvert	BHS	1x1.2
29	024+080	Box culvert	BHS	1x3
30	024+420	Box culvert	BHS	1x3
31	024+550	Box culvert	BHS	1x3
32	025+200	Slab culvert	BHS	1x3
33	025+600	Pipe culvert	BHS	1x1.2
34	025+750	Pipe culvert	BHS	1x1.2

S. No	Chainage	Type of culvert	Location	Span
35	027+050	Pipe culvert	BHS	1x1.2
36	027+420	Box culvert	BHS	1x3
37	027+680	Box culvert	BHS	1x3
38	028+000	Box culvert	BHS	1x3
39	030+000	Pipe culvert	BHS	1x1.2
40	030+480	Box culvert	BHS	1x3
41	031+790	Box culvert	BHS	1x3
42	032+040	Box culvert	BHS	1x3
43	033+420	Box culvert	BHS	1x3
44	033+830	Box culvert	BHS	1x3
45	034+114	Box culvert	BHS	1x3
46	034+680	Box culvert	BHS	1x3
47	034+980	Box culvert	BHS	1x3
48	035+160	Box culvert	BHS	1x3
49	035+880	Box culvert	BHS	1x3
50	036+080	Box culvert	BHS	1x3
51	036+430	Box culvert	BHS	1x3
52	037+310	Box culvert	BHS	1x3
53	037+630	Box culvert	BHS	1x3
54	037+780	Box culvert	BHS	1x3
55	037+980	Slab culvert	BHS	1x3
56	038+530	Pipe culvert	BHS	1x1.2
57	039+250	Slab culvert	BHS	1x3
58	039+780	Pipe culvert	BHS	1x1.2
59	040+680	Pipe culvert	BHS	1x1.2
60	042+700	Pipe culvert	BHS	1x1.2
61	042+830	Slab culvert	BHS	1x3
62	043+380	Box culvert	BHS	1x3
63	044+800	Box culvert	BHS	1x3
64	045+250	Box culvert	BHS	1x3
65	047+050	Pipe culvert	BHS	1x1.2
66	048+120	Pipe culvert	BHS	1x1.2
67	048+280	Box culvert	BHS	1x3
68	048+830	Pipe culvert	BHS	1x1.2
69	048+980	Pipe culvert	BHS	1x1.2
70	049+150	Pipe culvert	BHS	1x1.2
71	049+300	Box culvert	BHS	1x3

S. No	Chainage	Type of culvert	Location	Span
72	049+450	Pipe culvert	BHS	1x1.2
73	049+860	Pipe culvert	BHS	1x1.2
74	050+300	Pipe culvert	BHS	1x1.2
75	050+680	Pipe culvert	BHS	1x1.2
76	053+980	Slab culvert	BHS	1x3
77	054+980	Box culvert	BHS	1x3
78	058+080	Pipe culvert	BHS	1x1.2
79	058+700	Pipe culvert	BHS	1x1.2
80	059+400	Pipe culvert	BHS	1x1.2
81	060+120	Pipe culvert	BHS	1x1.2
82	060+450	Pipe culvert	BHS	1x1.2
83	061+680	Pipe culvert	BHS	1x1.2
84	061+880	Pipe culvert	BHS	1x1.2
85	062+180	Pipe culvert	BHS	1x1.2
86	062+200	Box culvert	BHS	1x3
87	062+250	Pipe culvert	BHS	1x1.2
88	062+350	Pipe culvert	BHS	1x1.2
89	062+950	Slab culvert	BHS	1x3
90	063+980	Pipe culvert	BHS	1x1.2
91	064+050	Pipe culvert	BHS	1x1.2
92	064+380	Pipe culvert	BHS	1x1.2
93	064+580	Pipe culvert	BHS	1x1.2
94	064+680	Pipe culvert	BHS	1x1.2
95	064+880	Pipe culvert	BHS	1x1.2
96	065+350	Box culvert	BHS	1x3
97	065+580	Pipe culvert	BHS	1x1.2
98	065+880	Box culvert	BHS	1x3
99	066+130	Box culvert	BHS	1x3
100	066+250	Slab culvert	BHS	1x3
101	066+480	Pipe culvert	BHS	1x1.2
102	066+550	Slab culvert	BHS	1x3
103	066+900	Pipe culvert	BHS	1x1.2
104	067+180	Box culvert	BHS	1x3
105	067+380	Pipe culvert	BHS	1x1.2
106	067+910	Pipe culvert	BHS	1x1.2
107	071+580	Pipe culvert	BHS	1x1.2
108	073+550	Box culvert	BHS	1x3

S. No	Chainage	Type of culvert	Location	Span
109	073+750	Pipe culvert	BHS	1x1.2
110	075+720	Pipe culvert	BHS	1x1.2
111	076+020	Pipe culvert	BHS	1x1.2
112	076+780	Pipe culvert	BHS	1x1.2
113	076+980	Pipe culvert	BHS	1x1.2
114	077+380	Pipe culvert	BHS	1x1.2
115	078+120	Pipe culvert	BHS	1x1.2
116	078+350	Pipe culvert	BHS	1x1.2
117	079+780	Pipe culvert	BHS	1x1.2
118	079+980	Pipe culvert	BHS	1x1.2
119	079+990	Pipe culvert	BHS	1x1.2
120	080+180	Pipe culvert	BHS	1x1.2
121	080+420	Pipe culvert	BHS	1x1.2
122	080+930	Pipe culvert	BHS	1x1.2
123	081+220	Box culvert	BHS	1x3
124	081+250	Box culvert	BHS	1x3
125	081+360	Pipe culvert	BHS	1x1.2
126	081+450	Pipe culvert	BHS	1x1.2
127	082+650	Pipe culvert	BHS	1x1.2
128	082+800	Pipe culvert	BHS	1x1.2
129	083+100	Box culvert	BHS	1x3
130	084+000	Pipe culvert	BHS	1x1.2
131	084+250	Pipe culvert	BHS	1x1.2
132	084+480	Pipe culvert	BHS	1x1.2
133	084+580	Pipe culvert	BHS	1x1.2
134	084+930	Pipe culvert	BHS	1x1.2
135	085+150	Box culvert	BHS	1x3
136	085+500	Pipe culvert	BHS	1x1.2
137	085+930	Pipe culvert	BHS	1x1.2
138	086+350	Pipe culvert	BHS	1x1.2
139	086+790	Pipe culvert	BHS	1x1.2
140	087+200	Pipe culvert	BHS	1x1.2
141	087+420	Pipe culvert	BHS	1x1.2
142	088+130	Box culvert	BHS	1x3
143	088+580	Pipe culvert	BHS	1x1.2
144	089+400	Pipe culvert	BHS	1x1.2
145	090+480	Pipe culvert	BHS	1x1.2

S. No	Chainage	Type of culvert	Location	Span
146	090+780	Pipe culvert	BHS	1x1.2
147	091+520	Pipe culvert	BHS	1x1.2
148	092+500	Box culvert	BHS	1x3
149	095+380	Pipe culvert	BHS	1x1.2
150	097+200	Pipe culvert	BHS	1x1.2
151	097+480	Pipe culvert	BHS	1x1.2
152	098+140	Pipe culvert	BHS	1x1.2
153	099+020	Pipe culvert	BHS	1x1.2
154	099+420	Pipe culvert	BHS	1x1.2
155	099+650	Pipe culvert	BHS	1x1.2
156	100+120	Slab culvert	BHS	1x3
157	101+170	Pipe culvert	BHS	1x1.2
158	101+870	Box culvert	BHS	1x3
159	102+380	Box culvert	BHS	1x3
160	103+020	Pipe culvert	BHS	1x1.2
161	103+450	Pipe culvert	BHS	1x1.2
162	103+860	Pipe culvert	BHS	1x1.2
163	103+990	Pipe culvert	BHS	1x1.2
164	104+510	Pipe culvert	BHS	1x1.2
165	104+860	Box culvert	BHS	1x3
166	106+330	Box culvert	BHS	1x3
167	106+630	Box culvert	BHS	1x3
168	107+250	Pipe culvert	BHS	1x1.2
169	107+830	Pipe culvert	BHS	1x1.2
170	108+290	Pipe culvert	BHS	1x1.2
171	109+580	Pipe culvert	BHS	1x1.2
172	110+130	Pipe culvert	BHS	1x1.2
173	110+450	Pipe culvert	BHS	1x1.2
174	110+460	Pipe culvert	BHS	1x1.2
175	110+600	Pipe culvert	BHS	1x1.2
176	110+850	Box culvert	BHS	1x3
177	111+190	Box culvert	BHS	1x3
178	111+620	Pipe culvert	BHS	1x1.2
179	111+930	Pipe culvert	BHS	1x1.2
180	113+450	Box culvert	BHS	1x3
181	113+720	Pipe culvert	BHS	1x1.2
182	113+790	Pipe culvert	BHS	1x1.2

S. No	Chainage	Type of culvert	Location	Span
183	114+000	Box culvert	BHS	1x3
184	114+100	Box culvert	BHS	1x3
185	114+980	Box culvert	BHS	1x3
186	115+000	Pipe culvert	BHS	1x1.2
187	115+320	Pipe culvert	BHS	1x1.2
188	115+580	Box culvert	BHS	1x3
189	116+680	Box culvert	BHS	1x3
190	117+190	Pipe culvert	BHS	1x1.2
191	117+280	Pipe culvert	BHS	1x1.2
192	118+890	Pipe culvert	BHS	1x1.2
193	120+190	Box culvert	BHS	1x3
194	120+550	Box culvert	BHS	1x3
195	121+020	Pipe culvert	BHS	1x1.2
196	121+050	Pipe culvert	BHS	1x1.2
197	121+550	Pipe culvert	BHS	1x1.2
198	122+120	Pipe culvert	BHS	1x1.2
199	122+960	Pipe culvert	BHS	1x1.2
200	123+580	Pipe culvert	BHS	1x1.2
201	124+570	Pipe culvert	BHS	1x1.2
202	126+520	Pipe culvert	BHS	1x1.2
203	126+620	Pipe culvert	BHS	1x1.2
204	128+840	Pipe culvert	BHS	1x1.2
205	29+200	Pipe culvert	BHS	1x1.2
206	51+000	Box culvert	BHS	1x3
207	54+700	Pipe culvert	BHS	1x1.2
208	58+450	Pipe culvert	BHS	1x1.2
209	59+920	Box culvert	BHS	1x3
210	61+080	Pipe culvert	BHS	1x1.2
211	75+520	Pipe culvert	BHS	1x1.2
212	99+250	Pipe culvert	BHS	1x1.2

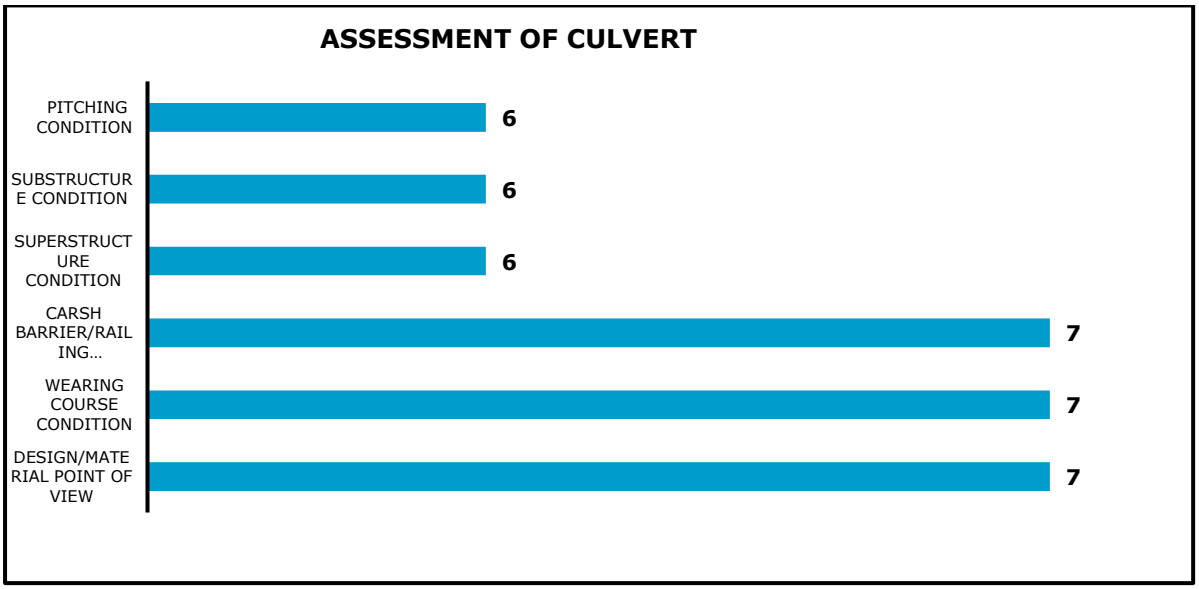


Figure 6-13: Comparative assessment of Culvert.

Typical Photographs of culvert are presented hereunder.



Box Culvert at Chainage 6+120



Box Culvert at Chainage 8+050



Box Culvert at Chainage 37+680



Box Culvert at Chainage 73+530



Box Culvert at Chainage 102+380



Box Culvert at Chainage 120+180



Slab Culvert at Chainage 11+800



Slab Culvert at Chainage 13+700



Slab Culvert at Chainage 25+200



Slab Culvert at Chainage 66+280



Pipe Culvert at Chainage 38+010



Pipe Culvert at Chainage 39+830



Pipe Culvert at Chainage 80+150



Pipe Culvert at Chainage 119+100

Figure 6-6-14: Site Photographs of Culvert

6.9 General Observation

All the structures were visually inspected to identify any signs of structural or superficial distress. No major structural deficiencies were observed during the inspection across the project corridor. However, several minor issues were noted that require routine maintenance and preventive measures to ensure long-term performance of the structures.

Common observations include growth of vegetation on structural components and within waterways, which may obstruct water flow and cause localized deterioration if not regularly cleared. Several drainage spouts were found clogged, reducing the effectiveness of deck drainage systems. Minor damages were observed on crash barriers at various locations, which need repair or replacement to restore safety standards. In certain locations, reinforcement was exposed at pier caps and abutments, which may lead to further deterioration if left unaddressed. Minor honeycombing was observed on some underpass walls, requiring patch repairs. Additionally, debris accumulation was noted beneath several culverts due to insufficient maintenance of waterway areas.

These observed deficiencies, though not structurally significant at present, warrant timely attention through routine cleaning, vegetation removal, and minor repair works to sustain the overall functionality, safety, and durability of the structures throughout their service life.

6.10 Routine maintenance and Minor Repair

Routine maintenance and minor repairs help to keep the structures safe and in good working condition. During the inspection, several common problems were found such as spalling, honeycombing, cracks, vegetation growth, clogged drainage, and small damages to crash barriers and expansion joints.

Spalling happens when the steel inside the concrete starts to rust, causing the concrete to break and fall off. The repair includes removing all loose and weak concrete, cleaning the steel, applying anti-corrosion paint, and then filling the area with special repair mortar. Honeycombing occurs when concrete is not properly compacted during construction, leaving empty spaces. These areas are repaired by cleaning and filling them with suitable repair materials.

Cracks in the concrete — whether straight across (transverse), along the length (longitudinal), or diagonal (inclined) — are filled with epoxy resin to seal the gaps and stop water from entering, which could cause further damage. Vegetation growth on the structures and around water flow areas needs to be cleared regularly, as plants can damage the structure and block water passages. Clogged drainage spouts and debris under culverts must be cleaned to keep water flowing properly and avoid pressure build-up that can damage structures.

Minor damages on crash barriers, bearings, and expansion joints should be fixed quickly to ensure safety and prevent them from getting worse. Regular inspections and timely small repairs can prevent bigger problems and increase the life of the structures.

Table 6-13: Remedial Measure Methods

S. No.	Name of Component	Type of Distress as per IRC: SP:35 -1990	Remedial measures as per IRC: SP:40-2019	Repair Action (Required / Not Required)
1	crash barrier, sub-structure and Slabs etc.	Cracking Delamination Spalling Disintegration	• Sealing of crack / porous concrete with Epoxy Grout by injection. • Applying epoxy mortar over leached, honey combed and spalled concrete surface and exposed steel reinforcement.	Required.
2	Expansion Joints	Non-functioning of joints due to Clogging or wearing out and failure of anchoring system,	• Cleaning • Covered expansion joint need to be open.	Required
7	Handrails, Parapets & Crash Barriers	Damage (Spalling, Disintegration and cracking etc).	• Repair	Required.
8	Drainage Spouts and Vest Holes	Damage and non-functioning	• Cleaning required.	Required.
9	Footpaths	Damage and non-functioning.	• Cleaning required	Required

7. ASSESSMENT OF PROJECT ASSETS - TOLL SYSTEMS

7.1 General

Technical Due Diligence of the TMS (Toll Management System), ETC (Electronic Toll Collection System) and WIM (Weigh-in-Motion) System (as available) along Rajkot – Jamnagar - Vadinar Section of SH-25 in the state of Gujarat is done through site visits, site surveys, interactions at site and review of documents and reports.

7.2 Project Information

Toll Plaza 1 (TP 1) Km 05+050

Toll Plaza 2 (TP 2) Km 58+325

Toll Plaza 3 (TP 3) Km 110+472

No. of Lanes at each Toll Plaza

- TP-1 is a straight-line toll plaza with 12 physical Lanes, however only 10 lanes (5 lanes in each direction) are equipped with Hybrid ETC equipment, two lanes are provisioned for future expansion, separate two-wheeler lanes provided adjacent to the extra-wide lane in each direction.
- TP-2 is a straight-line toll plaza with 12 physical Lanes, however only 10 lanes (5 lanes in each direction) are equipped with Hybrid ETC equipment, two lanes are provisioned for future expansion, separate two-wheeler lanes provided adjacent to the extra-wide lane in each direction.
- TP-3 is a straight-line toll plaza with 12 physical Lanes, however only 10 lanes (5 lanes in each direction) are equipped with Hybrid ETC equipment, two lanes are provisioned for future expansion, separate two-wheeler lanes provided adjacent to the extra-wide lane in each direction.

7.3 Toll System Maintenance

The TMS installation was done by M/s Logic Mo Systems in the year 2022 and since last two years is running under AMC by the same system integrator till date for all lanes at all these Toll Plazas.

7.4 WIM system

None of the lanes at the Toll Plaza are equipped with Weigh in Motion (WIM) systems.

7.5 SWB (Static Weigh Bridge)

None of the Toll Plazas are equipped with Static Weigh Bridge (SWB) for detection and collection of overload penalties

7.6 Review and Assessment of TMS (incl. AVCC Systems)

1. TMS maintenance at all four toll plazas is being done by i.e. M/s Logic Mo, for all the toll equipment with open tolling technology and is in the AMC since last 2 years.
2. Lane hardware is provided as per the industry standards, critical components required to check the vehicle classification e.g. AVC in all lanes are working in good condition, the AVC and TLC panels are installed inside the tunnel and caged to have the access to the TMS in a controlled way, at TP1 the AVC and TLC panels are installed inside the toll booth.
3. The MS-WIM and SWB to detect and collect overload penalty as per the government norms are not installed and all overloaded vehicles are moving through the lanes freely.
4. The network is Ethernet based and is provisioned with a backbone connectivity through OFC in parallel till the toll plaza building, which is installed at the center median, the toll

plaza building is at the center which is approx. 300 meters distance from toll plazas in both directions. The OFC is provisioned to prevent any data loss in case the primary link from plaza to lanes becomes faulty and which will further prevent any data loss.

5. Fastag integration is done through IDFC as an Acquirer bank and a dual ILL link of 15 Mbps speed is established from Airtel and Jio for round the clock connectivity.

7.7 Assessment of Toll Operation and integration with TMS

The AVC is profiler based with independent storage but not sending parallel data to the database server if the lane controller if put down for maintenance and in such cases the control room staff is completely dependent on toll collectors' input for validation of all discrepancies, Violations etc.

The LSDU i.e. Lane Status Display Unit to monitor the entire hardware of each lane is provided which is an essential part for monitoring of the toll equipment on day-to-day basis and generating all alerts.

Middle four lanes at all three toll plazas are provisioned with height restrictors to only allow C/J/V Traffic which is free at the toll plaza.

7.8 Backoffice TMS review

a. The TMS is controlled through the control room which is housed with the validator performing real time transaction validations.

b. LSDU as stated above is working properly and equipment status / failures are well known to the shift supervisor.

c. As per the guidelines of IHMCL, the plaza server must be installed with a hot-standby server arrangement and provided accordingly.

d. No fake note detectors installed in the lane to detect counterfeit currency

7.9 Conclusion

The complete TMS systems is working in good condition and does not need any replacement except the automatic boom barriers which need immediate replacements due to poor condition.

7.10 HTMS

a. No ECBs installed only foundations were found at few locations.

b. ATCC which are installed in sets at all four toll plazas are not providing any input to the control room and found faulty.

c. VMS are installed at 6 locations and found working

d. Met Station Installed in TP1 and TP3 and found the equipment working

The cost estimate for total replacements have been worked out and detailed is annexed in the chapter of Cost Estimate.

Figure 7-1: Typical Site Photographs of Toll Plaza & Equipment

TP1



TP2



TP3



Control Room (TP1-TP3)




30/05/2025 10:24


30/05/2025 10:24

Equipment Installations in island and Toll Booth





HTMS

ECB Foundations (Equipment Removed)



VMS



ATCC





MET Station



HTMS Software Screen



8. SOIL AND MATERIAL INVESTIGATION

8.1 General

As part of the soil and material investigation for the project, the consultants have undertaken a series of tests on subgrade soils, granular layers, and bituminous layers along the project corridor to evaluate the engineering characteristics and in-situ condition of the existing pavement materials.

8.2 Field investigation – sampling and testing

Field tests were conducted on the subgrade soils and required pavement materials were collected for testing. Table 8-1 presents the sampling criteria, tests and testing procedures adopted for various field and laboratory tests.

Table 8-1: Site sampling and testing criteria

S. No.	Type of Soil Sample	Sampling Criteria	Testing Criteria	
			Description of Test	Standard Code Applicable
Existing subgrade and pavement materials				
i)	**Subgrade Strength Test Pits**	Minimum of one subgrade soil sample was obtained at an interval directed by the client & Material Engineer based on site condition.	In-situ Density	IS 2720 (Part – 29)
			In-situ moisture content	IS 2720 (Part – 2)
			Soil Classification	IS 1498
			Sieve Analysis	IS 2720 (Part – 4)
			Atterberg Limits	IS 2720 (Part – 5)
			Laboratory Compaction Test (using heavy compaction)	IS 2720 (Part – 8)
			Field Compaction	IS 2720 (Part-29)
			4-days soaked CBR	IS 2720 (Part – 16)
			Free swell Index	IS 2720 (Part-40)
ii)	**Existing Granular Layers**	Existing granular layer materials was collected from each subgrade test pit at an interval directed by client	Gradation	MoRTH Table: 400-1 & 400-13
			Atterberg Limits	IS 2720 (Part – 5)
			Specific Gravity and Water Absorption	IS 2386 (Part – 3)
			Aggregate Impact Value (AIV)	IS 2386 (Part – 4)
iii)	**Existing Bituminous Layers**	Existing bituminous layer's material was collected through core cutting process at specific intervals as directed by the pavement engineer	Gradation	MoRTH Table: 500-10 & 500-17
			Density of core	ASTM D 2726
			Bitumen extraction	ASTM–D 2172

8.3 Investigations on subgrade soils

Field tests were conducted on the subgrade soils and required pavement materials were collected for needful testing. Table 8-1 presents the sampling criteria, tests and testing procedures adopted for various field and laboratory tests.

The test results and discussion are described in the section below.

Field tests were conducted as per the project requirement to determine the subgrade characteristics and strength. The field testing for subgrade soil includes:

- In-situ density determination at each test pit.
- Field moisture content determination at each test pit.
- In-situ CBR Determination at each test pit.

8.3.1 In-Situ CBR (Dynamic Cone Penetration Test)

Dynamic Cone Penetration tests were conducted at subgrade strength test pit locations to assess in-situ CBR on existing soil. The CBR value was calculated based on different soil layers encountered. The slope change in the graph (Penetration Vs Number of Blows) indicates the interface of two layers of different penetration resistance. From the graph, thickness of layer and slope (penetration mm/blow) were calculated. The following equation given in IRC: 37-2012 has been used to calculate the layer DCP-CBR value for each layer:

$$log_{10}\ CBR = 2.465 - 1.12 \times log_{10}(mm/blow)$$

Once the DCP-CBR calculated for each layer, the overall CBR (Weighted average) of all sub-layers will be converted into single DCP-CBR values by using Japan road association formula 1989 as given below:

$$Overall\ CBR = \left\{ \sum layer\ thickness \times (DCP - CBR)^{1/3} \Big/ \sum layer\ thickness \right\}^3$$

Dynamic Cone Penetration test results showing penetration of cone in cm and number of blows at each pit are plotted.

A summary of the DCP-derived CBR values is provided in Table 8-2, and an illustrative bar diagram depicting the spatial variation of DCP values across the project corridor is presented in Figure 8-5**.** Some of the Field investigation photographs of DCP-CBR are shown in Figure 8-2.



Figure 8-1: Field Investigations photographs of DCP-CBR

In general variations in DCP-CBR values are expected due to the influence of several site-specific factors. The penetration resistance of the DCP cone can be significantly affected by the prevailing in-

situ moisture content, the presence of underlying layers beneath the subgrade, and obstructions such as boulders or tree roots. Typically, DCP-CBR values tend to increase with a reduction in in-situ moisture content, and conversely, higher moisture levels can result in lower CBR values. Additionally, if the DCP cone encounters obstructions such as stones or boulders, the measured resistance increases, leading to abnormally high CBR estimations.

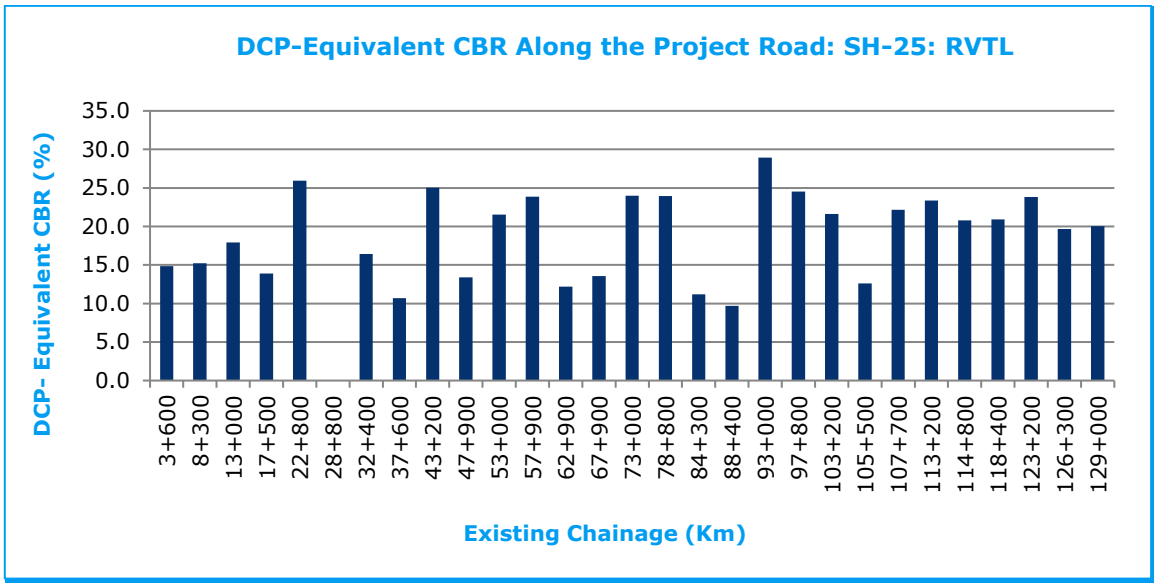


Figure 8-2: Illustrative summary of DCP-Equivalent CBR along the project corridor

8.3.2 Field Density & Moisture Content

In-situ density (field dry density) and moisture content of the subgrade were determined in accordance with the applicable standards listed in Table 8-1.

The field density measurements were utilized to assess the degree of compaction achieved in the existing subgrade, and to determine the in-situ California Bearing Ratio (CBR) under field density conditions. A consolidated summary of the field test results for the entire project corridor is presented in Table 8-2. Representative photographs of the field investigation are shown in Figure 8-3.



Figure 8-3: Field Investigations photographs

Table 8-2: Statistical summary of field tests in soil

Chainage (km)			FMC (%)			FDD (gm/cc)			DCP-CBR (%)		
Road	From	To	Min	Max	Avg.	Min	Max	Avg.	Min	Max	Avg.
SH-25	13+930	194.630	5.0	10.0	7.3	1.84	2.06	1.96	9.7	28.9	19.0

8.3.3 Subgrade test results

Approximately 50 kg of subgrade soil samples were collected in damp-proof bags to facilitate the necessary laboratory testing. The required tests, as specified in Table 8-1 were subsequently conducted in accordance with relevant standards.

Table 8-3: Summary of Subgrade Test Results

S. No	Type of carriage way	Existing Chainage (Km.)	Side (LHS/ RHS)	Soil Classification as per IS: 1498	Gravel content %	Sand content %	Clay & silt content %	Atterberg Limits [IS :2720-Pt-V]			Modified Proctor Test (IS:2720-Pt-VIII)		Field Density		4-Days Soaked CBR at MDD (%)	Free Swell Index (%)	Degree of Compaction (%)
								Liquid Limit (LL) %	Plastic Limit (PL) %	Plasticity Index (PI)	Max. dry density (gm/cc)	OMC (%)	Field Dry Density (gm/cc)	FMC (%)			
1	MCW	3+600	LHS	SW-SM	38.1	52.8	9.1	23	NP	NP	2.14	8.5	2.03	9.0	24.9	0.0	94.9
2	MCW	8+300	RHS	SM	31.7	51.4	16.9	19	NP	NP	2.09	8.2	1.96	8.0	17.7	10.0	93.8
3	MCW	13+000	LHS	SM	28.7	46.4	24.9	23	NP	NP	2.05	8.8	1.99	10.0	15.9	12.5	97.1
4	MCW	17+500	RHS	SM	22.7	56.0	21.3	21	NP	NP	2.09	8.7	2.01	9.0	18.4	12.5	96.2
5	MCW	22+800	LHS	SM	10.4	67.7	21.9	24	NP	NP	2.04	9.2	1.93	7.5	14.1	10.0	94.6
6	MCW	28+800	RHS	SM	5.8	67.8	26.4	21	NP	NP	1.99	9.0	-	-	16.3	12.5	-
7	MCW	32+400	LHS	SM	7.3	59.9	32.8	25	NP	NP	1.97	9.3	1.85	7.0	12.4	12.5	93.9
8	MCW	37+600	RHS	SM	23.5	56.4	20.1	23	NP	NP	2.05	8.5	1.95	7.0	16.5	0.0	95.1
9	MCW	43+200	LHS	SW-SM	32.1	59.2	8.7	19	NP	NP	2.11	8.1	2.03	6.5	23.2	0.0	96.2
10	MCW	47+900	RHS	SM	3.3	59.8	36.9	22	NP	NP	2.01	8.9	1.98	6.0	14.0	11.1	98.5
11	MCW	53+000	LHS	SC	37.7	46.4	15.9	29	21	8	1.97	9.7	1.89	7.0	13.9	20.0	95.9
12	MCW	57+900	RHS	GW-GM	47.5	42.9	9.6	18	NP	NP	2.14	8.2	2.06	7.0	31.7	0.0	96.3
13	MCW	62+900	LHS	SC	30.2	47.2	22.6	32	21	11	2.03	9.5	1.98	8.5	14.7	20.0	97.5
14	MCW	67+900	RHS	SC	14.9	44.3	40.8	34	20	14	1.93	10.7	1.90	9.0	8.6	33.3	98.4

S. No	Type of carriage way	Existing Chainage (Km.)	Side (LHS/ RHS)	Soil Classification as per IS: 1498	Gravel content %	Sand content %	Clay & silt content %	Atterberg Limits [IS :2720-Pt-V]			Modified Proctor Test (IS:2720-Pt-VIII)		Field Density		4-Days Soaked CBR at MDD (%)	Free Swell Index (%)	Degree of Compaction (%)
								Liquid Limit (LL) %	Plastic Limit (PL) %	Plasticity Index (PI)	Max. dry density (gm/cc)	OMC (%)	Field Dry Density (gm/cc)	FMC (%)			
15	MCW	73+000	LHS	CL	10.5	35.7	53.8	30	21	9	1.95	10.1	1.89	6.0	8.0	20.0	96.9
16	MCW	78+800	RHS	SM	28.6	46.6	24.8	21	NP	NP	1.99	8.2	1.88	8.0	15.3	10.0	94.5
17	MCW	84+300	LHS	SC	15.3	39.4	45.3	38	24	14	1.91	10.9	1.84	9.0	8.3	33.3	96.3
18	MCW	88+400	RHS	SM	33.7	37.3	29.0	23	NP	NP	1.98	8.8	1.89	7.0	13.5	10.0	95.5
19	MCW	93+000	LHS	SM	36.9	51.0	12.1	21	NP	NP	2.09	9.3	2.01	6.0	19.1	0.0	96.2
20	MCW	97+800	RHS	SP-SM	39.3	49.3	11.4	19	NP	NP	2.13	8.1	2.04	8.0	20.5	10.0	95.8
21	MCW	103+200	LHS	GP-GC	52.7	38.4	8.9	37	22	15	2.09	9.9	1.98	5.0	16.3	33.3	94.7
22	MCW	105+500	RHS	SC	11.1	47.4	41.5	34	23	11	2.04	10.7	1.92	7.5	8.4	20.0	94.1
23	MCW	107+700	RHS	SM	15.5	54.8	29.7	23	NP	NP	2.05	8.3	1.94	6.0	13.8	10.0	94.6
24	MCW	113+200	LHS	GC	38.7	38.4	22.9	35	21	14	1.98	10.7	1.86	7.0	12.0	22.2	93.9
25	MCW	114+800	RHS	SM	31.4	46.6	22.0	21	NP	NP	2.08	8.8	1.97	6.0	16.9	11.1	94.7
26	MCW	118+400	RHS	SM	34.9	44.1	21.0	20	NP	NP	2.07	8.7	2.01	5.0	15.4	0.0	97.1
27	MCW	123+200	LHS	SM-SC	28.8	50.4	20.8	24	17	7	2.03	10.1	1.94	7.0	11.4	12.5	95.6
28	MCW	126+300	LHS	SM	30.0	46.0	24.0	24	NP	NP	2.07	8.5	2.01	7.0	16.6	0.0	97.1
29	MCW	129+000	RHS	GM	45.4	42.0	12.6	17	NP	NP	2.11	8.1	2.06	7.5	20.1	10.0	97.6

8.3.4 Summary of Soil Test results

Soil Classification and Distribution:

From Table 8-3, it is evident that the subsoil along the project corridor is generally consistent and predominantly sandy and gravel in nature. At one location clayey with low compressibility soil were observed.

The Liquid Limit (LL) of these soils is ranging between 17%-38%, and these values are within the limit as per MoRTH specifications (<50%). The obtained maximum Plasticity Index (PI) of the subgrade soils is 15% and the degree of free swell (FSI) is 33.3%. All the measured PI and FSI values are also within the acceptable limits as per MoRTH guidelines, of 25% and 50% respectively.

Strength parameters:

Variance between MDD and FDD is converted in-terms of degree of compaction. The degree of compaction along the project corridor is ranging between 93.8% - 98.5%. The 4-days soaked CBR along the project corridor is ranging from 8.0% to 31.7% with an average value of 15.8%.

8.4 Existing Pavement Composition

Existing pavement composition (pavement course, material type, and thickness) are recorded at an interval directed by the client & material engineer based on the site condition along the project road.

The summary of existing pavement crust thickness is presented in a tabular form as well as an illustrative bar graph in Table 8-4 and Figure 8-5 respectively and few of the pavement crust photographs are shown in Figure 8-4

Table 8-4: Summary of pavement crust along the project corridor

S. No.	Location (Km.)	Side (LHS/ RHS)	Pavement Composition (mm)			
			Bituminous Layer	WMM	GSB	Total Thickness
1	3+600	LHS	130	300	200	630
2	8+300	RHS	110	290	240	640
3	13+000	LHS	170	180	200	550
4	17+500	RHS	180	200	200	580
5	22+800	LHS	170	200	240	610
6	28+800	RHS	200	150	240	590
7	32+400	LHS	125	200	225	550
8	37+600	RHS	190	200	200	590
9	43+200	LHS	130	200	300	630
10	47+900	RHS	210	210	200	620
11	53+000	LHS	145	360	240	745
12	57+900	RHS	160	380	350	890
13	62+900	LHS	145	370	300	815
14	67+900	RHS	145	250	280	675
15	73+000	LHS	180	220	175	575

S. No.	Location (Km.)	Side (LHS/ RHS)	Pavement Composition (mm)			
			Bituminous Layer	WMM	GSB	Total Thickness
16	78+800	RHS	130	320	300	750
17	84+300	LHS	160	250	200	610
18	88+400	RHS	230	350	190	770
19	93+000	LHS	140	250	290	680
20	97+800	RHS	200	150	150	500
21	103+200	LHS	140	240	300	680
22	105+500	RHS	175	260	230	665
23	107+700	RHS	330	210	300	840
24	113+200	LHS	150	210	270	630
25	114+800	RHS	210	210	310	730
26	118+400	RHS	195	280	200	675
27	123+200	LHS	135	210	200	545
28	126+300	LHS	110	265	300	675
29	129+000	RHS	165	300	190	655



Figure 8-4: Pavement Crust Thickness measuring photographs

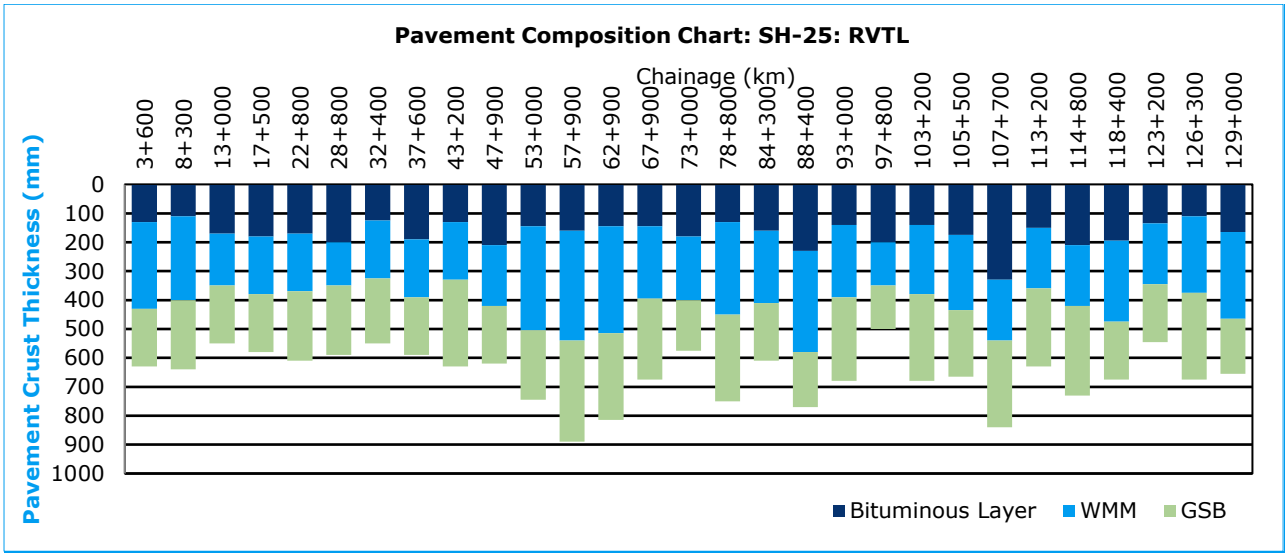


Figure 8-5: Existing pavement crust summary along the project road

8.4.1 Summary of Pavement test pit results

- The existing pavement along the project corridor is bituminous pavement. The pavement composition comprises of bituminous layer, granular base over the granular sub-base.
- Throughout the project road it possesses consistent bituminous/ granular layer thickness with an average of 168mm bituminous layer over the average Granular course of 491mm were observed.

8.5 Existing Granular Layers Testing

- Granular layer's samples were collected at an interval directed by the client & Material Engineer based on the site condition along the project road collected at the appropriate layers like WMM/ GSB separately from the excavated test pit. The granular material test results are presented in Table 8-5.

Table 8-5: Summary of Granular layers Test Results

S. No	Chainage (km)	Side (LHS/ RHS)	Type of Sample collected	Gradation Conformation as per MoRTH 5th Revision	Atterberg Limits			Specific Gravity	Water Absorption (%)	Aggregate Impact Value (%)
					Liquid Limit (LL) %	Plastic Limit (PL) %	Plasticity Index (PI)			
1	3+600	LHS	WMM	53mm IS sieve material coarser side in WMM gradation	23	NP	NP	2.690	1.79	24.8
2	8+300	RHS	GSB	53.0mm IS sieve coarser side in GSB grade-III & IV	19	NP	NP	2.685	2.05	22.4
3	13+000	LHS	GSB	26.5mm IS sieve coarser side in GSB grade-III & IV	20	NP	NP	2.687	1.68	24.3
4	17+500	RHS	WMM	Confirming to WMM gradation	22	NP	NP	2.689	2.07	23.4
5	22+800	LHS	WMM	Confirming to WMM gradation	20	NP	NP	2.703	1.67	20.5
6	28+800	RHS	GSB	Confirming to GSB grade-IV	21	NP	NP	2.683	1.87	20.7
7	32+400	LHS	GSB	53.0mm IS sieve coarser side in GSB grade-IV	17	NP	NP	2.678	2.04	22.6
8	37+600	RHS	WMM	Confirming to WMM gradation	19	NP	NP	2.710	1.65	23.1
9	43+200	LHS	WMM	22.4mm IS sieve material coarser side in WMM gradation	20	NP	NP	2.720	1.70	22.3
10	47+900	RHS	GSB	Confirming to GSB grade-IV	19	NP	NP	2.685	1.56	18.9
11	53+000	LHS	GSB	53.0mm IS sieve coarser side in GSB grade-IV	20	NP	NP	2.704	1.45	17.6
12	57+900	RHS	WMM	22.4mm IS sieve material coarser side in WMM gradation	19	NP	NP	2.743	1.45	20.6
13	62+900	LHS	WMM	Confirming to WMM gradation	18	NP	NP	2.745	1.56	20.5
14	67+900	RHS	GSB	53.0mm, 26.5mm IS sieve material coarser side in GSB grade-III	19	NP	NP	2.723	1.58	16.5
15	73+000	LHS	GSB	Confirming to GSB grade-III & IV	20	NP	NP	2.674	1.76	15.8
16	78+800	RHS	WMM	Confirming to WMM gradation	22	NP	NP	2.763	1.46	19.0

S. No	Chainage (km)	Side (LHS/ RHS)	Type of Sample collected	Gradation Conformation as per MoRTH 5th Revision	Atterberg Limits			Specific Gravity	Water Absorption (%)	Aggregate Impact Value (%)
					Liquid Limit (LL) %	Plastic Limit (PL) %	Plasticity Index (PI)			
17	84+300	LHS	WMM	4.75mm and 0.600mm IS sieves material coarser side in WMM gradation	19	NP	NP	2.771	1.34	12.5
18	88+400	RHS	GSB	53.0mm IS sieve coarser side in GSB grade-III	23	NP	NP	2.673	1.49	14.5
19	93+000	LHS	GSB	53.0mm and 26.5mm IS sieves material coarser side in GSB grade-III	21	NP	NP	2.631	2.39	18.7
20	97+800	RHS	WMM	22.4mm and 0.600mm IS sieves material coarser side in WMM gradation	23	NP	NP	2.810	1.34	13.4
21	103+200	LHS	GSB	53.0mm and 26.5mm IS sieves material coarser side in GSB grade-III & IV	20	NP	NP	2.768	0.02	16.6
22	105+500	RHS	GSB	Confirming to GSB grade-IV	23	NP	NP	2.810	1.00	15.2
23	107+700	RHS	GSB	Confirming to GSB grade-III & IV	19	NP	NP	2.813	2.07	24.6
24	113+200	LHS	WMM	11.2mm IS sieve material coarser side in WMM gradation	20	NP	NP	2.789	1.45	16.5
25	114+800	RHS	WMM	53mm,45mm IS sieves material coarser and 0.075mm IS sieves material finer side in WMM gradation	23	NP	NP	2.845	1.56	17.3
26	118+400	RHS	WMM	22.4mm, 11.2mm IS sieves material coarser side in WMM gradation	19	NP	NP	2.813	1.57	15.4
27	123+200	LHS	GSB	Confirming to GSB grade-III & IV	20	NP	NP	2.667	1.98	20.8
28	126+300	LHS	WMM	Not Confirming to WMM gradation	20	NP	NP	2.821	1.44	14.5
29	129+000	RHS	GSB	53.0mm IS sieve material coarser side in GSB grade-IV	23	NP	NP	2.668	2.13	18.7

8.5.1 Summary of granular layers testing:

The existing granular layer material was tested for determination of its gradation and all other parameters. The observations are given below

- Out of the 15 collected GSB samples, the gradation of six samples conforms to GSB Grade-III/ IV as per MoRTH (5th Revision) specifications. 9 samples exhibit gradation slightly finer/ coarser than the specified limits for Grade-III/IV with the specified MoRTH specifications.
- Among the obtained gradation of collected fourteen WMM materials, five samples are confirming to WMM gradation, eight samples are slightly coarser/ finer side of WMM gradation, and remaining one sample is not confirming to WMM gradation with the specified MoRTH specifications.
- The Plasticity Index for all the granular material is within the limit (Max. 6) as per MoRTH Specifications.
- The Aggregate Impact Value of Granular materials are within the limit (Max. 40% for GSB) as per MoRTH Specifications.
- AIV for all the granular samples was found to be within the acceptable limits prescribed for WMM (Max 30%) and GSB (Max 40%) as specified in the MoRTH

8.6 Existing Bituminous Layers Testing

Bituminous layer samples were extracted using a core cutting drilling machine with a 100 mm diameter bit to obtain representative bituminous core specimens. The locations of all core extractions are listed in Table 8-6. Laboratory tests, as specified in Table 8-1, are conducted on the recovered bituminous cores. The corresponding test results are presented in Table 8-7 and Table 8-8 for MCW and Spur Road respectively. while few of the photographs of the bituminous core extracted samples is provided in Figure 8-6

Table 8-6: Bituminous Layers Core cutting locations

S. No	Existing Road	Type of carriageway	Location (km)	Side (LHS/ RHS)	Lane	Wheel path	Height of Core (mm)
1	SH-25	MCW	3+600	RHS	Outer	OWP	170
2	SH-25	MCW	7+300	LHS	Outer	OWP	110
3	SH-25	MCW	10+700	RHS	Inner	OWP	140
4	SH-25	MCW	16+700	LHS	Inner	IWP	240
5	SH-25	MCW	20+550	RHS	Outer	OWP	150
6	SH-25	MCW	27+000	LHS	Outer	IWP	115
7	SH-25	MCW	30+750	RHS	Inner	OWP	180
8	SH-25	MCW	36+200	LHS	Inner	IWP	135
9	SH-25	MCW	40+000	RHS	Outer	IWP	260
10	SH-25	MCW	45+000	LHS	Outer	IWP	135
11	SH-25	MCW	50+000	RHS	Inner	OWP	195
12	SH-25	MCW	56+100	LHS	Inner	OWP	130
13	SH-25	MCW	59+750	RHS	Outer	OWP	195
14	SH-25	MCW	65+400	LHS	Outer	IWP	190

S. No	Existing Road	Type of carriageway	Location (km)	Side (LHS/ RHS)	Lane	Wheel path	Height of Core (mm)
15	SH-25	MCW	70+150	RHS	Inner	IWP	190
16	SH-25	MCW	75+300	LHS	Inner	IWP	150
17	SH-25	MCW	80+250	RHS	Outer	IWP	180
18	SH-25	MCW	86+300	LHS	Outer	OWP	140
19	SH-25	MCW	90+700	RHS	Inner	OWP	230
20	SH-25	MCW	94+600	LHS	Inner	OWP	140
21	SH-25	MCW	100+700	RHS	Outer	OWP	250
22	SH-25	MCW	105+400	LHS	Outer	IWP	280
23	SH-25	MCW	111+050	RHS	Inner	IWP	190
24	SH-25	MCW	115+350	LHS	Inner	IWP	240
25	SH-25	MCW	120+500	RHS	Outer	OWP	260
26	SH-25	MCW	125+200	LHS	Outer	OWP	150
27	SH-25	MCW	128+800	RHS	Inner	IWP	310
28	SH-25	Spur Road	0+200	LHS	Inner	IWP	310
29	SH-25	Spur Road	5+000	RHS	Outer	OWP	170



Figure 8-6: Some of the extracted bitumen core samples

Table 8-7: Summary of bituminous layers test results for Main carriage way

S. No	Type of carriage way	Location (Km.)	Side (LHS/ RHS)	Lane	Wheel path	Type of Material Tested	Source of Sample	Bitumen Content (%)	Bulk Specific gravity	Gradation Confirming to MoRTH 5th Revision
1	MCW	3+600	RHS	Outer	OWP	BC	Core	5.13	2.456	13.2mm IS sieve material finer side in BC grade-I
2	MCW	7+300	LHS	Outer	OWP	BC	Core	5.03	-	13.2mm IS sieve material finer side in BC grade-I
3	MCW	10+700	RHS	Inner	OWP	DBM	Core	4.37	-	Confirming to DBM grade-II
4	MCW	16+700	LHS	Inner	IWP	DBM	Core	4.22	2.534	Confirming to DBM grade-II
5	MCW	20+550	RHS	Outer	OWP	BC	Core	5.46	2.447	13.2mm IS sieve material finer side and 0.600mm IS sieve material coarser side in BC grade-I
6	MCW	27+000	LHS	Outer	IWP	DBM	Core	4.34	-	Confirming to DBM grade-II
7	MCW	30+750	RHS	Inner	OWP	DBM	Core	4.03	-	26.5mm IS sieve material finer side in DBM grade-I & 19.0mm IS sieve material finer side in DBM grade-II
8	MCW	36+200	LHS	Inner	IWP	BC	Core	5.25	-	13.2mm, 9.5mm IS sieves material finer side in BC grade-I
9	MCW	40+000	RHS	Outer	IWP	DBM	Core	4.56	2.581	Confirming to DBM grade-II
10	MCW	45+000	LHS	Outer	IWP	DBM	Core	4.19	2.576	Confirming to DBM grade-II
11	MCW	50+000	RHS	Inner	OWP	BC	Core	5.08	2.478	13.2mm IS sieve material finer side in BC grade-I
12	MCW	56+100	LHS	Inner	OWP	BC	Core	5.43	2.454	13.2mm, 9.5mm IS sieve material finer side in BC grade-I
13	MCW	59+750	RHS	Outer	OWP	BC	Core	5.21	2.444	13.2mm IS sieve material finer side in BC grade-I
14	MCW	65+400	LHS	Outer	IWP	DBM	Core	4.64	2.544	Not confirming to any DBM gradation

S. No	Type of carriage way	Location (Km.)	Side (LHS/ RHS)	Lane	Wheel path	Type of Material Tested	Source of Sample	Bitumen Content (%)	Bulk Specific gravity	Gradation Confirming to MoRTH 5th Revision
15	MCW	70+150	RHS	Inner	IWP	DBM	Core	4.53	2.597	19.0mm IS sieve material finer side in DBM grade-II
16	MCW	75+300	LHS	Inner	IWP	BC	Core	5.19	2.449	Confirming to BC grade-I
17	MCW	80+250	RHS	Outer	IWP	DBM	Core	4.46	2.614	26.5mm IS sieve material finer side in DBM grade-I & 19.0mm IS sieve material finer side in DBM grade-II
18	MCW	86+300	LHS	Outer	OWP	BC	Core	5.10	2.439	13.2mm, 9.5mm IS sieve material finer side in BC grade-I
19	MCW	90+700	RHS	Inner	OWP	BC	Core	5.34	2.441	13.2mm IS sieve material finer side in BC grade-I
20	MCW	94+600	LHS	Inner	OWP	DBM	Core	4.13	2.587	Confirming to DBM grade-II
21	MCW	100+700	RHS	Outer	OWP	BC	Core	5.63	2.438	13.2mm, 9.5mm IS sieves material finer side in BC grade-I
22	MCW	105+400	LHS	Outer	IWP	DBM	Core	4.43	2.563	19.0mm IS sieve material finer side and 2.36mm IS sieve material coarser side in DBM grade-II
23	MCW	111+050	RHS	Inner	IWP	DBM	Core	4.48	2.564	26.5mm IS sieve material finer side and 2.36mm IS sieve material coarser side in DBM grade-I & 19.0mm IS sieve material finer side and 2.36mm IS sieve material coarser side in DBM grade-II
24	MCW	115+350	LHS	Inner	IWP	BC	Core	5.42	-	13.2mm, 9.5mm and 4.75mm IS sieves material finer side in BC grade-I
25	MCW	120+500	RHS	Outer	OWP	BC	Core	5.08	2.465	13.2mm, 9.5mm IS sieve material finer side in BC grade-I
26	MCW	125+200	LHS	Outer	OWP	DBM	Core	4.75	2.598	Confirming to DBM grade-I & II

S. No	Type of carriage way	Location (Km.)	Side (LHS/ RHS)	Lane	Wheel path	Type of Material Tested	Source of Sample	Bitumen Content (%)	Bulk Specific gravity	Gradation Confirming to MoRTH 5th Revision
27	MCW	128+800	RHS	Inner	IWP	BC	Core	5.19	2.462	13.2mm, 9.5mm IS sieves material finer side in BC grade-I

Table 8-8: Summary of bituminous layers test results for Spur Road

S. No	Type of carriage way	Location (Km.)	Side (LHS/ RHS)	Lane	Wheel path	Type of Material Tested	Source of Sample	Bitumen Content (%)	Bulk Specific gravity	Gradation Confirming to MoRTH 5th Revision
1	Spur Road	0+200	LHS	Inner	IWP	BC	Core	5.38	2.435	13.2mm, 9.5mm IS sieves material finer side in BC grade-I
2	Spur Road	5+000	RHS	Outer	OWP	DBM	Core	4.39	-	19.0mm IS sieve material finer side in DBM grade-II

9. PAVEMENT EVALUATION STUDIES

9.1 Pavement condition survey with Network Survey Vehicle

9.1.1 Network Survey Vehicle Description

Road Runner NSV (Network Survey Vehicle) has been deployed to collect condition data along the project corridor. Road Runner NSV is a multi-functional and high-precision road survey equipment capable of capturing a wide spectrum of pavement and roadway asset information at highway speeds. It is specifically designed to facilitate non-intrusive, continuous, and efficient data collection across large-scale road networks.

Road Runner NSV can collect roughness, rutting, pavement distresses, assets along with GPS coordinates and project chainage.

The use of Road Runner NSV ensures standardized, repeatable, and accurate measurements, which are crucial for performing condition assessment, prioritizing maintenance activities, and supporting the overall technical due diligence process for the project road.

The main components which are integrated into Road Runner NSV are.

1. Digital Laser Profilers (DLP) -Road roughness and rutting.
2. Digital Imaging System (DIS) -Pavement distresses and road assets data.
3. Differential Global Positioning System (DGPS).
4. High Resolution Distance Measuring Instrument (HRDMI).





1. Digital Laser Profiler (DLP)

- DLP is integrated into the NSV consisting of eleven lasers to collect Road Roughness and Rutting.
- This inertial profiler can record the data continuously along each wheel path.

(a) Roughness

Road Runner NSV equipment fitted with dual wheel path laser profilometer to collect the roughness data. The roughness data was collected and reported for 100 m interval.

The outputs of the lasers and accelerometers located in each wheel path (750 mm either side of the Centre line of the vehicle) are sampled every 25 mm of longitudinal travel and used to calculate the longitudinal profile of the road.

The profile is then passed through the quarter car model to calculate the International Roughness Index (IRI) lane roughness as per the methodologies specified in the ASTM E-950.

(b) Rutting

Rutting will be measured and reported through DLP, and the data will be recorded at every 100m interval on both the wheel paths.

2. Digital Imaging System (DIS)

Digital Imaging System (DIS) in Network Survey Vehicle (NSV) consist of 5 high resolution roof mounted cameras to capture pavement distresses and road assets data. These cameras are oriented in a certain configuration to ensure that the information of interest, such as inventory or pavement condition, is being recorded in the camera field of view. Three cameras are forward facing and mounted on front side of vehicle (Left corner, Centre and Right corner), covers 160° angle images and are set to sample at every 10m interval. Another two cameras are mounted on back side of the vehicle (Left corner, Right corner) to capture the distress image of pavement 10m*4m (length*width) i.e., captures at 10m interval.

Digital image system is capable of

- Collecting real time digital images.
- Achieving a sampling rate of at least one set per 2.5 meters for Distress camera's and one set per 10 meters for Asset cameras.
- Incorporating real time differentially corrected GPS (DGPS).
- Capturing & recording at highway speeds.
- Providing real time on-screen displays for operator verification during collection.
- Storing images straight to PC's / NAS (Network Attached Storage).
- Linking into the client's referencing system via distance and GPS.

3. Geo Referencing (DGPS Data)

Road Runner NSV is equipped with DGPS system, and it do collect all the data and images with geo-reference. Reference that image against GPS co-ordinates by logging the latitude, longitude of the specific image.

4. Distance Measuring Instrument (DMI)

Road Runner NSV is equipped with DMI, and it is fitted to rear tyre of the network survey vehicle. The distance and speed measurement performed by the distance measuring instrument, which is a distance transducer and it's highly accurate providing GPS distance and speed.



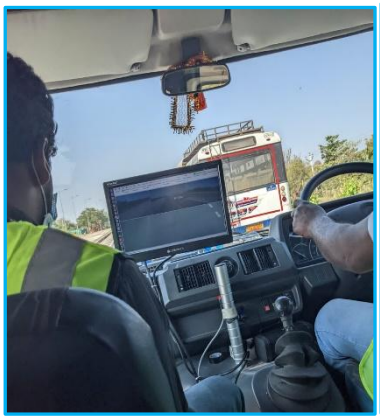


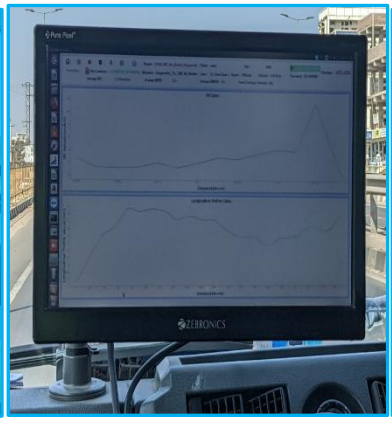
9.2 Methodology for NSV Field Testing

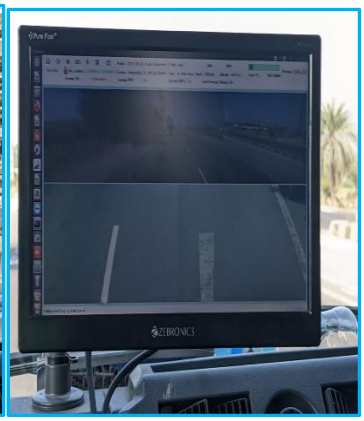
Usually, 4 members are assigned for site to collect the field data. Two of the trained/ experienced field engineers and two drivers during the collection phases of projects. During the survey, engineer is responsible for operating the vehicle's acquisition systems. Road Runner NSV dashboard tool is used to for data acquisition.

The survey will be carried out by lane wise, and the following steps will be followed during the survey.

- Engineer will setup the equipment and check the data collection system prior to the survey.
- Prior to the survey field engineer do set the project name, direction, lane number and starting chainage with increasing or decreasing (as per direction) details.
- The vehicle will run in middle of the lane and collects data up to a vehicle running speed of 80 Kmph.
- Digital Laser Profiler (DLP), Digital Imaging System (DIS) collect the data with GPS co-ordinates and chainage reference.
- Field Engineer will review the data collection and specifies any remarks/ details in observation column.
- At the end of project chainage, engineer will stop that survey and save all the recorded and the same process is followed for all other lanes of the project stretch.







9.3 Analysis of NSV Survey Data

Pavement condition survey was carried out on each lane of each carriage way with NSV. The NSV survey was conducted on the project corridor in June 2025, data was processed, analyzed, and presented in 100m interval.

9.3.1 Roughness

As stated in the earlier section, NSV collected the roughness data at 100m interval on each lane in terms of IRI (International Roughness Index) value.

In Indian context, the IRI values were converted to BI as per IRC: SP:16-2019 "Guidelines on Measuring Road Roughness and Norms" with the following equation.

$BI = 630*(IRI)^{\wedge 1.12}$

Were,

BI = Bump Integrator Roughness in mm/km

IRI = International Roughness Index.

Roughness data of the pavement is collected through Digital Laser Profilers System (DLP) for each section of the Main Carriageway (MCW) and Spur Road (SR).

MCW:

The obtained lane-wise kilometre roughness summary, expressed in terms of BI (mm/km) is presented in Table 9-1 and Table 9-2. The corresponding graphical representations for the LHS and RHS directions are illustrated in Figure 9-1.

Spur Road:

The obtained lane-wise kilometre roughness summary, expressed in terms of RI (mm/km) is presented in Table 9-3 and Table 9-4. The corresponding graphical representations for the LHS and RHS directions are illustrated in Figure 9-2.

Table 9-1: Summary of MCW Roughness Data on LHS Direction

Chainage (km)		LHS Direction		
		Avg. RI (mm/km)		
From	To	Outer Lane	Inner Lane	Average
3.000	4.000	2074.1	2391.1	2232.6
4.000	5.000	2495.6	2493.5	2494.6
5.000	6.000	1986.3	2438.7	2212.5
6.000	7.000	1782.3	2463.3	2122.8
7.000	8.000	2081.0	2374.5	2227.7
8.000	9.000	1779.3	1948.9	1864.1
9.000	10.000	1801.6	2253.8	2027.7
10.000	11.000	1902.8	1960.2	1931.5
11.000	12.000	2071.6	1907.3	1989.4
12.000	13.000	1751.1	1866.6	1808.9
13.000	14.000	2050.7	2069.8	2060.3
14.000	15.000	1865.5	2038.1	1951.8
15.000	16.000	1813.8	1905.4	1859.6
16.000	17.000	1878.5	1789.3	1833.9
17.000	18.000	2025.3	2277.2	2151.3

Chainage (km)		LHS Direction		
		Avg. RI (mm/km)		
From	To	Outer Lane	Inner Lane	Average
18.000	19.000	2040.2	2319.9	2180.1
19.000	20.000	1948.8	2109.8	2029.3
20.000	21.000	2020.0	2221.0	2120.5
21.000	22.000	1687.1	1914.3	1800.7
22.000	23.000	2003.9	2078.4	2041.2
23.000	24.000	2482.4	2443.7	2463.1
24.000	25.000	2204.1	2436.8	2320.5
25.000	26.000	1704.2	1989.5	1846.8
26.000	27.000	1686.1	2295.9	1991.0
27.000	28.000	1936.4	2185.6	2061.0
28.000	29.000	2393.0	2326.2	2359.6
29.000	30.000	2494.4	2349.4	2421.9
30.000	31.000	2006.2	1842.3	1924.2
31.000	32.000	2233.4	2184.7	2209.0
32.000	33.000	1857.6	1965.9	1911.7
33.000	34.000	1931.7	1744.3	1838.0
34.000	35.000	2023.7	2242.9	2133.3
35.000	36.000	1992.3	1907.8	1950.1
36.000	37.000	1740.8	2035.9	1888.4
37.000	38.000	2128.9	2096.1	2112.5
38.000	39.000	1692.8	1978.8	1835.8
39.000	40.000	1635.2	1915.6	1775.4
40.000	41.000	1799.4	1893.0	1846.2
41.000	42.000	2378.5	2381.6	2380.0
42.000	43.000	1951.3	2117.6	2034.4
43.000	44.000	2492.4	2483.1	2487.8
44.000	45.000	1881.4	1965.3	1923.4
45.000	46.000	2472.3	2386.9	2429.6
46.000	47.000	1680.0	1783.7	1731.9
47.000	48.000	1901.2	1996.2	1948.7
48.000	49.000	1824.6	2139.3	1982.0
49.000	50.000	1605.6	1788.5	1697.1
50.000	51.000	2049.4	2368.7	2209.0
51.000	52.000	2491.8	2438.9	2465.3
52.000	53.000	1834.2	2247.5	2040.9
53.000	54.000	1996.8	2371.2	2184.0
54.000	55.000	2160.4	2469.8	2315.1
55.000	56.000	2189.9	2316.1	2253.0
56.000	57.000	2369.0	2403.0	2386.0
57.000	58.000	2074.1	2056.0	2065.0
58.000	59.000	2458.6	2498.5	2478.5
59.000	60.000	2301.1	2076.2	2188.6
60.000	61.000	1734.3	1886.4	1810.4
61.000	62.000	1821.3	2194.7	2008.0
62.000	63.000	1563.4	1386.6	1475.0

Chainage (km)		LHS Direction		
		Avg. RI (mm/km)		
From	To	Outer Lane	Inner Lane	Average
63.000	64.000	1896.9	1889.8	1893.4
64.000	65.000	1725.2	1691.7	1708.5
65.000	66.000	1959.3	1875.3	1917.3
66.000	67.000	1922.3	1326.2	1624.2
67.000	68.000	2057.7	1862.1	1959.9
68.000	69.000	1899.8	1729.0	1814.4
69.000	70.000	2092.4	2149.6	2121.0
70.000	71.000	1973.4	1836.7	1905.1
71.000	72.000	2128.7	2261.9	2195.3
72.000	73.000	2117.4	2229.6	2173.5
73.000	74.000	2075.3	1963.8	2019.6
74.000	75.000	2138.4	2011.9	2075.1
75.000	76.000	2080.7	2074.0	2077.3
76.000	77.000	1733.4	2041.0	1887.2
77.000	78.000	1871.3	2234.0	2052.6
78.000	79.000	1777.8	1798.6	1788.2
79.000	80.000	1740.0	1958.0	1849.0
80.000	81.000	2359.6	2266.0	2312.8
81.000	82.000	1966.8	1993.3	1980.0
82.000	83.000	2097.3	1958.3	2027.8
83.000	84.000	2472.0	2496.2	2484.1
84.000	85.000	2134.0	2086.6	2110.3
85.000	86.000	2008.6	1840.3	1924.5
86.000	87.000	1835.5	1895.5	1865.5
87.000	88.000	1604.0	1675.5	1639.8
88.000	89.000	1917.5	2198.3	2057.9
89.000	90.000	2268.7	2424.4	2346.6
90.000	91.000	1435.8	2307.5	1871.6
91.000	92.000	2392.3	2491.3	2441.8
92.000	93.000	1938.5	2463.8	2201.1
93.000	94.000	2179.5	2487.0	2333.3
94.000	95.000	1506.2	2089.1	1797.7
95.000	96.000	1522.4	1505.7	1514.1
96.000	97.000	2424.7	2375.1	2399.9
97.000	98.000	1858.7	2028.3	1943.5
98.000	99.000	2220.3	2260.7	2240.5
99.000	100.000	1895.8	1953.2	1924.5
100.000	101.000	1723.8	1939.1	1831.4
101.000	102.000	2002.6	1885.9	1944.3
102.000	103.000	1910.3	2331.6	2120.9
103.000	104.000	2303.1	2251.1	2277.1
104.000	105.000	1839.0	2496.9	2168.0
105.000	106.000	1276.9	1780.6	1528.8
106.000	107.000	1566.9	1823.2	1695.0
107.000	108.000	2258.1	2485.5	2371.8

Chainage (km)		LHS Direction		
		Avg. RI (mm/km)		
From	To	Outer Lane	Inner Lane	Average
108.000	109.000	2189.7	2484.3	2337.0
109.000	110.000	1909.5	1572.0	1740.7
110.000	111.000	2470.0	2356.6	2413.3
111.000	112.000	2488.3	2482.1	2485.2
112.000	113.000	1837.0	1971.7	1904.4
113.000	114.000	1613.3	1417.0	1515.1
114.000	115.000	1987.0	2366.3	2176.6
115.000	116.000	1978.0	1582.8	1780.4
116.000	117.000	1364.5	1464.9	1414.7
117.000	118.000	1449.4	1689.6	1569.5
118.000	119.000	1460.7	1529.9	1495.3
119.000	120.000	1265.8	1251.9	1258.8
120.000	121.000	1349.9	1454.4	1402.2
121.000	122.000	2291.6	2319.7	2305.6
122.000	123.000	2150.3	2379.2	2264.7
123.000	124.000	2188.9	2275.1	2232.0
124.000	125.000	1949.6	1833.5	1891.5
125.000	126.000	1685.6	1704.7	1695.2
126.000	127.000	2030.3	2230.3	2130.3
127.000	128.000	1785.5	1962.8	1874.1
128.000	129.060	2238.2	2301.9	2270.1

Table 9-2: Summary of MCW Roughness Data on RHS Direction

Chainage (km)		RHS Direction		
		Avg. BI (mm/km)		
From	To	Outer Lane	Inner Lane	Average
129.060	128.000	1650.1	1475.7	1562.9
128.000	127.000	1376.3	1427.6	1401.9
127.000	126.000	1771.9	1911.2	1841.6
126.000	125.000	1435.9	1136.3	1286.1
125.000	124.000	2117.2	2012.2	2064.7
124.000	123.000	2044.9	2105.7	2075.3
123.000	122.000	2386.1	2436.0	2411.1
122.000	121.000	2382.2	2437.4	2409.8
121.000	120.000	1978.6	2492.8	2235.7
120.000	119.000	2090.6	2385.7	2238.1
119.000	118.000	2345.6	2415.7	2380.7
118.000	117.000	2384.7	2417.7	2401.2
117.000	116.000	1789.8	1774.9	1782.4
116.000	115.000	1899.8	2273.5	2086.6
115.000	114.000	2434.1	2257.8	2346.0
114.000	113.000	1677.6	1537.3	1607.5
113.000	112.000	1558.1	1670.1	1614.1
112.000	111.000	1908.5	2142.7	2025.6

Chainage (km)		RHS Direction		
		Avg. BI (mm/km)		
From	To	Outer Lane	Inner Lane	Average
111.000	110.000	2494.6	2397.6	2446.1
110.000	109.000	1699.9	1224.0	1461.9
109.000	108.000	1561.4	1746.4	1653.9
108.000	107.000	1480.3	1708.1	1594.2
107.000	106.000	1396.8	1610.4	1503.6
106.000	105.000	1940.6	2247.8	2094.2
105.000	104.000	2008.2	1877.2	1942.7
104.000	103.000	1675.3	1801.9	1738.6
103.000	102.000	1746.4	2355.5	2050.9
102.000	101.000	1288.0	1364.8	1326.4
101.000	100.000	1451.7	1411.1	1431.4
100.000	99.000	1426.2	1431.5	1428.8
99.000	98.000	1969.1	1899.8	1934.5
98.000	97.000	1681.9	1485.4	1583.6
97.000	96.000	2167.2	2441.7	2304.4
96.000	95.000	1570.9	1420.5	1495.7
95.000	94.000	1796.2	1617.1	1706.7
94.000	93.000	1708.3	1748.3	1728.3
93.000	92.000	1617.3	2131.2	1874.2
92.000	91.000	2252.5	2479.2	2365.9
91.000	90.000	1822.8	1969.6	1896.2
90.000	89.000	1869.6	2172.1	2020.9
89.000	88.000	1527.4	1708.6	1618.0
88.000	87.000	1580.6	2001.4	1791.0
87.000	86.000	1400.9	1189.6	1295.2
86.000	85.000	1748.8	1909.0	1828.9
85.000	84.000	1691.1	1849.0	1770.0
84.000	83.000	1673.8	1394.2	1534.0
83.000	82.000	1793.3	2087.4	1940.4
82.000	81.000	1665.6	1767.4	1716.5
81.000	80.000	2087.5	2236.4	2161.9
80.000	79.000	1853.2	1945.6	1899.4
79.000	78.000	1764.9	1983.0	1873.9
78.000	77.000	1745.3	1938.2	1841.7
77.000	76.000	1698.0	1659.8	1678.9
76.000	75.000	1792.0	1781.3	1786.7
75.000	74.000	1628.8	1593.9	1611.4
74.000	73.000	1671.9	1709.4	1690.6
73.000	72.000	2294.4	2331.8	2313.1
72.000	71.000	1605.9	1709.9	1657.9
71.000	70.000	1786.1	1996.0	1891.1
70.000	69.000	1819.8	2061.0	1940.4
69.000	68.000	1560.8	1549.2	1555.0

Chainage (km)		RHS Direction		
		Avg. BI (mm/km)		
From	To	Outer Lane	Inner Lane	Average
68.000	67.000	1748.3	2485.3	2116.8
67.000	66.000	1862.0	2133.7	1997.8
66.000	65.000	1463.4	1619.3	1541.3
65.000	64.000	1429.1	1223.3	1326.2
64.000	63.000	1997.5	1795.1	1896.3
63.000	62.000	1913.3	1684.3	1798.8
62.000	61.000	1615.0	1485.1	1550.0
61.000	60.000	1774.6	1741.3	1757.9
60.000	59.000	1743.5	1315.4	1529.4
59.000	58.000	2417.6	2314.4	2366.0
58.000	57.000	2233.0	2237.3	2235.1
57.000	56.000	2387.9	2385.0	2386.4
56.000	55.000	1937.8	2054.9	1996.3
55.000	54.000	1960.2	2089.6	2024.9
54.000	53.000	1795.7	1795.5	1795.6
53.000	52.000	2146.3	2213.1	2179.7
52.000	51.000	2070.1	2468.9	2269.5
51.000	50.000	1911.0	2185.3	2048.1
50.000	49.000	2206.5	2361.4	2283.9
49.000	48.000	2381.4	2388.9	2385.2
48.000	47.000	1825.3	2006.1	1915.7
47.000	46.000	2378.0	2281.3	2329.7
46.000	45.000	2495.3	2374.3	2434.8
45.000	44.000	2377.5	2402.5	2390.0
44.000	43.000	2129.5	2143.5	2136.5
43.000	42.000	2150.8	2164.9	2157.8
42.000	41.000	2432.9	2352.9	2392.9
41.000	40.000	2464.2	2413.5	2438.9
40.000	39.000	2423.3	2294.8	2359.1
39.000	38.000	2343.5	2406.8	2375.2
38.000	37.000	2436.1	2278.4	2357.3
37.000	36.000	1845.5	2482.6	2164.0
36.000	35.000	2183.8	2284.6	2234.2
35.000	34.000	2361.2	2007.2	2184.2
34.000	33.000	2142.5	2477.3	2309.9
33.000	32.000	1698.9	2038.6	1868.8
32.000	31.000	1834.8	2200.8	2017.8
31.000	30.000	1963.0	2007.1	1985.1
30.000	29.000	2398.3	2459.9	2429.1
29.000	28.000	2041.4	2269.0	2155.2
28.000	27.000	2179.5	2024.3	2101.9
27.000	26.000	1768.8	1732.3	1750.6
26.000	25.000	1871.2	2234.3	2052.8

Chainage (km)		RHS Direction		
		Avg. BI (mm/km)		
From	To	Outer Lane	Inner Lane	Average
25.000	24.000	2485.2	2495.6	2490.4
24.000	23.000	2106.8	2351.8	2229.3
23.000	22.000	1931.0	2032.6	1981.8
22.000	21.000	1714.6	1754.3	1734.4
21.000	20.000	1929.9	2000.1	1965.0
20.000	19.000	2049.9	1924.9	1987.4
19.000	18.000	2178.4	2107.3	2142.9
18.000	17.000	1825.2	1938.8	1882.0
17.000	16.000	1738.2	1810.8	1774.5
16.000	15.000	2348.4	2264.3	2306.4
15.000	14.000	2373.9	2459.8	2416.8
14.000	13.000	2286.5	2252.6	2269.6
13.000	12.000	1595.3	1692.1	1643.7
12.000	11.000	1791.5	1760.6	1776.1
11.000	10.000	2194.4	2261.3	2227.8
10.000	9.000	1783.3	2134.7	1959.0
9.000	8.000	1784.5	1681.4	1732.9
8.000	7.000	1923.3	2046.8	1985.0
7.000	6.000	1821.7	2475.6	2148.6
6.000	5.000	2123.4	2440.5	2282.0
5.000	4.000	2419.9	2438.1	2429.0
4.000	3.000	2038.5	2010.2	2024.3

Table 9-3: Summary of Spur Road Roughness Data on LHS Direction

Chainage (km)		LHS Direction		
		Avg. BI (mm/km)		
From	To	Outer Lane	Inner Lane	Average
0.000	1.000	2271.7	2415.2	2343.4
1.000	2.000	2009.0	2318.8	2163.9
2.000	3.000	2135.6	2185.9	2160.7
3.000	4.000	2274.4	2286.3	2280.3
4.000	5.240	2426.5	2356.2	2391.4

Table 9-4: Summary of Spur Road Roughness Data on RHS Direction

Chainage (km)		RHS Direction		
		Avg. BI (mm/km)		
From	To	Outer Lane	Inner Lane	Average
5.240	4.000	2480.1	2341.9	2411.0
4.000	3.000	2179.4	2327.4	2253.4
3.000	2.000	2257.4	2240.6	2249.0
2.000	1.000	2393.5	2486.6	2440.0
1.000	0.000	2499.9	2467.7	2483.8

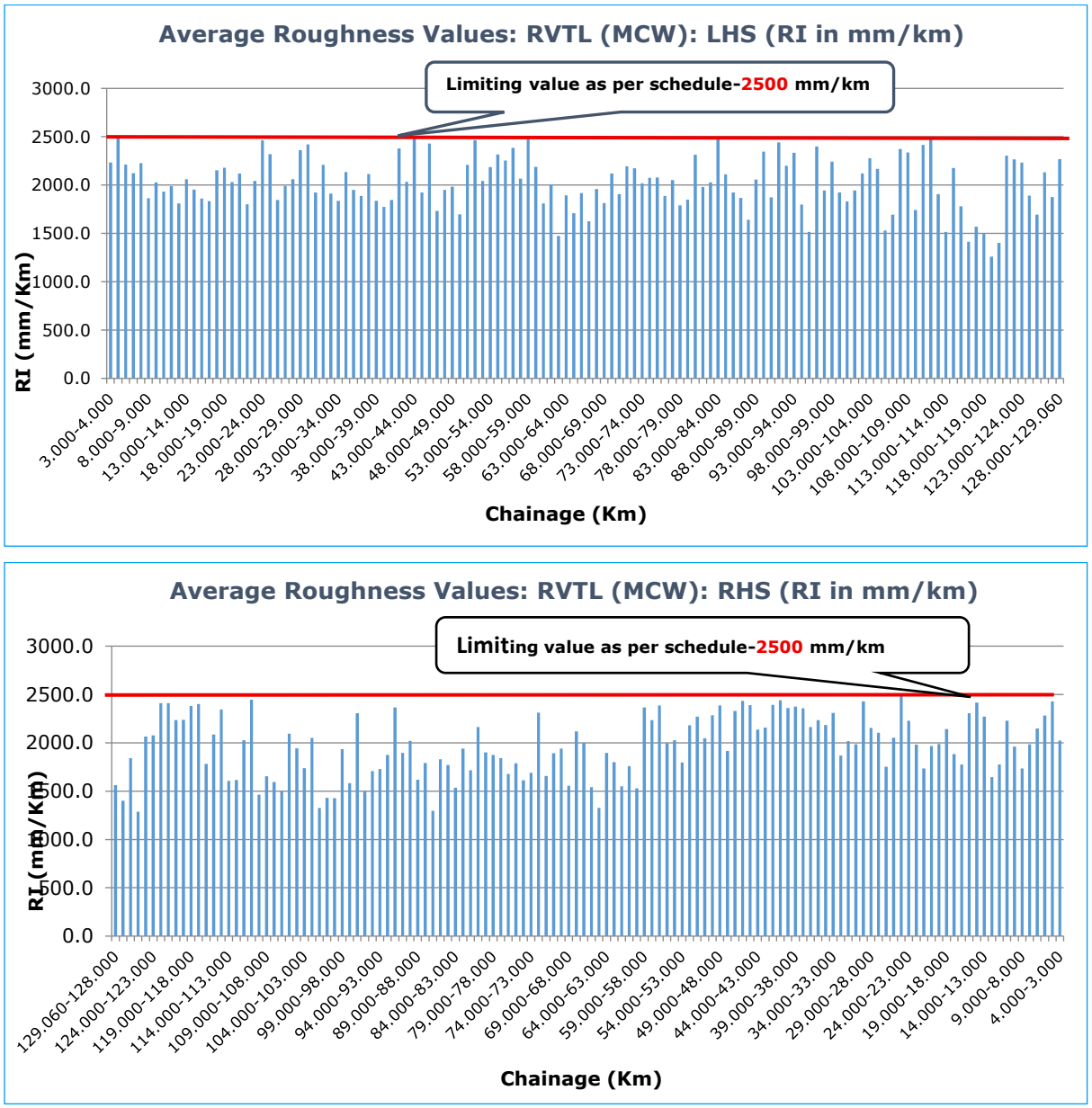


Figure 9-1: Illustrative Summary of MCW Roughness on LHS & RHS Direction



Figure 9-2: Illustrative Summary of Roughness on Spur Road LHS & RHS Direction

The roughness more than 2500 mm/km is considered max allowable limit.

Table 9-5: Roughness Summary in Both Directions of MCW

S. No	Condition	BI (mm/km)	LHS				RHS			
			Outer Lane		Inner Lane		Outer Lane		Inner Lane	
			Length (km)	Length (%)	Length (km)	Length (%)	Length (km)	Length (%)	Length (km)	Length (%)
1	Good	<1800	33.000	26.3	21.000	16.7	52.460	41.8	40.060	31.9
2	Fair	1800-2400	81.460	64.9	86.060	68.6	63.000	50.2	65.400	52.1
3	Poor	>2400	11.000	8.8	18.400	14.7	10.000	8.0	20.000	15.9
As per Schedule L		>2500	0.000	0.000	0.0	0.000	0.0	0.000	0.0	0.000

S. No	Condition	BI (mm/km)	LHS				RHS			
			Outer Lane		Inner Lane		Outer Lane		Inner Lane	
			Length (km)	Length (%)	Length (km)	Length (%)	Length (km)	Length (%)	Length (km)	Length (%)
Total Length surveyed (in km)			125.460	100.0	125.460	100.0	12.46	100.0	12.460	100.0

2. Spur Road (SR):

The roughness more than 2500 mm/km is considered max allowable limit.

Table 9-6: Roughness Summary in Both Directions of SR

S. No	Condition	BI (mm/km)	LHS				RHS			
			Outer Lane		Inner Lane		Outer Lane		Inner Lane	
			Length (km)	Length (%)	Length (km)	Length (%)	Length (km)	Length (%)	Length (km)	Length (%)
1	Good	<1800	0.000	0.0	0.000	0.0	0.000	0.0	0.000	0.0
2	Fair	1800-2400	4.000	76.3	4.240	80.9	3.000	57.3	3.240	61.8
3	Poor	>2400	1.240	23.7	1.000	19.1	2.240	42.7	2.000	38.2
As per Schedule L		>2500	0.000	0.000	0.0	0.000	0.0	0.000	0.0	0.0
Total Length surveyed (in km)			5.240	100.0	5.240	100.0	5.240	100.0	5.240	100.0

9.3.2 Rutting

Rutting data of flexible pavement section is collected through digital laser profilers' system.The obtained lane wise rutting summary is presented in Table 9-7 & Table 9-8 for both MCW & SPUR, respectively. The graphical representation of rutting data is presented in Figure 9-3 & Figure 9-4 for MCW & SPUR, respectively.

Table 9-7: Summary of MCW rutting data on both directions

Distress	Depth (in mm)	Length of the Road Effected with Rutting							
		LHS				RHS			
		Length in Km		Length in %		Length in Km		Length in %	
		Outer Lane	Inner Lane	Outer Lane	Inner Lane	Outer Lane	Inner Lane	Outer Lane	Inner Lane
Rutting	< 5 mm	108.36	73.060	86.4%	58.2%	93.360	82.760	74.4%	66.0%
	5- 10 mm	16.900	51.100	13.5%	40.7%	30.900	41.600	24.6%	33.2%
	> 10 mm	0.200	1.300	0.2%	1.0%	1.200	1.100	1.0%	0.9%
Total Length surveyed (in km)		125.460	125.460	100.0%	100.0%	125.460	125.460	100.0%	100.0%

Table 9-8: Summary of Spur Road Rutting Data on Both Directions

Distress	Depth (in mm)	Length of the Road Effected with Rutting							
		LHS				RHS			
		Length in Km		Length in %		Length in Km		Length in %	
		Outer Lane	Inner Lane	Outer Lane	Inner Lane	Outer Lane	Inner Lane	Outer Lane	Inner Lane
Rutting	< 5 mm	3.900	2.700	74.4%	51.5%	3.640	2.400	69.5%	45.8%
	5- 10 mm	1.240	2.340	23.7%	44.7%	1.500	2.740	28.6%	52.3%
	> 10 mm	0.100	0.200	1.9%	3.8%	0.100	0.100	1.9%	1.9%
Total Length surveyed (in km)		5.240	5.240	100.0%	100.0%	5.240	5.240	100.0%	100.0%

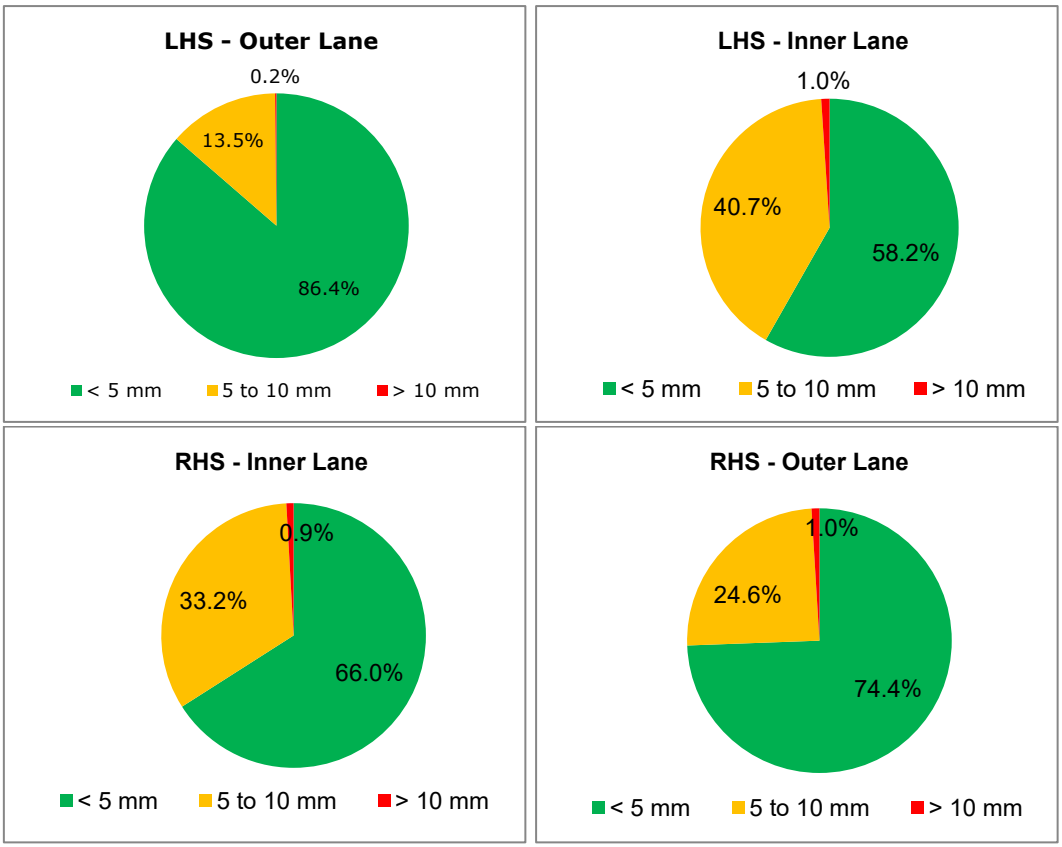


Figure 9-3: Illustrative Summary of MCW Rutting

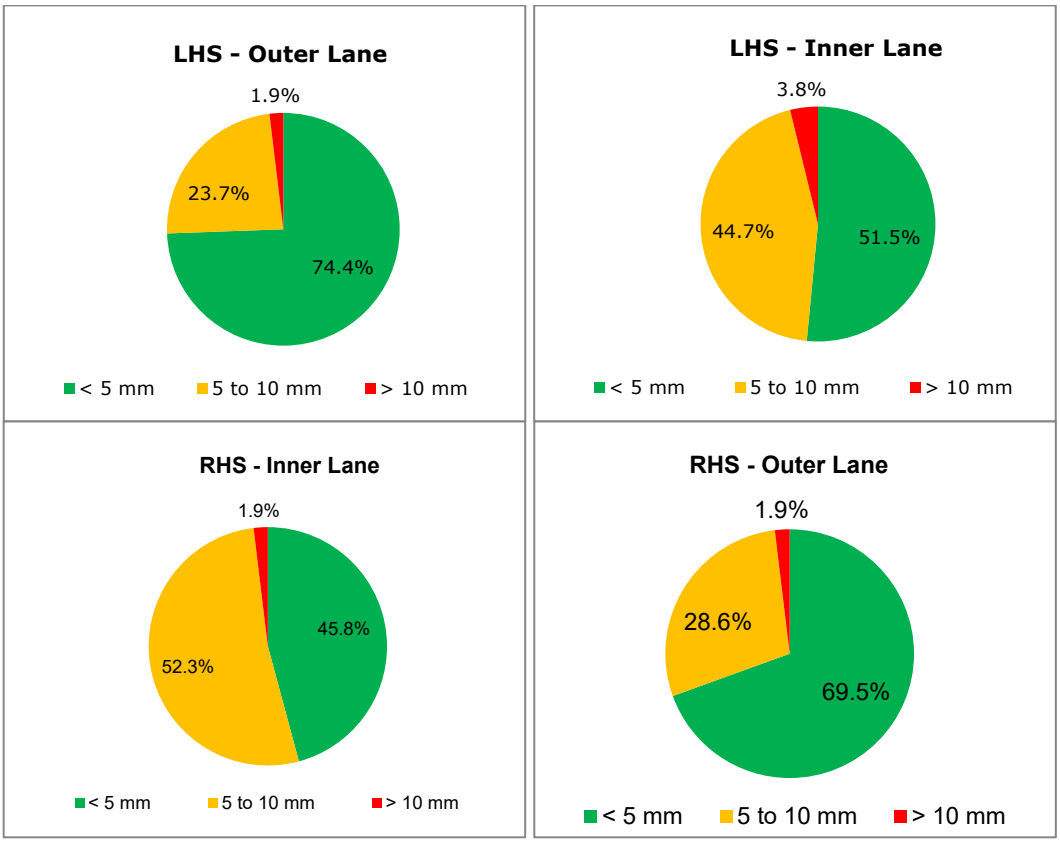


Figure 9-4: Illustrative Summary of Spur Road Rutting

9.3.3 Pavement distress data of Flexible Pavement

The NSV software processes the collected data and automatically geotags each image and measurement with the corresponding GPS coordinates and chainage. It further classifies pavement distresses by type, location, magnitude, and severity, enabling precise mapping and assessment of roadway conditions.

Pavement distress data of Flexible pavement- Main carriageway and Spur Road

The following Pavement distresses are considered for assessing the flexible pavement condition as per IRC: 82-2023 "Code of Practice for Maintenance of Bituminous Road Surfaces".

- Cracking
  - Longitudinal cracks
  - Transverse cracks
  - Alligator cracks/ Crocodile cracks
  - Multiple cracks
- Ravelling
- Shoving
- Bleeding
- Slippage/ Delamination
- Potholes
  - Area: Surface Area of the Pothole.

  - Numbers

- Edge break
- Patching
- Settlements, Depressions

All the above pavement distress will be provided at 100 m interval.

The detailed pavement condition analysis and distress rating is carried out as per Table 5.1 given in IRC 82:2023. The pavement distress summary is presented in the table below for both MCW & SR, respectively. Few site investigation photographs are shown in Figure 9-5.

Table 9-9: Summary of MCW Flexible pavement distresses

Distress	Severity (% of Area)	Length of the Road Effected		Length of the Road Effected	
		LHS		RHS	
		Inner Lane	Outer Lane	Inner Lane	Outer Lane
		Length in %	Length in %	Length in %	Length in %
Cracking	< 5%	91.02	97.88	94.80	98.05
	5% to 10%	5.45	1.79	3.25	1.06
	> 10%	3.53	0.33	1.95	0.89
Ravelling	< 1%	100.00	99.84	99.92	99.84
	1% to 10%	0.00	0.16	0.08	0.16
	> 10%	0.00	0.00	0.00	0.00
Potholes	Nil	100.00	100.00	100.00	100.00
	1 to 2	0.00	0.00	0.00	0.00
	>2	0.00	0.00	0.00	0.00
Patching	< 1%	94.32	96.93	89.84	96.02
	1% to 10%	5.11	2.99	8.62	3.90
	> 10%	0.57	0.08	1.54	0.08
Rut depth	< 5	57.72	86.17	65.55	74.45
	5 to 10	41.22	13.66	33.63	24.58
	> 10	1.06	0.16	0.81	0.98
IRI	< 2.55	34.49	43.19	39.79	47.67
	2.55 to 3.3	39.03	41.87	35.61	35.37
	> 3.3	26.48	14.94	24.60	16.96

Table 9-10: Summary of Spur Road Flexible pavement distresses

Distress	Severity (% of Area)	Length of the Road Effected		Length of the Road Effected	
		LHS		RHS	
		Inner Lane	Outer Lane	Inner Lane	Outer Lane
		Length in %	Length in %	Length in %	Length in %
Cracking	< 5%	77.10	100.00	71.37	84.73
	5% to 10%	11.45	0.00	11.45	9.54
	> 10%	11.45	0.00	17.18	5.73
Ravelling	< 1%	100.00	100.00	100.00	98.09
	1% to 10%	0.00	0.00	0.00	1.91

Distress	Severity (% of Area)	Length of the Road Effected		Length of the Road Effected	
		LHS		RHS	
		Inner Lane	Outer Lane	Inner Lane	Outer Lane
		Length in %	Length in %	Length in %	Length in %
	> 10%	0.00	0.00	0.00	0.00
Potholes	Nil	100.00	100.00	100.00	100.00
	1 to 2	0.00	0.00	0.00	0.00
	>2	0.00	0.00	0.00	0.00
Patching	< 1%	96.18	92.37	90.46	94.27
	1% to 10%	3.82	7.63	9.54	5.73
	> 10%	0.00	0.00	0.00	0.00
Rut depth	< 5	51.53	74.43	45.80	69.47
	5 to 10	44.66	23.66	52.29	28.63
	> 10	3.82	1.91	1.91	1.91
IRI	< 2.55	9.54	30.53	1.91	5.73
	2.55 to 3.3	45.80	40.08	38.17	32.44
	> 3.3	44.66	29.39	59.92	61.83

9.3.4 Pavement distress data of Rigid Pavement (Toll Plaza)

The following Pavement distresses are considered for assessing the rigid pavement condition as per IRC SP: 83-2023 (Guidelines for Maintenance, Repair and Rehabilitation of Cement concrete pavements);

- Cracking
  - Longitudinal cracks
  - Transverse cracks/ Diagonal Cracks
  - Corner cracks/ Corner breaks
  - Multiple cracks
- Spalling of Joints
- Joint seal defects
- Joint Faulting/ Stepping
- Joint Separation
- Blow up/ Buckling
- Ravelling/ Scaling
- Potholes/ Pop outs

All the above pavement distresses will be provided at 10 m interval.

The existing distresses are measured in five level distress rating system as specified in IRC: SP: 83-2018. The five-level distress rating system is given in Table 9-11 below.

Table 9-11: Five-level distress rating system for Rigid Pavement

Distress Rating	Slab Condition	Severity (Defects) Rating
0	Excellent	No Discernible
1	Very Good	Minor
2	Good/Average	Moderate

3	Fair	Major
4	Poor	Extreme
5	Very Poor	Unsafe/ Unserviceable

The condition survey of the rigid pavement was carried out by observing all the listed distresses as specified in IRC: SP: 83-2018 in conformity with Proforma given code. Type of distresses and assessment rating as given in Table 4.5 of IRC: SP: 83-2018 is followed and the same is listed in Table 9-12 below.

Table 9-12: Type of distresses and its assessment rating

S. No	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating
1	**CRACKING**			
	Single Discrete Cracks Not interaction with Any joint	w=width of crack L=length of crack d=depth of crack D=depth of slab	0	Nil, not discernible
			1	w<0.2 mm, hair cracks
			2	w= 0.2 -0.5 mm, discernible from slow-moving car
			3	w=0.5-1.5 mm, discernible from fast-moving car
			4	w=1.5-3.00 mm
			5	w>3 mm
2	Single Transverse (or Diagonal) Crack intersecting with one or more joints	w=width of crack L=length of crack d=depth of crack D=depth of slab	0	Nil, not discernible
			1	w<0.2 mm, hair cracks
			2	w=0.2 -0.5 mm, discernible from slow vehicle
			3	w=0.5-3.0 mm, discernible from fast vehicle
			4	w=3.0-6.0 mm
			5	w>6mm, usually associated with spalling, and/or slab rocking under traffic
3	Single Longitudinal Crack intersecting with one or more joints	w=width of crack L=length of crack d=depth of crack D=depth of slab	0	Nil, not discernible
			1	w<0.5 mm, discernible from slow vehicle
			2	w= 0.5 -3.0 mm. discernible from fast vehicle
			3	w=3.0-6.0 mm
			4	w=6.0-12. mm
			5	w>12mm, usually associated with spalling, and/or slab rocking under traffic
4	Multiple Cracks Intersecting with one or more joints or cracks	w=width of crack	0	Nil, not discernible
			1	w<0.2 mm, hair cracks
			2	w=0.2 - 0.5 mm, discernible from slow vehicle
			3	w=0.5-3.0 mm, discernible from fast vehicle
			4	w=3.0 - 6.0 mm panel broken into 2 or 3 pieces

S. No	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating
			5	w > 6 mm and/or panel broken into more than 4 pieces
5	Corner Break	w=width of crack L=length of crack	0	Nil, not discernible
			1	w<0.5 mm only one corner broken
			2	w< 1.5 mm, L<0.6 m, only one corner broken
			3	w< 1.5 mm. L <0.6 m, two corners broken
			4	w>1.5 mm, L >0.6 m, or Three corners broken
			5	Three or four corners broken
6	Punchout (Applicable to CRCP only)	w=width of crack L=length (m/m^2)	0	Nil, not discernible
			1	w< 0.5 mm; L< 3 m/m^2
			2	either w>0.5 mm or L<3 m/m^2
			3	w> 1.5 mm and L< 3 m/m^2
			4	w>3 mm, L<3 m/m^2 and deformation
			5	w>3 mm, L>3 m/m^2 and deformation
7	**SURFACE DEFECTS**			
	Ravelling or Honeycomb type surface	r= area damaged surface / total surface of slab (%) h=maximum depth of damage	0	Nil, not discernible
			1	r < 2 %
			2	r =2-10%
			3	r=10-25%
			4	r=25-50%
			5	r >50% and h>25 mm
8	Scaling	r= area damaged surface / total surface of slab (%) h=maximum depth of damage	0	Nil, not discernible
			1	r < 2 %
			2	r =2-10%
			3	r=10-20%
			4	r=20-30%
			5	r >30% and h>25 mm
9	Polished Surface/ Glazing	t=texture depth sand patch test	0	
			1	t > 1mm
			2	t=1-0.6 mm
			3	t=0.6-0.3 mm
			4	t=0.3-0.1 mm
			5	t<0.1 mm
10				

S. No	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating
	Pop out (small Hole), Pothole Refer Para 8.4	n=number/m2 d=diameter h= maximum depth	0	d<50 mm; h<25 mm; n <1 per 5 m^2
			1	d=50-100 mm: h<50 mm: n<1 per 5 m^2
			2	d=50-100 mm: h>50 mm: n<1 per 5 m^2
			3	d=100-300 mm: h<100 mm: n<1 per 5 m^2
			4	d=100-300 mm: h>100 mm: n<1 per 5 m^2
			5	d>300 mm: h>100 mm: n>1 per 5 m^2
	JOINT DEFECTS			
11	Joint Seal Defects	Loss or damage L=Length as % total joint length	0	Difficult to discern.
			1	Discernible, L<25% but of little immediate consequence eighth regard to ingress of water or trapping incompressible material.
			3	Notable, L>25% insufficient protection against ingress of water and trapping in incompressible material.
			5	Severe; w>3 mm negligible protection against ingress of water and trapping in incompressible material.
12	Spalling of Joints	w= width on either side of the joint L= Length as % total joint length	0	Nil, not discernible
			1	w<10 mm
			2	w=10-20 mm, L<25%
			3	w=20-40 mm, L >25%
			4	w=40-80mm, L >25%
			5	w>80mm, and L>25%
13	Faulting (or stepping) in Cracks or Joints	f=difference of level	0	Not discernible, f< 1 mm
			1	f< 3 mm
			2	f=3-6 mm
			3	f=6-12 mm
			4	f=12-18 mm
			5	f>18 mm
14	Blow up or buckling	h=vertical displacement from normal profile	0	Nil, not discernible
			1	h< 6 mm
			2	h=6-12 mm
			3	h=12-25 mm
			4	h>25 mm
			5	shattered slabs, i.e., 4 or more pieces
15	Depression	h= negative vertical displacement	0	Nil, not discernible, h<5 mm
			1	h=5-15 mm

S. No	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating
		from profile L= Length	2	h=15-30 mm. Nos < 20% joints
			3	h=30-50 mm
			4	h>50mm or >20% joints
			5	h>100 mm
16	Heave	h= positive vertical displacement from profile L= Length	0	Nil, not discernible, h<5 mm
			1	h=5-15 mm
			2	h=15-30 mm. Nos < 20% joints
			3	h=30-50 mm
			4	h>50 mm or >20% joints
			5	h>100 mm
17	Bump	h=vertical displacement from normal profile	0	h<4 mm
			1	h=4-7 mm
			3	h= 7 - 15 mm
			5	h>15 mm
18	Lane to Shoulder Dropoff	f=difference of level	0	Nil, not discernible f<5 mm
			1	f=3-10 mm
			2	f=10-25 mm.
			3	f=25-50 mm
			4	f=50-75 mm
			5	f >75 mm
19	**DRAINAGE**			
	Pumping	quantity of fines and water expelled through open joints and cracks Nos/ 100 m stretch	0	Not discernible
			1 to 2	slight / occasional Nos <10%
			3 to 4	appreciable / Frequent 10-25%
			5	Abundant, crack development>25%
20	Ponding	Ponding on slabs due to blockage of drains	0-2	No discernible problem
			3 to 4	Blockages observed in drains, but water flowing
			5	Ponding, accumulation of water observed

The rigid pavement condition summary of each section in lane wise is presented from Table 9-13.

Table 9-13: Rigid Pavement Distress Summary (Toll Plaza):

Rigid Distress Summary							
Distress	Unit	Toll Plaza-1		Toll Plaza-2		Toll Plaza-3	
		LHS	RHS	LHS	RHS	LHS	RHS
Single discrete Cracks	Rm.	5.000	5.000	0.000	0.000	0.000	0.000
Transverse Cracks	Rm.	50.500	115.000	7.000	18.000	20.000	0.000
Longitudinal Cracks	Rm.	0.000	10.000	0.000	0.000	26.000	0.000
Multiple Cracks	Rm.	7.000	115.000	0.000	0.000	15.000	0.000
Corner Cracks	Rm.	0.000	0.000	0.000	0.000	8.000	0.000
Joint Seal Defects	Rm.	0.000	5.000	0.000	10.000	0.000	0.000
Joint Separation	Rm.	0.000	5.000	0.000	0.000	15.000	0.000
Joint Spalling	Rm.	0.000	0.000	0.000	5.000	0.000	0.000
Ravelling/ Scaling	Sq.m	87.500	266.500	17.500	17.500	157.500	0.000
Pothole	Sq.m	0.000	0.000	0.000	0.000	0.000	0.000













Figure 9-5:Field testing photographs captured during the NSV survey

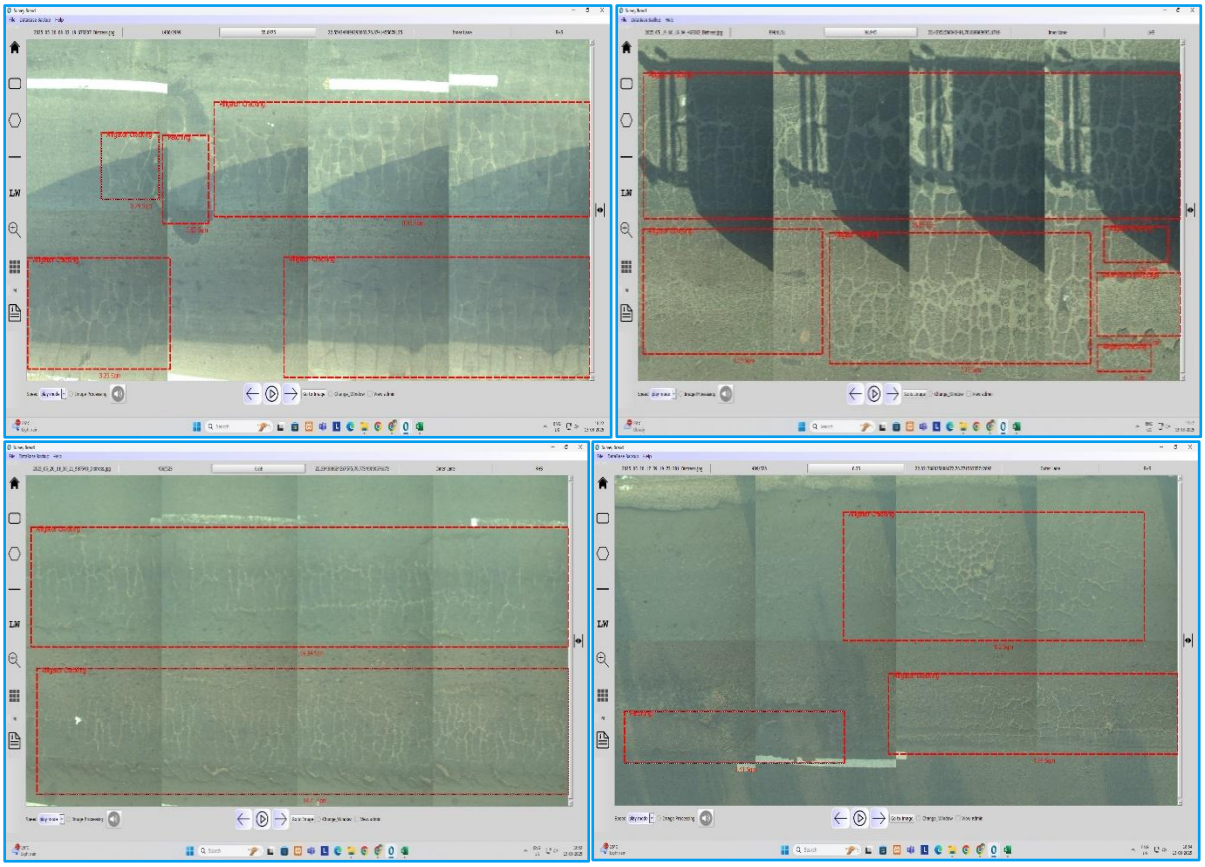


Figure 9-6:Distress Mapping Photographs- Flexible Pavement





Figure 9-7:Investigation Photographs- Rigid Pavement (Toll Plaza & Tunnel)

9.4 Structural Evaluation of Flexible Pavement by Using FWD

9.4.1 Equipment Description and Test Methodology

Principle of Pavement Evaluation Using FWD

Performance of flexible pavements can be evaluated by applying loads on the pavements that simulate the actual traffic loading conditions, The recording of such responses is made by measuring the elastic deflection under such loads. The collected deflection data from survey is duly analysed considering the factors influencing the performance of pavement such as subgrade strength, thickness and quality of each of the pavement layers, drainage conditions, pavement surface temperature etc.

Among the equipment available for structural evaluation of pavements, the Falling Weight Deflectometer (FWD) is extensively used world-wide because it simulates, to a large extent, the actual loading conditions of the pavement. When a moving wheel load passes over the pavement it produces load pulses. Normal stresses (vertical as well as horizontal) at a location in the pavement will increase in magnitude from zero to a peak value as the moving wheel load approaches the location. The time taken for the stress pulse to vary from zero to peak value is termed as 'rise time of the pulse'. As the wheel moves away from the location, magnitude of stress reduces from peak value to zero. The time during which the magnitude of stress pulse varies from 'zero-to-peak-to-zero' is the pulse duration. Peak load and the corresponding pavement responses are of interest for pavement evaluation.

The resulting load-deflection data can be interpreted through appropriate analytical techniques, such as back calculation technique, to estimate the elastic moduli of the pavement layers. The computed moduli are, in turn, used for (i) the strength evaluation of different layers of in-service pavements (ii) the estimation of the remaining life of in-service pavement (iii) determination of strengthening requirement, if any and (iv) evaluation of different rehabilitation alternatives (overlay, recycling, partial reconstruction, etc

Brief Description of Falling Weight Deflectometer (FWD)

Falling Weight Deflectometer is an impulse-generating device with a guide system. This device allows a variable weight to be dropped from a variable height. The apparatus has a loading plate which is used for uniform force distribution on the test layer. When the weight affects this plate, this loading plate ensures that the resulting force is applied perpendicularly to the test layer’s surface. It also has a load cell for measuring the actual applied impulse. It also has one or more deflection sensors. (Note: Deflection basin tests require at least seven sensors). It also has a system for collecting,

processing, and storing deflection data. Structural evaluation of pavements involves application of a standard load to the pavement and measuring its response in terms of stress, strain or deflection.

The basic working principle of the impulse loading equipment is to drop a mass on the pavement to produce an impulse load and measure the surface deflections. The mass is dropped on a spring system, which in turn transmits the load to the pavement through a loading plate. The resulting deflection bowl characteristics are observed and used in the back calculation of pavement material properties. The principle is illustrated in Figure 9-8.

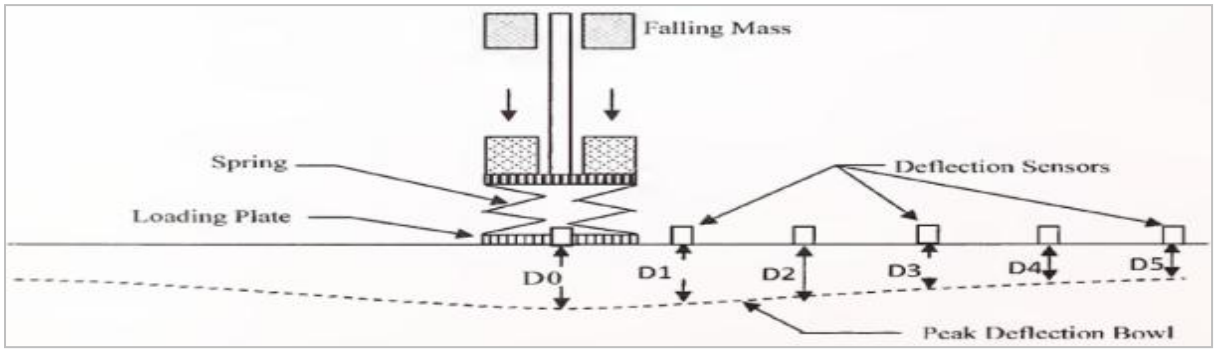


Figure 9-8: Working Principle of FWD

FWD Instrument Used for the Deflection Survey: DYNATEST 8002

For conducting FWD survey on the project road DYNATEST 8002 Fully Automatic Vehicle-mounted FWD. The FWD machines can apply a loading in the range of 12-150 kN, enabling them to simulate all type of vehicle loads on pavement surface. These models are equipped with a battery back-up and vehicle mounted set-up with all other accessories required for evaluation of pavement.

Moreover, this instrument mostly outperforms or matches all the criteria given in the IRC: 115-2014.

Testing Procedure and Methodology

The detailed test methodology and procedure was described in IRC: 115-2014 "Guidelines for Structural Evaluation and Strengthening of Flexible Road Pavements Using Falling Weight Deflectometer (FWD) Technique". However, as per the client's requirement the sampling procedure was customized in this project. In adherence to the same, structural evaluation of the existing 'pavement and subgrade system' by measuring its response in terms of deflection was carried out using FWD for the project road in the month of May 2025 (12/05/2025 to 16/05/2025).

Evaluation of pavement structural strength is carried out in accordance with requirements of TOR and IRC: 115-2014.

Testing Equipment

The equipment used for the testing is:

- **DYNATEST 8002 FWD** Vehicle Mounted Falling Weight Deflectometer with 1 loading plate and 7 numbers of geophones placed at the spacing of 0, 300, 600, 900, 1200, 1500 and 1800mm from the centre of the loading plate.
- Air Temperature and Pavement Surface Temperature sensors as part of the FWD instrument.
- Glycerol and digital thermometer.
- Red flags and red cones and flashing lamps for traffic arrangement.

FWD Deflection Testing Points and Measurement

FWD deflection measurement has been carried out for each lane in both directions. FWD deflection measurement has been carried out at a test point along outer wheel path of each lane which is at an offset of 0.75m from the outer edge of outer lane, at 4.2m from the outer edge of outer lane as specified in section 5.4.5 of IRC: 115-2014. At every measurement location, four drops were made, such that the first drop is neglected as 'seating drop' and the rest three drops' deflections are recorded. Photographs of FWD test under progress at some locations are shown in



Figure 9-9: Photographs showing FWD survey under progress

Also, during survey pavement temperature of bituminous layer was recorded as per the procedure specified in section 5.4.7, xiii of IRC: 115-2014.

The following steps are carried out for measuring deflections at a test point:

i. Mark the test point on the pavement

ii. Centre the load plate over the test point

iii. Lower the loading plate onto the pavement ensuring there should be no standing water on the pavement surface. The loading plate should be in proper contact with pavement surface. The longitudinal and transverse slope of the pavement should not exceed 10 percent at the test location.

iv. Lower the frame holding the geophones so that the transducers are in contact with pavement surface.

v. Raise the mass to a pre-determined height required for producing a target load of 40 kN (+10%).

vi. Drop one seating load. The load and deflection data for this seating load is not recorded.

vii. Raise the mass and drop. Record the load and deflection data into the computer through data acquisition system. While peak load and peak deflections at different selected radial positions must be recorded. At least 2 drops should be made at one location for precision.

viii. If, during previous 2 steps, the deflections measured are giving variations or the deflections/load pulses are not proper, repeat the test drop.

ix. Raise the geophone frame and load plate and move to the next test location

x. Deflection measurements should not be made when the pavement temperature is more than 45°C.

9.4.2 Existing Pavement Composition Details

The crust composition details used for analysis are taken from test pits and bituminous cores. The details are presented in Chapter 8

9.4.3 Pavement Condition

During the FWD survey, the pavement surface was generally observed to be in good condition throughout the entire project road. However, few LHS inner lane sections and RHS inner and outer lane sections were found to be in poor condition. The same condition is considered for providing the input for back-calculation as per IRC:115-2014.

9.4.4 In-put Data for BACK Calculation Analysis

(a) Processing of Load and Deflection data

The FWD test data collected from different drops at each test point primarily consists of peak load and peak deflections at different radial locations. Unrealistic deflection values and obviously erroneous data must be removed.

Average values of load and deflections are calculated from the three drop test data collected. FWD tests were carried out using 40 kN impulse load. However, since the FWD equipment does not impart the same load at every test point, normalization of all measured deflections was carried out to a common test load of 40 kN. Such 'normalization' of the data was carried out using the following formula:

$D_n = 40kN/L_m \times D_m$

were,

D_n = Normalized Deflection;

L_m = Imparted Load and

D_m = Measured Deflection

The "normalized deflection data" was then used for determining deflections, deflection bowl and finally in framing of homogeneous sections and calculation of overlay requirements.

(b) Back-calculation of Layer Moduli

Layer moduli have been back-calculated using KGPBACK program. The pavement has been modelled as a three-layer system with bituminous layer, granular layer and subgrade. The following inputs have been provided for back analysis.

- Single wheel load 40 kN and contact pressure 0.56 MPa
- No. of deflection sensors: 7

- Radial Distances of the Geophones i.e., 0, 300, 600, 900, 1200, 1500 and 1800mm
- Measured Surface Deflections normalized to 40kN in mm
- Pavement Layer Thicknesses
- Poisson's ratio of 0.35 is considered for bituminous, granular and subgrade layers.
- Range of Possible modulus value (Lower and Upper limits) of bituminous layer, granular layer and subgrade

Range of different layers moduli given as input to KGPBACK for back-calculation. These ranges selected judiciously by an experienced pavement engineer taking into considerations about approximate age of pavement, visual assessment of the condition of bituminous layer, prevailing climatic conditions during deflection measurements and based on information available from test pits, laboratory tests conducted as detailed in the sections below:

(c) Range of modulus for existing subgrade:

The range of moduli of existing subgrade layers is taken as 50-100 MPa.

(d) Range of modulus value of existing granular layers i.e., base and subbase:

The range of moduli of existing granular layers is based on clause II.8.4 of IRC 115-2014.The range for combined (base and sub-base) is taken as 100-500 MPa.

(e) Range of modulus value of existing bituminous layers:

The range of moduli of existing thick bituminous layer has been determined based on condition data. If the road condition is good the range is considered as 750MPa to 3000MPa, for sections with pavement condition is Fair- Poor, the range specified for thick bituminous layer 400 MPa to 1500 MPa as stipulated in section III.8.4 of IRC: 115-2014 has been taken into consideration.

9.4.5 Correction for data analysis

Correction for Temperature

Back-calculated moduli values of the bituminous layers evaluated by FWD survey are influenced by the pavement temperature. The standard pavement temperature for India is recommended as 35°C, hence the back-calculated moduli obtained at temperatures other than the identified standard temperature will have to be corrected using a suitable correction factor using equations 4 and 5 of IRC:115-2014 and the same is extracted below for ready reference.

ET1 = λ ET2

Were,

λ, temperature correction factor, is given as

λ = (1-0.238 lnT1) / (1-0.238 lnT2)

Were,

ET1 = Back-calculated modulus (MPa) at temperature T1 (°C)

ET2 = Back-calculated modulus (MPa) at temperature T2 (°C)

Correction for Seasonal Variation

Moisture content affects the strength of subgrade and granular subbase/base layers. The below equations are provided for Summer and Winter Seasonal reference.

$$E_{sub_mon=}\ 3.351 * \left(E_{sub_win}\right)^{0.7688} - 28.9 \ldots (6)$$

$$E_{sub_mon} = 0.8554 * (E_{sub_sum}) - 8.461 \ldots (7)$$

were,

E_{sub_mon} = subgrade modulus in monsoon (MPa)

E_{sub_sum} = subgrade modulus in Summer (MPa)

E_{sub_win} = subgrade modulus in Winter (MPa)

$$E_{gran_mon=} -0.0003 * (E_{gran_sum})^2 + 0.9584 * (E_{gran_sum}) - 32.989 \dots (8)$$

$$E_{gran_mon=} 10.5523 * (E_{gran_win})^{0.624} - 113.857 \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (9)$$

were,

E_{gran_mon} = granular layer modulus in monsoon (MPa)

E_{gran_sum} = granular layer modulus in Summer (MPa)

E_{gran_win} = granular layer modulus in Winter (MPa)

Since the deflection measurements have been carried out during Monsoon, hence seasonal correction factor is not applicable.

9.5 Remaining life estimation

The in-service three-layer pavement system has been analysed with the back-calculated corrected layer moduli and layer thicknesses. The critical strains have been calculated by IITPAVE program. From the performance criteria equations, the residual/remaining rutting and fatigue life have been estimated.

Performance Criteria

The layer moduli of in-service pavement back calculated from FWD deflection data are used to analyses the pavement for critical strains which are indicators of pavement performance in terms of rutting and fatigue cracking. The following approach is proposed for design of bituminous overlays for existing flexible pavements. The mechanistic criteria (fatigue and rutting) adopted in the Indian Roads Congress guidelines (IRC:115-2014) for design of flexible pavements forms the basis for the overlay design method. Performance models adopted in these guidelines are given below.

a) Fatigue in Bituminous layer:

As specified in IRC:37-2012, the fatigue model corresponding to 80 percent reliability was used for MCW and is given below:

$$N_f = 2.21 * 10^{-04} \times [1/\varepsilon_t]^{3.89} * [1/M_R]^{0.854}$$

Where,

N_f = fatigue life in cumulative standard axle load repetitions, in msa

ε_t = Maximum Tensile strain at the bottom of the bituminous layer;

M_R= Resilient modulus of the bituminous layer, in MPa

b) Rutting in Subgrade:

As specified in IRC:37-2012, the rutting model corresponding to 80 percent reliability was used for the MCW and is given below:

$$N= 4.1656 \times 10^{-08} [1/\varepsilon_v]^{4.5337}$$

Where,

N=Subgrade rutting life in cumulative standard axle load repetitions, in MSA

ε_v= Maximum Vertical strain in the subgrade

Obtained remaining life are presented in Table 9-14 & Table 9-15. The graphical representation of the remaining life is presented in Figure 9-10.

Table 9-14: Obtained remaining life of MCW on LHS direction

Chainage (km)		Remaining Life as per 80% Reliability in LHS Direction
From	To	
3.000	10.000	83.09
10.000	17.500	56.82
17.500	32.500	55.00
32.500	45.000	51.61
45.000	49.500	155.08
49.500	58.000	176.42
58.680	70.500	66.47
70.500	78.000	55.63
78.000	86.000	36.40
86.000	90.500	23.68
90.500	102.000	27.23
102.000	107.500	73.20
107.500	111.500	69.85
111.500	115.000	47.07
115.000	122.500	479.75
122.500	125.500	82.74
125.500	129.060	522.27

Table 9-15: Obtained remaining life of MCW on RHS direction

Chainage (km)		Remaining Life as per 80% Reliability in RHS Direction
From	To	
3.000	11.500	70.00
11.500	34.000	91.23
34.000	38.000	67.12
38.000	45.000	56.77
45.000	51.000	189.00
51.000	58.000	81.14
58.680	63.000	145.89
63.000	66.000	128.44
66.000	75.500	90.32
75.500	79.000	388.04
79.000	86.000	127.35
86.000	92.000	165.68
92.560	96.000	149.17
96.000	113.000	677.99
113.000	123.000	910.23
123.000	129.060	890.01



Figure 9-10: Illustrative summary of remaining life on both Directions (MCW)

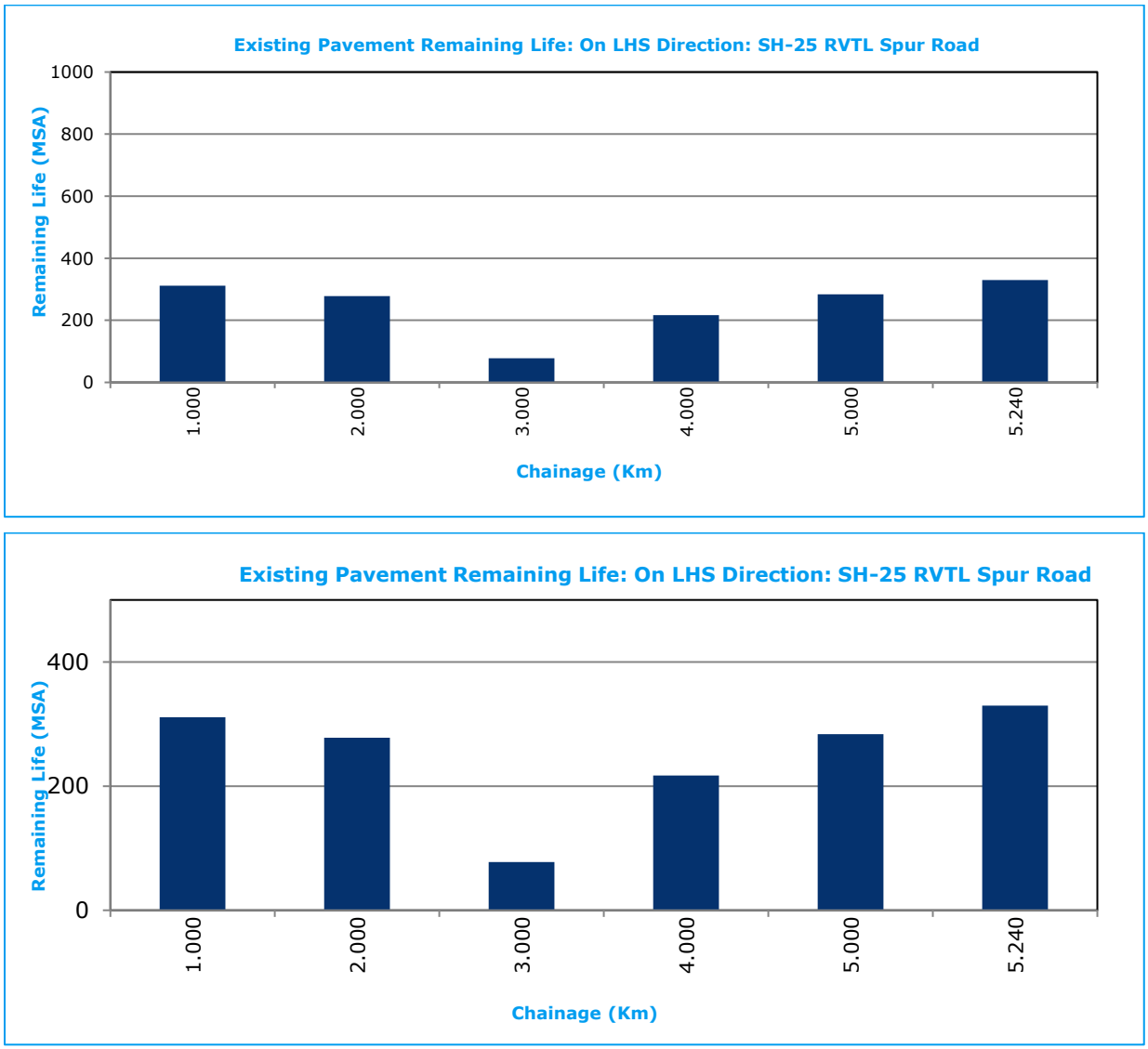


Figure 9-11: Illustrative summary of remaining life on both Directions (Spur Roads)

9.6 Traffic Survey and Analysis

Axle load survey of 48 hrs has been conducted at three Toll Plaza locations. The AADT and growth rates required for the further computations are provided by the client.

9.6.1 Annual Average Daily Traffic

The Annual Average Daily Traffic (AADT) in the FY 2026 are presented in Table 9-16.

Table 9-16: AADT of commercial vehicles at toll plaza in both directions (YR 2025-2026)

Location/ Vehicle Type		BUS	LCV	2-axle	3-axle	MAV
AADT	Paddari Toll Plaza (TP-1)	610	514	441	574	2156
	Soyal Toll Plaza (TP-2)	671	551	513	700	3071
	Bed Toll Plaza (TP-3)	978	526	455	752	2909

*For MSA calculation purposes, a direction distribution of 50% is considered for both LHS and RHS direction.

9.6.2 Vehicle Damage Factor

The axle load survey was conducted at three toll plazas; the number of equivalent 8.16 t standard axles for the different categories of commercial vehicles have been determined based on the axle load surveys.

The equations for computing equivalency factor for single, tandem and tridem axles given below is used as directed in the IRC: 37-2018 for converting different axle load repetitions into equivalent standard axle load repetitions.

- Single axle with single wheel on either side = {axle load in kN / 65}^{4}
- Single axle with dual wheel on either side = {axle load in kN / 80}^{4}
- Tandem axle with single wheel on either side = {axle load in kN /148}^{4}
- Tridem axle with dual wheel on either side = {axle load in kN /224}^{4}

Referring to section 4.4.3 of IRC 37-2018, some tandem axles have only one (single) wheel on each side of the axle. In such cases, each axle of the tandem axle set may be considered as two separate single axles (with single wheels). Similarly, if the axle spectrum has a tridem axle with single wheels, it may be considered as three separate single axles having single wheels.

VDF values are obtained as per the analysis of 48hrs axle load data and summary is presented in Table 9-17.

The photographs of axle load survey are shown in Figure 9-12.

Table 9-17: Summary of Vehicle Damage Factor

Location/ Vehicle Type		BUS	LCV	2-axle	3-axle	MAV
Paddari Toll Plaza (TP-1)	LHS	0.995	0.582	2.247	1.611	3.819
	RHS	0.964	0.430	2.800	6.555	10.699
Soyal Toll Plaza (TP-2)	LHS	1.024	0.405	1.121	1.929	5.558
	RHS	1.026	0.465	1.831	6.481	12.506
Bed Toll Plaza (TP-3)	LHS	1.155	0.431	1.143	1.673	6.261
	RHS	0.867	0.525	1.823	5.147	10.982



Figure 9-12: Photographs showing Axle load Survey

9.6.3 Design Traffic (Cumulative Number of Standard Axles)

The traffic loading in terms of the cumulative number of standard axles for the given period has been computed using the following relationship as given in IRC: 37-2018.

$$N = \frac{365 \times \left\{(1+r)^n - 1\right\}}{r} \times A \times D \times F$$

Where,

N = Cumulative number of standard axles to be catered for the design life in terms of MSA.

r = Annual growth rate of commercial vehicles

n = Design life in years

A = Initial traffic in the year of completion of construction in terms of number of commercial vehicles per day exceeding 3 ton

D = Lane distribution factor

F = Vehicle Damage Factor

Based on the preceding discussions, the traffic loading in terms of cumulative number of equivalent 8.16 t standard axle loads, the AADT was provided by concessionaire and considering 5% GR, and the design traffic was projected for next 5 years (FY 2030 end of concession period). Design traffic for flexible pavement design is computed and summarized in Table 9-18.

Table 9-18: Design Traffic (MSA) till end of the Concession Period (FY 2030)

Location	Design Traffic (MSA) up to FY- YR 2030	
	LHS	RHS
Paddari Toll Plaza (TP-1)	9	22
Soyal Toll Plaza (TP-2)	16	34
Bed Toll Plaza (TP-3)	17	29

9.7 Required Overlay Calculation as per FWD Analysis

Based on the remaining life assessment, it is observed that all the sections of the existing pavement have sufficient remaining life to remain serviceable for the next 5 years (i.e., up to the end of the concession period) in both LHS and RHS direction; therefore, no overlay has been recommended

10. DEVELOPMENT OF O&M STRATEGY

10.1 General

The Concessionaire is responsible for Operation & Maintenance of the Project Highway in accordance with the provisions of the Concession Agreement.

10.2 Maintenance Requirements as per Schedule L.

The concessionaire shall always maintain that during the Operation Period, the Project Highway conforms to the maintenance requirements set forth in Schedule L.

Repair/ Rectification of Defects and deficiencies specified in Schedule L within time limit set forth hereunder.

Table 10-1: Maintenance requirements with timelines

A: Schedule L		
S. No.	**Nature of Defect/ Deficiency**	**Timelines for Repair/ Rectification**
Project Highway		
(a)	**Carriageway and paved shoulders**	
(i)	Breach or blockade	Time Limit: Temporary restoration of traffic within 24 hours; Permanent restoration within 7 days.
(ii)	Roughness value exceeding 2,500 mm in a stretch of 1 km (as measured by a calibrated bump integrator)	Time Limit: 180 days
(iii)	Potholes	Time Limit: 24 hours
(iv)	Cracking in more than 5% of road surface in a stretch of 1 Km	Time Limit: 15 days
(v)	Rutting exceeding 10 mm in more than 2% of the road surface in a stretch of 1 km (measured with 3 m straight edge)	Time Limit: 15 days
(vi)	Bleeding / Skidding	Time Limit: 3 days
(vii)	Ravelling / Stripping of bitumen surface exceeding 10 sq.m	Time Limit: 7 days
(viii)	Damages to Pavement edges exceeding 10 cm	Time Limit: 7 days
(ix)	Removal of debris	Time Limit: 6 hours
(b)	**Hard / earth shoulders, side slopes, drains and culverts.**	
(i)	Variation by more than 2% in the prescribed slope of camber / cross fall	Time Limit: 15 days
(ii)	Edge drop at shoulders exceeding 40 mm	Time Limit: 4 days
(iii)	Variation by more than 15% in the prescribed side (embankment) slopes	Time Limit: 15 days

A: Schedule L		
S. No.	**Nature of Defect/ Deficiency**	**Timelines for Repair/ Rectification**
(iv)	Rain cuts / gullies in slope	Time Limit: 7 days
(v)	Damage to or silting of culverts and side drains during and immediately preceding the rainy season	Time Limit: 7 days
(vi)	Silted drains in urban / semi-urban areas	Time Limit: 48 hours
(C)	**Roadside furniture including road signs and pavement marking**	
(i)	Damage to shape or position, poor visibility or loss of retro-reflectivity	Time Limit: 24 hours
(d)	**Street lighting and telecom (ATMS)**	
(i)	Any major failure of the system	Time Limit: 24 hours
(ii)	Faults and minor failures	Time Limit: 8 hours
(e)	**Trees and plantation**	
(i)	Obstruction in a minimum headroom of 5 m above carriageway or obstruction in visibility of road signs	Time Limit: 12 hours
(ii)	Deterioration in health of trees and bushes	Time Limit: Timely watering and treatment
(iii)	Replacement of trees and bushes	Time Limit: 30 days
(iv)	Removal of vegetation affecting sight line and road structures	Time Limit: 3 days
(f)	**Rest areas**	
(i)	Cleaning of toilets	Time Limit: Every 4 hours
(ii)	Defects in electrical, water and sanitary installations	Time Limit: 12 hours
(g)	**Toll plaza[s]**	
(i)	Failure of toll collection equipment or lighting	Time Limit: 6 hours
(ii)	Damage to toll plaza	Time Limit: 3 days
(h)	**Other Project Facilities and Approach roads**	
(i)	Damage or deterioration in approach roads, [pedestrian facilities, truck lay-bys, bus-bays, bus-shelters, cattle crossings, Traffic Aid Posts, Medical Aid Posts and other works]	Time Limit: 10 days
Bridges/ROB's/CD works/Canal Crossing Structures		
(a)	**Superstructure of bridges**	*Cracks* Temporary measures Time Limit: Within 24 Hours Permanent measures

A: Schedule L		
S. No.	**Nature of Defect/ Deficiency**	**Timelines for Repair/ Rectification**
		Time Limit: Within 30 days *Spalling / Scaling* Time Limit: Within 7 days
(b)	**Foundations of bridges**	Scouring and/or cavitation Time Limit: 7 days
(c)	**Piers, abutments, return walls and wing walls of bridges**	*Cracks and damages including settlement and tilting* Time Limit: 15 days
(d)	**Bearings (metallic) of bridges**	*Deformation* Time Limit: 15 days
(e)	**Joints in bridges**	*Loosening and malfunctioning of joints* Time Limit: 7 days
(f)	**Other items relating to bridges**	
(i)	Deforming of pads in elastomeric bearings	Time Limit: 3 days
(ii)	Gathering of dirt in bearings and joints; or clogging of spouts, weep holes and vent-holes	Time Limit: 3 days
(iii)	Damage or deterioration in parapets, and handrails	Time Limit: 3 days
(iv)	Rain-cuts or erosion of banks of the side slopes of approaches	Time Limit: 7 days
(v)	Damage to wearing coat	Time Limit: 7 days
(vi)	Damage or deterioration in approach slabs, pitching, apron, toes, floor or guide bunds	Time Limit: 15 days
(vii)	Growth of vegetation affecting the structure or obstructing the waterway	Time Limit: 3 days
(g)	**Underpasses/RUBs**	Clearance of Flooding Time Limit: 36 hours

10.3 Immediate Repair/ Rehabilitation-Combined (Surface Distress)

Functional evaluation of pavement is conducted with NSV equipment to assess the present condition of the road, and it is found that a few distresses are observed on pavement and also at some locations roughness (BI) exceeding the limiting value (>2,500mm/km) specified in Annexure-I of Schedule-L. All appropriate technical and contractual parameters are carefully reviewed to assess and formulate the strategy of immediate repair. The quantities of rigid pavement immediate repair are presented in Table 10-2

Table 10-2: Recommended immediate repairing for Rigid pavement (Toll Plazas)

Immediate Repair Summary as per IRC SP 83-2018: SH-25: Section from Rajkot to Vadinar								
Treatment strategy	**Units**	**Quantity**						
		TP-1 LHS	**TP-1 RHS**	**TP-2 LHS**	**TP-2 RHS**	**TP-3 LHS**	**TP-3 RHS**	**Overall Qty.**
Seal with low viscosity EPOXY to secure broken parts	Rm.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Route and Seal	Rm.	13.5	5.0	7.0	3.0	0.0	0.0	28.5
Seal and Stitch	Rm.	12.0	30.0	0.0	0.0	11.0	0.0	53.0
Seal and Staple	Rm.	5.0	55.0	0.0	15.0	30.0	0.0	105.0
Apply low viscous EPOXY RESIN / mortar in cracked section	Rm.	0.0	0.0	0.0	5.0	0.0	0.0	5.0
PDR/PWR 50mm deep	Cu.m	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Local repair of areas damaged and liable to damage	Sq.m	35.0	0.0	0.0	0.0	0.0	0.0	35.0
Bonded Inlay	Sq.m	52.5	196.5	17.5	0.0	157.5	0.0	424.0
Full Depth Repair	Cu.m	7.6	15.6	0.0	0.0	4.5	0.0	27.7
Seal without Delay	Rm.	5.0	5.0	0.0	0.0	0.0	0.0	10.0
Slot stitching	Rm.	0.0	5.0	0.0	0.0	15.0	0.0	20.0
Clean Joint and reapply the sealant at selected locations	Rm.	0.0	5.0	0.0	10.0	0.0	0.0	15.0
Panel Replacement	Cu.m	1.7	60.6	0.0	6.1	5.2	0.0	73.6
Micro Surfacing was carried out over rigid pavement (Worn out)	Sq.m	0.0	0.0	0.0	0.0	2778.0	12000.0	14778.0

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10.4 Major Maintenance Schedule

Based on the discussions and inputs, the overlay cycles have been derived. The MM schedule for the main carriageway is presented is presented in Table 10-3.

Table 10-3: M&M Schedule- Main carriageway

Year	MM LHS of MCW	MM RHS of MCW	Remarks
YR 2027 - YR 2028	30 mm BC On 50% length	40 mm BC On 25% length 30 mm BC On 25% length	1st Cycle MCW
YR 2028 - YR 2029	40 mm BC On 35% length	40 mm BC On 40% length	

.

11. COST ESTIMATE

11.1 General

Cost Estimates worked out for expenses on Immediate Works (CAPEX) and expenses on operations and maintenance (OPEX). The cost estimates have been worked out at present rates considering 2025-26 as the base year.

11.2 Assumptions

The cost estimates are based on the following assumptions:

(a) Bitumen has been assumed to be sourced from IOCL Koyali Refinery. The distance (to & fro) from the midpoint of Project Highway is taken as 80 km. Modified Bitumen and VG-40 grade bitumen is considered in our cost estimate.

(b) Hire charges for the Machinery have been considered in accordance with Standard Data Book - 2020 and escalation have been considered. Rates for various items of works have been arrived at based on 'Standard Data Book for Analysis of Rates' published by MORT&H.

(c) Manpower rates have been taken from Rates of Wages Order, Government of Gujrat, issued on 30 March 2025.

(d) Material Rates are obtained from are obtained from Rajkot, Jamnagar Vadinar, Local vendor of the project.

(e) Sand and Aggregate are sourced from the nearest source located on project highway at approximately 30/40 km form the mid-point of Project Highway.

(f) Cement is procured from the nearest local market of Rajkot, Jamnagar Vadinar

(g) Rate of steel is taken from Tata June 2025

(h) Some of the rates are based on Consultant's experience on the similar ongoing projects in adjacent locations.

(i) Overheads and profits have been considered based on MORT&H Standard Data Book. Applicable taxes have been considered in the Rate Analysis.

11.3 CAPEX

Details of CAPEX are worked out under the following categories.

- Immediate maintenance / defect rectification.
- O&M maintenance

11.3.1 Immediate Maintenance

As per site investigation we have considered for immediate maintenance. Few items noticed are covered under routine maintenance.

11.4 O&M Estimates

Operation and Maintenance estimates have been worked out under the following heads:

(a) Preventive Maintenance / Routine Maintenance

(b) Operations

(c) Major Maintenance

11.4.1 Routine Maintenance - Categories

Routine Maintenance covers all activities required to maintain the road in traffic worthy condition to provide desired comforts to the road users. Routine Maintenance can be classified into following three categories:

(a) Routine or day to day maintenance

(b) Pre-monsoon maintenance

(c) Post monsoon maintenance.

11.4.1.1 Routine or day to day maintenance

Routine maintenance is required continuously on the road stretch and structures and covers the following activities:

(a) Cleaning of the Road

(b) Pavement maintenance to include crack sealing and pothole repairs.

(c) Shoulder repairs

(d) Maintenance of avenue plantation, horticulture, and median plantation

(e) Maintenance of signage, gantry boards and road furniture.

(f) Maintenance of culverts, bridge drainage spouts, expansion joints, side slopes and verges

(g) Surface cleaning, dust or vegetation control, sand removal from structures

(h) Reporting any damage caused to bridges by traffic accidents.

(i) Maintenance of guard rails and crash barrier etc.

11.4.1.2 Pre-monsoon Maintenance

This is carried out prior to the monsoons and includes the following:

(a) Inspection of channels/streams to ensure that there are no accumulation of logs, trees, and other debris in the vicinity of piers and abutments.

(b) Cleaning of roadside / median drains.

(c) Removal of vegetation growth on sub structures.

(d) Cleaning of culverts.

11.4.1.3 Post-monsoon Maintenance

This includes maintenance that is carried out immediately after the monsoons and includes the following:

(a) Inspection of all structures for any damages and taking appropriate actions.

(b) Cleaning of roadside drains, culverts etc.

11.5 Operations Estimates

11.5.1 Toll Plaza

This cost includes the following:

(a) Maintenance of Toll Plaza building, booths, and tolling equipment.

(b) Security of the booths, lanes, and toll plazas.

(c) Collection of toll and handling of cash till bank deposit.

(d) Provision of IT in-charge, IT supervisor, other staff at Toll Plaza location.

(e) Administration and essential facilities for the staff and road users.

(f) Maintenance of Toll Plaza equipment and replacement of expendable and short life items.

(g) Electricity cost including standby generator.

11.5.2 Highway

This cost includes the following:

(a) Providing one patrolling vehicle including operating cost for round-the-clock patrolling of the Project Highway.

(b) Providing of one ambulance at Toll Plaza for accident victims.

(c) Provision of one crane with 30 MT and tow truck facilities for clearing the highway and evacuating the breakdown vehicles at Toll Plaza.

(d) Provision of one Broomer for cleaning of the highway.

(e) Expenditure on medical aid and provision of nursing staff.

(f) Cost of tests and surveys.

11.5.3 Energy

As per the Concession agreement, electrification is to be provided at the toll plaza and priority intersections. Streetlight luminaries, high mast lights with electricity tariff, provision of standby Genset are considered in the cost estimate.

11.5.4 Miscellaneous

(a) We have taken IE cost as per Industry norms.

(b) Insurance expenses have been taken as per Industry norms.

11.6 Summary of O&M Cost

Summary of yearly O&M cost at present rate is presented in Table 11-1:

Table 11-1: Summary of OPEX (without escalation)

Sl. No.	Item Head	Unit	Rate (in Rs.) (Per Km /Per Month) for 4 Lane	Monthly Cost For FY 2026	Annual Cost in (Rs.) For FY 2026
1	Preventive Maintenance During Operation	Per Month	10,984	1,442,866	17,314,390
2	Routine Maintenance During Operation	Per Month	25,274	3,319,964	39,839,562
3	Highway Lighting	Per Month		873,080	10,476,960
4	Head Office, Admin Office and Toll Operation manpower cost				
(a)	On roll & off roll staff	Per Month		8,762,590	105,151,084

Sl. No.	Item Head	Unit	Rate (in Rs.) (Per Km /Per Month) for 4 Lane	Monthly Cost For FY 2026	Annual Cost in (Rs.) For FY 2026
5	Incident management expenses	Per Month		1,514,404	18,172,852
6	Toll system & AMC	Per Month		735,924	8,831,090
7	Admin Expenses	Per Month		534,569	6,414,825
8	Professional Fee Expense	Per Month		1,006,245	12,074,940
9	Insurance Fee	Per Month		835,000	10,020,000
10	Survey & Investigation charges	Per Month		175,672	2,108,065
	Total Annual Cost in Rs.			**19,200,314**	**230,403,769**
	Total Annual Cost in Crore.			**1.92**	**23.04**

11.7 Year Wise Summary of CAPEX & OPEX

Year-wise summary of CAPEX & OPEX for the balance concession period till FY 2029 is estimated and presented in Table 11-2:

Table 11-2: Summary of Year wise CAPEX & OPEX – RVTL

Year			CAPEX				Major Maintenance				OPEX											(CAPEX+MMR+OPEX)
Year in Nos	From	To	Pavement Repair	Structure Repair	TMS & ATMS Repair	Sub Total (A)	Periodic Maintenance (Highways)	Periodic Maintenance (Structures)	TMS & ATMS Replacement (Every 6 years)	Sub Total (B)	Preventive Maintenance	Routine Maintenance	Highway Lighting	SPV Staff (On & Off Roll)	Incident Management	AMC for HTMS & TMS	Professional Fee	Insurance Fee	Survey & Investigation charges	Admin Expenses	Sub Total (C)	Grand Total (D) = (A)+(B)+(C)
1	1-Apr-25	31-Mar-26	0.16	-	-	0.16		0.21	0.88	1.10	1.73	3.98	1.05	10.52	1.82	0.88	1.21	1.00	0.21	0.64	23.04	24.30
2	1-Apr-26	31-Mar-27				-				-	1.82	4.18	1.10	11.04	1.91	0.93	1.27	1.05	0.22	0.67	24.19	24.19
3	1-Apr-27	31-Mar-28				-	73.11	21.64		94.75	1.91	4.39	1.16	11.59	2.00	0.97	1.33	1.10	0.23	0.71	25.40	120.15
4	1-Apr-28	31-Mar-29				-	68.70	3.87		72.56	2.00	4.61	1.21	12.17	2.10	1.02	1.40	1.16	0.24	0.74	26.67	99.23
5	1-Apr-29	20-Feb-30				-			1.91	1.91	1.89	4.34	1.14	11.45	1.98	0.96	1.31	1.09	0.23	0.70	25.09	27.00
		Total Cost (INR Crore)	**0.16**	**-**	**-**	**0.16**	**141.81**	**25.72**	**2.79**	**170.32**	**9.35**	**21.51**	**5.66**	**56.77**	**9.81**	**4.77**	**6.52**	**5.41**	**1.14**	**3.46**	**124.40**	**294.88**

Note: Cost includes 18% GST. An annual escalation of 5% for Opex and 2% for Major Maintenance is applied in projections.

.



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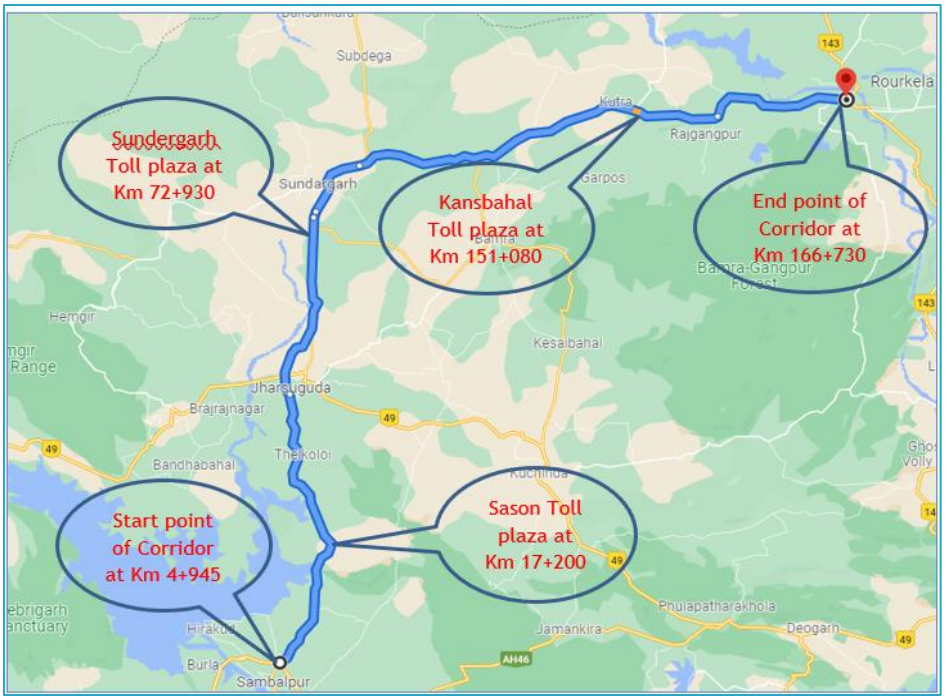
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TECHNICAL REPORT



Four-Laning with Paved Shoulders of Sambalpur-Rourkela section of SH-10 from km 4.900 to km 167.900 in the state of Odisha to be Executed as BOT (Toll) Project on DBFOT Pattern-SRTL

SAMARTH INFRAENGG Technocrats Private Limited

SAMARTH
committed competence

September 2025

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LIST OF ABBREVIATIONS AND SYMBOLS

AADT	-Average Annual Daily Traffic
AE	-Authority Engineer
AMC	-Annual Maintenance Contract
ATMS	-Advanced Traffic Management System
BBD	-Benkelman Beam Deflection
BC	-Bituminous Concrete
BHS	-Both Hand Side
BOQ	-Bill of Quantities
BOT	-Build, Operate & Transfer
CA	-Concession Agreement
CBR	-California Bearing Ratio
CCB	-Concrete Crash Barrier
CCR	-Cement Concrete Railing
COD	-Commercial Operation Date
COS	-Change of scope
CPI	-Consumer Price Index
CUP	-Cattle Under pass
CVC	-Classified Volume Count
CVPD	-Commercial Vehicles per Day
DBM	-Dense Bituminous Concrete
DPR	-Detailed Project Report
ECB	-Emergency Call Box
EPC	-Engineering, Procurement and Construction
ESI	- Employees' State Insurance
FDD	-Filed Dry Density
FOB	-Foot Over Bridge
FRL	-Finished Road Level
FSI	-Free Swell Index
FWD	-Falling Weight Deflectometer
FY	-Financial Year
GOI	- Government of India
GR	-Growth Rates
GS	-Grade Separated
GSB	-Granular Sub Base
GST	-Goods and Services Tax
HCPT	-Half-cell Potential Test
HPC	-Hume Pipe Culvert

HR	- Human Resources
HTMS	-Highway Traffic Management Systems
IE	-Independent Engineer
IRC	- Indian Roads Congress
IRC SP	- Indian Roads Congress Special Publications
IRI	-International Roughness Index
Km	-kilometer
LHS	-Left Hand Side
LL	-Liquid Limit
LS	-Lumpsum
m	-Meter
MAP	-Medical Aid Post
MBIU	-Mobile Bridge Inspection Unit
MCB	-Metal Beam Crash Barrier
MCS	-Micro Surfacing
MCW	-Main Carriageway
MDD	-Maximum Dry Density
MHR	-Metallic Hand Rail
MJB	-Major Bridge
mm	-Millimeter
MM	-Major Maintenance
MNB	-Minor Bridge
MoRTH	- Ministry of Road Transport & Highways
Mpa	-Mega Pascal
MR	-Resilient Modulus
MSA	-Million Standard Axle
NDT	-Non-Destructive Testing
NHAI	- National Highways Authority of India
NSV	-Network survey Vehicle
O&M	- Operation and Maintenance
OL	-Overlay
PCOD	-Provisional Completion
PF	-Provident Fund
PGR	-Pedestrian Guard Rail
PI	-Plasticity Index
PL	-Plastic Limit
PM	-Periodic Maintenance
PUP	-Pedestrian Underpass
R&R	-Repair and Rehabilitation
RCC	-Reinforced Cement Concrete
RE Wall	-Reinforced Earth Wall

RHS	-Right Hand Side
RHT	-Rebound Hammer Test
RM	-Routine Maintenance
ROB	-Road Over Bridge
RPO	-Route Patrol Officer
RUB	-Road Under Bridge
SDBC	-Semi-Dense Bituminous Concrete
SPV	-Special Purpose Vehicle
SR	-Service Road
SWB	-Static Weigh Bridge
TAP	-Traffic Aid Post
TCS	-Typical cross Section
TDRT	-Transient Dynamic Response test
TMS	-Toll Management System
UI	-Unevenness Index
UPVT	-Ultra Pulse Velocity test
VDF	-Vehicle Damage Factor
VG	-Viscosity Grade
VUP	-Vehicular Underpass
WBM	-Water Bound Macadam
WMM	-Wet Mix Macadam
WPI	-Wholesale Price Index

CHAPTER 1. INTRODUCTION

1.1 INTRODUCTION

Sambalpur – Rourkela Tollway Limited (SRTL), erstwhile L&T Sambalpur – Rourkela Tollway Limited, is an SPV originally sponsored by L&T Infrastructure Development Projects Limited (IDPL), that entered into a Concession Agreement on 08.11.2013 with Government of Odisha, Works Department, to undertake four laning with paved shoulders of Sambalpur to Rourkela section of SH-10 from Km. 4.900 to 167.900 Km in the state of Odisha to be executed as a BOT (Toll) project on DBFOT pattern.

The Sambalpur-Rourkela project stretch is 161.785 km long section of SH-10, which falls in the Biju Expressway. For this project stretch, Provisional Certificate, PCOD-1 & 2 achieved on 13.03.2018 & 12.08.2019 for the length of 159.570 km & 2.16 km respectively. Further, Final Completion achieved on 30.03.2021. The Concession Period is 22 years commencing from Appointed Date.

In April 2024, Sambalpur-Rourkela Tollway Limited (SRTL) was acquired by M/s Sekura Roads Pvt. Ltd., a portfolio company of EPIC 3, and was subsequently transferred to EPIC Concessions Private Limited. This acquisition was facilitated through an Alternate Investment Fund managed by EAAA India Alternatives Limited (EAAA), formerly known as Edelweiss Alternative Asset Advisors Limited).

We understand that EAAA TransInfra Managers Limited is the Investment Manager, Chennai -Tada Tollway Private Limited ("CTTPL") is the proposed Project Manager and Watrak Infrastructure Private Limited ("WIPL") is the sponsor of the Citius TransNet Investment Trust ("Trust" or "InvIT") and M/s Sambalpur-Rourkela Tollway Limited (“SRTL”) is proposed to be part of the initial portfolio assets of the Trust. The Trust was incorporated on 1st August 2025 with Securities and Exchange Board of India (“SEBI”) as an infrastructure investment trust under the SEBI InVIT Regulations.

M/s Watrak Infrastructure Private Limited (hereinafter “the Client”) as sponsor has appointed M/s Samarth Infraengg Technocrats Pvt Ltd (hereinafter referred as “Technical Consultant”) to carry out Technical Due Diligence of operational asset of “Four laning with paved shoulders of Sambalpur to Rourkela section of SH-10 from Km. 4.900 to 167.900 Km in the state of Odisha to be executed as a BOT (Toll) basis (herein after refer as “the Project”) which is being operated by “M/s Sambalpur-Rourkela Tollway Limited (“SRTL") (hereinafter refer as “the Concessionaire or Company or “SRTL”)

The details of the Road asset (“Project Highway”) are as follows:

S. No	Project Description	Length (Km)
1	Construction of 12.9 m wide bridge between Dhola and Sadia ghats along with 2 lane connecting roads from near about Dhola to islampur tinali in assam on BOT basis under Arunachal Pradesh package of Roads and Highways.- **Dhola**	28.511
2	Construction of bridges across Dibang river system and connecting road between Bomjur-Meka (NH 52) covering length of 18.95 km and construct bridge across river Lohit at alubari ghat and connecting road between Chowkham Digaru covering length of 12 km	29.635

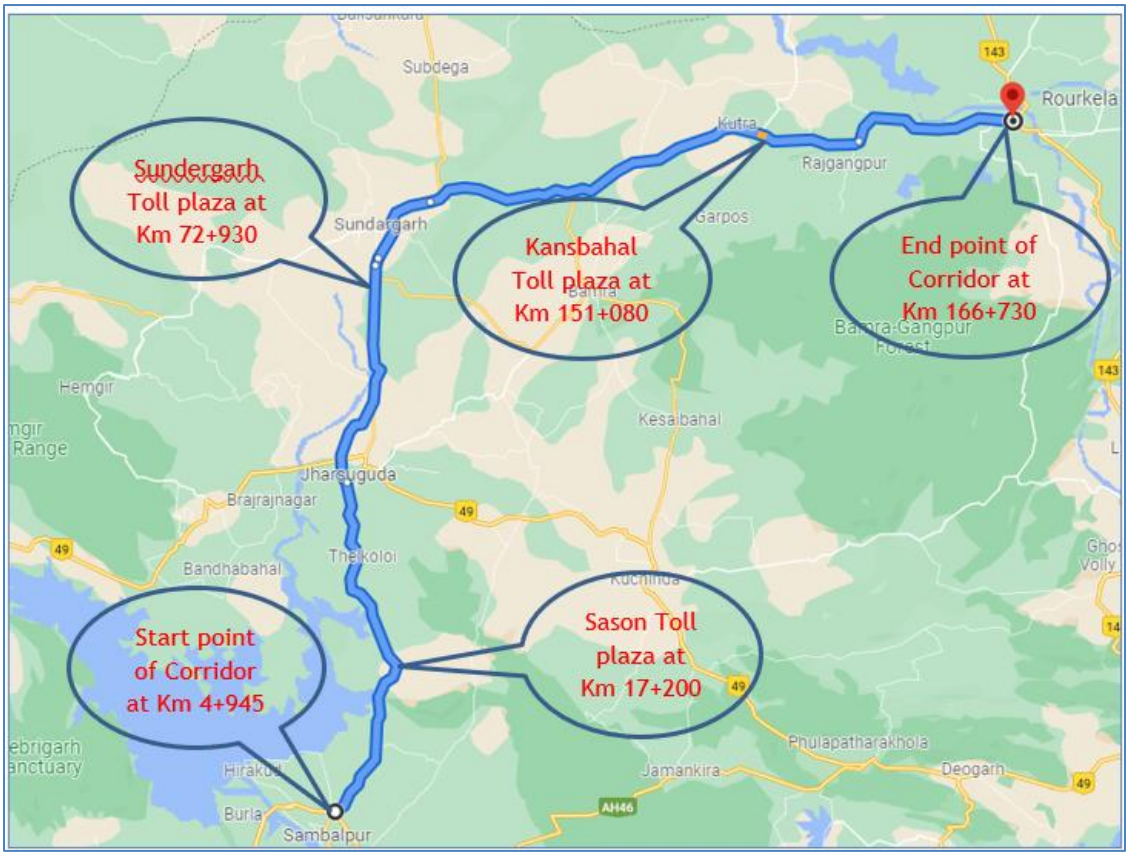
S. No	Project Description	Length (Km)
	in Arunachal Pradesh on BOT basis under Arunachal Pradesh package of Roads and Highways- **Dibang**	
3	*Four Laning of Maharashtra/Karnataka Border - Sangareddy section of NH9 (from KM 348.800 to Km 493.000) in the states of Karnataka and Andhra Pradesh to be executed as BOT (Toll project) on DBFOT pattern under NHDP phase IV B.- **DTL***	*144.950*
4	Four Laning of Jorbat Shillong of NH 40 from Km 0 to Km 61.8 in the state of Assam and Meghalaya on DBFOT Pattern under SARDP NE on BOT Basis. – **JSEL**	61.800
5	Four Laning of paved shoulders of Sambalpur- Rourkela section of SH-10 from Km 4.900 to 167.900 in the state of Odisha to be executed as BOT (toll) project on DBFOT pattern- **SRTL**	161.730

This report deals with the "*Four Laning of paved shoulders of Sambalpur- Rourkela section of SH-10 from Km 4.900 to 167.900 in the state of Odisha to be executed as BOT (toll) project on DBFOT pattern"- SRTL*

1.2 PROJECT AT A GLANCE

The SH-10, runs between Chandili and Rourkela. It is also known as Biju Expressway. SH-10 has runs the total length of 650Kms. It is the longest State Highway in Odisha. It starts near Chandili village in Korput district and passes through the towns such as Kotpad, Boriguma, Nabarangpur, Papadahandi, Ambapani, Godbhanja, Dharmagarh, Sinapalli, Bhella, Nuapada, Paikamal, Padampur, Sohela, Sambalpur, Jharsuguda, Sundargarh before ending at Rourkela. The main expressway is between Sambalpur and Vedvyas.

There are few settlements along the Project Highway are Ainthapalli, Malipalli, Kilasma, Nuarampeta, Lapanga, Badmal, Talpati, Tangarpalli, Bhasma, Kandamahal & Kirei, Latagaon, Badgaon, Kantiamura, Kutra, Ranibandh, Bhelua and Mandiakudar.



Map Showing the Project Corridor

As per the CA, the design chainage at start point of the project road shall be km 4.900 and the design chainage at end point of the project road shall be km 167.900 with a total length of 163 Kms.

Referencing system	Project Corridor Start Point (km)	Project Corridor End Point (km)	Length (km)
As per CA Chainage	4.900	167.900	163.000
As per Site	5.000	166.730	161.730

Photograph showing the start and end point of the project road are presented below

	
Start Point of Project Road at km 5.000	**End Point of Project Road at km 166.730**

Following Table highlights the total project at a glance:

Table 1: Project Details

S No.	Description	Date
1.	Employer	Govt. of Odisha, Works Department
2.	Concessionaire	Sambalpur-Rourkela Tollway Ltd
3.	SH No.	SH-10
4.	Mode of the Project	BOT-Toll
5.	Length of the Project as per CA	161.730
6.	Total Project Cost	1292.56 Crore
7.	Letter of Award	05.10.2013
8.	Date of Signing the Concession Agreement	08.11.2013
9.	Appointment Date	15.07.2014
10.	Scheduled Project completion	14.07.2017, 3years from Appointed date.
11.	Date of issue of Provisional Completion Certificate for length of 159.570kms	13.03.2018
12.	Date of issue of Provisional Completion Certificate for length of 2.160kms	12.08.2019
13.	Date of issue of Final Project Completion Certificate	30.03.2021
14.	Scheduled End of Concession	22 Years from Appointed date (likely 14.07.2036 as of now)
	Revised End of Concession Period	06.12.2040

1.3 REVIEW OF PAVEMENT DESIGN

A) Review of CA Stipulations for Pavement Design

The Schedule B silent on pavement design and type to be considered for the Project. However, Schedule D suggests that Four-Laning with paved shoulders of the Project Highway shall conform to Manual of Specifications and Standards for Four-Laning of Highways through PPP, IRC: SP:84-2009.

Clause 5.3.1 of IRC SP: 84-2009 stipulate that the new pavement shall be designed in accordance with the IRC: 37 Guidelines for the Design of Flexible Pavement.

Clause 5.4.1 (i) of IRC SP: 84-2009 stipulates that the flexible pavement shall be designed for a minimum design period of 15 years or operation period, whichever is more. **Stage Construction will be permissible subject to the requirements specified in para (ii) below**.

> *Clause 5.4.1 (ii) of IRC SP: 84-2009 specifies that "Alternative strategies or combination of initial design, strengthening and maintenance can be developed by the Concessionaire to provide the specified level of pavement performance over the operation period subject to satisfying the following minimum design requirements".*
>
> *Clause 5.4.1 (ii) (a) indicates that, the thickness of sub-base and base of pavement section is designed for a minimum design period of 15 years or the operation period, whichever is more and the **initial bituminous surfacing for a minimum design period of 10 years**.*
>
> *Clause 5.4.1 (ii-(b)) indicates that, the pavement shall be strengthened by bituminous overlay as and when required to extend the pavement life to full operation period. The thickness of bituminous overlay shall be determined on the basis of IRC:81.*

Clause 5.5.5 indicates that, the design traffic in case of Service Road shall be 5 MSA. The crust composition shall be provided accordingly.

Clause 5.9.6 (i) of IRC SP: 84-2009 stipulate the thickness of the bituminous overlay shall be determined on the basis of Benkelman Beam Deflection Technique and the design traffic as per the procedure outlined in IRC: 81 as also from structural numbers of existing pavement layers.

Clause 5.9.6 (ii) of the same manual also stipulates that the initial **strengthening shall be done for a minimum design period of 10 years**. Subsequent strengthening to extend the pavement to full operation period shall be implemented at the end of initial design period or earlier, in case of any structural distress in the pavement or if the surface roughness exceeds the value specified in Schedule-K of the CA.

Clause 5.9.6 (iv) of the same Section stipulate that the thickness of Bituminous Overlay for pavement strengthening shall not be less than 50 mm Bituminous concrete, after attending to the requirements of profile corrective course".

1. Review of Concessionaire's Pavement Design

Homogenous Sections

For the Pavement Design purpose, the Project Highway has been divided into four homogenous sections and the details are as

Table 2-1: Homogeneous Sections for Pavement Design

Homogeneous Section	Existing Chainage, Km	Proposed Chainage, Km
Sambalpur – Jharsuguda (HS-I)	4.900 – 52.500	4.945 – 53.175
Jharsuguda – Sundergarh (HS-II)	52.500 – 79.800	53.175 – 79.060
Sundergarh – OCL Cement (HS-III)	79.800 – 141.000	79.060 – 140.250
OCL Cement – Rourkela (HS-IV)	141.000 – 167.400	140.250 – 166.571

Design Period

As suggested in the manual (already discussed in 1.10.1), the thickness of sub-base and base of pavement section is designed for a minimum design period of 15 years or the operation period (20 years), whichever is more and the **initial** bituminous surfacing for a minimum design period of 10 years.

Design CBR

Report states that borrow area soils have CBR ranging from 17% to 38.8%, hence 15% subgrade CBR (effective) was considered in pavement design.

Design Loading for Flexible Pavement

The Pavement Design report states that based on the Traffic assessment Report prepared by L&T Sambalpur Rourkela Tollway Ltd., the section-wise adopted design loadings are as

Table 2-2: Design Traffic (in MSA)

Homogeneous Section (Proposed Chainage)	Direction	Design Traffic up to 2026 (10 Years)	Design Traffic up to 2036 (20 Years)
HS-I (Km 4.945 – Km 53.175)	Sambalpur – Rourkela	30	90
	Rourkela – Sambalpur	55	170
HS-II (Km 53.175 – Km 79.060)	Sambalpur – Rourkela	25	65
	Rourkela – Sambalpur	35	100
HS-III (Km 79.060 – Km 140.250)	Sambalpur – Rourkela	25	70
	Rourkela – Sambalpur	20	60
HS-IV (Km 140.250 – Km 166.571)	Sambalpur – Rourkela	30	80
	Rourkela – Sambalpur	40	110

Source: Traffic Assessment Report prepared by L&T Sambalpur Rourkela Tollway Ltd.

Design of New Flexible Pavement Crust for Main carriageway

Design of New construction was carried out in accordance with IRC 37-2012. The pavement layer for new construction has been designed for 10-year design traffic for the Bituminous layers and concession period (20 yrs) for base and sub base layers.

The section-wise Pavement layer thickness proposed for new construction is as

Table 2-4: Pavement Composition for New Construction

Homogeneous Section (proposed Chainage)	Design Traffic for 10 years (MSA)	Effective Design CBR (%)	Design Thickness				
			BC (mm)	DBM (mm)	Granular Base (mm) (WMM)	Granular Sub Base (mm)	Subgrade (mm)
Sambalpur - Rourkela							
HS-I (Km 4.945 – Km 53.175)	30	15	40	65	250	200	500
HS-II (Km 53.175 – Km 79.060)	25	15	40	60	250	200	500
HS-III (Km 79.060 – Km 140.250)	25	15	40	60	250	200	500
HS-IV (Km 140.250 – Km 166.571)	30	15	40	65	250	200	500
Rourkela – Sambalpur							
HS-I (Km 4.945 – Km 53.175)	55	15	40	70	250	200	500
HS-II (Km 53.175 – Km 79.060)	35	15	40	65	250	200	500
HS-III (Km 79.060 – Km 140.250)	20	15	40	60	250	200	500
HS-IV (Km 140.250 – Km 166.571)	40	15	40	65	250	200	500

In the widening sections, matching of GSB in existing pavement with that the GSB in new construction has been considered. Due to this there is an increase in GSB layer thickness and the has been verified with the analytical design. The adjusted pavement crust is as

Table 2-5: Pavement Composition for Widening Sections

Design Traffic, MSA	Increased Granular Sub Base Thickness (mm)	Design Thickness based on Analytical Design			
		BC (mm)	DBM (mm)	Granular Base (mm)	Subgrade (mm)
20	≥ 225	40	50	250	500
25	≥ 225	40	50	250	500
30	≥ 225	40	50	250	500
35	≥ 225	40	50	250	500
40	≥ 225	40	50	250	500
55	225	40	65	250	500
	250	40	65	250	500
	275	40	60	250	500
	300	40	60	250	500
	325	40	55	250	500
	350	40	55	250	500
	≥ 375	40	50	250	500

Strengthening of Existing Pavement

It has been done as per IRC:81-1997 guidelines. The Concessionaire carried out the BBD tests along the existing Project Road and determined the strengthening requirements for each homogenous section for 10 years of design life according to "IRC:81-1997, Section 5.3 &IRC SP 84-2009, Section 5.9.6". The Computed Overlay thickness is varying from 40mm to 105mm.

Design of Rigid Pavement Crust for Main carriageway at Toll Plaza

The design was carried out as per IRC: 58-2011 guidelines for the design life of 30 years. The included the Rigid Pavement Crust in the report is as

Table 2-9: Rigid Pavement Composition for Toll Plaza (with Tied Paved Shoulder)

Toll Plaza Location	PQC (mm) (M-40)	DLC (mm) (M-10)	GSB (mm)	Subgrade (mm)	Dowel Bar (Contraction Joints)	Deformed Tie Bar (Longitudinal Joints)
Sambalpur - Rourkela						
17.025	255	150	150	500	32mm dia, 450 mm Length, & 220 mm Spacing	12mm dia, 640 mm Length, & 700 mm Spacing
71.853	255	150	150	500	32mm dia, 450 mm Length, & 240 mm Spacing	12mm dia, 640 mm Length, & 700 mm Spacing
150.075	250	150	150	500	32mm dia, 450 mm Length, & 240 mm Spacing	12mm dia, 640 mm Length, & 715 mm Spacing
Rourkela - Sambalpur						
17.025	265	150	150	500	32mm dia, 450 mm Length, & 250 mm Spacing	12mm dia, 640 mm Length, & 675 mm Spacing
71.853	255	150	150	500	32mm dia, 450 mm Length, & 280 mm Spacing	12mm dia, 640 mm Length, & 700 mm Spacing
150.075	265	150	150	500	32mm dia, 450 mm Length, & 250 mm Spacing	12mm dia, 640 mm Length, & 675 mm Spacing

Note: Slab Size = 4.5 x 3.5 m and CBR is taken as 15%.

A separation membrane of 125 microns plastic sheeting has been proposed between concrete slab (PQC) and DLC for non-bonded rigid pavement.

Pavement Design for Service Roads, Bus bays and Laybys

The Service Road has to be designed for design traffic of 5 MSA as per IRC SP 84-2009.

As per Approved Pavement Design Report the service road has been designed for 5 MSA & CBR-15% and IRC: 37-2012 guidelines. The Pavement layer adopted for service road is as given below:

- BC-30 mm
- RAP-40 mm
- CTSB-200 mm

The Pavement in Bus-bay has been designed for 5 MSA & CBR-15% and the recommended crust is as given below:

- BC-30 mm
- DBM-50 mm
- WMM-250 mm
- GSB-150 mm

The Pavement in Truck Layby has been designed for 10 MSA & CBR-15% as per IRC: SP: 63-2004 guidelines and the recommended CC block pavement crust is as given below:

- Paver Block thickness-80 mm
- Sand bed-20 mm
- WMM-250 mm
- GSB-200 mm

1.4 REVIEW OF MONTHLY REPORTS

- Condition of the Project Highway; as per the inspections carried out during the month of March 2025 (Concessionaire's Report), is satisfactory and in conformance to CA provisions

- All Maintenance activities as planned and submitted to the Authority & IE, which includes, but are not limited to the following activities i.e. cleaning of Project Highway, bus shelter, truck lay bye, vegetation overgrowth trimming etc. drain cleaning, Earthen shoulder repair, maintenance of structure including expansion joint, drainage spout etc., median kerb repairing, Cleaning of chute drain, cleaning of culverts, PGR installation at damage location, replacement of damage guard post, pot hole repair, replacement of damage metal beam crash barrier, Regular watering of median plantation, hoeing and basin making and application of pesticides and mortality replacement activities were carried out during this period

- The status of COS works are as follows:

S No.	Description of claim/COS	Actual estimated cost of Work	Approved by Authority	Remarks
1	Construction of Flyover at KM 53.000	50.80	36.94	Work is completed, Billing progress
2	FASTag compatibility TMS equipment	5.63	5.63	FASTag mode toll collection started from 6th Jan 25. Annual maintenance charges for 5 years Rs 2.20 Crs shall be charged proportionately every year

1.5 REVIEW OF O&M REQUIREMENTS

Applicable O&M Requirements for the Project under consideration are presented in the following table.

S No	Applicable Manual	Applicable Schedule for O&M	Maximum Roughness Allowed	Minimum Thickness of Mandatory Overlay	Frequency of Roughness Test	Frequency of BBD Test	Remarks
1	IRC: SP:84-2009	Schedule-K and Manual	2750 mm/km	-	2 Times in a Year	Once in a 5Years	Overlay Design shall be done as per IRC:81

From the above table it is clear that the applicable method for overlay design is BBD (Overlay Design shall be done as per IRC: 81). Though BBD is applicable, considering the advantages of FWD Technique compared to BBD Technique, presently overlay assessment has been done by using FWD Technique but when it is required to assess the overlay in due course of time after acquiring the project the same can be done using BBD Technique for submission to IE/Authority.

Considering the above, the Initial Overlay assessment has been done by considering the 80% reliability as the original pavement was designed based on IRC: 37-2001, which was based on 80% reliability.

CHAPTER 2. SURVEYS AND INVESTIGATIONS

2.1 INTRODUCTION

The main objective of undertaking Surveys and Investigations is to appreciate the existing engineering features along the project corridor and to understand the present condition of the various elements of the project road and to prepare required inputs for various rehabilitation and maintenance strategies.

Following Survey and Investigations have been undertaken as a part of study with an objective to understand the present condition of the road and there by access the quality of construction and as well to prepare requisite rehabilitation/corrective designs where necessary.

- Road Inventory Surveys
- Pavement Condition using NSV
- FWD Surveys
- Roughness Surveys using NSV
- Pavement Composition surveys (Test Pits)
- Subgrade Investigations & Laboratory testing
- Material Investigations
- Core Sample surveys
- Axle Load Survey
- Structure Inventory and Condition Surveys

2.2 ROAD INVENTORY

The project corridor consists of 4-lane divided carriageway with flexible pavement throughout its entire length, with a 7.0m wide carriageway. It has 1.5m wide paved shoulder in rural section and 2.5m wide urban stretches, flanked by 1.5m to 2.0m earthen shoulder on either side.

In general, the median width is 2.0m at Built-up locations and 4.5m at remaining locations along the project road are observed.

The corridor predominantly traverses through plain terrain, with the adjoining land use being mostly agricultural. The project road passes through the settlements of Ainthapalli, Malipalli, Kilasma, Nuarampeta, Lapanga, Badmal, Talpati, Tangarpalli, Bhasma, Kandamahal & Kirei, Latagaon, Badgaon, Kantiamura, Kutra, Ranibandh, Bhelua and Mandiakudar.

In general, road embankments are in the range of 0.5m-1.5m height. Embankments higher than 1.5m are observed mainly in the approaches of CD structures and Underpass locations.

Typical View of Project Road is shown below:



A view of the Project Road at km 33.000-Median



A view of the Anti Glares at km 53.100-LHS



A view of the Project Road at km 62.500-Median



A view of the Median Cuts at km 80.000-RHS



A view of the Median Drains at km 97.000-Median



A view of the MCB & Double Arm Poles at km 114.000-Median



A view of the TruckLay bay at km 129.000-Median



A view of the Project Road at km 162.000-LHS

The Project Road has both major junctions and minor junctions along its length. Photographs showing the Major Junctions and minor junctions are presented below:



Major Junction at km 62.550-RHS



Major Junction at km 141.100 RHS



Minor Junction at km 93.650-LHS

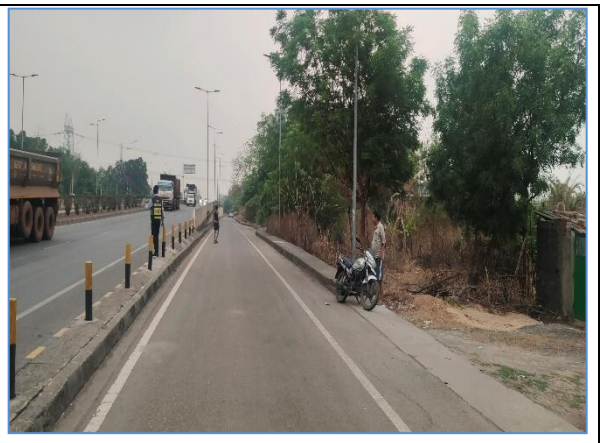


Minor Junction at km 122.400-RHS

Service road/slip roads have varying carriageway width from 5.5m to 7.0m. Photos depicting the service road pavement surface type, and Condition. Few photos taken at service road locations are presented below:



Slip road at km 28.700 RHS



Service road at km 72.600 RHS



Slip road at km 104.360 RHS



Slip road at km 136.900 RHS

A total of 39 High Mast Lighting poles and 20 Low Mast Lighting poles have been installed along the project corridor. In addition, there are 1,447 Double-Arm Lightings, 90 Single-Arm Lightings, and 02 Four-Arm Lightings. These lighting facilities are primarily located at junctions, built-up areas, and toll plaza locations. Few photos showing High mast lighting are presented below:



A view of High Mast Lighting at km 17.200 in toll plaza



A view of Single Arm lighting at km 98.000-Truck lay bye



A view of Double Arm lighting at km 111.500-Median

The road user facilities such as Bus Bay with Bus shelters and Truck lay-byes are provided along the project road. Few photos taken at the Bus Shelter are presented below:



Bus Bay with Shelter at km 87.920 -LHS



Bus Bay with Shelter at km 134.500-LHS

Few photos depicting the truck lay-bye are presented below:



A view Truck Lay Bye at Km 37.500-LHS



A view Truck Lay Bye at Km 129.000-LHS

The Project Road has 3 Toll Plazas at Km 17.150 (Sason Toll Plaza), km 72.850 (Sundergarh Toll plaza) and km 150.910 (Kansbahal Toll plaza). Rigid pavement exists at the toll plaza including tapering portions. The condition of the toll plaza appears to be fair. Sason toll plaza has 3+1 lanes on each side and Sundergarh toll plaza has 2+1 lanes and Kansbahal toll plaza has 2+1 lanes on each side. Presently, at each Toll Plaza location an additional 2 lanes (one on each side) are being constructed. 4 numbers of High mast lighting provided at each plaza.

S.No	Type	Unit	TP1	TP2	TP3
1	Chainage	*Km*	17.150	72.850	150.910
2	Toll plaza name		Sason Toll Plaza	Sundargarh Toll Plaza	Kansbahal Toll Plaza
3	Taper Start	*Km*	17.050	72.810	150.960
4	Taper End	*Km*	17.400	73.050	151.200
5	Pavement Type		Rigid	Rigid	Rigid
6	Pavement Type Central Portion		Rigid	Rigid	Rigid
7	No of lanes (includes Under construction toll lanes)	*Nos*	10	8	8
8	Canopy		Present	Present	Present
9	Toll office		Yes	Yes	Yes
10	Toll booths		8+ 2 (Under Construction)	5+ 2 (Under Construction)	5+ 2 (Under Construction)
11	Fast tag lanes	*Nos*	8	6	6
12	Total Toll Plaza length	*m*	350	240	240
13	Toll plaza width	*m*	62.9	51.3	51.3
14	Toll lanes width	*m*	3.5	3.5	3.5
15	Extra Wide Lane width	*m*	7.5	7.5	7.5
16	Bike Lane width	*m*			

S.No	Type	Unit	TP1	TP2	TP3
17	Separator width at Toll booths	*m*	2.3	2.3	2.3
18	Static Weigh bridges	*Nos*	2	2	2
19	WIMS	*Nos*	8	6	6
20	Highmast lights post	*Nos*	4	4	4
21	Double Arm post	*Nos*	20	15	15
22	Ambulances	*Nos*	1	1	1
23	Cranes	*Nos*	1	1	1
24	Highway Patrolling Vehicles	*Nos*	1	1	1
25	Towing Vehicle	*Nos*	1	1	1
26	Elevated walk Way		No	No	No
27	Tunnel		Yes	Yes	Yes
28	Toilets		Yes	Yes	Yes

Few photos showing the Toll Plazas are presented below:



A view of the Existing Toll Plaza near km 17.150 (Sason Toll plaza)



A view of the Existing Toll Plaza near km 72.900 (Sundergarh Toll plaza)



A view of the Existing Toll Plaza near km 150.910 (Kansbahal **Toll plaza)**

The collected Road Inventory Data is presented in **Appendix 1** of this Report

2.3 PAVEMENT CONDITION SURVEYS

The present Pavement condition data has been collected using Network Survey Vehicle (NSV). The Pavement Condition report covering the data collection for each km length in each direction has been presented in **Appendix 2** of this Report.

The photographs showing the pavement condition of the Project Road is presented below.

 **Inner-lane, Overlaid at km 18.100 RHS**	 **Fair Condition at km 30.970-RHS**	 **Rutting and Alligator cracking at km 55.200-RHS**
 **Rutting and Shoving on Inner Lane wheel paths at km 60.400-RHS**	 **Milling Works Progress at km 65.000-RHS**	 **Full Width Overlaying at km 80.000-LHS**
 **Rutting on Inner lane at km 104.200-LHS**	 **Rutting on Inner lane at km 122.000-LHS**	 **Rutting and Alligator on Inner lane at km 158.000-RHS**

2.4 FALLING WEIGHT DEFLECTOMETER (FWD) SURVEYS

In order to evaluate the structural strength of the existing pavement, Falling Weight Deflectometer (FWD) survey has been carried out along the project road in Main carriageway and Service Road in line with IRC: 115-2014.

- ✓ Prior to the start the surveys, Load repeatability tests are performed on each day
- ✓ The target Peak Load of 40 KN (+/- 4 KN) is maintained during survey.
- ✓ At Regular intervals of time Pavement temperature is noted.

- ✓ For every 1 Km of stretch 6 test Points (3 pts- Outer,3 pts-inner) were taken on Main Carriageway in each direction. Whereas, for service road minimum 3 points are taken in a km length.
- ✓ Temperature correction equation is applied for back calculated modulus of BT and summer seasonal correction factor is applied for the back calculated modulus of granular and Subgrade considering the summer Season (May Month).

The collected FWD Data and Analysis is presented in **Appendix 3** of this Report.

Few photos taken during the progress of FWD Surveys are presented below:



Deflection Measurement in progress

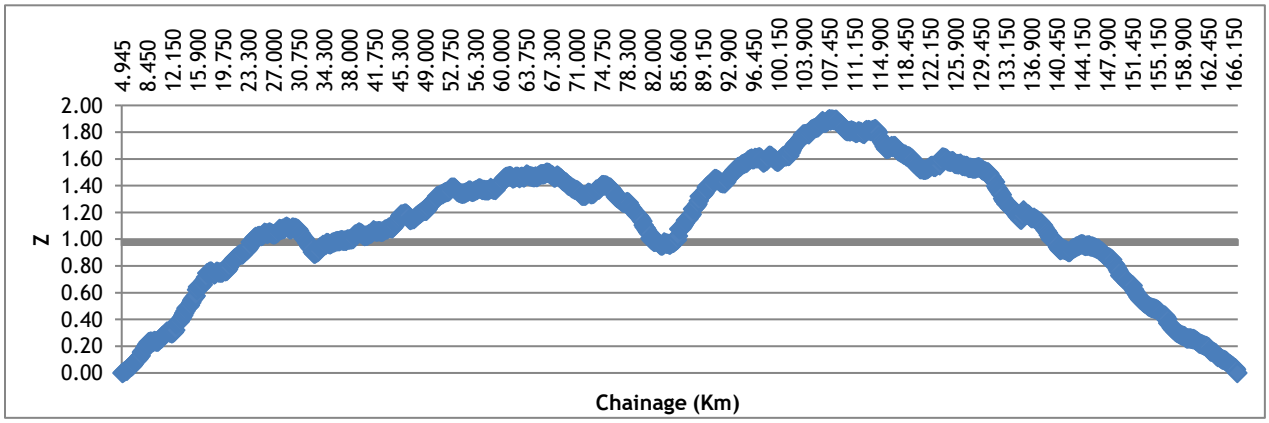


Temperature Measurement in progress

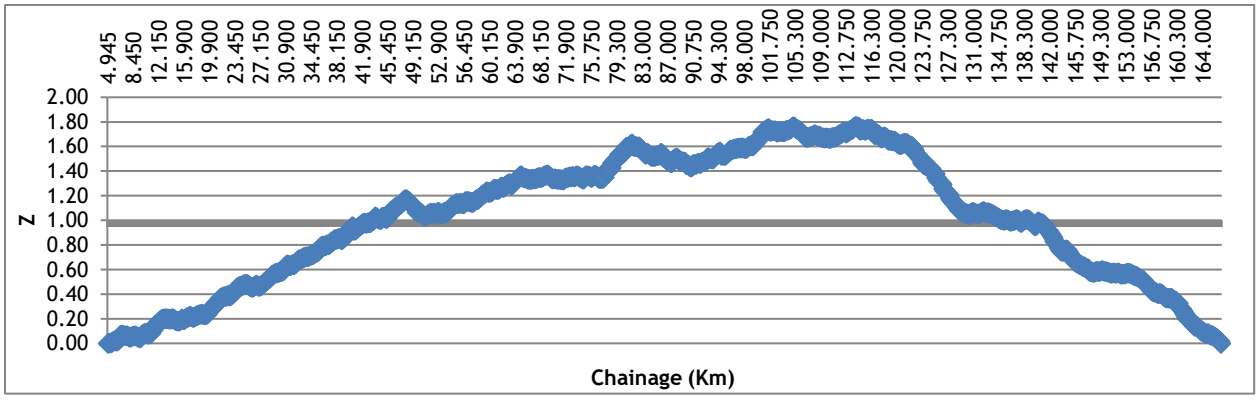
Cumulative Difference Approach (CDA) has been used for the identification of homogeneous sections on the basis of Surface Curvature Index (SCI). SCI is calculated as the difference between D_0 and D_{300}, where D_0 and D_{300} are the peak deflections (mm) measured at the center of loading plate and at a radial distance of 300mm.

The homogenous sections in each direction of traffic (i.e., LHS & RHS) for the project stretch have been identified and are given by graphical representation and followed tables for the same.

❖ ***For Main Carriageway:***



Delineation of Homogeneous Section – LHS MCW



Delineation of Homogeneous Section – RHS MCW

Table 2: FWD Data - Homogenous Sections of Main Carriageway - LHS

Homo Sections	From (Km)	To (Km)	Length (Km)	Remarks
1	5.000	7.150	2.15	
2	7.150	9.900	2.75	
3	9.900	12.300	2.40	
4	12.300	15.300	3.00	
5	15.300	17.050	1.75	
	17.050	17.400	0.35	Toll Plaza-1
	17.400	18.301	0.90	
6	18.301	20.300	2.00	
7	20.300	23.300	3.00	
8	23.300	27.000	3.70	
9	27.000	29.900	2.90	
10	29.900	33.000	3.10	
11	33.000	36.150	3.15	
12	36.150	39.150	3.00	
13	39.150	41.450	2.30	
14	41.450	44.150	2.70	
15	44.150	46.900	2.75	
16	46.900	50.150	3.25	
17	50.150	53.175	3.03	
18	53.175	55.150	1.98	
19	55.150	58.900	3.75	
20	58.900	61.150	2.25	
21	61.150	63.750	2.60	
22	63.750	66.450	2.70	
23	66.450	69.150	2.70	
24	69.150	71.750	2.60	
25	71.750	72.810	1.06	
	72.810	73.050	0.24	Toll Plaza-2
	73.050	73.650	0.60	
28	73.650	77.450	3.80	
29	77.450	80.300	2.85	
30	80.300	83.150	2.85	
31	83.150	85.600	2.45	
32	85.600	87.450	1.85	
33	87.450	89.450	2.00	

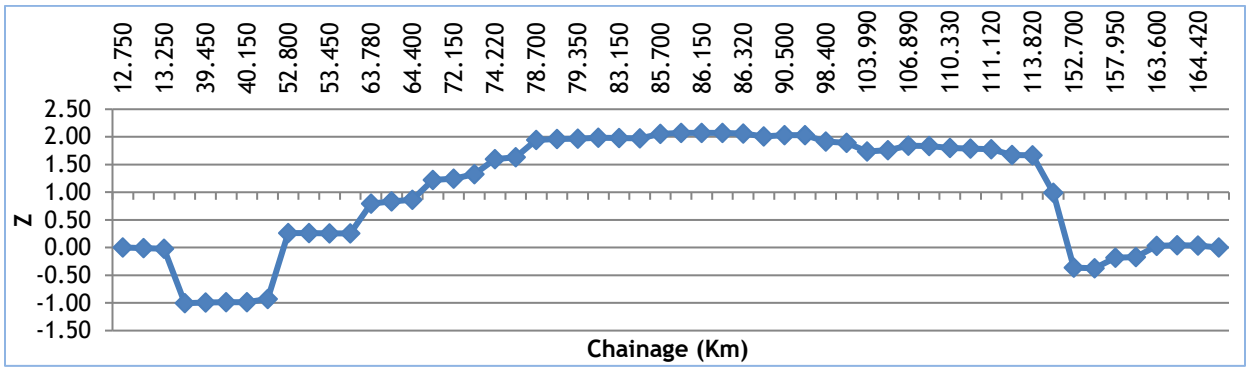
Homo Sections	From (Km)	To (Km)	Length (Km)	Remarks
34	89.450	92.000	2.55	
35	92.000	94.150	2.15	
36	94.150	97.150	3.00	
37	97.150	99.900	2.75	
38	99.900	101.900	2.00	
39	101.900	103.900	2.00	
40	103.900	106.300	2.40	
41	106.300	108.300	2.00	
42	108.300	110.300	2.00	
43	110.300	114.000	3.70	
44	114.000	116.000	2.00	
45	116.000	118.750	2.75	
46	118.750	121.150	2.40	
47	121.150	123.900	2.75	
48	123.900	126.450	2.55	
49	126.450	129.000	2.55	
50	129.000	131.450	2.45	
51	131.450	135.150	3.70	
52	135.150	138.300	3.15	
53	138.300	140.250	1.95	
54	140.250	142.300	2.05	
55	142.300	144.900	2.60	
56	144.900	147.000	2.10	
57	147.000	149.000	2.00	
58	149.000	150.960	1.96	
59	150.960	151.200	0.24	Toll Plaza-3
60	151.200	153.150	1.95	
61	153.150	156.450	3.30	
62	156.450	158.900	2.45	
63	158.900	162.450	3.55	
64	162.450	164.450	2.00	
65	164.450	166.730	2.28	
Total Length (Km)			161.730	

Table 3: FWD Data - Homogenous Sections of Main Carriageway -RHS

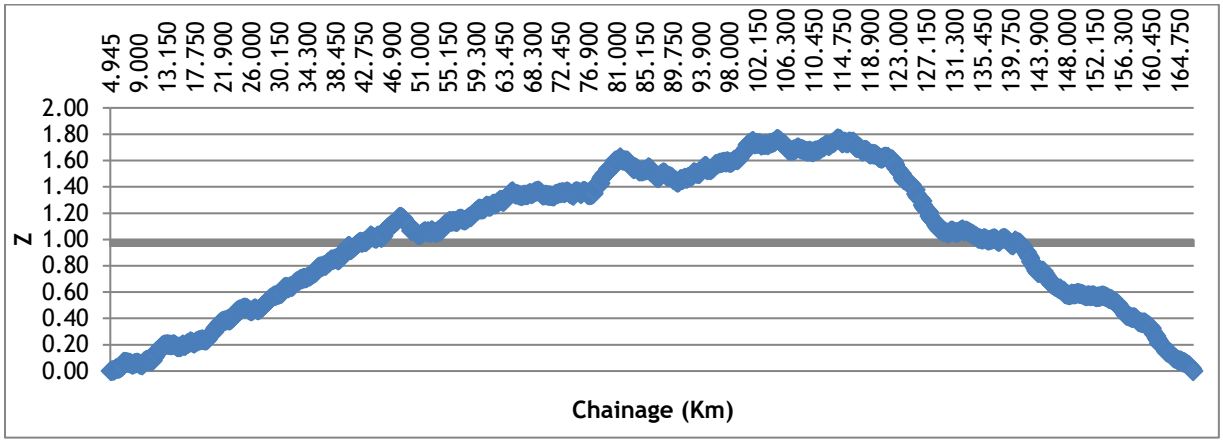
Homo Sections	From (Km)	To (Km)	Length (Km)	Remarks
1	5.000	6.750	1.75	
2	6.750	8.750	2.00	
3	8.750	10.750	2.00	
4	10.750	12.900	2.15	
5	12.900	14.900	2.00	
6	14.900	17.050	2.15	
7	17.050	17.400	0.35	Toll Plaza-1
8	17.400	19.300	1.90	
9	19.300	22.450	3.15	
10	22.450	24.900	2.45	
11	24.900	26.900	2.00	
12	26.900	30.300	3.40	
13	30.300	32.750	2.45	
14	32.750	35.300	2.55	
15	35.300	38.900	3.60	
16	38.900	40.900	2.00	
17	40.900	43.750	2.85	
18	43.750	45.750	2.00	

Homo Sections	From (Km)	To (Km)	Length (Km)	Remarks
19	45.750	48.000	2.25	
20	48.000	50.900	2.90	
21	50.900	53.175	2.28	
22	53.175	55.150	1.98	
23	55.150	57.750	2.60	
24	57.750	59.750	2.00	
25	59.750	62.150	2.40	
26	62.150	64.750	2.60	
27	64.750	67.150	2.40	
28	67.150	69.150	2.00	
29	69.150	71.450	2.30	
30	71.450	72.810	1.36	
	72.810	73.050	0.24	Toll Plaza-2
	73.050	73.650	0.60	
31	73.650	77.300	3.65	
32	77.300	79.300	2.00	
33	79.300	81.300	2.00	
34	81.300	83.450	2.15	
35	83.450	85.900	2.45	
36	85.900	88.000	2.10	
37	88.000	90.150	2.15	
38	90.150	92.750	2.60	
39	92.750	95.150	2.40	
40	95.150	98.000	2.85	
41	98.000	101.300	3.30	
42	101.300	104.900	3.60	
43	104.900	107.000	2.10	
44	107.000	110.150	3.15	
45	110.150	113.900	3.75	
46	113.900	117.000	3.10	
47	117.000	119.000	2.00	
48	119.000	121.000	2.00	
49	121.000	123.450	2.45	
50	123.450	125.450	2.00	
51	125.450	127.450	2.00	
52	127.450	130.150	2.70	
53	130.150	132.900	2.75	
54	132.900	135.300	2.40	
55	135.300	137.900	2.60	
56	137.900	140.300	2.40	
57	140.300	142.450	2.15	
58	142.450	144.450	2.00	
59	144.450	148.150	3.70	
60	148.150	150.960	2.81	
61	150.960	151.200	0.24	Toll Plaza-3
62	151.200	153.300	2.10	
63	153.300	155.450	2.15	
64	155.450	157.750	2.30	
65	157.750	160.300	2.55	
66	160.300	162.450	2.15	
67	162.450	164.450	2.00	
68	164.450	166.730	2.28	
Total Length (Km)			161.730	

❖ ***For Service Carriageway:***



Delineation of Homogeneous Section – LHS Service Road



Delineation of Homogeneous Section - RHS Service Road

Table 4: FWD Data - Homogenous Section of Service Road - LHS

Homo Sections	From (Km)	To (Km)	Length (Km)	Remarks
1	5.000	12.750	7.75	No Service Road
	12.750	13.250	0.50	
	13.250	28.550	15.30	No Service Road
	28.550	28.750	0.20	No data
	28.750	39.000	10.25	No Service Road
	39.000	40.700	1.70	
	40.700	52.800	12.10	No Service Road
	52.800	53.600	0.80	
	53.600	63.780	10.18	No Service Road
2	63.780	64.400	0.62	
	64.400	71.990	7.59	No Service Road
	71.990	72.500	0.51	
	72.500	74.220	1.72	No Service Road
	74.220	74.750	0.53	
	74.750	78.550	3.80	No Service Road
	78.550	79.350	0.80	
	79.350	82.700	3.35	No Service Road

Homo Sections	From (Km)	To (Km)	Length (Km)	Remarks
	82.700	83.450	0.75	
3	83.450	85.700	2.25	No Service Road
	85.700	86.320	0.62	
	86.320	90.030	3.71	No Service Road
	90.030	90.920	0.89	
	90.920	98.280	7.36	No Service Road
	98.280	98.870	0.59	
	98.870	103.990	5.12	No Service Road
	103.990	104.430	0.44	
	104.430	106.890	2.46	No Service Road
	106.890	107.400	0.51	
	107.400	110.330	2.93	No Service Road
4	110.330	111.120	0.79	
	111.120	113.300	2.18	No Service Road
	113.300	113.500	0.20	Service Road Damage,Paver block
	113.500	113.820	0.32	
	113.820	136.600	22.78	No Service Road
	136.600	136.950	0.35	
	136.950	152.500	15.55	No Service Road
	152.500	153.050	0.55	
	153.050	157.950	4.90	No Service Road
	157.950	158.370	0.42	
	158.370	163.180	4.81	No Service Road
	163.180	163.600	0.42	
	163.600	163.800	0.20	Not Constructed
	163.800	164.420	0.62	
	164.420	165.100	0.68	No Service Road
	165.100	165.700	0.60	
5	165.700	166.730	1.03	Rigid
Total Length (Km)			161.730	

Table 5: FWD Data - Homogenous Section of Service Road – RHS

Homo Sections	From (Km)	To (Km)	Length (Km)	Remarks
1	5.000	12.750	7.75	No Service Road
	12.750	13.250	0.500	
	13.250	28.550	15.300	No Service Road
	28.550	28.700	0.150	Under Construction
	28.700	38.669	9.969	No Service Road
	38.669	39.200	0.531	Not Constructed
	39.200	39.650	0.450	Rigid
	39.650	40.780	1.130	
	40.780	41.039	0.259	Not Constructed
	41.039	52.800	11.761	No Service Road
	52.800	53.600	0.800	
	53.600	63.800	10.200	No Service Road
	63.800	64.400	0.600	
	64.400	71.950	7.550	No Service Road
2	71.950	72.500	0.550	
	72.500	74.200	1.700	No Service Road
	74.200	74.750	0.550	
	74.750	82.650	7.900	No Service Road
	82.650	83.450	0.800	

Homo Sections	From (Km)	To (Km)	Length (Km)	Remarks
	83.450	85.307	1.857	No Service Road
	85.307	85.600	0.293	Not Constructed
	85.600	86.300	0.700	
	86.300	90.050	3.750	No Service Road
	90.050	91.300	1.250	
	91.300	98.300	7.000	No Service Road
	98.300	98.900	0.600	
	98.900	104.000	5.100	No Service Road
	104.000	104.500	0.500	
	104.500	106.900	2.400	No Service Road
	106.900	107.400	0.500	
	107.400	110.300	2.900	No Service Road
	110.300	110.700	0.400	No Data
	110.700	111.150	0.450	
3	111.150	113.300	2.150	No Service Road
	113.300	113.600	0.300	
	113.600	136.580	22.980	No Service Road
	136.580	136.990	0.410	
	136.990	144.370	7.380	No Service Road
	144.370	144.700	0.330	No Data
	144.700	145.400	0.700	
	145.400	152.400	7.000	No Service Road
	152.400	152.700	0.300	No Data
	152.700	153.000	0.300	
	153.000	157.600	4.600	No Service Road
	157.600	158.150	0.550	No Data
	158.150	158.370	0.220	
	158.370	163.250	4.880	No Service Road
	163.250	164.420	1.170	
	164.420	165.200	0.780	No Service Road
	165.200	165.700	0.500	
	165.700	166.730	1.030	Rigid
Total Length (Km)			161.730	

2.5 ROUGHNESS SURVEYS

The Roughness data has been collected using Network Survey Vehicle for main carriageway and service road and analyzed in terms of International Roughness Index (IRI), separately for each lane, for both direction of travel. Pavement Roughness data collection and computation of IRI for each km length in each direction is presented in **Appendix 4** of this Report.

Schedule K of CA specifies that Roughness values exceeding 2750 mm/km in a Km length, needs to be corrected.

The km-wise roughness index values for both Left-Hand Side (LHS) and Right-Hand Side (RHS) directions are presented below:

Chainage (Km)		Length (m)	Roughness Index (mm/km)		
From	To		Inner Lane	Outer Lane	RI Average (LHS)
LHS Carriageway					
5.000	6.000	1.000	1761	1744	1752
6.000	7.000	1.000	1613	1290	1452
7.000	8.000	1.000	1230	1091	1161
8.000	9.000	1.000	1715	1522	1619
9.000	10.000	1.000	2431	1868	2150
10.000	11.000	1.000	1723	1275	1499
11.000	12.000	1.000	2129	1538	1834
12.000	13.000	1.000	1605	1545	1575
13.000	14.000	1.000	1643	1660	1651
14.000	15.000	1.000	1495	1234	1365
15.000	16.000	1.000	1853	1512	1682
16.000	17.050	1.050	2255	1496	1875
17.050	17.400	0.350	Toll Plaza		
17.400	18.000	0.600	2247	1575	1911
18.000	19.000	1.000	1846	1880	1863
19.000	20.000	1.000	1463	1206	1334
20.000	21.000	1.000	1985	1606	1795
21.000	22.000	1.000	2432	1684	2058
22.000	23.000	1.000	1681	1503	1592
23.000	24.000	1.000	1581	1242	1412
24.000	25.000	1.000	1260	1039	1149
25.000	26.000	1.000	1391	1170	1281
26.000	27.000	1.000	1561	1287	1424
27.000	28.000	1.000	1642	1607	1624
28.000	29.000	1.000	2184	2230	2207
29.000	30.000	1.000	2556	2173	2364
30.000	31.000	1.000	1787	1610	1698
31.000	32.000	1.000	1311	1023	1167
32.000	33.000	1.000	1228	1066	1147
33.000	34.000	1.000	1501	1159	1330
34.000	35.000	1.000	1316	1288	1302
35.000	36.000	1.000	1441	1571	1506
36.000	37.000	1.000	1406	1378	1392
37.000	38.000	1.000	1219	1126	1173
38.000	39.000	1.000	1673	1341	1507
39.000	40.000	1.000	1702	1226	1464
40.000	41.000	1.000	1827	1746	1786
41.000	42.000	1.000	1934	1580	1757
42.000	43.000	1.000	2262	1567	1915
43.000	44.000	1.000	2076	1375	1725
44.000	45.000	1.000	1264	1186	1225
45.000	46.000	1.000	1475	1245	1360
46.000	47.000	1.000	1656	1328	1492
47.000	48.000	1.000	2011	1665	1838
48.000	49.000	1.000	1445	1232	1339
49.000	50.000	1.000	1859	1216	1537

Chainage (Km)		Length (m)	Roughness Index (mm/km)		
From	To		Inner Lane	Outer Lane	RI Average (LHS)
LHS Carriageway					
50.000	51.000	1.000	2336	2057	2197
51.000	52.000	1.000	1738	1561	1650
52.000	53.000	1.000	1781	1482	1631
53.000	54.000	1.000	1939	1808	1874
54.000	55.000	1.000	1685	1201	1443
55.000	56.000	1.000	1485	1377	1431
56.000	57.000	1.000	1726	1306	1516
57.000	58.000	1.000	1753	1423	1588
58.000	59.000	1.000	1370	1211	1291
59.000	60.000	1.000	1502	1539	1521
60.000	61.000	1.000	1655	1222	1439
61.000	62.000	1.000	1154	1222	1188
62.000	63.000	1.000	1411	1307	1359
63.000	64.000	1.000	1415	1534	1474
64.000	65.000	1.000	1241	1111	1176
65.000	66.000	1.000	1394	1320	1357
66.000	67.000	1.000	1686	1268	1477
67.000	68.000	1.000	1047	1125	1086
68.000	69.000	1.000	1220	955	1088
69.000	70.000	1.000	1222	853	1037
70.000	71.000	1.000	1064	1001	1032
71.000	72.000	1.000	991	903	947
72.000	72.810	0.810	1341	1272	1307
72.810	73.050	0.240	Toll Plaza		
73.050	74.000	0.950	1777	1126	1451
74.000	75.000	1.000	1397	1085	1241
75.000	76.000	1.000	1364	1113	1239
76.000	77.000	1.000	1166	858	1012
77.000	78.000	1.000	1352	867	1109
78.000	79.000	1.000	978	949	963
79.000	80.000	1.000	1074	1033	1054
80.000	81.000	1.000	1127	736	931
81.000	82.000	1.000	1072	750	911
82.000	83.000	1.000	1190	955	1072
83.000	84.000	1.000	1152	959	1056
84.000	85.000	1.000	1214	1176	1195
85.000	86.000	1.000	926	899	913
86.000	87.000	1.000	1537	780	1159
87.000	88.000	1.000	1294	Overlay works in progress	
88.000	89.000	1.000	1203	1257	1230
89.000	90.000	1.000	1176	1446	1311
90.000	91.000	1.000	1635	1460	1548
91.000	92.000	1.000	1036	1104	1070
92.000	93.000	1.000	1523	1415	1469
93.000	94.000	1.000	1673	1237	1455
94.000	95.000	1.000	1961	1410	1685

Chainage (Km)		Length (m)	Roughness Index (mm/km)		
From	To		Inner Lane	Outer Lane	RI Average (LHS)
LHS Carriageway					
95.000	96.000	1.000	1648	1152	1400
96.000	97.000	1.000	1705	1292	1499
97.000	98.000	1.000	962	1045	1003
98.000	99.000	1.000	1308	1346	1327
99.000	100.000	1.000	879	922	900
100.000	101.000	1.000	1269	936	1102
101.000	102.000	1.000	1552	1111	1331
102.000	103.000	1.000	1705	1427	1566
103.000	104.000	1.000	1326	1205	1266
104.000	105.000	1.000	1578	1616	1597
105.000	106.000	1.000	1746	1395	1571
106.000	107.000	1.000	1854	1404	1629
107.000	108.000	1.000	1682	1553	1618
108.000	109.000	1.000	1328	1591	1460
109.000	110.000	1.000	1514	1127	1320
110.000	111.000	1.000	1511	1232	1372
111.000	112.000	1.000	1595	1335	1465
112.000	113.000	1.000	1835	1631	1733
113.000	114.000	1.000	1686	1642	1664
114.000	115.000	1.000	1350	1178	1264
115.000	116.000	1.000	1236	1075	1156
116.000	117.000	1.000	1657	1549	1603
117.000	118.000	1.000	2211	1239	1725
118.000	119.000	1.000	1923	1430	1677
119.000	120.000	1.000	1698	1293	1496
120.000	121.000	1.000	1655	1285	1470
121.000	122.000	1.000	2235	1853	2044
122.000	123.000	1.000	1759	1514	1637
123.000	124.000	1.000	1737	1335	1536
124.000	125.000	1.000	1569	1150	1359
125.000	126.000	1.000	1969	1162	1566
126.000	127.000	1.000	2592	1358	1975
127.000	128.000	1.000	2572	1185	1879
128.000	129.000	1.000	2952	1409	2181
129.000	130.000	1.000	2522	1205	1864
130.000	131.000	1.000	2802	1367	2084
131.000	132.000	1.000	3324	1286	2305
132.000	133.000	1.000	2532	1319	1926
133.000	134.000	1.000	2545	1142	1844
134.000	135.000	1.000	3714	1317	2515
135.000	136.000	1.000	2812	1514	2163
136.000	137.000	1.000	3001	1358	2180
137.000	138.000	1.000	2903	1208	2056
138.000	139.000	1.000	2813	1288	2050
139.000	140.000	1.000	2706	1369	2037

Chainage (Km)		Length (m)	Roughness Index (mm/km)		
From	To		Inner Lane	Outer Lane	RI Average (LHS)
LHS Carriageway					
140.000	141.000	1.000	2063	1033	1548
141.000	142.000	1.000	2733	1295	2014
142.000	143.000	1.000	3373	1415	2394
143.000	144.000	1.000	4044	1478	2761
144.000	145.000	1.000	3255	1412	2334
145.000	146.000	1.000	2650	1292	1971
146.000	147.000	1.000	2120	1179	1649
147.000	148.000	1.000	2361	1152	1757
148.000	149.000	1.000	2326	1235	1780
149.000	150.000	1.000	2033	1155	1594
150.000	150.960	0.960	2495	1215	1855
150.960	151.200	0.240	Toll Plaza		
151.200	152.000	0.800	2467	1048	1757
152.000	153.000	1.000	3808	1126	2467
153.000	154.000	1.000	3228	1670	2449
154.000	155.000	1.000	3035	1483	2259
155.000	156.000	1.000	2732	1213	1972
156.000	157.000	1.000	2151	1071	1611
157.000	158.000	1.000	2500	1479	1990
158.000	159.000	1.000	2229	1252	1741
159.000	160.000	1.000	2256	1220	1738
160.000	161.000	1.000	2384	1151	1768
161.000	162.000	1.000	2196	1186	1691
162.000	163.000	1.000	2551	1342	1947
163.000	164.000	1.000	2723	1306	2015
164.000	165.000	1.000	2319	1337	1828
165.000	166.000	1.000	3159	1373	2266
166.000	166.730	0.730	2603	1453	2028

Note: The average roughness varying from 900 mm/km to 2761 mm/km

Chainage (Km)		Length(km)	Roughness Index (mm/km)		
From	To		Inner Lane	Outer Lane	RI Average (RHS)
RHS Carriageway					
5.000	6.000	1.00	1758	1545	1652
6.000	7.000	1.00	1708	1416	1562
7.000	8.000	1.00	1469	1421	1445
8.000	9.000	1.00	1779	1435	1607
9.000	10.000	1.00	1735	1657	1696
10.000	11.000	1.00	1965	1451	1708
11.000	12.000	1.00	1976	1583	1779
12.000	13.000	1.00	1767	1286	1527
13.000	14.000	1.00	1574	1146	1360
14.000	15.000	1.00	1484	987	1235
15.000	16.000	1.00	1437	1121	1279
16.000	17.050	1.05	2048	1787	1918

Chainage (Km)		Length(km)	Roughness Index (mm/km)		
From	To		Inner Lane	Outer Lane	RI Average (RHS)
RHS Carriageway					
17.050	17.400	0.35	Toll Plaza		
17.400	18.000	0.60	2211	1747	1979
18.000	19.000	1.00	1930	1732	1831
19.000	20.000	1.00	1720	1509	1615
20.000	21.000	1.00	1767	2194	1981
21.000	22.000	1.00	1881	1826	1854
22.000	23.000	1.00	1913	1737	1825
23.000	24.000	1.00	1440	1017	1229
24.000	25.000	1.00	1612	1165	1389
25.000	26.000	1.00	1678	1326	1502
26.000	27.000	1.00	1802	1193	1497
27.000	28.000	1.00	1492	1289	1391
28.000	29.000	1.00	2204	1914	2059
29.000	30.000	1.00	2406	2730	2568
30.000	31.000	1.00	1599	1517	1558
31.000	32.000	1.00	1392	1113	1253
32.000	33.000	1.00	1476	1095	1285
33.000	34.000	1.00	1870	1650	1760
34.000	35.000	1.00	1669	1352	1511
35.000	36.000	1.00	2010	1648	1829
36.000	37.000	1.00	1847	1496	1671
37.000	38.000	1.00	2058	1748	1903
38.000	39.000	1.00	1859	1501	1680
39.000	40.000	1.00	1694	1574	1634
40.000	41.000	1.00	1927	1910	1919
41.000	42.000	1.00	2258	1873	2066
42.000	43.000	1.00	2019	1848	1933
43.000	44.000	1.00	1948	1463	1705
44.000	45.000	1.00	1770	1320	1545
45.000	46.000	1.00	1876	1545	1711
46.000	47.000	1.00	2139	1524	1832
47.000	48.000	1.00	1989	1551	1770
48.000	49.000	1.00	1547	1001	1274
49.000	50.000	1.00	1290	1001	1145
50.000	51.000	1.00	2410	2799	2604
51.000	52.000	1.00	1729	1581	1655
52.000	53.000	1.00	2209	1717	1963
53.000	54.000	1.00	2372	2074	2223
54.000	55.000	1.00	2395	2029	2212
55.000	56.000	1.00	1964	1766	1865
56.000	57.000	1.00	1842	1582	1712
57.000	58.000	1.00	2039	1703	1871
58.000	59.000	1.00	1992	1510	1751
59.000	60.000	1.00	2223	1642	1933
60.000	61.000	1.00	2160	1656	1908
61.000	62.000	1.00	1405	1420	1413

Chainage (Km)		Length(km)	Roughness Index (mm/km)		
From	To		Inner Lane	Outer Lane	RI Average (RHS)
RHS Carriageway					
62.000	63.000	1.00	1228	1273	1251
63.000	64.000	1.00	1283	1519	1401
64.000	65.000	1.00	1372	2071	1721
65.000	66.000	1.00	1395	1306	1351
66.000	67.000	1.00	1737	1455	1596
67.000	68.000	1.00	1589	1700	1644
68.000	69.000	1.00	1372	1505	1438
69.000	70.000	1.00	1558	1502	1530
70.000	71.000	1.00	1314	1190	1252
71.000	72.000	1.00	1358	1794	1576
72.000	72.810	0.81	1429	1427	1428
72.810	73.050	0.24	Toll Plaza		
73.050	74.000	0.95	1501	1124	1313
74.000	75.000	1.00	1249	1578	1414
75.000	76.000	1.00	1498	1327	1412
76.000	77.000	1.00	1220	1169	1194
77.000	78.000	1.00	1482	1535	1508
78.000	79.000	1.00	1758	1386	1572
79.000	80.000	1.00	1220	943	1082
80.000	81.000	1.00	1112	926	1019
81.000	82.000	1.00	1106	803	955
82.000	83.000	1.00	1775	1586	1681
83.000	84.000	1.00	1323	1556	1439
84.000	85.000	1.00	1645	1162	1403
85.000	86.000	1.00	1543	1257	1400
86.000	87.000	1.00	1361	944	1152
87.000	88.000	1.00	1662	1011	1336
88.000	89.000	1.00	1319	1078	1199
89.000	90.000	1.00	1156	852	1004
90.000	91.000	1.00	1772	1332	1552
91.000	92.000	1.00	1647	1609	1628
92.000	93.000	1.00	1892	1457	1674
93.000	94.000	1.00	1575	1231	1403
94.000	95.000	1.00	1366	1006	1186
95.000	96.000	1.00	1502	1115	1309
96.000	97.000	1.00	1673	1224	1449
97.000	98.000	1.00	1641	1167	1404
98.000	99.000	1.00	2041	1558	1799
99.000	100.000	1.00	1210	1158	1184
100.000	101.000	1.00	1836	1576	1706
101.000	102.000	1.00	1220	1223	1222
102.000	103.000	1.00	1441	961	1201
103.000	104.000	1.00	1614	1135	1375
104.000	105.000	1.00	1760	1544	1652
105.000	106.000	1.00	1677	1292	1485
106.000	107.000	1.00	1441	1077	1259

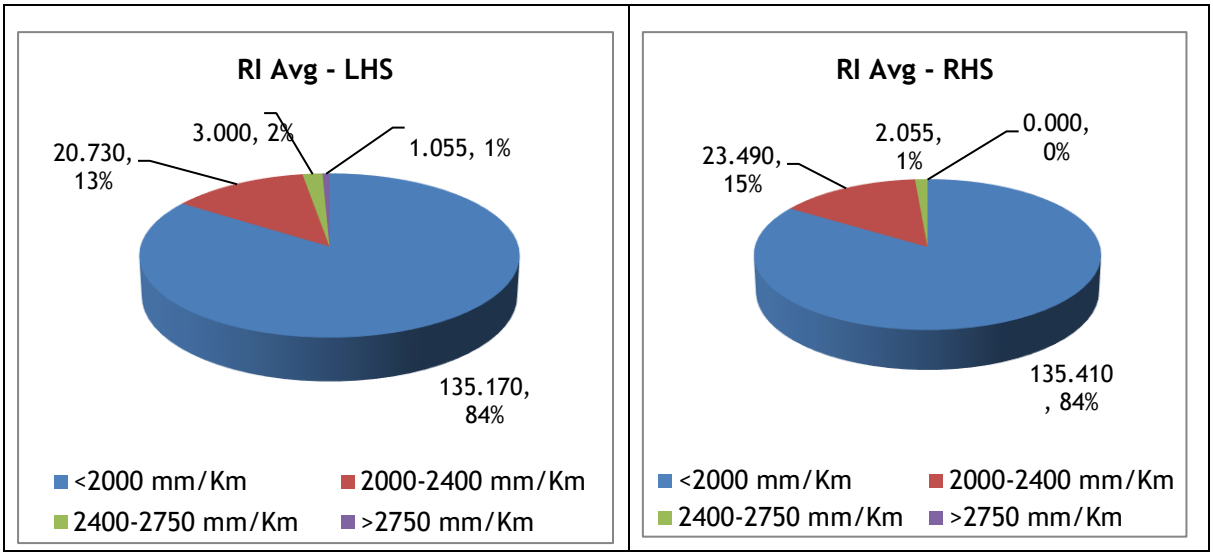
Chainage (Km)		Length(km)	Roughness Index (mm/km)		
From	To		Inner Lane	Outer Lane	RI Average (RHS)
RHS Carriageway					
107.000	108.000	1.00	1459	1553	1506
108.000	109.000	1.00	1788	1612	1700
109.000	110.000	1.00	2201	1518	1859
110.000	111.000	1.00	1352	1274	1313
111.000	112.000	1.00	1908	1479	1694
112.000	113.000	1.00	1853	1602	1727
113.000	114.000	1.00	1592	1703	1648
114.000	115.000	1.00	1861	1316	1588
115.000	116.000	1.00	2110	1201	1655
116.000	117.000	1.00	1743	1450	1596
117.000	118.000	1.00	2120	1966	2043
118.000	119.000	1.00	2060	1432	1746
119.000	120.000	1.00	1888	1513	1700
120.000	121.000	1.00	1575	1229	1402
121.000	122.000	1.00	1990	1567	1779
122.000	123.000	1.00	2147	1650	1898
123.000	124.000	1.00	1944	1561	1752
124.000	125.000	1.00	2134	1592	1863
125.000	126.000	1.00	2002	1593	1797
126.000	127.000	1.00	2228	1196	1712
127.000	128.000	1.00	2096	1171	1634
128.000	129.000	1.00	1565	1377	1471
129.000	130.000	1.00	2127	1459	1793
130.000	131.000	1.00	1855	1601	1728
131.000	132.000	1.00	2302	1406	1854
132.000	133.000	1.00	1938	1307	1623
133.000	134.000	1.00	2341	1462	1901
134.000	135.000	1.00	2449	1688	2069
135.000	136.000	1.00	2310	1482	1896
136.000	137.000	1.00	1896	1456	1676
137.000	138.000	1.00	1835	1535	1685
138.000	139.000	1.00	1960	1474	1717
139.000	140.000	1.00	2776	1351	2063
140.000	141.000	1.00	2919	1292	2106
141.000	142.000	1.00	2827	1114	1971
142.000	143.000	1.00	2144	1206	1675
143.000	144.000	1.00	3237	1415	2326
144.000	145.000	1.00	3255	1437	2346
145.000	146.000	1.00	2417	1376	1896
146.000	147.000	1.00	3193	1444	2319
147.000	148.000	1.00	3429	1154	2292
148.000	149.000	1.00	2648	1180	1914
149.000	150.000	1.00	2910	1546	2228
150.000	150.960	0.96	3130	1650	2390
150.960	151.200	0.24	Toll Plaza		

Chainage (Km)		Length(km)	Roughness Index (mm/km)		
From	To		Inner Lane	Outer Lane	RI Average (RHS)
RHS Carriageway					
151.200	152.000	0.80	2966	1304	2135
152.000	153.000	1.00	2755	1551	2153
153.000	154.000	1.00	3143	1582	2362
154.000	155.000	1.00	2920	1752	2336
155.000	156.000	1.00	3266	1410	2338
156.000	157.000	1.00	2917	1298	2107
157.000	158.000	1.00	2380	1474	1927
158.000	159.000	1.00	2374	1445	1909
159.000	160.000	1.00	2432	1405	1919
160.000	161.000	1.00	2241	1080	1661
161.000	162.000	1.00	2214	1045	1630
162.000	163.000	1.00	2659	1080	1869
163.000	164.000	1.00	3429	1086	2257
164.000	165.000	1.00	3068	1336	2202
165.000	166.000	1.00	3100	1337	2218
166.000	166.730	0.73	3339	1421	2380

Note: The average roughness varying from 955 mm/km to 2604 mm/km

Average Roughness Index (RI) values along the corridor were grouped in to four categories i.e., RI<=2000mm/km-Excellent, <=2400mm/km-Good, <=2750mm/km-Fair and >2750mm/km-Poor.

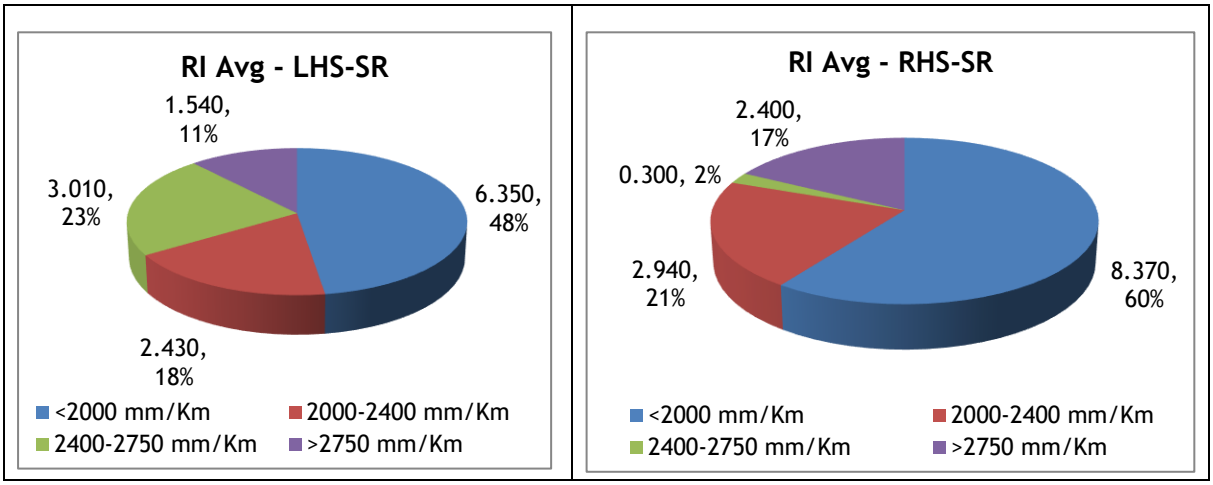
Average Roughness Index (RI) values along the corridor were grouped in to four categories, Pie chart showing the range of RI values in each carriageway of the project road have been presented below:



Based on the above pie charts, the Main carriageway of Project Road exhibits excellent to fair riding quality (RI < 2750mm/km) over 98% of the length on the LHS and 99% on the RHS.

❖ **Service Road**

Similarly, for service road also roughness values were captured and grouped in to four categories, Pie chart showing the range of RI values either service road has been presented below:



Based on the above pie charts, the service roads of Project Road exhibits good to fair riding quality (RI < 2750mm/km) over 89% of the length on the LHS and 83% on the RHS.

2.6 PAVEMENT COMPOSITION SURVEYS (TEST PITS)

The composition of the existing pavement crust has been noted from test pit surveys. Test pits have been undertaken at an interval of 10.0 km in each carriageway along the project road. Thus, a total of thirty-seven (37 no's) pits have been dug along the corridor and the data on composition of pavement has been noted. 33 out of 37 pits done on Main Carriageway edge ,4 test pits done on Service Road edge.

Results of the test pit survey showing average thickness of pavement layers are presented in the Table below.

Table 6: Pavement Composition of Existing Pavement along Project Road

S No	Test Pit Number	Design Chainage (km)	Direction	BT (mm)	WMM (mm)	GSB (mm)	Total (mm)
1	SR-TP-1	86+600	LHS	100	250	220	570
2	SR-TP-2	96+300	LHS	100	300	190	590
3	SR-TP-3	106+400	LHS	110	270	200	580
4	SR-TP-4	116+200	LHS	100	260	200	560
5	SR-TP-5	126+050	LHS	110	260	170	540
6	SR-TP-6	135+900	LHS	110	240	170	520
7	SR-TP-7	148+580	LHS	100	280	280	660
8	SR-TP-8	156+600	LHS	140	220	150	510
9	SR-TP-9	164+900	LHS	110	280	180	570
10	SR-TP-10	161+700	RHS	120	230	200	550
11	SR-TP-11	151+600	RHS	120	270	180	570
12	SR-TP-12	142+000	RHS	130	230	170	530

S No	Test Pit Number	Design Chainage (km)	Direction	BT (mm)	WMM (mm)	GSB (mm)	Total (mm)
13	SR-TP-13	131+040	RHS	100	270	180	550
14	SR-TP-14	121+650	RHS	110	320	300	730
15	SR-TP-15	109+980	RHS	100	250	180	530
16	SR-TP-16	99+780	RHS	120	220	200	540
17	SR-TP-17	91+700	RHS	100	280	280	660
18	SR-TP-18	81+400	RHS	100	250	200	550
19	SR-TP-19	71+350	RHS	100	230	200	530
20	SR-TP-20	61+350	RHS	100	250	250	600
21	SR-TP-21	51+550	RHS	100	170	170	440
22	SR-TP-22	41+600	RHS	100	240	130	470
23	SR-TP-23	31+550	RHS	120	270	200	590
24	SR-TP-24	19+100	RHS	100	150	200	450
25	SR-TP-25	9+900	RHS	100	200	140	440
26	SR-TP-26	8+900	LHS	100	250	200	550
27	SR-TP-27	18+700	LHS	120	240	160	520
28	SR-TP-28	27+600	LHS	100	200	190	490
29	SR-TP-29	37+040	LHS	110	250	230	590
30	SR-TP-30	47+720	LHS	140	250	220	610
31	SR-TP-31	58+600	LHS	130	260	260	650
32	SR-TP-32	68+200	LHS	100	200	220	520
33	SR-TP-33	77+800	LHS	120	270	180	570
34	SR-SR-TP-1	98+400	LHS	90	300	150	540
35	SR-SR-TP-2	137+020	RHS	60	260	160	480
36	SR-SR-TP-3	64+400	RHS	100	200	170	470
37	SR-SR-TP-4	12+800	LHS	130	200	100	430

Total average crust thickness of the MCW pavement is 555mm. The average thickness of Service Road is about 480mm. Pavement is mainly composed of a BT layer, WMM & GSB base over subgrade.

2.7 MATERIAL INVESTIGATIONS

2.7.1 SUBGRADE INVESTIGATIONS & LABORATORY TESTING

Sub-grade Investigations have been carried out to examine the subgrade soil characteristics along the project road. A total number of 37 test pits have been carefully dug from the pavement surface up to sub-grade level. 33 out of 37 pits done on Main Carriage way edge 4 test pits done on Service Road edge. Field density tests have been conducted for subgrade samples and a small quantity of sample has also been collected in airtight containers for determining the field moisture content. Upon completion of the field density test, representative sample of sub-grade soil has been collected in bulk, in gunny bags, from each test pit for laboratory testing.

The soil samples collected have been tested for the following properties to assess the existing sub-grade soil properties.

- Sieve analysis
- Atterberg limits
- Heavy compaction
- Four (4) days soaked CBR as per IS standards at 97% of MDD as applicable for sub-grade (Heavy Compaction)
- Free swelling index

Photographs have been taken at all test pit locations depicting the crust thickness and nature of material in the pavement. Few photographs are presented below:



SR-TP-5



SR-TP-14



SR-TP-18



SR-SR-TP-3

2.7.2 AGGREGATE SAMPLES

Aggregates to be used for sub-base, base, surface courses and concrete works have been collected from the crushers under operation in the existing quarries. The locations, estimated quantity, basic cost of material and the approximate distance from each source to the nearest point on the project corridor are compiled in Tables below.

Table 7: Aggregate Samples Details

Sample No.	Ex. Chainage (Km.)	Left/ Right	Name of Village	Name of Source/ Crusher	Lead from Nearest Ex. Chainage (Km.)	Approx. Quantity (ton)	Basic cost of the material (Rs.)	Remarks	Co-ordinate
SR-AQ-1	53+200	RHS	Kusumdihi	Krishna Stone Minerals Contact Person: Sunil Kumar Aggarwal Contact No: 9777167158, 9938788914	34.0 km	Plenty	40mm-Rs 750/- per ton (Non VSI) 20mm-Rs 1125/- per ton (VSI) 10mm - Rs 1000/- per ton (VSI) 6mm - Rs 875/- per ton (VSI) Dust - Rs 200/- per ton (VSI)	GST 5% and Royality - Rs 175/- per ton	21.606417 84.158269
SR-AQ-2	22+700	LHS	Babu Chakli (Regali)	Balaji Stone Crusher Contact Person: Anil Kumar Aggarwal Contact no:7008059463	5.5 km	Plenty	40mm-Rs 27/- per cft 30mm-Rs 27/- per cft 20mm-Rs 34/- per cft 10mm - Rs 28/- per cft 6mm -Rs 21/- per cft Dust - Rs 4/- per cft (Non VSI Material)	GST 5% and Royality Rs 285/- per Cub Mt	21.651690 84.017860
SR-AQ-3	165+600	RHS	Vill: Gutidarha	Shivam Stone Crusher Contact Person: Happy Prusty Contact no: 9668459333, 9238394020,	10.6 km	Plenty	20mm-Rs 54/- per cft 10mm - Rs 54/- per cft 6mm -Rs 45/- per cft Dust - Rs 30/- per cft (VSI Material)	GST 5% and Royality Extra	22.190966, 84.771789



SR-AQ-1



SR-AQ-2



SR-AQ-3

2.7.3 Sand SAMPLES

Sand samples collected from the river source. The locations, estimated quantity, basic cost of material and the approximate distance from each source to the nearest point on the project corridor are compiled in Tables below

Table 8: Sand Samples Details

Sample No.	Ex. Chainage (Km.)	Left/ Right	Contact Details	Name of River	Lead from Nearest Ex. Chainage (Km.)	Approximate Quantity (ton)	Basic cost of the material (Rs.)	Remarks	Co-ordinate
SR-SQ-1	53+200	LHS	Contact Person: Shekhar Khamari Contact No: 9861927777 Vill-Gaudenbahada (Jharsuguda)	IB River	7.5 km	Plenty	Sand Rs. -4500/- Per 600 cft	Inluding Royality & Loading	21.887109 83.949143
SR-SQ-2	64+100	LHS	Contact Person: Akash Nayak Contact No: 7735311201 Vill-Bhosma Amankala	IB River	2.0 km	Plenty	Sand Rs. -3500/- Per 600 cft	Including Royality & Loading	21.965124 84027840
SR-SQ-3	85+450	LHS	Contact Person: Manoj Sahoo Contact No: 9437045785 Vill- Bhojpur (Sundargarh)	IB River	200 m	Plenty	Sand Rs. -1800/- Per 600 cft	GST 5% and Royality Rs-150/- per cub mt	22.137999 84.057285

2.8 CORE CUTTING SAMPLES

The objective of the core cutting is to examine the engineering properties of the materials relevant to the project, as per specifications. Accordingly, 38 Nos. of cores were taken from main carriageway and 4 cores from the service road.

The Core samples collected from these identified locations have been tested for the following properties.

- Density of Core
- Theoretical Maximum Sp. gravity (GMM)
- Air voids
- Compaction
- Extraction and Gradation
- Gradation of Aggregates

The recorded details such as location, lane, condition, depth of core etc. for each core sample are presented below

Table 9: Core Cutting Samples Details

S. NO	Core Id	Existing Chainage	Direction	Carriage way	Lane	Offset From Kerb (in m)	Thickness (mm)	Hole Depth (mm)	Condition	Crack on hole Depth	Remark
1	SR-C-1	71+400	RHS	MCW	Inner Lane	3.2 M	140	170	Inner Lane New Laying Outer Lane Old B.T		
2	SR-C-2	64+100	RHS	Service Road	Inner Lane	2.4 M	80	90	Good		
3	SR-C-3	61+400	RHS	MCW	Outer Lane	6.8 M	100	130	Rutting &Alligator Cracks		
4	SR-C-4	51+550	RHS	MCW	Inner Lane	3.2 M	130	135	Rutting & Alligator Cracks		
5	SR-C-5	41+600	RHS	MCW	Outer Lane	6.8 M	100	130	Good Section & Mild Ravelling		
6	SR-C-6	31+550	RHS	MCW	Inner Lane	3.1 m	130	150	Good Section & Mild Ravelling		
7	SR-C-7	19+100	RHS	MCW	Outer Lane	6.8 m	145	150	Good		Outer Lane Old B.T & Inner Lane New Laying
8	SR-C-8	12+900	RHS	Service Road	Outer Lane	3.6 m	80	90	Good Section		
9	SR-C-9	9+900	RHS	MCW	Inner Lane	3.0 m	115	120	Good Section & Over Lay		
10	SR-C-10	8+900	LHS	MCW	Inner Lane	3.0 m	80	90	Poor & Alligator Cracks		
11	SR-C-11	18+700	LHS	MCW	Outer Lane	6.9 m	130	140	Good Section		
12	SR-C-12	27+900	LHS	MCW	Inner Lane	2.9 m	135	140	Good Section& Over Lay		
13	SR-C-13	37+020	LHS	MCW	Inner Lane	2.9 m	130	145	Good Section		
14	SR-C-14	37+020	LHS	MCW	Outer Lane	7.0 m	120	140	Good Section		
15	SR-C-15	47+750	LHS	MCW	Outer Lane	6.7 m	100	115	Alligator Cracks	Full Depth Cracks	Core Full Depth Cracks
16	SR-C-16	58+000	LHS	MCW	Inner Lane	3.1 m	115	125	Ravelling		
17	SR-C-17	68+200	LHS	MCW	Outer Lane	6.9 m	125	150	Outer Lane Good & Inner Lane Cracks		
18	SR-C-18	77+900	LHS	MCW	Inner Lane	3.0 m	140	160	Over Layng &Mild Rutting		
19	SR-C-19	86+600	LHS	MCW	Outer Lane	7.0 m	130	140	Good & Over Layng Section		

S. NO	Core Id	Existing Chainage	Direction	Carriage way	Lane	Offset From Kerb (in m)	Thickness (mm)	Hole Depth (mm)	Condition	Crack on hole Depth	Remark
20	SR-C-20	96+300	LHS	MCW	Inner Lane	3.0 m	100	110	Alligator Cracks	Full Depth Cracks	Core Full Depth Cracks
21	SR-C-21	98+410	LHS	SR Road	Inner Lane	1.1 m	90	100	Good		
22	SR-C-22	106+400	LHS	MCW	Inner Lane	3.0 m	120	125	Rutting & Bleeding		
23	SR-C-23	116+200	LHS	MCW	Outer Lane	6.8 m	105	130	Ravelling		
24	SR-C-24	126+050	LHS	MCW	Inner Lane	3.0 m	95	115	Ravelling		
25	SR-C-25	135+900	LHS	MCW	Outer Lane	6.9 m	210	220	Good		Inner Lane Bleeding
26	SR-C-26	136+900	LHS	Service Road	Outer Lane	3.7 m	110	110	Good		
27	SR-C-27	148+580	LHS	MCW	Inner Lane	3.0 m	110	140	Rutting & Ravelling		
28	SR-C-28	148+580	LHS	MCW	Outer Lane	6.9 m	105	150	Mild Rutting & Ravelling		
29	SR-C-29	156+600	LHS	MCW	Outer Lane	6.8 m	235	260	Ravelling & Mild Rutting		Core 2 Pieces collected
30	SR-C-30	164+900	LHS	MCW	Inner Lane	3.0 m	110	160	Ravelling & Rutting		
31	SR-C-31	161+700	RHS	MCW	Outer Lane	6.9 m	120	150	Ravelling & Rutting		
32	SR-C-32	151+600	RHS	MCW	Inner Lane	3.0 m	95	110	Ravelling & Rutting		
33	SR-C-33	142+000	RHS	MCW	Outer Lane	6.8 m	300	310	Ravelling & Rutting		
34	SR-C-34	131+040	RHS	MCW	Inner Lane	2.9 m	105	180	Ravelling & Bleeding		
35	SR-C-35	121+650	RHS	MCW	Outer Lane	6.8 m	135	150	Rutting & Bleeding		
36	SR-C-36	109+980	RHS	MCW	Inner Lane	3.0 m	140	150	Rutting & Bleeding		
37	SR-C-37	99+780	RHS	MCW	Outer Lane	7.0 m	105	120	Ravelling		
38	SR-C-38	91+700	RHS	MCW	Inner Lane	3.0 m	105	120	Bleeding & Rutting		Outer Lane Alligator Cracks
39	SR-C-39	81+400	RHS	MCW	Inner Lane	3.0 m		130	DBM new Laying		Core 2 Pieces collected 1.Pieces 50 mm 2. Pieces 70 mm
40	SR-C-40	81+400	RHS	MCW	Inner Lane	1.2 m		120	DBM new Laying		Core 2 Pieces collected 1.Pieces 50 mm 2. Pieces 60 mm
41	SR-C-41	81+450	RHS	MCW	Outer Lane	6.9 m	105	115	Good		Inner Lane new DBM Laying
42	SR-C-42	81+450	RHS	MCW	Outer Lane	5.3 m	110	120	Good		Inner Lane new DBM Laying

The sample photographs of cores are shown below.



SR-CORE-TP-1



SR-CORE-TP-11



SR-CORE-TP-32



SR-CORE-TP-42

2.9 AXLE LOAD SURVEYS

Traffic loading has a significant impact on pavement performance and design. This is because the damage that vehicles create to a road depends very strongly on the axle loads of the vehicles. The exact relationship is influenced by the type of road structure and the way the road deteriorates but a “fourth power” damage law gives a good approximation.

Axle load study has been conducted using portable axle load pads. The survey was conducted near Toll Plaza-1 at km 17+150 on date 13.05.2025 to 15.05.2025, Toll Plaza-2 at km 72+850 on date 16.05.2025 to 18.05.2025, Toll Plaza-3 at km 150+910 on date 19.05.2025 to 21.05.2025 for 48 hrs duration. The survey has been conducted in both the directions. The measurements have been made on random sampling basis. The collected axle load data and analysis is presented in **Appendix 5** of this Report.

The vehicle damage factors have been calculated using the standard axle loadings given in IRC: 37-2018. The standard axle loadings adopted have been presented in the following table.

Axle Configuration	Standard Axle load (Tonnes)/ KN	Remarks
Single Wheel, Single Axle	6.60/ 65	As per IRC:37-2018
Dual Wheel, Single Axle	8.16/ 80	As per IRC:37-2018
Dual Wheel, Tandem Axle group	15.10/ 148	As per IRC:37-2018
Dual Wheel, Tridem Axle group	22.90/ 224	As per IRC:37-2018

Few photographs illustrating the survey locations and axle load measurements are presented below.



Survey in Progress



Survey in Progress

Direction wise VDF for each mode of commercial traffic has been estimated. Results of axle load surveys have been presented in the following table.

Table 10: VDF Values Estimated

Vehicle Type	Toll plaza-1 (Sason)		Toll plaza-2 (Sundergarh)		Toll plaza-3 (Kansbahal)	
	UP	DN	UP	DN	UP	DN
BUS	0.53	0.32	0.44	0.95	0.79	1.06
2-Axle	2.02	3.15	1.26	2.59	5.15	1.68
3-Axle	3.83	4.72	5.27	3.62	7.65	2.22
M Axle	9.17	17.58	8.95	17.24	18.67	15.76
LCV	1.56	1.09	0.88	1.27	1.98	1.29

CHAPTER 3. VALIDATION OF EXECUTED WORKS

3.1 ROAD WORKS

The project road has been closely inspected to verify the executed works on ground. The works executed by the Concessionaire/Contractor as envisaged in CA has been recorded. Each structure has been inspected to note down its structural configuration and condition. The following table highlights the executed works on ground.

Table 11: Details of Executed works

S. No.	Particulars	Length/ Nos	As per Site	Remarks
1	**Start Chainage (Km)**	Km	5.000	
2	**End Chainage (Km)**	Km	166.730	
3	Length of the Project Corridor	Kms	161.730	
4	Service Road / Slip Road	Kms	29.196	
5	Bypass length	kms	14.065	Renali of 4.6km & Jharsuguda of 9.5 km
6	ROBs	Nos	3	
7	RUB's	Nos	1	
8	Flyovers	Nos	3	
9	VUPs	Nos	4	
10	PUP's/CUP's	Nos	15	
11	EUPs	Nos	1	
12	FOBs	Nos	1	
13	Subways	Nos	3	
14	Major Bridges	Nos	6	
15	Minor Bridges	Nos	39	
16	RUP	Nos	5	
17	Culverts (Pipe)	Nos	106	
18	Culvert (Box)	Nos	17	
19	Culvert (Slab)	Nos	206	
20	Major Junctions	Nos	15	
21	Minor junctions	Nos	306	
22	High Embankments	Kms	23.72	
23	Stone Pitching	Sqm	8,385	
24	Concrete Lining / Grouting	Sqm	0.57	
25	RCC Wall-Full Height	Kms	0.31	
26	RE Panels - Full height	Kms	20.13	
27	RE Panels / Blocks Area	Sqm	1,00,650	
28	RCC Cover Drain	Kms	32.87	
29	Median drain	Kms	23.83	
30	Median Cuts	Nos	3,586	

S. No.	Particulars	Length/ Nos	As per Site	Remarks
31	Chutes	Nos	112	
32	Toll Plaza	Nos	3	
33	No. of Lanes (Both side)	Nos	26	(TP1:10, TP2: 8 & TP3: 8)
34	Route Patrolling Vehicle	Nos	3	
35	Ambulance	Nos	3	
36	Cranes	Nos	3	
37	SWB	Nos	6	
38	Towing Vehicle	Nos	3	
39	High Mast Lights	Nos	437	39 locations
40	Low Mast Lights	Nos	153	20 locations
41	Highway Lighting (length only)	Kms	54.19	
42	Single Arm Lightings poles	Nos	90	
43	Double Arm Lightings poles	Nos	1,447	
44	Solar Blinkers	Nos	259	
45	Solar Lights with Panel	Nos	5	
46	Four Arm lightings	Nos	2	
47	Bus Bays with Shelter	Nos	26	
48	Truck Lay bye	Nos	8	
49	Median Opening	Nos	78	
50	Median Plantation_ Functional	Kms	107.3	
51	Median Plantation	Nos	1,07,300	
52	Road Markings	Kms	161.79	
53	Delineators	Nos	143	
54	Kilometre Stones	Nos	258	
55	Hectometre Stones	Nos	1,294	
56	5th Km Stone	Nos	66	
57	Single Face W-Beam Safety Barriers	Kms	43.171	
58	Double face W-Beam Safety Barriers	Kms	29.7	
59	Guard Posts	Nos	2,017	
60	Rigid Concrete Barriers	Kms	21.027	
61	Concrete Railing	Kms	0.25	
62	Pedestrian Guard Rails	Kms	10.4	
63	Antiglare	Nos	3,111	
64	Road Signs	Nos	3,314	
65	4-Lane Gantry Sign Boards	Nos	17	
66	Cantilever Sign Boards	Nos	17	
67	Varying Message Signs (VMS)	Nr	9	
68	PTZ camera's	Nr	11	

S. No.	Particulars	Length/ Nos	As per Site	Remarks
69	Toll Plaza Sign Boards	Nos	69	

The project corridor appears to have been constructed with the cross-sectional elements matching to those given in the manual at the time of execution. The carriageway width of 7.0m plus paved shoulders of 1.5m, shyness of 0.25m has been provided over the entire length except at structures.

In the project stretch, the Service Roads/Slip Roads with an overall length of 29.196kms (LHS: 14.391 km + RHS14.805 km) is observed along the project corridor. The details are provided in Road items, **Appendix 6** of this Report.

RCC Lined Covered drains and Median drain are provided along the project road. It is observed that at few locations cover slab is damaged and cleaning need to be required. These sections are presented in the Table below. The details are provided in Road items, **Appendix 6** of this Report.

Table 12: Summary of Drain

Description	Median Drain (Kms)	RCC Cover lined drain (Kms)	Open lined drains (Kms)
As per Site	23.830	32.870	-

On curved sections with super-elevation, Median drain cuts are provided and summary are presented below details are provided in **Appendix-6** of this report.

Table 13: Summary of Median drain cuts

Summary	Site
As Per Site (No.)	3586
No of Cuts Damaged	-
Cuts required cleaning	-

Slope protection in the form of RE walls/RCC walls are found in approaches of some of the underpasses and Bridge locations, which account for a total length of 45.480 km. The summary of slope protection is presented below and the details are presented in **Appendix-6** of this report.

Table 14: Summary of Slope Protection along Project Road

Approach Type	LHS (Kms)	RHS (Kms)	Length (Kms)
Embankment	11.34	12.38	**23.72**
RE Wall	10.62	9.51	**20.13**
RCC Wall	0.13	0.18	**0.31**
Stone Pitching	0.29	0.46	**0.75**
Concrete Lining	0.57	-	**0.57**
Length (km)			**45.48**

In general, the median width is varying from 4.5m to 1.5m considering the rural and urban sections. At site 78 No. of Median openings were observed with/with-out standing lanes. Solar blinkers are

installed at median opening locations. The details of these locations are provided in Road items, **Appendix 6** of this Report.

Table 15: Summary of Median Openings along Project Road

Summary	As per site
Total Nos	78
Normal Lane (No.)	48
Reserved lane (No.)	30

The Project Road has 15 Nos. of Major Junctions and 306 Nos. of Minor Junctions. The List of Major & Minor junctions are provided. The details of these locations are provided in Road items, **Appendix 6** of this Report.

Safety barriers in the form of MBCB, CCB and PGRs have been provided along the project road at high embankments and at sharp curve locations, at approaches of grade separated and cross drainage Structures. The details of these locations are provided in Road items, **Appendix 6** of this Report. The table below shows the summary of Safety Barriers provided along the project corridor are provided below:

Table 16: Summary of Safety Barrier Locations

Summary	MBCB (Km)	Double face MBCB (Km)	CCB (Km)	PGR (Km)	Delineators (km)
As per Site (Kms)	43.171	29.705	21.027	10.400	143
Damaged (Kms)	0.319	-	-	0.165	-

Road furniture in the form of Signs/Markings, Gantry signs and traffic safety blinkers, lighting, high mast lights have been provided along the project road the details presented in the **Appendix-6** of this Report. The summary of the same is presented in the Tables below:

Table 17: Locations of Highway Lightings

Summary	Nos	Remarks
No of High masts as per site	39	Average 11 no of Bulbs Per single pole
No of Low masts as per site	20	Average 08 no of Bulbs Per single pole
No of Single-arm Poles as per Site	90	LED Bulbs
No of Double-arm Poles as per Site	1447	LED Bulbs
Solar Lights with panels	05	

Table 18: Summary of Road Signs along Project Road

Summary of Road Signs							Total
Description	**LHS**	**RHS**	**Junctions**	**Total**	**Missing**	**Damage**	**Poor**
Unit	**Nos**	**Nos**	**Nos**	**Nos**	**Nos**	**Nos**	**Nos**
Overhead Gantry	12	5	-	17	-	1	-
Cantilever Gantry	4	13	-	17	-	-	-

Summary of Road Signs							Total
Description	**LHS**	**RHS**	**Junctions**	**Total**	**Missing**	**Damage**	**Poor**
Toll Boards	35	34	-	69	-	4	2
ADS/RAS	14	12	-	26	-	2	-
Rectangular	170	187	14	371	-	9	1
Triangular	309	294	128	731	-	18	5
Circular	269	252	13	534	-	10	2
Octagonal	3	3	159	165	-	19	-
Flag Type	-	-	-	-	-	-	-
Chevron	493	520	1	1014	-	12	9
Hazard	213	175	10	398	-	4	1
Route marker	20	17	-	37	-	2	-
Cluster	-	3	35	38	-	3	-
	-	-	-	-	-	-	-
Total	**1542**	**1515**	**360**	**3417**	-	**84**	**20**

Road user facilities such as Bus Shelters and Truck Lay-byes have been provided along the corridor. The project Road has total 42 Bus Bays with Bus Shelter and 6 Truck laybys. The details of the Bus bays & bus shelter and Truck lay byes are provided in **Appendix-6** of this report.

An Incident Management System (IMS) has been implemented along the project stretch to ensure timely detection, reporting, and resolution of any unforeseen events or emergencies. The details of the Incident Management System established for the project corridor are presented below.

Table 19: Summary of Incident Management Equipment

S No	Item/Particulars	Unit	Established
1	Ambulance	Nos	3
2	Recovery Crane	Nos	3
3	Patrolling vehicle	Nos	3
4	Towing vehicles	Nos	3

3.2 STRUCTURES

The inventory of structures has been carried for all every individual structure. The overall summary of existing bridges / structures is as presented below:

Table 20: Summary of Structures as per CA & Site

S. No	Type of Structure	No. of Structures As per CA	As per site					Remarks
			No. of Structures			Total No. of Str's	Total No. of Locations	
			LHS	RHS	BHS			
1	ROB	3	3	3	-	6	3	
2	RUB	1	-	-	1	1	1	
3	MJB	6	6	6	-	12	6	
4	MNB	39	39	39	-	78	39	
5	Flyover	3	2	2	-	4	3	
6	VUP	4	4	4	-	8	4	
7	EUP	1	1	1	-	2	1	
8	PUP	11	15	15	-	30	15	Addl 4 Nos. under COS
9	RUP	5	5	5	-	10	5	
10	SUBWAY	-	3	3	-	6	3	3 Nos. under COS
11	FOB	-	-	-	1	1	1	1 Nos. under COS
12	BC	17	-	-	17	17	17	
13	SC	206	-	-	206	206	206	
14	PC	106	-	-	106	106	106	
Total Nos			**78**	**78**	**331**	**487**	**410**	

Table 21: Age of Structures

S.No	Type of Structure	LHS		RHS		BHS		Total (Nos)		Total No. of Str's
		Old	New	Old	New	Old	New	Old	New	
1	ROB	-	3	1	2	-	-	1	5	6
2	RUB	-	-	-	-	-	1	-	1	1
3	MJB	-	6	6	-	-	-	6	6	12
4	MNB	14	25	14	25	-	-	28	50	78
5	Flyover	-	2	-	2	-	-	-	4	4
6	VUP	-	4	-	4	-	-	-	8	8
7	EUP	-	1	-	1	-	-	-	2	2
8	PUP	-	15	-	15	-	-	-	30	30
9	RUP	-	5	-	5	-	-	-	10	10
10	SUBWAY	-	3	-	3	-	-	-	6	6
11	FOB	-	-	-	-	-	1	-	1	1
12	BC	-	-	-	-	-	17	-	17	17
13	SC	-	-	-	-	205	1	205	1	206
14	PC	-	-	-	-	52	54	52	54	106
Total Nos		**14**	**64**	**21**	**57**	**257**	**74**	**292**	**195**	**487**

Table 22: Summary of Expansion Joints & Bearings

S. No	Type of Structure	Expansion joints		Bearings							
				Pot PTFE		Elastomeric		Rocker		Tar Paper	
		Old	New	Old	New	Old	New	Old	New	Old	New
1	ROB	-	19	-	144	10	-	-	-	-	-
2	MJB	25	25	-	180	12	-	60	-	120	-
3	MNB	-	36	-	32	72	-	-	-	-	-
4	Flyover	-	8	-	-	-	-	-	-	-	-
5	VUP	-	12	-	-	-	-	-	-	-	-
Total		**25**	**100**	**-**	**356**	**94**	**-**	**60**	**-**	**120**	**-**
		125		**356**		**94**		**60**		**120**	
				630							

Table 23: Summary & Combination of Superstructures

S. No	Type of Structure	RCC Girder PSC Girder & Steel Girder	RCC Box	Steel Girder	PSC Girder & RCC Box	RCC Girder & PSC Girder	RCC Girder & String Arch type	PSC Girder & PSC Box Girder	PSC Girder & RCC Box Girder	PSC Girder	RCC Box Girder	RCC Girder	PSC Girder & RCC Girder	RCC Solid Slab	RCC Solid Slab & Arch	RCC Cantilever Solid Slab	Steel Truss	Pipe	Total No. of Structures
1	ROB	3	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	6
2	RUB	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
3	MJB	-	-	-	-	1	1	1	1	3	1	3	1	-	-	-	-	-	12
4	MNB	-	37	-	-	-	-	-	-	2	-	10	-	20	1	8	-	-	78
5	Flyover	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	4
6	VUP	-	2	-	-	-	-	-	-	-	-	-	-	-	-	6	-	-	8
7	EUP	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
8	PUP	-	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30
9	RUP	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	10
10	SUBWAY	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
11	FOB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
Total		**3**	**87**	**1**	**1**	**1**	**1**	**1**	**1**	**9**	**1**	**13**	**1**	**20**	**1**	**14**	**1**	**2**	**158**

Table 24: Summary of Substructures

S. No	Type of Str	ABUTMENT					PIER			
		RCC Wall type	RCC Box	Stone Masonry Wall type	Pipe	Steel Truss	RCC Wall type	RCC Box	Stone Masonry Wall type	Steel Truss
1	ROB	5	1	-	-	-	5	1	-	-
2	RUB	-	1	-	-	-	-	1	-	-
3	MJB	11	-	1	-	-	12	-	-	-
4	MNB	31	37	10	-	-	19	13	4	-
5	Flyover	4	-	-	-	-	-	-	-	-
6	VUP	6	2	-	-	-	-	-	-	-
7	EUP	-	2	-	-	-	-	-	-	-
8	PUP	-	30	-	-	-	-	-	-	-
9	RUP	-	8	-	2	-	-	-	-	-
10	SUBWAY	-	6	-	-	-	-	-	-	-
11	FOB	-	-	-	-	1	-	-	-	1
Total		**57**	**87**	**11**	**2**	**1**	**36**	**15**	**4**	**1**
		158					**56**			

4.1 MATERIAL INVESTIGATION INFERENCES

4.1.1 SUBGRADE

The subgrade samples collected from the test pits taken from project road appears to be in fair condition as revealed by test pit investigations. Soil classification has been done according to IS Classification of Soils (ISC) as detailed in IS 1498 - 1978.

Laboratory test results indicate that all the Subgrade soil samples collected belongs to Coarse Grained Soil. Out of 37 test pits, 02 sample belong to CL type of soil, 02 samples belong to GC type of soil, 29 sample belongs to SC type of soil, and 4 samples belongs to SM-SC type of soil type.

Pie Chart showing the percentage distribution of soil classification of existing subgrade sample is presented below:

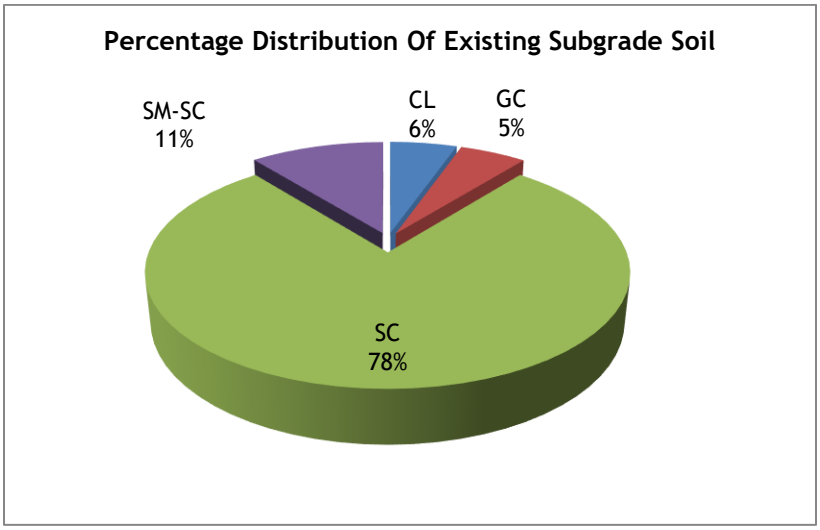
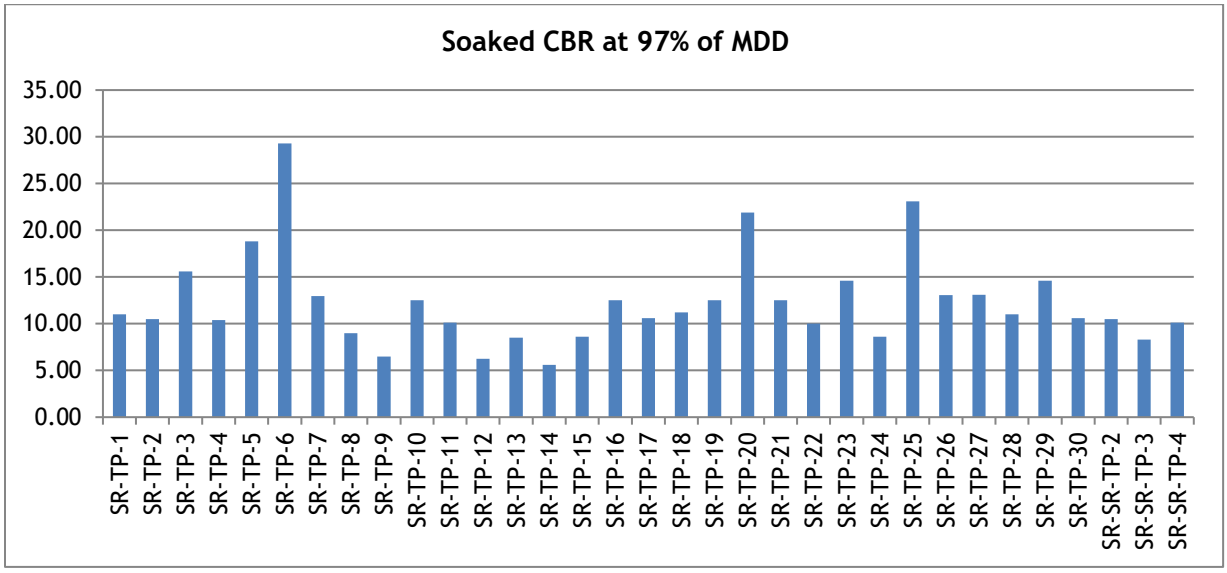


Table 25: Summary of test results of Existing Subgrade Soils

Lab Sample No	Site Identification		Grain Size Analysis					Atterberg Limits (%)			Soil Class	MDD (gm/cc)	OMC (%)	Soaked CBR 97% MDD	Free Swelling Index (%)
	Location (km)	Up/Dn	Percentage passing from					LL	PL	PI					
			4.75 mm IS Sieve	425 mic IS Sieve	75 mic IS Sieve	Gravel %	Sand %								
SR-TP-1	86+600	LHS	76.76	38.88	26.8	23.24	49.96	30	21	9	SC	1.98	11.40	11.00	15
SR-TP-2	96+300	LHS	82.37	60.13	41.86	17.63	40.51	35	18	17	SC	2.09	9.60	10.50	30
SR-TP-3	106+400	LHS	83.55	68.37	41.41	16.45	42.14	27	23	4	SM-SC	2.09	10.00	15.60	10
SR-TP-4	116+200	LHS	78.71	56.55	38.57	21.29	40.14	25	15	10	SC	1.97	14.00	10.40	5

Lab Sample No	Site Identification		Grain Size Analysis					Atterberg Limits (%)			Soil Class	MDD (gm/cc)	OMC (%)	Soaked CBR 97% MDD	Free Swelling Index (%)
	Location (km)	Up/Dn	Percentage passing from					LL	PL	PI					
			4.75 mm IS Sieve	425 mic IS Sieve	75 mic IS Sieve	Gravel %	Sand %								
SR-TP-5	126+050	LHS	62.58	39.57	36.95	37.42	25.63	32	18	14	GC	2.09	13.00	18.80	20
SR-TP-6	135+900	LHS	31.31	15.26	14.44	68.69	16.87	42	21	21	GC	2.19	11.00	29.30	27
SR-TP-7	148+580	LHS	86.13	47.42	35.61	13.87	50.52	25	15	10	SC	2.09	10.30	12.95	10
SR-TP-8	156+600	LHS	92.36	42.38	36.42	7.64	55.94	31	17	14	SC	2.00	12.40	9.00	30
SR-TP-9	164+900	LHS	74.92	38.07	32.85	25.08	42.07	36	21	15	SC	1.90	12.80	6.50	19
SR-TP-10	161+700	RHS	73.72	39.58	33.2	26.28	40.52	31	18	13	SC	2.05	11.40	12.50	20
SR-TP-11	151+600	RHS	77.70	40.21	37.33	22.3	40.37	33	17	16	SC	2.01	10.30	10.10	30
SR-TP-12	142+000	RHS	93.68	79.44	73.28	6.32	20.40	34	23	11	CL	1.92	11.50	6.25	30
SR-TP-13	131+040	RHS	70.20	39.1	25.06	29.8	45.14	34	17	17	SC	1.95	14.30	8.50	19
SR-TP-14	121+650	RHS	97.45	90.75	75.11	2.55	22.34	30	17	13	CL	1.87	11.30	5.60	23
SR-TP-15	109+980	RHS	75.16	46.2	33.4	24.84	41.76	32	23	9	SC	1.94	12.00	8.60	30
SR-TP-16	99+780	RHS	68.95	36.38	24.65	31.05	44.30	29	19	10	SC	2.03	11.20	12.50	32
SR-TP-17	91+700	RHS	90.36	59.84	39.07	9.64	51.29	29	18	11	SC	2.02	10.20	10.60	13
SR-TP-18	81+400	RHS	65.48	28.66	18.59	34.52	46.89	25	19	6	SM-SC	1.97	9.00	11.20	24
SR-TP-19	71+350	RHS	89.92	53.94	36.87	10.08	53.05	38	19	19	SC	2.05	9.20	12.50	25
SR-TP-20	61+350	RHS	74.60	50.41	38.77	25.4	35.83	37	20	17	SC	2.14	9.10	21.90	30
SR-TP-21	51+550	RHS	70.85	47.5	35.54	29.15	35.31	32	21	11	SC	2.05	10.00	12.50	25
SR-TP-22	41+600	RHS	78.20	41.53	32.47	21.8	45.73	31	16	15	SC	2.07	10.10	10.00	15
SR-TP-23	31+550	RHS	60.05	33.88	16.26	39.95	43.79	28	14	14	SC	2.13	11.40	14.60	20
SR-TP-24	19+100	RHS	89.95	65.2	47.28	10.05	42.67	43	22	21	SC	1.94	12.30	8.60	30
SR-TP-25	9+900	RHS	78.33	58.53	42.14	21.67	36.19	27	20	7	SM-SC	2.01	10.50	23.10	26
SR-TP-26	8+900	LHS	72.23	49.46	32.16	27.77	40.07	30	17	13	SC	2.06	10.20	13.05	20
SR-TP-27	18+700	LHS	83.87	40.05	28.99	16.13	54.88	40	20	20	SC	2.04	10.60	13.10	20
SR-TP-28	27+600	LHS	64.55	39.26	22.02	35.45	42.53	39	22	17	SC	1.98	10.50	11.00	20
SR-TP-29	37+040	LHS	88.99	34.1	20.22	11.01	68.77	23	14	9	SC	2.13	8.70	14.60	10
SR-TP-30	47+720	LHS	83.62	52.11	38.05	16.38	45.57	41	21	20	SC	2.02	10.40	10.60	30
SR-TP-31	58+600	LHS	80.10	49.47	33.96	19.9	46.14	33	18	15	SC	2.07	9.40	10.00	30
SR-TP-32	68+200	LHS	87.62	54.12	36.70	12.38	50.92	30	20	10	SC	1.94	11.90	8.60	30
SR-TP-33	77+800	LHS	82.32	51.07	26.34	17.68	55.98	29	23	6	SM-SC	2.02	8.70	24.10	21
SR-SR-TP-1	98+400	LHS	86.11	59.09	37.93	13.89	48.18	31	23	8	SC	2.00	9.20	9.00	10
SR-SR-TP-2	137+020	RHS	87.92	55.39	45.13	12.08	42.79	35	18	17	SC	2.09	11.30	10.50	25
SR-SR-TP-3	64+400	RHS	80.70	54.87	46.96	19.3	33.74	25	16	9	SC	1.93	11.30	8.30	10
SR-SR-TP-4	12+800	LHS	86.93	67.29	28.12	13.07	58.81	27	17	10	SC	2.01	10.10	10.10	10



The following observations can be made from the above test results conducted on of existing subgrade samples

- Liquid limit Values are in the range of 23% to 43%. All samples satisfying the LL limits <50%
- Plastic index ranges of 4% to 21%. All samples are satisfying the PI limits <25%
- Maximum Dry Density for all subgrade samples varies between 1.87 and 2.19 gm/cc. All Samples satisfying the MDD criterion (MDD>=1.75 gm/cc).
- OMC for existing subgrade samples varies Between 8.70 to 14.30.
- Free Swelling Index for existing subgrade samples varies from 05 to 32. All samples satisfying the FSI criterion (FSI<=50%)
- CBR Values are in the range of 5.60% to 29.30%

On the whole, it can be concluded that the existing subgrade is in fair condition. The laboratory test results for soil samples are presented in **Appendix-7** of this Report.

4.1.2 AGGREGATE

Aggregates to be used for sub-base, base, surface courses and concrete works have been collected from the crushers under operation from the existing quarries. The Table below represents the test results of the Aggregate and Sand Samples.

Table 26: Test Results of Aggregate Samples Details

S. No	Sample	Location (km)	Up/Dn	Aggregate Size	A.I.V (%)	Water Absorption (%)	Specific Gravity	Loose bulk density (kg/ltr)	Rodded bulk density (kg/ltr)	Stripping	Remark
1	SR-AQ-1	53+200	RHS	Dust	18	0.71	2.76	1.59	1.76	< 95% Coating	
				10 MM		0.54	2.82	1.46	1.62		
				20 MM		0.35	2.83	1.47	1.63		
2	SR-AQ-2	22+700	LHS	Dust	26	1.09	2.6	1.48	1.71	< 95% Coating	
				10 MM		0.97	2.66	1.34	1.50		
				20 MM		0.47	2.72	1.45	1.65		
3	SR-AQ-3	165+600	RHS	Dust	21	1.11	2.68	1.59	1.83	< 95% Coating	
				10 MM		0.70	2.81	1.42	1.57		
				20 MM		0.58	2.88	1.45	1.64		

Note: All the Aggregates samples are satisfying MoRTH requirements i.e., AIV (max. limit is 24% for BC-layer, Granular: 30%), Water Absorption (max. limit is 2%) except Stripping test (should be >95% retained coating).

4.1.3 SAND

Sand samples have been tested for its suitability. Summary of the test results carried out on these samples are presented in the following tables whilst the complete details are presented as an **Annexure-8** of this report.

Table 27: Test Results of Sand Samples Details

S No	Sample No	CHAINAGE	SIDE	10 mm Passing %	4.75 mm Passing %	2.36 mm Passing %	1.18mm Passing %	600mm Passing %	300mm Passing %	150mm Passing %	FM	ZONE
1	SR-SQ-1	53+200	LHS	100	97	92	77	51	15	3	2.65	ZONE-II
2	SR-SQ-2	64+100	LHS	100	100	98	88	60	15	2	2.38	ZONE-III
3	SR-SQ-3	85+450	LHS	100	94	87	74	51	15	3	2.77	ZONE-II

Note: Sample belongs to Zone-II & III of MORTH Specifications.

4.1.3.1 CORE RESULTS

The core samples as extracted at 42 locations were tested in the laboratory to find the engineering properties of BC/DBM materials.

The test results of the pavement cores are as presented below.

Table 28: Test Results of Pavement cores-BC Layers

Sl. No.	Name of Material	Core No.	Chainage	Direction	Carriage way lane	Lane	Distance from kerb m	Condition of Road	% of Bitumen Obtained (by extraction of core)		% Agg by Wt.of tatol Mix	Thickness of Specimen mm	DENSITY	Miximum Theoretical Sp.Gr.of Mix	% of Air Voids	Filler Asphalt Ratio (%)	% compaction	Gradation as per Morth	Remarks
									BC	Limits						0.075 mm			
1	BC	SR-C-1	71+400	RHS	MCW	Inner Lane	3.2 M	Inner Lane New Laying Outer Lane Old B.T	NO BC	As per MORTH 5th Revision Table no 500-17, Bitumen Content for BC grading - 1 is 5.2%	-	-	-	-	-	-	-	-	
2	BC	SR-C-2	64+100	RHS	Service Road	Inner Lane	2.4 M	Good	4.95		95.05	24.04	2.448	2.606	6.06	1.06	94	Grade-I	
3	BC	SR-C-3	61+400	RHS	MCW	Outer Lane	6.8 M	Rutting &Aligater Cracks	5.11		94.89	47.38	2.467	2.571	4.05	0.48	96	Grade-I	
4	BC	SR-C-4	51+550	RHS	MCW	Inner Lane	3.2 M	Rutting & Aligater Cracks	5.18		94.82	33.51	2.528	2.684	5.81	0.96	94	Grade-I	
5	BC	SR-C-5	41+600	RHS	MCW	Outer Lane	6.8 M	Good Section & Mild Ravelling	5.19		94.81	31.29	2.441	2.612	6.55	0.40	93	Grade-I	
6	BC	SR-C-6	31+550	RHS	MCW	Inner Lane	3.1 m	Good Section & Mild Ravelling	5.13		94.87	39.58	2.531	2.663	4.96	1.00	95	Grade-I	
7	BC	SR-C-7	19+100	RHS	MCW	Outer Lane	6.8 m	Good	5.19		94.81	62.27	2.478	2.567	3.47	0.28	97	Grade-I	
8	BC	SR-C-8	12+900	RHS	Service Road	Outer Lane	3.6 m	Good Section	5.21		94.79	35.34	2.354	2.482	5.16	1.07	95	Grade-I	
9	BC	SR-C-9	9+900	RHS	MCW	Inner Lane	3.0 m	Good Section& Over Lay	4.83		95.17	45.53	2.527	2.652	4.71	1.27	95	Grade-I	
10	BC	SR-C-10	8+900	LHS	MCW	Inner Lane	3.0 m	Poor & Aligater Cracks	5.09		94.91	24.67	2.451	2.580	5.00	0.91	95	Grade-I	
11	BC	SR-C-11	18+700	LHS	MCW	Outer Lane	6.9 m	Good Section	5.11		94.89	36.60	2.446	2.543	3.81	0.57	96	Grade-I	
12	BC	SR-C-12	27+900	LHS	MCW	Inner Lane	2.9 m	Good Section& Over Lay	5.20		94.80	37.21	2.456	2.597	5.43	0.88	95	Grade-I	
13	BC	SR-C-13	37+020	LHS	MCW	Inner Lane	2.9 m	Good Section	ITS				2.567						
14	BC	SR-C-14	37+020	LHS	MCW	Outer Lane	7.0 m	Good Section	ITS				2.537						
15	BC	SR-C-15	47+750	LHS	MCW	Outer Lane	6.7 m	Aligater Cracks	5.02		94.98	35.96	2.463	2.564	3.94	0.71	96	Grade-I	
16	BC	SR-C-16	58+000	LHS	MCW	Inner Lane	3.1 m	Raveling	5.20		94.80	42.84	2.506	2.594	3.39	0.33	97	Grade-I	
17	BC	SR-C-17	68+200	LHS	MCW	Outer Lane	6.9 m	Outer Lane Good & Inner Lane Cracks	5.17		94.83	41.36	2.510	2.610	3.83	0.59	96	Grade-I	
18	BC	SR-C-18	77+900	LHS	MCW	Inner Lane	3.0 m	Over Layng &Mild Rutiiiing	5.27		94.73	28.65	2.532	2.633	3.84	0.48	96	Grade-I	
19	BC	SR-C-19	86+600	LHS	MCW	Outer Lane	7.0 m	Good & Over Layng Section	5.26		94.74	31.09	2.547	2.647	3.78	0.39	96	not confirming to any grade	
20	BC	SR-C-20	96+300	LHS	MCW	Inner Lane	3.0 m	Aligater Cracks	4.93		95.07	34.06	2.478	2.582	4.03	0.63	96	Grade-I	
21	BC	SR-C-21	98+410	LHS	Service Road	Inner Lane	1.1 m	Good	5.25		94.75	29.74	2.439	2.529	3.56	0.79	96	Grade-I	
22	BC	SR-C-22	106+400	LHS	MCW	Inner Lane	3.0 m	Rutting & Bleeding	5.39		94.61	44.36	2.594	2.664	2.63	0.53	97	Grade-I	

Sl. No.	Name of Material	Core No.	Chainage	Direction	Carriage way lane	Lane	Distance from kerb m	Condition of Road	% of Bitumen Obtained (by extraction of core)		% Agg by Wt.of tatol Mix	Thickness of Specimen mm	DENSITY	Miximum Theoretical Sp.Gr.of Mix	% of Air Voids	Filler Asphalt Ratio (%)	% compaction	Gradation as per Morth	Remarks
									BC	Limits						0.075 mm			
23	BC	SR-C-23	116+200	LHS	MCW	Outer Lane	6.8 m	Raveeling	5.12		94.88	38.92	2.475	2.589	4.40	0.62	96	Grade-I	
24	BC	SR-C-24	126+050	LHS	MCW	Inner Lane	3.0 m	Raveeling	5.28		94.72	33.67	2.587	2.649	2.34	0.83	98	Grade-I	
25	BC	SR-C-25	135+900	LHS	MCW	Outer Lane	6.9 m	Good	5.20		94.80	72.62	2.585	2.663	2.93	0.45	97	Grade-I	
26	BC	SR-C-26	136+900	LHS	Service Road	Outer Lane	3.7 m	Good	5.30		94.70	26.52	2.414	2.488	2.97	0.58	97	Grade-I	
27	BC	SR-C-27	148+580	LHS	MCW	Inner Lane	3.0 m	Rutting & Ravelling	ITS				2.608						
28	BC	SR-C-28	148+580	LHS	MCW	Outer Lane	6.9 m	Mild Rutting & Ravelling	ITS				2.578						
29	BC-2	SR-C-29	156+600	LHS	MCW	Outer Lane	6.8 m	Ravelling & Mild Rutting	5.20		94.80	60.56	2.549	2.615	2.52	0.39		Grade-I	
30	BC	SR-C-30	164+900	LHS	MCW	Inner Lane	3.0 m	Ravelling & Rutting	5.36		94.64	41.80	2.597	2.694	3.60	0.48	96	Grade-I	
31	BC	SR-C-31	161+700	RHS	MCW	Outer Lane	6.9 m	Ravelling & Rutting	5.45		94.55	33.26	2.587	2.706	4.40	0.62	96	Grade-I	
32	BC	SR-C-32	151+600	RHS	MCW	Inner Lane	3.0 m	Ravelling & Rutting	5.94		94.06	27.38	2.456	2.571	4.47	0.50	96	Grade-I	
33	BC	SR-C-33	142+000	RHS	MCW	Outer Lane	6.8 m	Ravelling & Rutting	5.33		94.67	37.06	2.553	2.656	3.88	0.56	96	Grade-I	
34	BC	SR-C-34	131+040	RHS	MCW	Inner Lane	2.9 m	Ravelling & Bleeding	5.40		94.60	33.07	2.548	2.667	4.46	0.56	96	Grade-I	
35	BC	SR-C-35	121+650	RHS	MCW	Outer Lane	6.8 m	Rutting & Bleeding	5.28		94.72	54.56	2.569	2.654	3.20	0.48	97	Grade-I	
36	BC	SR-C-36	109+980	RHS	MCW	Inner Lane	3.0 m	Rutting & Bleeding	5.30		94.70	34.91	2.515	2.614	3.79	0.48	96	Grade-I	
37	BC	SR-C-37	99+780	RHS	MCW	Outer Lane	7.0 m	Ravelling	5.43		94.57	45.81	2.485	2.638	5.80	0.28	94	Grade-I	
38	BC	SR-C-38	91+700	RHS	MCW	Inner Lane	3.0 m	Bleeding & Rutting	5.45		94.55	32.44	2.563	2.659	3.61	0.52	96	Grade-I	
39	BC	SR-C-39	81+400	RHS	MCW	Inner Lane	3.0 m	DBM new Laying	ITS				-						
40	BC	SR-C-40	81+400	RHS	MCW	Inner Lane	1.2 m	DBM new Laying	ITS				-						
41	BC	SR-C-41	81+450	RHS	MCW	Outer Lane	6.9 m	Good	ITS				2.546						
42	BC	SR-C-42	81+450	RHS	MCW	Outer Lane	5.3 m	Good	ITS				2.529						

Observations:

- Binder content for BC: ranging from 4.83% to 5.94%. The MORTH Table 500-17 specifies the Bitumen content range is 5.2 ± 0.3 %. Majority of the sample satisfy for bitumen requirement.
- BC-Gradation results indicate the mix design: Grade I proportion.
- BC-Air Voids: ranging from 2.340% to 6.55% (MORTH Table-11, specifies 3% to 5%) 06 out of 33 samples is showing more Air Voids, 05 out of 33 sample is showing less Air Voids

- Compaction –More than 93% of Compaction is observed.
- Filler Asphalt Ratio– 12 out of 33 core samples have Filler –Asphalt ratio is within the specified limit of 0.6-1.2 (refer MORTH clause 505.3 or as per MS-2 (5.10).

Table 29: Test Results of Pavement cores-DBM Layers

Core No.	Chainage	Direction	Carriage way lane	Lane	Distance from kerb m	Condition of Road	% of Bitumen Obtained (by extraction of core)		% Agg by Wt.of tatol Mix	Thickness of Specimen mm	DENSITY	Mixiumum Theoretical Sp.Gr.of Mix (GMM)	% of Air Voids	Filler Asphalt Ratio (%)	% compaction	Gradation as per Morth	Remarks
							DBM	Limits						0.075 mm			
SR-C-1	71+400	RHS	MCW	Inner Lane	3.2 M	Inner Lane New Laying Outer Lane Old B.T	4.40	As per MORTH 5th Revision Table no 500-10, Bitumen Content for DBM grading - 2 is 4.5 %	95.60	55.87	2.516	2.676	5.98	0.36	94	Grade-II	
SR-C-2	64+100	RHS	Service Road	Inner Lane	2.4 M	Good	4.30		95.70	52.36	2.386	2.489	4.14	0.54	96	Grade-II	
SR-C-3	61+400	RHS	MCW	Outer Lane	6.8 M	Rutting &Aligater Cracks	4.36		95.64	55.42	2.424	2.560	5.31	0.32	95	Grade-II	
SR-C-4	51+550	RHS	MCW	Inner Lane	3.2 M	Rutting & Aligater Cracks	4.50		95.50	59.32	2.476	2.632	5.93	0.76	94	Grade-II	
SR-C-5	41+600	RHS	MCW	Outer Lane	6.8 M	Good Section & Mild Ravelling	4.11		95.89	64.65	2.409	2.591	7.02	0.30	93	Grade-II	
SR-C-6	31+550	RHS	MCW	Inner Lane	3.1 m	Good Section & Mild Ravelling	4.20		95.80	77.12	2.491	2.632	5.36	0.69	95	Grade-II	
SR-C-7	19+100	RHS	MCW	Outer Lane	6.8 m	Good	4.57		95.43	84.40	2.578	2.669	3.41	0.57	97	Grade-II	
SR-C-8	12+900	RHS	Service Road	Outer Lane	3.6 m	Good Section	4.00		96.00	85.73	2.391	2.473	3.32	0.71	97	Grade-II	
SR-C-9	9+900	RHS	MCW	Inner Lane	3.0 m	Good Section& Over Lay	4.03		95.97	62.23	2.454	2.594	5.40	0.52	95	Grade-II	
SR-C-10	8+900	LHS	MCW	Inner Lane	3.0 m	Poor & Aligater Cracks	3.96		96.04	50.37	2.434	2.561	4.96	0.61	95	Grade-II	
SR-C-11	18+700	LHS	MCW	Outer Lane	6.9 m	Good Section	4.31		95.69	90.30	2.524	2.624	3.81	0.44	96	Grade-II	
SR-C-12	27+900	LHS	MCW	Inner Lane	2.9 m	Good Section& Over Lay	4.11		95.89	53.27	2.473	2.605	5.07	0.32	95	Grade-II	
SR-C-13	37+020	LHS	MCW	Inner Lane	2.9 m	Good Section	ITS				2.498						
SR-C-14	37+020	LHS	MCW	Outer Lane	7.0 m	Good Section	ITS				2.485						

Core No.	Chainage	Direction	Carriage way lane	Lane	Distance from kerb m	Condition of Road	% of Bitumen Obtained (by extraction of core)		% Agg by Wt.of tatol Mix	Thickness of Specimen mm	DENSITY	Miximum Theoretical Sp.Gr.of Mix (GMM)	% of Air Voids	Filler Asphalt Ratio (%)	% compaction	Gradation as per Morth	Remarks
							DBM	Limits						0.075 mm			
SR-C-15	47+750	LHS	MCW	Outer Lane	6.7 m	Aligater Cracks	4.08		95.92	65.50	2.437	2.573	5.29	0.77	95	Grade-II	
SR-C-16	58+000	LHS	MCW	Inner Lane	3.1 m	Raveling	4.45		95.55	68.99	2.439	2.558	4.65	0.35	95	Grade-II	
SR-C-17	68+200	LHS	MCW	Outer Lane	6.9 m	Outer Lane Good & Inner Lane Cracks	4.20		95.80	76.99	2.422	2.538	4.57	0.63	95	Grade-II	
SR-C-18	77+900	LHS	MCW	Inner Lane	3.0 m	Over Layng &Mild Rutiiiing	4.15		95.85	69.55	2.443	2.503	2.40	0.75	98	Grade-II	
SR-C-19	86+600	LHS	MCW	Outer Lane	7.0 m	Good & Over Layng Section	4.24		95.76	94.66	2.513	2.633	4.56	0.48	95	Grade-II	
SR-C-20	96+300	LHS	MCW	Inner Lane	3.0 m	Aligater Cracks	4.00		96.00	62.21	2.459	2.564	4.10	0.76	96	Grade-II	
SR-C-21	98+410	LHS	Service Road	Inner Lane	1.1 m	Good	4.36		95.64	54.05	2.464	2.567	4.01	0.70	96	Grade-II	
SR-C-22	106+400	LHS	MCW	Inner Lane	3.0 m	Rutting & Bleeding	4.50		95.50	67.92	2.497	2.646	5.63	0.89	94	Grade-II	
SR-C-23	116+200	LHS	MCW	Outer Lane	6.8 m	Raveling	4.10		95.90	55.45	2.491	2.606	4.41	0.53	96	Grade-II	
SR-C-24	126+050	LHS	MCW	Inner Lane	3.0 m	Raveling	4.39		95.61	61.94	2.593	2.692	3.68	0.30	96	Grade-II	
SR-C-25	135+900	LHS	MCW	Outer Lane	6.9 m	Good	4.25		95.75	69.71	2.567	2.667	3.75	0.57	96	Grade-II	
SR-C-26	136+900	LHS	Service Road	Outer Lane	3.7 m	Good	4.34		95.66	79.49	2.554	2.634	3.04	0.65	97	Grade-II	
SR-C-27	148+580	LHS	MCW	Inner Lane	3.0 m	Rutting & Ravelling	ITS				2.553						
SR-C-28	148+580	LHS	MCW	Outer Lane	6.9 m	Mild Rutting & Ravelling	ITS				2.539						
SR-C-29	156+600	LHS	MCW	Outer Lane	6.8 m	Ravelling & Mild Rutting	4.12		95.88	109.29	2.604	2.671	2.51	0.72	97	Grade-II	
SR-C-30	164+900	LHS	MCW	Inner Lane	3.0 m	Ravelling & Rutting	4.20		95.80	66.89	2.518	2.625	4.08	0.88	96	Grade-II	
SR-C-31	161+700	RHS	MCW	Outer Lane	6.9 m	Ravelling & Rutting	4.15		95.85	82.36	2.586	2.678	3.44	0.77	97	Grade-II	
SR-C-32	151+600	RHS	MCW	Inner Lane	3.0 m	Ravelling & Rutting	4.60		95.40	64.52	2.478	2.631	5.82	1.15	94	Grade-II	
SR-C-33	142+000	RHS	MCW	Outer Lane	6.8 m	Ravelling & Rutting	4.20		95.80	60.09	2.615	2.696	3.00	0.71	97	Grade-II	

Core No.	Chainage	Direction	Carriage way lane	Lane	Distance from kerb m	Condition of Road	% of Bitumen Obtained (by extraction of core)		% Agg by Wt.of tatol Mix	Thickness of Specimen mm	DENSITY	Miximum Theoretical Sp.Gr.of Mix (GMM)	% of Air Voids	Filler Asphalt Ratio (%)	% compaction	Gradation as per Morth	Remarks
							DBM	Limits						0.075 mm			
SR-C-34	131+040	RHS	MCW	Inner Lane	2.9 m	Ravelling & Bleeding	4.36		95.64	68.79	2.567	2.687	4.47	0.56	96	Grade-II	
SR-C-35	121+650	RHS	MCW	Outer Lane	6.8 m	Rutting & Bleeding	4.33		95.67	80.45	2.565	2.662	3.64	0.88	96	Grade-II	
SR-C-36	109+980	RHS	MCW	Inner Lane	3.0 m	Rutting & Bleeding	4.40		95.60	40.11	2.578	2.694	4.31	0.79	96	Grade-II	
SR-C-37	99+780	RHS	MCW	Outer Lane	7.0 m	Ravelling	4.47		95.53	55.78	2.484	2.598	4.39	0.43	96	Grade-II	
SR-C-38	91+700	RHS	MCW	Inner Lane	3.0 m	Bleeding & Rutting	4.60		95.40	70.85	2.507	2.627	4.57	0.28	95	Grade-II	
SR-C-39	81+400	RHS	MCW	Inner Lane	3.0 m	DBM new Laying	ITS				2.545						
SR-C-40	81+400	RHS	MCW	Inner Lane	1.2 m	DBM new Laying	ITS				2.553						
SR-C-41	81+450	RHS	MCW	Outer Lane	6.9 m	Good	iTS				2.456						
SR-C-42	81+450	RHS	MCW	Outer Lane	5.3 m	Good	ITS				2.478						

Observations:

- Binder content for DBM: ranging from 3.96% to 4.60%. The MORTH Table 500-10 specifies the Bitumen content range is 4.5 ± 0.3 %. only 11-sample is showing less bitumen content.
- DBM-Gradation results indicate the mix design: Grade II proportion.
- DBM-Air Voids: ranging from 2.40% to 7.02% (MORTH Table-11, specifies 3% to 5%).10 out of 34 samples is showing more Air Voids, 02 out of 34 sample is showing less Air Voids
- Compaction –More than 93% of Compaction is observed.
- Filler Asphalt Ratio– 18 out of 34 tested core samples have Filler –Asphalt ratio is within the specified limit of 0.6-1.2 (refer MORTH clause 505.3 or as per MS-2 (5.10)).

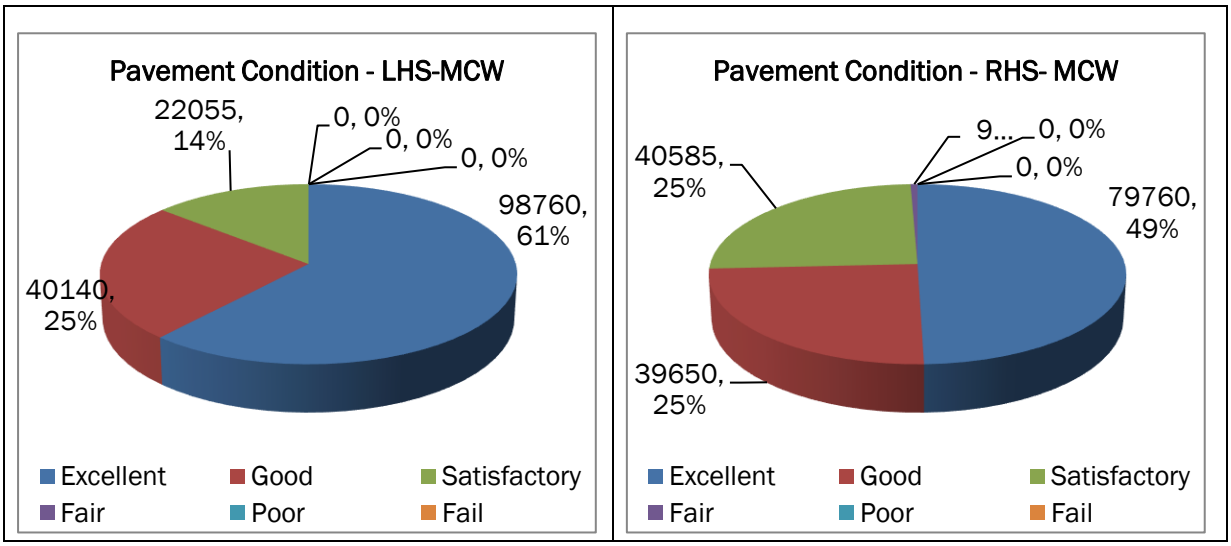
4.2 PAVEMENT CONDITION

The distresses in pavement surface have been captured on the project corridor for each lane separately by NSV survey. Pavement Condition rating (PCI) as per IRC:82-2023 from the data collected for each km length in each direction has been presented in the **Annexure-2** of this report.

The project corridor has been provided with flexible pavement over entire length including service roads. Rigid pavement is only provided at Toll Plaza.

- **For Main Carriageway:**

The Pavement condition rating (PCI) is presented in Pie-chart from Excellent to Fail are as below



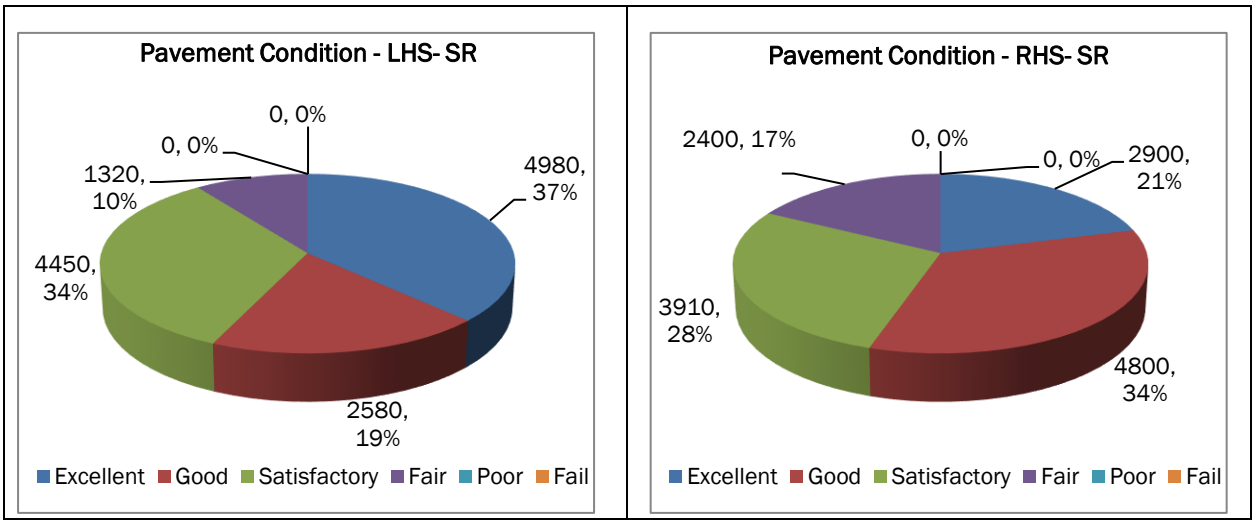
The condition rating for Main carriageway is presented in table as below

Overall PCI		Condition Rating	Length (km)	
>	<=		LHS	RHS
90	100	Excellent	98.760	79.760
80	90	Good	40.140	39.650
60	80	Satisfactory	22.055	40.585
40	60	Fair	-	0.960
20	40	Poor	-	-
0	20	Fail	-	-
Under Construction			-	-
Toll Plaza			0.830	0.830

From NSV pavement condition (PCI) analysis, entire length falls under Excellent to Fair.

➢ **For Service Road:**

The Pavement condition rating (PCI) is presented in Pie-chart from Excellent to Fail are as below



The condition rating for Main carriageway is presented in table as below

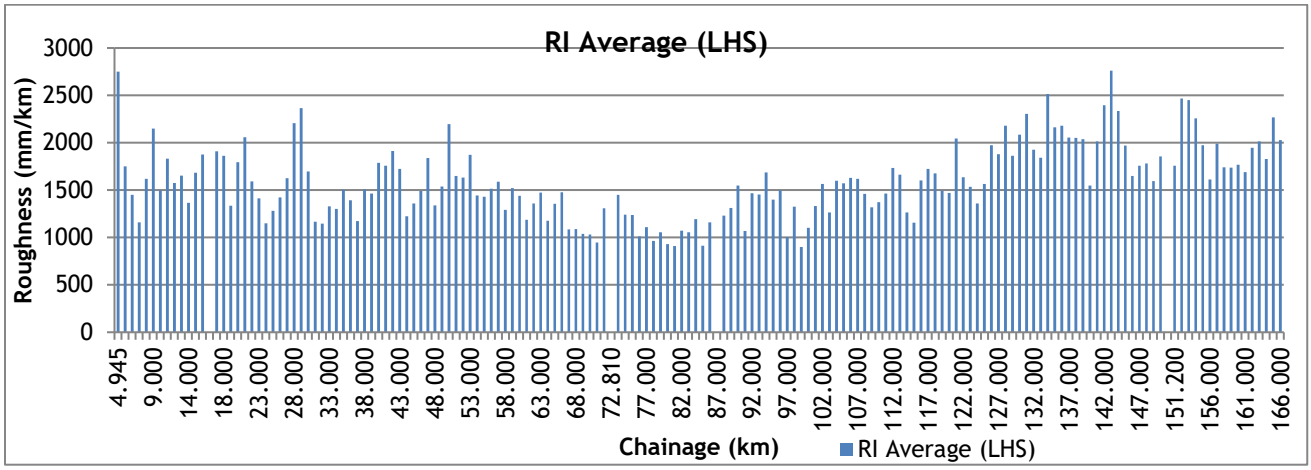
Overall PCI		Condition Rating	Length (km)	
>	<=		LHS	RHS
90	100	Excellent	4.980	2.900
80	90	Good	2.580	4.800
60	80	Satisfactory	4.450	3.910
40	60	Fair	1.320	2.400
20	40	Poor	-	-
0	20	Fail	-	-

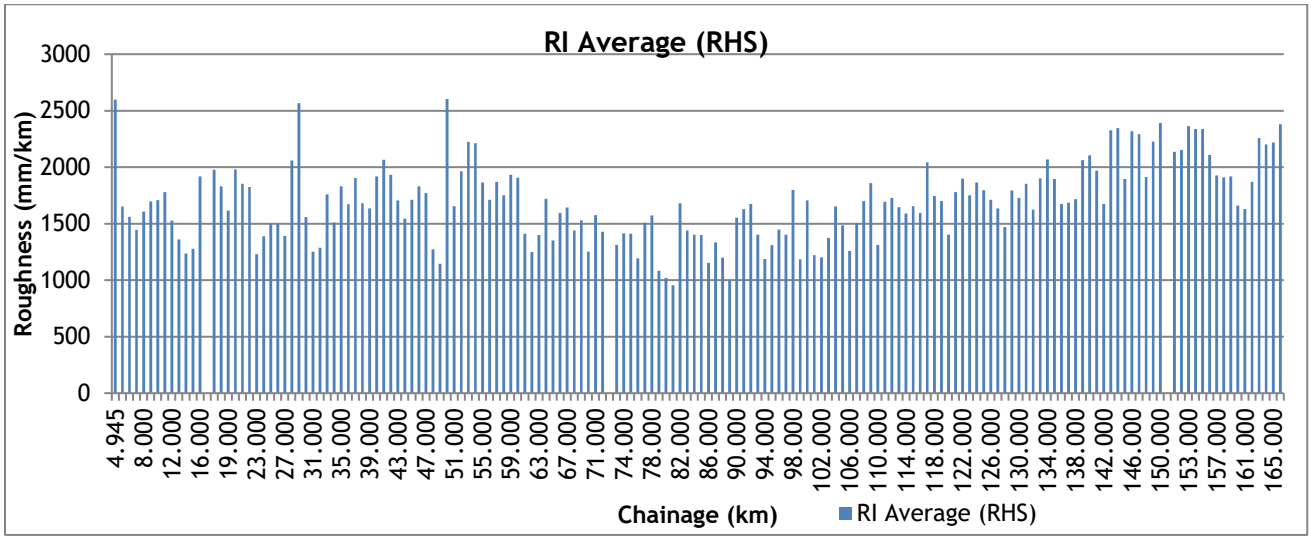
From NSV pavement condition (PCI) analysis, entire length falls under Excellent to Fair

4.3 ROUGHNESS

❖ **MAIN CARRIAGEWAY**

The Roughness represented in Bar charts for the main carriageway are as presented below:





Based on the above, considering the Km-stone reference system the summary of direction-wise km

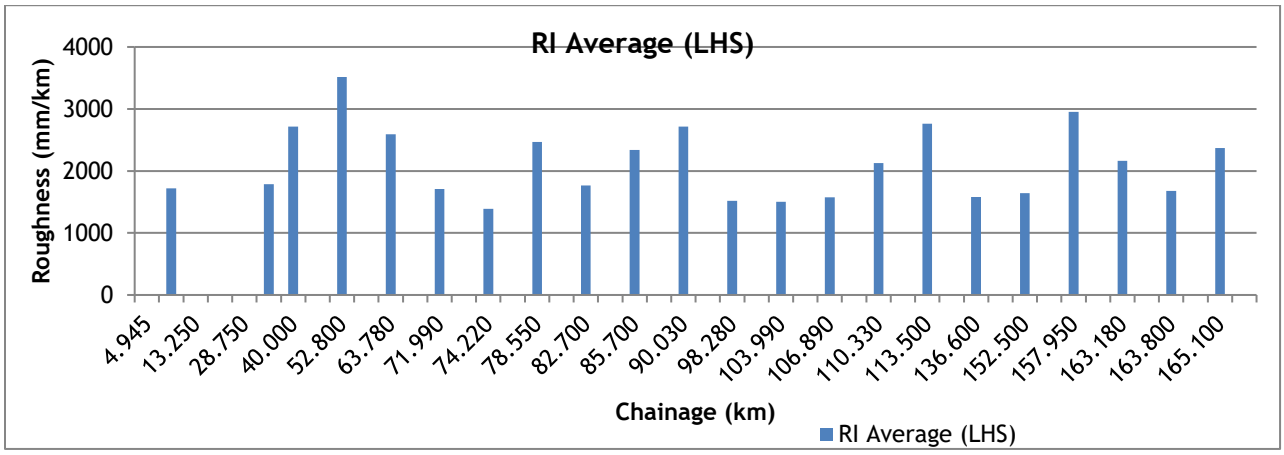
lengths having varying roughness values are as presented below:

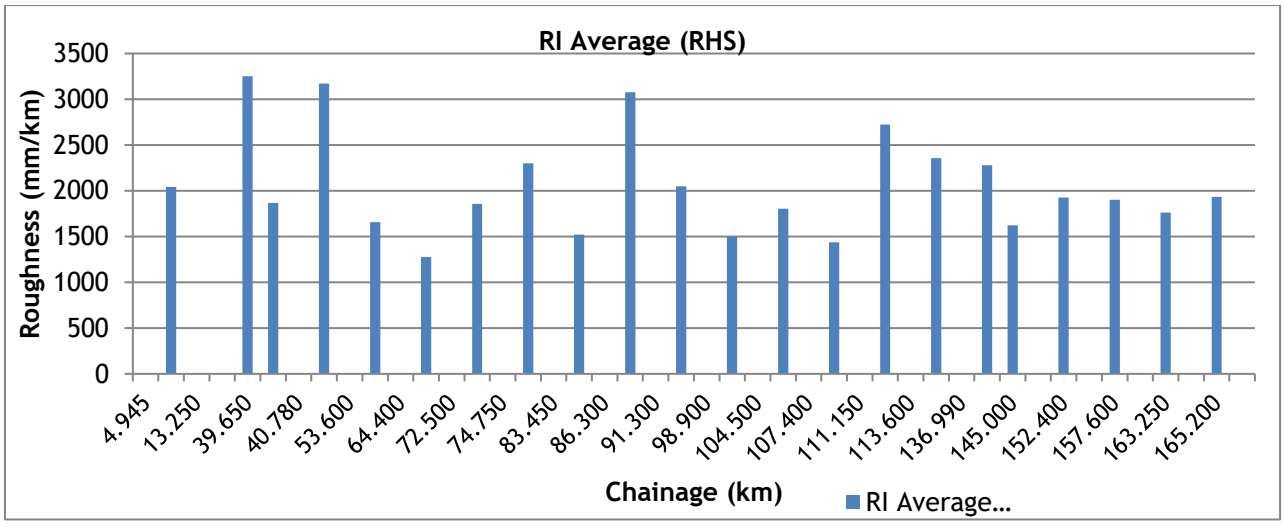
Roughness Range (mm/km)	MCW-Length in Km	
	LHS	RHS
Less than 2000	135.170	135.410
2000 - 2400	20.730	23.490
2400 -2750	3.000	2.055
More Than 2750	1.055	0.000
Toll Plaza & Overlay work progress length	1.830	0.830

From the above charts and tables, the project road requires functional overlay for a length of LHS: 1.055km as roughness Index (RI) is more than minimum requirement of Schedule-K, i.e., 2750mm/km.

❖ **SERVICE ROAD**

Bar diagrams showing the Kilometer wise roughness along the project road are presented below:





Roughness Range (mm/km)	Service Road--Length in Km	
	LHS	RHS
Less than 2000	6.350	8.370
2000 – 2400	2.430	2.940
2400 -2750	3.010	0.300
More Than 2750	1.540	2.400

From the above charts, 1.540 km in LHS direction and 2.400 km in RHS direction of the project road requires functional overlay as roughness Index (RI) is more than minimum requirement of Schedule-K, i.e., 2750mm/km.

4.4 FWD ANALYSIS AND ASSESSMENT OF OVERLAY REQUIREMENT

By looking at the age and condition and performance of the pavement following different set of ranges have been used while finalizing the modulus values:

Layer	Bituminous Layers	Granular Layer Modulus	Subgrade
Modulus Value (MPa)	750-3000	100-500	50-100

Bituminous layer Moduli obtained from back calculations shall be corrected for a standard pavement temperature of 35ºC using given equations. Whereas, for back calculated moduli values obtained for granular and subgrade layer shall be corrected for seasonal variations (using winter and summer equations). As FWD tests, performed, during the summer, seasonal correction factor is applied for granular and subgrade layer. The design moduli (15^{th} percentile moduli) of in-service layers for each homogenous section are given in table below.

❖ **MAIN CARRIAGEWAY**

Table 30: Summary of Design Moduli of different layers – LHS CW

S.No	Side	From	To	Length (Km)	15th Percentile MR values		
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)
1	LHS	5.00	7.15	2.15	3642	265	77
2	LHS	7.15	9.90	2.75	3578	365	77
3	LHS	9.90	12.30	2.40	3668	353	77
4	LHS	12.30	15.30	3.00	3347	280	77
5	LHS	15.30	17.05	1.75	2626	213	77
6	LHS	17.05	17.40	0.35			
7	LHS	17.40	18.30	0.90			
8	LHS	18.30	20.30	2.00	2628	313	77
9	LHS	20.30	23.30	3.00	2394	140	77

S.No	Side	From	To	Length (Km)	15th Percentile MR values		
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)
10	LHS	23.30	27.00	3.70	2602	343	77
11	LHS	27.00	29.90	2.90	2598	330	77
12	LHS	29.90	33.00	3.10	2590	366	77
13	LHS	33.00	36.15	3.15	2517	352	77
14	LHS	36.15	39.15	3.00	2763	355	77
15	LHS	39.15	41.45	2.30	2787	250	77
16	LHS	41.45	44.15	2.70	2785	350	77
17	LHS	44.15	46.90	2.75	2733	358	77
18	LHS	46.90	50.15	3.25	2764	244	77
19	LHS	50.15	53.18	3.03	2738	353	77
20	LHS	53.18	55.15	1.98	2836	334	77
21	LHS	55.15	58.90	3.75	2859	269	77
22	LHS	58.90	61.15	2.25	2864	334	77
23	LHS	61.15	63.75	2.60	2888	330	77
24	LHS	63.75	66.45	2.70	2859	355	77
25	LHS	66.45	69.15	2.70	2620	367	77
26	LHS	69.15	71.75	2.60	2471	363	77
27	LHS	71.75	72.81	1.06	2443	207	77
28	LHS	72.81	73.05	0.24			
29	LHS	73.05	73.65	0.60			
30	LHS	73.65	77.45	3.80	3088	359	77
31	LHS	77.45	80.30	2.85	3122	367	77
32	LHS	80.30	83.15	2.85	2666	362	77
33	LHS	83.15	85.60	2.45	2449	341	77
34	LHS	85.60	87.45	1.85	2181	335	77
35	LHS	87.45	89.45	2.00	2345	244	77
36	LHS	89.45	92.00	2.55	2115	332	77
37	LHS	92.00	94.15	2.15	2659	293	77
38	LHS	94.15	97.15	3.00	2692	256	77
39	LHS	97.15	99.90	2.75	2677	360	77
40	LHS	99.90	101.90	2.00	2650	317	77
41	LHS	101.90	103.90	2.00	2699	125	77
42	LHS	103.90	106.30	2.40	2575	307	77
43	LHS	106.30	108.30	2.00	2560	361	77
44	LHS	108.30	110.30	2.00	2830	368	77
45	LHS	110.30	114.00	3.70	2883	334	77
46	LHS	114.00	116.00	2.00	2928	366	77
47	LHS	116.00	118.75	2.75	2879	362	77
48	LHS	118.75	121.15	2.40	2922	365	77
49	LHS	121.15	123.90	2.75	3008	345	77
50	LHS	123.90	126.45	2.55	3175	361	77
51	LHS	126.45	129.00	2.55	3153	354	77
52	LHS	129.00	131.45	2.45	3182	368	77
53	LHS	131.45	135.15	3.70	3164	368	77
54	LHS	135.15	138.30	3.15	3102	365	77
55	LHS	138.30	140.25	1.95	3134	365	77
56	LHS	140.25	142.30	2.05	3063	367	77
57	LHS	142.30	144.90	2.60	3115	364	77
58	LHS	144.90	147.00	2.10	3123	368	77
59	LHS	147.00	149.00	2.00	3145	369	77
60	LHS	149.00	150.96	1.96	3091	367	77
61	LHS	150.96	151.20	0.24	Toll Plaza		
62	LHS	151.20	153.15	1.95	3126	367	77

S.No	Side	From	To	Length (Km)	15th Percentile MR values		
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)
63	LHS	153.15	156.45	3.30	3295	364	77
64	LHS	156.45	158.90	2.45	3267	365	77
65	LHS	158.90	162.45	3.55	3267	364	77
66	LHS	162.45	164.45	2.00	3322	366	77
67	LHS	164.45	166.73	2.28	3250	363	77

Table 31: Summary of Design Moduli of different layers – RHS CW

S.No	Side	From	To	Length (Km)	15th Percentile MR values		
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)
1	RHS	5.00	6.75	1.75	3272	354	77
2	RHS	6.75	8.75	2.00	3325	359	77
3	RHS	8.75	10.75	2.00	2851	291	77
4	RHS	10.75	12.90	2.15	2846	282	77
5	RHS	12.90	14.90	2.00	2941	342	77
6	RHS	14.90	17.05	2.15	2959	329	77
7	RHS	17.05	17.40	0.35			
8	RHS	17.40	19.30	1.90	2969	350	77
9	RHS	19.30	22.45	3.15	2190	204	77
10	RHS	22.45	24.90	2.45	2646	184	77
11	RHS	24.90	26.90	2.00	2759	360	77
12	RHS	26.90	30.30	3.40	2667	187	77
13	RHS	30.30	32.75	2.45	2713	349	77
14	RHS	32.75	35.30	2.55	2795	349	77
15	RHS	35.30	38.90	3.60	2577	336	77
16	RHS	38.90	40.90	2.00	2545	121	77
17	RHS	40.90	43.75	2.85	2538	262	77
18	RHS	43.75	45.75	2.00	2571	353	77
19	RHS	45.75	48.00	2.25	2487	148	77
20	RHS	48.00	50.90	2.90	2550	309	77
21	RHS	50.90	53.18	2.28	2520	361	77
22	RHS	53.18	55.15	1.98	2285	161	77
23	RHS	55.15	57.75	2.60	2540	317	77
24	RHS	57.75	59.75	2.00	2557	249	77
25	RHS	59.75	62.15	2.40	2824	238	77
26	RHS	62.15	64.75	2.60	2540	240	77
27	RHS	64.75	67.15	2.40	2574	312	77
28	RHS	67.15	69.15	2.00	2564	250	77
29	RHS	69.15	71.45	2.30	2572	340	77
30	RHS	71.45	72.81	1.36	2542	364	77
31	RHS	72.81	73.05	0.24			
32	RHS	73.05	73.65	0.60			
33	RHS	73.65	77.30	3.65	2739	357	77
34	RHS	77.30	79.63	2.33	2651	327	77
35	RHS	79.63	81.30	1.67	2734	203	77
36	RHS	81.30	83.45	2.15	3106	358	77
37	RHS	83.45	85.90	2.45	3187	346	77
38	RHS	85.90	88.00	2.10	3204	359	77
39	RHS	88.00	90.15	2.15	3119	364	77
40	RHS	90.15	92.75	2.60	3124	276	77

S.No	Side	From	To	Length (Km)	15th Percentile MR values		
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)
41	RHS	92.75	95.15	2.40	3096	328	77
42	RHS	95.15	98.00	2.85	3134	333	77
43	RHS	98.00	101.30	3.30	2840	128	77
44	RHS	101.30	104.90	3.60	2637	357	77
45	RHS	104.90	107.00	2.10	2906	362	77
46	RHS	107.00	110.15	3.15	3029	308	77
47	RHS	110.15	113.90	3.75	2747	343	77
48	RHS	113.90	117.00	3.10	3039	360	77
49	RHS	117.00	119.00	2.00	2990	362	77
50	RHS	119.00	121.00	2.00	3071	363	77
51	RHS	121.00	123.45	2.45	2505	356	77
52	RHS	123.45	125.45	2.00	2511	365	77
53	RHS	125.45	127.45	2.00	2486	370	77
54	RHS	127.45	130.15	2.70	2486	366	77
55	RHS	130.15	132.90	2.75	2516	273	77
56	RHS	132.90	135.30	2.40	2499	366	77
57	RHS	135.30	137.90	2.60	2491	349	77
58	RHS	137.90	140.30	2.40	2427	364	77
59	RHS	140.30	142.45	2.15	2501	367	77
60	RHS	142.45	144.45	2.00	2491	365	77
61	RHS	144.45	148.15	3.70	2511	366	77
62	RHS	148.15	150.96	2.81	2536	365	77
63	RHS	150.96	151.20	0.24			
64	RHS	151.20	153.30	2.10	3143	358	77
65	RHS	153.30	155.45	2.15	3209	366	77
66	RHS	155.45	157.75	2.30	3142	368	77
67	RHS	157.75	160.30	2.55	3202	363	77
68	RHS	160.30	162.45	2.15	3198	367	77
69	RHS	162.45	164.45	2.00	3180	367	77
70	RHS	164.45	166.73	2.28	3159	365	77

Observations on FWD Results

It can be noticed from the above table that the layer moduli for the three layers are varying along the length and direction. The MR value for BT layer is 2115 Mpa to 2190 Mpa in LHS & 3325 Mpa to 2589 Mpa in RHS Carriageway. The MR value for Granular Layers is 125 Mpa to 369 Mpa in LHS & 121 Mpa to 370 Mpa in RHS Carriageway. Similarly, the MR value for Subgrade Layer is 77 Mpa in LHS & 77 Mpa RHS Carriageway.

❖ **SERVICE ROAD**

Table 32: Summary of Design Moduli of different layers – LHS Service Road

S.No	Side	From	To	Length (Km)	15th Percentile MR values			Remarks
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)	
1	LHS	5.00	12.75	7.75	2689	302	77	No Service Road
2	LHS	12.75	13.25	0.50				No Overlay
3	LHS	13.25	28.55	15.30				No Service Road
4	LHS	28.55	28.75	0.20				No data

S.No	Side	From	To	Length (Km)	15th Percentile MR values			Remarks
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)	
5	LHS	28.75	39.00	10.25				No Service Road
6	LHS	39.00	40.70	1.70				No Overlay
7	LHS	40.70	52.80	12.10				No Service Road
8	LHS	52.80	53.60	0.80				No Overlay
9	LHS	53.60	63.78	10.18				No Service Road
10	LHS	63.78	64.40	0.62				No Overlay
11	LHS	64.40	71.99	7.59				No Service Road
12	LHS	71.99	72.50	0.51				No Overlay
13	LHS	72.50	74.22	1.72				No Service Road
14	LHS	74.22	74.75	0.53	3164	235	77	No Overlay
15	LHS	74.75	78.55	3.80				No Service Road
16	LHS	78.55	79.35	0.80				No Overlay
17	LHS	79.35	82.70	3.35				No Service Road
18	LHS	82.70	83.45	0.75				No Overlay
19	LHS	83.45	85.70	2.25				No Service Road
20	LHS	85.70	86.32	0.62				No Overlay
21	LHS	86.32	90.03	3.71				No Service Road
22	LHS	90.03	90.92	0.89				No Overlay
23	LHS	90.92	98.28	7.36				No Service Road
24	LHS	98.28	98.87	0.59	2604	302	77	No Overlay
25	LHS	98.87	103.99	5.12				No Service Road
26	LHS	103.99	104.43	0.44				No Overlay
27	LHS	104.43	106.89	2.46				No Service Road
28	LHS	106.89	107.40	0.51				No Overlay
29	LHS	107.40	110.33	2.93				No Service Road
30	LHS	110.33	111.12	0.79				No Overlay
31	LHS	111.12	113.30	2.18				No Service Road
32	LHS	113.30	113.50	0.20				No data
33	LHS	113.50	113.82	0.32				No Overlay
34	LHS	113.82	136.60	22.78				No data
35	LHS	136.60	136.95	0.35				No Overlay
36	LHS	136.95	152.50	15.55				No data
37	LHS	152.50	153.05	0.55				No Overlay
38	LHS	153.05	157.95	4.90	2660	365	77	No data
39	LHS	157.95	158.37	0.42				No Overlay
40	LHS	158.37	163.18	4.81				No data
41	LHS	163.18	163.60	0.42				No Overlay
42	LHS	163.60	163.80	0.20				No data
43	LHS	163.80	164.42	0.62				No Overlay
44	LHS	164.42	165.10	0.68				No data
45	LHS	165.10	165.70	0.60				No Overlay
46	LHS	165.70	166.73	1.03				No data

Table 33: Summary of Design Moduli of different layers – RHS Service Road

S.No	Side	From	To	Length (Km)	15th Percentile MR values			Remarks
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)	
1	RHS	5.00	12.75	7.75	2673	346	77	No Service Road
2	RHS	12.75	13.25	0.50				No Overlay
3	RHS	13.25	28.55	15.30				No Service Road
4	RHS	28.55	28.70	0.15				Under Construction
5	RHS	28.70	38.67	9.97				No Service Road
6	RHS	38.67	39.20	0.53				No Service Road
7	RHS	39.20	39.65	0.45				Under Construction
8	RHS	39.65	40.78	1.13				No Overlay
9	RHS	40.78	41.04	0.26				No Service Road
10	RHS	41.04	52.80	11.76				No Service Road
11	RHS	52.80	53.60	0.80				No Overlay
12	RHS	53.60	63.80	10.20				No Service Road
13	RHS	63.80	64.40	0.60				No Overlay
14	RHS	64.40	71.95	7.55				No Service Road
15	RHS	71.95	72.50	0.55	2707	232	77	No Overlay
16	RHS	72.50	74.20	1.70				No Service Road
17	RHS	74.20	74.75	0.55				No Overlay
18	RHS	74.75	82.65	7.90				No Service Road
19	RHS	82.65	83.45	0.80				No Overlay
20	RHS	83.45	85.31	1.86				No Service Road
21	RHS	85.31	85.60	0.29				No Service Road
22	RHS	85.60	86.30	0.70				No Overlay
23	RHS	86.30	90.05	3.75				No Service Road
24	RHS	90.05	91.30	1.25				No Overlay
25	RHS	91.30	98.30	7.00				No Service Road
26	RHS	98.30	98.90	0.60				No Overlay
27	RHS	98.90	104.00	5.10				No Service Road
28	RHS	104.00	104.50	0.50				No Overlay
29	RHS	104.50	106.90	2.40				No Service Road
30	RHS	106.90	107.40	0.50				No Overlay
31	RHS	107.40	110.30	2.90				No Service Road
32	RHS	110.30	110.70	0.40				No Data
33	RHS	110.70	111.15	0.45				No Overlay
34	RHS	111.15	113.30	2.15	2856	325	77	No Service Road
35	RHS	113.30	113.60	0.30				No Overlay
36	RHS	113.60	136.58	22.98				No Service Road
37	RHS	136.58	136.99	0.41				No Overlay
38	RHS	136.99	144.37	7.38				No Service Road
39	RHS	144.37	144.70	0.33				No Data
40	RHS	144.70	145.40	0.70				No Overlay
41	RHS	145.40	152.40	7.00				No Service Road
42	RHS	152.40	152.70	0.30				No Data
43	RHS	152.70	153.00	0.30				No Overlay

S.No	Side	From	To	Length (Km)	15th Percentile MR values			Remarks
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)	
44	RHS	153.00	157.60	4.60				No Service Road
45	RHS	157.60	158.15	0.55				No Data
46	RHS	158.15	158.37	0.22				No Overlay
47	RHS	158.37	163.25	4.88				No Service Road
48	RHS	163.25	164.42	1.17				No Overlay
49	RHS	164.42	165.20	0.78				No Service Road
50	RHS	165.20	165.70	0.50				No Overlay
51	RHS	165.70	166.73	1.03				No Service Road

Observations on FWD Results

It can be noticed from the above table that the layer moduli for the three layers are varying along the length and direction. The MR value for BT layer is 2604 Mpa to 3164 Mpa in LHS & 2673 Mpa to 2856 Mpa in RHS Carriageway. The MR value for Granular Layers is 235 Mpa to 365 Mpa in LHS & 232 Mpa to 346 Mpa in RHS Carriageway. Similarly, the MR value for Subgrade Layer is 77 Mpa to 77 Mpa in LHS & 77 Mpa to 77 Mpa in RHS Carriageway.

4.5 STRUCTURES

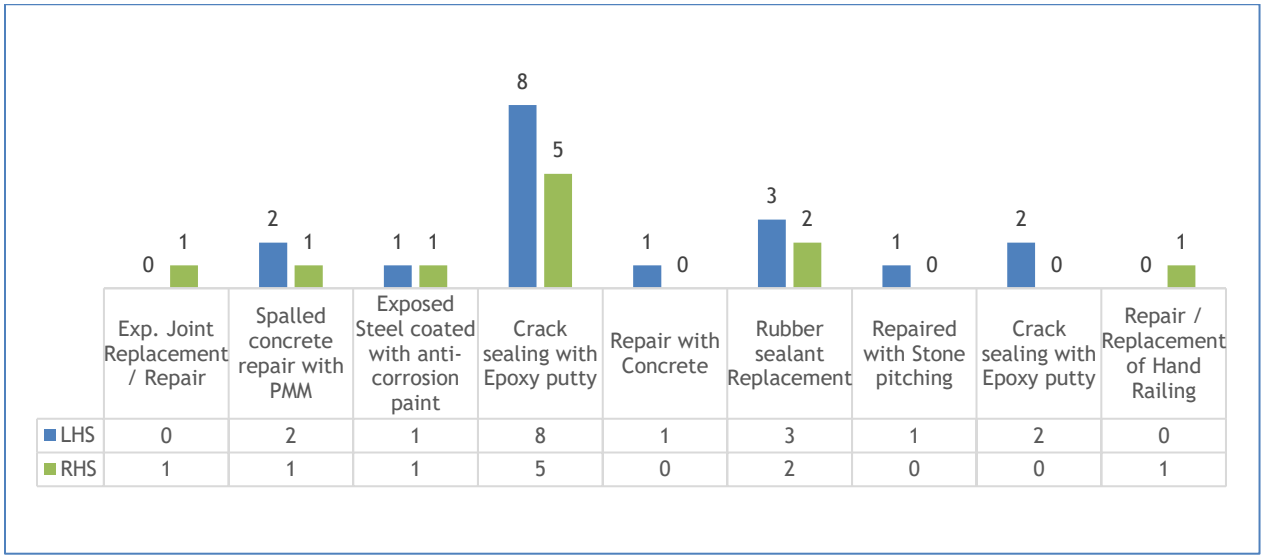
Inventory and asset condition all the existing structures falling within project road have been verified as per IRC: SP-35 procedures and guidelines with following field surveys

- Inventory of existing highway bridges / structures
- Visual condition survey of existing highway bridges / structures

Each and every structure has been verified at site and detailed inventory and condition survey is presented in **Appendix-8** of this report.

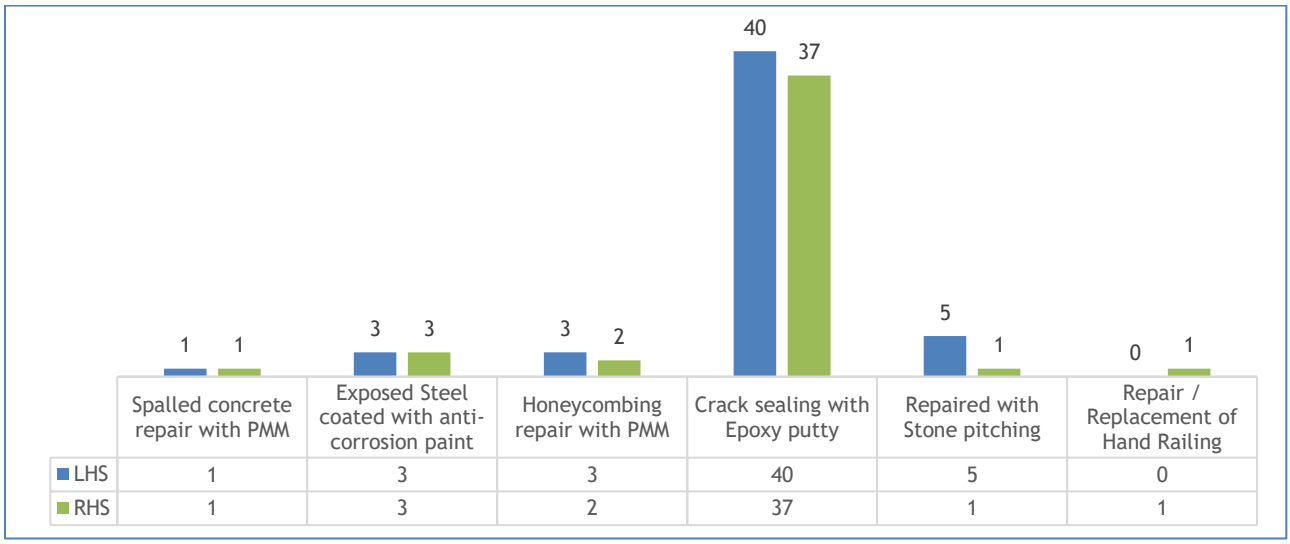
Maintenance of major and Minor structures includes the following

Type of repairs at number of locations for major structures



	Exp. Joint Replacement / Repair	Spalled concrete repair with PMM	Exposed Steel coated with anti-corrosion paint	Crack sealing with Epoxy putty	Repair with Concrete	Rubber sealant Replacement	Repaired with Stone pitching	Crack sealing with Epoxy putty	Repair / Replacement of Hand Railing
LHS	0	2	1	8	1	3	1	2	0
RHS	1	1	1	5	0	2	0	0	1

Type of repairs at number of locations for minor structures



	Spalled concrete repair with PMM	Exposed Steel coated with anti-corrosion paint	Honeycombing repair with PMM	Crack sealing with Epoxy putty	Repaired with Stone pitching	Repair / Replacement of Hand Railing
LHS	1	3	3	40	5	0
RHS	1	3	2	37	1	1

Inventory and condition details for all structures is presented in **Appendix-8** of this Report. However, Sample Inventory and Condition survey details for few major structures are as follows:

Chainage: 18+270
General Description
LHS MCW (New)

- Type of Structure : ROB
- Span Arrangement : 14+28+46.7+14 m
- Total length of Structure : 102.7 m
- Total deck width of Structure : 14 m
- Type of Foundation : Not Visible
- Type of Substructure (Abutment & Pier) : RCC Wall type
- Type of Superstructure : RCC Girder, PSC Girder & Steel Girder
- Type of Bearing : Pot PTFE
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Expansion joints partially filled with silt & debris.
- ✓ Rubber sealant damaged in Exp.joint on Abutment A-2.
- ✓ Vertical cracks observed on approach span Girders. Previous crack sealing works observed on these girders.
- ✓ Cracks observed on all the Piers, Pier caps, Abutments and as well as Abutment caps.
- ✓ Hairline cracks observed on Girder G-1 from shoulder side in Span-1 near to Pier P-1.
- ✓ Minor cracks observed on pedestal - 1 & 2 from median side on Pier P-2 direction towards Span-3.
- ✓ Cracks observed on soffit of deck slab near Pier P-3 in Span-3.
- ✓ Cracks observed on soffit of deck slab near Pier P-3 in Span-4.












Chainage: 18+270
General Description
RHS MCW (New)

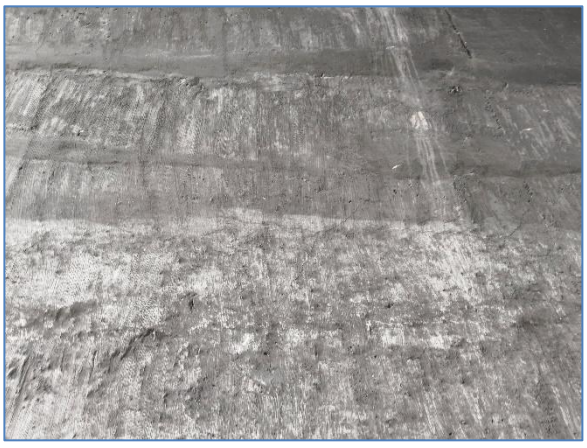
- Type of Structure : ROB
- Span Arrangement : 2 x 7 m
- Total length of Structure : 14 m
- Total deck width of Structure : 14.1 m
- Type of Foundation : Not Visible
- Type of Substructure (Abutment & Pier) : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : Head Wall
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Cracks observed on Side wall A-1, Intermediate wall P-1 & Retaining wall at A-2.
- ✓ Structure condition fair.






Chainage: 28+450
General Description
LHS MCW (New)

- Type of Structure : ROB
- Span Arrangement : 28+37.5+22.1+22.1 m
- Total length of Structure : 109.7 m
- Total deck width of Structure : 14 m
- Type of Foundation : Not Visible
- Type of Substructure (Abutment & Pier) : RCC Wall type
- Type of Superstructure : RCC Girder, PSC Girder & Steel Girder
- Type of Bearing : Pot PTFE
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Expansion joints partially filled with silt & debris.
- ✓ Vertical cracks observed on substructure of all Piers and Abutments.
- ✓ Inclined cracks observed on end girder & soffit of deck slab in Span-3.
- ✓ Cracks observed on soffit of deck slab near to Pier locations.
- ✓ Previous repair works observed on the structure.













Chainage: 28+450

General Description

RHS MCW (New)

- Type of Structure : ROB
- Span Arrangement : 28+37.5+22.1+22.1 m
- Total length of Structure : 109.7 m
- Total deck width of Structure : 14 m
- Type of Foundation : Not Visible
- Type of Substructure (Abutment & Pier) : RCC Wall type
- Type of Superstructure : RCC Girder, PSC Girder & Steel Girder
- Type of Bearing : Pot PTFE
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Expansion joints partially filled with silt & debris.
- ✓ Crack observed on pedestal-m from median side on Pier P-3.
- ✓ Vertical cracks observed on substructure of all Piers and Abutments.
- ✓ Inclined cracks observed on end girder & soffit of deck slab in Span-3.
- ✓ Cracks observed on soffit of deck slab near to Pier locations.
- ✓ Previous repair works observed on the structure.
















Chainage: 42+253
General Description
LHS MCW (New)

- Type of Structure : MJB
- Span Arrangement : 12.75+6x36.080+12.75 m
- Total length of Structure : 241.98 m
- Total deck width of Structure : 14 m
- Type of Foundation : Not Visible
- Type of Substructure (Abutment & Pier) : RCC Wall type
- Type of Superstructure : RCC Girder & PSC Girder
- Type of Bearing : Pot PTFE
- Type of Railing / Crash Barrier : Hand Railing & Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Expansion joints filled with silt and debris.
- ✓ Cracks observed on all the Piers and Abutments.







132.975











Chainage: 42+253
General Description
RHS MCW (Old)

- Type of Structure : MJB
- Span Arrangement : 12.75+6x36.080+12.75 m
- Total length of Structure : 241.98 m
- Total deck width of Structure : 8.2 m
- Type of Foundation : Not Visible
- Type of Substructure (Abutment & Pier) : RCC Wall type & Twin Circular column type
- Type of Superstructure : RCC Girder & String Arch type
- Type of Bearing : Rocker Roller
- Type of Railing / Crash Barrier : Hand Railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Previous repairs observed on structure.
- ✓ Expansion joint damaged partially on joint number-2,7 & 8 from A-1.
- ✓ Rubber sealant damaged in all the Expansion joints except on A-1 & A-2.
- ✓ RCC Hand railing partially damaged at some locations.
- ✓ Silt and debris observed on pier caps, drainage spouts and in expansion joints.













Chainage: 5+473
General Description
LHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 1 x 7.5 m
- Total length of Structure : 7.5 m
- Total deck width of Structure : 12.25 m
- Type of Foundation : Raft
- Type of Substructure (Abutment & Pier) : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Structure condition fair.






Chainage: 7+047
General Description
LHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 1 x 7.7 m
- Total length of Structure : 7.7 m
- Total deck width of Structure : 11.5 m
- Type of Foundation : Raft
- Type of Substructure (Abutment & Pier) : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Structure condition fair.






Chainage: 7+047
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 7.7 m
- Total length of Structure : 7.7 m
- Total deck width of Structure : 11.5 m
- Type of Foundation : Raft
- Type of Substructure (Abutment & Pier) : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing : Not Applicable
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Structure condition fair.







Photos depicting the Major Structures are presented below



18+270 ROB LHS MCW



18+270 ROB RHS MCW



28+450 ROB LHS MCW



28+450 ROB RHS MCW



50+573 ROB LHS MCW



50+573 ROB LHS MCW



54+930 RUB BHS MCW



42+253 MJB LHS MCW



42+253 MJB RHS MCW



42+253 MJB RHS MCW



66+180 MJB LHS MCW



66+180 MJB RHS MCW



116+347 MJB LHS MCW



116+347 MJB RHS MCW



143+561 MJB LHS MCW



143+561 MJB RHS MCW



153+520 MJB LHS MCW



153+520 MJB RHS MCW



164+600 MJB LHS MCW



164+600 MJB RHS MCW



10+670 MNB LHS MCW



16+029 MNB LHS MCW



16+029 MNB RHS MCW



29+901 MNB LHS MCW



29+901 MNB RHS MCW



51+721 MNB LHS MCW



51+721 MNB RHS MCW



58+980 MNB LHS MCW



58+980 MNB RHS MCW



60+661 MNB LHS MCW



60+661 MNB RHS MCW



78+350 MNB RHS MCW



84+930 MNB LHS MCW



121+260 MNB LHS MCW



121+260 MNB RHS MCW



133+726 MNB LHS MCW



133+726 MNB RHS MCW



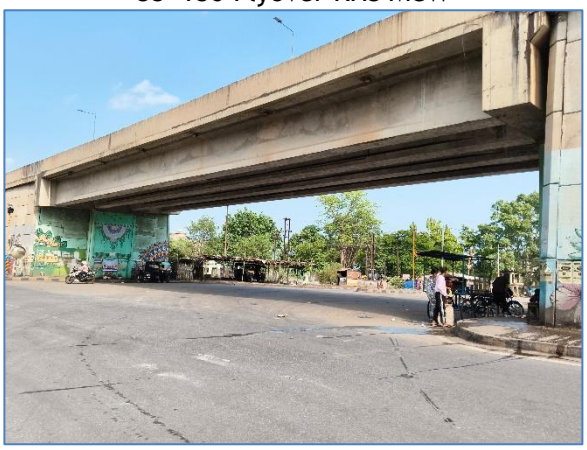
53+150 Flyover LHS MCW



53+150 Flyover RHS MCW



79+070 Flyover LHS Unidirectional



144+970 Flyover RHS Unidirectional



40+090 VUP RHS MCW

Photos depicting the existing culvert are presented below



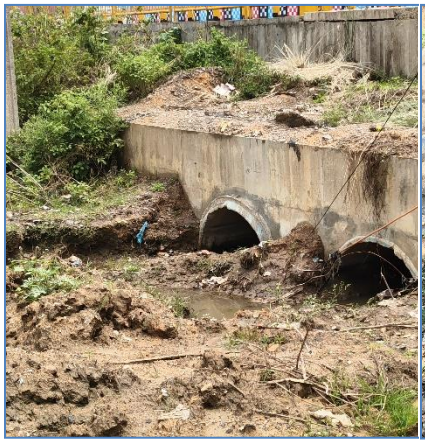
Pipe Culvert at Km 8+500



Pipe Culvert at Km 31+933



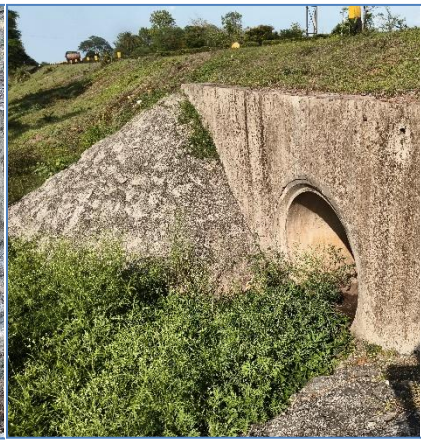
Pipe Culvert at Km 49+800



Pipe Culvert at Km 53+220



Pipe Culvert at Km 114+584



Pipe Culvert at Km 120+092

General Observations on structures: -

- The Project stretch have 81 numbers of major structures, in that 3 ROB's, 1 RUB, 6 MJB's, 39 MNB's, 3 Flyover's, 4 VUP's, 1 EUP's, 15 PUP's, 5 RUP's, 3 SUBWAY's and 1 FOB.
- The Project Road has varieties of super structure types for various structures such as RCC Girder, PSC Girder & Steel Girder, RCC Box, Steel Girder, PSC Girder & RCC Box, RCC Girder & PSC Girder, RCC Girder & String Arch type, PSC Girder & PSC Box Girder, PSC Girder & RCC Box Girder, PSC Girder, RCC Box Girder, RCC Girder, PSC Girder & RCC Girder, RCC Solid Slab & Arch & RCC Cantilever Solid Slab.
- In this Project stretch, there are Pot PTFE (New-356No's), Elastomeric (Old-94 No's), Rocker Roller (Old-60 No's) and Tar Paper (Old-120 No's) are observed in Girder type Structures.
- Structures are having 125 No's of Expansion joints in that 25 No’s on the old structures and 100 No’s on the new structures.
- The project is showing widespread signs of cracking, impacting all types of structures—major bridges, minor bridges and underpasses.
- Most of the structures are already repaired and it would be necessary to closely examine these structures for further distress during the maintenance period/Project duration, by way of close inspection and testing.
- Debris observed on Abutment & pier cap at couple of locations, Cleaning of expansion joints, drainage spouts need to be done regularly

4.6 DRAINAGE AND SLOPE PROTECTION

- ✓ Lined Covered drains observed at service road and Toll Plaza Locations along the corridor.
- ✓ Median Cuts and Median drains at curve locations are in good condition. No major distress is observed on the carriageway on downstream side at median drain locations.

4.7 TRAFFIC SAFETY AND ROAD FURNITURE

- ✓ Metal beam crash barriers provided along the project road appear to be intact over entire length except for few locations where it got damaged.
- ✓ Pedestrian guard rails installed Urban areas. Median Opening locations appear to be in good condition.
- ✓ Concrete Crash Barriers installed at different locations appear to be in fair condition.
- ✓ Solar Blinker are observed in few median opening locations. Street lightings in the form of Double arm lightings are provided at built-up location along the project corridor and appears to be good in condition locations.

4.8 ROAD USER FACILITIES

- ✓ The project Road has road user facilities such as Bus bays with bus shelters and Truck lay byes.

CHAPTER 5. REHABILITATION PLANS AND DESIGNS

5.1 DESIGN TRAFFIC LOADING

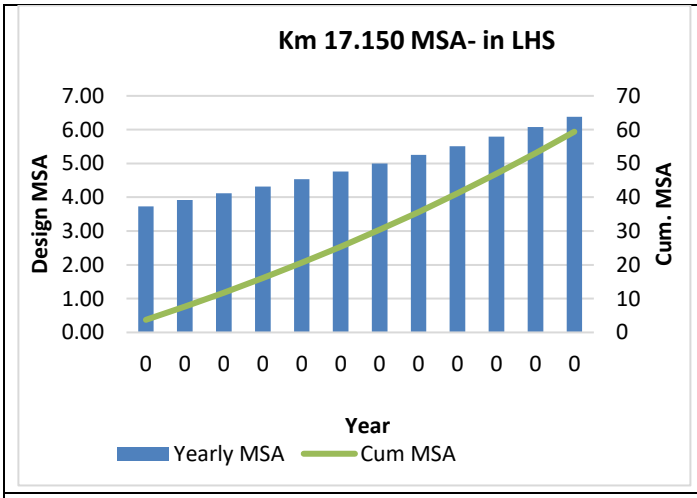
Design Traffic loading has been estimated by considering the latest traffic (given) and VDFs as estimated from the latest axle load survey data and with 5% growth rates for 10 years, 15 years and 20 years design period as below:

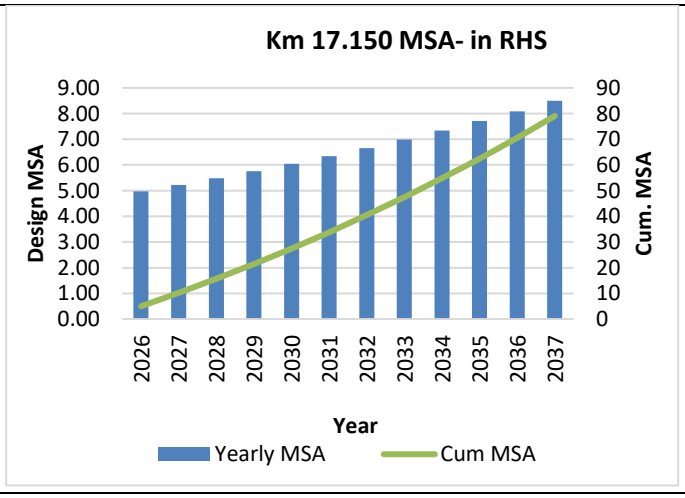
Table 34: Traffic Volume (AADT)

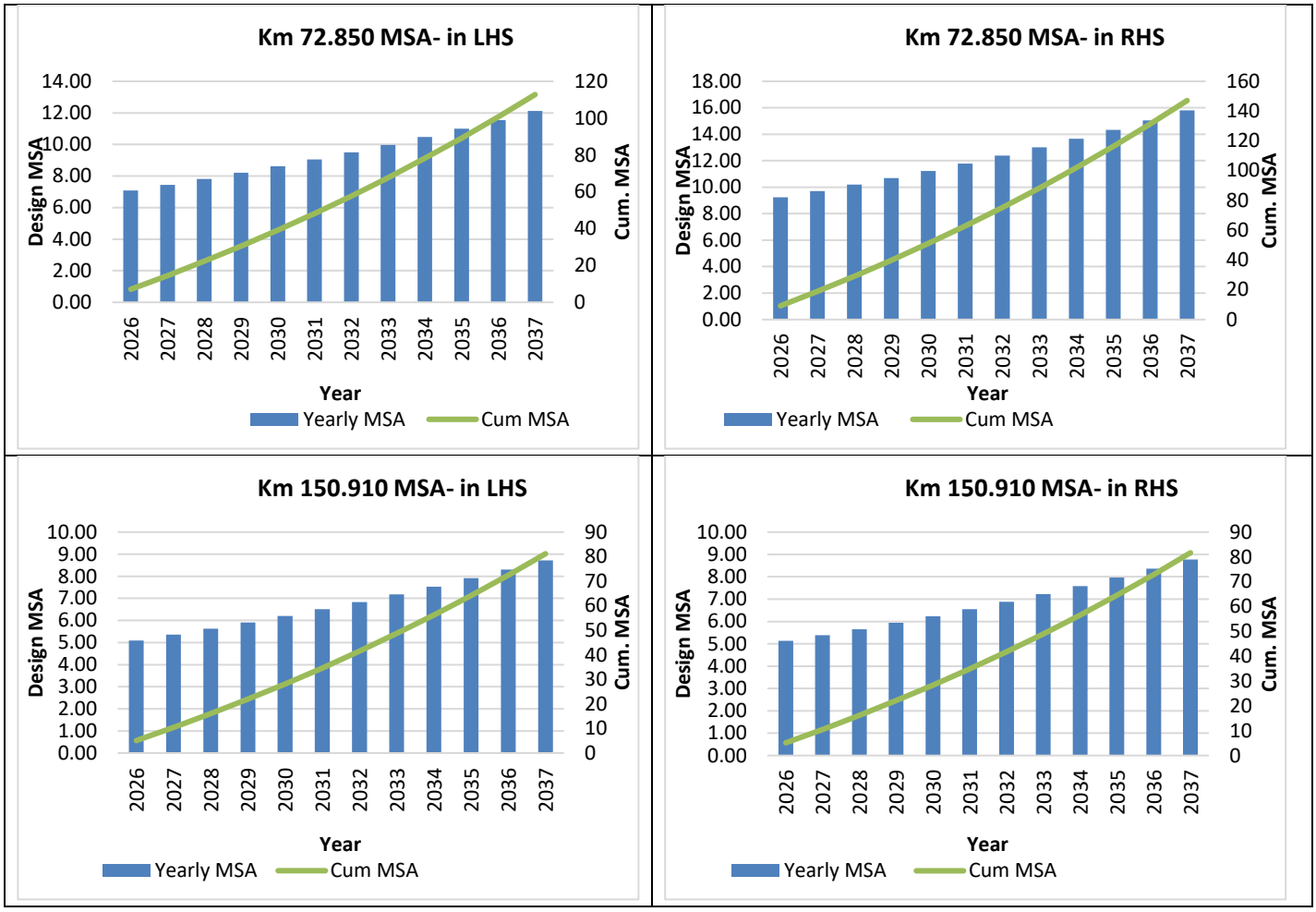
	Km.17.150, TP-1		Km.72.850, TP-2		Km.150.910, TP-3	
Vehicle/Mode	**LHS**	**RHS**	**LHS**	**RHS**	**LHS**	**RHS**
Bus	210	210	107	107	194	194
2-Axle	254	254	171	171	170	170
3-Axle	242	242	100	100	87	87
M-Axle	1504	1504	2798	2798	1740	1740
LCV	101	101	52	52	82	82

Table 35: Estimated Design traffic loading

Design Period	Km.17.150, TP-1		Km.72.850, TP-2		Km.150.910, TP-3	
	LHS	**RHS**	**LHS**	**RHS**	**LHS**	**RHS**
10 Years	47	62	89	116	64	65
15 Years	81	107	153	199	110	111
20 Years	123	164	234	306	169	170







The computation of traffic loadings is presented in **Appendix 9** of this Report.

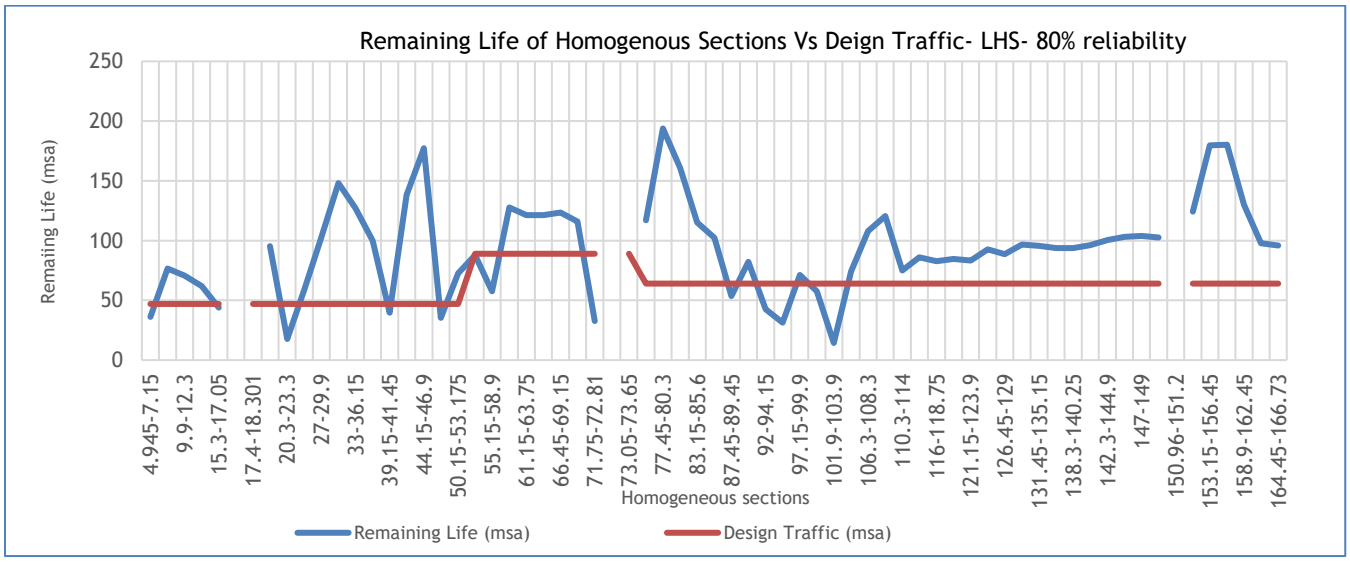
5.2 PAVEMENT REHABILITATION AND STRENGTHENING

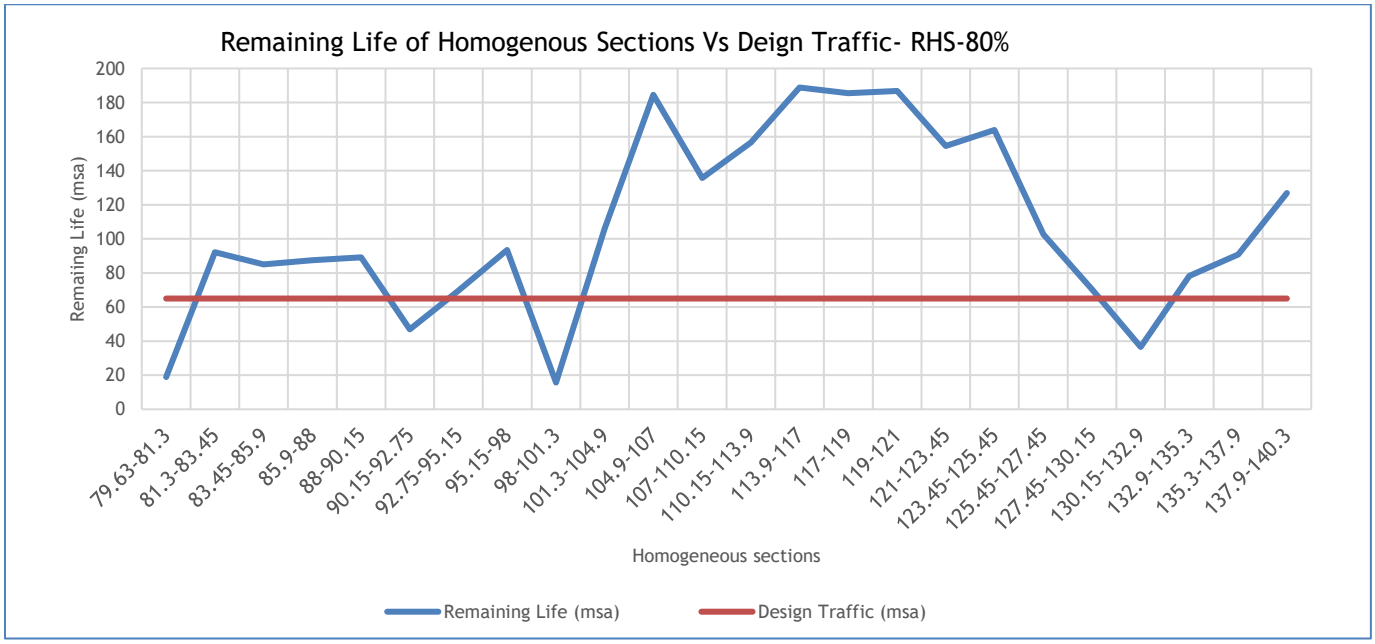
For Design the Overlay Thickness the following method as suggested in IRC: 115 has been used

- The existing pavement is considered as a 3-layer system consisting of subgrade, granular and bituminous layer. The remaining life of exiting pavement in terms of Fatigue and Rutting life (MSA) are estimated
- The remaining life is compared with design traffic loading. An overlay with assumed thickness is considered on exiting pavement where required.
- The Total system including the proposed Overlay (Trial thickness) is assumed as a four-layer system and considered the relevant MR values for all the four layers namely New BT layer, existing bituminous surface, total existing Granular layers and Subgrade layers.

- The MR value for the New BT is assumed as 3000 MPA (considering VG40 Bituminous grade) for Main Carriageway and Service Road and for all the remaining three layers, the MR Values derived and finalized from the FWD Analysis are considered.
- Critical Tensile strains and Vertical strains are found out by using the IIT PAVE Software at the bottom of existing bituminous layer and at the top of the subgrade layer respectively.
- The Fatigue and Rutting equations (equation given in the IRC: 37) have been used to estimate the Fatigue and Rutting Life of the Pavement system considering 80% reliability equation satisfying design philosophy provisions of the IRC 37-2001. And also for certain sections in RHS, the remaining life is estimated with 90% reliability as per IRC:115 guidelines.
- The Obtained Fatigue and Rutting Life are compared with the required life for the assumed trial overlay thickness.
- Analysis is carried out for individual homogeneous sections as well for minimum and Average Modulus Values on each direction separately.

Remaining life of the existing pavement from the above analysis is presented in the following tables:




Remaining Life of Homogenous Sections Vs Deign Traffic- RHS-80%
Remaiing Life (msa)
200
180
160
140
120
100
80
60
40
20
0
79.63-81.3
81.3-83.45
83.45-85.9
85.9-88
88-90.15
90.15-92.75
92.75-95.15
95.15-98
98-101.3
101.3-104.9
104.9-107
107-110.15
110.15-113.9
113.9-117
117-119
119-121
121-123.45
123.45-125.45
125.45-127.45
127.45-130.15
130.15-132.9
132.9-135.3
135.3-137.9
137.9-140.3
Homogeneous sections
Remaining Life (msa)
Design Traffic (msa)

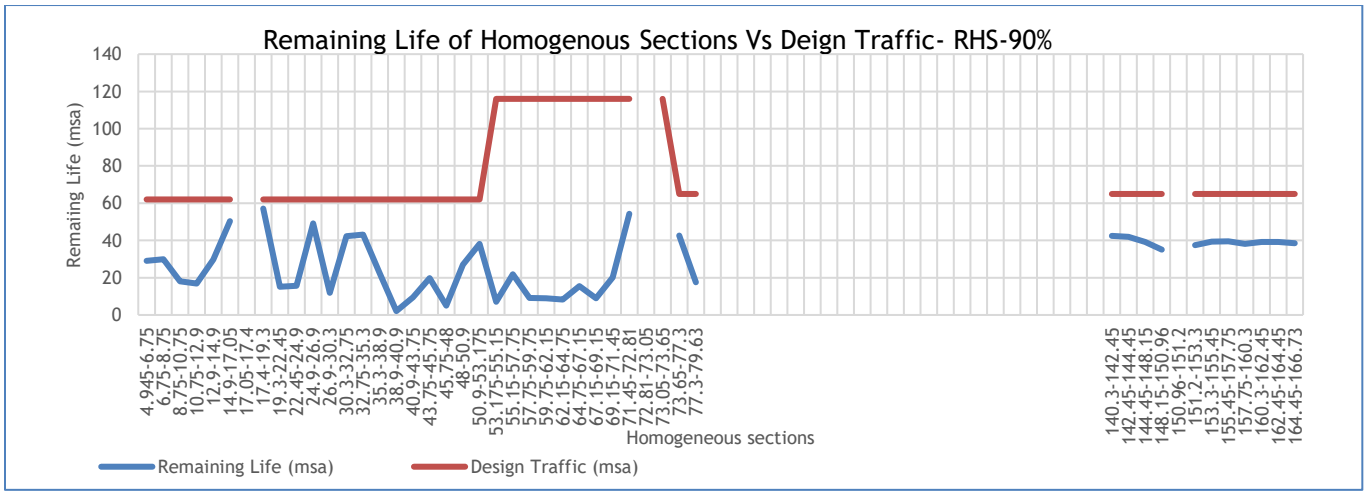

Remaining Life of Homogenous Sections Vs Deign Traffic- RHS-90%
Remaiing Life (msa)
140
120
100
80
60
40
20
0
4.945-6.75
6.75-8.75
8.75-10.75
10.75-12.9
12.9-14.9
14.9-17.05
17.05-17.4
17.4-19.3
19.3-22.45
22.45-24.9
24.9-26.9
26.9-30.3
30.3-32.75
32.75-35.3
35.3-38.9
38.9-40.9
40.9-43.75
43.75-45.75
45.75-48
48-50.9
50.9-53.175
53.175-55.15
55.15-57.75
57.75-59.75
59.75-62.15
62.15-64.75
64.75-67.15
67.15-69.15
69.15-71.45
71.45-72.81
72.81-73.05
73.05-73.65
73.65-77.3
77.3-79.63
140.3-142.45
142.45-144.45
144.45-148.15
148.15-150.96
150.96-151.2
151.2-153.3
153.3-155.45
155.45-157.75
157.75-160.3
160.3-162.45
162.45-164.45
164.45-166.73
Homogeneous sections
Remaining Life (msa)
Design Traffic (msa)

Table 36: Remaining life of the existing pavement LHS Carriageways

Side	From	To	Length (Km)	15th Percentile MR values			Average Existing Crust		Total Crust (mm)	Adopted MR for BT (Mpa)	Strains From IITPAVE		Remaining Life as per IRC 37-2012 equation for 80% Reliability			
				MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)	BT (mm)	Granular (mm)			Vertical strain at bottom, epZ	Tensile strain at top, epT	Nf-Fatigue life, mSA	Rutting life,mSA	Target MSA	Remarks
LHS	5.00	7.15	2.15	3642	265	77	100	450	550	3000	0.0003405	0.0002258	36	220	47	Overlay
LHS	7.15	9.90	2.75	3578	365	77	100	450	550	3000	0.0003008	0.0001862	77	386	47	No Overlay
LHS	9.90	12.30	2.40	3668	353	77	100	450	550	3000	0.0003050	0.0001901	71	362	47	No Overlay
LHS	12.30	15.30	3.00	3347	280	77	117	422	539	3000	0.0003289	0.0001967	62	257	47	No Overlay
LHS	15.30	17.05	1.75								0.0003592	0.0002212	44	172	47	Overlay
LHS	17.05	17.40	0.35	2626	213	77	130	400	530	2626						Toll Plaza
LHS	17.40	18.30	0.90												47	Overlay
LHS	18.30	20.30	2.00	2628	313	77	130	400	530	2628	0.0003209	0.0001813	95	288	47	No Overlay
LHS	20.30	23.30	3.00	2394	140	77	127	399	526	2394	0.0004061	0.0002855	18	99	47	Overlay
LHS	23.30	27.00	3.70	2602	343	77	100	390	490	2602	0.0003720	0.0002059	59	147	47	No Overlay
LHS	27.00	29.90	2.90	2598	330	77	129	390	519	2598	0.0003259	0.0001784	102	268	47	No Overlay
LHS	29.90	33.00	3.10	2590	366	77	134	409	543	2590	0.0002915	0.0001624	148	445	47	No Overlay
LHS	33.00	36.15	3.15	2517	352	77	130	480	610	2517	0.0002522	0.0001699	127	857	47	No Overlay
LHS	36.15	39.15	3.00	2763	355	77	116	480	596	2763	0.0002638	0.0001771	100	699	47	No Overlay
LHS	39.15	41.45	2.30	2787	250	77	110	480	590	2787	0.0003090	0.0002243	40	341	47	Overlay
LHS	41.45	44.15	2.70	2785	350	77	131	473	604	2785	0.0002522	0.0001627	138	857	47	No Overlay
LHS	44.15	46.90	2.75	2733	358	77	140	470	610	2733	0.0002427	0.0001532	177	1020	47	No Overlay
LHS	46.90	50.15	3.25	2764	244	77	108	470	578	2764	0.0003231	0.0002315	35	279	47	Overlay
LHS	50.15	53.18	3.03	2738	353	77	103	473	575	2738	0.0002858	0.0001927	73	486	47	No Overlay
LHS	53.18	55.15	1.98	2836	334	77	115	520	635	2836	0.0002450	0.0001821	88	977	89	Overlay
LHS	55.15	58.90	3.75	2859	269	77	117	520	637	2859	0.0002635	0.0002025	58	703	89	Overlay
LHS	58.90	61.15	2.25	2864	334	77	130	520	650	2864	0.0002293	0.0001650	128	1320	89	No Overlay
LHS	61.15	63.75	2.60	2888	330	77	129	507	636	2888	0.0002383	0.0001669	121	1108	89	No Overlay
LHS	63.75	66.45	2.70	2859	355	77	125	420	545	2859	0.0002943	0.0001672	121	426	89	No Overlay
LHS	66.45	69.15	2.70	2620	367	77	125	420	545	2620	0.0002946	0.0001697	124	424	89	No Overlay
LHS	69.15	71.75	2.60	2471	363	77	125	420	545	2471	0.0002985	0.0001747	116	399	89	No Overlay
LHS	71.75	72.81	1.06								0.0003512	0.0002424	33	191	89	Overlay
LHS	72.81	73.05	0.24	2443	207	77	123	433	555	2443						Toll Plaza
LHS	73.05	73.65	0.60												89	Overlay
LHS	73.65	77.45	3.80	3088	359	77	120	450	570	3000	0.0002754	0.0001670	117	575	64	No Overlay
LHS	77.45	80.30	2.85	3122	367	77	139	450	589	3000	0.0002499	0.0001467	194	894	64	No Overlay
LHS	80.30	83.15	2.85	2666	362	77	136	457	594	2666	0.0002551	0.0001580	161	814	64	No Overlay
LHS	83.15	85.60	2.45	2449	341	77	130	470	600	2449	0.0002628	0.0001753	115	711	64	No Overlay
LHS	85.60	87.45	1.85	2181	335	77	130	470	600	2181	0.0002691	0.0001854	102	639	64	No Overlay
LHS	87.45	89.45	2.00	2345	244	77	130	470	600	2345	0.0002973	0.0002156	54	407	64	Overlay
LHS	89.45	92.00	2.55	2115	332	77	122	475	597	2115	0.0002770	0.0001975	82	560	64	No Overlay
LHS	92.00	94.15	2.15	2659	293	77	100	490	590	2659	0.0002998	0.0002225	43	391	64	Overlay

Side	From	To	Length (Km)	15th Percentile MR values			Average Existing Crust		Total Crust (mm)	Adopted MR for BT (Mpa)	Strains From IITPAVE		Remaining Life as per IRC 37-2012 equation for 80% Reliability			
				MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)	BT (mm)	Granular (mm)			Vertical strain at bottom, epZ	Tensile strain at top, epT	Nf-Fatigue life, mSA	Rutting life,mSA	Target MSA	Remarks
LHS	94.15	97.15	3.00	2692	256	77	100	490	590	2692	0.0003151	0.0002400	31	312	64	Overlay
LHS	97.15	99.90	2.75	2677	360	77	100	490	590	2677	0.0002753	0.0001946	71	576	64	No Overlay
LHS	99.90	101.90	2.00	2650	317	77	105	485	590	2650	0.0002879	0.0002059	58	470	64	Overlay
LHS	101.90	103.90	2.00	2699	125	77	120	470	590	2699	0.0003577	0.0002932	14	176	64	Overlay
LHS	103.90	106.30	2.40	2575	307	77	120	470	590	2575	0.0002839	0.0001942	74	501	64	No Overlay
LHS	106.30	108.30	2.00	2560	361	77	120	470	590	2560	0.0002669	0.0001766	108	663	64	No Overlay
LHS	108.30	110.30	2.00	2830	368	77	120	470	590	2830	0.0002612	0.0001679	121	731	64	No Overlay
LHS	110.30	114.00	3.70	2883	334	77	109	463	572	2883	0.0002901	0.0001889	75	454	64	No Overlay
LHS	114.00	116.00	2.00	2928	366	77	105	460	565	2928	0.0002865	0.0001818	86	481	64	No Overlay
LHS	116.00	118.75	2.75	2879	362	77	105	460	565	2879	0.0002884	0.0001843	83	467	64	No Overlay
LHS	118.75	121.15	2.40	2922	365	77	105	458	563	2922	0.0002884	0.0001825	85	467	64	No Overlay
LHS	121.15	123.90	2.75	3008	345	77	110	430	540	3000	0.0003095	0.0001822	83	339	64	No Overlay
LHS	123.90	126.45	2.55	3175	361	77	110	430	540	3000	0.0003041	0.0001773	93	367	64	No Overlay
LHS	126.45	129.00	2.55	3153	354	77	110	430	540	3000	0.0003064	0.0001794	89	355	64	No Overlay
LHS	129.00	131.45	2.45	3182	368	77	110	425	535	3000	0.0003059	0.0001754	97	357	64	No Overlay
LHS	131.45	135.15	3.70	3164	368	77	110	410	520	3000	0.0003188	0.0001759	96	296	64	No Overlay
LHS	135.15	138.30	3.15	3102	365	77	110	410	520	3000	0.0003199	0.0001768	94	292	64	No Overlay
LHS	138.30	140.25	1.95	3134	365	77	110	410	520	3000	0.0003199	0.0001768	94	292	64	No Overlay
LHS	140.25	142.30	2.05	3063	367	77	110	423	533	3000	0.0003079	0.0001757	96	347	64	No Overlay
LHS	142.30	144.90	2.60	3115	364	77	110	560	670	3000	0.0002176	0.0001737	100	1674	64	No Overlay
LHS	144.90	147.00	2.10	3123	368	77	110	560	670	3000	0.0002166	0.0001725	103	1709	64	No Overlay
LHS	147.00	149.00	2.00	3145	369	77	110	560	670	3000	0.0002163	0.0001722	104	1720	64	No Overlay
LHS	149.00	150.96	1.96	3091	367	77	110	560	670	3000	0.0002168	0.0001728	103	1702	64	No Overlay
LHS	150.96	151.20	0.24													Toll Plaza
LHS	151.20	153.15	1.95	3126	367	77	119	502	621	3000	0.0002404	0.0001645	124	1065	64	No Overlay
LHS	153.15	156.45	3.30	3295	364	77	140	370	510	3000	0.0003063	0.0001496	180	355	64	No Overlay
LHS	156.45	158.90	2.45	3267	365	77	140	370	510	3000	0.0003060	0.0001495	180	357	64	No Overlay
LHS	158.90	162.45	3.55	3267	364	77	124	419	543	3000	0.0002915	0.0001626	130	445	64	No Overlay
LHS	162.45	164.45	2.00	3322	366	77	110	460	570	3000	0.0002791	0.0001749	98	541	64	No Overlay
LHS	164.45	166.73	2.28	3250	363	77	110	460	570	3000	0.0002800	0.0001758	96	534	64	No Overlay

Table 37: Remaining life of the existing pavement RHS Carriageways

S.No	Side	From	To	Length (Km)	15th Percentile MR values			Average Existing Crust		Total Crust (mm)	Adopted MR for BT (Mpa)	Strains From IITPAVE		Remaining Life as per IRC -115 /iRC 37 Equations for 90%/80% Reliability				Reliability
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)	BT (mm)	Granular (mm)			Vertical strain at bottom, epZ	Tensile strain at top, epT	Nf-Fatigue life, mSA	Rutting life,mSA	Target MSA	Remarks	
1	RHS	5.00	6.75	1.75	3272	354	77	115	340	455	3000	0.0003846	0.0001786	29	43	62	Overlay	90 %
2	RHS	6.75	8.75	2.00	3325	359	77	115	340	455	3000	0.0003827	0.0001771	30	44	62	Overlay	90 %
3	RHS	8.75	10.75	2.00	2851	291	77	115	340	455	2851	0.0004140	0.0002038	18	31	62	Overlay	90 %
4	RHS	10.75	12.90	2.15	2846	282	77	115	340	455	2846	0.0004181	0.0002075	17	29	62	Overlay	90 %
5	RHS	12.90	14.90	2.00	2941	342	77	120	342	462	2941	0.0003776	0.0001782	30	47	62	Overlay	90 %
6	RHS	14.90	17.05	2.15	2959	329	77	145	350	495	2959	0.0003256	0.0001555	50	91	62	Overlay	90 %
7	RHS	17.05	17.40	0.35													Toll Plaza	90 %
8	RHS	17.40	19.30	1.90	2969	350	77	145	350	495	2969	0.0003193	0.0001504	57	100	62	Overlay	90 %
9	RHS	19.30	22.45	3.15	2190	204	77	145	350	495	2190	0.0003926	0.0002260	15	39	62	Overlay	90 %
10	RHS	22.45	24.90	2.45	2646	184	77	145	350	495	2646	0.0003824	0.0002151	16	44	62	Overlay	90 %
11	RHS	24.90	26.90	2.00	2759	360	77	134	440	574	2759	0.0002678	0.0001588	49	221	62	Overlay	90 %
12	RHS	26.90	30.30	3.40	2667	187	77	130	470	600	2667	0.0003132	0.0002305	12	109	62	Overlay	90 %
13	RHS	30.30	32.75	2.45	2713	349	77	130	470	600	2713	0.0002566	0.0001658	42	268	62	Overlay	90 %
14	RHS	32.75	35.30	2.55	2795	349	77	130	470	600	2795	0.0002554	0.0001638	43	274	62	Overlay	90 %
15	RHS	35.30	38.90	3.60	2577	336	77	110	403	513	2577	0.0003440	0.0001973	22	71	62	Overlay	90 %
16	RHS	38.90	40.90	2.00	2545	121	77	100	370	470	2545	0.0005244	0.0003649	2	11	62	Overlay	90 %
17	RHS	40.90	43.75	2.85	2538	262	77	100	370	470	2538	0.0004361	0.0002470	9	24	62	Overlay	90 %
18	RHS	43.75	45.75	2.00	2571	353	77	100	370	470	2571	0.0003909	0.0002037	20	40	62	Overlay	90 %
19	RHS	45.75	48.00	2.25	2487	148	77	119	351	470	2487	0.0004719	0.0002923	5	17	62	Overlay	90 %
20	RHS	48.00	50.90	2.90	2550	309	77	130	340	470	2550	0.0003812	0.0001884	27	45	62	Overlay	90 %
21	RHS	50.90	53.18	2.28	2520	361	77	130	340	470	2520	0.0003632	0.0001729	38	56	62	Overlay	90 %
22	RHS	53.18	55.15	1.98	2285	161	77	130	340	470	2285	0.0004548	0.0002726	7	20	116	Overlay	90 %
23	RHS	55.15	57.75	2.60	2540	317	77	115	420	535	2540	0.0003280	0.0001991	22	88	116	Overlay	90 %
24	RHS	57.75	59.75	2.00	2557	249	77	100	500	600	2557	0.0003122	0.0002491	9	110	116	Overlay	90 %
25	RHS	59.75	62.15	2.40	2824	238	77	100	500	600	2824	0.0003136	0.0002449	9	108	116	Overlay	90 %
26	RHS	62.15	64.75	2.60	2540	240	77	100	500	600	2540	0.0003166	0.0002552	8	103	116	Overlay	90 %
27	RHS	64.75	67.15	2.40	2574	312	77	100	471	571	2574	0.0003086	0.0002170	16	116	116	Overlay	90 %
28	RHS	67.15	69.15	2.00	2564	250	77	100	430	530	2564	0.0003742	0.0002501	9	48	116	Overlay	90 %
29	RHS	69.15	71.45	2.30	2572	340	77	103	430	533	2572	0.0003287	0.0002031	20	87	116	Overlay	90 %
30	RHS	71.45	72.81	1.36								0.0002698	0.0001576	54	214	116	Overlay	90 %
31	RHS	72.81	73.05	0.24	2542	364	77	140	430	570	2542						Toll Plaza	90 %
32	RHS	73.05	73.65	0.60												116	Overlay	90 %
33	RHS	73.65	77.30	3.65	2739	357	77	129	436	564	2739	0.0002782	0.0001651	43	186	65	Overlay	90 %
34	RHS	77.30	79.63	2.33	2651	327	77	100	450	550	2651	0.0003193	0.0002089	18	100	65	Overlay	90 %
35	RHS	79.63	81.30	1.67	2734	203	77	100	450	550	2734	0.0003764	0.0002723	19	140	65	Overlay	80 %
36	RHS	81.30	83.45	2.15	3106	358	77	110	450	560	3000	0.0002891	0.0001776	92	462	65	No Overlay	80 %
37	RHS	83.45	85.90	2.45	3187	346	77	110	450	560	3000	0.0002931	0.0001813	85	434	65	No Overlay	80 %
38	RHS	85.90	88.00	2.10	3204	359	77	106	533	639	3000	0.0002377	0.0001800	87	1121	65	No Overlay	80 %

S.No	Side	From	To	Length (Km)	15th Percentile MR values			Average Existing Crust		Total Crust (mm)	Adopted MR for BT (Mpa)	Strains From IITPAVE		Remaining Life as per IRC -115 /iRC 37 Equations for 90%/80% Reliability				Reliability
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)	BT (mm)	Granular (mm)			Vertical strain at bottom, epZ	Tensile strain at top, epT	Nf-Fatigue life, mSA	Rutting life,mSA	Target MSA	Remarks	
39	RHS	88.00	90.15	2.15	3119	364	77	105	560	665	3000	0.0002220	0.0001791	89	1528	65	No Overlay	80 %
40	RHS	90.15	92.75	2.60	3124	276	77	105	560	665	3000	0.0002490	0.0002113	47	908	65	Overlay	80 %
41	RHS	92.75	95.15	2.40	3096	328	77	105	560	665	3000	0.0002322	0.0001909	70	1247	65	No Overlay	80 %
42	RHS	95.15	98.00	2.85	3134	333	77	118	436	555	3000	0.0002968	0.0001770	93	410	65	No Overlay	80 %
43	RHS	98.00	101.30	3.30	2840	128	77	120	420	540	2840	0.0003944	0.0002833	16	113	65	Overlay	80 %
44	RHS	101.30	104.90	3.60	2637	357	77	121	420	541	2637	0.0003031	0.0001762	106	372	65	No Overlay	80 %
45	RHS	104.90	107.00	2.10	2906	362	77	140	430	570	2906	0.0002642	0.0001496	185	694	65	No Overlay	80 %
46	RHS	107.00	110.15	3.15	3029	308	77	140	430	570	3000	0.0002777	0.0001608	136	554	65	No Overlay	80 %
47	RHS	110.15	113.90	3.75	2747	343	77	140	430	570	2747	0.0002720	0.0001580	157	609	65	No Overlay	80 %
48	RHS	113.90	117.00	3.10	3039	360	77	138	510	648	3000	0.0002188	0.0001477	189	1632	65	No Overlay	80 %
49	RHS	117.00	119.00	2.00	2990	362	77	135	620	755	2990	0.0001728	0.0001485	185	4759	65	No Overlay	80 %
50	RHS	119.00	121.00	2.00	3071	363	77	135	620	755	3000	0.0001725	0.0001481	187	4797	65	No Overlay	80 %
51	RHS	121.00	123.45	2.45	2505	356	77	135	620	755	2505	0.0001780	0.0001618	154	4161	65	No Overlay	80 %
52	RHS	123.45	125.45	2.00	2511	365	77	135	620	755	2511	0.0001761	0.0001593	164	4368	65	No Overlay	80 %
53	RHS	125.45	127.45	2.00	2486	370	77	115	521	635	2486	0.0002380	0.0001800	103	1115	65	No Overlay	80 %
54	RHS	127.45	130.15	2.70	2486	366	77	100	450	550	2486	0.0003072	0.0001983	70	350	65	No Overlay	80 %
55	RHS	130.15	132.90	2.75	2516	273	77	103	450	553	2516	0.0003395	0.0002342	37	223	65	Overlay	80 %
56	RHS	132.90	135.30	2.40	2499	366	77	105	450	555	2499	0.0003001	0.0001928	78	390	65	No Overlay	80 %
57	RHS	135.30	137.90	2.60	2491	349	77	118	423	542	2491	0.0003094	0.0001857	91	339	65	No Overlay	80 %
58	RHS	137.90	140.30	2.40	2427	364	77	130	400	530	2427	0.0003083	0.0001714	127	345	65	No Overlay	80 %
59	RHS	140.30	142.45	2.15	2501	367	77	130	400	530	2501	0.0003059	0.0001685	43	121	65	Overlay	90 %
60	RHS	142.45	144.45	2.00	2491	365	77	130	400	530	2491	0.0003067	0.0001693	42	120	65	Overlay	90 %
61	RHS	144.45	148.15	3.70	2511	366	77	126	420	546	2511	0.0002954	0.0001718	39	142	65	Overlay	90 %
62	RHS	148.15	150.96	2.81	2536	365	77	120	450	570	2536	0.0002803	0.0001765	35	180	65	Overlay	90 %
63	RHS	150.96	151.20	0.24													Toll Plaza	90 %
64	RHS	151.20	153.30	2.10	3143	358	77	120	450	570	3000	0.0002757	0.0001672	37	194	65	Overlay	90 %
65	RHS	153.30	155.45	2.15	3209	366	77	120	450	570	3000	0.0002734	0.0001651	39	201	65	Overlay	90 %
66	RHS	155.45	157.75	2.30	3142	368	77	120	439	559	3000	0.0002807	0.0001649	40	179	65	Overlay	90 %
67	RHS	157.75	160.30	2.55	3202	363	77	120	430	550	3000	0.0002890	0.0001665	38	156	65	Overlay	90 %
68	RHS	160.30	162.45	2.15	3198	367	77	120	430	550	3000	0.0002878	0.0001654	39	159	65	Overlay	90 %
69	RHS	162.45	164.45	2.00	3180	367	77	120	430	550	3000	0.0002878	0.0001654	39	159	65	Overlay	90 %
70	RHS	164.45	166.73	2.28	3159	365	77	120	430	550	3000	0.0002884	0.0001660	39	158	65	Overlay	90 %

From the above, for the main carriageway there is an overlay requirement for a length of 31.941 km in LHS and 110.605 km in RHS as the obtained remaining life of the pavement is lesser than Target MSA.

The overlay required sections are further analyzed as per IRC: 37 guidelines with assumed overlay thicknesses to obtain the strains (vertical and horizontal) and then fatigue and rutting life in terms of MSAs. In this process, it is to ensure that the obtained remaining life (MSA) of the existing pavement should be always more than calculated 10yrs design MSA.

The following tables indicates the proposed overlay thicknesses for Main carriageway in LHS and RHS directions respectively considering the 10th Year Design MSA.

Table 38: Design of overlay for LHS MCW

S. No	Side	From	To	Length (Km)	15th Percentile MR values			Average Existing Crust		VG-40 3000	Total BT	Total Crust (mm)	Adopted MR for BT (Mpa)	Strains From IITPAVE		Remaining Life as per IRC 37-2012 equation for 80% Reliability		
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)	BT (mm)	Granular (mm)	Proposed BT				Vertical strain at bottom, epZ	Tensile strain at top, epT	Nf-Fatigue life, mSA	Rutting life,mSA	Target MSA
1	LHS	4.95	7.15	2.21	3642	265	77	100	450	40	140	590	3000	0.0002773	0.0001727	103	558	47
5	LHS	15.30	17.05	1.75						40				0.0002850	0.0001712	119	492	47
6	LHS	17.05	17.40		2626	213	77	130	400		170	570	2626	Toll Plaza				
7	LHS	17.40	18.30	0.90						40				0.0002850	0.0001712	119	492	47
9	LHS	20.30	23.30	3.00	2394	140	77	127	399	40	167	566	2394	0.0003120	0.0002147	53	327	47
15	LHS	39.15	41.45	2.30	2787	250	77	110	480	40	150	630	2787	0.0002524	0.0001712	113	854	47
18	LHS	46.90	50.15	3.25	2764	244	77	108	470	40	148	618	2764	0.0002626	0.0001761	102	714	47
20	LHS	53.18	55.15	1.98	2836	334	77	115	520	40	155	675	2836	0.0002054	0.0001413	235	2174	89
21	LHS	55.15	58.90	3.75	2859	269	77	117	520	40	157	677	2859	0.0002187	0.0001560	159	1636	89
27	LHS	71.75	72.81	1.06						40				0.0002790	0.0001854	93	542	89
28	LHS	72.81	73.05		2443	207	77	123	433		163	595	2443	Toll Plaza				
29	LHS	73.05	73.65	0.60						40				0.0002790	0.0001854	93	542	89
35	LHS	87.45	89.45	2.00	2345	244	77	130	470	40	170	640	2345	0.0002407	0.0001671	144	1059	64
37	LHS	92.00	94.15	2.15	2659	293	77	100	490	40	140	630	2659	0.0002469	0.0001715	117	944	64
38	LHS	94.15	97.15	3.00	2692	256	77	100	490	40	140	630	2692	0.0002577	0.0001828	90	777	64
40	LHS	99.90	101.90	2.00	2650	317	77	105	485	40	145	630	2650	0.0002378	0.0001599	154	1119	64
41	LHS	101.90	103.90	2.00	2699	125	77	120	470	80	200	670	2699	0.0002246	0.0001679	126	1450	64

Table 39: Design of overlay for RHS MCW

S. No	Side	From	To	Length (Km)	15th Percentile MR values			Average Existing Crust		VG-40 (3000)	Total BT	Total Crust (mm)	Adopted MR for BT (Mpa)	Strains From IITPAVE		Remaining Life as per IRC -115 Equations for 90% Reliability			Reliability
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)	BT (mm)	Granular (mm)	Proposed BT				Vertical strain at bottom, epZ	Tensile strain at top, epT	Nf-Fatigue life, mSA	Rutting life,mSA	Target MSA	
1	RHS	5.00	6.75	1.75	3272	354	77	115	340	40	155	495	3000	0.0003091	0.0001406	74	115	62	90 %
2	RHS	6.75	8.75	2.00	3325	359	77	115	340	40	155	495	3000	0.0003079	0.0001396	76	117	62	90 %
3	RHS	8.75	10.75	2.00	2851	291	77	115	340	80	195	535	2851	0.0002652	0.0001280	111	231	62	90 %
4	RHS	10.75	12.90	2.15	2846	282	77	115	340	80	195	535	2846	0.0002670	0.0001298	105	224	62	90 %
5	RHS	12.90	14.90	2.00	2941	342	77	120	342	40	160	502	2941	0.0003032	0.0001406	75	126	62	90 %
6	RHS	14.90	17.05	2.15	2959	329	77	145	350	40	185	535	2959	0.0002641	0.0001253	117	235	62	90 %
8	RHS	17.40	19.30	1.90	2969	350	77	145	350	40	185	535	2969	0.0002598	0.0001214	131	254	62	90 %
9	RHS	19.30	22.45	3.15	2190	204	77	145	350	80	225	575	2190	0.0002469	0.0001403	97	319	62	90 %
10	RHS	22.45	24.90	2.45	2646	184	77	145	350	80	225	575	2646	0.0002412	0.0001328	102	355	62	90 %
11	RHS	24.90	26.90	2.00	2759	360	77	134	440	40	174	614	2759	0.0002216	0.0001263	120	522	62	90 %
12	RHS	26.90	30.30	3.40	2667	187	77	130	470	80	210	680	2667	0.0002065	0.0001397	83	718	62	90 %
13	RHS	30.30	32.75	2.45	2713	349	77	130	470	40	170	640	2713	0.0002131	0.0001310	106	623	62	90 %
14	RHS	32.75	35.30	2.55	2795	349	77	130	470	40	170	640	2795	0.0002125	0.0001295	108	631	62	90 %
15	RHS	35.30	38.90	3.60	2577	336	77	110	403	50	160	563	2577	0.000265	0.0001459	73	232	62	90 %
16	RHS	38.90	40.90	2.00	2545	121	77	100	370	125	225	595	2545	0.0002357	0.0001505	65	394	62	90 %
17	RHS	40.90	43.75	2.85	2538	262	77	100	370	80	180	550	2538	0.0002768	0.0001506	65	190	62	90 %
18	RHS	43.75	45.75	2.00	2571	353	77	100	370	80	180	550	2571	0.0002564	0.0001296	115	269	62	90 %
19	RHS	45.75	48.00	2.25	2487	148	77	119	351	100	219	570	2487	0.0002531	0.0001504	66	286	62	90 %
20	RHS	48.00	50.90	2.90	2550	309	77	130	340	40	170	510	2550	0.0003029	0.0001488	68	126	62	90 %
21	RHS	50.90	53.18	2.28	2520	361	77	130	340	40	170	510	2520	0.0002909	0.0001378	92	152	62	90 %
22	RHS	53.18	55.15	1.98	2285	161	77	130	340	115	245	585	2285	0.0002293	0.0001323	118	447	116	90 %
23	RHS	55.15	57.75	2.60	2540	317	77	115	420	80	195	615	2540	0.0002201	0.0001254	132	538	116	90 %
24	RHS	57.75	59.75	2.00	2557	249	77	100	500	110	210	710	2557	0.0001854	0.0001261	129	1171	116	90 %
25	RHS	59.75	62.15	2.40	2824	238	77	100	500	110	210	710	2824	0.0001856	0.0001233	129	1165	116	90 %
26	RHS	62.15	64.75	2.60	2540	240	77	100	500	110	210	710	2540	0.0001870	0.0001284	121	1126	116	90 %
27	RHS	64.75	67.15	2.40	2574	312	77	100	471	90	190	661	2574	0.0002019	0.0001272	124	795	116	90 %
28	RHS	67.15	69.15	2.00	2564	250	77	100	430	110	210	640	2564	0.0002123	0.0001275	123	633	116	90 %
29	RHS	69.15	71.45	2.30	2572	340	77	103	430	80	183	613	2572	0.0002222	0.0001277	122	515	116	90 %
30	RHS	71.45	72.81	1.36						40				0.0002222	0.0001261	129	515	116	90 %
31	RHS	72.81	73.05		2542	364	77	140	430		180	610	2542	Toll Plaza					
32	RHS	73.05	73.65	0.60						40				0.0002222	0.0001261	129	515	116	90 %
33	RHS	73.65	77.30	3.65	2739	357	77	129	436	40	169	604	2739	0.0002295	0.0001306	106	445	65	90 %
34	RHS	77.30	79.63	2.33	2651	327	77	100	450	80	180	630	2651	0.0002173	0.0001301	111	570	65	90 %
35	RHS	79.63	81.30	1.67	2734	203	77	100	450	50	150	600	2734	0.0002845	0.0001913	75	496	65	80 %
40	RHS	90.15	92.75	2.60	3124	276	77	105	560	40	145	705	3000	0.0002092	0.0001614	134	2001	65	80 %
43	RHS	98.00	101.30	3.30	2840	128	77	120	420	80	200	620	2840	0.0002431	0.0001632	134	1013	65	80 %
55	RHS	130.15	132.90	2.75	2516	273	77	103	450	40	143	593	2516	0.0002748	0.0001800	102	581	65	80 %

S. No	Side	From	To	Length (Km)	15th Percentile MR values			Average Existing Crust		VG-40 (3000)	Total BT	Total Crust (mm)	Adopted MR for BT (Mpa)	Strains From IITPAVE		Remaining Life as per IRC -115 Equations for 90% Reliability			Reliability
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)	BT (mm)	Granular (mm)	Proposed BT				Vertical strain at bottom, epZ	Tensile strain at top, epT	Nf-Fatigue life, mSA	Rutting life,mSA	Target MSA	
59	RHS	140.3	142.45	2.15	2501	367	77	130	400	40	170	570	2501	0.0002492	0.0001338	104	306	65	90 %
60	RHS	142.45	144.45	2.00	2491	365	77	130	400	40	170	570	2491	0.0002498	0.0001330	107	303	65	90 %
61	RHS	144.45	148.15	3.70	2511	366	77	126	420	40	166	586	2511	0.0002418	0.0001357	98	351	65	90 %
62	RHS	148.15	150.96	2.81	2536	365	77	120	450	40	160	610	2536	0.0002310	0.0001384	90	432	65	90 %
64	RHS	151.20	153.30	2.10	3143	358	77	120	450	40	160	610	3000	0.0002289	0.0001314	96	450	65	90 %
65	RHS	153.30	155.45	2.15	3209	366	77	120	450	40	160	610	3000	0.0002272	0.0001298	100	466	65	90 %
66	RHS	155.45	157.75	2.30	3142	368	77	120	439	40	160	599	3000	0.0002328	0.0001297	101	417	65	90 %
67	RHS	157.75	160.30	2.55	3202	363	77	120	430	40	160	590	3000	0.0002389	0.0001310	97	371	65	90 %
68	RHS	160.30	162.45	2.15	3198	367	77	120	430	40	160	590	3000	0.0002381	0.0001302	99	377	65	90 %
69	RHS	162.45	164.45	2.00	3180	367	77	120	430	40	160	590	3000	0.0002381	0.0001302	99	377	65	90 %
70	RHS	164.45	166.73	2.28	3159	365	77	120	430	40	160	590	3000	0.0002385	0.0001306	98	374	65	90 %

Similar exercise has been done for the Service Road and the results are as follows.

Table 40: Remaining life of the existing pavement on Service Road LHS

S.No	Side	From	To	Length (Km)	15th Percentile MR values			Average Existing Crust		Total Crust (mm)	Adopted MR for BT (Mpa)	Strains From IITPAVE		Remaining Life as per IRC 37-2012 equation for 80% Reliability			
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)	BT (mm)	Granular (mm)			Vertical strain at bottom, epZ	Tensile strain at top, epT	Nf-Fatigue life, mSA	Rutting life,mSA	Target MSA	Remarks
1	LHS	5.00	12.75	7.75	2689	302	77	130	300	430	2689						No Service Road
2	LHS	12.75	13.25	0.50								0.0004246	0.0001897	78	81	10	No Overlay
3	LHS	13.25	28.55	15.30													No Service Road
4	LHS	28.55	28.75	0.20													No data
5	LHS	28.75	39.00	10.25													No Service Road
6	LHS	39.00	40.70	1.70													No Overlay
7	LHS	40.70	52.80	12.10													No Service Road
8	LHS	52.80	53.60	0.80													No Overlay
9	LHS	53.60	63.78	10.18													No Service Road
10	LHS	63.78	64.40	0.62	3164	235	77	90	450	540	3000	0.0003744	0.0002584	21	143	10	No Overlay
11	LHS	64.40	71.99	7.59													No Service Road

S.No	Side	From	To	Length (Km)	15th Percentile MR values			Average Existing Crust		Total Crust (mm)	Adopted MR for BT (Mpa)	Strains From IITPAVE		Remaining Life as per IRC 37-2012 equation for 80% Reliability			
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)	BT (mm)	Granular (mm)			Vertical strain at bottom, epZ	Tensile strain at top, epT	Nf-Fatigue life, mSA	Rutting life,mSA	Target MSA	Remarks
12	LHS	71.99	72.50	0.51													No Overlay
13	LHS	72.50	74.22	1.72													No Service Road
14	LHS	74.22	74.75	0.53													No Overlay
15	LHS	74.75	78.55	3.80													No Service Road
16	LHS	78.55	79.35	0.80													No Overlay
17	LHS	79.35	82.70	3.35													No Service Road
18	LHS	82.70	83.45	0.75													No Overlay
19	LHS	83.45	85.70	2.25													No Service Road
20	LHS	85.70	86.32	0.62								0.0003464	0.0002339	36	203	10	No Overlay
21	LHS	86.32	90.03	3.71													No Service Road
22	LHS	90.03	90.92	0.89													No Overlay
23	LHS	90.92	98.28	7.36													No Service Road
24	LHS	98.28	98.87	0.59	2604	302	77	90	450	540	2604						No Overlay
25	LHS	98.87	103.99	5.12													No Service Road
26	LHS	103.99	104.43	0.44													No Overlay
27	LHS	104.43	106.89	2.46													No Service Road
28	LHS	106.89	107.40	0.51													No Overlay
29	LHS	107.40	110.33	2.93													No Service Road
30	LHS	110.33	111.12	0.79								0.0003009	0.0001912	77	385	10	No Overlay
31	LHS	111.12	113.30	2.18													No Service Road
32	LHS	113.30	113.50	0.20													No data
33	LHS	113.50	113.82	0.32													No Overlay
34	LHS	113.82	136.60	22.78													No data
35	LHS	136.60	136.95	0.35													No Overlay
36	LHS	136.95	152.50	15.55	2660	365	77	103	450	553	2660						No data
37	LHS	152.50	153.05	0.55													No Overlay
38	LHS	153.05	157.95	4.90													No data
39	LHS	157.95	158.37	0.42													No Overlay
40	LHS	158.37	163.18	4.81													No data
41	LHS	163.18	163.60	0.42													No Overlay

S.No	Side	From	To	Length (Km)	15th Percentile MR values			Average Existing Crust		Total Crust (mm)	Adopted MR for BT (Mpa)	Strains From IITPAVE		Remaining Life as per IRC 37-2012 equation for 80% Reliability			
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)	BT (mm)	Granular (mm)			Vertical strain at bottom, epZ	Tensile strain at top, epT	Nf-Fatigue life, mSA	Rutting life,mSA	Target MSA	Remarks
42	LHS	163.60	163.80	0.20													No data
43	LHS	163.80	164.42	0.62													No Overlay
44	LHS	164.42	165.10	0.68													No data
45	LHS	165.10	165.70	0.60													No Overlay
46	LHS	165.70	166.73	1.03													No data

Table 41: Remaining life of the existing pavement on Service Road RHS

S.No	Side	From	To	Length (Km)	15th Percentile MR values			Average Existing Crust		Total Crust (mm)	Adopted MR for BT (Mpa)	Strains From IITPAVE		Remaining Life as per IRC 37-2012 equation for 80% Reliability			
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)	BT (mm)	Granular (mm)			Vertical strain at bottom, epZ	Tensile strain at top, epT	Nf-Fatigue life, mSA	Rutting life,mSA	Target MSA	Remarks
1	RHS	5.00	12.75	7.75	2673	346	77	83	370	453	2673						No Service Road
2	RHS	12.75	13.25	0.50								0.0004283	0.0002214	43	78	10	No Overlay
3	RHS	13.25	28.55	15.30													No Service Road
4	RHS	28.55	28.70	0.15													Under Construction
5	RHS	28.70	38.67	9.97													No Service Road
6	RHS	38.67	39.20	0.53													No Service Road
7	RHS	39.20	39.65	0.45													Under Construction
8	RHS	39.65	40.78	1.13													No Overlay
9	RHS	40.78	41.04	0.26													No Service Road
10	RHS	41.04	52.80	11.76													No Service Road
11	RHS	52.80	53.60	0.80													No Overlay
12	RHS	53.60	63.80	10.20													No Service Road
13	RHS	63.80	64.40	0.60													No Overlay
14	RHS	64.40	71.95	7.55													No Service Road
15	RHS	71.95	72.50	0.55	2707	232	77	89	384	473	2707	0.0004599	0.0002760	18	56	10	No Overlay
16	RHS	72.50	74.20	1.70													No Service Road
17	RHS	74.20	74.75	0.55													No Overlay
18	RHS	74.75	82.65	7.90													No Service Road

S.No	Side	From	To	Length (Km)	15th Percentile MR values			Average Existing Crust		Total Crust (mm)	Adopted MR for BT (Mpa)	Strains From IITPAVE		Remaining Life as per IRC 37-2012 equation for 80% Reliability			
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)	BT (mm)	Granular (mm)			Vertical strain at bottom, epZ	Tensile strain at top, epT	Nf-Fatigue life, mSA	Rutting life,mSA	Target MSA	Remarks
19	RHS	82.65	83.45	0.80													No Overlay
20	RHS	83.45	85.31	1.86													No Service Road
21	RHS	85.31	85.60	0.29													No Service Road
22	RHS	85.60	86.30	0.70													No Overlay
23	RHS	86.30	90.05	3.75													No Service Road
24	RHS	90.05	91.30	1.25													No Overlay
25	RHS	91.30	98.30	7.00													No Service Road
26	RHS	98.30	98.90	0.60													No Overlay
27	RHS	98.90	104.00	5.10													No Service Road
28	RHS	104.00	104.50	0.50													No Overlay
29	RHS	104.50	106.90	2.40													No Service Road
30	RHS	106.90	107.40	0.50													No Overlay
31	RHS	107.40	110.30	2.90													No Service Road
32	RHS	110.30	110.70	0.40													No Data
33	RHS	110.70	111.15	0.45													No Overlay
34	RHS	111.15	113.30	2.15													No Service Road
35	RHS	113.30	113.60	0.30								0.0004199	0.0002428	28	85	10	No Overlay
36	RHS	113.60	136.58	22.98													No Service Road
37	RHS	136.58	136.99	0.41													No Overlay
38	RHS	136.99	144.37	7.38													No Service Road
39	RHS	144.37	144.70	0.33													No Data
40	RHS	144.70	145.40	0.70													No Overlay
41	RHS	145.40	152.40	7.00	2856	325	77	60	420	480	2856						No Service Road
42	RHS	152.40	152.70	0.30													No Data
43	RHS	152.70	153.00	0.30													No Overlay
44	RHS	153.00	157.60	4.60													No Service Road
45	RHS	157.60	158.15	0.55													No Data
46	RHS	158.15	158.37	0.22													No Overlay
47	RHS	158.37	163.25	4.88													No Service Road
48	RHS	163.25	164.42	1.17													No Overlay

S.No	Side	From	To	Length (Km)	15th Percentile MR values			Average Existing Crust		Total Crust (mm)	Adopted MR for BT (Mpa)	Strains From IITPAVE		Remaining Life as per IRC 37-2012 equation for 80% Reliability			
					MR for BT (Mpa)	MR for Granular (Mpa)	MR for Subgrade (Mpa)	BT (mm)	Granular (mm)			Vertical strain at bottom, epZ	Tensile strain at top, epT	Nf-Fatigue life, mSA	Rutting life,mSA	Target MSA	Remarks
49	RHS	164.42	165.20	0.78													No Service Road
50	RHS	165.20	165.70	0.50													No Overlay
51	RHS	165.70	166.73	1.03													No Service Road
Total length				161.785													

From the above, for the Service Road there is **No overlay requirement** in both the carriageways (LHS & RHS) as the obtained remaining life of the pavement is greater than Target MSA.

Input data used and the output from the IIT Pave software has been presented as screen shots for ready reference as **Appendix 10** of this Report.

5.3 STRUCTURAL REHABILITATION

All the structure found to be in fair condition except little minor treatment like repair of stone pitching, cleaning of drainage spouts, cleaning of vegetation etc. may be required. Detailed structural rehabilitation quantities have been worked out based on the prevailing condition of existing structures. This methodology describes in detail the procedure for the execution of each item of rehabilitation work of the Existing Bridges of the project.

The scope of this methodology covers the items mentioned below for rehabilitation work of all the existing Bridges.

- Repair/ Replacement of Existing Bearings
- Repair / Replacement of Existing Expansion Joints
- Repair / Replacement of Existing Wearing Coat
- Profile Correction for Existing Deck Slab by Cement Concrete
- Sealing of Cracks for Bridges by Epoxy Resin
- Replacement of Spalled Concrete of ECW by Epoxy Mortar
- Cement Grouting for Repair of Existing Bridges
- Guniting / Shotcreting for Repair of Existing Bridges
- Providing & Fixing of Drainage Spouts
- Repair of Substructure Component
- Repair / Replacement of Railing & Crash Barrier
- Epoxy Bonding between New and Old Concrete.

CHAPTER 6. OPERATION AND MAINTENANCE

6.1 INTRODUCTION

Looking at the contractual requirements of maintaining project road under specified level of roughness it is felt that roughness is the most important criterion for finalizing the O&M schedule for the project. Accordingly, the methodology adopted by present consultants includes predicting the roughness year by year under the traffic using a well acknowledged HDH-4 model developed for developing countries like India after lot of research by World Bank. The said model is widely prescribed by MORTH and NHAI during the preparation of detailed project reports for several projects in doing economic analysis for the projects. The economic analysis mainly consists of two parts:

1. Predicting the road deterioration and estimating VOC
2. Estimating Benefits

Considering its importance and present use in India, consultants felt prudent to use the first part, i.e. estimating road deterioration and predicting roughness in HDM 4 model to finalize the O&M schedule for the project. This approach is more scientific as it does not assume hypothetical deflection values at 10^{th} and 20^{th} year and includes main criterion of maintaining roughness at 2750mm/km as per Schedule K.

6.2 CA SPECIFICATIONS FOR MAJOR MAINTENANCE

- Schedule K of CA species that Roughness values exceed 2750mm/km in a length of KM, needs to be corrected within 180 days. Roughness survey has to be done two times in a year.
- BBD survey to be done in every 5years.

6.3 INPUTS FOR MM SCHEDULE

6.3.1 PROJECT SECTIONS

The entire project road is divided into “three sections” based on traffic characteristics i.e.,

- Section-1: km 04+945 to km 53+175
- Section-2: km 53+175 to km 73+650
- Section-3: km 73+650 to km 166+730

Further, entire project stretch, i.e., all above 3 sections are considered as “Overlay sections” with 40mm BC.

Then, taking the consideration of Roughness as a key criterion for major maintenance, further the above sub-sections categorized in to four cases below:

- Case 1: Roughness value <2000 mm/Km
- Case 2: Roughness values 2000>=UI in mm/Km <2400
- Case 3: Roughness values 2400>=UI in mm/Km <2750
- Case 4: Roughness values >=2750 mm/Km

6.4 HDM INPUTS

FWD and Roughness values are used as obtained from surveys and investigations as below:

Section-1_LHS & RHS: 40mm Overlay

	LHS					RHS			
No Overlay	<2000	>=2000 and <2400	>=2400 and <2750	>=2750		<2000	>=2000 and <2400	>=2400 and <2750	>=2750
	case-1	case-2	case-3	case-4		case-1	case-2	case-3	case-4
Length, km	42.055	6.175				43.055	3.175	2.000	-
Roughness, mm/km	1521	2173				1614	2114	2586	-
IRI	2.19	3.02				2.31	2.95	3.53	-
Deflection, mm	0.43	0.40				0.40	0.38	0.39	-
Cracking, %	2.91	5.64				2.27	4.10	5.95	-
Ravelling, %	0.02	0.05				0.02	0.02	0.11	-
Rut Depth, mm	3.97	4.04				3.74	4.75	4.02	-
Patching, %	0.27	0.03				0.16	0.03	0.84	-
Potholes, %	0.19	0.14				0.07	0.00	0.00	-
BT Crust, mm	117	121				124	126	130	-
Granular Crust, mm	442	424				376	383	405	-

Section-2_LHS & RHS: 40mm Overlay

	LHS					RHS			
No Overlay	<2000	>=2000 and <2200	>=2200 and <2500mm	>=2500		<2000	>=2000 and <2200	>=2200 and <2500mm	>=2500
	case-1	case-2	case-3	case-4		case-1	case-2	case-3	case-4
Length, km	20.475					18.650	1.825		
Roughness, mm/km	1341					1586	2225		
IRI	1.96					2.28	3.08		
Deflection, mm	0.38					0.41	0.43		
Cracking, %	1.57					15.32	2.90		
Ravelling, %	0.01					0.06	0.03		
Rut Depth, mm	3.45					4.17	7.43		
Patching, %	0.14					0.48	0.51		
Potholes, %	0.05					0.26	0.00		
BT Crust, mm	123					108	130		
Granular Crust, mm	471					460	340		

Section-3_LHS & RHS: 40mm Overlay

LHS					RHS			
No Overlay	<2000	>=2000 and <2200	>=2200 and <2500mm	>=2500	<2000	>=2000 and <2200	>=2200 and <2500mm	>=2500
	case-1	case-2	case-3	case-4	case-1	case-2	case-3	case-4
Length, km	72.350	16.730	3.000	1.000	73.350	19.730	-	-
Roughness, mm/km	1475	2142	2477	2761	1562	2239	-	-
IRI	2.13	2.98	3.40	3.74	2.25	3.10	-	-
Deflection, mm	0.33	0.27	0.21	0.44	0.32	0.29	-	-
Cracking, %	1.75	0.39	6.61	0.00	3.65	6.05	-	-
Ravelling, %	0.01	0.02	0.00	0.00	0.03	0.06	-	-
Rut Depth, mm	4.73	7.02	6.06	8.27	6.23	7.54	-	-
Patching, %	0.17	0.11	0.35	0.07	0.20	0.06	-	-
Potholes, %	0.03	0.18	0.00	0.00	0.03	0.35	-	-
BT Crust, mm	117	112	123	110	121	122	-	-
Granular Crust, mm	462	444	426	560	473	442	-	-

6.5 OPTIONS FOR MM SCHEDULES

Based on the requirements of CA, various options have been considered to be used as responsive overlays triggered at specified level of roughness of 2750 mm/km. Micro surfacing has also been considered to examine its feasibility for major maintenance.

Following options were considered in the analysis:

- ✓ Base Case: Micro Surfacing at Roughness of 2750mm/km with regular maintenance It is pertinent to note that Base alternative is included as “Do nothing Scenario” for the purpose of analysis in model. It is not be reckoned with.
- ✓ Opt-1: Responsive Mill & Overlay of 30mm BC whenever roughness is >2750mm/km with regular maintenance
- ✓ Opt-2: Responsive Mill & Overlay of 40mm BC whenever roughness is >2750mm/km with regular maintenance.
- ✓ Opt-3: Responsive Mill & Overlay of 50mm BC whenever roughness is >2750mm/km with regular maintenance.

6.6 ROUGHNESS PROGRESSION

Roughness progression for each section under each alternative maintenance option has been done using the deterioration models in HDM-4. Following graphs represents the roughness progression for each alternative:

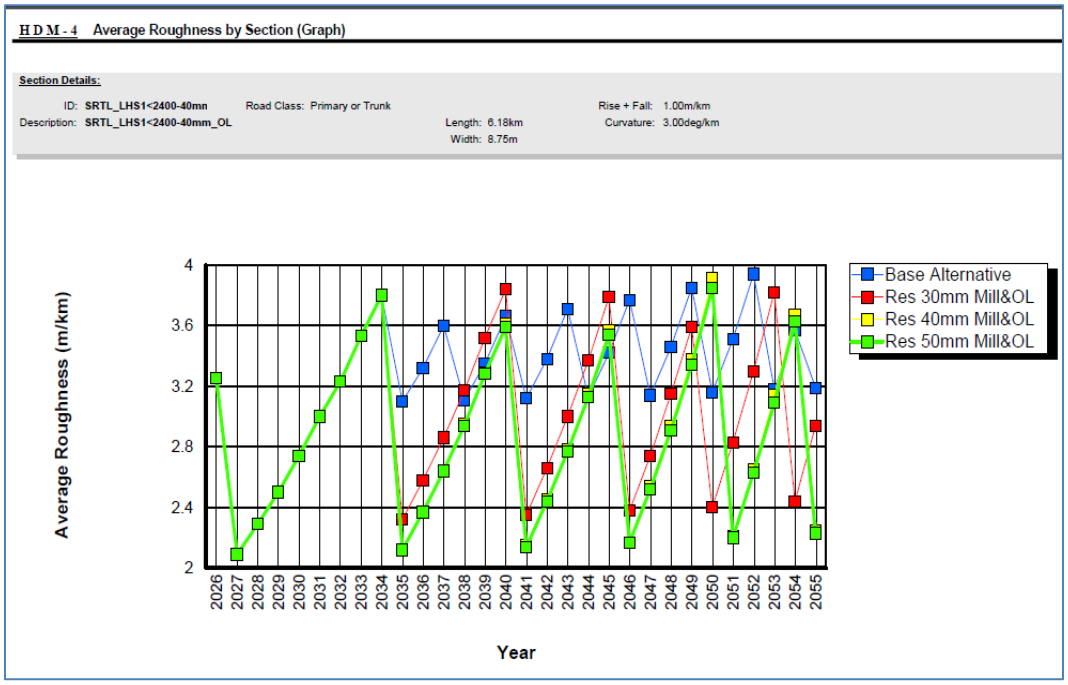


Figure 1: Average Roughness in LHS Carriageway Sec-1: 40mm Overlay (LHS<2400mm/Km)

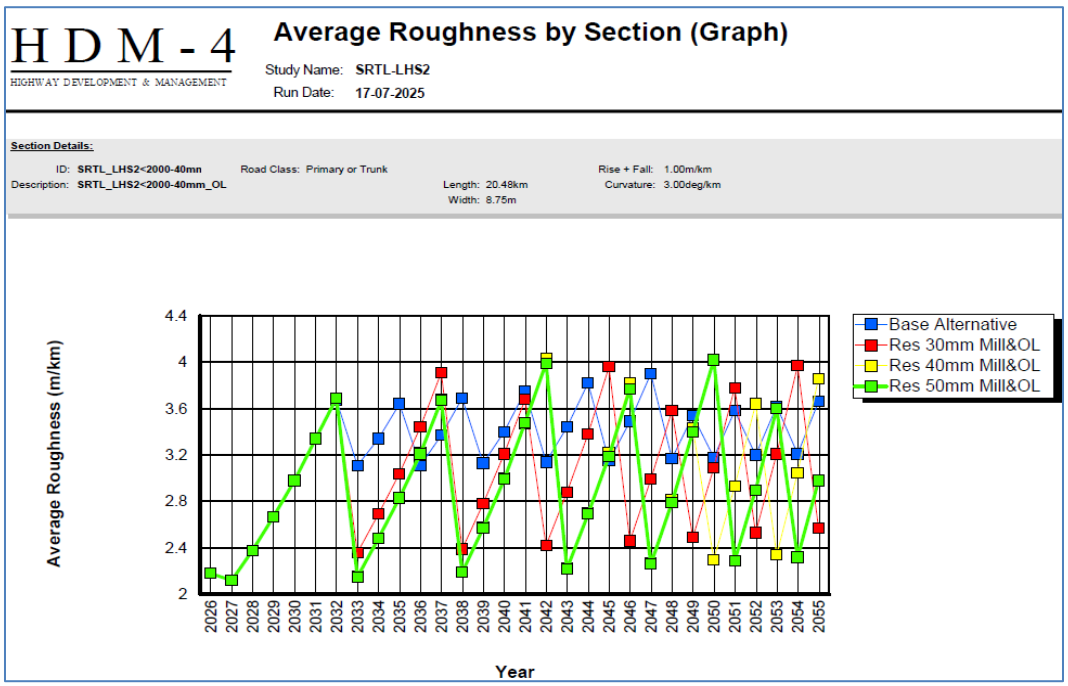
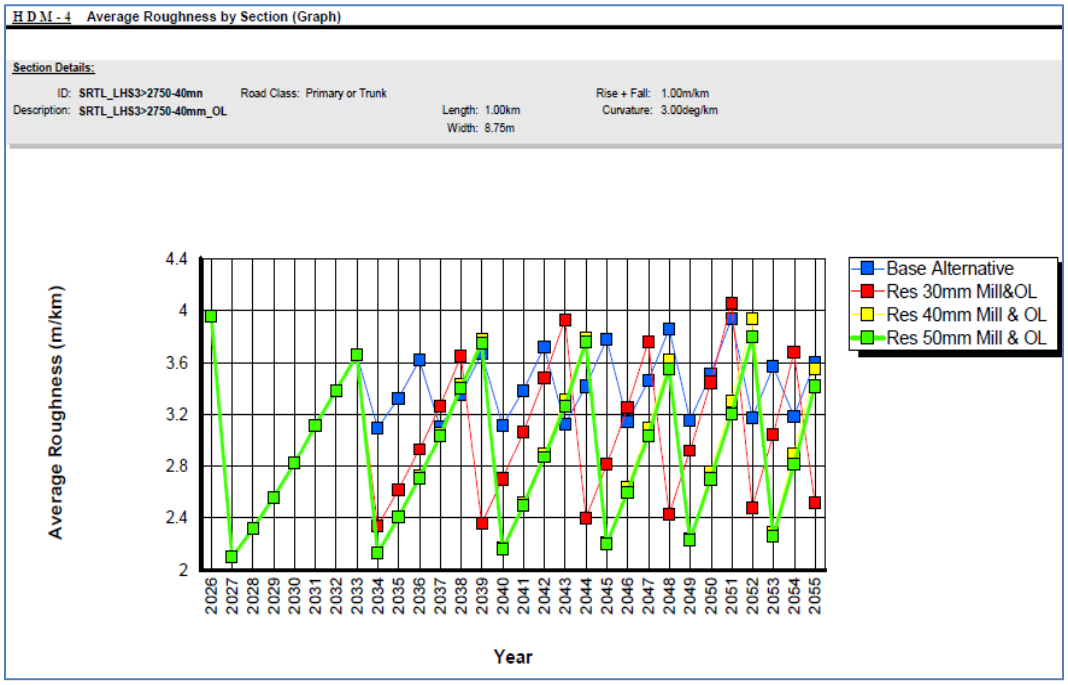


Figure 2: Average Roughness in LHS Carriageway Sec-2: 40m Overlay (LHS<2000mm/Km)



No table of figures entries found.**Figure 3: Average Roughness in LHS Carriageway Sec-3: 40mm Overlay (LHS>2750mm/Km)**

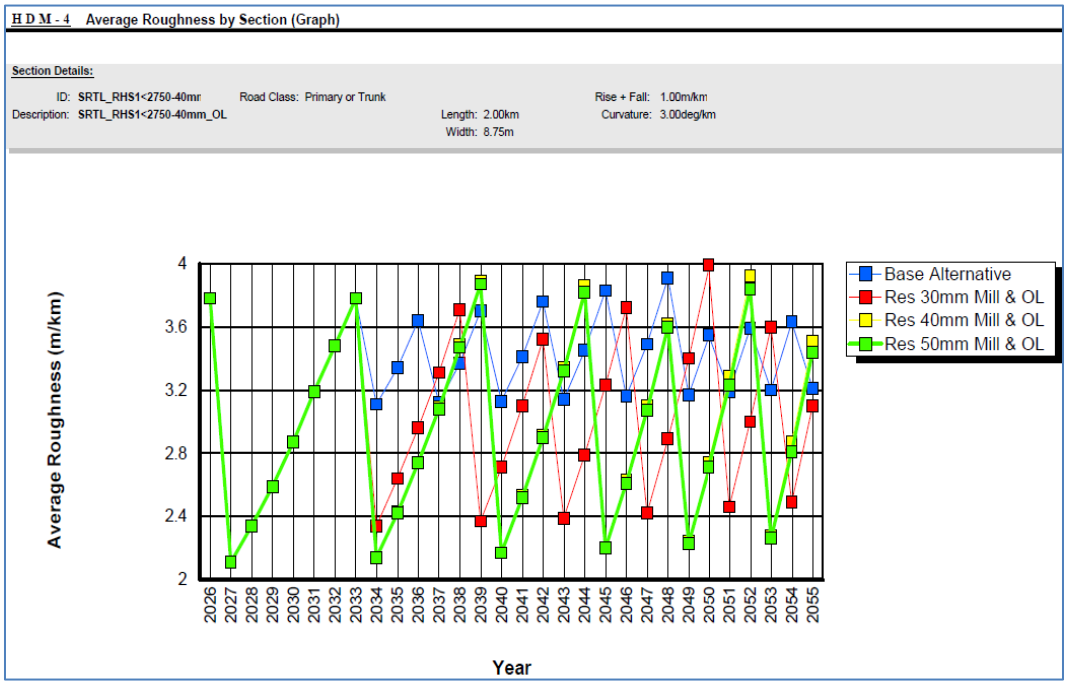


Figure 4: Average Roughness in RHS Carriageway Sec-1: 40mm Overlay (LHS<2750mm/Km)

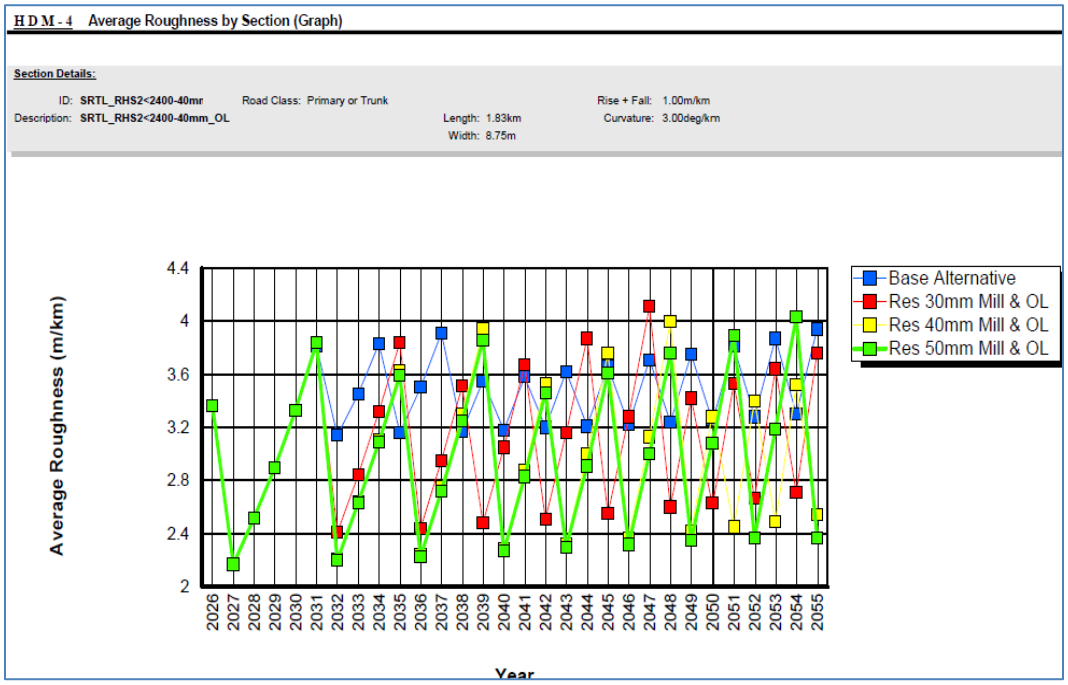


Figure 5: Average Roughness in RHS Carriageway Sec-2: 40mm Overlay (RHS<2400mm/Km)

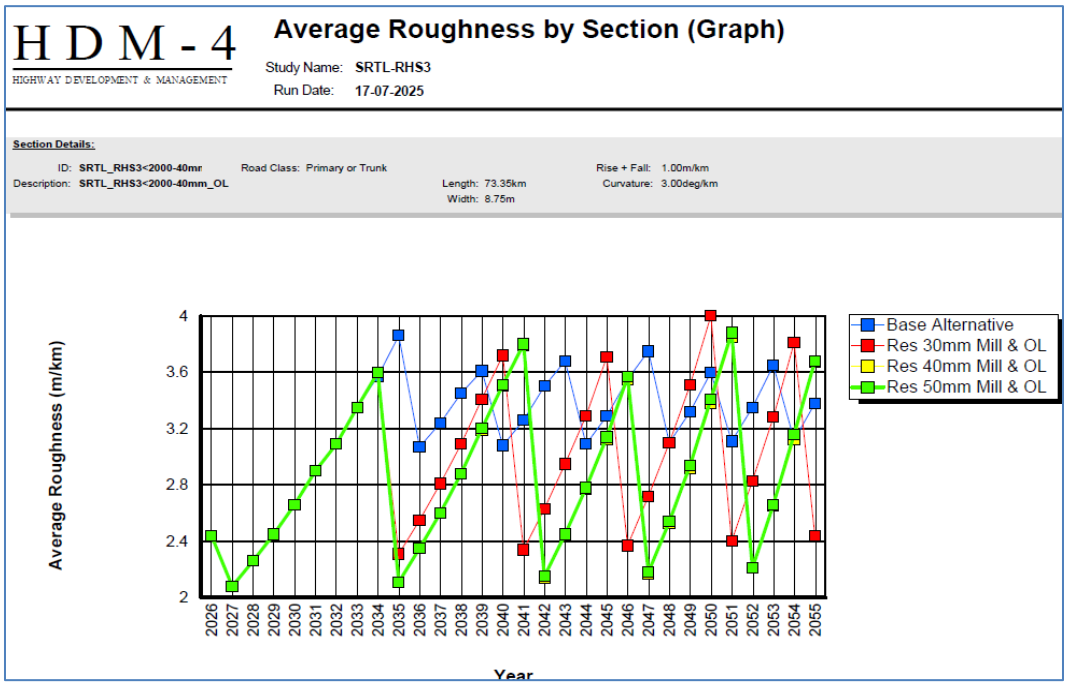


Figure 5: Average Roughness in RHS Carriageway Sec-3: 40mm Overlay (RHS<2000mm/Km)

6.7 ADOPTED M&M SCHEDULE

Looking at the present condition, progression of traffic with actual traffic growth rates, it is felt prudent to consider 50mmBC-PMB/40mm BC as OL as the preferred option, with certain percentage of additional DBM in subsequent cycles. Adopted MM schedule for the project is as below.

	LHS, Length in "mts"		
Planned in -->	***2026***	***2034***	***2041***
Milling required for BC?	***No***	***Yes***	***No***
BC- 50 mm with PMB 82E-10	**44000**		
BC- 40 mm with PMB 82E-10			
BC- 40 mm with VG 40	117671	161671	
BC- 30 mm with VG 40			161671
DBM- 50 mm with VG40	21250	8084	

	RHS, Length in "mts"		
2026	***2033***	***2040***	
No	***Yes***	***No***	
44000			
117671	161671	44000	
		161671	
42500	20209		

6.8 STRUCTURAL PERIODIC MAINTENANCE STRATEGY

Expansion joints:

- Visual inspection is carried out to check for seal breakages, Armor angle, Weld failures, cracks between deck & Expansion joints concrete and Joints filled with debris. Such joints shall be replaced immediately.
- In the absence of records pertaining to Expansion joint replacements it is highly difficult to predict the date of replacement needed for compliance to IRC codal requirements. However, periodic maintenance is considered.

Bearings:

- All types of Bearings are considered for periodic maintenance.

Wearing Coat:

- Wearing coat is a very weak component of the bridge structure which is subjected to severe deterioration due to Loading, Environment etc. This requires periodic maintenance and is considered in BOQ.

Cost Component for various items and activities have been worked out by considering the Best Industry practice and most appropriate methods. Detailed quantities for work items have been estimated based on the details presented in previous chapters for various heads as per schedule provisions, roughness criteria (RI<2500mm/km) and other required parameters inline with Concession Agreement provisions.

The gist of the cost components considered are presented below:

- Immediate Repair's Cost
- Routine Maintenance Cost
- Incident Management Cost
- Periodic Maintenance Cost
- Operations Cost
- Year by Year total O&M Costs

7.1 RATE ANALYSIS

Detailed rate analysis has been carried out based on MORTH guidelines to arrive at the unit rates of various items. Material rates and their leads from the project corridor are considered as per the material investigations done on the project road. Summary of unit rates arrived at are presented in table below:

Table 42: Summary of Unit Rates of Basic material

S No	Description	Units	Source	Basic rate excluding Transportation & GST	Lead in Kms
1	VG-40 (CAPEX)	MT	Haldia	45336	546
2	VG-40 (MMR)	MT	Haldia	45336	546
3	PMB - CAPEX	MT	Haldia	57012	546
4	Good earth	Cum	BA	36	10
5	40 mm	Cum	Crusher	1043	31
6	20 mm	Cum	Crusher	1448	31
7	12 mm	Cum	Crusher	1248	31
8	6 mm	Cum	Crusher	1030	31
9	Dust	Cum	Crusher	927	31
10	M sand	Cum	Crusher	1078	31
11	Bitumen 60/70	MT	Haldia	45371	546
12	Bitumen 80/100	MT	Haldia	44633	546
13	CRMB-55	MT	Haldia	51993	546
14	SS1	MT	Haldia	45000	546
15	Steel	MT	Sambalpur	50000	107
16	HTS Strands	MT	Sambalpur	75000	107
17	Cement	MT	Sambalpur	7600	107

Note: For asphalt pavement works, a discount of 7.5% is applied on Bitumen (VG-40) to the present market rate.

Table 43: Summary of Major Material Rates excluding GST

S No	Item	Unit	Rate (INR) Excluding GST
1	Embankment - borrow	Cum	432
2	Embankment - Excavation	Cum	91
3	Subgrade	Cum	449
4	GSB G-2	Cum	3127
5	WMM	Cum	3219
6	Prime Coat	Sqm	52
7	Tack coat on granular	Sqm	17
8	DBM G-1-VG-40	Cum	9861
9	Tack coat on bituminous surface	Sqm	16
10	BC - G1-VG-40-CAPEX	Cum	11830
11	Road Marking	Sqm	362
12	RE wall	Sqm	3069
13	Select Fill	Cum	494
14	Filter Media	Cum	1337
15	M15	Cum	7079
16	M20	Cum	8093
17	M25	Cum	8763
18	M30	Cum	8573
19	M35	Cum	8999
20	M40	Cum	9147
21	PSC M45	Cum	11008
22	PSC M50	Cum	13449
23	PSC M55	Cum	13625
24	HYSD	MT	73425
25	HT strand	MT	151278
26	CTSB	Cum	3914
27	CTB	Cum	4263
28	PQC	Cum	8752
29	DLC	Cum	4597
30	PMB-CAPEX	Cum	13564
31	CRMB	Cum	12818
32	PMB-MMR-Gr1	Cum	13564
33	BC - G1-VG-40-MMR	Cum	11830

NOTE: 1. Item rates are considered for medium projects

2. Labour: State Minimum Wages, Odisha as on April'2025 of construction workers

7.2 IMMEDIATE REPAIRS COSTS

Costs associated with immediate repairs are estimated based on the detailed asset inventory and condition assessment surveys, Pavement condition and structural condition assessment surveys. Items which are not executed as part of scope or in damaged condition have been considered for immediate costs as a part of 1-year Capex. Following items are mainly considered for immediate costs:

- Scope which is not executed
- Road work items
- Bridge Work Items
- Pavement Rehabilitation works
- Structural Rehabilitation works
- Drainage Works
- Slope Protection works
- Safety Works

Immediate repair costs assessed by the Consultants have not been included, as the Concessionaire is undertaking the rehabilitation works at site.

7.3 ROUTINE MAINTENANCE & INCIDENT MANAGEMENT COSTS

Routine maintenance costs include general maintenance costs of road elements, bridge elements and road furniture and appurtenances. This can be mainly divided into two parts as:

- ✓ General Maintenance of Works
- ✓ Repairs to Highway & Bridge Elements

7.3.1 General Routine Maintenance

General Routine Maintenance of Roads generally include following items:

- Cleaning of Project facilities
- Structures cleaning,
- Cleaning of ROW
- Cleaning and Maintenance of Toll Plaza
- Unlined Drain Maintenance
- Lined Drain Maintenance
- Maintenance of Highway Lighting at Toll Plaza and other project locations
- Median Plantation maintenance & Avenue plantation maintenance:
- Maintenance of Road Furniture
- Maintenance of Road Safety Items

The above items are estimated by considering the detailed break-up of following items:

- Manpower including Managers/Labour etc.

- Vehicles for Labour Transport/Water Tankers/Sweeping Machines etc.
- Resources/Equipment's such as grass cutters, tools, jet sprayers, hydraulic trimmers etc.

7.3.2 Repairs to Highway & Bridge Works

Repairs to highway and bridge works have been estimated based on the assumed quantities (Percentage basis) of execution for every year.

These items include the following:

A. Roads

1	Providing treatment for sealing of road surface / isolated cracks at scattered locations
	i) covered with 6.7 mm size stone chipping @ 0.1 cum/ 10 sqm.
	ii) covered with dry coarse sand passing through 2.36 mm sieve and retained on 180-micron sieve @ 0.03 cum/10 sqm heated to 600 C
	iii) filling discrete cracks with slow curing bitumen emulsion as per Technical Specification Clause 3004.3.3
2	Providing treatment to bleeding bituminous surface at scattered locations
3	Providing localized repair to rutted portion and edge breaking of bituminous surface
4	Providing treatment and repair to pot-holes and patch work
5	Providing and laying dense bituminous macadam using bitumen grade 60/70 complete as per Technical Specification Clause 507
6	Proving and laying bituminous concrete (asphaltic concrete)
	(a) Using bitumen (VG-40) as per IRC: SP: 53
7	Road Roughness survey
8	Turfing on embankment slopes and at all other Project Facilities
9	Providing repair to stone pitching/apron at scattered locations
10	Rain Cuts Maintenance: Restoration of rain cuts soil, moorum, gravel or a mixture of these
11	Cleaning of Lined Drain
12	Repair of damaged lined drain
13	Unlined drain cleaning
14	Filling in median island with approved materials with all leads and lifts complete as per TS Clause No. 407
15	Replacing damaged / broken railing with new pre-cast / cast-in-situ, concrete railing to match with existing design and pattern.
24	Carrying out repair to road signs including strengthening resetting or otherwise repairing signs and delineators
	a) Road sign board mounted on single post
	b) Road sign board mounted on double post
	c) Overhead/ Gantry Sign boards
	d) Delineator
25	Supplying and fixing at site retro-reflectorized type sign boards/signs
	90cm Equilateral triangle
	60cm circular
	90 cm circular
	90cm high octagon
	80cm x 60cm rectangle

	Chevron signs 60cm x 45cm
	Place identification signs (Fig 15.7 of IRC 67)
	Providing and fixing Object Markers
	Providing and fixing of retro-reflectorized Route Marker signs (size 450mm x 600mm)
26	Hazard Marker Sign:
	a) size 90 x 30 cm
	b) size 30cm triangular side cluster of red reflectors (screen printed)
27	Cats Eyes/Raised pavement marker (NMC Nails Less)
28	Painting two coats on old surface after minor repairs to give an even and smooth surface and printing letters and figures with synthetic enamel paint
	a) Hectometer stones
	b) Kilometer Stone
	c) 5 Kilometer stone
	d) Boundary stone
	e) Guard stone
29	Providing painting lettering and fixing of distance measurement stones including dismantling of old damaged/ broken ones, confirming to TS Clause 804
	a) Hectometer stones
	b) Kilometer Stone
	c) 5 Kilometer stone
	d) Boundary stone
	e) Guard stone
30	Providing and fixing road delineators conforming to TS Clause No. 805 as directed by the Engineer.
31	Repainting the Kerb stones and separation barrier with first quality synthetic enamel paint of approved brand
32	Painting all types of pavement markings including lines, dashes, arrows etc. on roads as per relevant IRC/MOST standards after cleaning the surface complete in all respects as directed by the Engineer.
	a) Hot applied Thermoplastic compound
	(i) Lane / Centre Line / Edge Line
	(ii) Direction Arrows, Diagonal Chevrons Markings, PC etc.,
	(iii) Transverse bar Marking
33	Supplying and laying cast-in-situ cement concrete Kerb without channel section
	a) by Manual/machine including formwork
34	Major repair / replacement of metal beam crash barrier (W profile guard rails)
35	Providing and fixing chain link/ welded mesh fencing / square bars fencing
36	Dismantling the old damaged chain link/welded mesh / square bars fencing and replacing it with new chain link/ welded mesh/square bars fencing
37	Provision of rumble strips
38	Shoulder Maintenance
39	synthetic enamel paint of approved brand on metal pedestrian guard rail
40	Dismantling of wearing course
41	Toll Plaza building repairs, booths, canopy and also maintenance of TP buildings
42	Median plantation maintenance
43	RE wall Maintenance

B. Structures

1. Wearing coat comprising of 50 mm thick BC.
2. Cleaning and adding rubber sealant near expansion joints.
3. Modular Expansion joints.
4. Replacement of Damaged Concrete Railing all complete as per technical specifications and as directed by the Engineer
5. Provision of an RCC crash barrier (0.35sqm cross sectional area) constructed with M-40 grade concrete including reinforcement
6. Cleaning of rocker & roller bearing using high pressure water jet, free from rust scales, re-setting & greasing the bearings using graphite grease including cost of materials, labour etc., complete.
7. POT PTF Bearings greasing and maintaining (sand plastering).
8. Elastomeric Bearings and maintaining.
9. Cutting of groove of 15 mm x 15 mm along crack and sealing the same with epoxy putty including cost of material, labour etc.
10. Carrying out 50 to 60 mm thick shortsheeting using a mix proportion of 1:2:2 (cement: sand:6 mm down aggregate) added with Polypropylene fibers at a dosage rate of 125 gms/bag of cement including cost of labour, material, scaffolding, equipment etc complete.
11. Repair of Floor Aprons, pitching and other protection works
12. Cleaning of Drainage Spouts
13. M-25 Concrete

7.3.3 Incident Management Cost

Incident Management & Safety items include the following:

- ✓ ATMS control room operations,
- ✓ Regular patrolling & reaching accident/incident site,
- ✓ providing relief to injured persons including taking them to nearest hospital and attending to the safety requirements at the location (putting cones, safely guide & manage the traffic using signs, safety barricades, etc.),
- ✓ removal of accident /breakdown vehicles, removing of dead animals/birds lying on the highway and loading, unloading, transportation & disposal of surplus material left over by accidental vehicle or otherwise lying on road (on carriageway) and
- ✓ Encroachment prevention & removal with all lead & lifts complete with proper communication equipment,
- ✓ consumables, materials, suitable Towing vehicles, Ambulance, patrolling vehicles and manpower like drivers, helpers, para-medical staff, labour including deployment of crane and all works shall be done as per requirement and as directed by Client representative and as per Relevant Specifications as applicable.

7.4 OPERATIONS COSTS

Cost towards Operations include the following:

- Electricity Bill of lighting
- Toll Plaza Operation cost
- Operation and management costs of rest areas and lay byes
- SPV Costs
- Survey Costs
- Insurance
- Audit Charges
- IE Fee
- Administrative Cost

Following table presents the summary of Operations & Maintenance cost for the project

Table 44: 1st Year O&M Cost, FY26

S No	Description	Amount in Crores.	GST %	GST Amount Crores	Total Crores
	SPV - Expenditure				
1	SPV staff	3.42	-	-	3.42
2	Highway lighting	3.05	-	-	3.05
3	Tolling and ATMS AMC/ Spare Parts	0.45	18%	0.08	0.54
4	Surveys & Investigations (BBD, Roughness)	0.18	18%	0.03	0.22
5	IE fees	0.98	18%	0.18	1.16
6	Insurance Charges	1.23	18%	0.22	1.46
7	Audit Charges	0.10	18%	0.02	0.12
8	Admin cost - Board Meeting Expenses, valuation etc.	0.12	18%	0.02	0.15
	Agency - Expenditure				
9	Toll Operation - Agency	4.91	18%	0.88	5.79
10	Route patrolling	3.66	18%	0.66	4.32
11	TAP & MAP	-	-	-	-
12	Routine maintenance	6.13	18%	1.10	7.23
13	Repair of Road - BoQ Items	7.20	18%	1.30	8.49
14	Repair of Structures	0.27	18%	0.05	0.32
	Total Amount in CRs	**31.72**		**4.54**	**36.27**

Note: *The Costs are at Base Year FY2026 with GST and without escalation*

Further, O&M Cost for FY2026 has been escalated with 5% and the projected Y-O-Y cost is as presented below:

Financial Year (FY)	Y-O-Y O&M Including GST, in Crores
FY2026	36.27
FY2027	38.08
FY2028	39.98
FY2029	41.98
FY2030	44.08
FY2031	46.29
FY2032	48.60
FY2033	51.03

Financial Year (FY)	Y-O-Y O&M Including GST, in Crores
FY2034	53.58
FY2035	56.26
FY2036	59.07
FY2037	62.03
FY2038	65.13
FY2039	68.39
FY2040	71.81
FY2041	75.40

7.5 PERIODIC MAINTENANCE COSTS

Cost towards major maintenance include following:

- ✓ Cost of Periodic maintenance of Pavement based on Finalized MM schedule
- ✓ Cost of Periodic Maintenance of Structures
- ✓ Cost of Periodic replacement of Toll Equipment's & Software

As suggested by Client, periodic maintenance cost has been projected with 2% escalation.

Table 45: Periodic Maintenance Costs in Crores

S No	Financial Year (FY)	Periodic Maintenance				
		Functional +Structural overlay MCW+ S/R	Major Maintenance of Rigid Pavement	Replacement of **ATMS**	Replacement of **TMS**	Structure specified repairs
1	2026	242.95	-			-
2	2027	-	-			-
3	2028	-	1.22	4.53	3.41	2.04
4	2029	-	-			-
5	2030	2.54	-			-
6	2031	-	-			-
7	2032	-	-			-
8	2033	119.60	1.35			4.67
9	2034	122.32	-	6.80	3.83	-
10	2035	-	-			-
11	2036	-	-			-
12	2037	2.91	-			-
13	2038	-	1.49			8.47
14	2039	-	-			-
15	2040	115.32	0.78	5.74	4.32	2.59
16	2041	109.67	-			-
	Total:	**715.30**	**4.84**	**17.07**	**11.56**	**17.77**

Note: The amount is Crores inclusive of GST (18%) and with 2% escalation, considering FY2026 rates

- The project corridor has 4-lane divided carriageway with Flexible pavement with an overall length of 161.785 km.
- In total, 3 Toll Plazas provided within the Project Stretch.
- The O&M requirements related to the Project based on Schedules and Manuals are as follows:

Applicable Manual	Applicable Schedule for O&M	Maximum Roughness Allowed	Minimum Thickness of Mandatory Overlay	Frequency of Roughness Test	Frequency of BBD Test	Remarks
IRC: SP:84-2009	Schedule-K and Manual	2750 mm/Km	-	2 Times in a Year	Once in a 5-Years	Overlay Design shall be done as per IRC:81

- Majority length of the Project Road exhibits excellent to fair riding quality. However, the roughness threshold limit of 2750 mm/km is exceeded only in 1 km stretch.
- Based on pavement condition, entire length of the project road is rated as excellent to satisfactory. However, only 1 km length is showing fair condition.
- From FWD analysis, for the main carriageway there is an overlay requirement for a length of 31.941 km in LHS and 110.605 km in RHS as the obtained remaining life of the pavement is lesser than Target MSA.
- The following MMR cycle are considered during the concession period

	LHS, Length in "mts"			RHS, Length in "mts"		
Planned in -->	***2026***	***2034***	***2041***	***2026***	***2033***	***2040***
Milling required for BC?	***No***	***Yes***	***No***	***No***	***Yes***	***No***
BC- 50 mm with PMB 82E-10	**44000**			**44000**		
BC- 40 mm with PMB 82E-10						
BC- 40 mm with VG 40	117671	161671		117671	161671	44000
BC- 30 mm with VG 40			161671			161671
DBM- 50 mm with VG40	21250	8084		42500	20209	

- There is no immediate repair cost envisaged in this project as the Concessionaire is undertaking the rehabilitation works at site.
- In the Costing, the amount considered is Crores inclusive of GST (18%) considering FY2026 rates

Intended for

WATRAK INFRASTRUCTURE PRIVATE LIMITED

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October 2025

TECHNICAL DUE DILIGENCE REPORT

SIX LANING OF SAMAKHIALI GANDHIDHAM SECTION OF NH-8A FROM KM 306.00 TO KM 362.12 (LENGTH KM 56.16), IN THE STATE OF GUJARAT ON BOT TOLL BASIS



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TECHNICAL DUE DILIGENCE REPORT

SIX LANING OF SAMAKHIALI GANDHIDHAM SECTION OF NH-8A FROM KM 306.00 TO KM 362.12 (LENGTH KM 56.16), IN THE STATE OF GUJARAT ON BOT TOLL BASIS

Project name	**SIX LANING OF SAMAKHIALI GANDHIDHAM SECTION OF NH-8A FROM KM 306.00 TO KM 362.12 (LENGTH KM 56.16), IN THE STATE OF GUJARAT ON BOT TOLL BASIS**
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Acronyms and Abbreviations

BBD	Benkelman Beam Deflection	LCV	Light Commercial Vehicle
BOQ	Bill of Quantities	LHS	Left hand side
BC	Bituminous Concrete	LIE	Lenders' Independent Engineer
BOT	Build, Operate and Transfer	LT	Low Tension
CA	Concession Agreement	MOEF	Ministry of Environment and Forest
CAPEX	Capital Expenditure	MORT&H	Ministry of Road Transport & Highways
COD	Commercial Operation Date	MPRDC	Madhya Pradesh Road Development Corporation
CRPF	Central Reserve Police Force	MSA	Million Standard Axle
C & G	Clearing and grubbing	NCR	Non-Compliance Report
CRMB	Crumb Rubber Modified Bitumen	NH	National Highways
CUP	Cattle Under Pass	NHAI	National Highways Authority of India
DBM	Dense Bitumen Macadam	NHDP	National Highway Development Programme
DLC	Dense Lean Concrete	NRMB	Natural Rubber Modified Bitumen
DFO	Divisional Forest Office	NOC	No Objection Certificate
DG	Diesel Generator	OFC	Optical Fibre Cable
DLP	Defect liability period	OPEX	Operation Expenditure
DPR	Detailed Project Report	O&M	Operation and Maintenance
EIA	Environment Impact Assessment	PPE	Personal Protection Equipment
EMP	Environment Management Plan	PPP	Public-Private/Public Sector Partnership
EPC	Engineering Procurement & Construction	PQC	Pavement Quality Concrete
FCI	Food Corporation of India	PUP	Pedestrian Under pass
FRL	Formation Road Level	PWD	Public Works Department

FWD	Falling Weight Deflectometer	PCC	Plain Cement Concrete
GAD	General Arrangement Drawing	PD	Project Director
GFC	Good for Construction	PIU	Project Implementation Unit
GOI	Government of India	PLR	Prime lending rate
GSB	Granular Subbase	PMB	Polymer Modified Bitumen
HT	High Tension	PMC	Project Management Consultant
HMP	Hot Mix Plant	PUP	Pedestrian Under Pass
HDM	Highway Development & Management	QA/QC	Quality Assurance / Quality Control
IC	Independent Consultant	SDBC	Semi-dense Bitumen Concrete
IE	Independent Engineer	SPV	Special Purpose Vehicle
IPC	Interim Payment Certification	VDF	Vehicle Damage Factor
IRC	Indian Road Congress		

1. EXECUTIVE SUMMARY

1.1 General

We understand that **EAAA TransInfra Managers Limited** is the **Investment Manager, Chennai - Tada Tollway Private Limited ("CTTPL")** is the proposed **Project Manager** and **Watrak Infrastructure Private Limited ("WIPL")** is the **sponsor** of the **Citius Transnet Investment Trust ("Trust"** or **"InvIT")** and **M/s Samakhiali Bhachau Gandhidham Tollway Private Limited ("SBGTL")** is proposed to be part of the initial portfolio assets of the Trust. The Trust is registered with **Securities and Exchange Board of India ("SEBI")** as an infrastructure investment trust under the SEBI InVIT Regulations.

M/s Watrak Infrastructure Private Limited (hereinafter **"**the **Client"**) as sponsor has appointed **M/s Ramboll India Private Limited** (hereinafter referred as **"Technical Consultant"**) to carry out Technical Due Diligence of operational asset of 6 Lane National Highway, NH-41 (old NH-8A) from Samakhiali to Gandhidham in the state of Gujarat on DBFOT Basis (herein after refer as "the **Project**") which is being operated by **"M/s Samakhiali Bhachau Gandhidham Tollway Private Limited "** (hereinafter refer as **"**the **Concessionaire** or **Company** or **SBGTL"**)

1.2 Project Introduction

The Government of India had entrusted to National Highways Authority of India (NHAI) for development, maintenance, and management of National Highway No. 41 (old NH-8A) which includes.

- Augmentation of existing road to six laning of NH-8A from Samakhiali to Gandhidham (km 306.000 to km 362.16) (length 56.16 km) in the state of Gujarat on DBFOT basis.

The National Highways Authority of India (NHAI) invited proposals through notice dated November 2007 for the implementation of the project. Following the evaluation of bids received, the Authority accepted the proposal of a selected bidder, M/s Larsen and Toubro Limited along with its associate L&T Transco Pvt. Ltd. Accordingly, Letter of Award No. NHAI/NHDP-V/BOT(Toll)FR/21/SG/408 was issued to the selected bidder on 20 January 2010.

M/s Larsen and Toubro Limited subsequently promoted and incorporated the Concessionaire, L&T Samakhiali Gandhidham Tollway Private Limited, for the implementation of the project. The Concession Agreement was executed on 17 March 2010. The Appointed Date for the project was declared as 11 September 2010, marking the commencement of the 24-year Concession Period from that date.

The Completion Certificate for the project was achieved on 09 December 2024. The Project Highway is currently under the Operation and Maintenance (O&M) phase, in accordance with the provisions of the existing Concession Agreement. The concession period has been extended from the original end date of 10 September 2034 to the revised date of 12 November 2034. This extension is pursuant to the Supplementary Agreement executed on 28 November 2024, which granted an extension of 63 days.

Sekura India Management Limited completed the acquisition of the project and has been operating the project road in the name - Samakhiali Bhachau Gandhidham Tollway Private Limited (SBGTL).

Sl. No.	Feature	Details
1	Project Name	Six Laning of Samakhiali-Gandhidham-Section Road (NH-41) (old NH-8A)
2	Mode of the Execution (BOT Toll/ BOT Annuity/ EPC/ HAM/ Others)	Design Build, Operate and Transfer (DBFO Toll) Basis
3	Project Phase	Tolling, Operation, Maintenance and Transfer
4	No. of Lanes/ Configuration	6 lanes
5	Length of the Project (in Km)	56.160 km
6	Authority	National Highways Authority of India (NHAI)
7	Concessionaire	Samakhiali Bhachau Gandhidham Tollway Limited (SBGTL)
8	Independent Engineer	MSV International Inc.
9	Date of Signing of CA	17 March 2010
10	Letter of Acceptance	20 January 2010
11	Appointed Date	11 September 2010
12	Total Project Cost as per CA	Rs. 805.39 Cr.
13	PCOD	04 January 2020
14	Appointed Date	11 September 2010
15	Completion certificate issued on	09 December 2024
16	Concession period	24 Years
17	Concession end date	12 November 2034

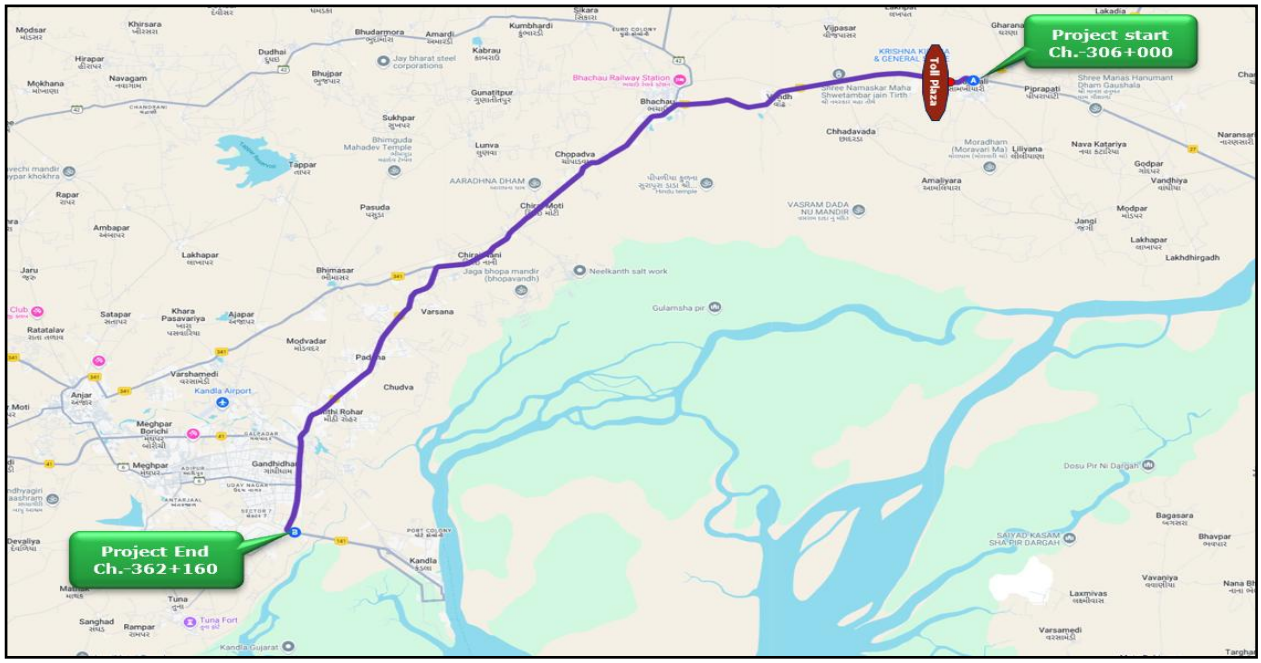
1.3 Project Description

The project runs east–west in Kutch and the stretch lies entirely in Kutch District, Gujarat, from Km 306.000 at Samakhiali to Km 362.160 near Gandhidham, covering a total length of 56.16 km. This section forms part of the strategic highway corridor connecting the inland national highway network with the major ports of Kandla and Mundra.

Terrain and Land Use

The Samakhiali–Bhachau–Gandhidham section traverses predominantly arid and semi-arid landscapes typical of Kutch district. The alignment follows the existing NH-41 corridor, widened from four to six lanes, and remains largely within the existing Right of Way (ROW) with localized bypasses and realignments. The land use along the stretch can be broadly, Agricultural land (dryland and irrigated pockets), Barren/scrub and salt-affected land, Industrial/warehousing and port-linked land, Built-up settlements and mixed-use roadside development.

Project Location Map



1.4 Scope of work

This report is prepared as per scope of work defined in Work Order and project information provided to us. Ramboll work, which is summarized in this Due Diligence Report, has been limited to matters which have been identified that would appear to be of significance within the context of scope of work.

This report is prepared based on visual condition survey of highway, structures, site investigations and evaluation of test results and project information and direction provided by the Client. In this report, Ramboll provides an overview of the asset based on site survey on 2025 from technical perspective, and executed at site, Review of available documents and site visit, Field inspection, investigations, and Analysis, Operations and Maintenance assessment, Major Maintenance strategy and assessment, Estimation of Opex and CapEx of the project, Preparation of presentation and project report.

1.5 Key Findings

The key findings of the project are mentioned below,

H	**High Priority:** Critical activities that will have material impact on cost of project during balance concession period
M	**Medium Priority:** Moderate likelihood of impact on cost of project during balance concession period
L	**Low Priority:** Low level of impact on cost of project during balance concession period

Diligence Area	Findings	Priority level
Completion Certificate (COD)	Project Road entered the commercial operation after, PCOD was issued on 4th Jan 2020. Completion Certificate was issued on 09 December 2024. Concession period ends on 12 November 2034. The contract is based on BOT basis	L
Operation and Maintenance	As per Section XVII of CA, the Concessionaire shall maintain project highway in conformity with Maintenance Requirements, the Maintenance Manuals or any schedules made as per plan. All the maintenance requirements shall be as per Sch-K	H
Maintenance Manual and Yearly Program	As per Article 17.3 of Concession Agreement, not later than 180 days prior to scheduled 4-laning date, the concessionaire shall in consultation with IE develop O&M Manual. While the maintenance programme not later than 45days prior to start of financial year during operation period the concessionaire shall provide to the authority and IE its annual plan covering immediate, periodic and scheduled maintenance activities.	H
Pavement Design	As per the approved pavement design report to the IE, the design CBR of 10% is considered with a design traffic of 100msa. The proposed flexible pavement of BC-50mm, DBM-130mm, WMM-250mm and GSB-200mm. However as per Pavement design Report Clause 1.11.3 Design of Pavement (As per IRC Guidelines) - (c) Pavement Thickness for New construction of Main Carriageway under Grade Separator Structure Locations - II homogeneous section Km.324.000 to Km.341.400 is designed for 150msa only change to DBM with 150mm thickness rest is same. For the SR with a design traffic of 10msa and CBR -10%, the thicknesses are BC-40mm, DBM-50mm, WMM-250mm and GSB-200m. In the Rigid pavement design for Toll Plaza designed as per IRC 58-2002 with PQC of 300mm with design CBR of 10%.	L
Pavement Condition	The pavement condition of the entire project road is observed to be in GOOD condition. A proper binder shall be chosen as per climatic conditions, as there seems to be few isolated settlements / depressions. It was observed that pavement is in POOR condition at structure locations majorly and few of the expansion joints are also found to be in defective condition.	H
Toll Plaza	The Concession Agreement mandates the establishment of a toll plazas at Km.308.800. A straight-line toll plaza with 18 physical Lanes (9 in each direction), which are equipped with Hybrid ETC equipment. All lanes at the Toll Plaza are equipped with Weigh-in- Motion (WIM) systems however none of them are functional. The Toll Plaza is equipped with Static Weigh Bridge (SWB) for detection and collection of overload penalties however the condition of the weigh bridge is very poor, and it looks like a very old installation. The condition of Toll Plaza pavement is GOOD in condition.	M

Diligence Area	Findings	Priority level
TMS and HTMS	As Per Schedule C, there is requirement of TMS following equipment's status of all equipment's is as follows: TMS maintenance at all four toll plazas is being done by i.e. M/s Techsture Technologies India Pvt. Ltd., for all the toll equipment with open tolling technology and is in the AMC since last 5 years. The complete TMS systems is working in good to fair condition however has gone end of life and is recommended for replacement. No ECBs installed only foundations were found installed at few locations The AVC is profiler based with independent storage but not sending parallel data to the database server Lane hardware is provided as per the industry standards	H
Major - Issue Identified by IE	As per the MSV International road safety audit report April 2nd, 2025, some of the critical issues are listed below, Service road critical damage on service road km.348.500 Some of the damaged road sections at edges Km.344.750 LHS, Covered drains condition of drain slabs between km.324 to km.331 on both sides of service roads. Severely distressed SR at Km.331.200 to Km.331.800 on LHS Damaged pedestrian guard rail at Km.324.200 and at other locations ECB theft cases Illegal dumping of garbage and food by local peoples on Service roads Salt transportation through open dumper trucks	H
Geometric Design	The project road is to be designed as per Specifications and Standards provided in Schedule D. Key parameters of design is as follows: Ruling design speed is 100 km/hr while the minimum design speed is 80km/hr	-
As-Built Drawings	As per Schedule -H, Annex-I, the Concessionaire is to deliver relevant records and reports pertaining to the Project Highway and its design, engineering, construction, operation and maintenance including all and all operation and maintenance records and programs and manuals pertaining thereto and complete As-Built Drawing on the Date of Divestment. The unsigned soft copies of the as-built drawings and typical cross-sections has been provided for the reference	M
Hand back Requirement	As per the CA all project assets including the road, pavement, structure and equipment shall have been renewed and cured of all defects and deficiencies as necessary so that project highway is compliant with the Specification and standards set forth in this Agreement. All sections of traffic lane shall have a roughness value not more than 2000 mm/km. All Lamps shall be in working condition It is understood that the maintenance and replacement of all lamps shall be covered by the annual O&M estimates. Additionally, all other defects and rectification relating to the asset is covered under the O&M and MMR estimate	H

1.6 Assessment of Project Assets

Projects asset inventory and their condition assessment is prepared through visual inspection during site visits, review and analysing the reports shared by the client, by field investigations validating the findings and by NSV survey. All the elements and components pertaining to project asset are reported

in subsequent Chapter 5, 6 & 7 of this report and their assessment is used to prepare the strategy for preventive, routine, and periodic maintenance. Salient features of the project are given below. The overall condition of the project and its assets are satisfactory. Salient features of the project are given below.

S.no	Description		Units	Total Quantities
1	Project Road		Km	56.160
2	Service Road in Rural Section (as per CA)		Km	LHS - 46.549 RHS - 40.974
3	Bypasses		Km	1.100
4	Major Intersections		Nos	9
5	Minor Intersection		Nos	10
6	Bus Bay & Shelters		Nos	24
7	Truck lay bye		Nos	6
8	Rest Area		Nos	NIL
9	Toll Plaza		Nos	1
10	Median Openings	Authorized	Nos	NIL
		Unauthorized	Nos	NIL
11	High Mast Light Locations		Nos	38
12	Solar LED Blinkers		Nos	5
13	Streetlights	Single Arm poles	Nos	729
		Double Arm poles	Nos	888
		Triple Arm poles	Nos	-
14	Fuel Stations		Nos	44
15	Pedestrian guard rail		Km	16.068
16	ECB (SOS Facility)		Nos	56
17	Gantry Boards	Cantilever Over Head	Nos	11
		Half Width Over Head	Nos	1
18	Sign Boards		Nos	874
19	Variable message sign (VMS)	Cantilever Over Head	Nos	0
		Half Width Over Head	Nos	4
20	Entry & Exit		Nos	92
21	5th / Ordinary Kilometer stones		Nos	106
22	Hectometer stones		Nos	354
23	Drainage	Median Drain	Km	3.127
		Shoulder drain	Km	78.549
		Earthen Drain	Km	27.325
		Cut Drains	Km	4.348

		Chute Drain	Km	4.397
24	Utility Corridor		Km	99.699
25	Median Plantation		Km	25.712
26	Metal Beam Crash Barrier (MBCB)	W-beam One Side	Km	1.165
		W-beam Two Side	Km	6.845
		Single side double beam	Km	74.603
27	Concrete Crash Barrier		Km	32.570
28	New Jersey Crash Barrier		Km	18.919
29	Land Use	Agriculture	Km	55.235
		Residential	Km	2.315
		Commercial	Km	33.454
		Water Bodies	Km	1.610
		Industrial	Km	14.802
		Mixed	Km	4.084
30	Kerb		Km	173.609
31	Chevron Signs		Nos	347
32	Road Studs		Nos	7447
33	OHM		Nos	444
34	Delineators		Nos	3790
35	Footpath		Km	136.093
36	Guard post		Nos	25
37	Parapet wall		Km	0.514
38	Handrail		Km	13.344
39	RCC railing		Km	0.497
40	Fencing		Length (km/m)	0.954
41	PTZ Cameras		Nos	7
42	Antiglare Screens		Nos	2435
43	Flexible median markers		Nos	1323

1.7 Assessment of Structures

Comprehensive visual inspection is carried out for inventory and assessing condition of Major bridges, Minor Bridges, Grade separators, underpasses ROBs and culverts. During the inspection and condition survey few Distresses are observed and are detailed in Chapter 6 of this project report.

Total nos. of structures on the Project Highway are given in the table below

Structure Type	Units	Structure as per MPR April 2025
MJB	Nos	5
MNB	Nos	23
VUP	Nos	11
Flyover	Nos	6
PUP	Nos	1
ROB	Nos	4
Culvert	Nos	51 (HP 33 nos & BC 18 nos)
Total	**Nos**	**101**

1.8 Toll Management System (TMS)

The project has one toll plaza comprising of hybrid ETC lane infrastructure of combined 18 lanes. Plaza also includes two reversible lanes, separate 2W lanes provided adjacent to the extra-wide lane in each direction.

Toll Plaza is equipped with Static Weigh Bridge (SWB) for detection and collection of overload penalties SWG looks like a very old installation, and it may be updated.

All lanes at the Toll Plaza are equipped with Weigh in Motion (WIM) systems however none of them are functional

TMS maintenance is in the AMC since last 5 years. Lane hardware is provided as per the industry standards, in all lanes are working in good condition. AVC and TLC panels are installed over the toll booth and secured inside a cabinet to protect the equipment from weather conditions. Fastag integration is done through IDFC. LSDU i.e. Lane Status Display Unit to monitor the entire hardware of each lane is provided. TMS systems is working in good condition.

HTMS is found installed and functional in this section of the highway with PTZ camera, ECBs, ATCC, VMS and ATCC.

1.9 Soil and Material investigation

Soil and Material investigation are done with the samples collected from pit investigation and the results are narrated in Chapter 8.

Subsoil along the project corridor is generally consistent and predominantly sandy nature. At one location, gravelly soil was observed. The degree of compaction along the project corridor is ranging between 92.0% - 97.0%. The 4-days soaked CBR along the project corridor is ranging from 10.3% to 26.5% with an average value of 15.8%.

Summary of strength parameters in the soil investigation is shown below.

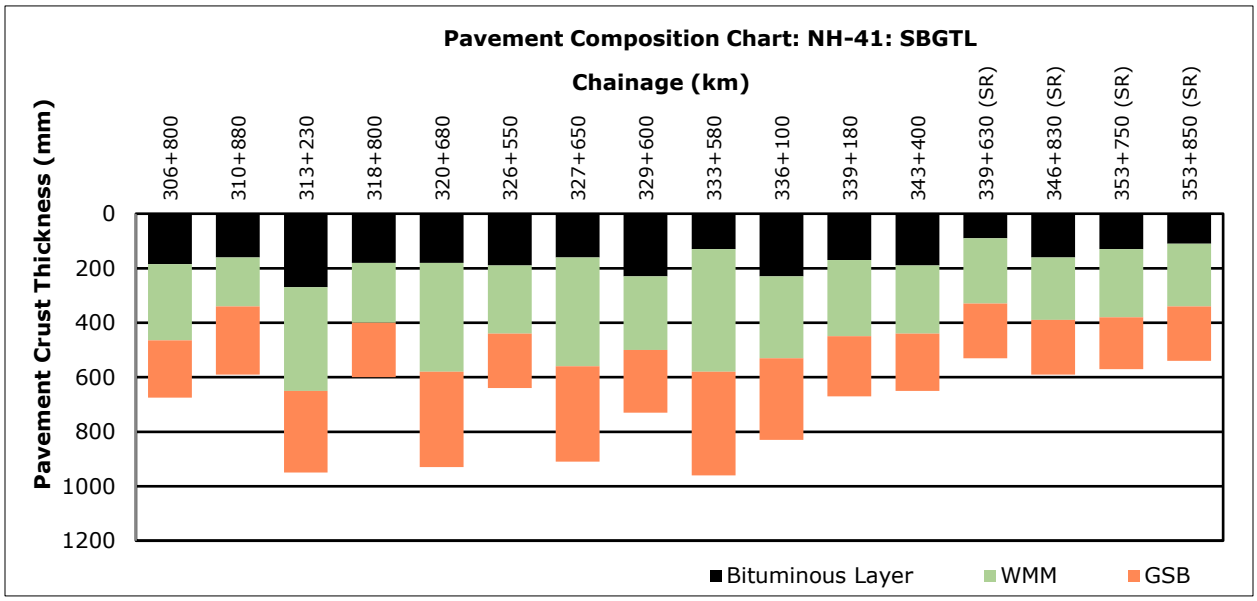
Description	Liquid Limit	Plasticity Index	Free Swell Index	4-days soaked CBR	Degree of compaction
Project - SAMAKHIALI GANDHIDHAM SECTION OF NH-8A FROM KM 306.00 TO KM 362.12	16%-29%	Max 11%	Max 22.2%	8.8%-26.5%	92.3%-96.7%
MoRTH Limits	**<50%**	**<25%**	**<50%**		

*Variance between MDD and FDD is converted in-terms of degree of compaction

Pavement composition

The existing pavement along the project corridor is bituminous pavement. The pavement composition comprises of bituminous layer, WMM Base over the GSB subbase. Summary of existing pavement crust thickness is presented in an illustrative bar graph below.

For MCW, an average of 190mm BT layer over an average aggregate layer of 538mm is observed.

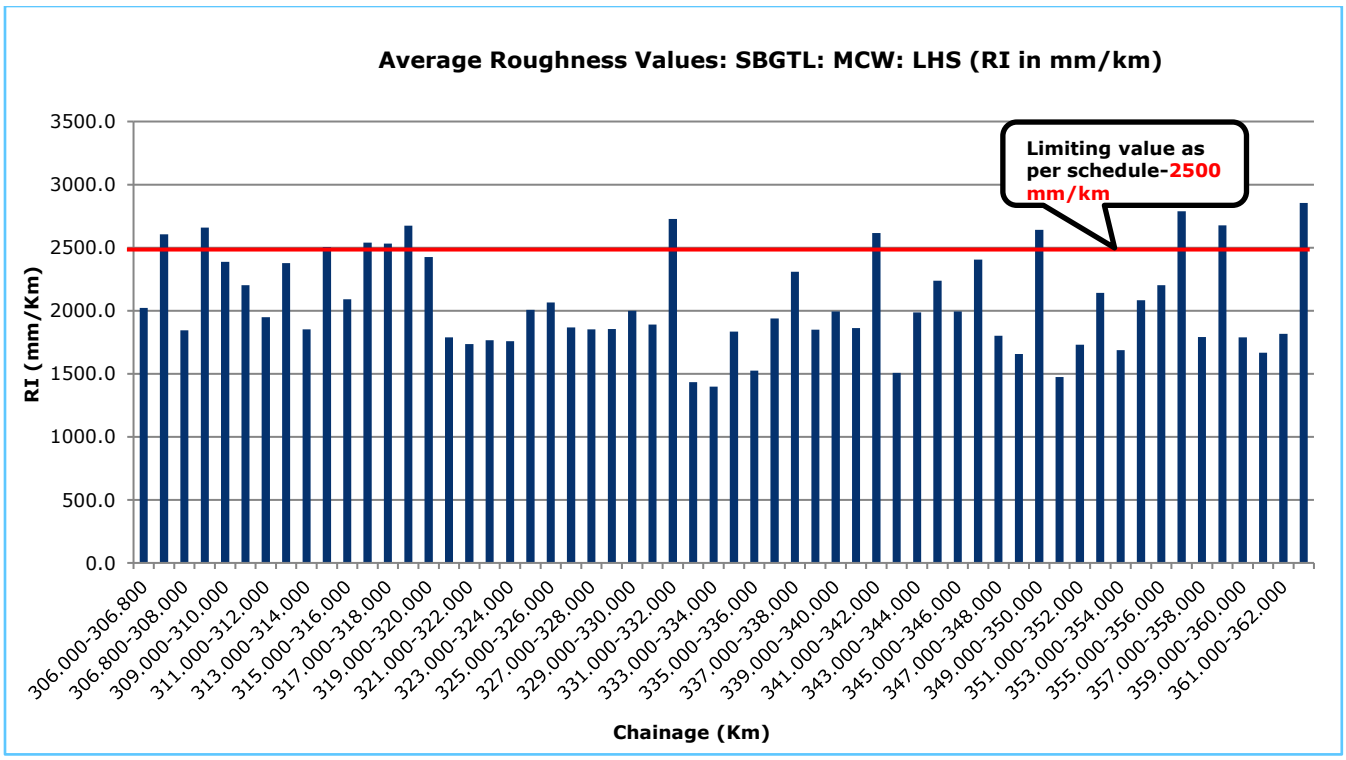


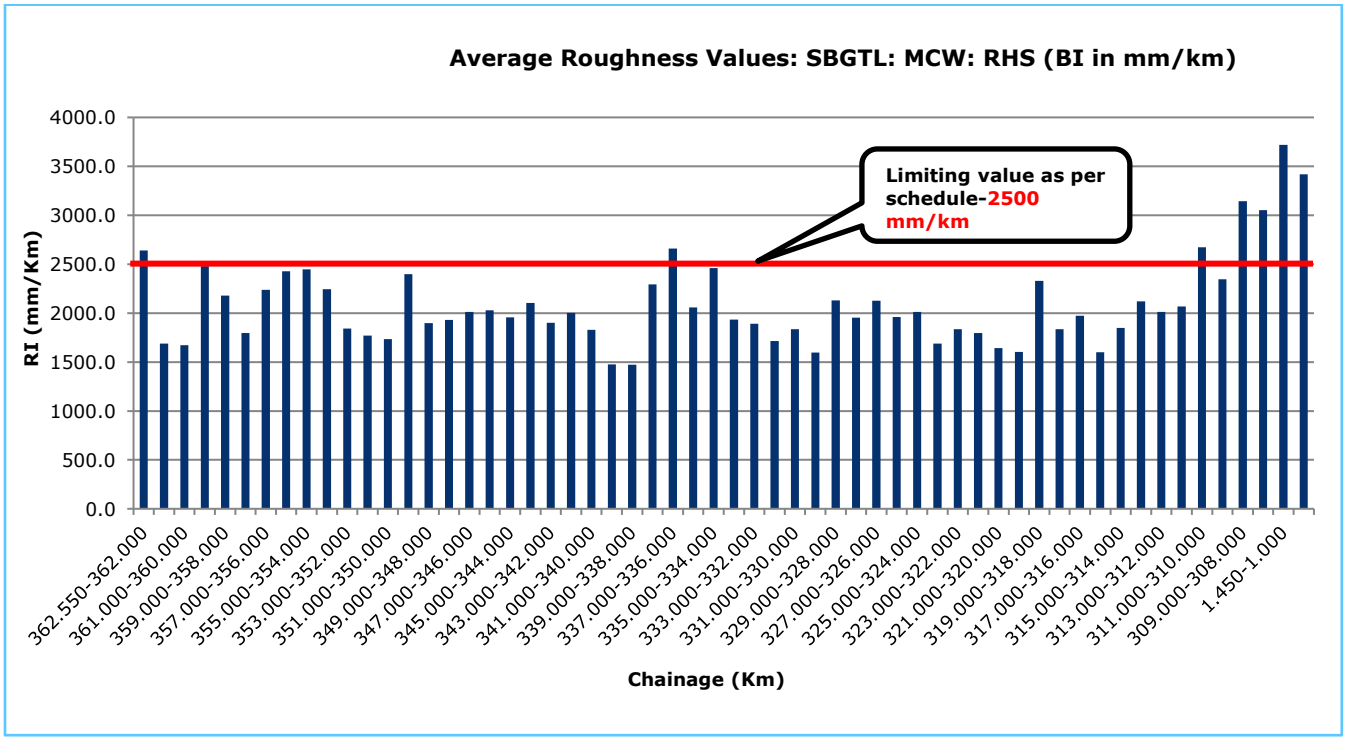
Bituminous core samples

Bituminous layer samples were extracted using a core cutting drilling machine with a 100 mm diameter bit to obtain representative bituminous core specimens. The core samples of BC refer to Grade-I, while DBM as Grade-II.

1.10 Pavement Evaluation

Pavement condition survey was carried out on each carriage way with NSV. The obtained lane wise Roughness summary in terms of RI (mm/km) is illustrated below and in Chapter 9 for Main carriage way and Service roads. The summarized roughness is presented below.



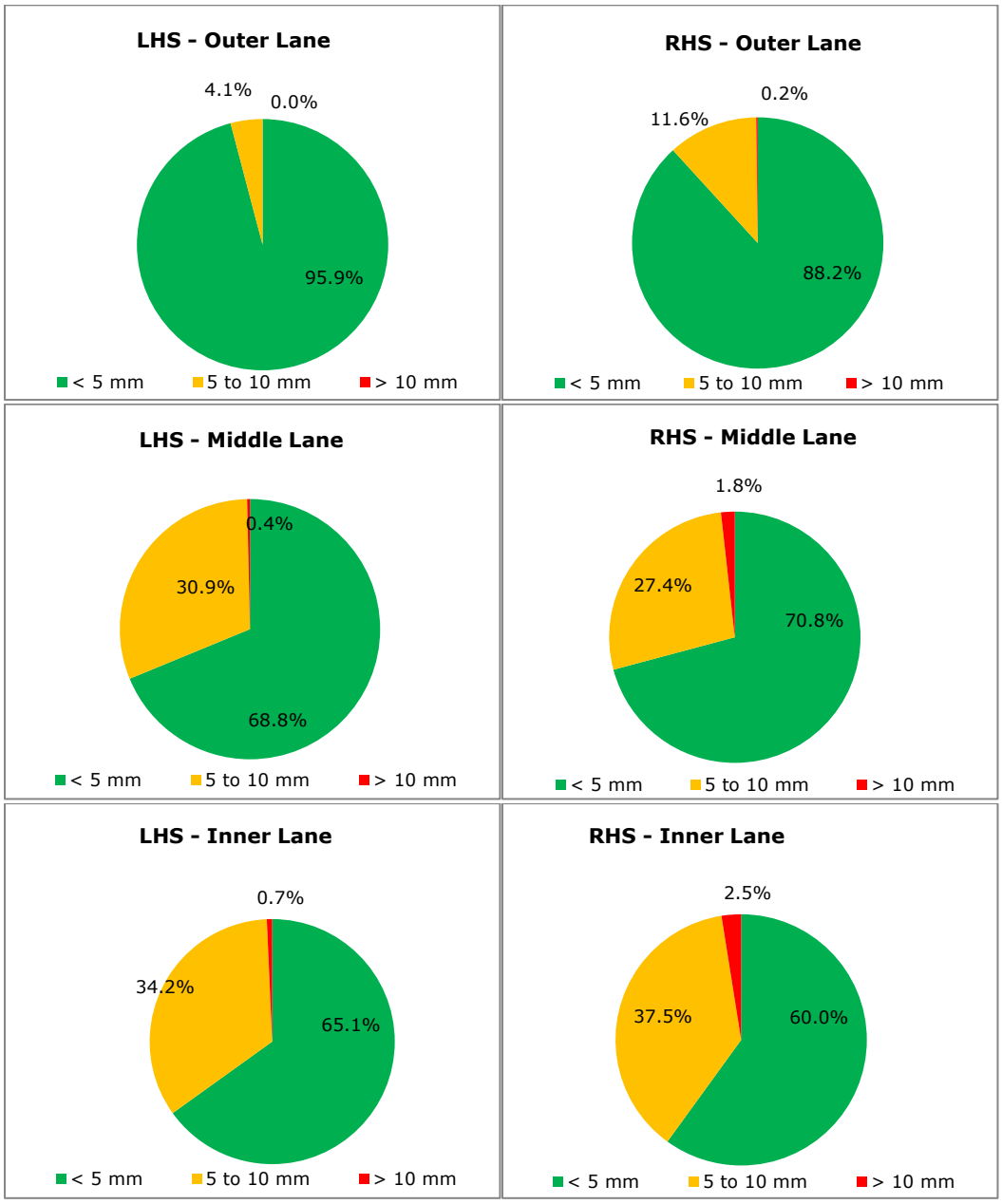


Illustrative summary of roughness for MCW both directions

Rutting data of flexible pavement section is also collected through Digital Laser Profilers System (DLP). The obtained lane wise rutting summary is graphically represented for both LHS & RHS direction for both MCW and SR as below and detailed in Chapter 9.

Main carriageway

On the LHS direction 600m and RHS 2.5Km the rutting values exceeded the 10mm

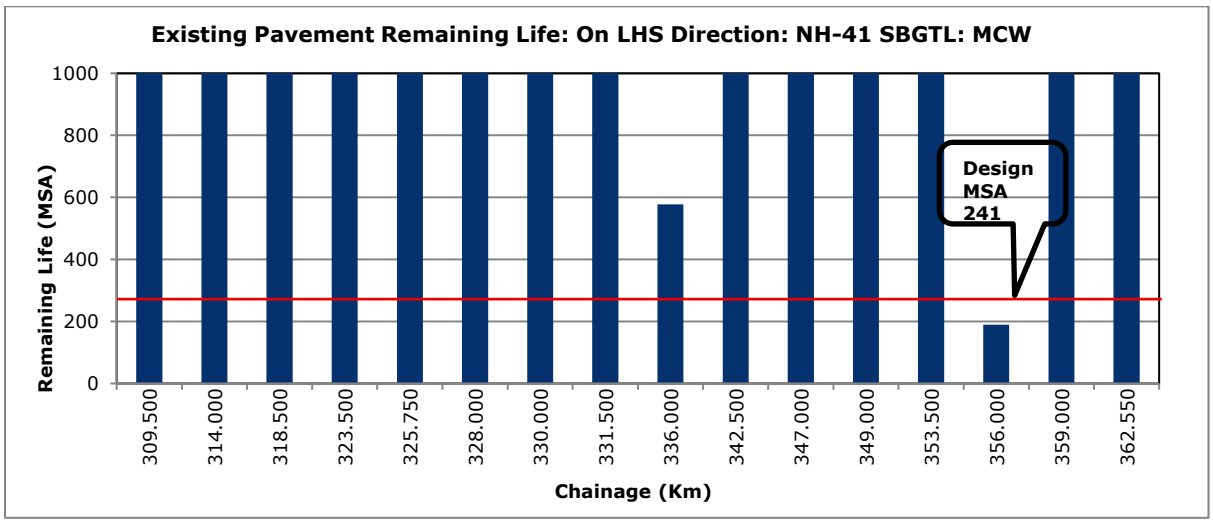


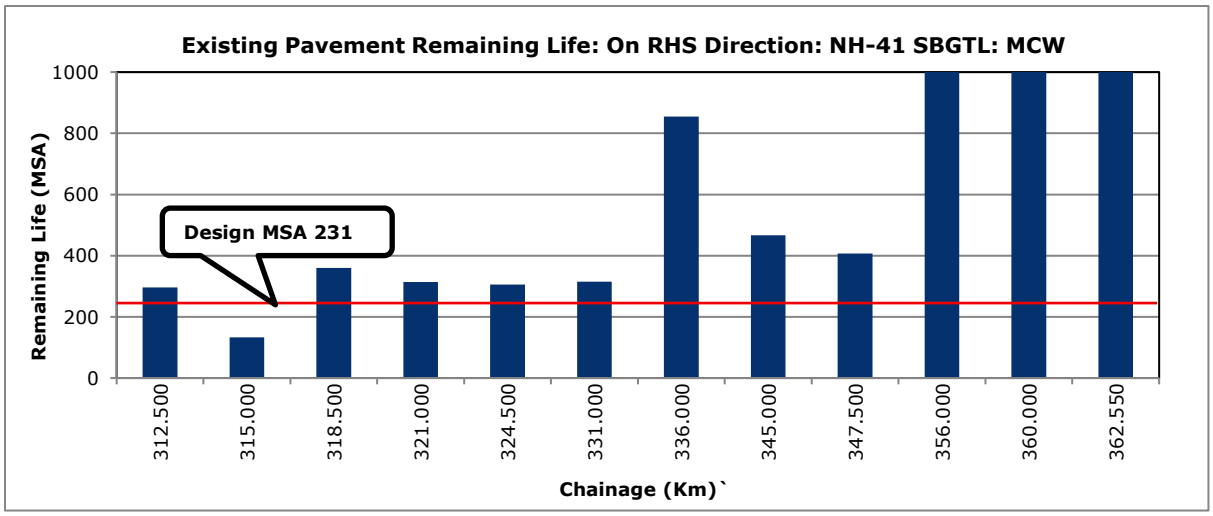
Illustrative summary of MCW rutting

Analysis of Flexible Pavement and graphical presentation:

The in-service 3-layer pavement system has been analysed with the back-calculated corrected layer moduli and layer thicknesses. From the performance criteria equations, the residual/remaining rutting and fatigue life have been estimated and Remaining life and required overlay are calculated.

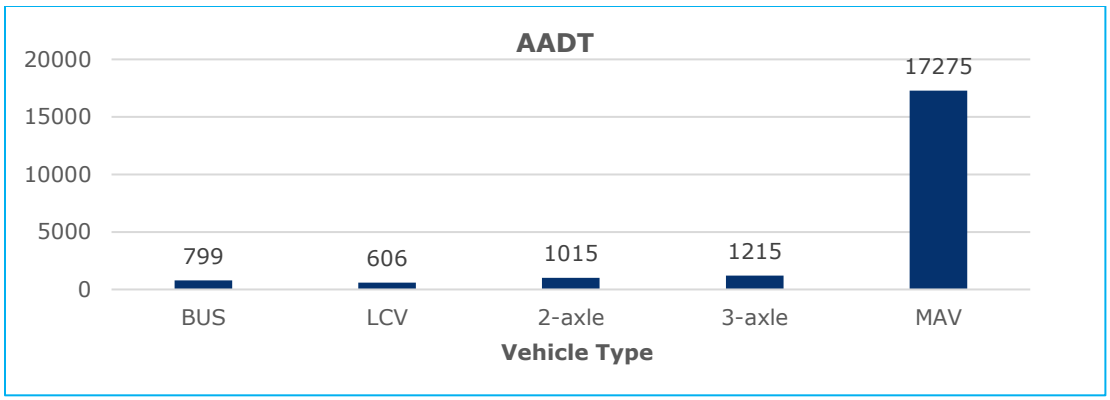
The detailed analysis is presented direction wise in Chapter 9 and the obtained remaining life are graphically presented below:





Illustrative summary of remaining life of MCW

Team for Technical Due Diligence conducted a 48-hr axle load survey at the toll plaza location. The Annual Average Daily Traffic (AADT) of all commercial class vehicles as provided by the client is shown below



VDF values are obtained as per the analysis of 48-hr axle load survey are presented below:

Location/ Vehicle Type		BUS	LCV	2axle	3axle	MAV
Samakhiali Toll Plaza	LHS	0.96	0.42	2.40	1.80	9.78
	RHS	0.85	0.40	1.87	5.40	9.15

AADT and 5% growth rates are provided by client, and the design traffic was projected till end of concession period. Design traffic for flexible pavement design is computed and shown below

Location	Design Traffic (MSA) up to FY 2035	
	LHS	RHS
Samakhiali Toll Plaza	241	231

Based on the remaining life assessment, it is observed that only 5.0km of the existing pavement need a structural overlay. The detailed direction-wise overlay thickness for the MCW presented below.

Chainage (Km)		Side (LHS/ RHS)	Length (km)	Recommended Overlay (mm)	
From	To			BC (mm)	DBM (mm)
353.500	356.000	LHS	2.5	40	-
312.500	315.000	RHS	2.5	40	-

1.11 Operation and Maintenance Requirements and Strategy

The Contractor and concessionaire shall always maintain that during the Operation Period, the Project Highway conforms to the maintenance requirements set forth in Schedule K

The Major Maintenance Strategy is assessed in 2 scenarios based on engineering practice and HDM-4 model. The recommended Major Maintenance Strategy till the end of concession period is presented below and elaborated in Chapter 10.

Major/Periodic Maintenance Strategy

Year	MM LHS of MCW	MM RHS of MCW	MM of SR	Remarks
YR 2025 - YR 2026	40 mm BC On 96% length 50mm BC on 4% length 50mm DBM on 1.3% length	40 mm BC on 97.5% length 50mm BC on 2.5% length 50mm DBM on 3.7% length		Base Year (MCW+SR)
YR 2029 - YR 2030	40 mm BC On 100% length	40 mm BC on 100% length 50mm DBM on 5% length	40 mm BC On 100% length	1st Cycle MCW
YR 2033 - YR 2034	30 mm BC On 50% length	30 mm BC On 50% length	30 mm BC On 50% length	2nd Cycle MCW

1.12 Cost Estimate

The cost estimate is worked out for expenses on Immediate Works, periodic renewals (CAPEX) and expenses on operations and maintenance (OPEX) at present rates considering 2025-26 as the base year and is detailed in Chapter 11. Cost Estimate is worked out for expenses on

i. The costs for the restoration / improvement of the Toll Plaza pavement, highway flexible pavement, structural repairs, and replacement of few TMS equipment. These costs are accounted for Capex (Initial Improvement works).
ii. Cost for Installation/restoration of Sign Board, Thermoplastic Marking on pavement, Installation/restoration of 5th, KM, HM, Boundary Stone, Painting of Kerb Stone, etc. are taken as Preventive Maintenance. Routine Maintenance and Repairs are also considered and evaluated till end of concession period.
iii. Highway Lighting, Tolling operations, Survey, Insurance Charges, Administrative Expenses, Incident management, AMC cost for TMS is included as Operational cost for the Concessionaire.
iv. Bitumen has been assumed to be sourced from IOCL Vadinar Refinery. PMB 76E-10 grade bitumen and VG-40 grade bitumen is considered in cost estimate. Tata steels are taken for cost estimate.

OPEX and CAPEX of the project is estimated till end of Concession period and presented in Table 11-2 and represented here below.

- Initial improvement works is estimated as INR 0.31 Crore.
- Periodic Maintenance is estimated as INR 422.94 Cr.
- Routine and preventive maintenance cost will be INR 56.11 Cr. and overall OPEX till end of concession for this 56.16 km stretch is INR 301.51 Cr.

CAPEX and OPEX for this 4-lane corridor are estimated till end FY 2032-33 as INR 724.75 Cr. This estimate includes 18% GST and annual escalation of 5% on Opex and 2% on Major Maintenance.

2. INTRODUCTION, APPROACH AND METHODOLOGY

Watrak Infrastructure Private Limited has engaged Ramboll India Private Limited to conduct a Technical Due Diligence (TDD) study for the Samakhiali Bhachau Gandhidham section of NH-41 (old NH-8A) in the state of Gujarat.

Accordingly, Ramboll team has undertaken the work of preparing Technical Due Diligence Report based on study of project related reports and documents, visual inspections, and field investigations.

2.1 Scope of Work and Compliances

The scope of work agreed with Watrak Infrastructure Private Limited for conducting the technical due diligence study is presented in Table 2-1. The table also presents the chapters of the Technical Due Diligence Report where different items of scope of work are covered.

Table 2-1: Scope of Work and Compliances

SN	Scope of Work	Discussed At
1	**Site Visit and condition Survey – Visual Assessment** Site visit will be undertaken by Highway and Structural Engineers, Tunnel Expert, Pavement Expert, Quantity Surveyor, TMS & HTMS Expert and engineers to have visual assessment done for the project stretch. Observations will be recorded and critical issues for the Project will be identified. Project Structural integrity issues that require rectification / re-mediation will be observed and recorded along with possible risk mitigation strategy & costing thereof. The Consultant shall carry out a detailed reconnaissance of the project area and shall record and highlight important features and point out any issue that may be of importance to the Client in terms of operation and maintenance of the project.	Chapter 1, 3, 5, 6, 7, 11
2	**Conducting inventory, condition surveys and Field Investigations for Project Road** Inventory and detailed condition surveys will be conducted for project highway, bridges & cross drainage structures, project assets, safety appurtenances, TMS & ATMS system including recommendation for either strengthening / rehabilitation or reconstruction / replacement. *Requirements for NDT tests will be identified and informed. Based on the preliminary investigations and walk-through along the stretch, the Consultant shall prepare a project road map indicating the following elements Inventory of existing project assets Existing pavement condition – kilometer-wise (along with Photographs thereof) Intersecting/Crossroads (along with Photographs thereof). Inventory and condition assessment of CD structures (along with Photographs thereof).	Chapter 1, 3, 5, 6, 7, 8, 9

SN	Scope of Work	Discussed At
	Condition assessment of pavement. Condition assessment of structures. Review the extent of balance work. The Consultant should prepare a photo-documentation (Soft copy) of the mentioned areas and any other important findings. The Consultant shall assess the adequacy of Operations & Maintenance, Toll Management System and Advanced Toll Management system. The following field investigations will be carried out for the project stretch. Falling Weight Deflectometer (FWD) Surveys NSV Survey Test Pit investigations. Core samples from pavement Axle Load Surveys	
3	**Review of available Project Documents and Reports** The available reports (Concession Agreements, Approved Pavement design report, Monthly Progress Reports, As-built Drawings, Correspondences of stake holders, Asset Management Contracts, Maintenance Manuals, Maintenance history etc) will be reviewed. The Consultant shall assess the completion status of work Vis-à-vis compared with schedule B, C and Schedule D	Chapter 4, 10
4	**Review of construction material and quality, Rehabilitation Plans by Developing strategy for immediate/periodic maintenance.** The Consultant should review of Quality of construction and compaction based on available data and from Laboratory testing of samples collected from trial pits, and cores The Consultant should conduct visual inspection of expansion joints, wearing coat, pitching, bearings, retaining structures, etc of the structures to assess the condition and requirements for its repair, replacements and / or rehabilitation. The pavement stretches along with the type of distresses will be identified analysing NSV and FWD data. The Consultant should assess maintenance cycles for pavements using HDM analysis. Repair techniques will be suggested for stretches requiring immediate rehabilitation measures. Pavement maintenance strategy (functional overlay/ structural overlay) will be developed for the entire concession period to bring back riding quality of each lane of the carriageway to maximum permissible as stipulated in the Concession Agreement.	Chapter 5, 6, 7, 9, 10, 11

SN	Scope of Work	Discussed At
5	**Preparation of BoQ and Cost Estimate** Bill of Quantities will be prepared for Immediate repairs, Routine maintenance, Periodic/major maintenance, O&M Cost, and Improvement works as per Schedule B of the CA. O&M cost will involve Routine maintenance and Incident Management, Tolling Operations, Admin Expenses and Preventive Maintenance. The Consultant should provide cost till the end of the concession period including any expected extension of Concession periods as informed by the Client. For assessing the cost, Ramboll will use rates available in the market or from the inhouse data base.	Chapter 12

2.2 Deliverables and Timelines

The deliverables and the timelines for the study are as under:

SN	Deliverables	Time period
1	Project Appreciation Report (PAR)	Within 15 days from date of receipt of Agreement from the Company.
2	Draft Report	Within 30 days from date of receipt of Agreement from the Company.
3	Final Report all-inclusive along with Preventive / Major Maintenance and yearly O&M Cost estimates	Within 15 days from draft report or within 7 days from the comments received from client on Draft report, whichever is earlier

The above timelines assume that all project related data are available at the start of work.

2.3 Structure of the Report

In line with the requirements of agreed scope of work, this Technical Due Diligence Report is being submitted. The report is organised in the following fashion.

Chapter 1	**Executive Summary:** The chapter presents an overview of the project after review & study of documents, site investigations and estimates for maintenance.
Chapter 2	**Introduction, Approach and Methodology:** The chapter presents a brief approach and methodology adopted for carrying out the Due Diligence Study.
Chapter 3	**Project Description:** The chapter summarises the project features based on Concession Agreement requirements.

Chapter 4	**Review of Concession Agreement:** This chapter contains a short review of the existing HAM CA of the package.
Chapter 5	**Assessment of Project Assets - Highway:** The chapter presents the details of various essential features of the project highway recorded through reconnaissance survey and data obtained through NSV Survey.
Chapter 6	**Assessment of Project Assets - Structures:** The chapter presents the details of various essential features of the structures recorded through visual inspection.
Chapter 7	**Assessment of Project Assets – Toll Systems:** The chapter presents the details of various essential features of the Toll Plaza Systems and associated facilities recorded through visual inspection.
Chapter 8	**Soil and Material Investigations:** This chapter describes the tests carried out for soil and material samples collected from site and analysis of the test results.
Chapter 9	**Pavement Evaluation Studies:** This chapter describes the tests carried for pavement evaluation and analyses of the test results.
Chapter 10	**Development of O&M Strategy:** The chapter presents the details of O&M strategy developed based on the Pavement evaluation studies and analysis described in Chapter 10.
Chapter 11	**Cost Estimate:** The chapter outlines the key assumption considered for cost estimate and provides details of cost estimates under various heads viz immediate, O&M and major maintenance for the concession period

2.4 List of Shared Documents of the project.

Documents shared by Watrak Infrastructure Private Limited for Technical Due Diligence of the project and Ramboll reviewed the information are given below.

- Concession Agreement of the projects
- Pavement Design Report (June 2012, 5th Revision as per IE comments)
- O&M Subcontracts agreement
- Road Safety Audit Report for February 2025
- Road Safety Audit Report for March 2025
- Road Safety Audit Report for April 2025
- Monthly Progress Report for March 2025
- Project Cross sections and Plan and Profile

- Project Manpower and Insurance fees
- Electricity Charges
- SBGTL Organogram
- AMC for TMS & HTMS

2.5 Approach and Methodology

Our approach and methodology to address the requirements defined in terms of reference are briefly presented below.

- Identification of objectives of Client through detailed study of scope of work and discussions with the Client.
- Identification of Assignment specific team of professionals covering all the skills and specializations required and involving with the assignment from day one.
- A Team Leader is assigned to coordinate various events / activities of various team members.
- Assessment of data / information required is made at the time of Proposal / Engagement letter and the list is shared with the Client.

2.6 Study

The following briefly presents the process followed for the present study.

- The data available for the project are collected from site offices of PIU – NHAI and of respective Independent Engineers of three packages.
- The data is reviewed by the study team and information collated in different categories e.g., asset inventory, contracts, change of scope, communications from NHAI, maintenance strategy and maintenance costs etc.
- Data gaps are identified through the above process and communicated to the Client.
- Detailed review of all the available data is carried out.
- Site visit is made by team of experts to understand the project features and observations are recorded.
- Field tests are carried out as per agreed scope of work.
- The test results are analysed in detail and maintenance strategies are developed.
- Inferences are made on various items of scope of work based on the available data and compared with the requirements of existing concession Agreement. Issues are flagged wherever required.
- The costs associated with the project under various head (immediate, routine operation and maintenance and Major Maintenance) are worked out in accordance with the requirements of existing Concession Agreement under current scenario.
- Finally, a comprehensive report is prepared covering all aspects of the agreed scope of work.

2.7 Delivery

Delivery follows the following flow:

- Formats of agreed deliverables are formalized and shared with Client, wherever required.
- Deliverables are shared with the Client within agreed timelines.

2.8 Feedback

Regular and end-of-the-assignment feedback are obtained from the client for further enhancing the quality of service.

3. PROJECT DESCRIPTION

The Government of India had entrusted to National Highways Authority of India (NHAI) for development, maintenance, and management of National Highway No. 41 (old NH-8A) which includes.

- Augmentation of existing road to six laning of NH-8A from Samakhiali to Gandhidham (km 306.000 to km 362.16) (length 56.16 km) in the state of Gujarat on DBFOT basis.

The National Highways Authority of India (NHAI) invited proposals through notice dated November 2007 for the implementation of the project. Following the evaluation of bids received, the Authority accepted the proposal of a selected bidder, M/s Larsen and Toubro Limited along with its associate L&T Transco Pvt. Ltd. Accordingly, Letter of Award No. NHAI/NHDP-V/BOT(Toll)FR/21/SG/408 was issued to the selected bidder on 20 January 2010.

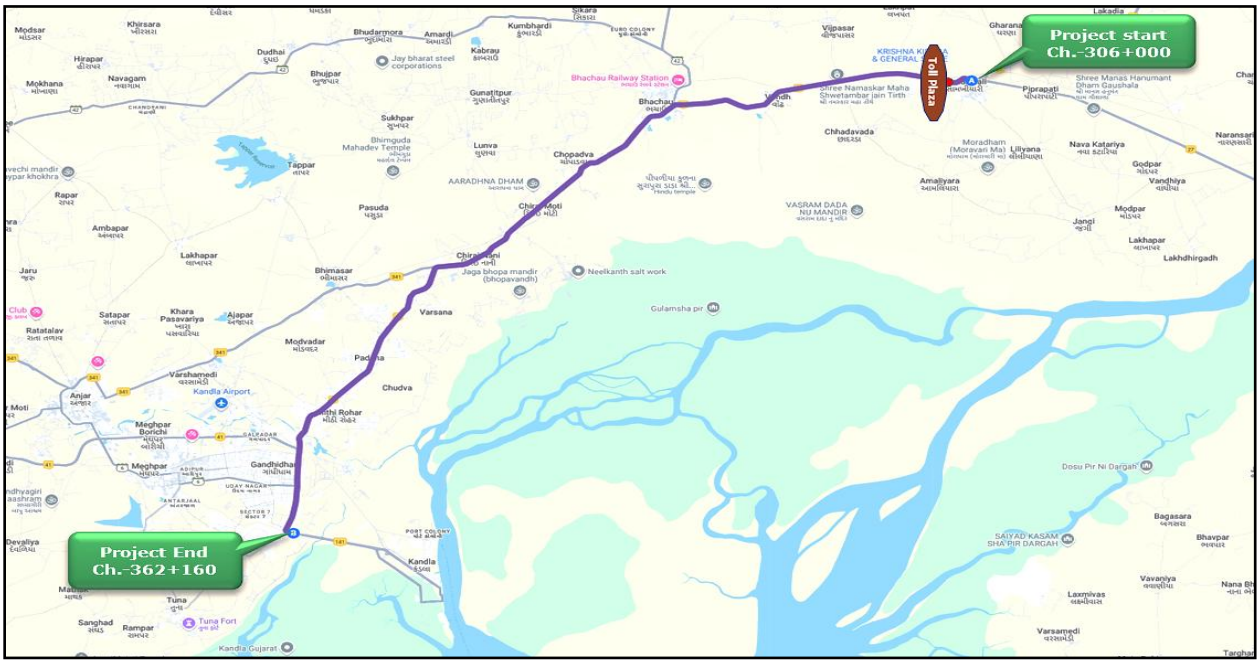
M/s Larsen and Toubro Limited subsequently promoted and incorporated the Concessionaire, L&T Samakhiali Gandhidham Tollway Private Limited, for the implementation of the project. The Concession Agreement was executed on 17 March 2010. The Appointed Date for the project was declared as 11 September 2010, marking the commencement of the 24-year Concession Period from that date.

The Completion Certificate for the project was achieved on 09 December 2024. The Project Highway is currently under the Operation and Maintenance (O&M) phase, in accordance with the provisions of the existing Concession Agreement.

Sekura India Management Limited completed the acquisition of the project and has been operating the project road in the name - Samakhiali Bhachau Gandhidham Tollway Private Limited (SBGTL).

The project runs east–west in Kutch and the stretch lies entirely in Kutch District, Gujarat, from Km 306.000 at Samakhiali to Km 362.160 near Gandhidham, covering a total length of 56.16 km. This section forms part of the strategic highway corridor connecting the inland national highway network with the major ports of Kandla and Mundra.

Figure 3-1: Location Map of Project Stretch



3.1 Land use and Terrain

The Samakhiali–Bhachau–Gandhidham section traverses predominantly arid and semi-arid landscapes typical of Kutch district. The alignment follows the existing NH-41 corridor, widened from four to six lanes, and remains largely within the existing Right of Way (ROW) with localized bypasses and realignments. The land use along the stretch can be broadly, Agricultural land (dryland and irrigated pockets), Barren/scrub and salt-affected land, Industrial/warehousing and port-linked land, Built-up settlements and mixed-use roadside development. This section forms a crucial freight movement corridor, linking the NH-27 at Samakhiali to the Gandhidham–Kandla–Mundra port region.

3.2 Administrative Details of the Project

Administrative details of the project are listed below.

Table 3-1: Administrative Details of the Project

Sl. No.	Feature	Details
1	Project Name	Six Laning of Samakhiali-Gandhidham-Section Road (NH-41) (old NH-8A)
2	Mode of the Execution (BOT Toll/ BOT Annuity/ EPC/ HAM/ Others)	Build, Operate and Transfer (BOT) Basis
3	Project Phase	Tolling, Operation, Maintenance and Transfer
4	No. of Lanes/ Configuration	6 lanes
5	Length of the Project (in Km)	56.160 km
6	Authority	National Highways Authority of India (NHAI)
7	Concessionaire	Samakhiali Bhachau Gandhidham Tollway Limited (SBGTL)
8	Independent Engineer	MSV International Inc.
9	Date of Signing of CA	17 March 2010
10	Letter of Acceptance	20 January 2010
11	Appointed Date	11 September 2010
12	Total Project Cost as per CA	Rs. 805.39 Cr.
13	PCOD	04 January 2020
14	Appointed Date	11 September 2010
15	Completion certificate issued on	09 December 2024
16	Concession period	24 Years
17	Concession end date	12 November 2034

3.3 Salient Features of the Project and Scope of Work

The salient features of the project are presented below

S.no	Description		Units	Total Quantities
1	Project Road		Km	56.160
2	Service Road in Rural Section		Km	LHS - 46.549 RHS - 40.974
3	Bypasses		Km	1.100
4	Major Intersections		Nos	9
5	Minor Intersection		Nos	10
6	Bus Bay & Shelters		Nos	24
7	Truck lay bye		Nos	6
8	Rest Area		Nos	NIL
9	Toll Plaza		Nos	1
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24	Utility Corridor		Km	99.699
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		Industrial	Km	14.802
		Mixed	Km	4.084
30	Kerb		Km	173.609
31	Chevron Signs		Nos	347
32	Road Studs		Nos	7447
33	OHM		Nos	444
34	Delineators		Nos	3790
35	Footpath		Km	136.093
36	Guard post		Nos	25
37	Parapet wall		Km	0.514
38	Handrail		Km	13.344
39	RCC railing		Km	0.497
40	Fencing		Length (km/m)	0.954
41	PTZ Cameras		Nos	7
42	Antiglare Screens		Nos	2435
43	Flexible median markers		Nos	1323

3.4 Specification and Standards

Six - Laning of the Project shall conform to the latest Manual of Specifications and Standards for BOT Road Projects published by Authority / MOSRTH.

Deviations from the Manual

Notwithstanding anything to the contrary contained in the Manual of Specifications and Standards few Specifications and Standards shall apply to the construction of the Project Highway, and for purposes of this agreement, the referred manual shall be deemed to be amended to the extent set forth in the CA Schedule D (from Page D 2 of 3 to page D 3 of 3).

4. REVIEW OF CONCESSION AGREEMENT

This chapter contains a short review of the concession agreement

4.1 Brief Review of Concession Agreement

It may be noted that The Concession Agreement is primarily divided into 48 Articles and 23 Schedules that are available at the end of the CA. Contents of each of the Articles and the Schedules is briefly mentioned below.

Part I Preliminary

Concession Agreement

Clause 1 Definitions and Interpretations

Addresses - the Definition and Interpretation, measurements and arithmetic conventions, priority of agreements, clauses and schedules

Part II The Concession

Clause 2 Scope of the Project

Clause 3 Grant of concession

Addresses- the concession

Clause 4 Conditions precedent

Addresses-conditions precedent, damages for delay by the authority, damages for delay by the concessionaire.

Clause 5 Obligation of the concessionaire

Addresses-obligations of the concessionaire, obligations relating to project agreements, obligations relating to change in ownership, employment of foreign nationals, employment of trained personnel, sole purpose of the concessionaire, branding of project highway, facilities for physically challenged and elderly persons, obligations during construction and operation period.

Clause 6 obligation of the authority

Addresses obligation of the authority, maintenance obligation prior to appointed date, obligation relating to competing roads.

Clause 7 Representation and Warranties

Addresses- representation and warranties of the concessionaire, representation and warranties of the authority, disclosure.

Clause 8 Disclaimer

Addresses - Disclaimer

Part III Development and Operation

Clause 9 Performance Security

Addresses-performance security, appropriation of performance security, release of performance security.

Clause 10 Right of way

Addresses-the site, license, access and right of way, procurement of site, site to be free from encumbrances, protection of site from encroachments, special temporary right of way, access to authority and independent engineer.

Clause 11 Utilities associated roads and trees

Addresses- existing utilities and roads, shifting of obstruction utilities, new utilities and roads, felling of trees.

Clause 12 Construction of project highway

Addresses -obligations prior to commencement of construction, maintenance during construction. Drawings, construction of project highway, construction of service lanes by authority.

Clause 13 Monitoring of construction

Addresses- monthly progress reports, inspection, tests, delays during construction, suspension of unsafe construction works, video recording.

Clause 14 Completion certificate

Addresses- tests, completion certificate, provisional certificate, completion of punch list items withholding of provisional certificate, rescheduling of tests.

Clause 15 Entry into commercial service

Addresses-commercial operation date COD, damages for delay.

Clause 16 Change of scope

Addresses- change of scope, procedure for change of scope, payment for change of scope, restriction on certain works, power of authority to undertake works, reduction in scope of the project.

Clause 17 operation and maintenance

Addresses-all and M obligations of the concessionaire, maintenance requirements, maintenance manual, maintenance program, safety vehicle breakdowns and accidents, decommissioning due to emergency, lane closure, damages for breach of maintenance obligations, authorities right to take remedial measures, overriding power of the authority, restoration of loss or damage to project highway, modifications to project highway, excuse from performance of obligations, barriers and diversions, advertising on the site.

Clause 18 Safety requirements

Addresses-safety requirements, expenditure on safety requirements

Clause 19 Monitoring of operation and maintenance

Addresses- monthly status reports, inspection, tests, remedial measures, monthly fee statement.

Clause 20 Traffic regulation

Addresses-traffic regulation by concessionaire, police assistants, building for traffic aid post, recurring expenditure on medical aid posts**.**

Clause 21 Emergency medical aid

Addresses- medical aid posts, buildings for medical aid posts, recurring expenditure on medical aid posts.

Clause 22 Traffic census and sampling

Addresses -traffic senses, traffic survey, traffic sampling, computer system and networking.

Clause 23 Independent Engineer

Addresses- appointment of independent engineer, duties and functions, remuneration, termination of appointment, authorized signatories, dispute resolution.

Part IV Financial Covenants

Clause 24 Financial closure-financial closure, domination due to failure to achieve financial closure

Addresses

Clause 25 Grant

Addresses-grant equity support, O&M support.,

Clause 26 concession fee

Addresses-concession fee, additional concession fee, determination of concession fee, payment of concession fee, verification of reliable fee.

Clause 27 user fee

Addresses-collection and appropriation of fee revision of fee exemption of local traffic, free use of service lanes users, discounted fee for frequent users, reappropriation of extra fees, tolling contractor, fee collection points, additional charge for evasion of fee, display of fee rates.

Clause 28 Revenue shortfall loan

Addresses-repayment of shortfall loan, repayment of shortfall revenue loan

Clause 29 effect of variations in traffic growth

Addresses-effect of variations in traffic growth, modifications and concession.

Clause 30 construction of additional tollway

Addresses-restrictions on construction of additional tollway, modification of concession., minimum fee for the project highway, minimum fee for additional tollway idiot

Clause 31 escrow account

Addresses -escrow account, deposits into escrow account, withdrawals during concession., withdrawals upon termination.

Clause 32 Insurance

Addresses-insurance during concession., notice to the authority, evidence of insurance cover, remedy for failure to ensure, waiver for subrogation, concessionaires' waiver, application of insurance proceeds.

Clause 33 accounts and audit

Addresses- audited accounts, appointment of auditors, certification of claims by statutory auditors, dispute resolution.

Part V Force Majeure and Termination

Clause 34 Force Majeure

Addresses force majeure, nonpolitical event, indirect political event, political event, duty to report force measure event effect force measure event on the concession, allocation of cost arising out of force measure, termination notice for force measure event, termination payment for force majeure event, dispute resolution, excuse from performance of obligations.

Clause 35 Compensation for Breach of Agreement

Addresses-compensation for default by concessionaire, compensation for default by the authority, extension of concession., compensation for competing roads, compensation to be in addition.

Clause 36 Suspension of Concessionaire's rights

Addresses- suspension upon concessionaires' default, authority to act on behalf of concessionaire, revocation of suspension, suspension of concessionaire, termination right here

Clause 37 Termination

Addresses-termination for concessionaire default, termination for authority default, termination payment, other rights and obligation of the authority, survival of rights.

Clause 38 Divestment of rights and interest

Addresses- the investment requirements, inspection and cure, vesting certificate, additional facilities, divestment costs etc

Clause 39 Defects liability after termination

Addresses-liability for defects after termination, retention in escrow account.

Part VI Other Provisions

Clause 40 assignment and charges-

Addresses-restriction on assignment and charges, permitted assignment and charges, substitution agreement, assignment by the authority

Clause 41 Change in law

Addresses - increase in costs, reduction in costs, protection of NPV, restriction on cash compensation, no claim in the event of recovery from users

Clause 42 Liability and indemnity

Addresses -general indemnity, indemnity by the concessionaire, notice and context of claims, defense of claims, no consequential claims, survival on termination.

Clause 43 Rights and title over the site

Addresses- License rights, access rights of the authority and others, property taxes, restriction on subletting

Clause 44 Dispute resolution

Addresses -dispute resolution, conciliation, arbitration, adjudication by regulatory authority or Commission

Clause 45 Disclosure

Addresses - disclosure of specified documents, disclosure of documents relating to safety.

Clause 46 Redressal of public grievances

Addresses- complaints register, redressal of complaints

Clause 47 Miscellaneous

Addresses - governing law and jurisdiction, waiver of immunity, state support agreement, depreciation, delayed payments, favor, liability for review of documents and drawings, exclusion of implied warranties etc., survival, and tire agreement, severability, no partnership, third parties, successors and assigns, notices, language, counterparts

Clause 48 Definitions

Addresses – Definitions

Schedules

Schedule A: Site of the Project,

Schedule B: Development of the Project Highway

Schedule C: Project Facilities

Schedule D: Specifications and Standards

Schedule E: Applicable Permits

Schedule F: Performance Security

Schedule G: Project Completion Schedule ee Notification

Schedule H: Drawings

Schedule I: Tests

Schedule J: Completion Certificate

Schedule K: Maintenance Requirements

Schedule L: Safety Requirements

Schedule M: Monthly Fee Statement

Schedule N: Weekly Traffic Census

Schedule O: Traffic Sampling

Schedule P: Selection of Independent Engineer

Schedule Q: Terms of Reference for Independent Engineer

Schedule R: Fee Notification

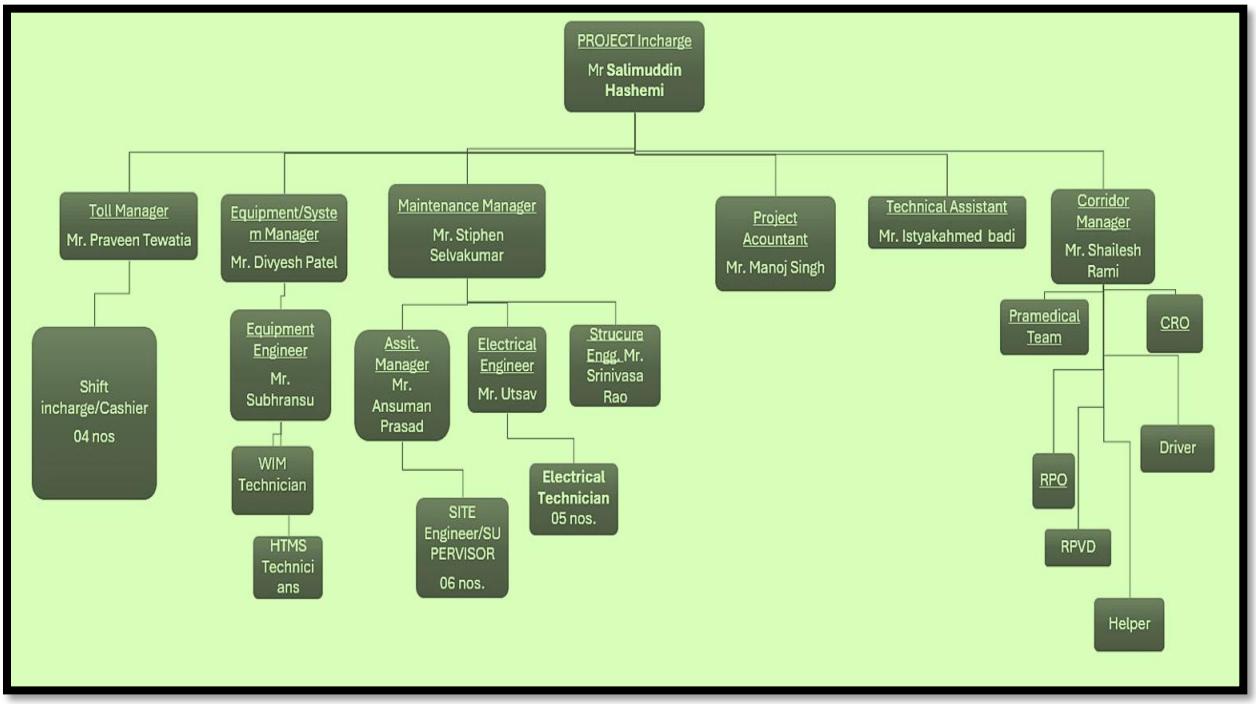
Schedule S: Escrow Agreement Safety Requirement

Schedule T: Panel of Chartered Accountants

Schedule U: Vesting Certificate

Schedule V: Substitution Agreement

O&M Organization Chart of Concessionaire



4.2 Operation and Maintenance activities being undertaken by the Concessionaire:

Routine Maintenance

Emergency Maintenance

Other Maintenance

Corridor Maintenance

Safety &Traffic Management

Accident Reporting

Site inspection and Action taken report

Emergency Services

Conformance to Performance Standards

Encroachment Reporting

Critical issues Reporting**:**

4.3 Details of Subcontracts

4.3.1 Routine Maintenance – Subcontractor No 1

SGBTL has appointed M/s. KEYA CONSTRUCTION, B-307, AMBICA COMPLEX, KHEDA,

Gujarat – 387120 for providing Routine Maintenance as per Scope of Work given below.

Scope of Work of M/s KEYA CONSTRUCTION is as follows

1. Carrying out the following activities Supply of manpower for the following rout

a) Routine Maintenance of Highway (Entire ROW including toll Plaza area, rest area, Road. furniture etc.)

b) Horticulture maintenance (median plants, Avenue plants and Landscaping)

4.3.2 Routine Maintenance – Subcontractor No 2

SGBTL has appointed M/s. EVEREST INFRASTRUCTURE COMPANY, OPP. KIRTITENAMENTS, AHMEDABAD, Gujarat – 382481 providing Routine Maintenance as per Scope of Work given below.

Scope of Work of M/s EVEREST INFRASTRUCTURE is as follows

1. Carrying out the following activities Supply of manpower for the following rout

a) Routine Maintenance of Highway (Entire ROW including toll Plaza area, rest area, Road. furniture etc.)

b) Horticulture maintenance (median plants, Avenue plants and Landscaping)

4.3.3 Route Operations and Incident Management Services – Subcontractor No 3

SGBTL has appointed M/s. ASHAPURA ENTERPRISE Gusai Vas, Village, Bhachau, Gujarat-370020 providing Route Operations and Incident Management Services at L&T Samakhiali Gandhidham Road Project as per Scope of Work given below.

Scope of Work of M/s ASHAPURA ENTERPRISE is as follows

a) Providing Patrolling surveillance and Incident management of the project highway on 24 x 7 to provide smooth and uninterrupted flow of traffic on Project Highway during normal operating conditions.
b) Providing Crane services 24 x 7 with necessary lifting capacity of 30 ton for rescue operations, removal of debris, obstruction and other activity which may endanger or interrupt smooth flow of traffic and as directed by Employer.
c) Providing ambulance services 24 x 7 during emergency for transporting the accident victims to nearest trauma hospital and provide emergency first aid.
d) Ensure no incidence of permanent and temporary encroachment, unauthorized access and illegal median openings.
e) The Contractor shall facilitate removal/closure of the same.

4.3.4 Route Operations and Incident Management Services – Subcontractor No 4

SGBTL has appointed M/s. SHIV CONSTRUCTION, DADHIYA VADI, JAMNAGAR for providing Route Operations and Incident Management Services at L&T Samakhiali Gandhidham Road Project as per Scope of Work given below.

Scope of Work of M/s SHIV CONSTRUCTION is as follows

a) Painting of various road furniture items as per approved drawing
b) As directed by Engineer in Charge- incl material – Two Coats of Paint- Single Post Sign Boards

4.3.5 Routine Maintenance – Subcontractor No 5

SGBTL has appointed M/s. SHIV CONSTRUCTION, DADHIYA VADI, JAMNAGAR for providing Route Operations and Incident Management Services at L&T Samakhiali Gandhidham Road Project as per Scope of Work given below.

Scope of Work of M/s SHIV CONSTRUCTION is as follows

a) Routine Maintenance of Highway (Entire ROW including toll Plaza area, rest area, Road. furniture etc.)
b) Horticulture maintenance (median plants, Avenue plants and Landscaping)
c) Cleaning of accident site including debris from accident and assistance in removal of dead animals etc.
d) Any other items necessary for maintenance.
e) Replacement of all casualties in Median plantation, Avenue plantation, landscaping, excluding accidental damage.
a) Provide daily progress reports

4.3.6 Routine Maintenance – Subcontractor No 6

SGBTL has appointed M/s. Jay Darkadhish Construction, JAMNAGAR for providing Routine Maintenance at L&T Samakhiali Gandhidham Road Project as per Scope of Work given below.

Scope of Work of M/s Jay Darkadhish Construction is as follows

a) Routine Maintenance of Highway (Entire ROW including toll Plaza area, rest area, Road. furniture etc.)
b) Horticulture maintenance (median plants, Avenue plants and Landscaping)
c) Cleaning of accident site including debris from accident and assistance in removal of dead animals etc.
d) Any other items necessary for maintenance.
e) Replacement of all casualties in Median plantation, Avenue plantation, landscaping, excluding accidental damage.
b) Provide daily progress reports

4.3.7 MBCB – Subcontractor No 7

SGBTL has appointed M/s. Jay Gopal Constructions, VILLAGE-ADHOI, PASAKAYARA providing Route Operations and Incident Management Services at L&T Samakhiali Gandhidham Road Project as per Scope of Work given below.

Scope of Work of M/s Jay Gopal Constructions, VILLAGE-ADHOI, PASAKAYARA, is as follows

a) L-Removal of damaged MBCB
b) L-Double Beam MBCB fixing
c) S&F of Plantation for Landscaping

4.3.8 Misc Civil Works – Subcontractor No 8

SGBTL has appointed M/s. Jay Darkadhish Construction, JAMNAGAR for miscellaneous civil works at L&T Samakhiali Gandhidham Road Project as per Scope of Work given below.

Scope of Work of M/s Jay Darkadhish Construction is as follows

a) L-Labor for safety arrangement
b) S&I of China vitreous urinal partition
c) P&F-oxidized MS sliding door-300x16mm
d) S&F-5mm thick acrylic glass fiber sheet
e) P&F Repair canopy roof sheet drain gutter
f) Providing and laying of paver block-50mm thick & M30
g) P&F- of paver block-80mm thick & M30
h) R&RF - Repair of checkered tiles

4.3.9 Miscellaneous Road Service – Subcontractor No 9

SGBTL has appointed M/s. Bheema Tolling & Traffic Solution Pvt Limited Rise providing miscellaneous road works related Services at L&T Samakhiali Gandhidham Road Project as per Scope of Work given below.

Scope of Work of M/s JAY SHAKTI ENTERPRISE, is as follows

a) L- Labor for safety arrangement
b) L-Installation of Road studs -RPM
c) P&F-Delineator-HDPE pipe w reflector strip
d) Fixing of Antiglare including all
e) L - Fixing of Cluster, Hazard markers
f) L - Fixing of Signs with single pole
g) L - Fixing of Signs with Double Pole
h) L-Fill Alligator crack
i) L-Fill pothole & patch repair w road bond

4.3.10 Tolling – Subcontractor No 10

SGBTL has appointed M/s. Bheema Tolling & Traffic Solution Pvt Limited for providing miscellaneous road works related Services at L&T Samakhiali Gandhidham Road Project as per Scope of Work given below.

Scope of Work of M/s Bheema Tolling & Traffic Solution Pvt Limited, is as follows

a) Operate all lanes of the toll plaza for smooth functioning 24x7
b) Collect toll
c) Provide trained and suitable staff
d) Manage and administer staff
e) Comply with safety and security
f) File FIR on any incidents of unlawful nature
g) Timely generation of MIS, reports etc
h) To ensure that all handover properties of SPV for usage of the toll Plaza, buildings are pertinent, toll booths, all lanes, its assets, TMS and ATMs equipment, toll management systems, including communication and video surveillance camera and other devices, furniture and tools & tackles etc. are received in good operational condition by the service provider.
i) Ensure staff is in uniform.
j) Manage and arrange necessary Consumables
k) Etc

4.3.11 AMC of Toll Management System – Subcontractor No 11

SGBTL has appointed M/s. TECHSTURE TECHNOLOGIES INDIA PVT LT for providing TMS related Services at L&T Samakhiali Gandhidham Road Project as per Scope of Work given below.

Scope of Work of M/s TECHSTURE TECHNOLOGIES INDIA PVT LT, is as follows

a) AMC of TMS for a period of 12 Months from 1st April 2024 to 31st March 2025 -SGTL Project as per SLA.
b) AMC-Software service-TMS
c) manpower cost for engineer
d) The scope of work includes design, supply, civil, installation, testing and commissioning of HTMS system as per the agreed Specifications. The equipment includes the items as listed in the BoQ and the Contractor shall ensure that the performance requirements are also in compliance with the Concession Agreement.

5. ASSESSMENT OF PROJECT ASSETS – HIGHWAY

Ramboll team reviewed the documents shared by Sakura for the project titled "Six-laning of divided carriageway including strengthening of the existing carriageway between Samakhiali and Gandhidham (km 306.000 to km 362.160) in Gujarat." This section of NH-8A (New NH-41) was developed by the Concessionaire (SBGTL) under the DBFOT model on a BOT basis.

After reviewing the documents, the Ramboll team visited the site to check the condition of the road and Road assets. The main Carriageway has a 6-lane flexible pavement. On both sides of the road, there are service roads. Along the corridor, features like a drain-cum-footpath, footpath-cum-utility corridor, and earthen drains are also provided. Based on visual inspection, the overall condition of the Road assets is fair to good.

Project Start point: Start (Chainage km 306.000) near Samakhiali, Gujarat — project begins around the Samakhiali side of the Samakhiali–Bhachau corridor.

Project End point: End (Chainage km 362.160) near Gandhidham, Gujarat — project closes near the Gandhidham/Kandla port approach side. Direction of Increasing Chainage from Samakhiali (km 306.000) towards Gandhidham (km 362.160).

The important road features and Assets inspected during the visit include:

- Road and Other Traffic Appurtenances: Service roads, road junctions, roundabouts, and road markings.
- Safety and Roadside Items: Signboards, metal crash barriers, pedestrian Guard Rail, traffic blinkers, slope protection works, side drains, and plantation areas like medians.
- Highway Facilities: Streetlights, truck Lay bays, rest areas, bus shelters, toll plazas, and pedestrian Facilities.

5.1 Service Roads/ Slip Roads

Service roads and slip roads along the project corridor have been constructed using flexible pavement. At a few isolated spots, minor potholes have been observed which can be addressed through routine maintenance. Loose debris and dust on the shoulder areas indicate the need for regular cleaning to ensure continued performance. Overall, the service roads are mostly in fair to good condition. With periodic upkeep, including minor repairs and cleaning, their functionality and safety will be sustained over time. Some Photographs of service and slip road are provided below.







Figure 5-1: Service roads

5.2 Intersections

Along the stretch, there are at-grade junctions which includes both major and minor intersections. There are a total of 18 junctions along the project road, consisting of 8 major and 10 minor junctions. All junctions have been constructed using flexible pavement. Roundabouts are provided at all minor junctions to facilitate smooth traffic flow. During the site visit, it was observed that dust have accumulated near the edges of several roundabouts, which may be cleaned through routine maintenance.

Additionally, high mast lighting has been installed at all major junctions to ensure adequate illumination and safety during nighttime. Directional and regulatory signboards are also provided at all junctions to guide road users and ensure safe and efficient movement through intersections. Overall, the junctions are functioning well, though cleanliness, lighting, and signage upkeep are recommended.

Some reference photographs are provided below.



Figure 5-2: Major Intersections



Figure 5-3: Minor Intersections

5.3 Toll Plaza

There is one toll plaza located at km 308+800 along the project stretch. It has 9 lanes in each direction and is operational with a Hybrid ETC (Electronic Toll Collection) system. The toll plaza is equipped with all essential facilities, including canopy lighting, high mast lighting, an administrative building, toilet blocks, tow-away cranes, Patrolling vehicles, weighbridge, paramedical booth, and ambulance services. Based on Site inspection, the toll plaza and its associated infrastructure are in good condition and functioning well. Some photographs are presented below.



Figure 5-4: Toll Plaza

5.4 Fuel Station

There are 44 fuel stations — 3 on the left-hand side (LHS) and 41 on the right-hand side (RHS) of the carriageway. Access arrangements to these fuel stations were in good condition. Few photographs are presented below.



Figure 5-5: Fuel stations

5.5 Bus bay and Bus Shelter

There are a total of 25 bus shelters provided along both sides of the project road. Out of 25 Bus shelter there are 12 on the left-hand side (LHS) and 13 on the right-hand side (RHS). All bus shelters are in

fair to good condition as per Site inspection and requires routine maintenance. Representative photographs are provided below.



Figure 5-6:Bus shelters

5.6 Truck lay-byes.

There are 6 truck lay-byes constructed along the project stretch, 3 on the left-hand side (LHS) and 3 on the right-hand side (RHS). These lay byes are paved with paver blocks. Lay byes are provided with toilet blocks for the convenience of drivers and travellers. Overall condition of the truck lay-byes and associated facilities are in good condition with proper maintenance. Representative photographs are presented below.



Figure 5-7: Truck Lay bye

5.7 Entry/ Exit Ramp

There are 92 entry and exit points along the project road to facilitate smooth access between the main carriageway and service roads. 47 Entry and Exit are located on the left-hand side (LHS) and 45 on the right-hand side (RHS). Lighting with both single-arm and double-arm poles are present. Representative photographs provided below.



Figure 5-8: Entry/ Exit Ramp

5.8 Drainage

The road drainage system along the project highway comprises lined covered drains, earthen drains along the shoulders, and longitudinal lined drains in the median. Chute drains are provided at high embankment locations. The overall condition of the drainage system is fair to good, with some drain covers damaged or missing at isolated locations. Some photographs are presented below for reference.



Figure 5-9: Drainage system

5.9 Utility Corridor

Utility corridors are provided along the shoulder side of the main carriageway, as well as on the left shoulder and, at several locations, on the right shoulder of the service roads. However, during the site inspection, it was observed that at multiple locations, cover slabs are missing or damaged. Few photographs are provided below for reference.



Figure 5-10: Utility corridors

5.10 Metal Beam Crash Barriers

Metal Beam Crash Barriers (MBCBs) are installed along the shoulder side and median of the main carriageway across the project stretch. On the shoulder side, single-sided double beam barriers are provided over a length of 74.603 km, In the median, W-beam crash barriers are installed in both configurations double-sided W-beam barriers covering 6.845 km, and single-sided W-beam barriers provided over 1.165 km.

Overall, the condition of the metal beam crash barriers is fair to good, and they are functioning effectively. However, at certain locations, the barriers are found with dust accumulation affecting their visibility. Representative photographs are presented below for reference



Figure 5-11: Metal Beam Crash Barriers

5.11 Traffic Signage

Road signage along the project highway includes Regulatory, Warning, and Informatory signs, as well as overhead gantry-mounted signs. There are 619 signboards, and 12 gantry signs as found during site inspection. These signs are in good condition and are serving their intended function effectively.

Representative photographs are presented below for reference.

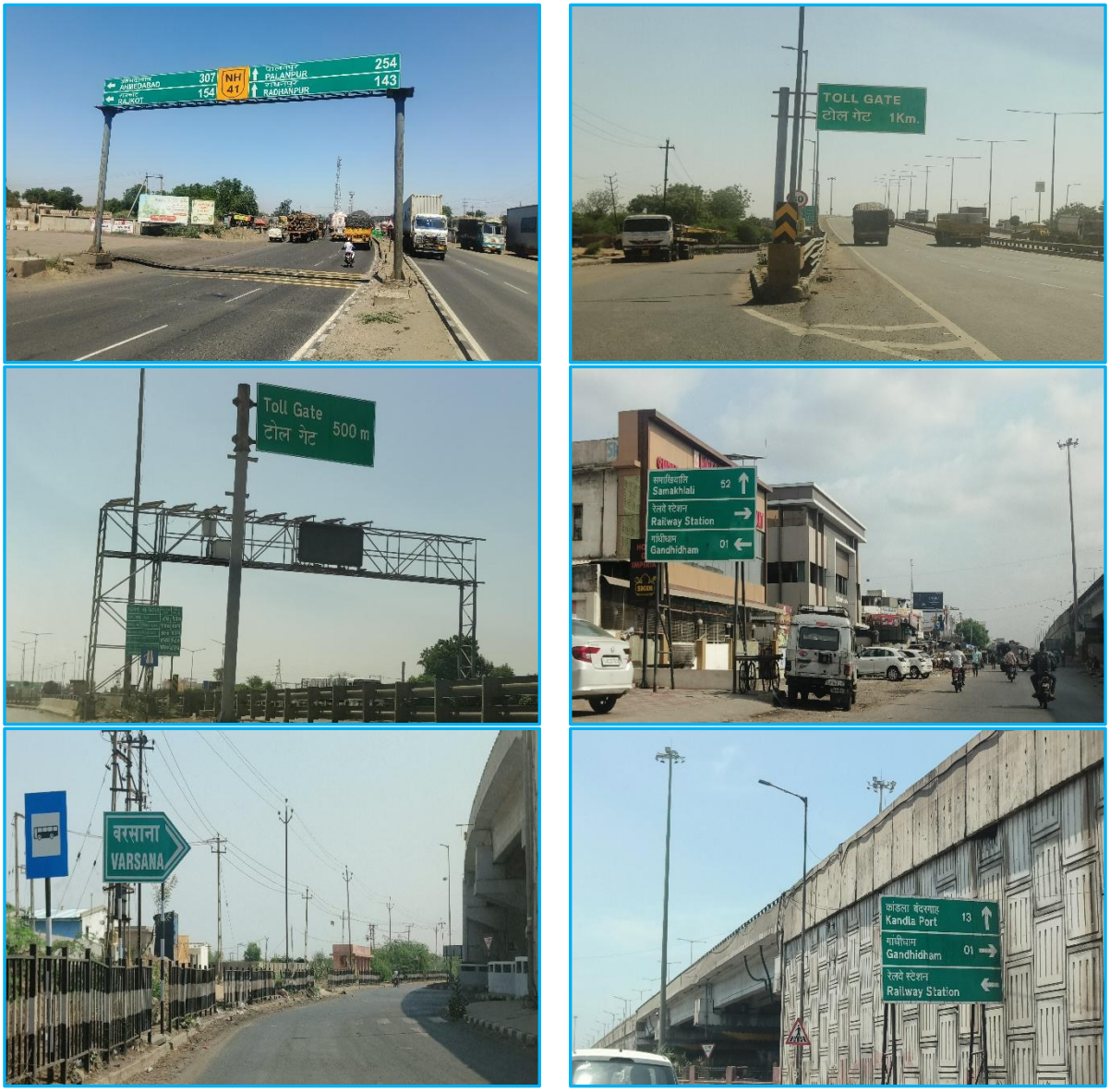


Figure 5-12: Traffic Signs

5.12 Highway lighting

Highway lighting is provided at critical locations along the project corridor, such as at Vehicular Underpasses (VUPs), flyover approaches, entry and exit points, toll plazas, and built-up areas. There are single-arm and double-arm lighting poles to ensure proper visibility and road safety during nighttime. In addition to these lighting, high mast lights are installed at toll plazas and major intersections to provide wide-area illumination.

Solar blinker signals are also installed at the median and shoulder sides near the entry and exit points to alert drivers and improve safety.

Furthermore, an Emergency Operating System (EOS) facility is available along the corridor to support emergency response. Overall, the lighting systems are in good working condition and appear to be well-maintained. Representative photographs of the lighting installations are presented below for reference.

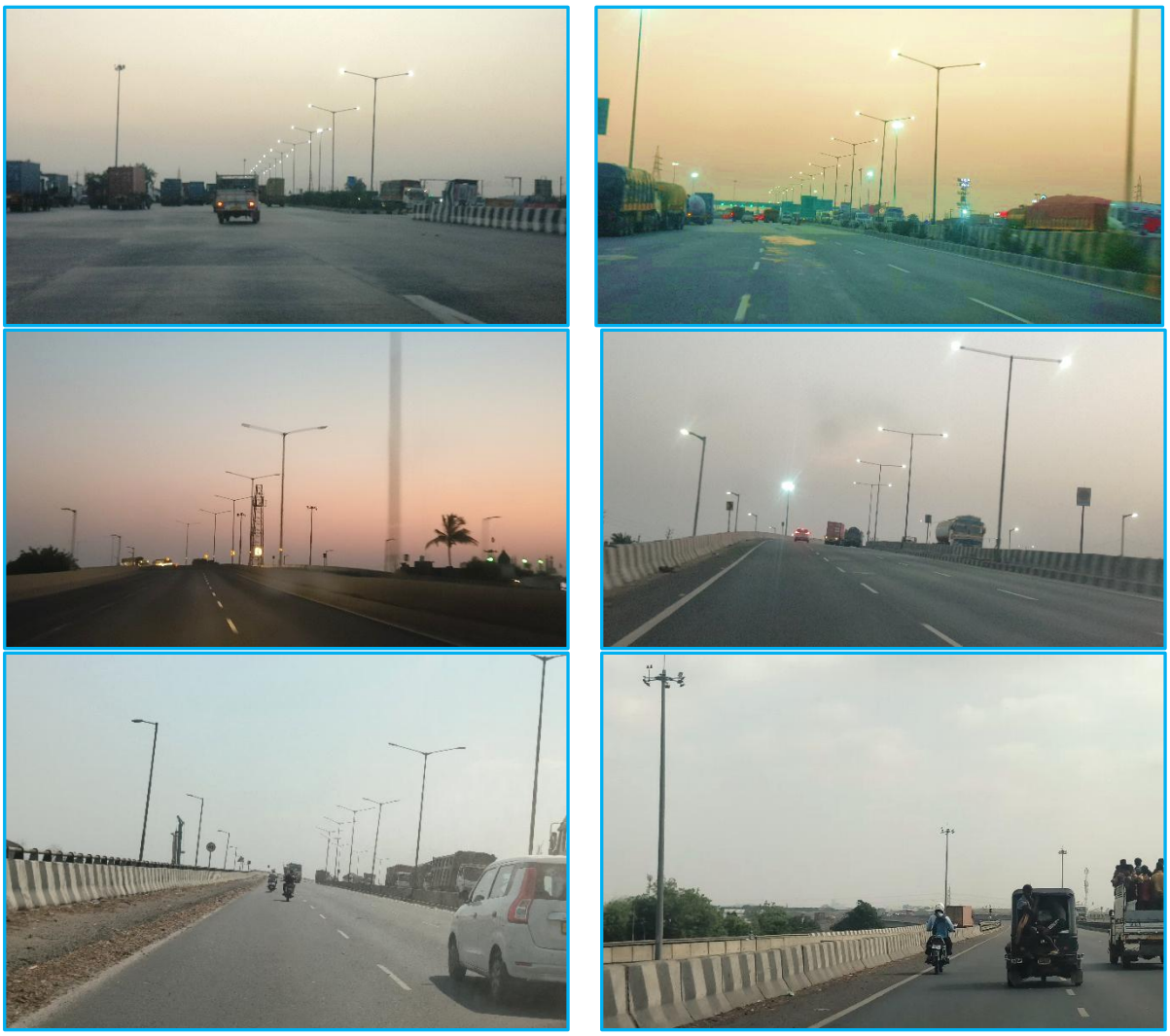


Figure 5-13: Highway Lighting

5.13 Plantation

Landscaping and median plantations are provided along the project corridor, enhancing the visual appeal of the highway. In addition to aesthetic benefits, these plantations serve multiple functional purposes—like reducing glare from oncoming headlights, regulating vehicle speeds, and contributing to improved air quality. However, during the site visit, it was observed that in some sections, shrubs and plants are either overgrown and require pruning or have dried out and need regular watering, maintenance, or replacement. Representative photographs are presented below for reference.



Figure 5-14: Plantation

5.14 Pedestrian guard rail

Pedestrian Guard Rails (PGR) are installed along the edge of the service road, primarily at the start and end of the approach sections, and in some locations between the main carriageway and the service road. The overall condition of the PGR is good along the stretch. Some sections show signs of corrosion and require repainting to prevent further deterioration. In several locations, the PGR is missing or damaged, reducing pedestrian safety in those areas. Timely repair, replacement, and maintenance of the guard rails are necessary to ensure effective protection for pedestrians. Representative photographs are presented below for reference.





Figure 5-15: Pedestrian Guard Rails

5.15 Kilometre stone/Hectometre stones

Kilometre and hectometre stones are generally present and visible along the project stretch. However, during the site visit, it was observed that some stones are either missing or have faded markings, which require routine maintenance and repainting to ensure proper visibility and functionality. Representative photographs are presented below for reference.





Figure 5-16: Kilometre Stones & Hectometre Stones

6. ASSESSMENT OF PROJECT ASSETS – STRUCTURES

6.1 Structural Inventory

The visual condition survey of all the structures is carried out by Structural Expert/Bridge Engineer of the consultant team with an inspection is aimed at identifying and quantifying deterioration, which may be caused by applied loads and factors such as deadload, live load, wind load and physical (e.g. wear, abrasion) / chemical (e.g. corrosion due to environmental exposure) influences. Apart from inspection of bridge damage caused by unpredictable natural phenomena (e.g. earthquake, flood) or collision by vehicles or vessels, inspection is also needed to identify or follow up the effect of any built-in imperfections. Inspection can also provide insights into the structural condition to address issues proactively, helps in devising necessary remedial measures to enhance safety and performance, contributes to extending the service life of bridges through timely intervention and maintenance strategies.

Table 6-1: Summary of Structures

Structure Type	Units	Structure as per MPR April 2025
MJB	Nos	5
MNB	Nos	23
VUP	Nos	11
Flyover	Nos	6
PUP	Nos	1
ROB	Nos	4
Culvert	Nos	51 (HP 33 nos & BC 18 nos)
Total	**Nos**	**101**

There are 5 major bridges, 23 minor bridges, 4 ROBs, 12 underpasses, 6 Flyover and 51 culverts in this project corridor. All the structures are generally in satisfactory condition but in fair state of maintenance. The survey of structures involves visual inspection to identify any cracking, spalling, staining, deformation, leaching, exposed reinforcement, honeycombing, condition of expansion joints, condition of bearings, approach slabs, drainage, damaged railings, and validation of structure data, etc.

During the condition survey, no major structural failures or serious distress were observed, with only minor attention needed for optimal performance, including repairing exposed reinforcement at pier caps, repairing minor damaged crash barriers, improving the sealing material at expansion joints, and ensuring drainage spouts are clear and present, alongside routine maintenance to clear debris accumulation under culverts and within waterway sections, managing vegetation growth and removing unwanted materials around bearings of superstructures, and regularly removing vegetation around culverts and RE walls.

These findings indicate the need for regular maintenance and minor repairs to ensure the long-term durability, functionality, and safety of the structures.

Following codes are used for the condition rating of the structural members.

Code	Description
N	NOT APPLICABLE
9	EXCELLENT CONDITION
8	VERY GOOD CONDITION - no problems noted

Code	Description
7	GOOD CONDITION – some minor problems
6	SATISFACTORY CONDITION - structural elements show some minor deterioration
5	FAIR CONDITION - all primary structural elements are sound but may have minor section loss, cracking, spilling or scour
4	POOR CONDITION - advanced section loss, deterioration, Spalling or scour
3	SERIOUS CONDITION - loss of section, deterioration, spelling or scour have seriously affected primary structural components Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present
2	CRITICAL CONDITION - advanced deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken
1	IMMINENT' FAILURE CONDITION - major deterioration or section loss present in critical structural components or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic, but corrective action may put back in light service.
0	FAILED CONDITION - out of service - beyond corrective action

6.2 Major Bridge

There are 5 Nos of Major bridges found on this stretch, these bridges are in satisfactory condition and fair state of maintenance but specific components such as piers, slabs, and barriers exhibit minor damage due to cracks, spalling, corrosion, and discoloration. These issues need attention to prevent further deterioration and ensure structural safety. The comparative assessment of the Major bridges is presented in the Figure 6-1.

Table 6-2: Detailed distresses of major bridge

S. No.	Chainage	Assessment
1	349+498,316+115 and 355+640, 337+678	**1. Vertical Cracks in Pier:** • Location: Pier P-1 (Ch. 349+498) and Pier P-3 (Ch. 355+640) of LHS MJB. • Vertical cracks, maximum width 2-3 mm, depth 15 mm. **2. Spalling of Concrete:** • Location: Slab S-1 of LHS MJB at Ch. 355+640. • Observation: Significant concrete degradation and major spalling. **3. Corrosion of Rebar:** • Reinforcing bars are corroded, compromising structural integrity. **4. Discoloration at Soffit of Slab:** • Dark patches indicating moisture ingress or contaminants. **5. Cracks in Slabs:** • Multiple cracks maintained with epoxy grouting; surface appears rough and worn. **6. Exposed Reinforcement:** • Significant damage to RCC concrete crash barrier, exposing internal steel reinforcement.

Table 6-3: Detailed List of Major Bridge

S.NO	Chainage (Km)	Structure	Location	Str On	Type of Structure	Deck Width (m)	Span Arrangement (m)	POT-PTFE Bearings (Nos)	Elastomeric bearings (Nos)	Type of Expansion joint	Expansion joint (Nos)	Type of Super-structure
1	316+115	MJB	LHS	MCW	Old	12	8.37+17.25 +17.25+17.07	0	36	strip seal	5	RCC Girder
		MJB	RHS	MCW	Old	12	7.4+8.5+8.6+8.9 +8.56+8.88+8.73	0	0	strip seal	0	Solid slab
2	337+658	MJB	LHS	MCW	Old	12	15.23+15.3+15.24 +15.24+15.24 +15.04+15.3 +15.27+14.73 +15.2+15.5	0	88	strip seal	12	RCC Girder
		MJB	RHS	MCW	Old	12	15.42+15.19+15.2 +15.24+15.27 +15.19+15.27 +15.22+15.55 +15.17+14.96	0	88	strip seal	12	RCC Girder
3	346+915	MJB	LHS	MCW	New	15	9+18.38+18.38 +18.38+18.38+9	52	0	strip seal	7	PSC I-Girder
		MJB	RHS	MCW	Old	12	20X4.6	0	0	NO	0	Solid slab
4	349+482	MJB	LHS	MCW	Old	12	14.2+13.92+13.84 +14.02+14.2	0	40	strip seal	6	RCC Girder
		MJB	RHS	MCW	Old	12	14+13.9+13.9 +13.9+14.25	0	40	Covered	0	RCC Girder
5	355+587	MJB	LHS	MCW	Old	12	15.1+15.34 +15.26+15.45	0	32	strip seal	5	PSC Girder with RCC Slab
			RHS	MCW	Old	12	15.1+15.27 +15.17+15.12	0	32	strip seal	5	PSC Girder with RCC Slab
			LHS	SR	New	10.5	2X30.5	16	0	strip seal	3	PSC Girder with RCC Slab
			RHS	SR	New	10.5	2X30.5	16	0	strip seal	3	PSC Girder with RCC Slab

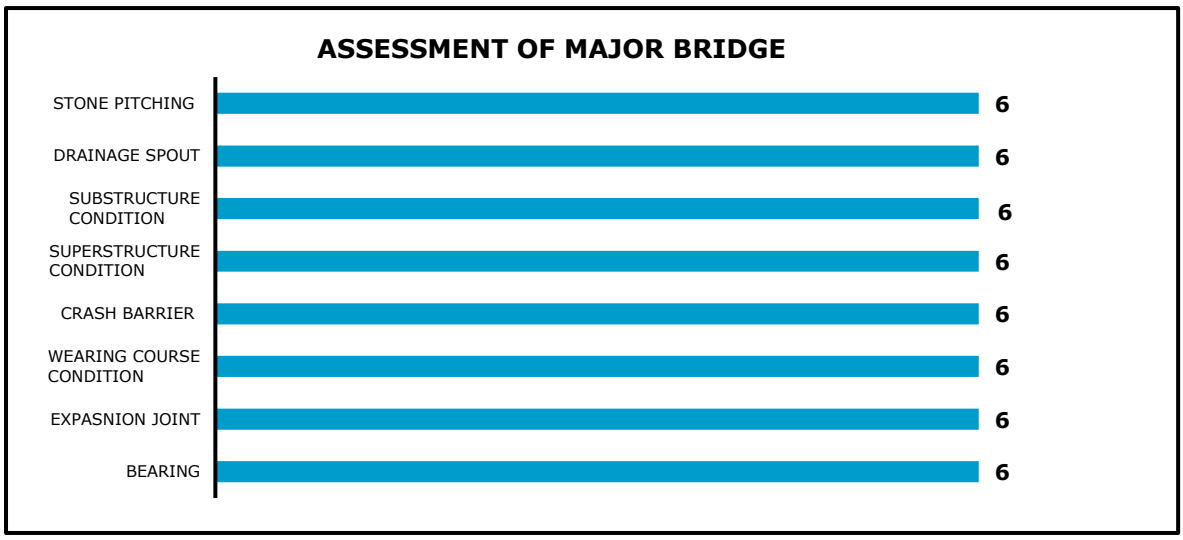


Figure 6-1: Comparative condition assessment of major bridges





MJB at Ch. 316+115



Cracked repaired at Ch. 316+115



MJB at Ch. 316+115



MJB Ch. 346+944



MJB Ch. 346+944



Cracked repaired at MJB Ch. 349+498 (LHS)



MJB at Ch. 349+498 (LHS)



Cracked repaired at MJB Ch. 349+498 (LHS)



Spalling in slab at Ch. 349+498 (LHS)



MJB at Ch. 349+498 (RHS)



MJB at Ch. 349+498 (RHS)



MJB at Ch. 355+640



MJB at Ch. 355+640



MJB at Ch. 355+640



MJB at Ch. 355+640



MJB at Ch. 355+640



MJB at Ch. 355+640

Figure 6-6-2: Site Photographs of major bridges

6.3 Minor Bridge

There are 23 Nos of minor bridge at this stretch, these bridges are in fair to satisfactory condition with distresses, exhibiting distresses such as cracking, spalling, exposed and corroded reinforcement, discoloration, surface degradation, honeycombing, and environmental contamination under the bridges. While these issues reflect some structural concerns, regular maintenance and timely remedial actions can ensure the structures remain operational and safe, preserving their long-term durability. The comparative assessment of the Minor bridges is presented in the Figure 6-3.

Table 6-4: Detailed distresses of minor bridges

S. No	Chainage	Assessment
1	308+130 and 315+088	1. **Cracks and Spalling:** The pedestal shows significant vertical cracking and minor scaling at MNB Ch.308+130 on main carriegways.
2	325+317	1. **Cracks:** There are considerable transvers cracks visible on the soffit of deck slab of span -6 at LHS service road MNB 325+317. The concrete appears to be spalling, with portions of the surface peeling off**.** 2. **Overall Structural Condition:** The overall condition of the column seems poor and could compromise the structural integrity of the bridge or building it is supporting.
3	327+935	1. **Cracks and Spalling:** There are multiple intersecting cracks across the surface. These cracks appear to be both vertical and diagonal, indicating potential structural stress**.** 2. **Crack Depth:** Based on the visibility and width of the cracks, it is likely that they penetrate at least several millimeters into the concrete. However, there was no access to reach the slab, making it challenging to determine the exact depth. 3. **Exposed aggregates on the deck slab of the MNB 326+224:** This type of surface is undesirable as it can lead to reduced structural integrity and increased susceptibility to environmental damage.
4	334+786	1. **Spalling and Exposed reinforcement:** There is significant visible damage to the side of abutment A-2 at LHS Service Road structure. Large portions of the concrete have spalled and broken away, exposing the internal steel reinforcement (rebar).
5	344+792 and 347+763	1. **Spalling and Exposed reinforcement:** There is significant visible damage to the soffit of the girder at MNB Ch.347+792 on LHS main carriageway and on edge of slab at MNB 344+792 on LHS main carriageway, large portions of the concrete have spalled and broken away, exposing the internal steel reinforcement (rebar). 2. **Cracks in piers:** There are multiple intersecting cracks across the surface of the piers at MNB on LHS Main carriageway. These cracks appear to be both vertical and diagonal, indicating potential structural stress**.** 3. **Side slope condition:** The side slopes adjacent to the bridge appear to be eroded, showing displacement of rocks and soil materials.

Table 6-5: Detailed List of Minor bridge

S.NO	Site Chainage (Km)	Location	Str On	Type of Structure	Deck Width (m)	Span Arrangement (m)	Nos of Elastomeric bearings	Type of Expansion joint	Nos of Expansion joint	Type of Super-structure
1	308+136	LHS	MCW	New	12.06	6.88+6.78+6.86+7.0	16	Strip seal	3	RCC Girder
		RHS	MCW	Widened	12.06	12.5 + 12.20	-	-	-	RCC Slab
		LHS	SR	New	8	6X4.58	-	-	-	RCC Box
		RHS	SR	New	8	6X4.58	-	-	-	RCC Box
2	311+250	LHS	MCW	Widened	12.06	6.72+3.34+6.72	36	Strip seal	4	RCC Slab
		RHS	MCW	New	12.3	4.2+4.2+4.2+4.2+4.2	-	-	-	RCC Slab
		LHS	SR	New	8	4X4.0	-	-	-	RCC Box
3	311+950	LHS	MCW	Widened	12	7.25	12	Strip seal	2	RCC Slab
		RHS	MCW	New	12	4.55+4.55	-	-	-	RCC Slab
		LHS	SR	New	8	1X7	-	-	-	RCC Box
4	313+676	LHS	MCW	Widened	12	8.42	12	Strip seal	2	RCC Slab
		RHS	MCW	New	12.2	4.43+4.54	-	-	-	RCC Slab
		LHS	SR	New	8	2X3.8	-	-	-	RCC Slab
5	315+090	LHS	MCW	Widened	12.1	1X14.5	12	Strip seal	2	RCC Slab
		RHS	MCW	New	11.4	1X14.5	-	-	-	RCC Slab
6	316+640	LHS	MCW	Widened	12.1	13.35	8	Strip seal	-	RCC Girder
		RHS	MCW	New	11.95	7.15+6.94	-	-	-	RCC Slab
7	323+180	LHS	MCW	Widened	12.26	7.71	12	Strip seal	2	RCC Slab
		RHS	MCW	New	12.16	4.43+4.3	-	-	-	RCC Slab
		LHS	SR	New	8	2X3.5	-	-	-	RCC Slab

S.NO	Site Chainage (Km)	Location	Str On	Type of Structure	Deck Width (m)	Span Arrangement (m)	Nos of Elastomeric bearings	Type of Expansion joint	Nos of Expansion joint	Type of Super-structure
		RHS	SR	New	8	2X3.5	-	-	-	RCC Slab
8	325+317	LHS	MCW	Widened	12.12	5X4.5	-	-	-	RCC Slab
		RHS	MCW	New	12.16	5X4.5	-	-	-	RCC Slab
		LHS	SR	New	8	5X4.5	-	-	-	RCC Slab
		RHS	SR	New	8	5X4.5	-	-	-	RCC Slab
9	326+226	LHS	MCW	Widened	12.06	1X8.8	12	Strip seal	2	RCC Slab
		RHS	MCW	New	11.9	1X8.8	-	-	-	RCC Slab
		LHS	SR	New	8	2X4	-	-	-	RCC Slab
		RHS	SR	New	8	2X4	-	-	-	RCC Slab
10	327+935	LHS	MCW	Widened	12.7	8.85+4.4+8.71	36	Strip seal	4	RCC Slab
		RHS	MCW	New	12.16	4.45+4.45+4.57+4.45+4.45	-	-	-	RCC Slab
		LHS	SR	New	8	6X3.728	-	-	-	RCC Slab
		RHS	SR	New	8	6X3.728	-	-	-	RCC Slab
11	329+030	LHS	MCW	Widened	12.08	2X4.2	-	-	-	RCC Slab
		RHS	MCW	New	11.93	2X4.2	-	-	-	RCC Slab
		LHS	SR	New	8	2X3.90	-	-	-	RCC Slab
		RHS	SR	New	8	2X3.90	-	-	-	RCC Slab
12	330+580	LHS	MCW	Widened	12	8.99+8.79+8.55+8.6+8.39	60	Strip seal	6	RCC Slab
		RHS	MCW	New	12	8.49+8.87+8.59+8.68+8.5	-	-	-	RCC Slab
13	331+830	LHS	MCW	Widened	12	6X4.82	-	-	-	RCC Slab
		RHS	MCW	New	12	6X4.82	-	-	-	RCC Slab
		RHS	SR	New	8	6X4.82	-	-	-	RCC Slab

S.NO	Site Chainage (Km)	Location	Str On	Type of Structure	Deck Width (m)	Span Arrangement (m)	Nos of Elastomeric bearings	Type of Expansion joint	Nos of Expansion joint	Type of Super-structure
14	334+786	LHS	MCW	Widened	11.63	4X3.58	-	-	5	RCC Slab
		RHS	MCW	New	12	4X3.58	24	Strip seal	-	RCC Slab
		LHS	SR	New	8	4X3.58	-	-	-	RCC Slab
		RHS	SR	New	8	4X3.58	-	-	-	RCC Slab
15	335+115	LHS	MCW	Widened	12.6	2X6.8	-	-	-	RCC Slab
		RHS	MCW	New	12.7	1 X 13.6	-	-	-	RCC Slab
		LHS	SR	New	8	1X6	-	-	-	RCC Slab
		RHS	SR	New	8	1X6	-	-	-	RCC Slab
16	335+363	LHS	MCW	Widened	11.96	4+4.5+4.6+4.2	-	-	5	RCC Slab
		RHS	MCW	New	13.76	8.32+8.5	24	Strip seal	-	RCC Slab
		LHS	SR	New	8	4X4.5	-	-	-	RCC Slab
		RHS	SR	New	8	4X4.5	-	-	-	RCC Slab
17	335+510	LHS	MCW	Widened	14.26	2X3.5	-	-	-	RCC Slab
		RHS	MCW	New	13.84	2X3.5	-	-	-	RCC Slab
		LHS	SR	New	8	1X7	-	-	-	RCC Slab
		RHS	SR	New	8	1X7	-	-	-	RCC Slab
18	343+483	LHS	MCW	Widened	12.11	14.42	8	Strip seal	2	RCC Girder
		RHS	MCW	New	11.8	7.16+7.10	-	-	-	RCC Slab
		LHS	SR	New	8	4X3.5	-	-	-	RCC Slab
		RHS	SR	New	8	4X3.5	-	-	-	RCC Slab
19	344+784	LHS	MCW	Widened	12.16	6.38+6.18+6.16+6.07+6.53	60	Strip seal	6	RCC Slab
		RHS	MCW	New	12.2	6.38+6.18+6.16+6.07+6.53	-	-	-	RCC Slab

S.NO	Site Chainage (Km)	Location	Str On	Type of Structure	Deck Width (m)	Span Arrangement (m)	Nos of Elastomeric bearings	Type of Expansion joint	Nos of Expansion joint	Type of Super-structure
		LHS	SR	New	8	6X5	-	-	-	RCC Slab
		RHS	SR	New	8	6X5	-	-	-	RCC Slab
20	345+287	LHS	MCW	Widened	11.9	1 X 13.6	-	-	-	RCC Slab
		RHS	MCW	New	12	1 X 13.6	-	-	-	RCC Slab
		LHS	SR	New	8	3X4.53	-	-	-	RCC Slab
		RHS	SR	New	8	3X4.53	-	-	-	RCC Slab
21	346+175	LHS	MCW	Widened	12.16	9.43	12	Strip seal	2	RCC Slab
		RHS	MCW	New	12.16	9.43	-	-	-	RCC Slab
		LHS	SR	New	8	2X5	-	-	-	RCC Slab
		RHS	SR	New	8	2X5	-	-	-	RCC Slab
22	347+770	LHS	MCW	Widened	12.16	4.7+4.95+4.8	8	Strip seal	2	RCC Slab
		RHS	MCW	New	12	1X14.5	-	-	-	RCC Slab
		LHS	SR	New	8	4X3.5	-	-	-	RCC Slab
		RHS	SR	New	8	4X3.5	-	-	-	RCC Slab
23	359+700	LHS	MCW	Widened	11.0	1 X 13.6	-	-	-	RCC Girder
		RHS	MCW	New	11.0	1 X 13.6	-	-	-	RCC Slab
		LHS	SR	New	8	2X6.8	-	-	-	RCC Slab
		RHS	SR	New	8	2X6.8	-	-	-	RCC Slab

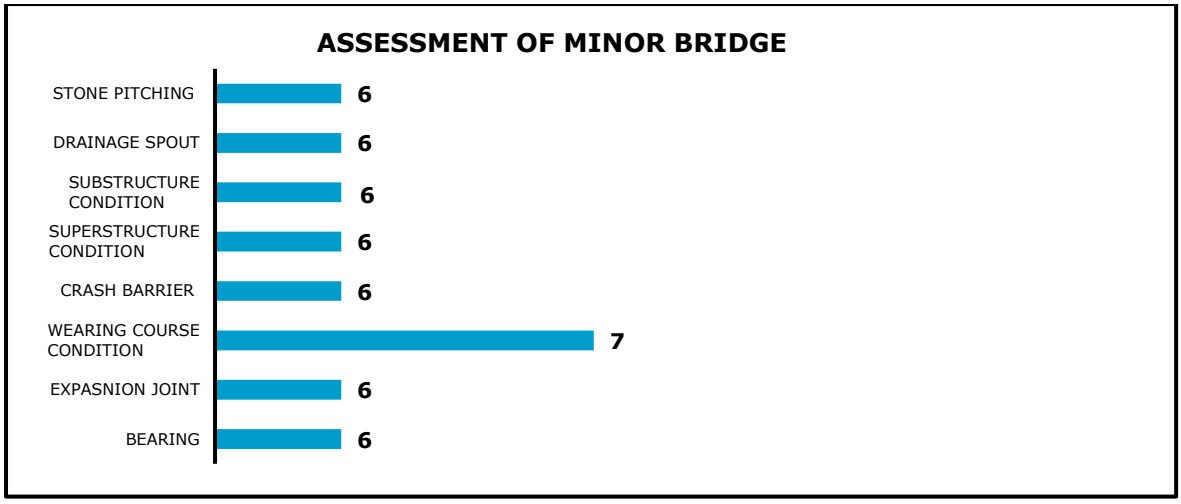


Figure 6-3: Comparative condition assessment of minor bridge



MNB at Ch. 308+130



MNB at Ch. 308+130



MNB at Ch. 308+130



Crack in pedestal MNB at Ch. 308+130



MNB at Ch.308+130



Spalling in deck slab edges MNB at Ch.308+130



MNB 315+088



MNB 315+088



MNB at Ch 323+177 LHS Service



MNB at Ch 323+177 LHS Service



Debries on carriegeaway at MNB on Ch. 325+317



Crack in deck slab at MNB Ch. 325+317 (LHS Service)



MNB at Ch.326+224



Damaged Crash barrier at MNB Ch.326+224 (LHS)



Exposed aggregates of deck slab at Ch. 326+224



Spalling in crash barrier at MNB Ch. 326+224



MNB at Ch. 327+935 (LHS Service)



MNB at Ch. 327+935





Spaliing on pier cap at MNB Ch. 327+935 (LHS)



MNB at Ch. 330+526



MNB at Ch. 330+526





Spalling on Abutmetn Edges at MNB Ch. 334+786



MNB at Ch. 335+511



MNB Ch. 335+511

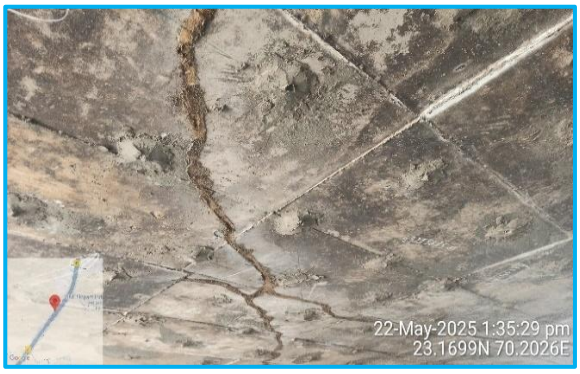




Minor spalling at edges of deck slab at MNB Ch. 335+511



MNB 345+289



Repaired Crack at MNB 345+289



MNB at Ch.347+763



MNB at Ch.347+763



Spalling aroud projection pipe at MNB Ch.347+763



Spalling at RCC Girders at MNB Ch.347+763

Figure 6-6-4: Site Photographs of minor bridges

6.4 ROB

The project road has 4 ROBs which are in satisfactory condition but RE wall exhibits some issues. The wall exhibits significant issues including stabilization by visible nails or bolts, extensive steel frame grids at ROBs, marked panels for maintenance, wear and discoloration of panels due to weathering, damaged rubber sealing of expansion joints needing immediate replacement, minor corrosion on steel members. Regular inspection, maintenance, and structural reinforcements are crucial to ensure long-term stability. The comparative assessment of the Minor bridges is presented in the Figure 6-5.

Table 6-6: Detailed distresses of ROBs

S. No	Chainage	Assessment
1	356+925	1. **Expansion joint:** The material is severely damaged and no longer functions as a strip and seal. Immediate replacement is necessary to prevent further damage to the structure. 2. **Spalling:** The Abutment A-1 at LHS shows significant vertical cracking and Major spalling at bottom. The concrete surface is peeling off, exposing the reinforcing steel bars. Immediate repair is necessary to prevent further damage to the structure.

Table 6-7: Detailed list of ROBs

S.NO	Chainage	Location	Str On	Type of Structure	Deck Width (m)	Span Arrangement (m)	POT-PTFE Bearings (Nos)	Elastomeric bearings (Nos)	Type of Expansion joint	Expansion joint (Nos)	Type of Super-structure
1	330.035	BHS	MCW	New	37	1X30	-	20	Strip seal	4	PSC I girder
2	336.918	BHS	MCW	New	37	1X32.500+ 1X21.500	-	40	Strip seal	6	PSC I girder
3	354.03	BHS	MCW	New	32.25	1X30	-	20	Strip seal	4	PSC I girder
4	356.925	BHS	MCW	New	27	1X20+1X24+1X38+1X20	88	0	Strip seal	10	PSC I girder and steel girder

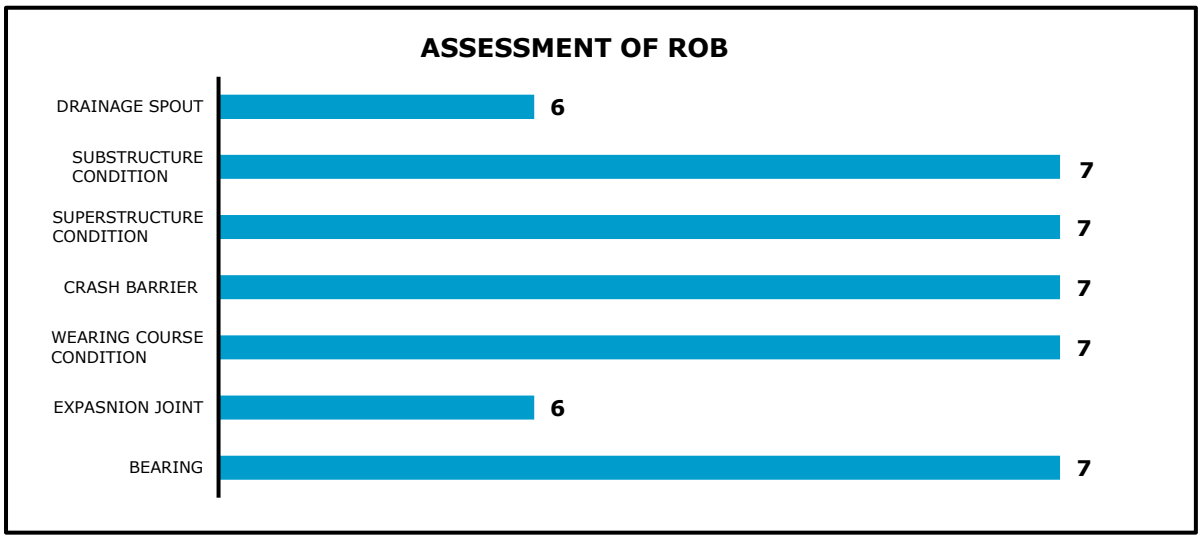


Figure 6-5: Comparative condition assessment of ROBs



ROB at Ch. 336+926



ROB at Ch.330+026





ROB at Ch.354+023





ROB at Ch.356+925



Strip seal expasnion damaged at RHS ROB CH. 356+925



Spalling at bottom of Abutment A-1 Ch. 356+925



Paintless bearings ROB at Ch. 356+925



Minor corrosion on bolts at ROB Ch. 356+925

Figure 6-6-6: Site Photographs of ROBs

6.5 Vehicular underpasses

The project road constitutes 11 Nos of VUP according to the client's data, however, upon inspection at the site, 17 VUP bridges were found. These structures are in satisfactory condition and fair state of maintenance but specific components such as Abutment cap, Pier cap, expansion joint and expansion joint exhibit minor damage due to spalling, cracks and damaged joint. These issues need attention to prevent further deterioration and ensure structural safety. Details of the underpass structures on the project highway are provided in Table 6-9 below.

Table 6-8: Detailed distresses of VUP

S. No	Chainage	Assessment
1	325+568, 321+255 & 334+400	1. **Cracks in Pier:** • Cracks on bottom of abutment cap and pier cap. 2. **Spalling and honeycombing in Concrete:** • Spalling observed in crash barrier. • Honeycombing found on the cap of pier and abutment.
2		**RE wall panel:** Honeycombing and multiple cracks found in RE wall panels on both sides.
3		**Cleanliness:** Drainage spout and expansion joint need to be clear.

Table 6-9: Detailed list of VUP

S.NO	Chainage (Km)	Location	Str On	Type of Structure	Deck Width (m)	POT-PTFE Bearings (Nos)	Type of Expansion joint	Expansion joint (Nos)	Type of Super-structure
1	307+755	BHS	MCW	New	27	40	Strip seal	6	PSC I girder
2	314+200	BHS	MCW	New	27	40	Strip seal	6	PSC I girder
3	318+300	BHS	MCW	New	27	40	Strip seal	18	PSC I girder
4	325+552	BHS	MCW	New	27	40	Strip seal	8	PSC I girder
5	331+250	BHS	MCW	New	27	40	Strip seal	6	PSC I girder
6	334+400	BHS	MCW	New	27	40	Strip seal	6	PSC I girder
7	340+150	BHS	MCW	New	27	40	Strip seal	8	PSC I girder
8	344+170	BHS	MCW	New	27	40	Strip seal	6	PSC I girder
9	349+100	BHS	MCW	New	27	40	Strip seal	6	PSC I girder
10	352+325	BHS	MCW	New	27	40	Strip seal	6	PSC I girder
11	356+740	BHS	MCW	New	27	24	Strip seal	8	PSC I girder

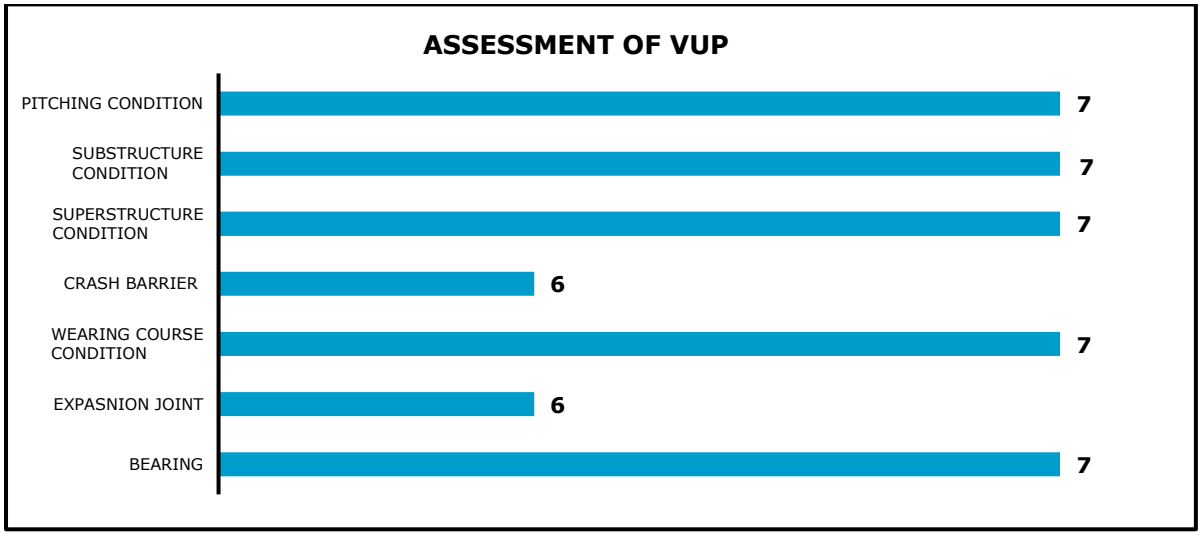


Figure 6-7: Comparative assessment of VUP



VUP at Ch. 314+190



VUP at Ch. 331+255



Crack repaired on abutment Cap VUP at Ch. 325+568



VUP at Ch. 325+568



VUP at Ch. 331+255



VUP at Ch. 331+255





VUP at Ch.334+400





VUP at Ch.352+325

Figure 6-6-8: Site Photographs of VUP

6.6 Flyover

The project road has 6 flyovers and are in satisfactory condition with fair state of maintenance but specific components such as Abutment, Pier, expansion joint and barriers exhibit minor damage due to spalling, cracks and damaged joint. These issues need attention to prevent further deterioration and ensure structural safetyThese repairs will help maintain the functionality and safety of the underpasses.

Details distresses of the flyover on the project highway are provided in Table 6-10below.

Table 6-10: Detailed distresses of flyover

S. No	Chainage	Observation
1	341+740, 324+035 and 356+315	**Vertical Cracks in Pier:** Location: Pier P-1 (Ch. 341+740) LHS flyover. Observation: Vertical cracks, maximum width 2-3 mm, depth 15 mm. **Spalling of Concrete:** Location: pier P-1 of LHS Flyover at Ch. 324+035. Location: Abutment A-1 of LHS Flyover at Ch. 341+740. Location: pier Cap P-1 of LHS Flyover at Ch. 341+740. Location: pier Cap P-1 of LHS Flyover at Ch. 356+315 Observation: Significant concrete degradation and major spalling. **Exposed Reinforcement:** Observation: Significant damage to RCC concrete crash barrier, exposing internal steel reinforcement.

Table 6-11: Detail List of Flyover

S.NO	Chainage (Km)	Location	Str On	Type of Structure	Deck Width (m)	Span Arrangement (m)	POT-PTFE Bearings (Nos)	Type of Expansion joint	Expansion joint (Nos	Type of Super-structure
1	324+035	BHS	MCW	New	28.8	3X30	72	Strip seal	8	PSC I girder
2	341+750	BHS	MCW	New	28.8	3X30	72	Strip seal	8	PSC I girder
3	356+315	BHS	MCW	New	35.5	5X30	160	Strip seal	18	PSC I girder
4	358+615	BHS	MCW	New	17.5	3X30	42	Strip seal	8	PSC I girder
5	359+030	BHS	MCW	New	17.5	3X30	42	Strip seal	8	PSC I girder
6	362+100	BHS	MCW	New	17.5	3X30	48	Strip seal	8	PSC I girder

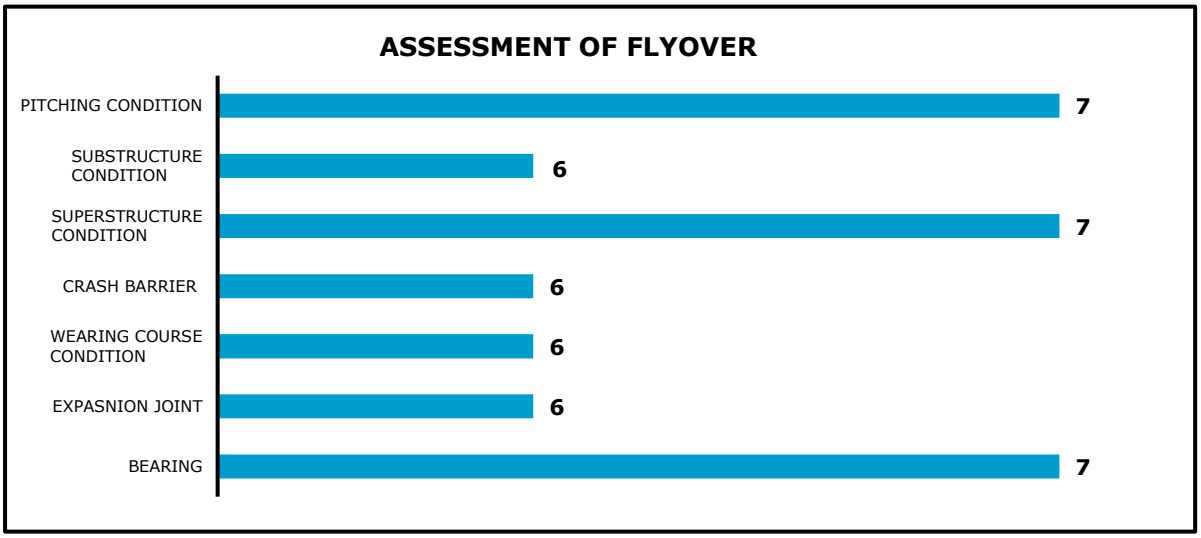


Figure 6-9: Comparative assessment of flyover





Flyover at Ch. 324+035



Spalling in pier at Ch. 324+035



Flyover at Ch. 324+035





Flyover at Ch.341+740



Damages repaired at Flyover Ch.341+740



Spalling at bottom of Abutment wall at Flyover Ch.341+740



Flyover at 356+315



Spaliing found on pier cap Flyover at 356+315





Flyover at Ch. 362+123

Figure 6-6-10: Site Photographs of flyover

6.7 RE Wall Panel

The project road comprises 6 flyovers and 17 VUPs. They are in satisfactory condition, apart from issues with the RE walls. The retaining walls has not shown bulging, which indicates no apparent deformation in its structure; however, the surface of some of the wall's panels shows visible cracks. These cracks differ in size and orientation, pointing to underlying structural stress or damage. Additionally, there is significant spalling, where sections of the concrete surface have flaked off or broken away, further exposing the material beneath to potential degradation.



Panel cracked Flyover at Ch.341+700



Panel cracked at Ch.344+180



Spalling in pier at Ch. 352+325



Flyover at Ch. 358+615



Flyover at Ch. 359+050



Flyover at Ch. 334+400



Flyover at Ch. 362+123



Flyover at Ch. 331+255

Figure 6-6-11: Site Photographs of RE wall panel

6.8 Culverts

There are 51 culverts along the project stretch, including RCC box culverts, slab culverts, and Hume pipe culverts. Visual inspection shows that these culverts are generally in good structural condition. However, maintenance is needed in some areas to address issues like debris removal at the inlet and outlet, vegetation blockage, and cleaning of the waterway to ensure smooth drainage.

A few representative photographs of the culverts are provided below to illustrate their current condition and maintenance.

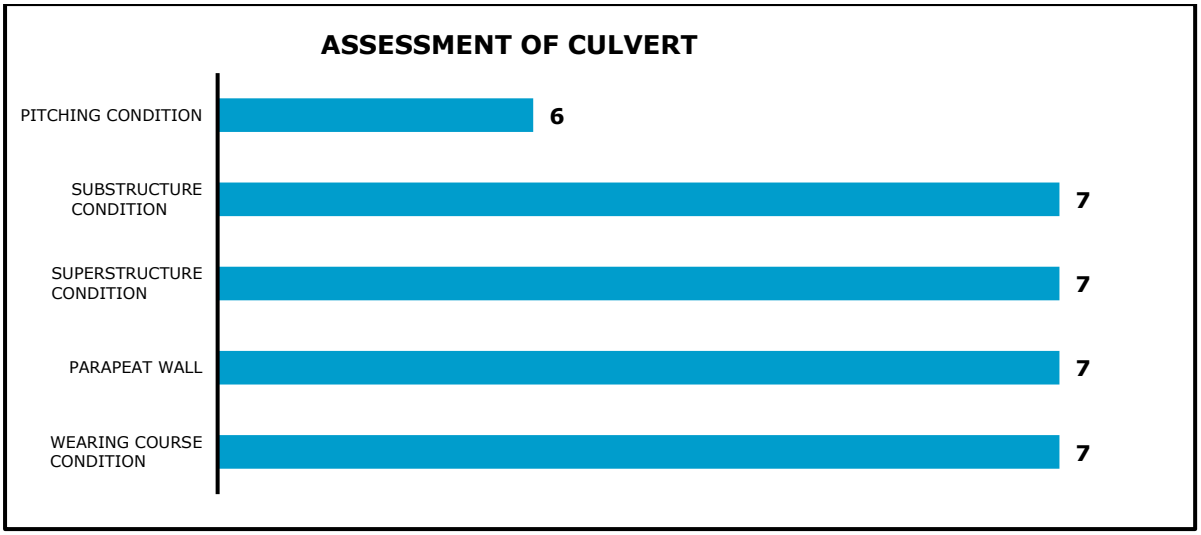


Figure 6-12: Comparative assessment of Culverts



HPC at Ch.336+170



HPC at Ch.340+000



Box Culvert at Ch. 340+000



HPC at Ch.361+151



HPC at Ch 330+526



Box culvert at Ch.310+437

Figure 6-13: Site Photographs of Culverts

6.9 Routine maintenance and Remedial measures

Spalling of concrete, which often requires patching, is typically caused by corrosion of steel reinforcement. Honeycombing, on the other hand, occurs due to inadequate compaction of concrete during casting. While patching is a common repair method for spalled areas, it is considered a temporary solution unless all chloride-contaminated concrete is removed first.

For spalling the repair involves applying polymer cement repair mortar to the affected area, after the surface has been treated with an appropriate bonding agent and the corroded reinforcement (rebar) has been coated with anticorrosion paint. Proper curing of the repaired area is essential for effective results.

Table 6-12: Remedial Measure for structures

S. No.	Name of Component	Type of Distress as per IRC: SP:35 -1990	Remedial measures as per IRC: SP:40-2019	Repair Action (Required / Not Required)
1	Girders Beams, crash barrier, sub-structure and Slabs etc.	Cracking Delamination Spalling Disintegration	• Sealing of crack / porous concrete with Epoxy Grout by injection. • Applying epoxy mortar over leached, honey combed and spalled concrete surface and exposed steel reinforcement.	Required.
2	Abutment, Pier Abutment caps and Pier caps	Disintegration cracks, spalling, honey combing etc.	Crack filling, Concrete restoration (The surface honeycomb can mitigate by removing the honeycomb part and grouting) Structural Strengthening (Jacketing, CFRP etc.)	Required
3	Elastomeric	Damages including embrittlement of elastomer, Cracking and tearing, Displacement	Replacement	Required.
4	Girders Beams and Slabs	Cracking (dead / dormant), spalling and damage to Concrete, Displacement, Rusting &	Corrosion preventative paint Shuttering removes Treatment by grouting and/or filler material micro concrete.	Required.

S. No.	Name of Component	Type of Distress as per IRC: SP:35 -1990	Remedial measures as per IRC: SP:40-2019	Repair Action (Required / Not Required)
		Corrosion on steel members.		
6	Expansion Joints	Non-functioning of joints due to Clogging or wearing out and failure of anchoring system,	Cleaning Replacement Covered expansion joint need to be open.	Required
7	Handrails, Parapets & Crash Barriers	Damage (Spalling, Disintegration and cracking etc).	Repair & Replacement	Required.
8	Drainage Spouts and Vest Holes	Damage and non-functioning	Cleaning required.	Required.

7. ASSESSMENT OF PROJECT ASSETS - TOLL SYSTEMS

7.1 General

Technical Due Diligence of the TMS (Toll Management System), ETC (Electronic Toll Collection System) and WIM (Weigh-in-Motion) System (as available) along Samakhiali Gandhidham Section of NH-41 in the state of Gujarat is done through site visits, site surveys, interactions at site and review of documents and reports.

7.2 Project Information

Toll Plaza Km 56+1600

No. of Lanes at Toll Plaza

- It is a straight-line toll plaza with 18 Lanes, (9 lanes in each direction) are equipped with Hybrid ETC equipment including two reversible lanes, separate two-wheeler lanes provided adjacent to the extra-wide lane in each direction.

7.3 Toll System Maintenance

TMS installation was done by M/s Techsture Technologies India Pvt. Ltd. in the year 2019 and since last five years is running under AMC by the same system integrator till date for all lanes at the Toll Plaza.

7.4 WIM system

All lanes at the Toll Plaza are equipped with Weigh in Motion (WIM) systems however none of them are functional.

7.5 SWB (Static Weigh Bridge)

Toll Plaza is equipped with Static Weigh Bridge (SWB) for detection and collection of overload penalties however the condition of the weigh bridge is very poor and it looks like a very old installation

7.6 Review and Assessment of TMS (incl. AVCC Systems)

1. TMS maintenance at the toll plaza is being done by i.e. M/s Techsture Technologies India Pvt. Ltd., for all the toll equipment with open tolling technology and is in the AMC since last 5 years.
2. Lane hardware is provided as per the industry standards, critical components required to check the vehicle classification e.g. AVC in all lanes are working in good condition, the AVC and TLC panels are installed over the toll booth and secured inside a cabinet to protect the equipment from weather conditions.
3. The MS-WIM are supplied by E-ARETE in 16 lanes to detect and collect overload penalty as per the government norms for which the validity is expiring on 20th August 2025 however none of the equipment is functional and all overloaded vehicles are moving through the lanes freely.
4. The Static Weigh Bridge on the LHS is supplied by Essae Digitronics and is working fine however the condition of the weigh bridge is very poor and needs to be either repaired or replaced. The calibration of the SWB at LHS side is expired which was valid till 21st March 2026.
5. The Static Weigh Bridge on the RHS is supplied by Orion and is working fine however capacity of the SWB is 100 tons which is lower than the standard requirements as per the industry, the condition of the weigh bridge is very poor and needs to be either repaired or replaced. The calibration of the SWB at LHS side is valid till 20th July 2025.

6. The network is Ethernet based and is provisioned with a backbone connectivity through OFC in parallel till the toll plaza building, which is installed at the center median, the toll plaza building is at the center which is approx. 300 meters distance from toll plazas in both directions. The OFC is provisioned to prevent any data loss in case the primary link from plaza to lanes becomes faulty and which will further prevent any data loss.
7. Fastag integration is done through IDFC as an Acquirer bank and a dual ILL link of 15 and 25 Mbps speed and are established from Airtel and GTPL respectively for round the clock connectivity.

7.7 Assessment of Toll Operation and integration with TMS

The AVC is profiler based with independent storage but not sending parallel data to the database server if the lane controller if put down for maintenance and in such cases the control room staff is completely dependent on toll collectors' input for validation of all discrepancies, Violations etc.

The LSDU i.e. Lane Status Display Unit to monitor the entire hardware of each lane is provided which is an essential part for monitoring of the toll equipment on day-to-day basis and generating all alerts.

7.8 Backoffice TMS review

a. The TMS is controlled through the control room which is housed with the validator performing real time transaction validations.
b. LSDU as stated above is working properly and equipment status / failures are well known to the shift supervisor.
c. As per the guidelines of IHMCL, the plaza server must be installed with a hot-standby server arrangement and provided accordingly.
d. No fake note detectors installed in the lane to detect counterfeit currency

7.9 Conclusion

The complete TMS systems is working in good condition however has gone end of life and is recommended for replacement.

7.10 HTMS

a. PTZ – Two installed and are functional
b. ECBs – Out of 26 locations installed, ECB were not functional on 4 locations found (both Master and Slave units)
c. ATCC – IR based Turtl make found working and providing input to the control room.
d. VMS - Installed at 4 locations and found working
e. Met Station Installed at TP and found equipment working

The cost estimate for total replacements have been worked out and detailed is annexed in the chapter of Cost Estimate.

Figure 7-1: Typical Site Photographs of Toll Plaza & Equipment

Toll Plaza



Control Room



Server Room



UPS Room

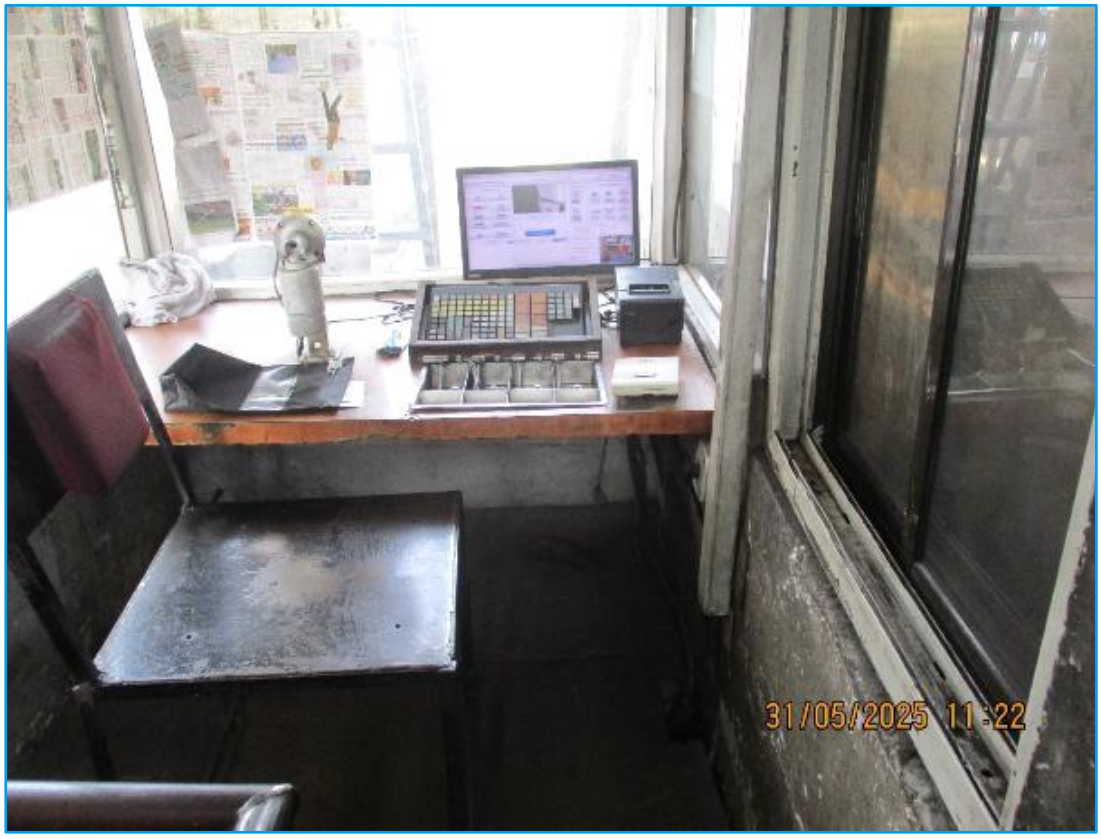




Equipment Installation on the Island and Toll Booth







Static Weight Bridge
LHS





RHS





HTMS

ECB





VMS


1 Jun 2025 6:35:48 pm
23.294489085674286N 70.364687154069 54E

MET



ATCC







8. SOIL AND MATERIAL INVESTIGATION

8.1 General

As part of the soil and material investigation report, the consultants conducted tests on subgrade soils, granular layers, and bituminous layers along the project corridor to evaluate the properties and performance characteristics of the existing pavement materials.

8.2 Field Investigation – Sampling and Testing

Field investigations were carried out on the subgrade soils, and representative pavement material samples were collected for laboratory analysis. The Table 8-1 outlines the sampling methodology, the list of tests performed, and the corresponding testing protocols employed for both field and laboratory evaluations.

Table 8-1: Site sampling and testing criteria

S. No.	Type of Soil Sample	Sampling Criteria	Testing Criteria	
			Description of Test	Standard Code Applicable
Existing subgrade and pavement materials				
i)	**Subgrade Strength Test Pits**	Minimum of one subgrade soil sample was obtained at an interval directed by the client & Material Engineer based on site condition.	In-situ Density	IS 2720 (Part – 29)
			In-situ moisture content	IS 2720 (Part – 2)
			Soil Classification	IS 1498
			Sieve Analysis	IS 2720 (Part – 4)
			Atterberg Limits	IS 2720 (Part – 5)
			Laboratory Compaction Test (using heavy compaction)	IS 2720 (Part – 8)
			Field Compaction	IS 2720 (Part-29)
			4-days soaked CBR	IS 2720 (Part – 16)
			Free swell Index	IS 2720 (Part-40)
ii)	**Existing Granular Layers**	Existing granular layer materials was collected from each subgrade test pit at an interval directed by client	Gradation	MoRTH Table: 400-1 & 400-13
			Atterberg Limits	IS 2720 (Part – 5)
			Specific Gravity and Water Absorption	IS 2386 (Part – 3)
			Aggregate Impact Value (AIV)	IS 2386 (Part – 4)
iii)	**Existing Bituminous Layers**	Existing bituminous layer's material was collected through core cutting process at specific intervals as directed by the pavement engineer	Gradation	MoRTH Table: 500-10 & 500-17
			Density of core	ASTM D 2726
			Bitumen extraction	ASTM–D 2172

8.3 Subgrade Sampling and Testing

Subgrade investigations were undertaken to evaluate the strength characteristics of the in-situ soil. As outlined in Table 8-1, subgrade strength test pits were excavated at intervals determined by the client and the materials engineer, considering prevailing site conditions. A combination of in-situ and laboratory tests were conducted on the collected soil samples in accordance with the relevant standards summarized in Table 8-1.

The test results and discussion are described in the section below.

Field tests were conducted as per the project requirement to determine the subgrade characteristics and strength. The field testing for subgrade soil at each test pit includes the following,

- In-situ density determination using Core-cutter method
- Field moisture content determination using Rapid moisture meter
- In-situ CBR Determination using the Dynamic Cone Penetrometer testing

8.3.1 In-Situ CBR (Dynamic Cone Penetration Test)

Dynamic Cone Penetration tests were conducted at subgrade strength test pit locations to assess in-situ CBR on existing soil. The CBR value was calculated based on different soil layers encountered. The slope change in the graph (Penetration Vs Number of Blows) indicates the interface of two layers of different penetration resistance. From the graph, thickness of layer and slope (penetration mm/blow) were calculated. The following equation given in IRC: 37-2012 has been used to calculate the layer DCP-CBR value for each layer:

$$log_{10}\, CBR = 2.465 - 1.12 \times log_{10}(mm/blow)$$

Once the DCP-CBR calculated for each layer, the overall CBR (Weighted average) of all sub-layers will be converted into single DCP-CBR values by using Japan road association formula 1989 as given below:

$$Overall\ CBR = \left\{ \sum layer\ thickness \times (DCP - CBR)^{1/3} \Big/ \sum layer\ thickness \right\}^3$$

Dynamic Cone Penetration test results showing penetration of cone in cm and number of blows at each pit are plotted.

- A summary of the DCP-derived CBR values is provided in Table 8-2, Some of the field investigation photographs of DCP-CBR are shown in Figure 8-1 . and an illustrative bar diagram depicting the spatial variation of DCP values across the project corridor is presented in Figure 8-2



Figure 8-1: Field Investigations photographs of DCP-CBR

In general variations in DCP-CBR values are expected due to the influence of several site-specific factors. The penetration resistance of the DCP cone can be significantly affected by the prevailing in-situ moisture content, the presence of underlying layers beneath the subgrade, and obstructions such as boulders or tree roots. Typically, DCP-CBR values tend to increase with a reduction in in-situ moisture content, and conversely, higher moisture levels can result in lower CBR values. Additionally, if the DCP cone encounters obstructions such as stones or boulders, the measured resistance increases, leading to abnormally high CBR estimations.

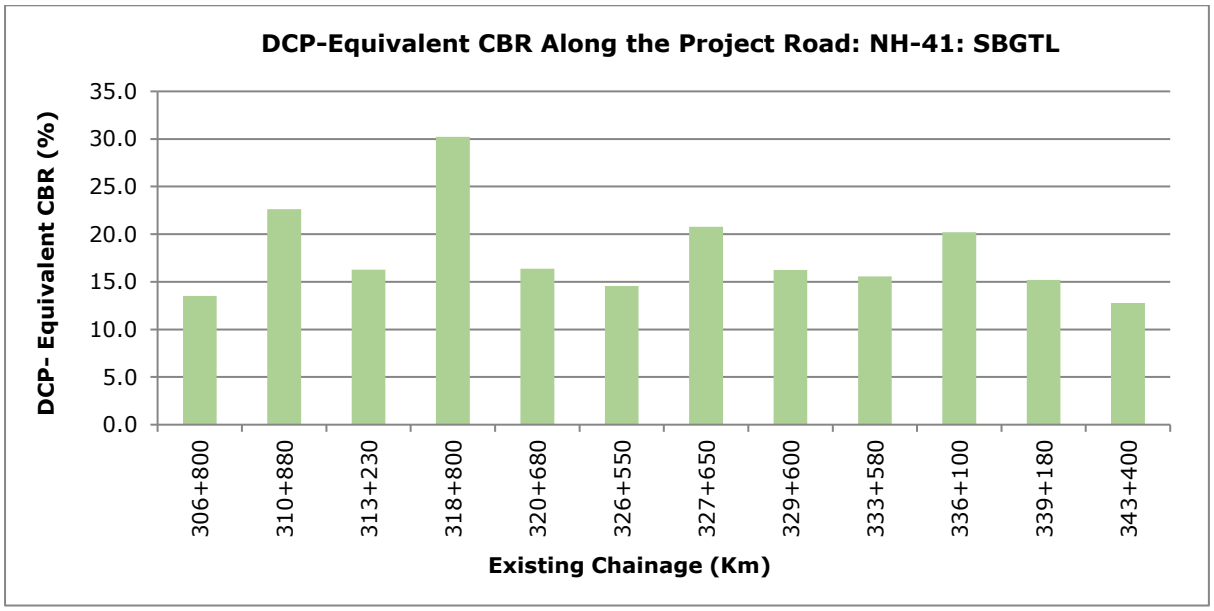


Figure 8-2: Illustrative summary of DCP-Equivalent CBR along the project corridor

8.3.2 Field Density & Moisture Content

In-situ density (field dry density) and moisture content of the subgrade were determined in accordance with the applicable standards listed in Table 8-1.

The field density measurements were utilized to assess the degree of compaction achieved in the existing subgrade, and to determine the in-situ California Bearing Ratio (CBR) under field density conditions. A consolidated summary of the field test results for the entire project corridor is presented in Table 8-2. Representative photographs of the field investigation are in Figure 8-3



Figure 8-3: Field Investigations photographs of field density and moisture

Table 8-2: Statistical summary of field tests in soil

Type of Carriageway	FMC (%)			FDD (gm/cc)			DCP-CBR (%)		
	Min	Max	Avg.	Min	Max	Avg.	Min	Max	Avg.
Main Carriageway (MCW)	4.0	8.0	6.3	1.83	2.05	1.96	12.8	30.2	17.9

8.3.3 Subgrade test results

Approximately 50 kg of subgrade soil samples were collected in damp-proof bags to facilitate the necessary laboratory testing. The required tests, as specified in Table 8-1 were subsequently conducted in accordance with relevant standards.

Table 8-3: Summary of subgrade test results

S. No	Type of carriage way	Existing Chainage (Km.)	Side (LHS/ RHS)	Soil Classification as per IS: 1498	Gravel content %	Sand content %	Clay & silt content %	Atterberg Limits [IS :2720-Pt-V]			Modified Proctor Test (IS:2720-Pt-VIII)		Field Density		4-Days Soaked CBR at MDD (%)	Free Swell Index (%)	Degree of Compaction (%)
								Liquid Limit (LL) %	Plastic Limit (PL) %	Plasticity Index (PI)	Max. dry density (gm/cc)	OMC (%)	Field Dry Density (gm/cc)	FMC (%)			
1	MCW	306+800	LHS	SM	6.4	63.5	30.1	18	NP	NP	2.07	8.8	1.98	7.00	12.1	0.0	95.7
2	MCW	310+880	RHS	SM	7.8	57.6	34.6	21	NP	NP	2.06	8.5	1.95	5.00	10.5	12.5	94.7
3	MCW	313+230	LHS	GM	39.6	34.5	25.9	25	NP	NP	2.10	8.4	1.95	6.00	16.5	10.0	92.9
4	MCW	318+800	RHS	SM	8.4	58.5	33.1	22	NP	NP	2.02	9.2	1.96	7.00	11.4	12.5	97.0
5	MCW	320+680	LHS	SM	39.8	43.5	16.7	24	NP	NP	2.16	8.2	2.05	5.00	18.3	0.0	94.9
6	MCW	326+550	RHS	SM-SP	38.5	50.9	10.6	21	NP	NP	2.13	8.5	2.01	4.00	21.2	11.1	94.4
7	MCW	327+650	LHS	SM	35.8	47.0	17.2	19	NP	NP	2.10	8.0	1.95	6.00	23.4	12.5	92.9
8	MCW	329+600	RHS	SM	0.9	66.9	32.2	18	NP	NP	2.09	9.0	1.94	7.00	11.6	12.5	92.8
9	MCW	333+580	LHS	SM	15.2	58.6	26.2	19	NP	NP	2.08	8.6	1.95	7.00	14.8	12.5	93.8
10	MCW	336+100	RHS	SM-SW	41.6	50.8	7.6	16	NP	NP	2.16	7.8	2.03	8.00	26.5	12.5	94.0
11	MCW	339+180	LHS	SC	12.6	42.8	44.6	28	20	8	1.99	9.6	1.83	7.00	10.3	15.2	92.0
12	MCW	343+400	RHS	SC	35.0	43.2	21.8	25	16	9	2.10	10.8	1.96	7.00	12.6	15.2	93.3

8.3.4 Summary of Soil Test results

Soil Classification and Distribution:

From Table 8-3, it is evident that the subsoil along the project corridor is generally consistent and predominantly sandy nature. At one location, gravelly soil was observed.

The Liquid Limit (LL) of these soils is ranging between 16%-28%, and these values are within the limit as per MoRTH specifications (<50%). The obtained maximum Plasticity Index (PI) of the subgrade soils is 9% and the degree of free swell (FSI) is 15.2%. All the measured PI and FSI values are also within the acceptable limits as per MoRTH guidelines, of 25% and 50% respectively.

Strength parameters:

Variance between MDD and FDD is converted in-terms of degree of compaction. The degree of compaction along the project corridor is ranging between 92.0% - 97.0%. The 4-days soaked CBR along the project corridor is ranging from 10.3% to 26.5% with an average value of 15.8%.

8.4 Existing Pavement Composition

Existing pavement composition (pavement course, material type, and thickness) were recorded at an interval directed by the client & material engineer based on the site condition along the project road.

The summary of existing pavement crust thickness is presented in Table 8-4 for MCW & SR. Some of the field investigation photographs shared in the Figure 8-4, The pavement crust summary presented in an illustrative bar graph of Figure 8-5

Table 8-4: Summary of pavement crust along the project corridor

S. No.	Location (Km.)	Side (LHS/ RHS)	Pavement Composition (mm)			
			Bituminous Layer	WMM	GSB	Total Thickness
1	306+800	LHS	185	280	210	675
2	310+880	RHS	160	180	250	590
3	313+230	LHS	270	380	300	950
4	318+800	RHS	180	220	200	600
5	320+680	LHS	180	400	350	930
6	326+550	RHS	190	250	200	640
7	327+650	LHS	160	400	350	910
8	329+600	RHS	230	270	230	730
9	333+580	LHS	130	450	380	960
10	336+100	RHS	230	300	300	830
11	339+180	LHS	170	280	220	670
12	343+400	RHS	190	250	210	650



Figure 8-4: Pavement Crust Thickness measuring photographs

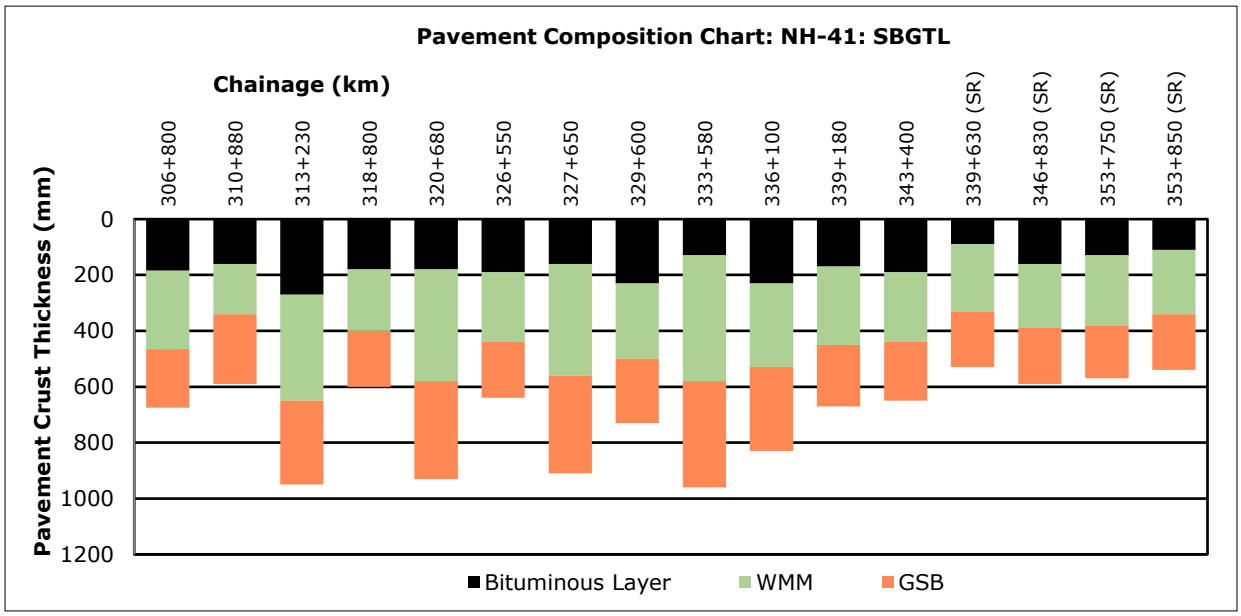


Figure 8-5: Existing pavement crust summary along the project road

8.4.1 Summary of Pavement test pit results

- The existing pavement along the project corridor is bituminous pavement. The pavement composition comprises of bituminous layer, granular base over the granular sub-base.
- For MCW, throughout the project road it possesses consistent bituminous/ granular layer thickness with an average of 190mm bituminous layer over the average Granular course of 538mm were observed.

8.5 Existing Granular Layers Testing

Granular layer's samples were collected at an interval directed by the client & Material Engineer based on the site condition along the project road. Care has been taken to collect the appropriate granular layer like WMM/ GSB separately from the excavated test pit. Sufficient sample is collected for testing as mentioned in Table 8-1.

The granular material test results are presented in Table 8-5.

Table 8-5: Summary of Granular layers Test Results

S. No	Chainage (km)	Side (LHS / RHS)	Type of Sample	Gradation Conformation as per MoRTH 5th Revision	Atterberg Limits			Specific Gravity	Water Absorption (%)	Aggregate Impact Value (%)
					Liquid Limit (LL) %	Plastic Limit (PL) %	Plasticity Index (PI)			
1	306+800	LHS	WMM	0.600mm IS sieve material coarser side in WMM gradation	24	NP	NP	2.864	0.68	16.5
2	310+880	RHS	GSB	53.0mm sieve material coarser side in GSB grade-IV	19	NP	NP	2.857	0.67	14.9
3	313+230	LHS	GSB	Confirming to GSB grade-III & IV	22	NP	NP	2.849	0.64	15.9
4	318+800	RHS	WMM	22.4mm IS sieve material finer side in WMM gradation	21	NP	NP	2.848	0.68	12.3
5	320+680	LHS	WMM	0.600mm IS sieve material coarser side in WMM gradation	20	NP	NP	2.856	0.62	17.7
6	326+550	RHS	GSB	Confirming to GSB grade-III & IV	20	NP	NP	2.861	0.58	17.8
7	327+650	LHS	GSB	53.0mm IS sieve material coarser side in GSB grade-III & IV	22	NP	NP	2.870	0.64	17.5
8	329+600	RHS	WMM	4.75mm, 2.360mm IS sieves material finer side in WMM gradation	19	NP	NP	2.868	0.63	13.1
9	333+580	LHS	WMM	4.75mm, 2.360mm IS sieves material finer side in WMM gradation	21	NP	NP	2.860	0.59	18.9
10	336+100	RHS	GSB	26.5mm IS sieve material coarser side in GSB grade-III & IV	20	NP	NP	2.854	0.67	15.7
11	339+180	LHS	GSB	Confirming to GSB grade-III & IV	22	NP	NP	2.862	0.59	16.6
12	343+400	RHS	WMM	0.600mm IS sieve material coarser side in WMM gradation	21	NP	NP	2.874	0.51	15.4

8.6 Existing Bituminous Layers Testing

Bituminous layer samples were extracted using a core cutting drilling machine with a 100 mm diameter bit to obtain representative bituminous core specimens. The locations of all core extractions are listed in Table 8-6. Laboratory tests, as specified in Table 8-1, were conducted on the recovered bituminous cores. The corresponding test results are presented in Table 8-7. Some of the core sample extracted at site are shown in Figure 8-6.

Table 8-6: Bituminous Layers Core cutting locations

S. No	Existing Road	Location (km)	Side (LHS/ RHS)	Lane	Wheel path	Height of Core (mm)
1	NH-41	307+000	LHS	Outer	OWP	220
2	NH-41	310+550	RHS	Outer	OWP	170
3	NH-41	313+300	LHS	Inner	OWP	355
4	NH-41	320+750	RHS	Inner	IWP	270
5	NH-41	322+650	LHS	Middle	OWP	380
6	NH-41	329+300	RHS	Inner	OWP	255
7	NH-41	331+930	LHS	Outer	OWP	200
8	NH-41	336+050	RHS	Outer	OWP	390
9	NH-41	340+680	LHS	Inner	IWP	190
10	NH-41	344+700	RHS	Middle	OWP	220
11	NH-41	346+420	LHS	Middle	IWP	240
12	NH-41	354+750	LHS	Outer	IWP	275
13	NH-41	354+750	RHS	Outer	OWP	185
14	NH-41	361+000	RHS	Inner	IWP	220



Figure 8-6: Core cutting investigation photographs

Table 8-7: Summary of bituminous layers test results

S. No	Location (Km.)	Side (LHS/ RHS)	Lane	Wheel path	Type of Material Tested	Source of Sample	Bitumen Content (%)	Bulk Specific gravity	Gradation Confirming to MoRTH 5th Revision
1	307+000	LHS	Outer	OWP	BC	Core	5.38	2.529	13.2mm IS sieve material finer side in BC grade-I
2	310+550	RHS	Outer	OWP	DBM	Core	4.69	2.553	Confirming to DBM grade-II
3	313+300	LHS	Inner	OWP	DBM	Core	4.61	2.561	Confirming to DBM grade-II
4	320+750	RHS	Inner	IWP	BC	Core	5.14	2.532	1.18mm, 0.600mm & 0.300mm IS sieves material coarser side in BC grade-I
5	322+650	LHS	Middle	OWP	BC	Core	5.66	2.566	13.2mm, 9.5mm IS sieves material finer side in BC grade-I
6	329+300	RHS	Inner	OWP	DBM	Core	4.02	2.567	4.75mm, 2.36mm IS sieves material coarser side in DBM grade-II
7	331+930	LHS	Outer	OWP	DBM	Core	4.51	2.562	Confirming to DBM grade-II
8	336+050	RHS	Outer	OWP	BC	Core	5.35	2.538	13.2mm, 9.5mm IS sieves material finer side in BC grade-I
9	340+680	LHS	Inner	IWP	BC	Core	4.32	2.525	Confirming to BC grade-I
10	344+700	RHS	Middle	OWP	DBM	Core	5.01	2.544	19.0mm IS sieve material finer side in DBM grade-II
11	346+420	LHS	Middle	IWP	DBM	Core	4.13	-	4.75mm, 2.36mm and 0.300mm IS sieves material coarser side in DBM grade-II
12	354+750	LHS	Outer	IWP	BC	Core	5.58	-	13.2mm IS sieve material finer side in BC grade-I
13	354+750	RHS	Outer	OWP	BC	Core	5.45	-	13.2mm, 9.5mm IS sieves material finer side in BC grade-I
14	361+000	RHS	Inner	IWP	DBM	Core	4.41	2.557	19.0mm IS sieve material finer side and 4.75mm, 2.36mm IS sieves material coarser side in DBM grade-II

9. PAVEMENT EVALUATION STUDIES

9.1 Pavement Condition Survey with Network Survey Vehicle

9.1.1 Network Survey Vehicle Description

Road Runner NSV was used for collection of condition data for this assignment. Road Runner (NSV) is multi-faceted road survey equipment which could be configured to collect a wide range of pavement condition data and asset data.

Road Runner NSV can collect roughness, rutting, pavement distresses, assets along with GPS coordinates and project chainage.

The main components which are integrated into Road Runner NSV are

- Digital Laser Profilers (DLP) -Road roughness and rutting.
- Digital Imaging System (DIS) -Pavement distresses and road assets data.
- Differential Global Positioning System (DGPS).
- High Resolution Distance Measuring Instrument (HRDMI).





1. Digital Laser Profiler (DLP)

- DLP is integrated into the NSV consisting of 11 lasers to collect Road Roughness and Rutting.
- This inertial profiler can record the data continuously along each wheel path.

a) Roughness

Road Runner NSV equipment fitted with dual wheel path laser profilometer to collect the roughness data. The roughness data was collected and reported for 100 m interval.

The outputs of the lasers and accelerometers located in each wheel path (750 mm either side of the Centre line of the vehicle) are sampled every 25 mm of longitudinal travel and used to calculate the longitudinal profile of the road.

The profile is then passed through the quarter car model to calculate the International Roughness Index (IRI) lane roughness as per the methodologies specified in the ASTM E-950.

b) Rutting

Rutting will be measured and reported through DLP, and the data will be recorded at every 100m interval on both the wheel paths.

2. Digital Imaging System (DIS)

Digital Imaging System (DIS) in Network Survey Vehicle (NSV) consist of 5 high resolution roof mounted cameras to capture pavement distresses and road assets data. These cameras are oriented in a certain configuration to ensure that the information of interest, such as inventory or pavement condition, is being recorded in the camera field of view. Three cameras are forward facing and mounted on front side of vehicle (Left corner, Centre and Right corner), covers 160o angle images and are set to sample at every 10m interval. Another two cameras are mounted on back side of the vehicle (Left corner, Right corner) to capture the distress image of pavement 10m*4m (length*width) i.e., captures at 10m interval.

Digital image system is capable of

- Collecting real time digital images.
- Achieving a sampling rate of at least one set per 2.5 meters for Distress camera's and one set per 10 meters for Asset cameras.
- Incorporating real time differentially corrected GPS (DGPS).
- Capturing & recording at highway speeds.
- Providing real time on-screen displays for operator verification during collection.
- Storing images straight to PC's / NAS (Network Attached Storage).
- Linking into the client's referencing system via distance and GPS.

3. Geo Referencing (DGPS Data)

The Road Runner NSV is equipped with a Differential GPS (DGPS) system, enabling accurate geo-referencing of collected data. All pavement condition data and images are captured along with corresponding spatial coordinates. Each image is tagged with precise latitude and longitude values, allowing direct referencing and correlation with specific locations on the roadway.

4. Distance Measuring Instrument (DMI)

Road Runner NSV is equipped with DMI, and it is fitted to rear tyre of the network survey vehicle. The distance and speed measurement performed by the distance measuring instrument, which is a distance transducer and it's highly accurate providing GPS distance and speed.



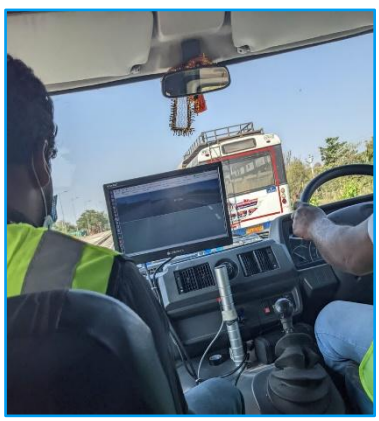


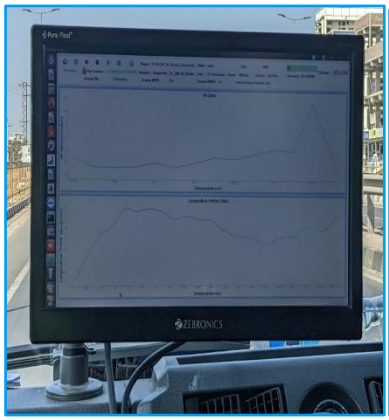
9.2 Methodology for NSV Field Testing

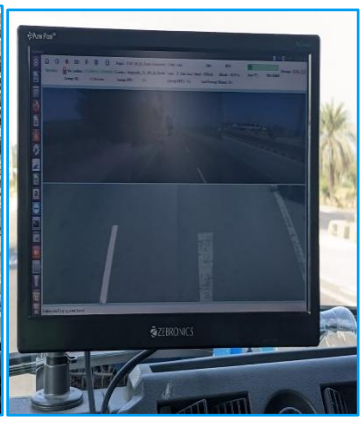
Usually, 4 members are assigned for site to collect the field data. Two of the trained/ experienced field engineers and two drivers during the collection phases of projects. During the survey, engineer is responsible for operating the vehicle's acquisition systems. Road Runner NSV dashboard tool is used to for data acquisition.

The survey will be carried out by lane wise, and the following steps will be followed during the survey.

- Engineer will setup the equipment and check the data collection system prior to the survey.
- Prior to the survey field engineer do set the project name, direction, lane number and starting chainage with increasing or decreasing (as per direction) details.
- The vehicle will run in middle of the lane and collects data up to a vehicle running speed of 80 Kmph.
- Digital Laser Profiler (DLP), Digital Imaging System (DIS) collect the data with GPS co-ordinates and chainage reference.
- Field Engineer will review the data collection and specifies any remarks/ details in observation column.
- At the end of project chainage, engineer will stop that survey and save all the recorded and the same process is followed for all other lanes of the project stretch.







9.3 Analysis of NSV Survey Data

Pavement condition survey was carried out on each lane of each carriage way with NSV. The NSV survey was conducted on the project corridor from 21/05/2025 to 23/05/2025, data was processed, analyzed and summary of it presented as below.

9.3.1 Roughness

As stated in the earlier section, NSV collected the roughness data at 100m interval on each lane in terms of IRI (International Roughness Index) value.

In Indian context, the IRI values were converted to RI as per IRC: SP:16-2019 "Guidelines on Measuring Road Roughness and Norms" with the following equation;

$$RI = 630*(IRI)^{1.12}$$

Where,

RI = Roughness in mm/km

IRI = International Roughness Index.

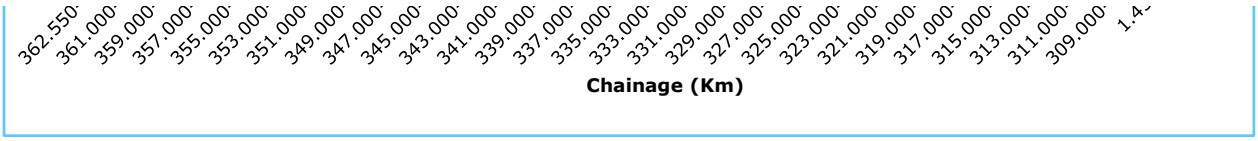


Figure 9-2, respectively.

Table 9-1: Summary of MCW roughness data on LHS direction

Chainage (km)		LHS Direction			
		Avg. BI (mm/km)			
From	To	Outer Lane	Middle Lane	Inner Lane	Average
306.000	306.800		2019.3	2025.4	2022.4
0.000	0.300		2418.7	2792.1	2605.4
306.800	308.000	1747.7	1862.4	1919.2	1843.1
308.000	309.000	2434.5	2798.7	2742.8	2658.7
309.000	310.000	2282.0	2405.8	2476.8	2388.2
310.000	311.000	2194.7	2101.7	2306.8	2201.1
311.000	312.000	1890.5	1872.9	2080.8	1948.1
312.000	313.000	2720.9	2072.5	2338.9	2377.4
313.000	314.000	1933.5	1811.9	1811.2	1852.2
314.000	315.000	2264.1	2792.0	2456.3	2504.1
315.000	316.000	2501.2	1745.3	2021.2	2089.2
316.000	317.000	2602.6	2551.5	2468.0	2540.7
317.000	318.000	2906.4	2364.7	2322.7	2531.2
318.000	319.000	2562.4	2645.7	2816.0	2674.7
319.000	320.000	2611.1	2182.7	2484.6	2426.1
320.000	321.000	1558.5	1852.5	1951.7	1787.6
321.000	322.000	1534.4	1533.4	2135.5	1734.4
322.000	323.000	1528.3	1798.9	1967.6	1764.9
323.000	324.000	1708.0	1799.0	1769.1	1758.7

Chainage (km)		LHS Direction			
		Avg. BI (mm/km)			
From	To	Outer Lane	Middle Lane	Inner Lane	Average
324.000	325.000	1981.7	2000.1	2039.0	2006.9
325.000	326.000	1903.3	2052.0	2238.7	2064.7
326.000	327.000	1649.4	2189.3	1763.2	1867.3
327.000	328.000	1560.3	2061.9	1931.1	1851.1
328.000	329.000	1564.5	2094.0	1908.4	1855.7
329.000	330.000	1868.9	2027.9	2098.8	1998.6
330.000	331.000	2004.0	1784.5	1879.0	1889.2
331.000	332.000	2380.6	2712.0	3092.5	2728.4
332.000	333.000	1530.8	1326.8	1440.4	1432.7
333.000	334.000	1610.7	1288.6	1297.6	1399.0
334.000	335.000	1634.9	2085.5	1779.0	1833.1
335.000	336.000	1676.4	1427.2	1468.7	1524.1
336.000	337.000	1918.1	2074.2	1823.0	1938.4
337.000	338.000	2238.5	2331.3	2358.6	2309.5
338.000	339.000	1712.7	1849.4	1989.1	1850.4
339.000	340.000	1644.6	1992.6	2343.2	1993.4
340.000	341.000	1844.3	1683.4	2054.9	1860.9
341.000	342.000	2580.2	2532.4	2734.7	2615.8
342.000	343.000	1482.5	1418.7	1620.3	1507.2
343.000	344.000	1643.5	2268.6	2044.1	1985.4
344.000	345.000	1795.7	2429.2	2487.4	2237.4
345.000	346.000	1595.0	1850.3	2538.5	1994.6
346.000	347.000	2171.3	2628.3	2413.2	2404.3
347.000	348.000	1637.0	1905.8	1859.2	1800.7
348.000	349.000	1620.5	1669.3	1676.2	1655.3
349.000	350.000	2587.9	2445.4	2890.6	2641.3
350.000	351.000	1395.9	1495.6	1526.5	1472.7
351.000	352.000	1713.5	1589.3	1891.4	1731.4
352.000	353.000	1904.3	2054.7	2462.9	2140.6
353.000	354.000	1537.6	1686.6	1834.6	1686.3
354.000	355.000	1926.0	2170.0	2152.4	2082.8
355.000	356.000	1953.4	2247.9	2405.9	2202.4
356.000	357.000	2486.2	2698.3	3181.8	2788.8
357.000	358.000	1904.1	1612.8	1859.8	1792.2
358.000	359.000	2370.8	2664.6	2996.4	2677.2
359.000	360.000	1788.7	1828.3	1745.2	1787.4
360.000	361.000	1638.4	1688.7	1672.7	1666.6
361.000	362.000	1624.9	1799.9	2027.8	1817.5
362.000	362.550		2735.3	2971.8	2853.6

Table 9-2: Summary of MCW roughness data on RHS direction

Chainage (km)		RHS Direction			
		Avg. BI (mm/km)			
From	To	Outer Lane	Middle Lane	Inner Lane	Average
362.550	362.000		2653.9	2624.1	2639.0
362.000	361.000	1597.4	1749.0	1716.4	1687.6
361.000	360.000	1621.3	1678.9	1716.6	1672.2
360.000	359.000	1986.6	2609.8	2842.7	2479.7
359.000	358.000	2452.2	1918.1	2169.5	2179.9
358.000	357.000	2000.0	1569.2	1821.9	1797.0
357.000	356.000	2224.5	2351.1	2136.4	2237.3
356.000	355.000	2389.9	2358.7	2531.6	2426.7
355.000	354.000	2301.1	2409.9	2631.5	2447.5
354.000	353.000	2394.8	2232.6	2105.0	2244.2
353.000	352.000	1753.0	2026.9	1746.2	1842.0
352.000	351.000	1617.2	1869.4	1824.8	1770.5
351.000	350.000	1695.7	1614.5	1895.8	1735.3
350.000	349.000	2115.8	2447.0	2636.0	2399.6
349.000	348.000	1774.8	1967.3	1951.9	1898.0
348.000	347.000	1918.9	1937.9	1935.5	1930.8
347.000	346.000	1793.7	2061.6	2177.3	2010.9
346.000	345.000	1929.6	1953.2	2201.3	2028.0
345.000	344.000	2015.9	1875.1	1980.6	1957.2
344.000	343.000	2165.5	2031.3	2111.3	2102.7
343.000	342.000	1755.0	1871.9	2076.7	1901.2
342.000	341.000	2073.8	1854.2	2074.4	2000.8
341.000	340.000	1937.2	1833.7	1713.7	1828.2
340.000	339.000	1555.5	1406.6	1468.3	1476.8
339.000	338.000	1564.9	1408.9	1441.9	1471.9
338.000	337.000	2445.3	2312.8	2118.2	2292.1
337.000	336.000	2701.3	2529.7	2749.4	2660.1
336.000	335.000	1830.4	2126.9	2218.8	2058.7
335.000	334.000	2335.4	2500.8	2544.5	2460.2
334.000	333.000	1856.1	1969.6	1974.9	1933.5
333.000	332.000	1765.3	1840.5	2066.8	1890.9
332.000	331.000	1778.5	1686.8	1682.1	1715.8
331.000	330.000	2223.3	1603.0	1677.4	1834.6
330.000	329.000	1713.4	1501.2	1573.3	1595.9
329.000	328.000	1951.4	2335.2	2104.1	2130.2
328.000	327.000	1877.1	2028.9	1949.6	1951.9
327.000	326.000	1955.0	2303.8	2124.2	2127.7
326.000	325.000	2045.3	1902.9	1930.5	1959.6
325.000	324.000	2103.8	1905.8	2027.4	2012.4
324.000	323.000	1702.7	1676.4	1688.6	1689.2
323.000	322.000	1818.7	1691.1	1998.1	1835.9

Chainage (km)		RHS Direction			
		Avg. BI (mm/km)			
From	To	Outer Lane	Middle Lane	Inner Lane	Average
322.000	321.000	1587.8	1759.6	2038.3	1795.2
321.000	320.000	1726.0	1560.9	1641.8	1642.9
320.000	319.000	2081.3	1361.2	1366.5	1603.0
319.000	318.000	2149.1	2408.6	2426.4	2328.0
318.000	317.000	2219.6	1626.7	1664.5	1836.9
317.000	316.000	2085.6	1974.2	1855.0	1971.6
316.000	315.000	1762.7	1568.5	1472.6	1601.3
315.000	314.000	2716.2	1434.0	1400.4	1850.2
314.000	313.000	2440.9	1961.0	1957.4	2119.8
313.000	312.000	2466.2	1780.1	1787.9	2011.4
312.000	311.000	2069.7	2052.7	2083.2	2068.5
311.000	310.000	2625.7	2749.5	2645.2	2673.5
310.000	309.000	2087.5	2407.9	2545.9	2347.1
309.000	308.000	2849.1	3316.3	3267.0	3144.1
308.000	306.800	2635.2	3237.0	3283.5	3051.9
1.450	1.000		3411.9	4027.0	3719.4
1.000	0.000		3582.5	3255.9	3419.2

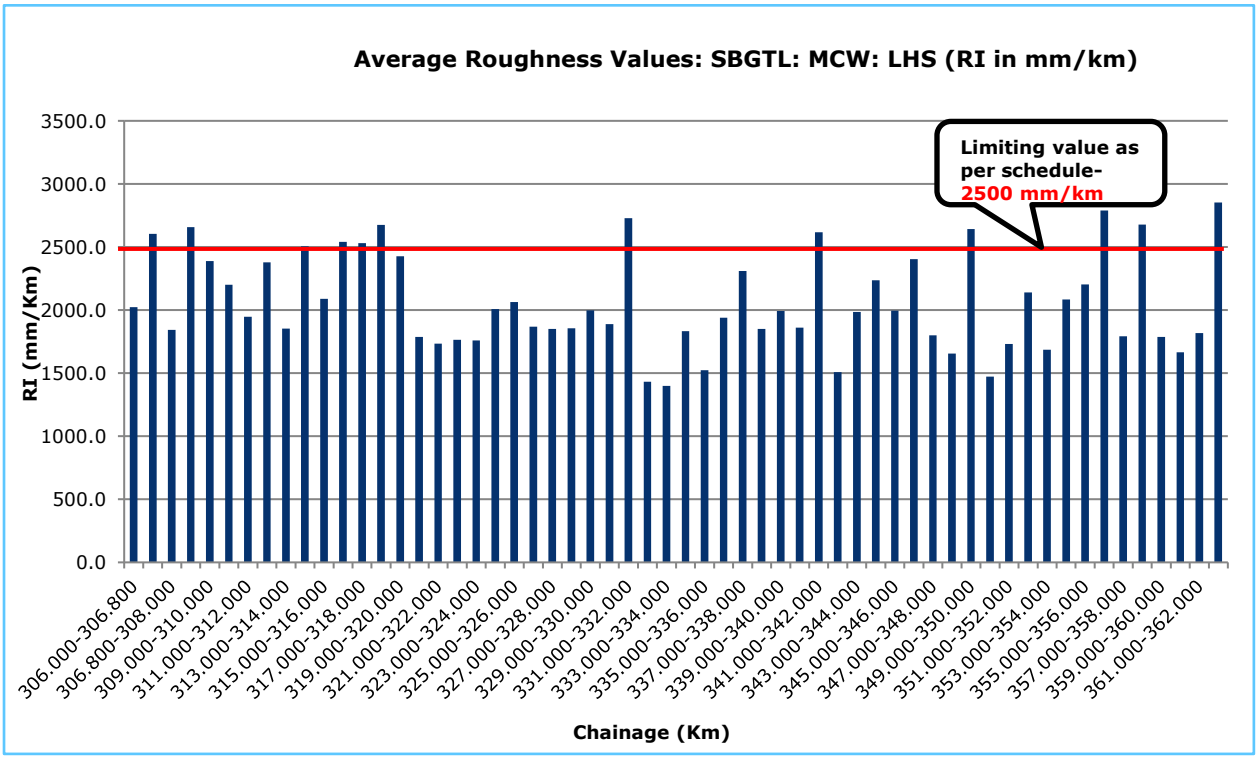


Figure 9-1: Illustrative summary of MCW roughness on LHS direction

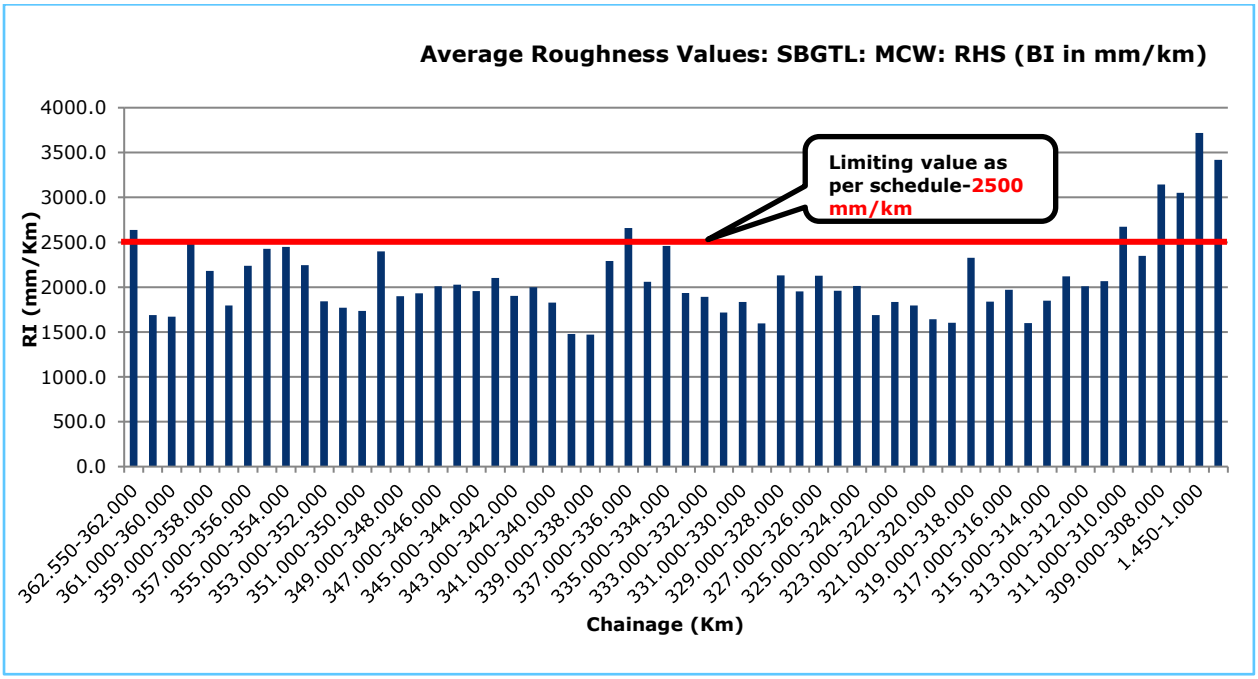


Figure 9-2: Illustrative summary of MCW roughness on RHS direction

9.3.2 Rutting

Rutting data of flexible pavement section is collected through digital laser profilers' system.

The obtained lane wise rutting summary is presented in Table 9-3. The graphical representation of rutting data is presented in Figure 9-3.

Table 9-3: Summary of MCW rutting data on both directions

Summary of Rutting Analysis of LHS & RHS direction													
Distress	Depth (in mm)	Length of the Road Effected with Rutting											
		LHS (Length in Km)			LHS (Length in %)			RHS (Length in Km)			RHS (Length in %)		
		Outer Lane	Middle Lane	Inner Lane	Outer Lane	Middle Lane	Inner Lane	Outer Lane	Middle Lane	Inner Lane	Outer Lane	Middle Lane	Inner Lane
Rutting	< 5 mm	51.400	39.100	37.000	95.9	68.8	65.1	47.200	40.200	33.500	88.2	70.8	60.0
	5- 10 mm	2.200	17.550	19.450	4.1	30.9	34.2	6.200	15.550	20.950	11.6	27.4	37.5
	> 10 mm	0.000	0.200	0.400	0.0	0.4	0.7	0.100	1.000	1.400	0.2	1.8	2.5
Total Length surveyed (in km)		53.600	56.850	56.850	100.0	100.0	100.0	53.500	56.750	55.850	100.0	100.0	100.0

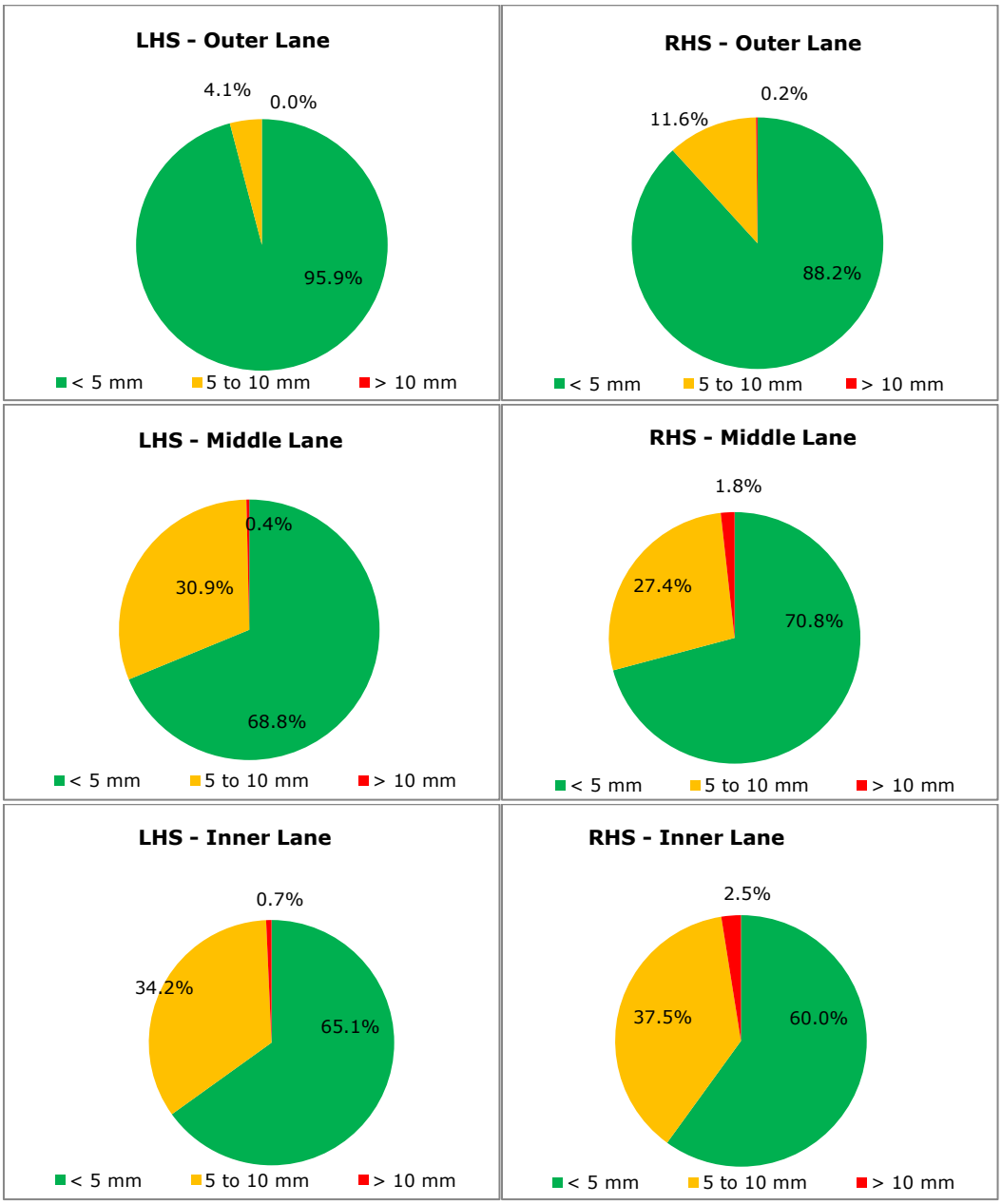


Figure 9-3: Illustrative summary of MCW rutting

Observations:

- In the LHS, rutting values were generally within the desirable limit, with only 0.600 lane km exceeding 10mm.
- In the RHS, a stretch of 2.500 lane km recorded rutting values exceeding 10 mm.

9.3.3 Pavement distress data of Flexible Pavement

The NSV software processes the collected data and automatically geotags each image and measurement with the corresponding GPS coordinates and chainage. It further classifies pavement distresses by type, location, magnitude, and severity, enabling precise mapping and assessment of roadway conditions.

The following Pavement distresses are considered for assessing the flexible pavement condition as per IRC: 82-2023 "Code of Practice for Maintenance of Bituminous Road Surfaces".

- Cracking

  - Longitudinal cracks
  - Transverse cracks
  - Alligator cracks/ Crocodile cracks
  - Multiple cracks
- Ravelling
- Shoving
- Bleeding
- Slippage/ Delamination
- Potholes
  - Area: Surface Area of the Pothole;
  - Numbers
- Edge break
- Patching
- Settlements, Depressions

The detailed pavement condition analysis and distress rating is carried out as per Table 5.1 given in IRC 82:2023. The pavement distress summary is presented below. Few NSV Sites investigation photographs are shown in Figure 9-4. The FWD NSV mapping is shown in Figure 9-5.

Table 9-4: Summary of MCW Flexible pavement distresses

Distress	Severity (% of Area)	Percentage Length of the Road Effected			Percentage Length of the Road Effected		
		LHS			RHS		
		Inner Lane	Middle Lane	Outer lane	Inner Lane	Middle Lane	Outer lane
		Length in %	Length in %	Length in %	Length in %	Length in %	Length in %
Cracking	< 5%	91.26	90.54	95.07	88.13	87.52	94.89
	5% to 10%	5.35	4.28	3.03	5.80	4.46	3.41
	> 10%	3.39	5.17	1.89	6.07	8.02	1.70
Ravelling	< 1%	99.64	99.64	99.43	98.91	99.82	100.00
	1% to 10%	0.18	0.36	0.57	1.09	0.18	0.00
	> 10%	0.18	0.00	0.00	0.00	0.00	0.00
Potholes	Nil	100.00	99.82	100.00	100.00	100.00	100.00
	1 to 2	0.00	0.00	0.00	0.00	0.00	0.00
	>2	0.00	0.18	0.00	0.00	0.00	0.00
Patching	< 1%	86.44	87.15	84.85	87.59	92.01	96.40
	1% to 10%	12.85	11.96	10.61	11.69	7.85	3.22
	> 10%	0.71	0.89	4.55	0.72	0.14	0.38
Rut depth	< 5	64.58	68.33	95.83	59.50	70.49	88.07
	5 to 10	34.71	31.32	4.17	37.97	27.73	11.74
	> 10	0.71	0.36	0.00	2.54	1.78	0.19
IRI	< 2.55	34.35	40.51	61.38	39.24	44.22	35.96
	2.55 to 3.3	42.90	42.92	21.88	37.79	34.42	45.24
	> 3.3	22.75	16.58	16.75	22.98	21.36	18.80

9.3.4 Pavement distress data of Rigid Pavement (Toll Plaza)

The following Pavement distresses are considered for assessing the rigid pavement condition as per IRC SP: 83-2018 (Guidelines for Maintenance, Repair and Rehabilitation of Cement concrete pavements);

- Cracking
  - Longitudinal cracks
  - Transverse cracks/ Diagonal Cracks
  - Corner cracks/ Corner breaks
  - Multiple cracks
- Spalling of Joints
- Joint seal defects
- Joint Faulting/ Stepping
- Joint Separation
- Blow up/ Buckling
- Ravelling/ Scaling
- Potholes/ Pop outs

The existing distresses are measured in five level distress rating system as specified in IRC: SP: 83-2018. The five-level distress rating system is given in Table 9-5 below.

Table 9-5: Five-level distress rating system for the Rigid Pavement

Distress Rating	Slab Condition	Severity (Defects) Rating
0	Excellent	No Discernible
1	Very Good	Minor
2	Good/Average	Moderate
3	Fair	Major
4	Poor	Extreme
5	Very Poor	Unsafe/ Unserviceable

The condition survey of the rigid pavement was carried out by observing all the listed distresses as specified in IRC: SP: 83-2018 in conformity with proforma given code. Type of distresses and assessment rating as given in Table 4.5 of IRC: SP: 83-2018 is followed and the same is listed in Table 9-6 below. The rigid pavement investigation pictures presented in Figure 9-6

Table 9-6: Type of distresses and its assessment rating

S. No	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating
1	**CRACKING**			
	Single Discrete Cracks Not interaction with Any joint	w=width of crack L=length of crack d=depth of crack D=depth of slab	0	Nil, not discernible
			1	w<0.2 mm, hair cracks
			2	w= 0.2 -0.5 mm, discernible from slow-moving car
			3	w=0.5-1.5 mm, discernible from fast-moving car

S. No	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating
			4	w=1.5-3.00 mm
			5	w>3 mm
2	Single Transverse (or Diagonal) Crack intersecting with one or more joints	w=width of crack L=length of crack d=depth of crack D=depth of slab	0	Nil, not discernible
			1	w<0.2 mm, hair cracks
			2	w=0.2 -0.5 mm, discernible from slow vehicle
			3	w=0.5-3.0 mm, discernible from fast vehicle
			4	w=3.0-6.0 mm
			5	w>6mm, usually associated with spalling, and/or slab rocking under traffic
3	Single Longitudinal Crack intersecting with one or more joints	w=width of crack L=length of crack d=depth of crack D=depth of slab	0	Nil, not discernible
			1	w<0.5 mm, discernible from slow vehicle
			2	w= 0.5 -3.0 mm. discernible from fast vehicle
			3	w=3.0-6.0 mm
			4	w=6.0-12. mm
			5	w>12mm, usually associated with spalling, and/or slab rocking under traffic
4	Multiple Cracks Intersecting with one or more joints or cracks	w=width of crack	0	Nil, not discernible
			1	w<0.2 mm, hair cracks
			2	w=0.2 - 0.5 mm, discernible from slow vehicle
			3	w=0.5-3.0 mm, discernible from fast vehicle
			4	w=3.0 - 6.0 mm panel broken into 2 or 3 pieces
			5	w > 6 mm and/or panel broken into more than 4 pieces
5	Corner Break	w=width of crack L=length of crack	0	Nil, not discernible
			1	w<0.5 mm only one corner broken
			2	w< 1.5 mm, L<0.6 m, only one corner broken
			3	w< 1.5 mm. L <0.6 m, two corners broken
			4	w>1.5 mm, L >0.6 m, or Three corners broken
			5	Three or four corners broken
6	Punchout (Applicable to CRCP only)	w=width of crack L=length (m/m^2)	0	Nil, not discernible
			1	w< 0.5 mm; L< 3 m/m^2
			2	either w>0.5 mm or L<3 m/m^2
			3	w> 1.5 mm and L< 3 m/m^2
			4	w>3 mm, L<3 m/m^2 and deformation
			5	w>3 mm, L>3 m/m^2 and deformation
7	**SURFACE DEFECTS**			
			0	Nil, not discernible

S. No	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating
	Ravelling or Honeycomb type surface	r= area damaged surface / total surface of slab (%) h=maximum depth of damage	1	r < 2 %
			2	r =2-10%
			3	r=10-25%
			4	r=25-50%
			5	r >50% and h>25 mm
8	Scaling	r= area damaged surface / total surface of slab (%) h=maximum depth of damage	0	Nil, not discernible
			1	r < 2 %
			2	r =2-10%
			3	r=10-20%
			4	r=20-30%
			5	r >30% and h>25 mm
9	Polished Surface/ Glazing	t=texture depth sand patch test	0	
			1	t > 1mm
			2	t=1-0.6 mm
			3	t=0.6-0.3 mm
			4	t=0.3-0.1 mm
			5	t<0.1 mm
10	Pop out (small Hole), Pothole Refer Para 8.4	n=number/m2 d=diameter h= maximum depth		
			0	d<50 mm; h<25 mm; n <1 per 5 m^2
			1	d=50-100 mm: h<50 mm: n<1 per 5 m^2
			2	d=50-100 mm: h>50 mm: n<1 per 5 m^2
			3	d=100-300 mm: h<100 mm: n<1 per 5 m^2
			4	d=100-300 mm: h>100 mm: n<1 per 5 m^2
			5	d>300 mm: h>100 mm: n>1 per 5 m^2
	JOINT DEFECTS			
11	Joint Seal Defects	Loss or damage L=Length as % total joint length	0	Difficult to discern.
			1	Discernible, L<25% but of little immediate consequence eighth regard to ingress of water or trapping incompressible material.
			3	Notable, L>25% insufficient protection against ingress of water and trapping in incompressible material.
			5	Severe; w>3 mm negligible protection against ingress of water and trapping in incompressible material.
12	Spalling of Joints	w= width on either side of the joint L= Length as % total joint length		
			0	Nil, not discernible
			1	w<10 mm
			2	w=10-20 mm, L<25%

S. No	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating
			3	w=20-40 mm, L >25%
			4	w=40-80mm, L >25%
			5	w>80mm, and L>25%
13	Faulting (or stepping) in Cracks or Joints	f=difference of level	0	Not discernible, f< 1 mm
			1	f< 3 mm
			2	f=3-6 mm
			3	f=6-12 mm
			4	f=12-18 mm
			5	f>18 mm
14	Blow up or buckling	h=vertical displacement from normal profile	0	Nil, not discernible
			1	h< 6 mm
			2	h=6-12 mm
			3	h=12-25 mm
			4	h>25 mm
			5	shattered slabs, i.e., 4 or more pieces
15	Depression	h= negative vertical displacement from profile L= Length		
			0	Nil, not discernible, h<5 mm
			1	h=5-15 mm
			2	h=15-30 mm. Nos < 20% joints
			3	h=30-50 mm
			4	h>50mm or >20% joints
			5	h>100 mm
16	Heave	h= positive vertical displacement from profile L= Length	0	Nil, not discernible, h<5 mm
			1	h=5-15 mm
			2	h=15-30 mm. Nos < 20% joints
			3	h=30-50 mm
			4	h>50 mm or >20% joints
			5	h>100 mm
17	Bump	h=vertical displacement from normal profile	0	h<4 mm
			1	h=4-7 mm
			3	h= 7 - 15 mm
			5	h>15 mm
			0	Nil, not discernible f<5 mm
18	Lane to Shoulder Dropoff	f=difference of level	1	f=3-10 mm
			2	f=10-25 mm.

S. No	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating
			3	f=25-50 mm
			4	f=50-75 mm
			5	f >75 mm
19	**DRAINAGE**			
	Pumping	quantity of fines and water expelled through open joints and cracks Nos/ 100 m stretch	0	Not discernible
			1 to 2	slight / occasional Nos <10%
			3 to 4	appreciable / Frequent 10-25%
			5	Abundant, crack development>25%
20	Ponding	Ponding on slabs due to blockage of drains	0-2	No discernible problem
			3 to 4	Blockages observed in drains, but water flowing
			5	Ponding, accumulation of water observed

The rigid pavement condition summary of each section in lane wise is presented from Table 9-7.

Table 9-7: Rigid Pavement Distress Summary (Toll Plaza):

Rigid Distress Summary			
Distress	**Unit**	**Toll LHS**	**Tunnel RHS**
Single discrete Cracks	Rm.	0.000	0.000
Transverse Cracks	Rm.	0.000	35.000
Longitudinal Cracks	Rm.	0.000	0.000
Multiple Cracks	Rm.	0.000	5.000
Corner Cracks	Rm.	0.000	0.000
Joint Seal Defects	Rm.	0.000	0.000
Joint Separation	Rm.	0.000	0.000
Joint Spalling	Rm.	0.000	0.000
Ravelling/ Scaling	Sq. m	0.000	272.8









Figure 9-4:Field testing photographs captured during the NSV survey

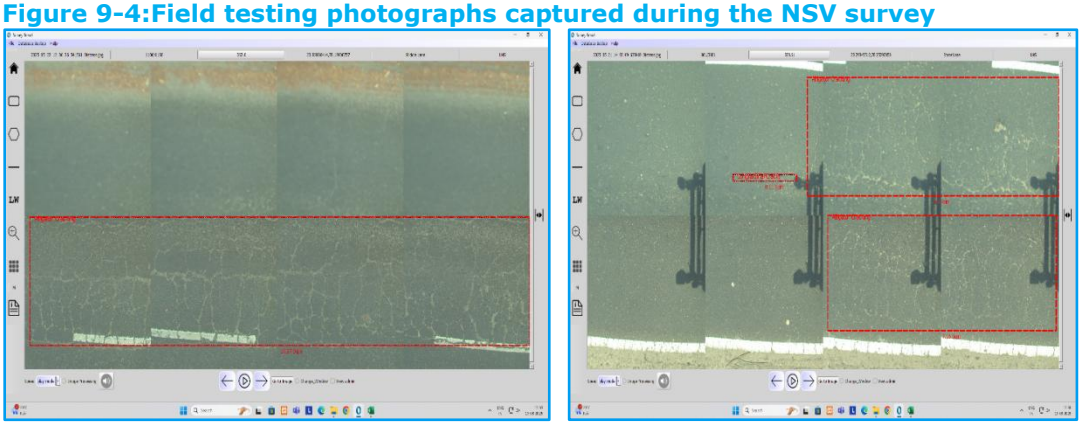


Figure 9-5:Distress Mapping Photographs- Flexible Pavement







Figure 9-6:Investigation Photographs- Rigid Pavement (Toll Plaza)Investigation Photographs- Rigid Pavement (Toll Plaza)

9.4 Structural Evaluation of Flexible Pavement by Using FWD

9.4.1 Equipment Description and Test Methodology

Principle of Pavement Evaluation Using FWD

Performance of flexible pavements can be evaluated by applying loads on the pavements that simulate the actual traffic loading conditions, The recording of such responses is made by measuring the elastic deflection under such loads. The collected deflection data from survey is duly analysed considering the factors influencing the performance of pavement such as subgrade strength, thickness and quality of each of the pavement layers, drainage conditions, pavement surface temperature etc.

Among the equipment available for structural evaluation of pavements, the Falling Weight Deflectometer (FWD) is extensively used world-wide because it simulates, to a large extent, the actual loading conditions of the pavement. When a moving wheel load passes over the pavement it produces load pulses. Normal stresses (vertical as well as horizontal) at a location in the pavement will increase in magnitude from zero to a peak value as the moving wheel load approaches the location. The time taken for the stress pulse to vary from zero to peak value is termed as 'rise time of the pulse'. As the wheel moves away from the location, magnitude of stress reduces from peak value to zero. The period during which the magnitude of stress pulse varies from 'zero-to-peak-to-zero' is the pulse duration. Peak load and the corresponding pavement responses are of interest for pavement evaluation.

The resulting load-deflection data can be interpreted through appropriate analytical techniques, such as back calculation technique, to estimate the elastic moduli of the pavement layers. The computed moduli are, in turn, used for (i) the strength evaluation of different layers of in-service pavements (ii) the estimation of the remaining life of in-service pavement (iii) determination of strengthening requirement, if any and (iv) evaluation of different rehabilitation alternatives (overlay, recycling, partial reconstruction, etc

Brief Description of Falling Weight Deflectometer (FWD)

Falling Weight Deflectometer is an impulse-generating device with a guide system. This device allows a variable weight to be dropped from a variable height. The apparatus has a loading plate which is used for uniform force distribution on the test layer. When the weight affects this plate, this loading plate ensures that the resulting force is applied perpendicularly to the test layer’s surface. It also has a load cell for measuring the actual applied impulse. It also has one or more deflection sensors. (Note: Deflection basin tests require at least seven sensors). It also has a system for collecting, processing, and storing deflection data. Structural evaluation of pavements involves application of a standard load to the pavement and measuring its response in terms of stress, strain or deflection.

The basic working principle of the impulse loading equipment is to drop a mass on the pavement to produce an impulse load and measure the surface deflections. The mass is dropped on a spring system, which in turn transmits the load to the pavement through a loading plate. The resulting deflection bowl characteristics are observed and used in the back calculation of pavement material properties. The principle is illustrated in Figure 9-7

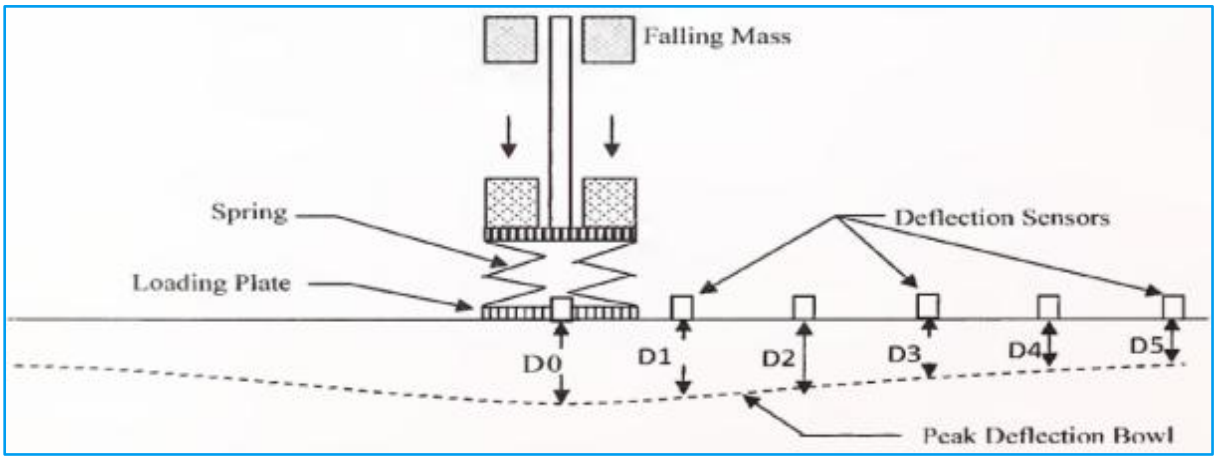


Figure 9-7: Working Principle of FWD

FWD Instrument Used for the Deflection Survey: DYNATEST 8002 FWD

For conducting FWD survey on the project road DYNATEST 8002 FWD Fully Automatic Vehicle-mounted FWD. The FWD machines can apply a loading in the range of 12-150 kN, enabling them to simulate all type of vehicle loads on pavement surface. This model is equipped with a battery back-up and vehicle mounted set-up with all other accessories required for evaluation of pavement.

Moreover, this instruments mostly outperforms or matches all the criteria given in the IRC: 115-2014.

Testing Procedure and Methodology

The detailed test methodology and procedure was described in IRC: 115-2014 "Guidelines for Structural Evaluation and Strengthening of Flexible Road Pavements Using Falling Weight Deflectometer (FWD) Technique". However, as per the client's requirement the sampling procedure was customized in this project. In adherence to the same, structural evaluation of the existing 'pavement and subgrade system' by measuring its response in terms of deflection was carried out using FWD for the project road in the month of May 2025 (16/05/2025 to 18/05/2025).

Evaluation of pavement structural strength is carried out in accordance with requirements of TOR and IRC: 115-2014.

Testing Equipment

The equipment used for the testing is:

- DYNATEST 8002 FWD Vehicle Mounted Falling Weight Deflectometer with 1 loading plate and 7 numbers of geophones placed at the spacing of 0, 300, 600, 900, 1200, 1500 and 1800mm from the centre of the loading plate.
- Air Temperature and Pavement Surface Temperature sensors as part of the FWD instrument.
- Glycerol and digital thermometer.
- Red flags and red cones and flashing lamps for traffic arrangement.

FWD Deflection Testing Points and Measurement

FWD deflection measurement has been carried out for each lane in both directions. FWD deflection measurement has been carried out at a test point along outer wheel path of each lane which is at an offset of 0.75m from the outer edge of outer lane, at 4.2m from the outer edge of outer lane as specified in section 5.4.5 of IRC: 115-2014. At every measurement location, four drops were made, such that the first drop is neglected as 'seating drop' and the rest three drops' deflections are recorded. Photographs of FWD test under progress at some locations are shown in Figure 9-8

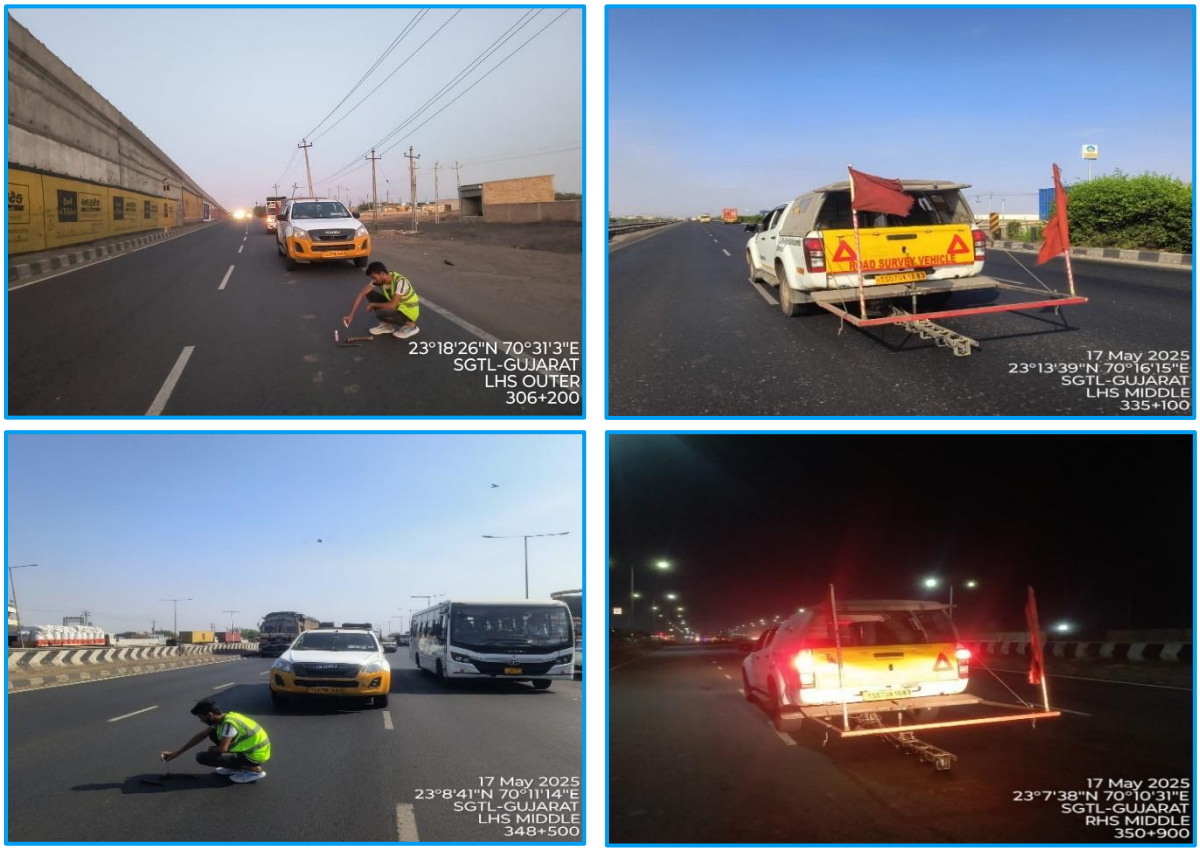


Figure 9-8: Photographs showing FWD survey under progress

Also, during survey pavement temperature of bituminous layer was recorded as per the procedure specified in section 5.4.7, xiii of IRC: 115-2014.

The following steps are carried out for measuring deflections at a test point:

i. Mark the test point on the pavement
ii. Centre the load plate over the test point
iii. Lower the loading plate onto the pavement ensuring there should be no standing water on the pavement surface. The loading plate should be in proper contact with pavement surface. The longitudinal and transverse slope of the pavement should not exceed 10 percent at the test location.
iv. Lower the frame holding the geophones so that the transducers are in contact with pavement surface.
v. Raise the mass to a pre-determined height required for producing a target load of 40 kN (+10%).
vi. Drop one seating load. The load and deflection data for this seating load is not recorded.
vii. Raise the mass and drop. Record the load and deflection data into the computer through data acquisition system. While peak load and peak deflections at different selected radial positions must be recorded. At least 2 drops should be made at one location for precision.

viii. If, during previous 2 steps, the deflections measured are giving variations or the deflections/load pulses are not proper, repeat the test drop.

ix. Raise the geophone frame and load plate and move to the next test location

x. Deflection measurements should not be made when the pavement temperature is more than 45°C.

9.4.2 Existing Pavement Composition Details

The crust composition details used for analysis were taken from test pits and bitumen cores and are presented in chapter 8

9.4.3 Pavement Condition

During the FWD survey, the pavement surface along the project road was generally found to be in good condition. However, certain sections of the LHS middle and outer lanes were observed to be in fair to fair-poor condition, while some sections of the RHS inner lane were in fair-poor condition. The same condition is considered for providing the input for back-calculation as per IRC:115-2014.

9.4.4 In-put Data for BACK Calculation Analysis

(a) Processing of Load and Deflection data

The FWD test data collected from different drops at each test point primarily consists of peak load and peak deflections at different radial locations. Unrealistic deflection values and obviously erroneous data must be removed.

Average values of load and deflections are calculated from the three drop test data collected. FWD tests were carried out using 40 kN impulse load. However, since the FWD equipment does not impart the same load at every test point, normalization of all measured deflections was carried out to a common test load of 40 kN. Such 'normalization' of the data was carried out using the following formula:

$D_n = 40kN/L_m \times D_m$

were,

D_n = Normalized Deflection.

L_m = Imparted Load and

D_m = Measured Deflection

The "normalized deflection data" was then used for determining deflections, deflection bowl and finally in framing of homogeneous sections and calculation of overlay requirements.

(b) Back-calculation of Layer Moduli

Layer moduli have been back calculated using KGPBACK program. The pavement has been modelled as a three-layer system with bituminous layer, granular layer and subgrade. The following inputs have been provided for back analysis.

- Single wheel load 40 kN and contact pressure 0.56 MPa
- No. of deflection sensors: 7
- Radial Distances of the Geophones i.e., 0, 300, 600, 900, 1200, 1500 and 1800mm
- Measured Surface Deflections normalized to 40kN in mm
- Pavement Layer Thicknesses
- Poisson's ratio of 0.35 is considered for bituminous, granular and subgrade layers.
- Range of Possible modulus value (Lower and Upper limits) of bituminous layer, granular layer and subgrade

Range of different layers moduli given as input to KGPBACK for back-calculation. These ranges selected judiciously by an experienced pavement engineer taking into considerations about approximate age of pavement, visual assessment of the condition of bituminous layer, prevailing climatic conditions during deflection measurements and based on information available from test pits, laboratory tests conducted as detailed in the sections below:

(c) Range of modulus for existing subgrade:

The range of moduli of existing subgrade layers is taken as 50-100 MPa.

(d) Range of modulus value of existing granular layers i.e., base and subbase:

The range of moduli of existing granular layers is based on clause II.8.4 of IRC 115-2014.The range for combined (base and sub-base) is taken as 100-500 MPa.

(e) Range of modulus value of existing bituminous layers:

The range of moduli of existing thick bituminous layer has been determined based on condition data. If the road condition is good the range is considered as 750MPa to 3000MPa, for sections with pavement condition is Fair- Poor, the range specified for thick bituminous layer 400 MPa to 1500 MPa as stipulated in section III.8.4 of IRC: 115-2014 has been taken into consideration.

9.4.5 Correction for data analysis

Correction for Temperature

Back-calculated moduli values of the bituminous layers evaluated by FWD survey are influenced by the pavement temperature. The standard pavement temperature for India is recommended as 35°C, hence the back-calculated moduli obtained at temperatures other than the identified standard temperature will have to be corrected using a suitable correction factor using equations 4 and 5 of IRC:115-2014 and the same is extracted below for ready reference.

ET1 = λ ET2

Where,

λ, temperature correction factor, is given as

λ = (1-0.238 lnT1) / (1-0.238 lnT2)

Were,

ET1 = Back-calculated modulus (MPa) at temperature T1 (°C)

ET2 = Back-calculated modulus (MPa) at temperature T2 (°C)

Correction for Seasonal Variation

Moisture content affects the strength of subgrade and granular sub base/base layers. The below equations are provided for Summer and Winter Seasonal reference.

$$E_{sub_mon} = 3.351 * (E_{sub_win})^{0.7688} - 28.9 \ldots (6)$$

$$E_{sub_mon} = 0.8554 * (E_{sub_sum}) - 8.461 \ldots (7)$$

were,

E_{sub_mon} = subgrade modulus in monsoon (MPa)

E_{sub_sum} = subgrade modulus in Summer (MPa)

E_{sub_win} = subgrade modulus in Winter (MPa)

$$E_{gran_mon=} -0.0003 * (E_{gran_sum})^2 + 0.9584 * (E_{gran_sum}) - 32.989 \dots (8)$$

$$E_{gran_mon=} 10.5523 * (E_{gran_win})^{0.624} - 113.857 \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (9)$$

were,

E_{gran_mon} = granular layer modulus in monsoon (MPa)

E_{gran_sum} = granular layer modulus in Summer (MPa)

E_{gran_win} = granular layer modulus in Winter (MPa)

Since the deflection measurements have been carried out during Monsoon, hence no seasonal correction factors are applied in this analysis.

9.5 Remaining life estimation

The in-service three-layer pavement system has been analysed with the back-calculated corrected layer moduli and layer thicknesses. The critical strains have been calculated by IITPAVE program. From the performance criteria equations, the residual/remaining rutting and fatigue life have been estimated.

Remaining life are presented in

Table 9-8 to Table 9-9. The graphical representation of the remaining life is presented in

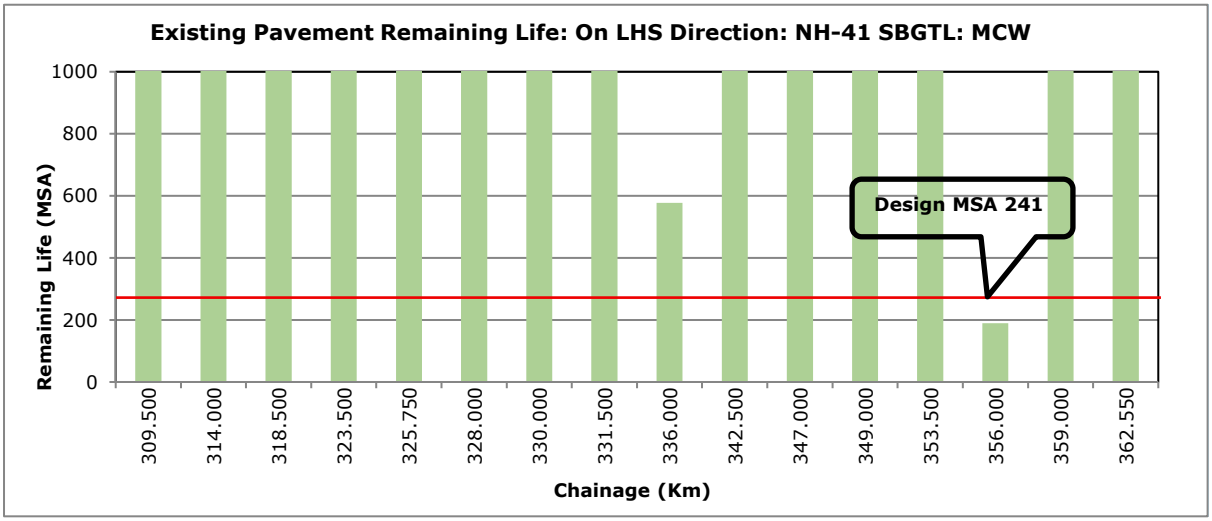
Table 9-8: Obtained remaining life of MCW on LHS direction

Chainage (km)		Remaining life in LHS Direction
From	To	
306.000	309.500	1516
309.500	314.000	2824
314.000	318.500	2896
318.500	323.500	2657
323.500	325.750	1677
325.750	328.000	2889
328.000	330.000	2705
330.000	331.500	2631
331.500	336.000	578
336.000	342.500	2345
342.500	347.000	1484
347.000	349.000	2229
349.000	353.500	1642
353.500	356.000	189
356.000	359.000	1427
359.000	362.550	1037

Table 9-9: Obtained remaining life of MCW on RHS direction

Chainage (km)		Remaining life in RHS Direction
From	To	
306.000	312.500	296
312.500	315.000	133
315.000	318.500	360
318.500	321.000	314
321.000	324.500	306

Chainage (km)		Remaining life in RHS Direction
From	To	
324.500	331.000	314
331.000	336.000	855
336.000	345.000	466
345.000	347.500	407
347.500	356.000	1319
356.000	360.000	1314
360.000	362.550	2086



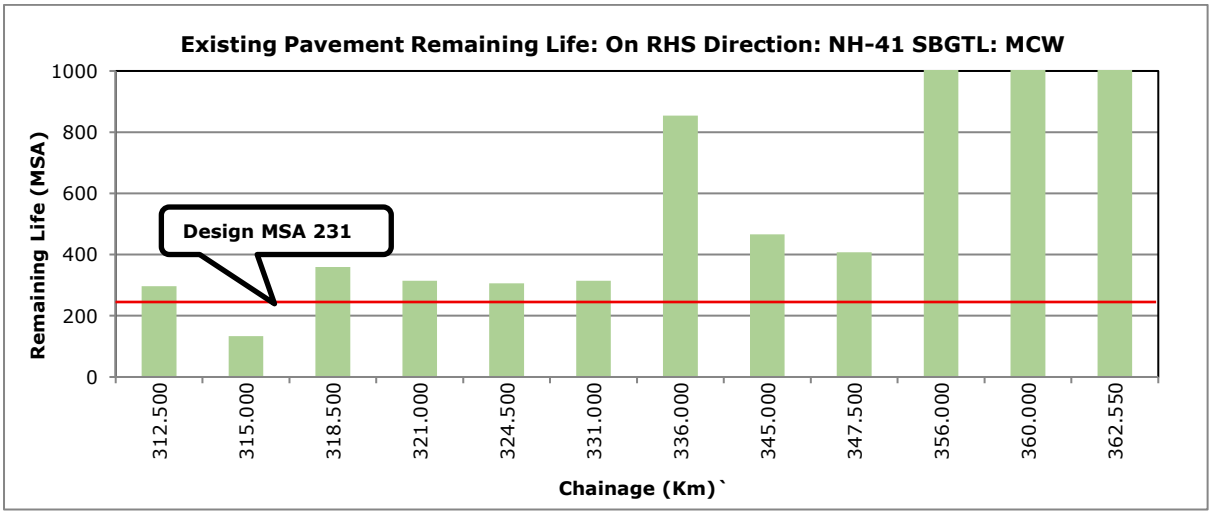


Figure 9-9: Illustrative summary of remaining life on both Directions (MCW)

9.6 Traffic Survey and Analysis

Axle load survey of 48 hrs has been conducted at Toll Plaza location. The AADT and growth rates required for the further computations are provided by the client.

9.6.1 Annual Average Daily Traffic

The Annual Average Daily Traffic (AADT) in the FY 2026 are presented in Table 9-10.

Table 9-10: AADT of commercial vehicles at toll plaza in both directions (YR 2026)

Vehicle Type	BUS	LCV	2-axle	3-axle	MAV
AADT	799	606	1015	1215	17275

*For MSA calculation purposes, a direction distribution of 50% is considered for both LHS and RHS direction.

9.6.2 Vehicle Damage Factor

The axle load survey was conducted at toll plaza (Samakhiali); the number of equivalent 8.16 t standard axles for the different categories of commercial vehicles have been determined based on the axle load surveys.

The equations for computing equivalency factor for single, tandem and tridem axles given below is used as directed in the IRC: 37-2018 for converting different axle load repetitions into equivalent standard axle load repetitions.

- Single axle with single wheel on either side = {axle load in kN / 65}^{4}
- Single axle with dual wheel on either side = {axle load in kN / 80}^{4}
- Tandem axle with single wheel on either side = {axle load in kN /148}^{4}
- Tridem axle with dual wheel on either side = {axle load in kN /224}^{4}

Referring to section 4.4.3 of IRC 37-2018, some tandem axles have only one (single) wheel on each side of the axle. In such cases, each axle of the tandem axle set may be considered as two separate single axles (with single wheels). Similarly, if the axle spectrum has a tridem axle with single wheels, it may be considered as three separate single axles having single wheels.

VDF values are obtained as per the analysis of 48hrs axle load data and presented in Table 9-11.

The sample photographs axle load survey is shown in Figure 9-10

Table 9-11: Summary of Vehicle Damage Factor

Location/ Vehicle Type		BUS	LCV	2axle	3axle	MAV
Samakhiali Toll Plaza	LHS	0.960	0.416	2.404	1.800	9.780
	RHS	0.848	0.391	1.864	5.399	9.150







Figure 9-10:Photographs showing Axle load Survey

9.6.3 Design Traffic (Cumulative Number of Standard Axles)

The traffic loading in terms of the cumulative number of standard axles for the given period has been computed using the following relationship as given in IRC: 37-2018.

$$N = \frac{365 \times \left\{(1+r)^n - 1\right\}}{r} \times A \times D \times F$$

Were,

N = Cumulative number of standard axles to be catered for the design life in terms of MSA.

r = Annual growth rate of commercial vehicles

n = Design life in years

A = Initial traffic in the year of completion of construction in terms of number of commercial vehicles per day exceeding 3 ton

D = Lane distribution factor

F = Vehicle Damage Factor

Based on the preceding discussions, the traffic loading in terms of cumulative number of equivalent 8.16 t standard axle loads, the AADT was provided by concessionaire and Actual growth rates are considered on year on year, and the design traffic was projected for next 10 years (FY 2035 end of concession period). Design traffic for flexible pavement design is computed and summarized in Table 9-12.

Table 9-12: Design Traffic (MSA) till end of the Concession Period (FY 2035)

Location	Design Traffic (MSA) up to FY- YR 2035	
	LHS	RHS
Samakhiali Toll Plaza	240	231

9.7 Required Overlay Calculation as per FWD Analysis

Based on the remaining life assessment, it is observed that only two sections of the existing pavement do not meet the required design life of 10 years (i.e., up to the end of the concession period), which corresponds to 240 MSA and 231 MSA in the LHS and RHS directions, respectively. To ensure these sections can sustain the projected traffic load, the required additional overlay thicknesses have been computed using IIT-Pave

The summarised overlay thicknesses chainage wise are presented in Table 9-13. The overall summary of different overlay thicknesses for LHS and RHS directions is presented in Table 9-14.

Table 9-13: Required Overlay as per FWD

Chainage (Km)		Side (LHS/ RHS)	Length (km)	Recommended Overlay (mm)	
From	To			BC (mm)	DBM (mm)
353.500	356.000	LHS	2.5	40	-
312.500	315.000	RHS	2.5	40	-

Table 9-14: Direction-wise summary of required overlay thickness as per FWD

Rehabilitation/ Repairing Strategy	Treatment length in km	
	LHS	RHS
40mm BC Overlay	2.500	2.500

10. DEVELOPMENT OF O&M STRATEGY

10.1 GENERAL

The Concessionaire is responsible for Operation & Maintenance of the Project Highway in accordance with the provisions of the Concession Agreement.

10.2 MAINTENANCE REQUIREMENTS AS PER SCHEDULE K.

The concessionaire shall always maintain that during the Operation Period, the Project Highway conforms to the maintenance requirements set forth in Schedule K.

Repair/ Rectification of Defects and deficiencies specified in Schedule K within time limit set forth hereunder.

Table 10-1: Maintenance requirements with timelines

A: Schedule K		
S. No.	**Nature of Defect/ Deficiency**	**Timelines for Repair/ Rectification**
Project Highway		
(a)	**Carriageway and paved shoulders**	
(i)	Breach or blockade	Time Limit: Temporary restoration of traffic within 24 hours; permanent restoration within 15 (fifteen) days.
(ii)	Roughness value Exceeding 2,500 mm in a stretch of 1 km (as measured by a calibrated bump integrator)	Time Limit: 180 (One Hundred and Eighty) days
(iii)	Potholes	Time Limit: 48 hours
(iv)	Cracking in more than 5% of road surface in a stretch of 1 Km	Time Limit: 30 days
(v)	Rutting exceeding 10mm in more than 2% of the road surface in a stretch of 1 km	Time Limit: 30 days
(vi)	Bleeding / Skidding	Time Limit: 7 (Seven) days
(vii)	Ravelling / Stripping of Road surface exceeding 10 sq.m road	Time Limit: 15 (Fifteen) days.
(viii)	Damages to Pavement edges exceeding 10 cm	Time Limit: 15 (Fifteen) days.
(ix)	Removal of debris	Time Limit: 6 hours
(b)	**Hard / earth shoulders, side slopes, drains and culverts.**	
(i)	Variation by more than 2% in the prescribed slope of camber / cross fall	Time Limit: 30 (Thirty) days.
(ii)	Edge drop at shoulders exceeding 40 mm	Time Limit: 7 (Seven) days
(iii)	Variation by more than 15% in the prescribed side (embankment) slopes	Time Limit: 30 (Thirty) days
(iv)	Rain cuts / gullies in slope	Time Limit: 7 (Seven) days
(v)	Damage to or silting of culverts and side drains during and	Time Limit: 7 (Seven) days

A: Schedule K		
S. No.	**Nature of Defect/ Deficiency**	**Timelines for Repair/ Rectification**
	immediately preceding the rainy season	
(vi)	Desilting of drains in urban / semi-urban areas	Time Limit: 48 hours
(C)	**Roadside furniture including road signs and pavement marking**	
(i)	Damage to shape or position, poor visibility or loss of retro-reflectivity	Time Limit: 48 hours
(d)	**Street lighting and telecom (ATMS)**	
(i)	Any major failure of the system	Time Limit: 24 hours
(ii)	Faults and minor failures	Time Limit: 8 hours
(e)	**Trees and plantation**	
(i)	Obstruction in a minimum headroom of 5 m above carriageway or obstruction in visibility of road signs	Time Limit: 24 hours
(ii)	Deterioration in health of trees and bushes	Time Limit: Timely watering and treatment
(iii)	Trees and bushes requiring replacement	Time Limit: 90 days
(iv)	Removal of vegetation affecting sight line and road structures	Time Limit: 15 (Fifteen) days
(f)	**Rest areas**	
(i)	Cleaning of toilets	Time Limit: Every 4 hours
(ii)	Defects in electrical, water and sanitary installations	Time Limit: 24 hours
(g)	**Toll plaza**	
(i)	Failure of toll collection equipment or lighting	Time Limit: Every 8hours
(ii)	Damage to toll plaza	Time Limit: 7 (Seven) days
(h)	**Other Project Facilities and Approach roads**	
(i)	Damage in approach roads, pedestrian facilities, truck laybys, bus-bays, cattle crossings, (Traffic Aid Posts, Medical Aid Posts) and service road	Time Limit: 15 (Fifteen) days.
Bridges		
(a)	**Superstructure**	*Cracks* Temporary measures Time Limit: Within 48 Hours Permanent measures Time Limit: Within 45 days *Spalling / Scaling* Time Limit: Within 15 days

A: Schedule K		
S. No.	**Nature of Defect/ Deficiency**	**Timelines for Repair/ Rectification**
(b)	**Foundations**	Scouring and/or cavitation Time Limit: 15 (Fifteen) days
(c)	**Piers, abutments, return walls and wing walls**	*Cracks and damages including settlement and tilting.* Time Limit: 30 (Thirty) days
(d)	**Bearings (metallic) of bridges**	*Deformation* Time Limit: 15 (Fifteen) days;
(e)	**Joints in bridges**	*Loosening and malfunctioning of joints* Time Limit: 15 (Fifteen) days
(f)	**Other items relating to Bridges**	
(i)	Deforming of pads in elastomeric bearings	Time Limit: 7 (Seven) days
(ii)	Gathering of dirt in bearings and joints; or clogging of spouts, weep holes and vent-holes	Time Limit: 3 (Three) days
(iii)	Damage or deterioration in kerbs, parapets, handrails and crash barriers	Time Limit: 3 (Three) days.
(iv)	Rain-cuts or erosion of banks of the side slopes of approaches	Time Limit: 15 (Fifteen) days
(v)	Damage to wearing coat	Time Limit: 15 (Fifteen) days
(vi)	Damage or deterioration in approach slabs, pitching, apron, toes, floor or guide bunds	Time Limit: 30 (Thirty) days.
(vii)	Growth of vegetation affecting the structure or obstructing the waterway	Time Limit: 15 (Fifteen) days

10.3 Immediate Repair/ Rehabilitation-Combined (Surface Distress)

Functional evaluation of the pavement has been carried out using NSV equipment to assess the current condition of the road and to identify locations where roughness (RI) exceeds the threshold value (>2,500 mm/km) specified in Annexure-I of Schedule-K. All relevant technical and contractual parameters are being thoroughly reviewed to determine the strategy for immediate repair. It was also observed during the site visit that an overlay has recently been applied on both the LHS and RHS of the main carriageway along the entire project stretch.

10.4 Major Maintenance Schedule

MM schedule for the main carriageway and Service Road is presented in Table 10-2.

Table 10-2: M&M Schedule- Main carriageway and Service Road

Year	MM LHS of MCW	MM RHS of MCW	MM of SR	Remarks
YR 2025 - YR 2026	40 mm BC On 96% length 50mm BC on 4% length 50mm DBM on 1.3% length	40 mm BC on 97.5% length 50mm BC on 2.5% length 50mm DBM on 3.7% length		Base Year (MCW+SR)

Year	MM LHS of MCW	MM RHS of MCW	MM of SR	Remarks
YR 2029 - YR 2030	40 mm BC On 100% length	40 mm BC on 100% length 50mm DBM on 5% length	40 mm BC On 100% length	1st Cycle MCW
YR 2033 - YR 2034	30 mm BC On 50% length	30 mm BC On 50% length	30 mm BC On 50% length	2nd Cycle MCW

Note PMB 76E-10 & VG-40 Grade Bitumen considered.

11. COST ESTIMATE

11.1 General

Cost Estimates have been worked out for expenses on Immediate Works (CAPEX) and expenses on operations and maintenance (OPEX). The cost estimates have been worked out at present rates considering 2025-26 as the base year.

11.2 Assumptions

The cost estimates are based on the following assumptions:

(a) Bitumen has been assumed to be sourced from Reliance, Nyara Vadinar Refinery. The distance (to & fro) from the midpoint of Project Highway is taken as 238 km. Modified Bitumen and VG-40 grade bitumen is considered in our cost estimate.

(b) Hire charges for the Machinery have been considered in accordance with Standard Data Book - 2020 and escalation have been considered. Rates for various items of works have been arrived at based on 'Standard Data Book for Analysis of Rates' published by MORT&H.

(c) Manpower rates have been taken from Central Wages Order, Government of India, Ministry of Labour and Employment issued on 28 March 2025.

(d) Material Rates are obtained from are obtained from Gandhidham, Bhachau, Local vendor of the project.

(e) Sand and Aggregate are sourced from the nearest source located on project highway at approximately 30/40 km form the mid-point of Project Highway.

(f) Cement is procured from the nearest local market of Gandhidham, Bhachau

(g) Rate of steel is taken from Tata June 2025

(h) Some of the rates are based on Consultant's experience on the similar ongoing projects in adjacent locations.

(i) Overheads and profits have been considered based on MORT&H Standard Data Book. Applicable taxes have been considered in the Rate Analysis

11.3 CAPEX

Details of CAPEX are worked out under the following categories.

- Immediate maintenance / defect rectification.
- O&M maintenance

11.3.1 Immediate Maintenance

As per site investigation we have considered for immediate maintenance. A few items noticed are covered under routine maintenance.

11.4 O&M Estimates

Operation and Maintenance estimates have been worked out under the following heads:

(a) Preventive Maintenance / Routine Maintenance

(b) Operations

(c) Major Maintenance

11.4.1 Routine Maintenance - Categories

Routine Maintenance covers all activities required to maintain the road in traffic worthy condition to provide desired comforts to the road users. Routine Maintenance can be classified into following three categories:

(a) Routine or day to day maintenance

(b) Pre-monsoon maintenance

(c) Post monsoon maintenance

11.4.1.1 Routine or day to day maintenance

Routine maintenance is required continuously on the road stretch and structures and covers the following activities:

(a) Cleaning of the Road

(b) Pavement maintenance to include crack sealing and pothole repairs

(c) Shoulder repairs

(d) Maintenance of avenue plantation, horticulture, and median plantation

(e) Maintenance of signage, gantry boards and road furniture.

(f) Maintenance of culverts, bridge drainage spouts, expansion joints, side slopes and verges

(g) Surface cleaning, dust or vegetation control, sand removal from structures

(h) Reporting any damage caused to bridges by traffic accidents

(i) Maintenance of guard rails and crash barrier etc.

11.4.1.2 Pre-monsoon Maintenance

This is carried out prior to the monsoons and includes the following:

(a) Inspection of channels/streams to ensure that there are no accumulation of logs, trees and other debris in the vicinity of piers and abutments.

(b) Cleaning of roadside / median drains.

(c) Removal of vegetation growth on sub structures.

(d) Cleaning of culverts.

11.4.1.3 Post-monsoon Maintenance

This includes maintenance that is carried out immediately after the monsoons and includes the following:

(a) Inspection of all structures for any damages and taking appropriate actions.

(b) Cleaning of roadside drains, culverts etc.

11.5 Operations Estimates

11.5.1 Toll Plaza

This cost includes the following:

(a) Maintenance of Toll Plaza building, booths, and tolling equipment.

(b) Security of the booths, lanes, and toll plazas.

(c) Collection of toll and handling of cash till bank deposit.

(d) Provision of IT in-charge, IT supervisor, other staff at Toll Plaza location.

(e) Administration and essential facilities for the staff and road users.

(f) Maintenance of Toll Plaza equipment and replacement of expendable and short life items.

(g) Electricity cost including standby generator.

11.5.2 Highway

This cost includes the following:

(a) Providing one patrolling vehicle including operating cost for round-the-clock patrolling of the Project Highway.

(b) Providing of one ambulance at Toll Plaza for accident victims.

(c) Provision of one crane with 30 MT and tow truck facilities for clearing the highway and evacuating the breakdown vehicles at Toll Plaza.

(d) Provision of one Broomer for cleaning of the highway.

(e) Expenditure on medical aid and provision of nursing staff.

(f) Cost of tests and surveys.

11.5.3 Energy

As per the Concession agreement, electrification is to be provided at the toll plaza and priority intersections. Streetlight luminaries, high mast lights with electricity tariff, provision of standby Genset are considered in the cost estimate.

11.5.4 Miscellaneous

(a) We have taken IE cost as per Industry norms.

(b) Insurance expenses have been taken as per Industry norms.

11.6 Summary of O&M Cost

Summary of yearly O&M cost at present rate is presented in Table 11-1:

Table 11-1: Summary of OPEX (without escalation)

Sl. No.	Item Head	Unit	Rate (in Rs.) (Per Km /Per Month) for 4 Lane	Monthly Cost	Annual Cost in (Rs.) For FY 2026
				FY 2026	
1	Preventive Maintenance During Operation	Per Month	23,470	1,308,442	15,701,299
2	Routine Maintenance During Operation	Per Month	46,525	2,593,743	31,124,916
3	Highway Lighting	Per Month		1,585,755	19,029,056
4	Head Office, Admin Office and Toll Operation manpower cost				
(a)	On roll & off roll staff	Per Month		10,026,832	120,321,980

Sl. No.	Item Head	Unit	Rate (in Rs.) (Per Km /Per Month) for 4 Lane	Monthly Cost FY 2026	Annual Cost in (Rs.) For FY 2026
5	Incident management expenses	Per Month		998,679	11,984,148
6	Toll system & AMC	Per Month		941,020	11,292,244
7	Admin Expenses	Per Month		450,267	5,403,200
8	Professional Fee Expense	Per Month		1,034,663	12,415,960
9	Insurance Fee	Per Month		1,916,667	23,000,000
10	Survey & Investigation charges	Per Month		111,835	1,342,014
	Total Annual Cost in Rs.			**20,967,901**	**251,614,817**
	Total Annual Cost in Crore.			**2.10**	**25.16**

11.7 Year Wise Summary of CAPEX & OPEX

Year-wise summary of CAPEX & OPEX for the balance concession period till FY 2044-45 is estimated and presented in Table 11-2:

Table 11-2: Summary of Year wise CAPEX & OPEX (SBGTL)

Year			CAPEX				Major Maintenance				OPEX											(CAPEX+MMR+OPEX)
Year in Nos	From	To	Pavement Repair	Structure Repair	TMS & ATMS Repair	Sub Total (A)	Periodic Maintenance (Highways)	Periodic Maintenance (Structures)	TMS & ATMS Replacement (Every 6 years)	Sub Total (B)	Preventive Maintenance	Routine Maintenance	Highway Lighting	SPV Staff (On & Off Roll)	Incident Management	AMC for HTMS & TMS	Professional Fee	Insurance Fee	Survey & Investigation charges	Admin Expenses	Sub Total (C)	Grand Total (D) = (A)+(B)+(C)
1	1-Apr-25	31-Mar-26	-	0.31	-	0.31	99.92	30.77	5.65	136.34	1.57	3.11	1.90	12.03	1.20	1.13	1.24	2.30	0.13	0.54	25.16	161.81
2	1-Apr-26	31-Mar-27				-				-	1.65	3.27	2.00	12.63	1.26	1.19	1.30	2.42	0.14	0.57	26.42	26.42
3	1-Apr-27	31-Mar-28				-				-	1.73	3.43	2.10	13.27	1.32	1.24	1.37	2.54	0.15	0.60	27.74	27.74
4	1-Apr-28	31-Mar-29				-				-	1.82	3.60	2.20	13.93	1.39	1.31	1.44	2.66	0.16	0.63	29.13	29.13
5	1-Apr-29	31-Mar-30				-	174.95	8.42		183.37	1.91	3.78	2.31	14.63	1.46	1.37	1.51	2.80	0.16	0.66	30.58	213.96
6	1-Apr-30	31-Mar-31				-				-	2.00	3.97	2.43	15.36	1.53	1.44	1.58	2.94	0.17	0.69	32.11	32.11
7	1-Apr-31	31-Mar-32				-			6.36	6.36	2.10	4.17	2.55	16.12	1.61	1.51	1.66	3.08	0.18	0.72	33.72	40.08
8	1-Apr-32	2-Mar-33				-				-	2.21	4.38	2.68	16.93	1.69	1.59	1.75	3.24	0.19	0.76	35.40	35.40
9	1-Apr-33	2-Mar-34				-	92.31	4.56		96.87	2.32	4.60	2.81	17.78	1.77	1.67	1.83	3.40	0.20	0.80	37.17	134.04
10	1-Apr-34	12-Nov-34				-				-	1.50	2.98	1.82	11.51	1.15	1.08	1.19	2.20	0.13	0.52	24.06	24.06
		Total Cost (INR Crore)	**-**	**0.31**	**-**	**0.31**	**367.19**	**43.74**	**12.00**	**422.94**	**18.81**	**37.30**	**22.80**	**144.18**	**14.36**	**13.53**	**14.88**	**27.56**	**1.61**	**6.47**	**301.51**	**724.75**

Note: Cost includes 18% GST. An annual escalation of 5% for Opex and 2% for Major Maintenance is applied in projections.



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TECHNICAL DUE DILIGENCE REPORT

SIX LANE SECTION OF VADAKANCHERY TO THRISSUR OF NH-47 (KM 240 TO KM 270), LENGTH 28.36 KM, IN THE STATE OF KERALA ON DBFOT BASIS



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TECHNICAL DUE DILIGENCE REPORT

SIX LANE SECTION OF VADAKANCHERY TO THRISSUR OF NH-47 (KM 240 TO KM 270), LENGTH 28.36 KM, IN THE STATE OF KERALA ON DBFOT BASIS

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Acronyms and Abbreviations

BBD	Benkelman Beam Deflection	LCV	Light Commercial Vehicle
BOQ	Bill of Quantities	LHS	Left hand side
BC	Bituminous Concrete	LIE	Lenders' Independent Engineer
BOT	Build, Operate and Transfer	LT	Low Tension
CA	Concession Agreement	MOEF	Ministry of Environment and Forest
CAPEX	Capital Expenditure	MORT&H	Ministry of Road Transport & Highways
COD	Commercial Operation Date	MPRDC	Madhya Pradesh Road Development Corporation
CRPF	Central Reserve Police Force	MSA	Million Standard Axle
C & G	Clearing and grubbing	NCR	Non-Compliance Report
CRMB	Crumb Rubber Modified Bitumen	NH	National Highways
CUP	Cattle Under Pass	NHAI	National Highways Authority of India
DBM	Dense Bitumen Macadam	NHDP	National Highway Development Programme
DLC	Dense Lean Concrete	NRMB	Natural Rubber Modified Bitumen
DFO	Divisional Forest Office	NOC	No Objection Certificate
DG	Diesel Generator	OFC	Optical Fibre Cable
DLP	Defect liability period	OPEX	Operation Expenditure
DPR	Detailed Project Report	O&M	Operation and Maintenance
EIA	Environment Impact Assessment	PPE	Personal Protection Equipment
EMP	Environment Management Plan	PPP	Public-Private/Public Sector Partnership
EPC	Engineering Procurement & Construction	PQC	Pavement Quality Concrete
FCI	Food Corporation of India	PUP	Pedestrian Under pass
FRL	Formation Road Level	PWD	Public Works Department

FWD	Falling Weight Deflectometer	PCC	Plain Cement Concrete
GAD	General Arrangement Drawing	PD	Project Director
GFC	Good for Construction	PIU	Project Implementation Unit
GOI	Government of India	PLR	Prime lending rate
GSB	Granular Subbase	PMB	Polymer Modified Bitumen
HT	High Tension	PMC	Project Management Consultant
HMP	Hot Mix Plant	PUP	Pedestrian Under Pass
HDM	Highway Development & Management	QA/QC	Quality Assurance / Quality Control
IC	Independent Consultant	SDBC	Semi-dense Bitumen Concrete
IE	Independent Engineer	SPV	Special Purpose Vehicle
IPC	Interim Payment Certification	VDF	Vehicle Damage Factor
IRC	Indian Road Congress		

1. EXECUTIVE SUMMARY

1.1 General

We understand that **EAAA TransInfra Managers Limited** is the **Investment Manager, Chennai - Tada Tollway Private Limited ("CTTPL")** is the proposed **Project Manager** and **Watrak Infrastructure Private Limited ("WIPL")** is the **sponsor** of the **Citius Transnet Investment Trust ("Trust"** or **"InvIT")** and **M/s Thrissur Expressway Limited ("TEL")** is proposed to be part of the initial portfolio assets of the Trust. The Trust is registered with **Securities and Exchange Board of India ("SEBI")** as an infrastructure investment trust under the SEBI InVIT Regulations.

M/s Watrak Infrastructure Private Limited (hereinafter **"**the **Client"**) as sponsor has appointed **M/s Ramboll India Private Limited** (hereinafter referred as **"Technical Consultant"**) to carry out Technical Due Diligence of operational asset of six lane NH-47 (New NH 544) from Vadakanchery to Thrissur (km 240 to km 270) (length 28.355 km) in the state of Kerala on DBFOT basis (herein after refer as "the **Project**") which is being operated by **"M/s Thrissur Expressway Limited "** (hereinafter refer as **"**the **Concessionaire** or **Company** or **TEL"**)

1.2 Project Introduction

The Government of India had entrusted to National Highways Authority of India (NHAI) for development, maintenance, and management of National Highway No. 47 (New NH 544) which includes.

- Augmentation of existing road to six laning of NH-47 (New NH 544) from Vadakanchery to Thrissur (km 240 to km 270) (length 28.355 km) in the state of Kerala on DBFOT basis.

The National Highways Authority of India (NHAI) invited proposals through notice dated 19 December 2007 for the implementation of the project. Following the evaluation of bids received, the Authority accepted the proposal of a selected bidder, which is a Consortium comprising M/s KMC Constructions Limited and China Railways 18th Bureau Group Corporation Limited, with M/s KMC Constructions Limited acting as the Lead Member. Accordingly, Letter of Award No. NHAI/Tech/NS-2/NH-47/BOT/KL-2&3/2006 was issued to the selected bidder on 27 February 2009.

The Consortium subsequently promoted and incorporated the Concessionaire, Thrissur Expressway Private Limited, for the implementation of the project. The Concession Agreement was executed on 24 August 2009. The Appointed Date for the project was declared as 15 September 2012, marking the commencement of the 20-year Concession Period from that date.

The Provisional Completion Certificate for the project was achieved on 09 March 2022, followed by the issuance of the Final Completion Certificate on 14 June 2024. The Project Highway is currently under the Operation and Maintenance (O&M) phase, in accordance with the provisions of the existing Concession Agreement. The Concessionaire, Thrissur Expressway Private Limited, shall continue to operate and maintain the project highway until the end of the Concession Period, which is set to be extended and concluded on 14 September 2036.

Sekura India Management Limited completed the acquisition of the project and has been operating the project road in the name of M/s Thrissur Expressway Limited (TEL).

Sl. No.	Feature	Details
1	Project Name	Design, Construction, Development, Finance, operation and Maintenance of 6-Laning of Vadakanchery-Thrissur Section of NH-47 (Km 240.000 to Km 270.000) in The State of Kerala on Design, Build, Finance, Operate and Transfer (DBFOT) Basis
2	Mode of the Execution (BOT Toll/ BOT Annuity/ EPC/ HAM/ Others)	Design, Build, Finance, Operate and Transfer (DBFOT) Toll Basis
3	Project Phase	Tolling, Operation, Maintenance and Transfer
4	No. of Lanes/ Configuration	6 lanes
5	Length of the Project (in Km)	28.355 km
6	Authority	National Highways Authority of India (NHAI)
7	Concessionaire	Thrissur Expressway Limited (TEL)
8	Independent Engineer	Dhruv Consultancy Services Ltd. in Association with Varad Associates
9	Letter of Acceptance	27 February 2009
10	Appointed Date	15 September 2012
11	Concession Agreement Signed on	24 August 2009
12	Total Project Cost as per CA	INR 617 Crores
13	Provisional Certificate issued on	09 March 2022
14	Completion certificate issued on	14 June 2024
15	Concession end date	14 September 2036 (including extension of 4 years)

1.3 Project Description

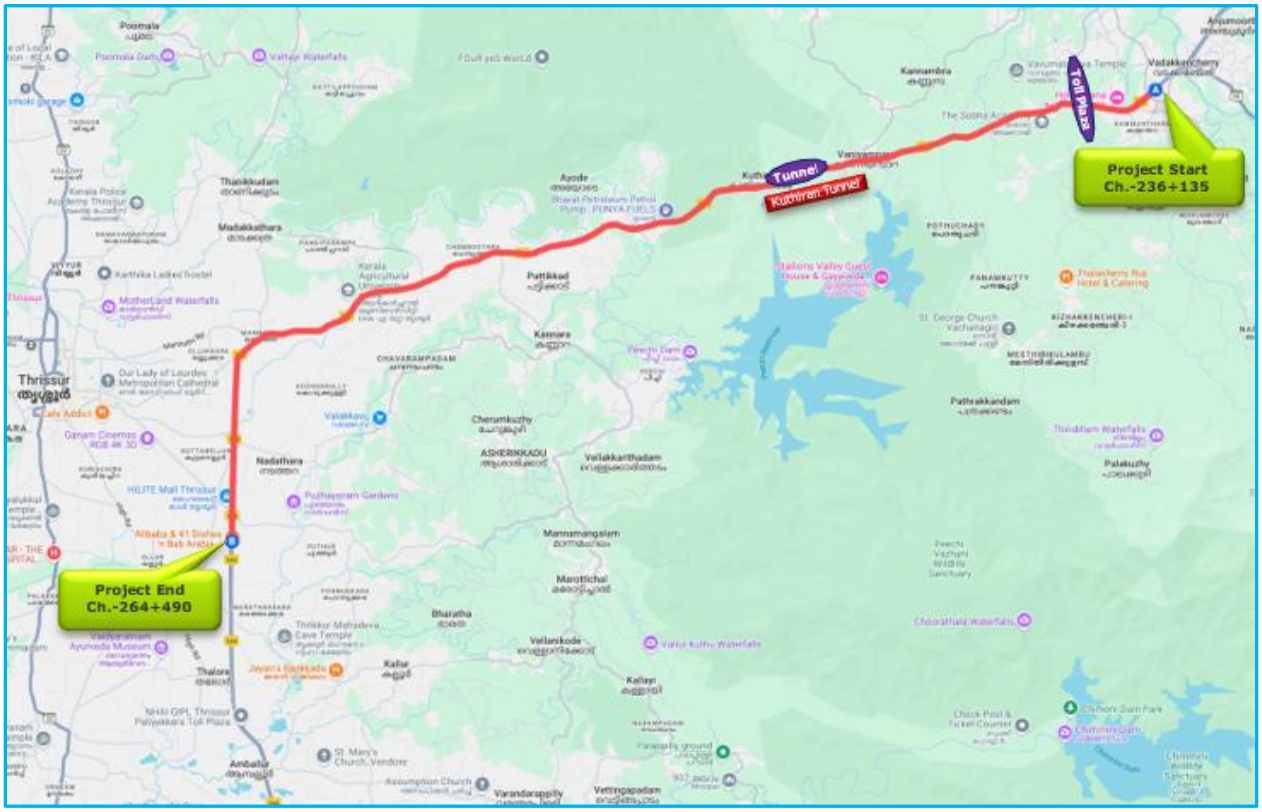
The project involves upgrading the existing two-lane carriageway to a six-lane dual carriageway configuration, including strengthening and widening of the existing two lanes to three lanes of NH – 47 (New NH 544), between Km 240.000 (Exiting km 236.135) at Vadakanchery and Km 270.000 (Exiting km 264.490) near Thrissur with a six-lane twin-tube tunnel, the Kuthiran Tunnel, near Kuthiran hills.

The Kuthiran Tunnel has been constructed to mitigate traffic bottlenecks and reduce the frequency of accidents along the Kuthiran hill stretch, a previously challenging and accident-prone section of the highway. By bypassing this difficult terrain, the tunnel significantly reduces travel time and enhances road safety. Notably, this is Kerala's first-ever road transport tunnel and stands as South India's longest six-lane road tunnel. The tunnel has also resulted in a reduction of approximately 3 kilometres in the travel distance between Kochi and Coimbatore. It comprises twin tubes, each accommodating three lanes of traffic. The left tube measures 955 meters, while the right tube measures 944 meters, with a width of 14 meters and a height of 10 meters. Additionally, two emergency crossovers have been provided within the tunnel to facilitate safe movement during emergencies.

This stretch of NH-47 (New NH 544) forms a critical segment of the highway corridor connecting Kochi in Kerala to Salem in Tamil Nadu. The route traverses several key cities including Thrissur, Palakkad, Coimbatore, and Erode. It facilitates seamless interstate connectivity between Kerala and Tamil Nadu and supports high volumes of both passenger and freight traffic. The corridor is strategically significant for economic, industrial, and logistical development in the region. It serves as a primary conduit for the transportation of goods to and from the Cochin Port, industrial hubs in Coimbatore and Salem, and agricultural regions in Palakkad and Erode. Additionally, the route plays a pivotal role in supporting tourism, trade, and access to critical services across state boundaries.

The abutting land use along the project corridor is a mix of commercial, residential, agricultural, and industrial zones, reflecting the diverse and dynamic nature of the region's development. The alignment primarily traverses plain terrain, which is generally conducive to highway development and expansion but there is a notable hilly stretch between km 252.000 and km 255.000, which includes challenging topographical features. Right of way (ROW) available for the project road is 60m.

Project Location Map



1.4 Scope of work

Broadly the scope of work for Ramboll encompasses the following:

- Review of available documents and site visit
- Field inspection, investigations, and Analysis
- Operations and Maintenance assessment
- Major Maintenance strategy and assessment
- Estimation of Opex and CapEx.
- Preparation of presentation and project report

1.5 Key Findings

The **key findings** of the project are detailed in the table below,

H	**High Priority:** Critical activities that will have material impact on cost of project during balance concession period
M	**Medium Priority:** Moderate likelihood of impact on cost of project during balance concession period
L	**Low Priority:** Low level of impact on cost of project during balance concession period

Diligence Area	Findings	Priority Level
Completion Certificate (COD)	Project Road entered the commercial operation after, PCOD was issued on 9th March 2022, and COD was issued on 14th June 2024.Concession end date has now scheduled on revised date of 14 September 2036 with an anticipated extension of 4 years).	M
Operation and Maintenance	As per Section XVII of CA, the Concessionaire shall maintain project highway in conformity with Maintenance Requirements, the Maintenance Manuals or any schedules made as per plan. As per O & M Inspection Report monitoring under Clause 19.2 of CA the prepared by IE, Concessionaire is advised to carryout day to day routine maintenance activity no later than 7 days after close of each month.	M
Major Maintenance (MM)	As per Schedule K, Annex-I, a functional overlay is required when surface roughness is exceeding 2500 mm/km measured by a standardized roughometer/ bump integrator. As per Sub Clause 4.3.2.3 of Schedule L, renewal / strengthening course to be provided on as required basis (once 5 years).	M
Maintenance Manual and Yearly Program	As per Article 18.3 of Concession Agreement, Concessionaire required to submit proposed Programme not later than 45 days before beginning of each accounting year.	M
Pavement Design	The submitted pavement design report approved by Independent Consultant for 15 year of design traffic as per IRC 37-2001 considering 10 % CBR. Key fact of pavement design is as follows: No Stage construction is considered. Pavement design period is for 15 years Design Traffic 57 MSA on RHS and 120msa on LHS till year 2028 (15th year) Adopted Pavement thickness for MCW is BC - 40 mm, DBM - 150mm, WMM - 250 mm and GSB - 230 mm. Adopted pavement design for MCW is in line with the CA. For the SR, a design traffic of 5msa with design life of 15 years and 10% CBR is considered by providing a BC-25mm, DBM of 75mm, WMM-225mm and a GSB of 200mm The rigid pavement is proposed for the Toll Plaza and Tunnel section with a PQC-330mm, DLC-150mm and GSB-200mm, design CBR of 15%	L
Pavement Condition	The pavement condition of the entire project road is observed to be in GOOD condition. The riding quality is good.	L

Diligence Area	Findings	Priority Level
Penalty/Damage	Due to delay in carrying MMR by former Concessionaire in year 2014, IE recommended for Penalty vide letter no. MSV/HYD/NHAI/AP-5/2018/1294 dated 24.02.2018 of amounting to Rs.14,97,64,248/-. As per IE letter, Concessionaire was supposed to complete MMR by 29 Sep 2014 but completed on 2 Dec 2015 thereby delay by 428 days. This penalty amount was not settled by former Concessionaire and must be settled by Concessionaire / Company. As per the recent discussion with the Client, it is understood that this the Authority has deducted the amount from the Annuity payable to the client and the penalty has been settled.	-
Toll Plaza	There is a toll plaza at Km. 239+000 having 18 lanes which include 2 reversible lanes. The plaza is operational with hybrid ETC and having all facilities. The overall toll plaza pavement is in GOOD condition.	**L**
TMS	As Per Schedule C, following equipment's are to be installed. The status of equipment is as follows: TMS is operational but it requires replacement The WIM is a Slow Speed type in 16 lanes, while medium speed in 2 lanes. None of them are working ATMS is not installed and functional	**M**
Major/Minor - Issue Identified by IE	Referring to IE Inspection report of Sep 2019, the following issues has flagged: Water Tanks provided at Bus Shelters, but taps are missing Weeds / grasses at Median required pruning and grass cutting KM & HM damaged at few locations ROW Cleaning Damaged Sign Board Shoulder Rectification	**M**
Road Safety	A report is submitted on 28th October 2024 by Sphere Infratech consultants. Some of the audit observations are summarized below, Periodic maintenance of bridge expansion joints All streetlights to be made functional between Km.242.300 to Km.242.800 both sides. Missing joint between different crash barriers at km.258.300 Proper installation of MBCB on the MCW RHS between Km.257.400 to 257.800 and km.263.500 to 263.700 and km.258.300, Traffic impact attenuator at Km.239.000 on b/s of MCW near Toll Plaza Improvised speaker system with noise cancellation inside tunnel on both sides of tunnel between Km.248.408 to Km.247.415	**H**
Geometric Design	The project road is to be designed as per Specifications and Standards provided in Schedule D. Key parameters of design is as follows: Design Speed is 100 km/hr, and service roads with 40km/hr	**L**
As-Built Drawings	As per Schedule -H, Annex-I, the Concessionaire is to deliver relevant records and reports pertaining to the Project Highway and its design, engineering, construction, operation and maintenance including all and all operation and maintenance records and programs and manuals pertaining thereto and complete As-Built Drawing on the Date of Divestment. An unsigned soft copy of the as-built drawings has been provided for the reference.	**M**

Diligence Area	Findings	Priority Level
Routine Maintenance	There is a signed contract with Arclight Facilities Pvt. Ltd., for the work order to carry out the routine maintenance of the project including manpower, tools, machinery, equipment, PPE's highway during 1st April 2025 to 31st March 2026.	H
Hand back Requirement	As per the CA all project assets including the road, pavement, structure and equipment shall have been renewed and cured of all defects and deficiencies as necessary so that project highway is compliant with the Specification and standards set forth in this Agreement. All sections of traffic lane shall have a roughness value not more than 2500 mm/km. All Lamps shall be in working condition It is understood that the maintenance and replacement of all lamps shall be covered by the annual O&M estimates. Additionally, all other defects and rectification relating to the asset is covered under the O&M and MMR estimate.	H

1.6 Assessment of Project Assets

Projects asset inventory and their condition assessment is prepared through visual inspection during site visits, review and analysing the reports shared by the client, by field investigations validating the findings and by NSV survey. All the elements and components pertaining to project asset are reported in subsequent Chapter 5, 6 & 7 of this report and their assessment is used to prepare the strategy for preventive, routine, and periodic maintenance. Salient features of the project are given below and in Table 3-2. The overall condition of the project and its assets are satisfactory.

S.no	Description	Units	Total Quantities
1	Section from Vadakanchery (236.135 km) to Thrissur (264.490 km) of NH-47	km	28.355
	Total Length of Main Carriageway with Rigid Pavement (Considering both sides)	km	2.750
	Total Length of Main Carriageway with Flexible Pavement (Considering both sides)	km	53.960
2	Service Road & Slip Road	km	Completed as per CA Scope = 31.42 Kms, Under COS = 9.65 Kms
3	Bypasses	km	NIL
4	Major Intersections	Nos	3
5	Minor Intersection	Nos	7
6	Bus Bay & Shelters	Nos	21
7	Truck lay bye	Nos	1
8	Rest Area	Nos	NIL

S.no	Description		Units	Total Quantities
9	Toll Plaza		Nos	1
10	Median Openings	Authorized	Nos	16
		Unauthorized	Nos	2
11	High Mast Light Locations		Nos	10
12	Solar LED Blinkers		Nos	22
13	Streetlights	Single Arm Pole	Nos	45
		Double Arm Pole	Nos	356
14	Fuel Stations		Nos	13
15	Pedestrian guard rail		km	0.185
16	ECB (SOS Facility)		Nos	NIL
17	Gantry Boards	Cantilever Over Head	Nos	8
		Half width Over Head	Nos	2
18	Sign Boards		Nos	604
19	Variable message sign (VMS)	Cantilever Over Head	Nos	0
		Half width Over Head	Nos	4
20	Entry & Exit		Nos	26
21	5th / Ordinary Kilometer stones		Nos	45
22	Hectometer stones		Nos	186
23	Drainage	Median Drain	km	1.657
		Shoulder drain	km	44.794
		Earthen Drain	km	10.685
		Cut Drains	km	30.785
		Chute Drain	km	0.604
24	Median Plantation		km	km
25	Avenue Plantation		km	km

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S.no	Description		Units	Total Quantities
26	Metal Beam Crash Barrier (MBCB)	W-beam One Side	km	12.089
		W-beam Two Side	km	15.232
		Thrie beam one side	km	0.000
27	Concrete Crash Barrier		km	km
28	Land Use	Agriculture	km	18.667
		Residential	km	12.262
		Commercial	km	20.429
		Mixed	km	5.352
29	Kerb		km	km
30	Chevron Signs		Nos	535
31	Road Studs		Nos	12060
32	OHM		Nos	236
33	Delineators		Nos	828
34	Footpath		km	50.384
35	Guard post		Nos	133
36	Pipe railing		km	4.044
37	Parapet wall		km	3.146
38	FOB (Foot over bridge)		Nos	1
39	Handrail		km	5.083
40	RCC railing		km	0.640

1.7 Assessment of Structures

The structural assessment has been carried out along a 28.4 km project stretch. There are 3 VUP's at Chainages Km.244.200, Km.252.900, and Km.256.900 which were under construction through separate contract. The damages found during the inspection can be restored through routine / preventive maintenance. However, no major structural distress was observed in any of the structures. These issues need routine cleaning, vegetation removal, and minor repair works to improve the overall condition and ensure the durability of the structures.

Total nos. of structures on the Project Highway are given in the table below

Structure Type	Unit	Structure as Per Site	Remark
Flyover	Nos	2	
MJB	Nos	1	
MNB	Nos	1	
Underpass	Nos	12	VUP 4 nos, LVUP 1 No, PUP 4 Nos. 3 underpasses at Chainages 244+200, 252+900, and 256+900 were noticed under construction through separate contracts.
BOX	Nos	58	
HPC	Nos	29	
Aqueduct	Nos	1	
Total	**Nos**	**102**	

1.8 Toll Management System (TMS)

The project has one toll plaza (Km.239.030) comprising of 18 hybrid lanes with no separate 2W lanes are provided adjacent to the extra-wide lanes. It is also found that none of the directions of the toll plaza are equipped with Static Weigh Bridges but currently at LHS one SWB civil works are in progress and on the other side (RHS) there is no space for SWB installation.

Toll Plaza is installed with Slow Speed Weigh-in-Motion (SSWIM) systems in 16 lanes and Medium Speed Weigh-in-Motion (MSWIM) systems in 2 lanes, none of them are functional and are recommended for replacement. No stamping certificate present at any site for WIM Systems.

The TMS installation was done by M/s Arya Omnitalk in the year 2017 and since last seven years is running under AMC by the same system integrator till date

HTMS is not installed in this section of the highway.

1.9 Soil and Material investigation

Soil and Material investigation are done with the samples collected from pit investigation and the detailed results are narrated in Chapter 8 of this report.

Subsoil is generally consistent throughout the project road and is predominantly Silty sand, at one location silty sand with intermediate plasticity is observed. This is the reason during the lab investigation non-plastic soils are reported for majority of test pit sections.

Summary of strength parameters in the soil investigation is shown below.

Description	Liquid Limit	Plasticity Index	Free Swell Index	4-days soaked CBR	Degree of compaction
Vadakanchery -Thrissur Section of NH-47	19%-25%	Max 6%	Max 12.5%	10.90%-26.10%	92.30%-95.90%
MoRTH Limits	**<50%**	**<25%**	**<50%**		

**Variance between MDD and FDD is converted in-terms of degree of compaction*

The DCP test is also conducted to evaluate the field CBR, it was observed that DCP-CBR ranges 10.4% to 21.4%

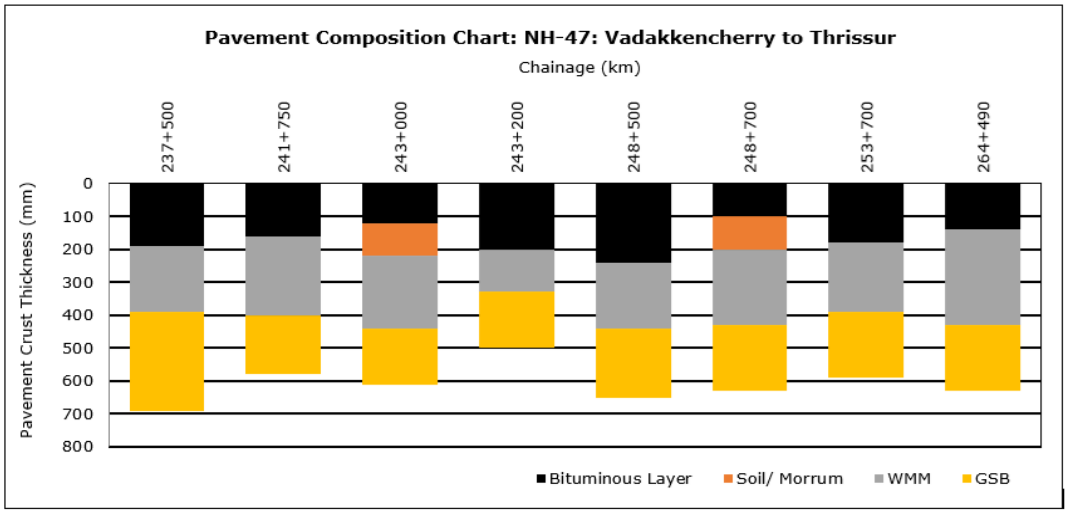
All the measured LL, PI and FSI values are within the acceptable limits as per MoRTH guidelines.

Pavement Composition

The existing pavement along the project corridor is flexible in nature. The pavement composition comprises of bituminous layer, granular base over the granular sub-base.

The section has an average of 166mm bituminous layer over the average Granular course of 419mm

The summary of existing pavement crust thickness is presented in an illustrative bar graph below.



Bitumen core extract

There are 5 BC core samples, which are tested for gradation and binder content. The results indicate that all samples fall slightly on the finer or coarser side of the specified limits for BC Grade-I, as per MoRTH (5th Revision) specifications. The extracted binder content is in range of 4.98% to 5.46%

Similarly, 5 DBM core samples are tested for gradation and binder content. All samples exhibit gradation slightly coarser than the specified limits for DBM Grade-II in accordance with MoRTH (5th Revision) specifications. The extracted binder content is in range of 3.69% to 4.27%

The binder contents are lesser than specified limits of the MoRTH.

The detailed results are tabulated in Chapter 8, Section 8.6 of this report.

1.10 Pavement Evaluation

Pavement condition survey is carried out on each lane of each carriage way with NSV including service roads. The obtained lane wise Roughness summary in terms of RI (mm/km) is given in Chapter 9

Rutting data of pavement section is also collected through Digital Laser Profilers System (DLP). The obtained lane wise rutting summary is graphically represented for both LHS & RHS direction as below and detailed in Chapter 9 the summary in below pie-charts.

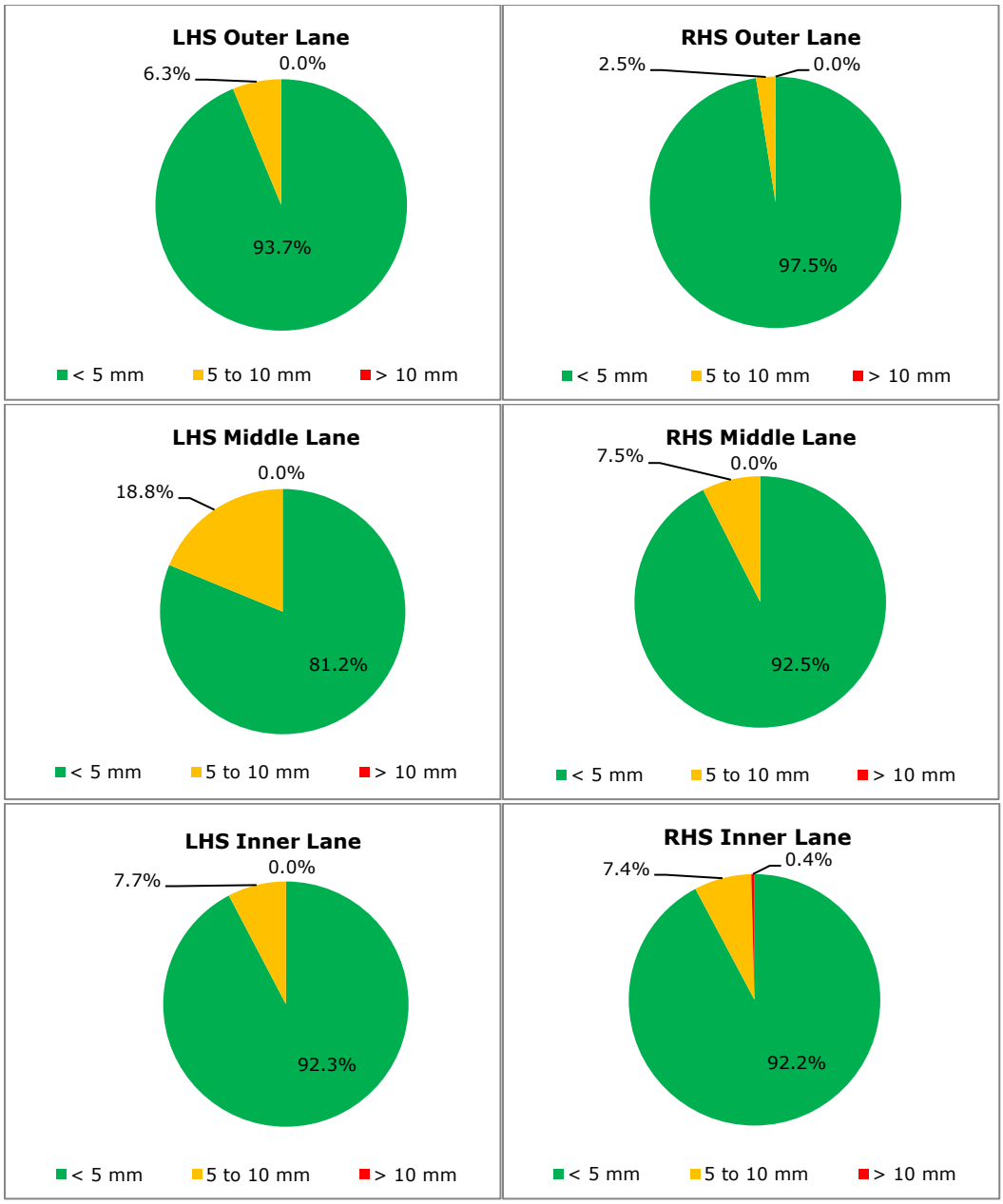


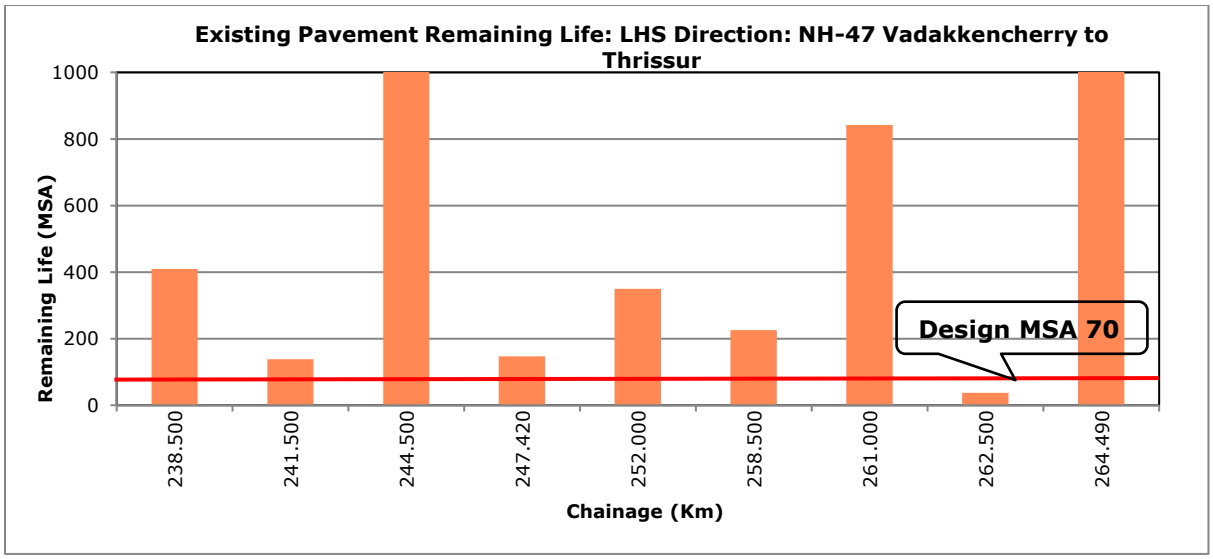
Figure 1-1: Illustrative summary of MCW rutting

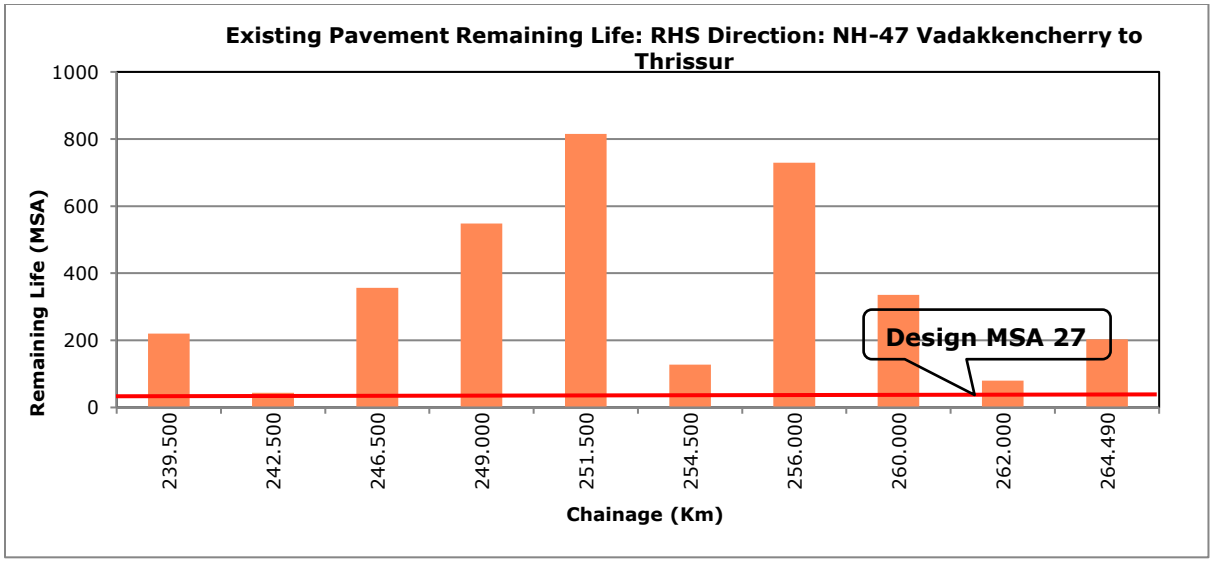
The rutting values are within the desirable limits, except 100m of MCW on RHS Inner Lane rutting values exceeded 10mm.

FWD deflection measurement

It has been carried out for MCW to evaluate the pavement structural strength and analysis of remaining life of project is carried out in conformity with IRC: 115-2014 and detailed analysis is presented in Chapter 9, of this report. The fatigue and rutting model are presented below.

Analysis of Flexible Pavement and graphical presentation:

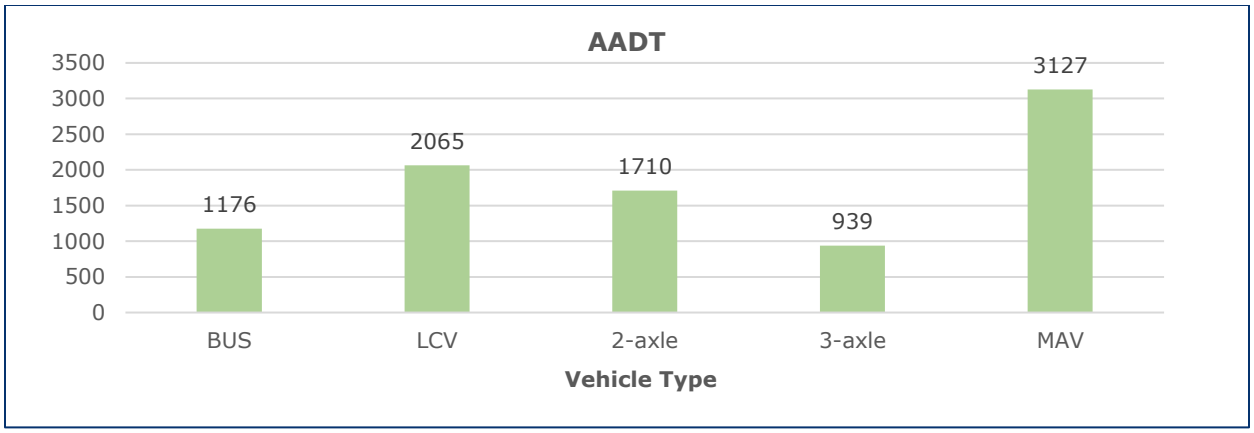




Illustrative summary of remaining life in Main carriageway

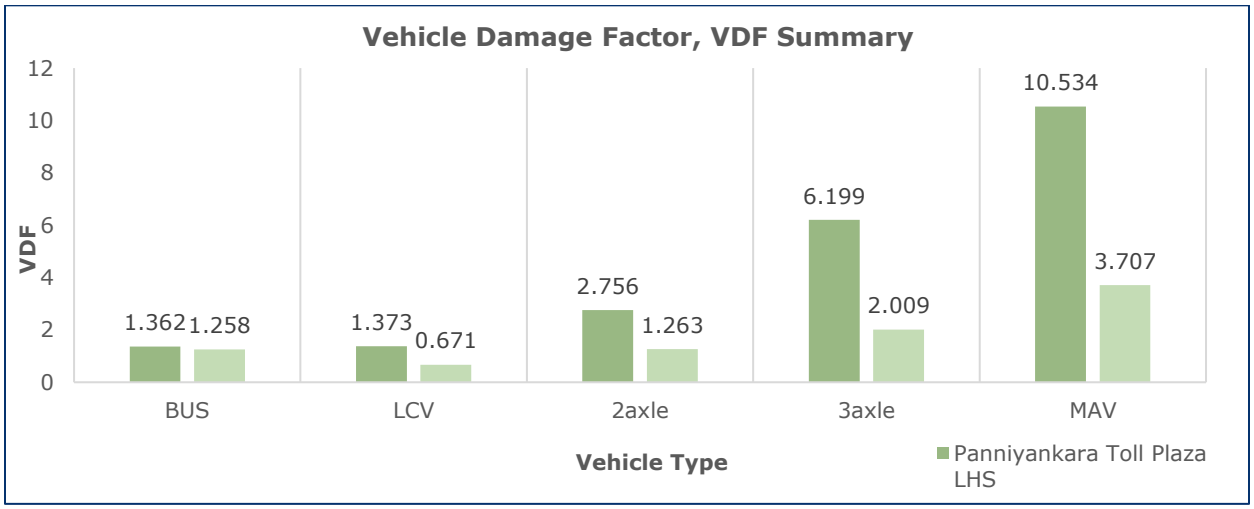
Team for Technical Due Diligence conducted 48 hours axle load survey at the toll plaza location.

The Annual Average Daily Traffic (AADT) of all commercial class vehicles as provided by the client is shown below.



*For MSA calculation purposes, a direction distribution of 50% is considered for both LHS and RHS direction.

VDF values are obtained as per the analysis of axle load survey are presented below:



AADT is provided by client and considering actual growth rates, design traffic is projected till. end of Concession Period. Design traffic for flexible pavement design is computed and shown below

Location	Design Traffic (MSA)	
	LHS	RHS
Panniyankara Toll Plaza	50	20

Considering the remaining life assessment, it is observed that certain sections of the existing pavement do not meet the required design life till end of the concession period, which corresponds to 50 MSA and 20 MSA in the LHS and RHS directions, respectively. To ensure these sections can sustain the projected traffic load, the required additional overlay thicknesses have been computed using IIT-Pave.

Direction-wise summary of required overlay thickness as per FWD

Rehabilitation/ Repairing Strategy	Treatment length in km	
	LHS	RHS
30mm BC Overlay	3.350	3.270
40mm BC Overlay	1.000	-
50mm BC Overlay	1.000	-
30mm BC+50mm DBM Overlay	2.000	-

1.11 Operation and Maintenance Requirements and Strategy

The Contractor and concessionaire shall always maintain that during the Operation Period, the Project Highway conforms to the maintenance requirements set forth in Schedule K (the "Maintenance Requirements" of Concession Agreement) *Schedule K of the CA*

Distresses develop in flexible pavements are described with severity index, and repairing measures are given in Chapter 10. All appropriate technical and contractual parameters are careful reviewed to formulate the strategy of immediate repair and rehabilitation for the existing distresses and roughness. The recommended Major Maintenance Strategy till the end of concession period is presented below elaborated in Chapter 10.

M&M Schedule- Main carriageway and Service Road

Year	MM LHS of MCW	MM RHS of MCW	MM of SR	Remarks
YR 2025 - YR 2026	40 mm BC On 100% length 50mm DBM on 5% length	40 mm BC On 100% length 50mm DBM on 5% length	30 mm BC On 100% length	Base Year (MCW+SR)
YR 2028 - YR 2029				Pavement Marking & Kerb Painting
YR 2031 - YR 2032	40 mm BC On 100% length 50mm DBM on 10% length	30 mm BC On 100% length		1st Cycle MCW
YR 2034 - YR 2035			30 mm BC On 100% length	1st Cycle SR
YR 2035 – YR 2036	30 mm BC On 30% length	30 mm BC On 10% length		2nd Cycle MCW

Note VG-40 Grade Bitumen considered.

1.12 Cost Estimate

The cost estimate is worked out for expenses on Immediate Works, periodic renewals (CAPEX) and expenses on operations and maintenance (OPEX) at present rates considering 2025-26 as the base year and is detailed in Chapter 11. Cost Estimate is worked out for expenses on

i. The costs for the restoration / improvement of the Toll Plaza pavement, highway flexible pavement, structural repairs, tunnel repairs and replacement of few TMS equipment. These costs are accounted for Capex (Initial Improvement works).

ii. Cost for Installation/restoration of Sign Board, Thermoplastic Marking on pavement, Installation/restoration of 5th, KM, HM, Boundary Stone, Painting of Kerb Stone, etc. are taken as Preventive Maintenance. Routine Maintenance and Repairs are also considered and evaluated till end of concession period.

iii. Highway Lighting, Tolling operations, Survey, Insurance Charges, Administrative Expenses, Incident management, AMC cost for TMS– is included as Operational cost for the Concessionaire.

iv. Bitumen has been assumed to be sourced from BPCL Kochi Refinery. The distance (to & fro) from the midpoint of Project Highway is taken as 95 km. PMB 76-10 grade bitumen and VG-40 grade bitumen is considered in cost estimate. Rates of Tata steel is taken from Thrissur.

OPEX and CAPEX of the project is estimated till end of Concession period and presented in Table 11-2 and represented here below.

- Initial improvement works is estimated as INR 0.46 Crore.
- Periodic Maintenance is estimated as INR 193.71 Cr.
- Routine and preventive maintenance cost will be INR 49.43 Cr. and overall OPEX till end of concession for this 28.36 km stretch is INR 222.50 Cr.
- CAPEX and OPEX for this 6-lane corridor are estimated till end concession period as INR 416.68 Cr. This estimate includes 18% GST and annual escalation of 5% on Opex and 2% on Major Maintenance.

2. INTRODUCTION, APPROACH AND METHODOLOGY

Ramboll India Private Limited is engaged to conduct a Technical Due Diligence study for a 28.40 km stretch of National Highway (NH-47), comprising a six-lane section between Vadakanchery and Thrissur in the state of Kerala.

Accordingly, Ramboll team has undertaken the work of preparing Technical Due Diligence Report based on study of project related reports and documents, visual inspections, and field investigations.

2.1 Scope of Work and Compliances

The scope of work agreed with Watrak Infrastructure Private Limited for conducting the technical due diligence study is presented in Table 2-1. The table also presents the chapters of the Technical Due Diligence Report where different items of scope of work are covered.

Table 2-1: Scope of Work and Compliances

SN	Scope of Work	Discussed At
1	**Site Visit and condition Survey – Visual Assessment** Site visit will be undertaken by Highway and Structural Engineers, Tunnel Expert, Pavement Expert, Quantity Surveyor, TMS & HTMS Expert and engineers to have visual assessment done for the project stretch. Observations will be recorded and critical issues for the Project will be identified. Project Structural integrity issues that require rectification / re-mediation will be observed and recorded along with possible risk mitigation strategy & costing thereof. The Consultant shall carry out a detailed reconnaissance of the project area and shall record and highlight important features and point out any issue that may be of importance to the Client in terms of operation and maintenance of the project.	Chapter 1, 3, 5, 6, 7, 10
2	**Conducting inventory, condition surveys and Field Investigations for Project Road** Inventory and detailed condition surveys will be conducted for project highway, bridges & cross drainage structures, project assets, safety appurtenances, TMS & ATMS system including recommendation for either strengthening / rehabilitation or reconstruction / replacement. *Requirements for NDT tests will be identified and informed. Based on the preliminary investigations and walk-through along the stretch, the Consultant shall prepare a project road map indicating the following elements Inventory of existing project assets Existing pavement condition – kilometer-wise (along with Photographs thereof) Intersecting/Crossroads (along with Photographs thereof); Inventory and condition assessment of CD structures (along with Photographs thereof).	Chapter 1, 3, 5, 6, 7, 8, 9

SN	Scope of Work	Discussed At
	Condition assessment of pavement. Condition assessment of structures. Review the extent of balance work. The Consultant should prepare a photo-documentation (Soft copy) of the mentioned areas and any other important findings. The Consultant shall assess the adequacy of Operations & Maintenance, Toll Management System and Advanced Toll Management system. The following field investigations will be carried out for the project stretch. Falling Weight Deflectometer (FWD) Surveys NSV Survey Test Pit investigations. Core samples from pavement. Axle Load Surveys	
3	**Review of available Project Documents and Reports** The available reports (Concession Agreements, Approved Pavement design report, Monthly Progress Reports, As-built Drawings, Correspondences of stake holders, Asset Management Contracts, Maintenance Manuals, Maintenance history etc) will be reviewed. The Consultant shall assess the completion status of work Vis-à-vis compared with schedule B, C and Schedule D	Chapter 4, 10
4	**Review of construction material and quality, Rehabilitation Plans by Developing strategy for immediate/periodic maintenance.** The Consultant should review of Quality of construction and compaction based on available data and from Laboratory testing of samples collected from trial pits, and cores The Consultant should conduct visual inspection of expansion joints, wearing coat, pitching, bearings, retaining structures, etc of the structures to assess the condition and requirements for its repair, replacements and / or rehabilitation. The pavement stretches along with the type of distresses will be identified analysing NSV and FWD data. The Consultant should assess maintenance cycles for pavements using HDM analysis. Repair techniques will be suggested for stretches requiring immediate rehabilitation measures. Pavement maintenance strategy (functional overlay/ structural overlay) will be developed for the entire concession period to bring back riding quality of each lane of the carriageway to maximum permissible as stipulated in the Concession Agreement.	Chapter 5, 6, 7, 9, 10,

SN	Scope of Work	Discussed At
5	**Preparation of BoQ and Cost Estimate** Bill of Quantities will be prepared for Immediate repairs, Routine maintenance, Periodic/major maintenance, O&M Cost, and Improvement works as per Schedule B of the CA. O&M cost will involve Routine maintenance and Incident Management, Tolling Operations, Admin Expenses and Preventive Maintenance. The Consultant should provide cost till the end of the concession period including any expected extension of Concession periods as informed by the Client. For assessing the cost, Ramboll will use rates available in the market or from the inhouse data base.	Chapter 11

2.2 Deliverables and Timelines

The deliverables and the timelines for the study are as under:

SN	Deliverables	Time period
1	Project Appreciation Report (PAR)	Within 15 days from date of receipt of Agreement from the Company.
2	Draft Report	Within 30 days from date of receipt of Agreement from the Company.
3	Final Report all-inclusive along with Preventive / Major Maintenance and yearly O&M Cost estimates	Within 15 days from draft report or within 7 days from the comments received from client on Draft report, whichever is earlier

The above timelines assume that all project related data are available at the start of work.

2.3 Structure of the Report

In line with the requirements of agreed scope of work, this Technical Due Diligence Report is being submitted. The report is organised in the following fashion.

Chapter 1	**Executive Summary:** The chapter presents an overview of the project after review & study of documents, site investigations and estimates for maintenance.
Chapter 2	**Introduction, Approach and Methodology:** The chapter presents a brief approach and methodology adopted for carrying out the Due Diligence Study.
Chapter 3	**Project Description:** The chapter summarises the project administrative details and features based on Concession Agreement requirements.
Chapter 4	**Review of Concession Agreement and contracts:** This chapter contains a short review of the existing CA of the package.

Chapter 5	**Assessment of Project Assets - Highway:** The chapter presents the details of various essential features of the project highway recorded through reconnaissance survey and data obtained through NSV Survey.
Chapter 6	**Assessment of Project Assets - Structures:** The chapter presents the details of various essential features of the structures recorded through visual inspection.
Chapter 7	**Assessment of Project Assets – Toll Management Systems:** The chapter presents the details of various essential features of the Toll Plaza Systems and associated facilities recorded through visual inspection.
Chapter 8	**Soil and Material Investigation:** This chapter describes the tests, and their result carried for soil and material collected from site through pit investigation and pavement core samples.
Chapter 9	**Pavement Evaluation Studies:** This chapter describes the tests carried for pavement evaluation and analyses of the test results.
Chapter 10	**Development of O&M Strategy:** The chapter presents the details of O&M strategy developed based on the Pavement evaluation studies and analysis.
Chapter 11	**Cost Estimate:** The chapter outlines the key assumption considered for cost estimate and provides details of cost estimates under various heads viz immediate, O&M and major maintenance for the concession period.

2.4 List of Shared Documents of the project.

Documents shared by Watrak Infrastructure Private Limited for Technical Due Diligence of the project and reviewed by Ramboll are given below.

- Concession Agreement of the projects
- As built drawings
- Monthly Progress Report
- Road Safety Audit Report
- Electricity Charges
- Road Safety Audit Report.
- Insurance fee
- Manpower and Organisation Chart

2.5 Approach and Methodology

Our approach and methodology to address the requirements defined in terms of reference are briefly presented below.

- Identification of objectives of Client through detailed study of scope of work and discussions with the Client.

- Identification of Assignment specific team of professionals covering all the skills and specializations required and involving with the assignment from day one.
- A Team Leader is assigned to coordinate various events / activities of various team members.
- Assessment of data / information required is made at the time of Proposal / Engagement letter and the list is shared with the Client.

2.6 Study

The following briefly presents the process followed for the present study.

- The data is reviewed by the study team and information collated in different categories e.g., asset inventory, contracts, change of scope, communications from NHAI, maintenance strategy and maintenance costs etc.
- Data gaps are identified through the above process and communicated to the Client.
- Detailed review of all the available data is carried out.
- Site visit is made by team of experts to understand the project features and observations are recorded.
- Field tests are carried out as per agreed scope of work.
- The test results are analysed in detail and maintenance strategies are developed.
- Inferences are made on various items of scope of work based on the available data and compared with the requirements of existing concession Agreement. Issues are flagged wherever required.
- The costs associated with the project under various head (immediate, routine operation and maintenance and Major Maintenance) are worked out in accordance with the requirements of existing Concession Agreement under current scenario.
- Finally, a comprehensive report is prepared covering all aspects of the agreed scope of work.

2.7 Delivery

Delivery follows the following flow:

- Formats of agreed deliverables are formalized and shared with Client, wherever required.
- Deliverables are shared with the Client within agreed timelines.

2.8 Feedback

Regular and end-of-the-assignment feedback are obtained from the client for further enhancing the quality of service.

3. PROJECT DESCRIPTION

The Government of India had entrusted to National Highways Authority of India (NHAI) for development, maintenance, and management of National Highway No. 47 (New NH 544) which includes.

- Augmentation of existing road to six laning of NH-47 (New NH 544) from Vadakanchery to Thrissur (km 240 to km 270) (length 28.36 km) in the state of Kera on DBFOT basis.

The National Highways Authority of India (NHAI) invited proposals through notice dated 19 December 2007 for the implementation of the project. Following the evaluation of bids received, the Authority accepted the proposal of a selected bidder, which is a Consortium comprising M/s KMC Constructions Limited and China Railways 18th Bureau Group Corporation Limited, with M/s KMC Constructions Limited acting as the Lead Member. Accordingly, Letter of Award No. NHAI/Tech/NS-2/NH-47/BOT/KL-2&3/2006 was issued to the selected bidder on 27 February 2009.

The Consortium subsequently promoted and incorporated the Concessionaire, Thrissur Expressway Private Limited, for the implementation of the project. The Concession Agreement was executed on 24 August 2009. The Appointed Date for the project was declared as 15 September 2012, marking the commencement of the 20-year Concession Period from that date.

The Provisional Completion Certificate for the project was achieved on 09 March 2022, followed by the issuance of the Final Completion Certificate on 14 June 2024. The Project Highway is currently under the Operation and Maintenance (O&M) phase, in accordance with the provisions of the existing Concession Agreement. The Concessionaire, Thrissur Expressway Private Limited, shall continue to operate and maintain the project highway until the end of the Concession Period, which is set to conclude on 14 September 2036.

The project involves upgrading the existing two-lane carriageway to a six-lane dual carriageway configuration, including strengthening and widening of the existing two lanes to three lanes of NH – 47 (New NH 544), between Km 240.000 (Exiting km 236.135) at Vadakanchery and Km 270.000 (Exiting km 264.490) near Thrissur with a six-lane twin-tube tunnel, the Kuthiran Tunnel, near Kuthiran hills.

The Kuthiran Tunnel has been constructed to mitigate traffic bottlenecks and reduce the frequency of accidents along the Kuthiran hill stretch, a previously challenging and accident-prone section of the highway. By bypassing this difficult terrain, the tunnel significantly reduces travel time and enhances road safety. Notably, this is Kerala's first-ever road transport tunnel and stands as South India's longest six-lane road tunnel. The tunnel has also resulted in a reduction of approximately 3 kilometres in the travel distance between Kochi and Coimbatore. It comprises twin tubes, each accommodating three lanes of traffic. The left tube measures 955 meters, while the right tube measures 944 meters, with a width of 14 meters and a height of 10 meters. Additionally, two emergency crossovers have been provided within the tunnel to facilitate safe movement during emergencies.

This stretch of NH-47 forms a critical segment of the highway corridor connecting Kochi in Kerala to Salem in Tamil Nadu. The route traverses several key cities including Thrissur, Palakkad, Coimbatore, and Erode. It facilitates seamless interstate connectivity between Kerala and Tamil Nadu and supports high volumes of both passenger and freight traffic. The corridor is strategically significant for economic, industrial, and logistical development in the region. It serves as a primary conduit for the transportation of goods to and from the Cochin Port, industrial hubs in Coimbatore and Salem, and agricultural regions in Palakkad and Erode. Additionally, the route plays a pivotal role in supporting tourism, trade, and access to critical services across state boundaries.

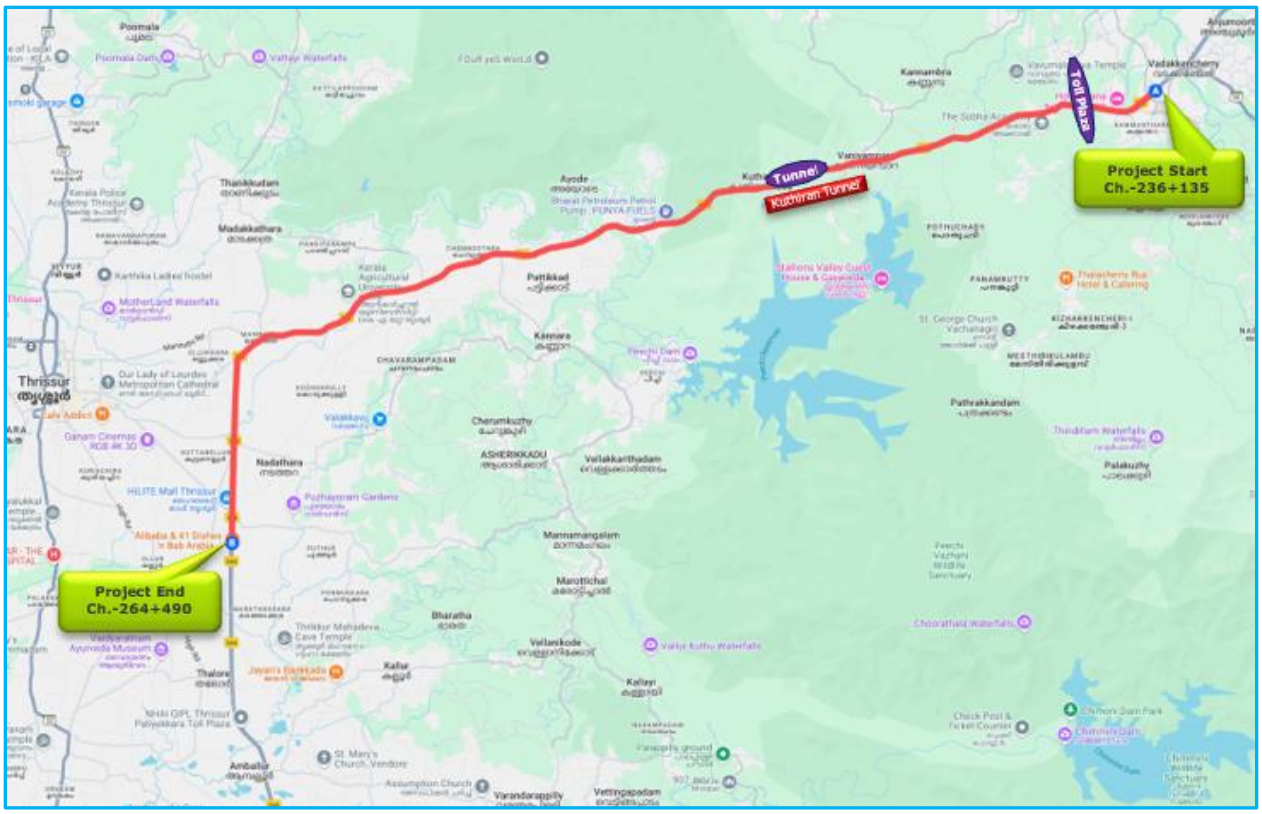


Figure 3-1: Location Map of Project Stretch

3.1 Terrain and Land Use

The abutting land use along the project corridor is a mix of commercial, residential, agricultural, and industrial zones, reflecting the diverse and dynamic nature of the region's development. The alignment primarily traverses plain terrain, which is generally conducive to highway development and expansion but there is a notable hilly stretch between km 252.000 and km 255.000, which includes challenging topographical features.

3.2 Right of Way

The right of way (RoW) available in the project is 60m as specified in the CA.

3.3 Administrative Details of the Project

Administrative details of the project are listed below.

Table 3-1: Administrative Details of the Project

Sl. No.	Feature	Details
1	Project Name	Design, Construction, Development, Finance, operation and Maintenance of 6-Laning of Vadakanchery-Thrissur Section of NH-47 (Km 240.000 to Km 270.000) in The State of Kerala on Design, Build, Finance, Operate and Transfer (DBFOT) Basis

Sl. No.	Feature	Details
2	Mode of the Execution (BOT Toll/ BOT Annuity/ EPC/ HAM/ Others)	Design, Build, Finance, Operate and Transfer (DBFOT) Basis
3	Project Phase	Tolling, Operation, Maintenance and Transfer
4	No. of Lanes/ Configuration	6 lanes
5	Length of the Project (in Km)	28.400 km
6	Authority	National Highways Authority of India (NHAI)
7	Concessionaire	Thrissur Expressway Limited (TEL)
8	Independent Engineer	Dhruv Consultancy Services Ltd. in Association with Varad Associates
9	Letter of Acceptance	27 February 2009
10	Appointed Date	15 September 2012
11	Concession Agreement Signed on	24 August 2009
12	Total Project Cost as per CA	INR 617 Crores
13	Provisional Certificate issued on	09 March 2022
14	Completion certificate issued on	14 June 2024
15	Concession end date	14 September 2036 (including extension of 4 years)

3.4 Salient Features of the Project and Scope of Work

The salient features of the project are presented in Table 3-2.

Table 3-2: Salient Features of the Project

S.no	Description	Units	- Total Quantities
1	Section from Vadakanchery (236.135 km) to Thrissur (264.490 km) of NH-47 (New NH 544)	km	28.355
	Total Length of Main Carriageway with Rigid Pavement (Considering both sides)	km	2.750
	Total Length of Main Carriageway with Flexible Pavement (Considering both sides)	km	53.960
2	Service Road & Slip Road (as per CA)	km	Completed as per CA Scope = 31.42 Kms, Under COS = 9.65 Kms
3	Bypasses	km	NIL
4	Major Intersections	Nos	3

S.no	Description		Units	- Total Quantities
5	Minor Intersection		Nos	7
6	Bus Bay & Shelters	Nos	Nos	21
		Bus shelters only		
		Bus Bays only		
7	Truck lay bye		Nos	1
8	Rest Area		Nos	NIL
9	Toll Plaza		Nos	1
10	Median Openings	Authorized	Nos	16
		Unauthorized	Nos	2
11	High Mast Light Locations		Nos	10
12	Solar LED Blinkers		Nos	22
13	Streetlights	Single Arm Pole	Nos	45
		Double Arm Pole	Nos	356
14	Fuel Stations		Nos	13
15	Pedestrian guard rail		km	0.185
16	ECB (SOS Facility)		Nos	NIL
17	Gantry Boards	Cantilever Over Head	Nos	8
		Half width Over Head	Nos	2
18	Sign Boards		Nos	604
19	Variable message sign (VMS)	Cantilever Over Head	Nos	0
		Half width Over Head	Nos	4
20	Entry & Exit		Nos	26
21	5th / Ordinary Kilometer stones		Nos	45
22	Hectometer stones		Nos	186
23	Drainage	Median Drain	km	1.657

S.no	Description		Units	- Total Quantities
		Shoulder drain	km	44.794
		Earthen Drain	km	10.685
		Cut Drains	km	30.785
		Chute Drain	km	0.604
24	Median Plantation		km	km
25	Avenue Plantation		km	km
26	Metal Beam Crash Barrier (MBCB)	W-beam One Side	km	12.089
		W-beam Two Side	km	15.232
		Thrie beam one side	km	0.000
27	Concrete Crash Barrier		km	km
28	Land Use	Agriculture	km	18.667
		Residential	km	12.262
		Commercial	km	20.429
		Mixed	km	5.352
29	Kerb		km	km
30	Chevron Signs		Nos	535
31	Road Studs		Nos	12060
32	OHM		Nos	236
33	Delineators		Nos	828
34	Footpath		km	50.384
35	Guard post		Nos	133
36	Pipe railing		km	4.044
37	Parapet wall		km	3.146
38	FOB (Foot over bridge)		Nos	1

S.no	Description	Units	- Total Quantities
39	Handrail	km	5.083
40	RCC railing	km	0.640

List of structures on the Project Highway

S. No	Particulars	Unit	Structures
1	MJB	Nos	1
2	MNB	Nos	1
3	Flyover	Nos	2
4	Underpass	Nos	12 (3 nos under construction)
5	Box culvert	Nos	58
6	HPC	Nos	29
7	Aqua duct	Nos	1
8	Structure approach length	meter	4,750
9	RCC Crash barrier on structure	meter	5,173
10	RCC Crash barrier on approach	meter	7,082
11	MBCB	meter	252
12	Elastomeric bearings	cu.cm	2,432,430
13	Strip seal Expansion Joints	RM	1,491
14	POT-PTFE bearings	Nos	640
15	Total Deck area in (m2)	Sqm	37,459
16	Elastomeric bearings	Nos	78
17	Strip seal Expansion Joints	Nos	106

3.5 Specification and Standards

Six - Laning of the Project shall conform to the Manual of Specifications and Standards for Six - Laning of National Highways through Public Private Partnership published by MOSRTH in May 2008.

Deviations from the Manual

Notwithstanding anything to the contrary contained in the Manual of Specifications and Standards for Six - Laning of National Highways through Public Private Partnership published by MOSRTH in May 2008, few Specifications and Standards shall apply to the construction of the Project Highway, and for purposes of this agreement, the referred manual shall be deemed to be amended to the extent set forth in the CA Schedule D (from Page no 205 to page no 207).

4. REVIEW OF CONCESSION AGREEMENT

This chapter contains a short review of the concession agreement

4.1 Brief Review of Concession Agreement

It may be noted that The Concession Agreement is primarily divided into 48 Articles and 23 Schedules that are available at the end of the CA. Contents of each of the Articles and the Schedules is briefly mentioned below.

Part I Preliminary

Concession Agreement

Article 1 Definitions and Interpretations

Addresses - the Definition and Interpretation, measurements and arithmetic conventions priority of agreements and Errors/Discrepancies

Part II The Concession

Article 2 Scope of the Project

Article 3 Grant of concession

Addresses- the concession

Article 4 Conditions precedent

Addresses-conditions precedent, damages for delay by the authority.

Article 5 Obligation of the concessionaire

Addresses-obligations of the concessionaire, obligations relating to project agreements, obligations relating to change in ownership, employment of foreign nationals, employment of trained personnel, sole purpose of the concessionaire.

Article 6 obligation of the authority

Addresses obligation of the authority, maintenance obligation prior to appointed date, obligation relating to competing roads.

Article 7 Representation and Warranties

Addresses- representation and warranties of the concessionaire, representation and warranties of the authority, disclosure.

Article 8 Disclaimer

Addresses - Disclaimer

Part III Development and Operation

Article 9 Performance Security

Addresses-performance security, appropriation of performance security, release of performance security.

Article 10 Right of way

Addresses-the site, license, access and right of way, procurement of site, site to be free from encumbrances, protection of site from encroachments, special temporary right of way, access to authority and independent engineer.

Article 11 Utilities associated roads and trees

Addresses- existing utilities and roads, shifting of obstruction utilities, new utilities and roads, felling of trees.

Article 12 Construction of project highway

Addresses -obligations prior to commencement of construction, maintenance during construction. Drawings, construction of project highway, construction of service lanes by authority.

Article 13 Monitoring of construction

Addresses- monthly progress reports, inspection, tests, delays during construction, suspension of unsafe construction works, video recording.

Article 14 Completion certificate

Addresses- tests, completion certificate, provisional certificate, completion of punch list items withholding of provisional certificate, rescheduling of tests.

Article 15 Entry into commercial service

Addresses-commercial operation date COD, damages for delay.

Article 16 Change of scope

Addresses- change of scope, procedure for change of scope, payment for change of scope, restriction on certain works, power of authority to undertake works, reduction in scope of the project.

Article 17 operation and maintenance

Addresses-all and M obligations of the concessionaire, maintenance requirements, maintenance manual, maintenance program, safety vehicle breakdowns and accidents, decommissioning due to emergency, lane closure, damages for breach of maintenance obligations, authorities right to take remedial measures, overriding power of the authority, restoration of loss or damage to project highway, modifications to project highway, excuse from performance of obligations, barriers and diversions, advertising on the site.

Article 18 Safety requirements

Addresses-safety requirements, expenditure on safety requirements

Article 19 Monitoring of operation and maintenance

Addresses- monthly status reports, inspection, tests, remedial measures, monthly fee statement.

Article 20 Traffic regulation

Addresses-traffic regulation by concessionaire, police assistants, building for traffic aid post, recurring expenditure on medical aid posts**.**

Article 21 Emergency medical aid

Addresses- medical aid posts, buildings for medical aid posts, recurring expenditure on medical aid posts.

Article 22 Traffic census and sampling

Addresses -traffic senses, traffic survey, traffic sampling, computer system and networking.

Article 23 Independent Engineer

Addresses- appointment of independent engineer, duties and functions, remuneration, termination of appointment, authorized signatories, dispute resolution.

Part IV Financial Covenants

Article 24 Financial closure-financial closure, domination due to failure to achieve financial closure

Addresses

Article 25 Grant

Addresses-grant equity support, O&M support.,

Article 26 concession fee

Addresses-concession fee, additional concession fee, determination of concession fee, payment of concession fee, verification of reliable fee.

Article 27 user fee

Addresses-collection and appropriation of fee revision of fee exemption of local traffic, free use of service lanes users, discounted fee for frequent users, reappropriation of extra fees, tolling contractor, fee collection points, additional charge for evasion of fee, display of fee rates.

Article 28 Revenue shortfall loan

Addresses-repayment of shortfall loan, repayment of shortfall revenue loan

Article 29 effect of variations in traffic growth

Addresses-effect of variations in traffic growth, modifications and concession.

Article 30 construction of additional tollway

Addresses-restrictions on construction of additional tollway, modification of concession., minimum fee for the project highway, minimum fee for additional tollway idiot

Article 31 escrow account

Addresses -escrow account, deposits into escrow account, withdrawals during concession., withdrawals upon termination.

Article 32 Insurance

Addresses-insurance during concession., notice to the authority, evidence of insurance cover, remedy for failure to ensure, waiver for subrogation, concessionaires' waiver, application of insurance proceeds.

Article 33 accounts and audit

Addresses- audited accounts, appointment of auditors, certification of claims by statutory auditors, dispute resolution.

Article 34 Force measure

Addresses force majeure, nonpolitical event, indirect political event, political event, duty to report force measure event effect force measure event on the concession, allocation of cost arising out of force

measure, termination notice for force measure event, termination payment for force majeure event, dispute resolution, excuse from performance of obligations.

Article 35 Compensation for Breach of Agreement

Addresses-compensation for default by concessionaire, compensation for default by the authority, extension of concession., compensation for competing roads, compensation to be in addition.

Article 36 Suspension of Concessionaire's rights

Addresses- suspension upon concessionaires' default, authority to act on behalf of concessionaire, revocation of suspension, suspension of concessionaire, termination right here

Article 37 Termination

Addresses-termination for concessionaire default, termination for authority default, termination payment, other rights and obligation of the authority, survival of rights.

Article 38 Divestment of rights and interest

Addresses- the investment requirements, inspection and cure, vesting certificate, additional facilities, divestment costs etc

Article 39 Defects liability after termination

Addresses-liability for defects after termination, retention in escrow account.

Article 40 assignment and charges-

Addresses-restriction on assignment and charges, permitted assignment and charges, substitution agreement, assignment by the authority

Article 41 Change in law

Addresses - increase in costs, reduction in costs, protection of NPV, restriction on cash compensation, no claim in the event of recovery from users

Article 42 Liability and indemnity

Addresses -general indemnity, indemnity by the concessionaire, notice and context of claims, defense of claims, no consequential claims, survival on termination.

Article 43 Rights and title over the site

Addresses- License rights, access rights of the authority and others, property taxes, restriction on subletting

Article 44 Dispute resolution

Addresses -dispute resolution, conciliation, arbitration, adjudication by regulatory authority or Commission

Article 45 Disclosure

Addresses - disclosure of specified documents, disclosure of documents relating to safety.

Article 46 Redressal of public grievances

Addresses- complaints register, redressal of complaints

Article 47 Miscellaneous

Addresses - governing law and jurisdiction, waiver of immunity, state support agreement, depreciation, delayed payments, favor, liability for review of documents and drawings, exclusion of implied warranties etc., survival, and tire agreement, severability, no partnership, third parties, successors and assigns, notices, language, counterparts

Article 48 Definitions

Addresses – Definitions

Schedules

Schedule A: Site of the Project,

Schedule B: Development of the Project Highway,

Schedule C: Project Facilities,

Schedule D: Specifications and Standards,

Schedule E: Applicable Permits,

Schedule F: Performance Security,

Schedule G: Project Completion Schedule,

Schedule H: Drawings,

Schedule I: Tests,

Schedule J: Completion Certificate,

Schedule K: Maintenance Requirements,

Schedule L: Safety Requirements,

Schedule M: Monthly Fee Statement,

Schedule N: Weekly Traffic Census,

Schedule O: Traffic Sampling,

Schedule P: Selection of Independent Engineer,

Schedule Q: Terms of Reference for Independent Engineer,

Schedule R: Fee Notification,

Schedule S: Escrow Agreement,

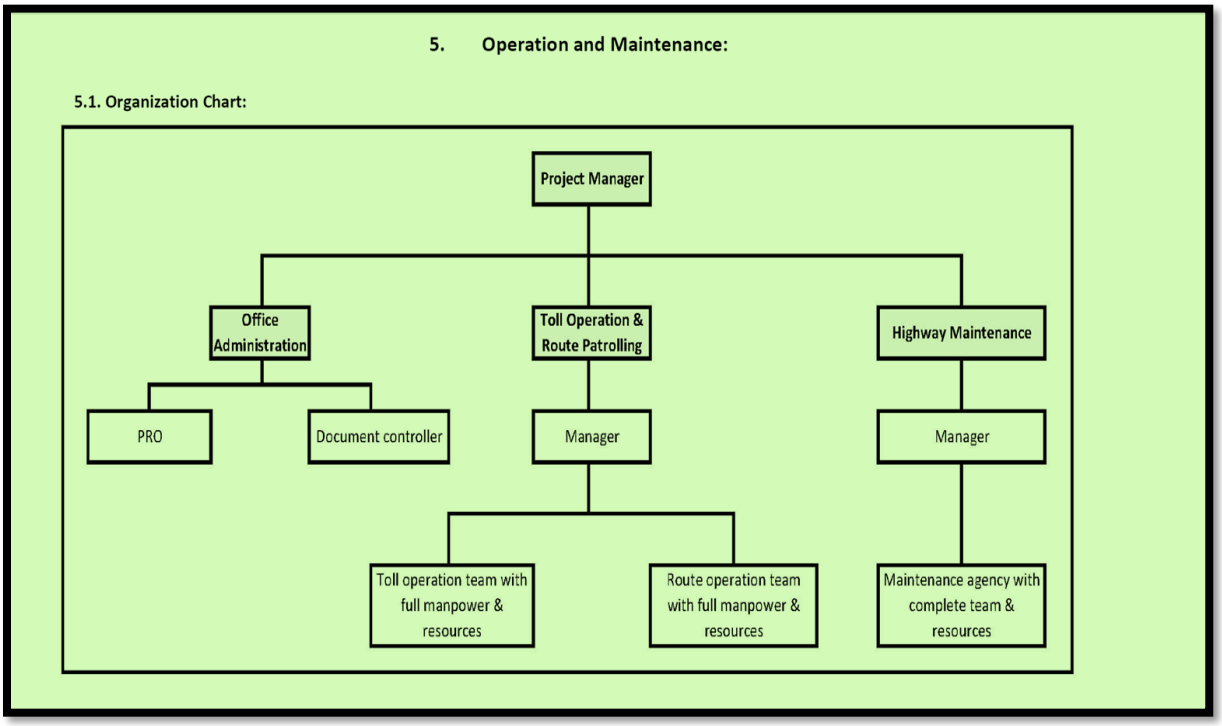
Schedule T: Panel of Chartered Accountants,

Schedule U: Vesting Certificate,

Schedule V: Substitution Agreement,

Schedule W: State Support Agreement

4.2 O&M Organization Chart of Concessionaire



4.2.1 Details of Subcontracts

4.2.1.1. Routine Maintenance

Thrissur Expressway Limited has appointed M/s. Arclight Facilities Pvt Ltd. (formerly M/s. NPS Facilities), Office No. 13-14, Citi Enclave, Plot No. 9, Sector - 2A, Kopar Khairane, Navi Mumbai, Maharashtra - 400 709, for providing Routine Maintenance as per details below.

Scope of Work of Arclight Facilities Pvt Ltd is as follows.

A. Providing routine maintenance service at the project highway including manpower, tools & tackles, staff uniform & PPE.

Supply of manpower for the following routine maintenance works on daily basis as per directives of SPV or his authorized representative:

a) General cleaning & maintenance of bus shelters, junctions, footpaths, kerb pavement, medians, separators, shoulders, sign boards, metal crash barriers, pedestrian guard rails, delineators, bridge/ culvert concrete railing/ RCC crash barrier/parapet, exp. Joints, drainage spouts, truck lay byes (incl. toilets), rest area, canopy structures by manual means & incident management, including tools – tackles and machineries.

b) General cleaning & maintenance of toll plaza buildings, traffic aid posts, medical aid posts, toll booths, car parking, toilets, plumbing & sanitary works etc. including cleaning materials, consumables, tools & tackles, and machineries.

c) Removal of rank vegetation/ weeds and undesirable vegetation from shoulders, embankment slopes up to ROW (both sides) complete in all respect including breaking of clos, rough

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dressing and disposal of waste material and vegetation at a place outside Row with all leads & lifts including tools & tackles and machineries.

d) Clearing culverts (slab, box, pipe), bridges etc. including clearing, cleaning, and reshaping of upstream and downstream faces of culverts within right of way, including disposal of excess material recovered from site including vegetation, outside ROW with all leads & lifts including tools & tackles and machineries.

e) Clearing, deepening and reshaping of roadside unlined / kacha drains and clearing roadside/ median open lined/ pucca drains to bring them to original shape, drainage capacity including removal and disposal of sediments, extraneous debris and vegetation growth blocking the free flow from site outside ROW with all leads & lifts including tools & tackles and machineries.

f) Maintenance of plants/ shrubs in median/ islands/ avenue/ and any other locations within RoW / landscaping including basin making, weeding, hoeing, cleaning, levelling and dressing of median, removal of weeds/ undesirable vegetation, cutting grass(by machine or manual means) and disposal of all muck outside ROW regularly, watering of plants, spreading of manure, application of insecticide/ pesticide/ fungicide etc., training of all shrubs/ plants as and when required to give them required shape, size and spread, including tools – tackles and machineries.

B. Cleaning, repair & maintenance of Highway lighting including:

a) All maintenance issues of Highway Lighting, High Mast Lighting, Canopy lighting, Complete Toll Plaza lighting, Underpasses (PUPs & VUPs) Lighting, DG sets/ panel room, Operation &maintenance of Solar blinkers, etc., without material but including all tools, tackles, equipment, manpower, conveyance as per direction & instructions of Project head and his representatives.

b) Maintenance of Electrification & Lighting works of the Project Highway including Toll plazas,

Bus shelters, Structures Lighting, Way side Amenities including procurement of required material for repair & maintenance works (Material shall be provided by SPV)

A. Providing Routine Maintenance Service at the Project highway including Machinery

Supply of machinery & equipment in good condition including its maintenance, driver, fuel, lubricants & consumables as per the unit of measurement mentioned in priced bill of quantities.

D. Providing Routine Maintenance Services as directed by the Client (*but not limited to above*) from time to time as per the site requirement.

4.2.1.2. AMC for Toll Management System

Thrissur Expressway Limited, has appointed M/s. Arya Omnitalk Wireless Solutions, Pune,

Maharashtra-411013 for AMC for Toll Management System: HO Support on Non-Comprehensive basis: HO Support includes Software Support 24*7, Support for CCH, Technical support for Hardware/ Software Failure, Hot Standby Server Monitoring etc. as per Service level Agreement.

5. ASSESSMENT OF PROJECT ASSETS – HIGHWAY

The project - Two-lane carriageway to a six-lane dual carriageway configuration, including the strengthening and widening of the existing two lanes to three lanes, between Km 240.000 (Exiting chainage-236.135) and Km 270.000 (Exiting chainage-264.490).

The teams organised their site visits to carry out visual inspection of Road assets. Main carriageway is 6 lanes with flexible pavement. Overall good condition of the pavement is good. At three locations (244+200,252+900,256.900) new structures are under construction through some separate contract by the Authority. Traffic is currently moving via the service road.

Overview of the assets are presented below:

- Service road, slip road, junctions, and road markings.
- Road Furniture, including sign boards, metal beam, crash barrier, pedestrian guardrails, traffic blinkers, slope protections, drains, plantations (median, avenue, and other landscaping), etc.
- Project Facilities, including highway lightings, truck lay byes, rest areas, bus shelters, toll plazas, highway nest, etc.

5.1 Service Roads/ Slip Roads

Service roads and slip roads have been constructed along the project corridor using flexible pavement. The overall pavement condition is satisfactory. However, due to land acquisition (LA) issues, the construction of service roads is pending at certain locations (existing service road width observed at site: 2m/5m), and work is currently in progress. Photographic evidence is provided below for reference.






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Figure 5-1: Service roads

5.2 Intersections

Intersections are the places where one or more roads shares the common space. These includes major and minor intersections. There is total 10 junctions along the project road. Out of these, there are 03 major junctions and 07 minor junctions. Junctions are with flexible pavement provided. Some photographs are presented below for reference.



Figure 5-2: Major Intersections



Figure 5-3: Minor Intersections

5.3 Toll Plaza

The Concession Agreement stipulates that one toll plaza, located at km 239+000 (Panniyankara Toll Plaza), is operational within the project corridor. The toll plaza is provided with 18 lanes, including 2 reversible lanes, although the Concession Agreement specifies 14 lanes (7 in each direction). The toll plaza operates with a Hybrid ETC system and is equipped with facilities such as canopy lighting, high mast lighting, an administrative building, toilet blocks, tow-away cranes, corridor management vehicles, a paramedical booth, and ambulance services. Installation of a static weighbridge is currently in progress at the toll plaza. Overall, the condition of the plaza is good. Supporting photographs are presented below.



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Figure 5-4: Toll Plaza

5.4 Fuel Station

Fuel stations along the project stretch, along with their access arrangements, have been documented during the inventory visual inspection. Few photographs are presented below.



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Figure 5-5: Fuel stations

5.5 Bus bay and Bus Shelter

There is total 21 bus shelters are provided on both sides along the project road; however, not all shelters are equipped with bus bays. Overall, the bus shelters are in good condition. Representative photographs are provided below



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Figure 5-6:Bus shelters

5.6 Truck lay-byes.

Concession Agreement has proposed construction of Truck lay-byes at 04 nos. of different locations at on both sides but due to land issue only one has been constructed. Which is currently being used for the construction of RE wall panels.

Arrangements for lights and toilet rooms have been made at truck lay-byes, but the rest room is locked. Some photographs of truck lay byes are given the below. The truck lay is overall good condition. Some photographs of the bypass are given below.



Figure 5-7: Truck Lay bye

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5.7 Entry/ Exit Ramp

Entry and Exit ramps to service road from Main Carriageway is provided along the Project Road. Some photographs of these Entry and Exit ramps are given below.



Figure 5-8: Entry/ Exit Ramp

5.8 Drainage System

Road drainage along the project Highway includes Main carriageway Lined drain, Service Road Lined drain, Median Longitudinal lined drain, and Chute drain. Condition of these drains are good but requires appropriate routine / preventive maintenance by cleaning debris and vegetations to make the arrangement working. overall drainage is in good condition. Drains are still pending at some locations due to LA issue. Illustrative photographs are presented below**.**



Figure 5-9: Drainage system

5.9 Median opening

Median openings have been provided in accordance with the scope defined in the Concession Agreement and based on the requirements of local authorities and residents along the project highway, with necessary approvals obtained from the competent authority. For the safety of road users, some median openings are temporarily blocked using New Jersey barriers. Representative photographs are presented below.



Figure 5-10: Median Opening

5.10 Metal Beam Crash Barriers

Metal Beam Crash Barriers are provided at main Carriageway along the project and at locations of high embankment on Service Road inner side. Double side crash barriers have been installed in the middle of the built-up area. which are installed in good condition. Photographs of Metal beam crash barrier.



Figure 5-11: Metal Beam Crash Barriers

5.11 Traffic Signage

Road signs include roadside signs, overhead Gantry Mounted signs, Kerb mounted signs and median signs along the Project Highway. There are about 614 nos. sign boards, 10 Gantry signs on Project Stretch which are in good condition. Photographs are shown below.



Figure 5-12: Traffic Signs

5.12 Highway lighting

Highway lighting is provided at VUP's, Flyovers, Toll Plaza, and at Built-up Locations with single and double arm light poles. High Mast lightings are provided at Toll Plazas and Major Intersections. These lights are properly maintained and are in good working condition. Solar Blinker Signals are provided at Entry/exit and Intersections locations. High Mast Lighting and Solar Blinkers. Photographs are presented below.



Figure 5-13: Highway Lighting

5.13 Plantation

Landscaping, Median plantation is visible along the road. plantation to beautifying the corridor, median plantations help reduce glare from oncoming headlights, control vehicle speeds, moderate road surface temperatures, and contribute to improved air quality. Where available shrubs and plants are either found with overgrowth needs pruning or dried out and needs regular watering / maintenance / replacement. Photographs are shown below.

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Figure 5-14: Avenue and Median Plantation

5.14 Tunnel

The tunnel, situated within the highway corridor, is currently in good condition. Equipped with modern features such as LED lighting, fire safety systems, SOS call facilities, and tunnel ventilation fans, it ensures a safe passage for users. Additionally, the tunnel lining is also in good condition, further reinforcing its overall structural integrity. Overall, the tunnel appears well-maintained and equipped with essential facilities.



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Figure 5-15: Pedestrian Guard Rails

5.15 Kilometre stone/Hectometre stones

Kilometre and hectometre stones are mostly visible along most of the stretch however some of them found uprooted / damaged or script is faded which requires routine maintenance. Photographs are shown below.



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Figure 5-16: Kilometre Stones & Hectometre Stones

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6. ASSESSMENT OF PROJECT ASSETS – STRUCTURES

6.1 General

The project comprises a 28.4 km of road corridor which starts at design chainage 236+000 and ends at 264+400 with Service Road at many locations. Many structures have been built along these roads, which include Major bridges, minor bridges, flyovers, underpasses, pedestrian passes, box culverts, pipe culverts, and drainage. All the structures available at site and inspected during site visit are listed in Table 6-1.

6.2 Structure Inventory

A visual condition survey of all structures is conducted during the site visit, by the consultant's Structural/Bridge Engineer. The purpose of this inspection is to evaluate the overall condition of the structures, identifying any visible signs of deterioration or distress. Such deterioration may be due to various load effects, including dead load, live load, wind load, and environmental actions, as well as physical degradation (such as wear and abrasion) and chemical influences (such as corrosion caused by moisture, chlorides, or pollutants). The inspection is also focused on identifying damage resulting from unpredictable external events, including earthquakes, flooding, or vehicular collisions, and on evaluating the impact of any construction-related imperfections or material deficiencies. By visually inspecting the structures, the assessment aimed to detect early signs of failure, deformation, or material loss that may not yet be critical but may be worsen over time. This type of inspection is a vital part of the structural health monitoring process of project structures. It enables early detection of issues, supports the planning of appropriate remedial measures, enhances structural safety, and contributes to the long-term durability and service life extension of the assets through timely maintenance and repair strategies.

Table 6-1: Summary of Structures

Structure Type	Unit	Structure as Per Site	Remark
Flyover	Nos	2	
MJB	Nos	1	
MNB	Nos	1	
Underpass	Nos	12	VUP 4 nos, LVUP 1 No, PUP 4 Nos. 3 underpasses at Chainages 244+200, 252+900, and 256+900 were noticed under construction through separate contracts.
BOX	Nos	58	
HPC	Nos	29	
Aqueduct	Nos	1	
Total	**Nos**	**102**	

The collection and analysis of inventory data for structures including Bridges, Fly overs, Underpasses, Box Culverts and Hump Pipe Culverts is carried out through visual inspection along the total project stretch of 28.4 km.

During the condition survey, no major structural failures or serious distress are observed. However, attention is needed for optimal performance, including repairing exposed reinforcement at pier caps of Minor bridge, repairing minor damaged crash barriers, improving the sealing material at expansion joints, and ensuring drainage spouts are clear and present, alongside routine maintenance to clear debris accumulation under culverts and restricting waterway, managing vegetation growth and

removing unwanted materials around bearings of superstructures, and regularly removing vegetation around culverts and RE walls.

These findings indicate the need for regular maintenance and minor repairs to ensure the long-term durability, functionality, and safety of the structures.

Following codes are used for the condition rating of the structural members.

Code	Description
N	NOT APPLICABLE
9	EXCELLENT CONDITION
8	VERY GOOD CONDITION - no problems noted
7	GOOD CONDITION – some minor problems
6	SATISFACTORY CONDITION - structural elements show some minor deterioration
5	FAIR CONDITION - all primary structural elements are sound but may have minor section loss, cracking, spilling or scour
4	POOR CONDITION - advanced section loss, deterioration, Spalling or scour
3	SERIOUS CONDITION - loss of section, deterioration, spelling or scour have seriously affected primary structural components Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present
2	CRITICAL CONDITION - advanced deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken
1	IMMINENT' FAILURE CONDITION - major deterioration or section loss present in critical structural components or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic, but corrective action may put back in light service.
0	FAILED CONDITION - out of service - beyond corrective action

6.3 Minor Bridges

There is one Minor Bridge. This bridge is in good condition. However, Pier cap of existing retained Pier at LHS side has suffered damage due to ageing and has exposed reinforcements. Vegetation growth in both waterway of the bridge is present. The comparative assessment of the minor bridge is presented in the Figure 6-1.

Table 6-2: Detail list of Minor Bridge

S. No	Site Chainage (Km)	Location	Deck Width (m)	Span Arrangement (m)	Type of Expansion joint	Elastomeric bearing (Nos)	Super-structure	Sub-Structure
1	241+171	LHS	14.5	2X6.8	NA	NA	RCC Slab	RCC and Stone Masonry wall
		RHS	14.5	1X13.6	Strip seal	6	Voided slab	RCC wall

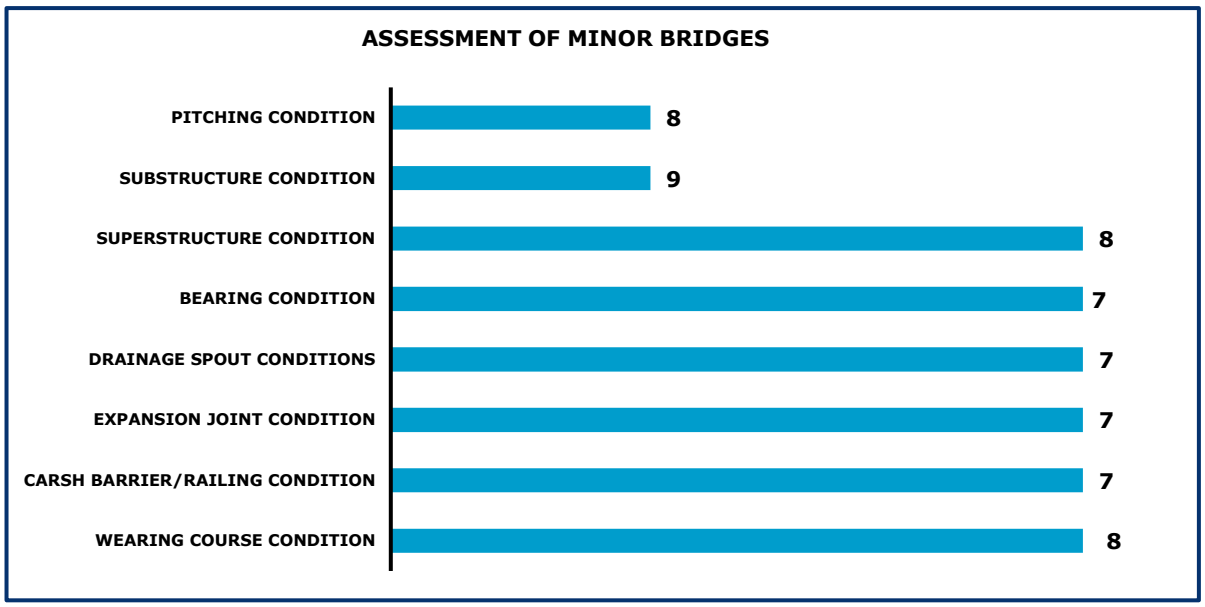


Figure 6-1: Comparative condition assessment of Minor Bridge



Minor Bridge at Chainage 241+116



Minor Bridge at Chainage 241+116



Waterway of Minor Bridge



Pier Cap of Minor Bridge

Figure 6-2: Site Photographs of Minor bridge

6.4 Major Bridges

There is one major bridge on this stretch, which is also in sound structural condition, with minor issues such as debris accumulation, clogged drainage spouts, vegetation growth on the footpath and pier cap, and sealing material at some expansion joints and drainage spouts that needs replacement.

Table 6-3: Details of Major Bridges

S. No	Design Chainage (Km)	Side	Deck Width (m)	Span Arrangement (m)	Type of Super-structure	POT-PTFE Bearings (Nos)	Type of Expansion joint	Expansion joint (Nos
1	247+200	LHS	14.3	10X31.5	PSC Girder with RCC Slab	80	Strip seal	11
		RHS	14.3	10X31.5	PSC Girder with RCC Slab	80	Strip seal	11

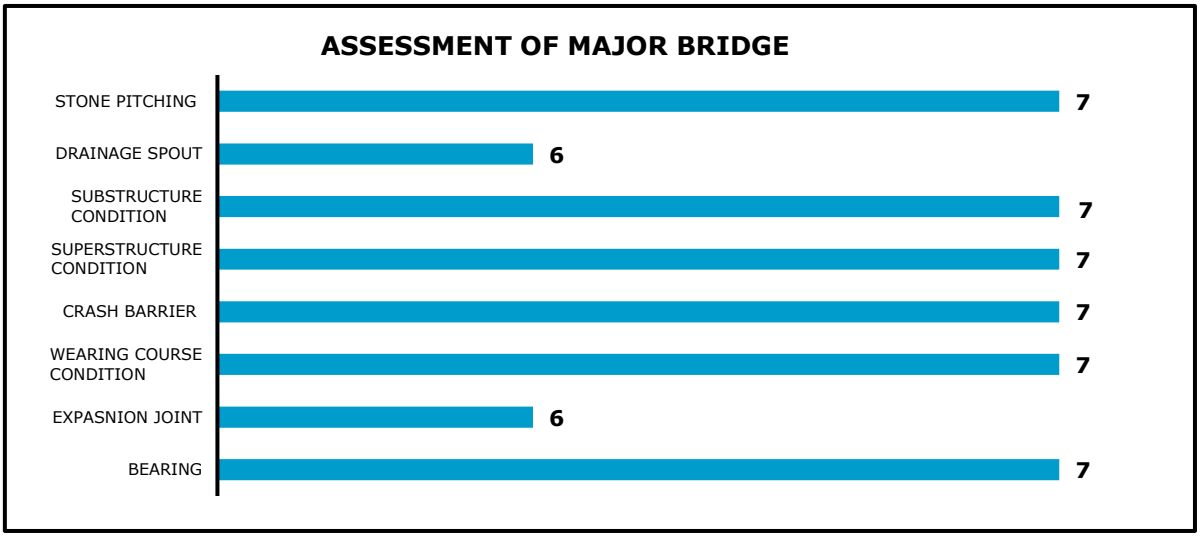


Figure 6-3: Comparative condition assessment of major bridge





Major Bridge at Ch. 247+200



Major Bridge at Ch. 247+200



PTFE Bearing at Major Bridge 247+200



Pier Cap at Major Bridge



Expansion Joint at Major Bridge

Figure 6-4: Site Photographs of Major bridge

6.5 Flyover

There are two flyovers. Both flyovers are in a good state of maintenance. Minor repair and maintenance works, such as cleaning of the carriageway, bearings, expansion joints, and removal of vegetation are required. The sealing material at some expansion joints and drainage spouts that needs replacement.

Table 6-4: Detail list of flyovers

S. No	Chainage	Name of Flyover	Location	Span Arrangement (m)	Type of Super-structure	POT-PTFE Bearing (Nos)	Strips seal Expansion joint (Nos)
1	236+744	Vadakk-encherry	LHS	1X46+14X26	PSC I Girder + PSC Box Girder	118	16
			RHS	1X46+14X26	PSC I Girder + PSC Box Girder	118	16
2	262+738	Mannuthy	LHS	14x30	PSC I Girder	112	15
			RHS	14x30	PSC I Girder	112	15

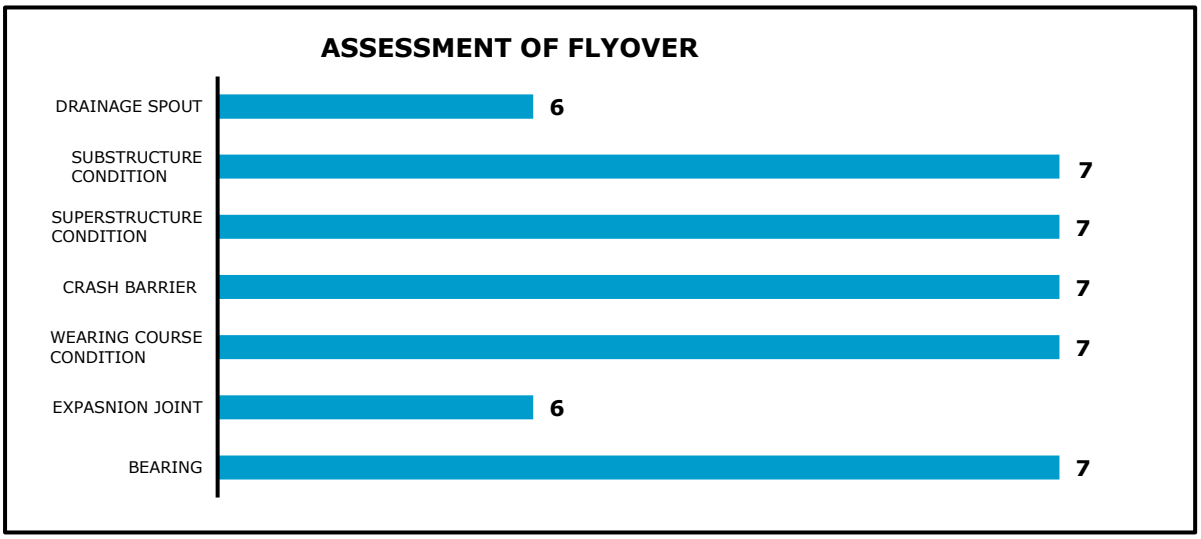


Figure 6-5: Comparative condition assessment of Flyovers



Approach of Flyover at Ch. 236+744



Flyover at Ch. 236+744



Service road at Flyover 236+744



Missing Drainage Spout at Flyover 236+744



Vegetation on Return Wall at Flyover 236+744



Expansion Joint at Flyover 236+744



Approach at Flyover 262+700



Service road at Flyover 262+700

Figure 6-6: Site Photographs of flyovers

6.6 Underpass

There are 12 Nos of underpasses along the project stretch, serving both urbanized and non-urbanized populations on either side of the road. At the time of our visit, 3 underpasses were under

construction at Chainage 244+200, 252+900 and 256+900. The overall condition of these structures is good, with no major structural issues observed. However, routine maintenance is recommended, including cleaning of the carriageway, removing vegetation on walls, and replacing sealing of expansion joints. These repairs will help maintain the functionality and safety of the underpasses.

Details of the underpass structures on the project highway are provided in Table 6-5 below.

Table 6-5: Detail list of Underpasses

S. No	Chainage (Km)	AS per Scope	Structure	Location	Span Arrangement (m)	Super-structure	Elastomeric bearings (Nos)	strip seal Expansion joint (Nos)
1	236+320	Under COS	PUP	LHS	1X7.0	BOX type	0	0
			PUP	RHS	1X7.0	BOX type	0	0
2	236+475		VUP	LHS	1x19.5	RCC Girder	10	2
			VUP	RHS	1x19.5	RCC Girder	10	2
3	238+120		PUP	LHS	1x12x4	BOX type	0	0
			PUP	RHS	1x12x4	BOX type	0	0
4	244+200		VUP	LHS	1X21.20	PSC solid slab	6	2
			VUP	RHS	1X21.20	PSC solid slab	6	2
5	249+320	Under COS	LVUP	LHS	1x12x4	BOX type	0	0
			LVUP	RHS	1x12x4	BOX type	0	0
6	252+900	Extra	LVUP	LHS	1x12x4	BOX type	0	0
			LVUP	RHS	1x12x4	BOX type	0	0
7	254+355	Under COS	VUP	LHS	1X16.80	RCC Girder	10	2
			VUP	RHS	1X16.80	RCC Girder	10	2
8	254+795		VUP	LHS	1X16.80	RCC Girder	10	2
			VUP	RHS	1X16.80	RCC Girder	10	Strip seal
9	256+900	Extra	LVUP	LHS	1x12	BOX type	0	
			LVUP	RHS	1x12	BOX type	0	

S. No	Chainage (Km)	AS per Scope	Structure	Location	Span Arrangement (m)	Super-structure	Elastomeric bearings (Nos)	strip seal Expansion joint (Nos)
10	258+920		PUP	LHS	1x12	BOX type	0	NA
			PUP	RHS	1x12	BOX type	0	NA
11	261+816		PUP	LHS	1x12	BOX type	0	NA
			PUP	RHS	1x12	BOX type	0	NA
12	262+250		VUP	LHS	1X19.5	BOX type	0	Strip seal
			VUP	RHS	1X19.5	BOX type	0	Strip seal

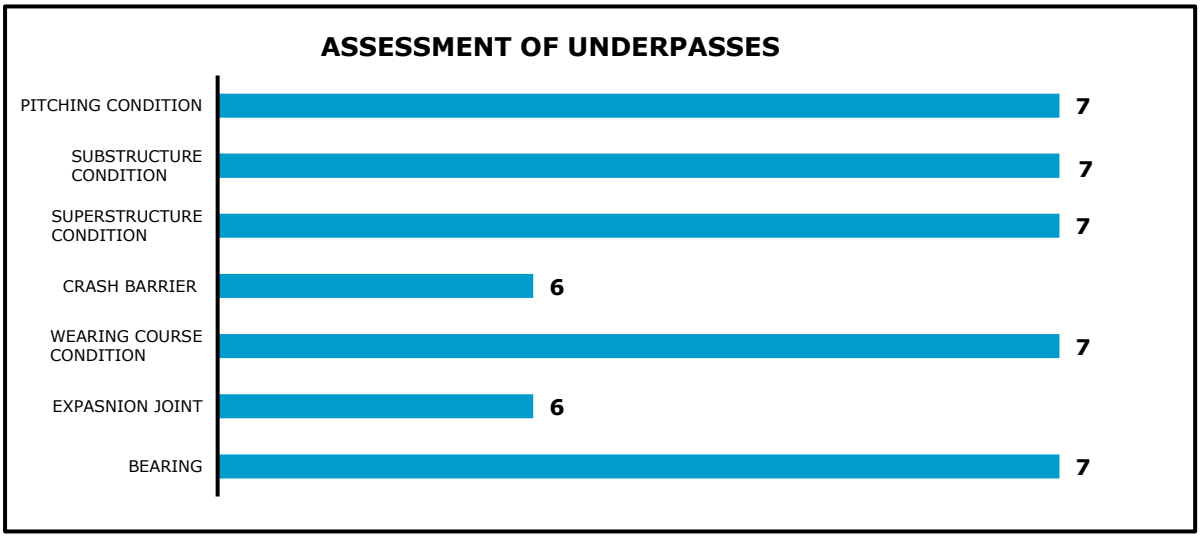


Figure 6-7: Comparative assessment of underpasses



Vegetation on return wall at VUP 236+475



Expansion joint at VUP 236+475


Vegetation on return wall at VUP 249+230


Footpath at VUP 254+390


Vegetation on return wall at VUP 254+810


Expansion Joint at VUP 254+810


Concrete floor of Underpass at Ch. 258+940


Concrete floor of Underpass at Ch. 258+940

Figure 6-8: Site Photographs of Underpass

6.7 Culverts

85 culverts are present along the project stretch, comprising both RCC box culverts and Hume pipe culverts. Visual inspection indicates that the structural condition of these culverts is good. However, maintenance is required to address issues such as debris removal at the inlet and outlet, blockage caused by vegetation, and cleaning of the waterway to ensure smooth drainage.

A few representative photographs of the culverts are provided below to illustrate their current condition and maintenance needs.

Table 6-6: Detail list of Culverts

S. No	Type	Vent way (m)	Vent Height (m)
1	Box	1.500	2.990
2	Box	1.500	2.639

S. No	Type	Vent way (m)	Vent Height (m)
3	Box	1.000	1.500
4	Irrigation	4.000	2.000
5	Box	1.000	1.500
6	Pipe	1.000	1.200
7	Pipe	2.000	1.200
8	Pipe	1.000	1.200
9	Pipe	1.000	1.200
10	Pipe	1.000	1.200
11	Pipe	1.000	1.200
12	Box	2.000	1.600
13	Box	1.500	1.700
14	Box	1.500	1.500
15	Pipe	2.000	1.200
16	Box	3.000	3.000
17	Pipe	1.000	1.200
18	Pipe	1.000	1.200
19	Box	2.100	1.500
20	Box	3.500	3.000
21	Pipe	2.00	1.200
22	Box	1.500	1.500
23	Box	1.500	2.100
24	Pipe	2.000	1.200
25	Box	2.300	1.500
26	Pipe	2.000	1.200
27	Pipe	2.000	1.200
28	Pipe	2.000	1.200
29	Pipe	2.000	1.200
30	Pipe	2.000	1.200
31	Pipe	2.000	1.200
32	Box	6.000	2.500
33	Box	3.500	4.500
34	Box	4.500	4.000
35	Box	3.500	4.000
36	Irrigation	1.000	1.500
37	Box	2.000	3.000
38	Pipe	2.000	1.200
39	Pipe	2.000	1.200

S. No	Type	Vent way (m)	Vent Height (m)
40	Box	5.000	2.000
41	Box	2.200	1.500
42	Box	2.200	1.500
43	Pipe	2.000	1.200
44	Box	2.000	1.500
45	Pipe	2.000	1.200
46	Box	2.000	1.500
47	Box	2.000	1.700
48	Box	1.500	1.800
49	Box	1.500	1.500
50	Box	6.000	3.200
51	Box	1.000	2.000
52	Box	2.000	1.500
53	Box	1.000	3.000
54	Box	1.500	2.300
55	Box	2.500	2.000
56	Box	1.500	1.600
57	Pipe	2.000	1.200
58	Pipe	1.000	1.200
59	Pipe	1.000	1.200
60	Box	6.000	2.650
61	Box	1.000	1.500
62	Box	4.500	2.200
63	Box	1.800	2.100
64	Box	2.000	1.500
65	Box	1.500	1.700
66	Pipe	2.000	1.200
67	Box	1.150	1.700
68	Irrigation	1.600	1.500
69	Box	1.200	1.700
70	Irrigation	4.000	1.700
71	Box	3.000	3.400
72	Pipe	1.000	1.200
73	Box	1.000	1.500
74	Pipe	2.000	1.200
75	Pipe	2.000	1.200
76	Pipe	2.000	1.200

S. No	Type	Vent way (m)	Vent Height (m)
77	Box	1.500	1.600
78	Irrigation	1.500	1.500
79	Pipe	1.000	1.200
80	Box	1.000	1.500
81	Box	1.500	1.500
82	Box	1.000	2.041
83	Box	1.000	1.500
84	Box	3.000	2.235
85	Box	1.500	1.200

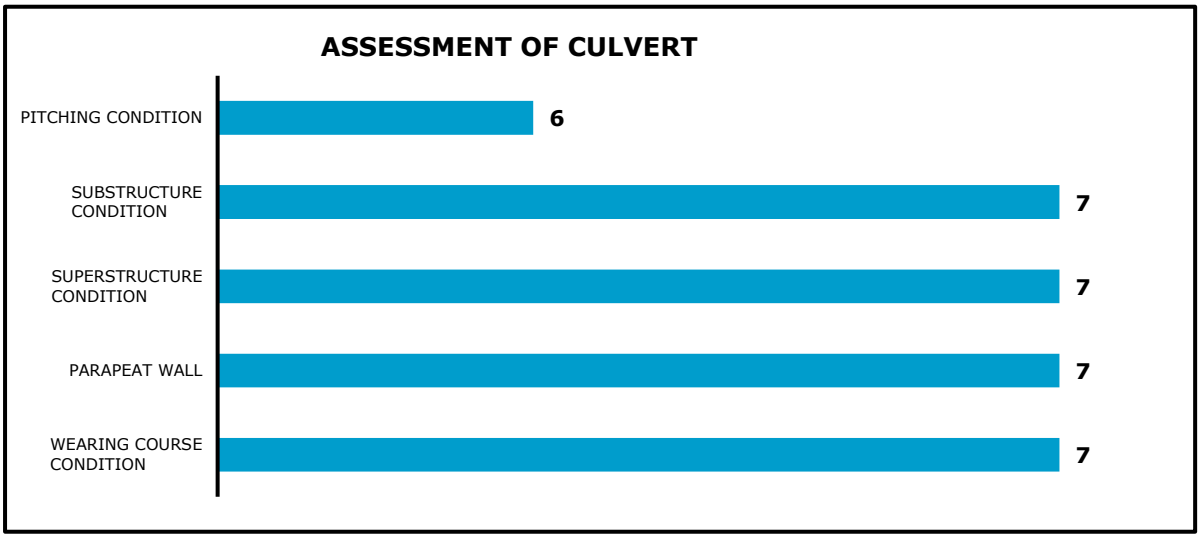


Figure 6-9: Comparative assessment of Culverts



Box Culvert at Ch. 244+661



HPC at Ch. 245+807 Covered with Vegetation



Box Cul. at 245+807 Covered with Vegetation



Hazard marker damaged at Box Cul. 262+942

Figure 6-10: Site Photographs of Culverts

6.8 General Observations

All the structures are visually inspected to check for issues such as cracks, spalling (surface flaking), stains, deformation, leaching, exposed reinforcement, honeycombing, and the condition of expansion joints, wearing coat, approach slabs, drainage systems, and damaged railings.

The damages found during the inspection can be restored through routine / preventive maintenance. However, no major structural distress is observed in any of the structures within the project packages. The general issues observed are summarized below:

- Growth of vegetation on the structures and in waterway areas
- Clogged drainage spouts.
- Minor Damage observed on crash barriers.
- Exposed reinforcement seen at the Pier cap of Minor Bridge
- Minor honeycombing on wall of Underpass
- Debris under culverts due to poor maintenance of waterways

These issues need routine cleaning, vegetation removal, and minor repair works to improve the overall condition and ensure the durability of the structures.

6.9 Routine maintenance and minor repair

Spalling of Concrete and Honeycombing:

Spalling of concrete, which often requires patching, is typically caused by corrosion of steel reinforcement. Honeycombing, on the other hand, occurs due to inadequate compaction of concrete during casting. While patching is a common repair method for spalled areas, it is considered a temporary solution unless all chloride-contaminated concrete is removed first.

For spalling the repair involves applying polymer cement repair mortar to the affected area, after the surface has been treated with an appropriate bonding agent and the corroded reinforcement (rebar) has been coated with anticorrosion paint. Proper curing of the repaired area is essential for effective results.

Table 6-7: Remedial Measure Methods

S. No.	Name of Component	Type of Distress as per IRC: SP:35 -1990	Remedial measures as per IRC: SP:40-2019	Repair Action (Required / Not Required)
1	Girders Beams, crash barrier, sub-structure and Slabs etc.	Cracking Delamination Spalling Disintegration	• Sealing of crack / porous concrete with Epoxy Grout by injection. • Applying epoxy mortar over leached, honey combed and spalled concrete surface and exposed steel reinforcement.	Not Required.
2	Abutment, Pier Abutment caps and Pier caps	Disintegration cracks, spalling, honey combing etc.	• Crack filling, • Concrete restoration (The surface honeycomb can mitigate by removing the honeycomb part and grouting) • Structural Strengthening (Jacketing, CFRP etc.)	Required
3	Expansion Joints	Non-functioning of joints due to Clogging or wearing out and failure of anchoring system,	• Cleaning • Replacement • Covered expansion joint need to be open.	Required
4	Handrails, Parapets & Crash Barriers	Damage (Spalling, Disintegration and cracking etc).	• Repair & Replacement	Required.
5	Drainage Spouts and Vest Holes	Damage and non-functioning	• Cleaning required.	Required.
6	Footpaths	Damage and non-functioning.	• Cleaning required	Required

7. ASSESSMENT OF PROJECT ASSETS - TOLL SYSTEMS

7.1 General

Technical Due Diligence of the TMS (Toll Management System), ATMS, ETC (Electronic Toll Collection System) and WIM (Weigh-in-Motion) System (as available) along 6 lane Vadakanchery - Thrissur section of NH-47 in the state of Kerala is done through site visits, site surveys, interactions at site and review of documents and reports.

7.2 Project Information

Toll Plaza at Km 239+030

No. of Lanes at each Toll Plaza

- TP is with 18 Hybrid lanes at the toll plaza, no separate two-wheeler lanes are provided adjacent to the extra-wide lanes.

7.3 Toll System Maintenance

The Toll Management System (TMS) was originally installed by M/s Arya Omnitalk in the year 2017. Since its installation, the system has been operating under an Annual Maintenance Contract (AMC) with the same system integrator for the past seven years. The AMC has been continuously extended and remains active to date, covering the operation and maintenance of the TMS across all lanes at the Toll Plaza.

7.4 WIM system

The Toll Plaza is equipped with Slow Speed Weigh-In-Motion (SSWIM) systems installed in 16 lanes and Medium Speed Weigh-In-Motion (MSWIM) systems in 2 lanes, all supplied and installed by M/s Vishwakarma Scales. However, it has been observed that none of these WIM systems are currently functional. The specific installation date of these systems is not available in the records. Given their non-functional status and potential obsolescence, it is recommended that the entire set of WIM systems be replaced to restore the intended axle load enforcement and vehicle classification functionalities at the plaza.

No stamping certificate present at any site for Weigh in Motion Systems installed at Toll Plaza and is in direct non-compliance to the Weight and Measurements department norms and can have legal implications.

7.5 SWB (Static Weigh Bridge)

Total 2 No. Static Weigh Bridge are required to be installed (one in each direction) at the Toll Plazas however none are installed and currently at LHS one SWB civil works are in progress and on the other side (RHS) there is no space for SWB installation

7.6 ATMS System

ATMS is not installed and functional in this section of the highway.

7.7 Review and Assessment of TMS (incl. AVCC Systems)

1. TMS maintenance at the toll plaza is being done by i.e. M/s Arya Omnitalk, for all the toll equipment with open tolling technology and is in the AMC since last 7 years.
2. Lane hardware is provided as per the industry standards however is end of life, critical components required to check the vehicle classification e.g. AVC in all lanes are getting rusted, the AVC and TLC panels installed over the booth top are exposed due to excessive heat and maintenance is difficult due to accessibility issues.

3. The MS-WIM and SWB to detect and collect overload penalty as per the government norms are not functional and all overloaded vehicles are moving through the lanes freely.
4. The network is Ethernet based and is provisioned with a backbone connectivity through OFC in parallel, this is provisioned to prevent any data loss in case the primary link from plaza to lanes becomes faulty and which will further prevent any data loss.
5. Fastag integration is done through IDFC as an Acquirer bank and ILL is established for round the clock connectivity.

7.8 Assessment of Toll Operation and integration with TMS

The AVC is profiler based with independent storage but not sending data if the lane controller if put down for maintenance and in such cases the control room staff is completely dependent on toll collectors' input for validation of all discrepancies, Violations etc.

The LSDU i.e. Lane Status Display Unit to monitor the entire hardware of each lane is provided which is an essential part for monitoring of the toll equipment on day-to-day basis and generating all alerts.

7.9 Backoffice TMS review

a. The TMS is controlled through the control room which is housed with the validator performing real time transaction validations.

b. LSDU as stated above is working properly and equipment status / failures are well known to the shift supervisor.

c. As per the guidelines of IHMCL, the plaza server must be installed with a hot-standby server arrangement and provided accordingly.

d. No fake note detectors installed in the lane to detect counterfeit currency.

7.10 Conclusion

The complete TMS systems need to be replaced to as the equipment is obsolete at the toll plaza.

The WIMs and SWBs need replacements as none of them are found functional and information to the weights and measurements department must be given about nonfunctional WIMs and SWB to avoid any penal action on account of no stamping done for any WIMs and SWBs till date.

7.11 Cost estimates

a. Assessment of Immediate Repair Cost

Considering that the toll plaza equipment is currently under an Annual Maintenance Contract (AMC), and that a comprehensive replacement of the entire Toll Management System (TMS) has been recommended upon the expiry of the AMC, only the immediate repair works—those not covered under the scope of the AMC, like Toll lane controller, Automatic Vehicle Classification System, Automatic Boom Barrier, Weigh in Motion and SWB, are proposed to be undertaken at this stage. These necessary repairs, required to ensure continued operation of the system until the TMS is fully replaced, have been identified and included in the cost estimate.

b. Assessment of Total Replacement Cost of TMS Equipment

The TMS replacement cost for 18 Lane TP is estimated and included in Periodic Maintenance cost.

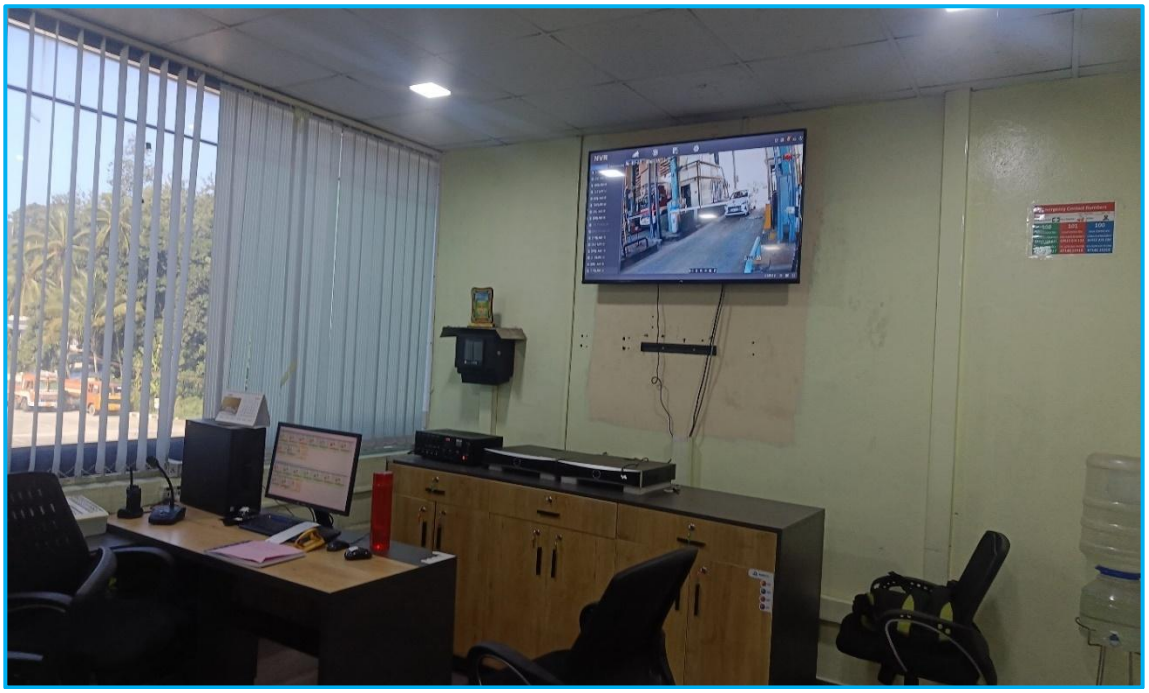
c. Assessment of AMC Cost

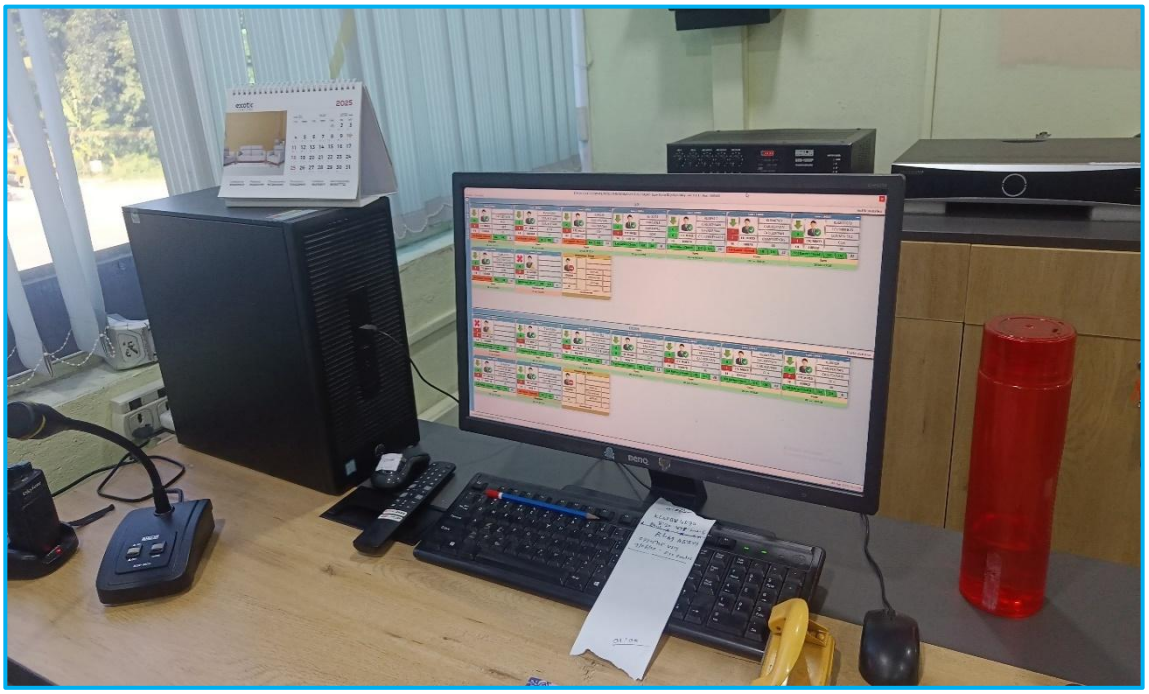
Though there is no AMC document provided for reference, however the same has been considered as 10% of the replacement cost at each toll plaza.

Figure 7-1: Typical Site Photographs of Toll Plaza & Equipment

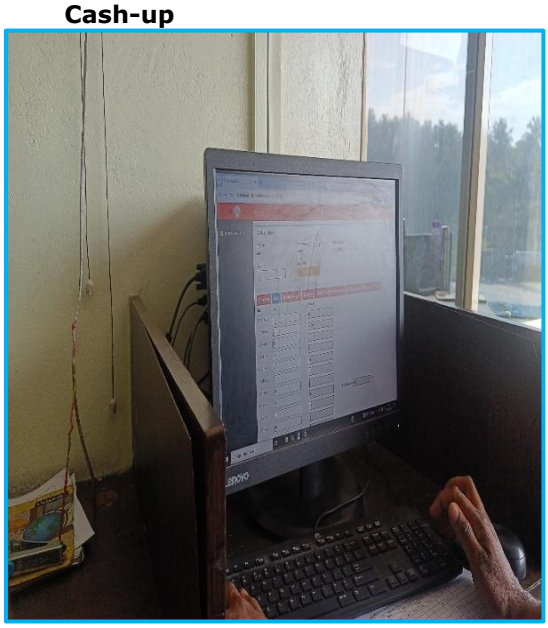


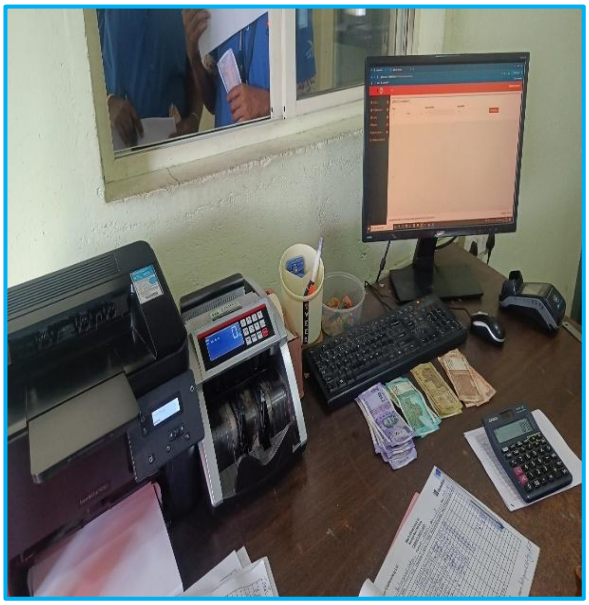
Control Room





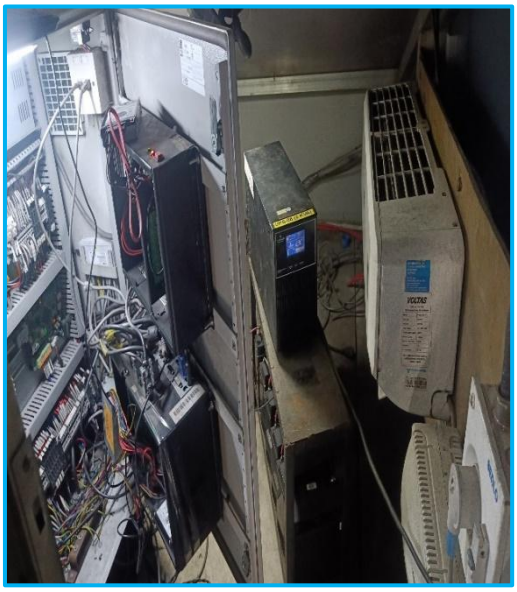
Cash-up

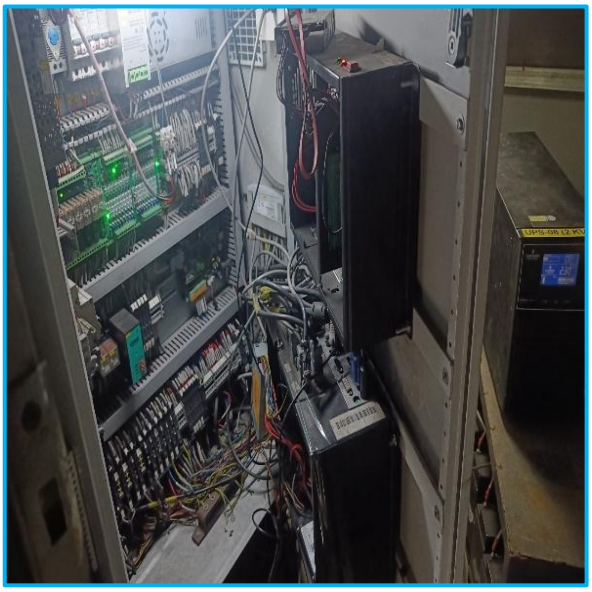






Lane Controller installation over the toll booth

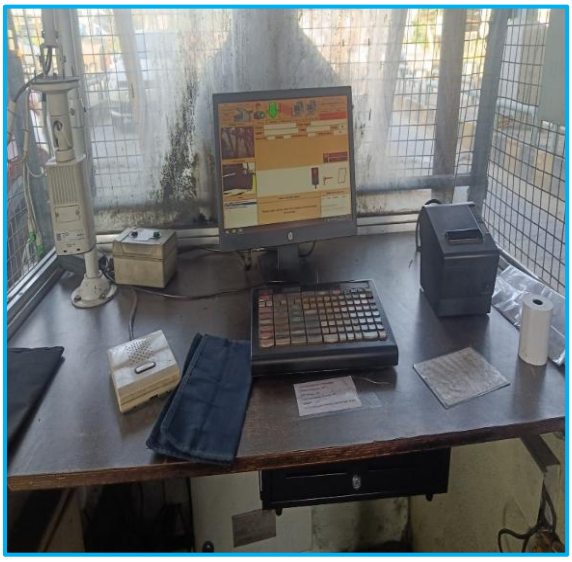


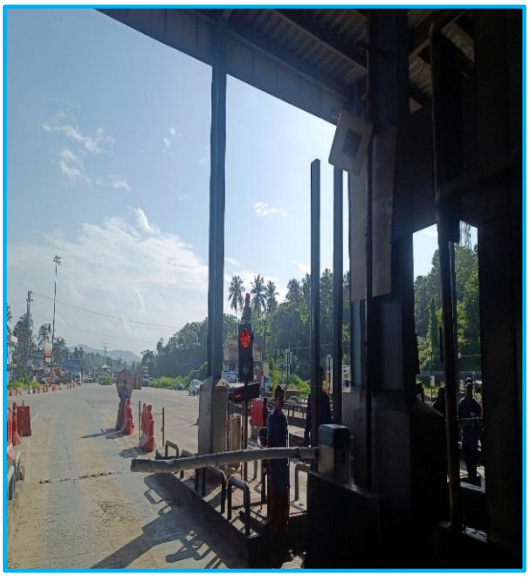


Equipment installation inside the toll booth









WIM Installation





SWB material and ongoing civil works







AVC Tower (rusted)



8. SOIL AND MATERIAL INVESTIGATION

8.1 General

As part of the soil and material investigation for the project, the consultants have undertaken a series of tests on subgrade soils, granular layers, and bituminous layers along the project corridor to evaluate the engineering characteristics and in-situ condition of the existing pavement materials.

8.2 Field investigation – sampling and testing

Field tests were conducted on the subgrade soils and required pavement materials were collected for testing. Table 8-1 presents the sampling criteria, tests and testing procedures adopted for various field and laboratory tests.

Table 8-1: Site sampling and testing criteria

S. No.	Type of Soil Sample	Sampling Criteria	Testing Criteria	
			Description of Test	**Standard Code Applicable**
Existing subgrade and pavement materials				
i)	**Subgrade Strength Test Pits**	Minimum of one subgrade soil sample was obtained at an interval directed by the client & Material Engineer based on site condition.	In-situ Density	IS 2720 (Part – 29)
			In-situ moisture content	IS 2720 (Part – 2)
			Soil Classification	IS 1498
			Sieve Analysis	IS 2720 (Part – 4)
			Atterberg Limits	IS 2720 (Part – 5)
			Laboratory Compaction Test (using heavy compaction)	IS 2720 (Part – 8)
			Field Compaction	IS 2720 (Part-29)
			4-days soaked CBR	IS 2720 (Part – 16)
			Free swell Index	IS 2720 (Part-40)
ii)	**Existing Granular Layers**	Existing granular layer materials was collected from each subgrade test pit at an interval directed by client	Gradation	MoRTH Table: 400-1 & 400-13
			Atterberg Limits	IS 2720 (Part – 5)
			Specific Gravity and Water Absorption	IS 2386 (Part – 3)
			Aggregate Impact Value (AIV)	IS 2386 (Part – 4)
iii)	**Existing Bituminous Layers**	Existing bituminous layer's material was collected through core cutting process at specific intervals as directed by the pavement engineer	Gradation	MoRTH Table: 500-10 & 500-17
			Density of core	ASTM D 2726
			Bitumen extraction	ASTM–D 2172

8.3 Subgrade sampling and testing

Subgrade investigations were undertaken to evaluate the strength characteristics of the in-situ soil. As outlined in Table 8-1, subgrade strength test pits were excavated at intervals determined by the client and the materials engineer, considering prevailing site conditions. A combination of in-situ and laboratory tests were conducted on the collected soil samples in accordance with the relevant standards summarized in Table 8-1.

The test results and discussion are described in the section below.

Field tests were conducted as per the project requirement to determine the subgrade characteristics and strength. The field testing for subgrade soil at each test pit includes the following,

- In-situ density determination using Core-cutter method
- Field moisture content determination using Rapid moisture meter
- In-situ CBR Determination using the Dynamic Cone Penetrometer testing

8.3.1 In-Situ CBR (Dynamic Cone Penetration Test)

Dynamic Cone Penetration tests were conducted at subgrade strength test pit locations to assess in-situ CBR on existing soil. The CBR value was calculated based on different soil layers encountered. The slope change in the graph (Penetration Vs Number of Blows) indicates the interface of two layers of different penetration resistance. From the graph, thickness of layer and slope (penetration mm/blow) were calculated. The following equation given in IRC: 37-2012 has been used to calculate the layer DCP-CBR value for each layer:

$$log_{10}\, CBR = 2.465 - 1.12 \times log_{10}(mm/blow)$$

Once the DCP-CBR calculated for each layer, the overall CBR (Weighted average) of all sub-layers will be converted into single DCP-CBR values by using Japan road association formula 1989 as given below:

$$Overall\ CBR = \left\{ \sum layer\ thickness \times (DCP - CBR)^{1/3} \Big/ \sum layer\ thickness \right\}^3$$

Dynamic Cone Penetration test results showing penetration of cone in cm and number of blows at each pit are plotted.

A summary of the DCP-derived CBR values is provided in Table 8-2, and an illustrative bar diagram depicting the spatial variation of DCP values across the project corridor is presented in Figure 8-2. Some of the Field investigation photographs of DCP-CBR are shown in Figure 8-1.



Figure 8-1: Field Investigations photographs of DCP-CBR

In general variations in DCP-CBR values are expected due to the influence of several site-specific factors. The penetration resistance of the DCP cone can be significantly affected by the prevailing in-situ moisture content, the presence of underlying layers beneath the subgrade, and obstructions such as boulders or tree roots. Typically, DCP-CBR values tend to increase with a reduction in in-situ moisture content, and conversely, higher moisture levels can result in lower CBR values. Additionally, if the DCP cone encounters obstructions such as stones or boulders, the measured resistance increases, leading to abnormally high CBR estimations.

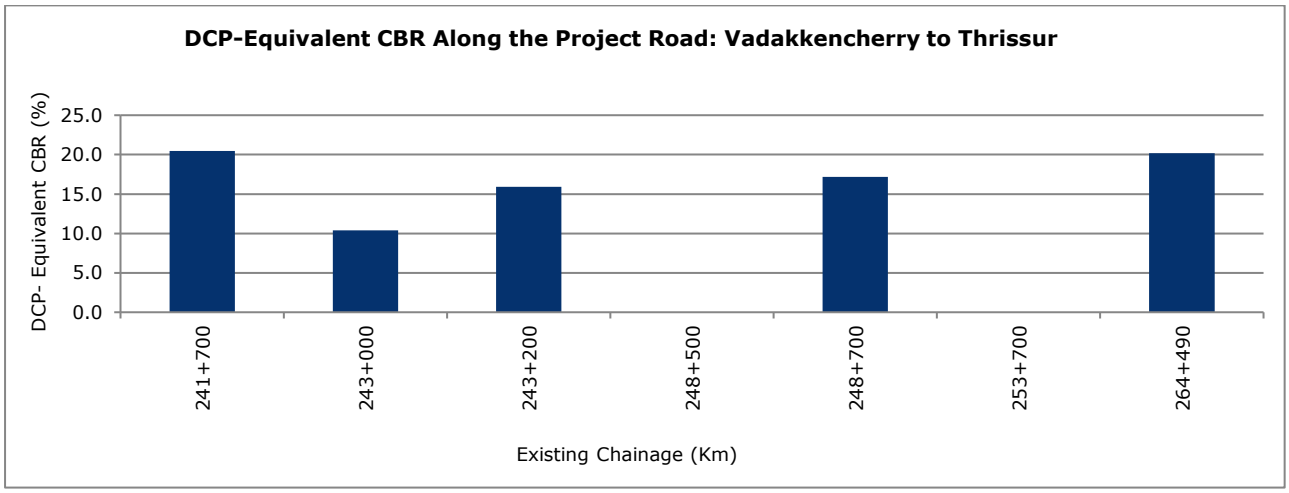


Figure 8-2: Illustrative summary of DCP-Equivalent CBR along the project corridor.

Note: In the chart above, Ch.248+500 and 253+700 samples are not collected due to site constraints

8.3.2 Field Density & Moisture Content

In-situ density (field dry density) and moisture content of the subgrade were determined in accordance with the applicable standards listed in Table 8-1.

The field density measurements were utilized to assess the degree of compaction achieved in the existing subgrade, and to determine the in-situ California Bearing Ratio (CBR) under field density conditions. A consolidated summary of the field test results for the entire project corridor is presented in Table 8-3. Representative photographs of the investigation are shown in Figure 8-3.



Figure 8-3: Field Investigations photographs.

Table 8-2: Statistical Summary of Field Test Results

Chainage (km)			FMC (%)			FDD (gm/cc)			DCP-CBR (%)		
Road	From	To	Min	Max	Avg.	Min	Max	Avg.	Min	Max	Avg.
NH-47	236.135	264.490	6.0	7.0	6.5	1.83	1.94	1.88	10.4	21.4	17.6

8.3.3 Subgrade Test Results

Approximately 50kg of Subgrade samples were collected in damp proof bags for needful laboratory testing. Required laboratory testing as specified in Table 8-1 were conducted and the summary of the test results are furnished in Table 8-3.

Table 8-3: Summary of Subgrade Test Results

S. No	Existing Road	Existing Chainage (Km.)	Side (LHS/ RHS)	Soil Classification as per IS: 1498	Gravel content %	Sand content %	Clay & silt content %	Atterberg Limits [IS :2720-Pt-V]			Modified Proctor Test (IS:2720-Pt-VIII)		Field Density		4-Days Soaked CBR at MDD (%)	Free Swell Index (%)	Degree of Compaction (%)
								Liquid Limit (LL) %	Plastic Limit (PL) %	Plasticity Index (PI)	Max. dry density (gm/cc)	OMC (%)	Field Dry Density (gm/cc)	FMC (%)			
1	NH-47	237+500	LHS	SM	5.9	67.9	26.2	24	NP	NP	1.95	9.1	1.87	6.0	13.7	10.0	95.9
2	NH-47	241+750	RHS	SM	15.0	60.8	24.2	19	NP	NP	2.07	8.5	1.91	7.0	16.4	11.1	92.3
3	NH-47	243+000	LHS	SM	7.7	64.6	27.7	22	NP	NP	2.03	9.0	1.89	7.0	13.1	0.0	93.1
4	NH-47	243+200	RHS	SM-SC	11.7	54.8	33.5	25	19	6	1.95	9.5	1.83	6.0	10.9	12.5	93.8
5	NH-47	248+500	LHS	Adequate sample was not collected due to rocks present in the subgrade													
6	NH-47	248+700	RHS	MI	7.4	29.7	62.9	25	NP	NP	1.93	9.2	1.83	7.0	11.2	10.0	94.8
7	NH-47	253+700	LHS	SM	18.5	65.0	16.5	20	NP	NP	2.11	9.1			26.1	0.0	
8	NH-47	264+490	RHS	SM-SC	29.7	44.4	25.9	25	19	6	2.03	9.6	1.94	6.0	13.8	9.1	95.6

- For Sl. No 7 - Field tests are not conducted due to water percolation into the subgrade

Observations and Conclusions

Soil Classification and Distribution

From Table 8-3, it is evident that subsoil is generally consistent throughout the project road and is predominantly Sandy soils, at one location silty with intermediate compressibility soil is observed. Because of this soil type, Liquid Limit (LL) is ranging between 19%-25%, and these values are within the limit as per MoRTH specifications (<50%).

The obtained maximum Plasticity Index of the subgrade soils is 6% and the degree of free swell (FSI) is 12.5%. All the measured PI and FSI values are also within the acceptable limits as per MoRTH guidelines, of 25% and 50%, respectively.

Strength parameters:

Variance between MDD and FDD is converted in-terms of degree of compaction. The degree of compaction along the project corridor is ranging between 92.3% - 95.9%. The 4-days soaked CBR along the project corridor is ranging from 10.9% to 26.1% with an average value of 15.0%.

8.4 Existing pavement composition

Existing pavement composition (pavement course, material type, and thickness) were recorded at an interval directed by the client & material engineer based on the site condition along the project road.

The summary of existing pavement crust thickness is presented in a tabular form as well as an illustrative bar graph in Table 8-4 and Figure 8-5 respectively and the pavement crust thickness photographs are shown in Figure 8-4.

Table 8-4: Summary of pavement crust along the project corridor

S. No.	Location (Km.)	Side (LHS/ RHS)	Pavement Composition (mm)					Remarks
			Bituminous Layer	Soil/ Morrum	WMM	GSB	Total Thickness	
1	237+500	LHS	190		200	300	690	
2	241+750	RHS	160		240	180	580	
3	243+000	LHS	120	100	220	170	610	
4	243+200	RHS	200		130	170	500	
5	248+500	LHS	240		200	210	650	Sample was not collected due to the presence of rocks in the Subgrade
6	248+700	RHS	100	100	230	200	630	
7	253+700	LHS	180		210	200	590	Seepage of water is observed in subgrade
8	264+490	RHS	140		290	200	630	



Figure 8-4: Sample Pavement Crust Thickness measuring photographs.

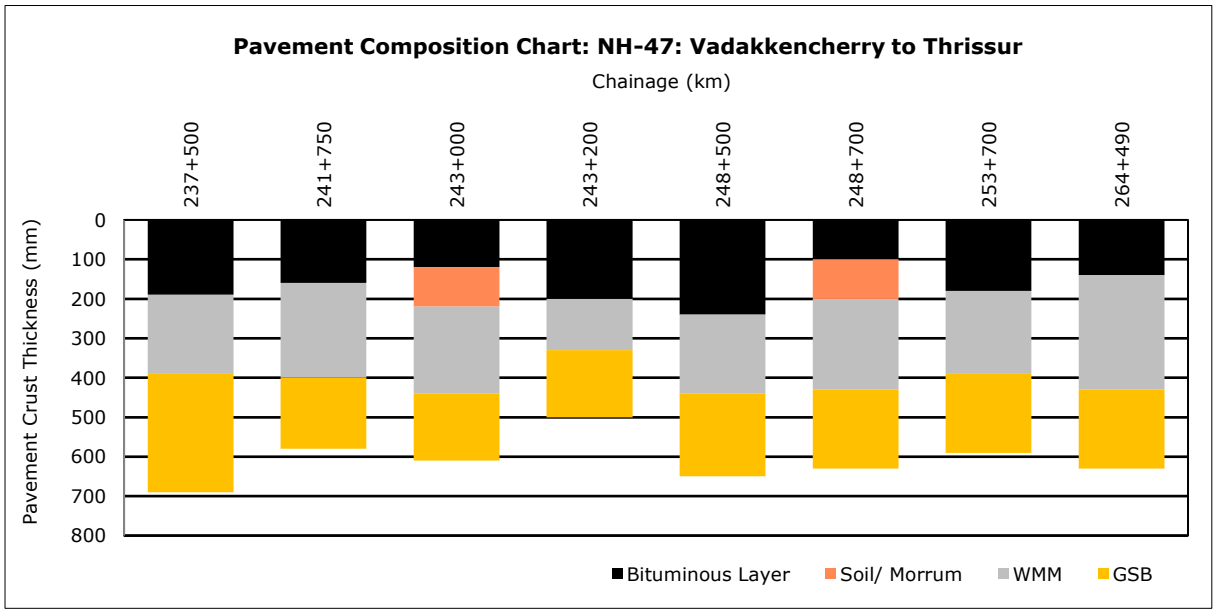


Figure 8-5: Existing Pavement Crust Summary along the project road.

8.4.1 Summary of Pavement test pit results

- The existing pavement along the project corridor is flexible in nature. The pavement composition comprises of bituminous layer, granular base over the granular sub-base.
- Throughout the project road it possesses consistent bituminous/ granular layer thickness with an average of 166mm bituminous layer over the average Granular course of 419mm were observed.
- At two locations (km.243+000 LHS, km.248+700 RHS) 100mm soil/Morrum layer is observed.

8.5 Existing granular layers testing

Granular layer's samples were collected at an interval directed by the client & Material Engineer based on the site condition along the project road. Care has been taken to collect the appropriate granular layer like WMM/ GSB separately from the excavated test pit. Sufficient sample is collected for testing as mentioned in Table 8-1.

The granular material test results are shown in Table 8-5.

Table 8-5: Summary of Granular layers Test Results

S. No	Chainage (km)	Side (LHS/ RHS)	Type of Sample	Gradation Conformation as per MoRTH 5th Revision	Atterberg Limits			Specific Gravity	Water Absorption (%)	Aggregate Impact Value (%)
					Liquid Limit (LL) %	Plastic Limit (PL) %	Plasticity Index (PI)			
1	237+500	LHS	WMM	11.2mm IS sieve material coarser side in WMM gradation	19	NP	NP	2.757	0.48	28.9
2	241+750	RHS	GSB	Confirming to GSB grade-III & IV	22	NP	NP	2.727	0.63	35.5
3	243+000	LHS	GSB	0.075mm IS sieve material finer side in GSB grade-IV	24	NP	NP	2.769	0.46	35.9
4	243+200	RHS	WMM	Not confirming to WMM gradation	21	NP	NP	2.793	0.55	30.5
5	248+500	LHS	WMM	Not confirming to WMM gradation	20	NP	NP	2.731	0.47	28.5
6	248+700	RHS	GSB	0.075mm IS sieve material finer side in GSB grade-III & IV	19	NP	NP	2.783	0.50	34.1
7	253+700	LHS	GSB	53.0mm, 26.5mm IS sieves material coarser side in GSB grade-III & IV	20	NP	NP	2.778	0.52	33.8

S. No	Chainage (km)	Side (LHS/ RHS)	Type of Sample	Gradation Conformation as per MoRTH 5th Revision	Atterberg Limits			Specific Gravity	Water Absorption (%)	Aggregate Impact Value (%)
					Liquid Limit (LL) %	Plastic Limit (PL) %	Plasticity Index (PI)			
8	264+490	RHS	WMM	22.4mm IS sieve material coarser side in WMM gradation	19	NP	NP	2.795	0.47	31.6

8.6 Existing bituminous layers testing

Bituminous layer samples are collected by using a 100mm diameter core cutting drilling machine to obtain the bituminous core specimens. The details of collected core specimens are given in Table 8-6. Tests are performed on the collected bituminous core specimens, as mentioned in Table 8-1. The test results summary are shown in Table 8-7, and few of the bituminous core extracted samples photographs are shown in Figure 8-6.

Table 8-6: Bituminous Layers Core cutting locations.

S. No	Existing Road	Location (km)	Side (LHS/ RHS)	Lane	Wheel path	Height of Core (mm)
1	NH-544	237+500	LHS	Outer	LWP	190
2	NH-544	240+150	RHS	Inner	LWP	150
3	NH-544	240+700	RHS	Middle	LWP	220
4	NH-544	241+550	LHS	Middle	RWP	280
5	NH-544	241+600	RHS	Outer	RWP	180
6	NH-544	246+650	LHS	Inner	LWP	200
7	NH-544	251+550	RHS	Middle	LWP	220
8	NH-544	255+350	LHS	Inner	LWP	160
9	NH-544	261+350	RHS	Inner	RWP	160
10	NH-544	263+650	LHS	Outer	RWP	230



Figure 8-6: Core Cutting Investigation photographs.

Table 8-7: Summary of Bituminous Layers Test Results

S. No	Location (Km.)	Side (LHS/ RHS)	Lane	Wheel path	Type of Material Tested	Source of Sample	Bitumen Content (%)	Bulk Specific gravity	Gradation Confirming to MoRTH 5th Revision
1	237+500	LHS	Outer	LWP	DBM	Core	4.27	2.475	4.75mm Is sieve coarser side in DBM grade-II
2	240+150	RHS	Inner	LWP	BC	Core	5.01	2.478	13.2mm IS sieve material finer side in BC grade-I
3	240+700	RHS	Middle	LWP	DBM	Core	3.89	2.476	2.36mm and 0.075mm Is sieves coarser side in DBM grade-II
4	241+550	LHS	Middle	RWP	BC	Core	4.98	2.471	13.2mm IS sieve material finer side in BC grade-I
5	241+600	RHS	Outer	RWP	DBM	Core	4.27	2.465	2.36mm and 0.075mm Is sieves coarser side in DBM grade-II
6	246+650	LHS	Inner	LWP	BC	Core	5.07	2.442	13.2mm IS sieve material finer side in BC grade-I
7	251+550	RHS	Middle	LWP	BC	Core	5.40	2.460	13.2mm IS sieve material finer side in BC grade-I

S. No	Location (Km.)	Side (LHS/ RHS)	Lane	Wheel path	Type of Material Tested	Source of Sample	Bitumen Content (%)	Bulk Specific gravity	Gradation Confirming to MoRTH 5th Revision
8	255+350	LHS	Inner	LWP	DBM	Core	3.69	2.457	2.36mm and 0.075mm Is sieves coarser side in DBM grade-II
9	261+350	RHS	Inner	RWP	BC	Core	5.46	2.448	13.2mm IS sieve material finer side and 2.36mm IS sieves material coarser side in BC grade-I
10	263+650	LHS	Outer	RWP	DBM	Core	4.26	2.470	2.36mm and 0.075mm Is sieves coarser side in DBM grade-II

9. PAVEMENT EVALUATION STUDIES

9.1 Pavement condition survey with Network Survey Vehicle

9.1.1 Network Survey Vehicle Description

Road Runner NSV (Network Survey Vehicle) has been deployed to collect condition data along the project corridor. Road Runner NSV is a multi-functional and high-precision road survey equipment capable of capturing a wide spectrum of pavement and roadway asset information at highway speeds. It is specifically designed to facilitate non-intrusive, continuous, and efficient data collection across large-scale road networks.

Road Runner NSV can collect roughness, rutting, pavement distresses, assets along with GPS coordinates and project chainage.

The main components which are integrated into Road Runner NSV are.

- Digital Laser Profilers (DLP) -Road roughness and rutting.
- Digital Imaging System (DIS) -Pavement distresses and road assets data.
- Differential Global Positioning System (DGPS).
- High Resolution Distance Measuring Instrument (HRDMI).



1. Digital Laser Profiler (DLP)

- DLP is integrated into the NSV consisting of eleven lasers to collect Road Roughness and Rutting.
- This inertial profiler can record the data continuously along each wheel path.

(a) Roughness

Road Runner NSV equipment fitted with dual wheel path laser profilometer to collect the roughness data. The roughness data was collected and reported for 100 m interval.

The outputs of the lasers and accelerometers located in each wheel path (750 mm either side of the Centre line of the vehicle) are sampled every 25 mm of longitudinal travel and used to calculate the longitudinal profile of the road.

The profile is then passed through the quarter car model to calculate the International Roughness Index (IRI) lane roughness as per the methodologies specified in the ASTM E-950.

(b) Rutting

Rutting will be measured and reported through DLP, and the data will be recorded at every 100m interval on both the wheel paths.

2. Digital Imaging System (DIS)

Digital Imaging System (DIS) in Network Survey Vehicle (NSV) consist of 5 high resolution roof mounted cameras to capture pavement distresses and road assets data. These cameras are oriented in a certain configuration to ensure that the information of interest, such as inventory or pavement condition, is being recorded in the camera field of view. Three cameras are forward facing and mounted on front side of vehicle (Left corner, Centre and Right corner), covers 160o angle images and are set to sample at every 10m interval. Another two cameras are mounted on back side of the vehicle (Left corner, Right corner) to capture the distress image of pavement 10m*4m (length*width) i.e., captures at 10m interval.

Digital image system is capable of

- Collecting real time digital images.
- Achieving a sampling rate of at least one set per 2.5 meters for Distress camera's and one set per 10 meters for Asset cameras.
- Incorporating real time differentially corrected GPS (DGPS).
- Capturing & recording at highway speeds.
- Providing real time on-screen displays for operator verification during collection.
- Storing images straight to PC's / NAS (Network Attached Storage).
- Linking into the client's referencing system via distance and GPS.

3. Geo Referencing (DGPS Data)

The Road Runner NSV is equipped with a Differential GPS (DGPS) system, enabling accurate geo-referencing of collected data. All pavement condition data and images are captured along with corresponding spatial coordinates. Each image is tagged with precise latitude and longitude values, allowing direct referencing and correlation with specific locations on the roadway.

4. Distance Measuring Instrument (DMI)

Road Runner NSV is equipped with DMI, and it is fitted to rear tyre of the network survey vehicle. The distance and speed measurement performed by the distance measuring instrument, which is a distance transducer and it's highly accurate providing GPS distance and speed.





9.2 Methodology for NSV Field Testing

Usually, 4 members are assigned for site to collect the field data. Two of the trained/ experienced field engineers and two drivers during the collection phases of projects. During the survey, engineer

is responsible for operating the vehicle's acquisition systems. Road Runner NSV dashboard tool is used to for data acquisition.

The survey will be carried out by lane wise, and the following steps will be followed during the survey.

- Engineer will setup the equipment and check the data collection system prior to the survey.
- Prior to the survey field engineer do set the project name, direction, lane number and starting chainage with increasing or decreasing (as per direction) details.
- The vehicle will run in middle of the lane and collects data up to a vehicle running speed of 80 Kmph.
- Digital Laser Profiler (DLP), Digital Imaging System (DIS) collect the data with GPS co-ordinates and chainage reference.
- Field Engineer will review the data collection and specifies any remarks/ details in observation column.
- At the end of project chainage, engineer will stop that survey and save all the recorded and the same process is followed for all other lanes of the project stretch.



9.3 Analysis of NSV Survey Data

Pavement condition survey was carried out on each lane of each carriage way with NSV. The NSV survey was conducted on the project corridor from 11/05/2025 to 13/05/2025, data was processed, analyzed, and presented in 100m interval. Detailed NSV data is presented below and summary of it presented as below.

9.3.1 Roughness

As stated in the earlier section, NSV collected the roughness data at 100m interval on each lane in terms of IRI (International Roughness Index) value.

In Indian context, the IRI values were converted to RI as per IRC: SP:16-2019 "Guidelines on Measuring Road Roughness and Norms" with the following equation.

$$RI = 630*(IRI)^{1.12}$$

Where,

RI = Roughness in mm/km

IRI = International Roughness Index.

Roughness data of the pavement is collected through Digital Laser Profilers System (DLP) for each section of the Carriageway (MCW).

The obtained lane-wise kilometre roughness summary, expressed in terms of BI (mm/km) is presented in Table 9-1 and Table 9-2. The corresponding graphical representations for the LHS and RHS directions are illustrated in

Figure 9-1 and

Figure 9-2, respectively.

Table 9-1: Summary of MCW roughness data on LHS direction

Chainage (km)		LHS Direction			
		Avg. BI (mm/km)			
From	To	Outer Lane	Middle Lane	Inner Lane	Average
236.135	237.000	2837.5	2539.1	2628.8	2668.5
237.000	238.000	2347.3	2446.8	2189.1	2327.8
238.000	238.900	2520.9	2619.4	2314.8	2485.1
238.900	239.200	3972.1	3483.3	3564.6	3673.3
239.200	240.000	2001.5	2608.3	2163.9	2257.9
240.000	241.000	2255.6	2218.8	2122.0	2198.8
241.000	242.000	2362.7	2337.4	2073.3	2257.8
242.000	243.000	2351.3	2303.6	2041.3	2232.1
243.000	244.000	2136.7	2207.7	1840.4	2061.6
244.000	245.000	2128.9	2361.7	2268.1	2252.9
245.000	246.000	1981.3	1926.9	1388.9	1765.7
246.000	247.000	2169.5	2119.2	1733.2	2007.3
247.000	247.400	2915.7	3058.3	3058.1	3010.7
247.400	248.400	3963.7	4073.8	4452.2	4163.2
248.400	249.000	2298.4	2103.6	1862.6	2088.2
249.000	250.000	2334.1	2159.9	1640.5	2044.8
250.000	251.000	2131.1	2159.6	1551.5	1947.4
251.000	252.000	2043.3	1936.2	1786.8	1922.1
252.000	253.000	2226.5	2056.1	1173.4	1818.7
253.000	254.000	1903.9	2219.5	1983.3	2035.5
254.000	255.000	2022.8	1889.0	1575.1	1829.0
255.000	256.000	1896.6	1952.8	1628.3	1825.9
256.000	257.000	1909.1	2057.3	1839.3	1935.2
257.000	258.000	1575.8	1589.5	1564.3	1576.5
258.000	259.000	1882.6	2310.0	1578.4	1923.7
259.000	260.000	1869.0	2155.7	1599.3	1874.7
260.000	261.000	1786.0	1719.5	1380.8	1628.8
261.000	262.000	1889.0	2245.5	1569.2	1901.2
262.000	263.000	2141.8	2335.7	1985.4	2154.3
263.000	264.000	2179.1	2090.4	1947.8	2072.5

Chainage (km)		LHS Direction			
		Avg. BI (mm/km)			
From	To	Outer Lane	Middle Lane	Inner Lane	Average
264.000	264.480	1827.9	1928.0	1543.1	1766.4

Table 9-2: Summary of MCW roughness data on RHS direction

Chainage (km)		RHS Direction			
		Avg. BI (mm/km)			
From	To	Outer Lane	Middle Lane	Inner Lane	Average
264.480	264.000	2144.9	2158.0	2020.3	2107.8
264.000	263.000	1903.8	1788.4	1461.8	1718.0
263.000	262.000	2384.1	2348.5	2310.5	2347.7
262.000	261.000	1969.0	2009.2	1649.0	1875.7
261.000	260.000	1660.0	1653.6	1520.4	1611.3
260.000	259.000	1903.9	1668.2	1484.0	1685.4
259.000	258.000	1894.2	2038.4	1766.2	1899.6
258.000	257.000	1902.7	1786.3	1596.6	1761.9
257.000	256.000	1894.7	1923.4	1570.9	1796.3
256.000	255.000	2010.8	1702.0	1488.7	1733.8
255.000	254.000	1728.4	1572.9	1692.4	1664.6
254.000	253.000	1918.7	2193.1	1702.2	1938.0
253.000	252.000	1939.0	1652.7	1539.3	1710.3
252.000	251.000	1640.0	1646.1	1279.5	1521.9
251.000	250.000	1779.9	1571.3	1444.9	1598.7
250.000	249.000	1793.5	1684.0	1907.1	1794.9
249.000	248.400	1780.7	2035.8	2104.7	1973.7
248.400	247.400	3621.4	3733.6	3957.3	3770.8
247.400	247.000	2700.9	2699.6	2673.9	2691.5
247.000	246.000	1797.4	1723.2	1716.5	1745.7
246.000	245.000	1682.2	1585.1	1477.2	1581.5
245.000	244.000	2362.4	2081.9	2224.3	2222.9
244.000	243.000	2090.9	2046.5	1752.0	1963.1
243.000	242.000	2082.3	2191.4	1893.2	2055.6
242.000	241.000	2297.7	2334.9	2054.6	2229.0
241.000	240.000	2076.6	2254.0	2061.7	2130.7
240.000	239.200	1709.9	2165.9	1543.7	1806.5
239.200	238.900	3745.8	3384.9	3349.1	3493.2
238.900	238.000	1969.2	2082.9	1916.6	1989.6
238.000	237.000	2072.6	2140.4	1879.0	2030.7
237.000	236.135	2340.3	2276.6	2280.7	2299.2

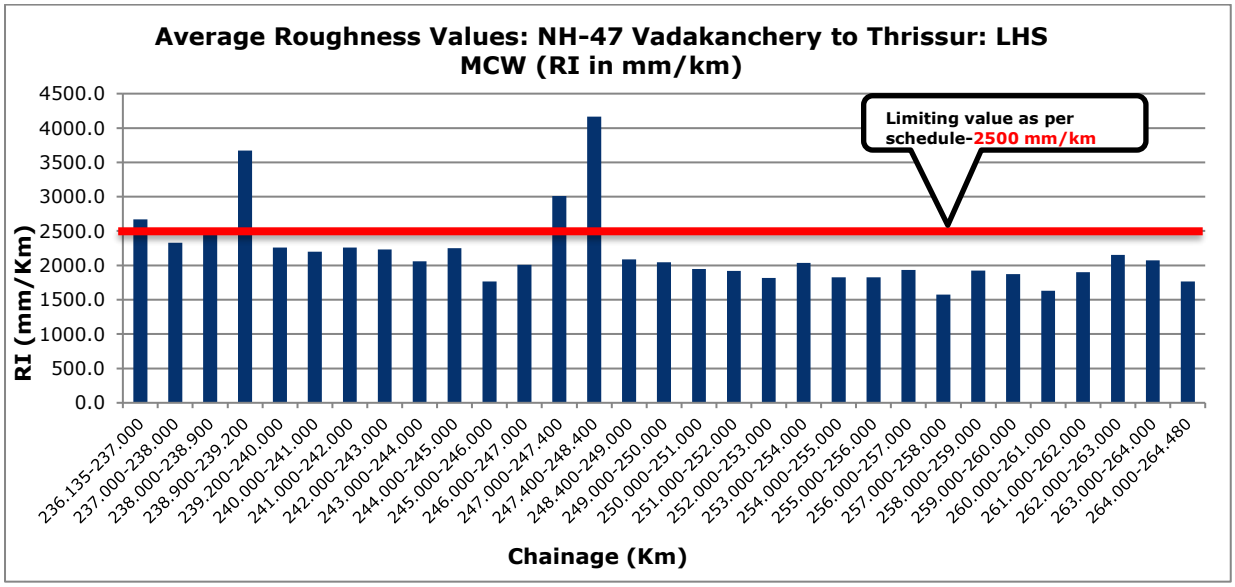


Figure 9-1: Illustrative summary of MCW roughness on LHS direction

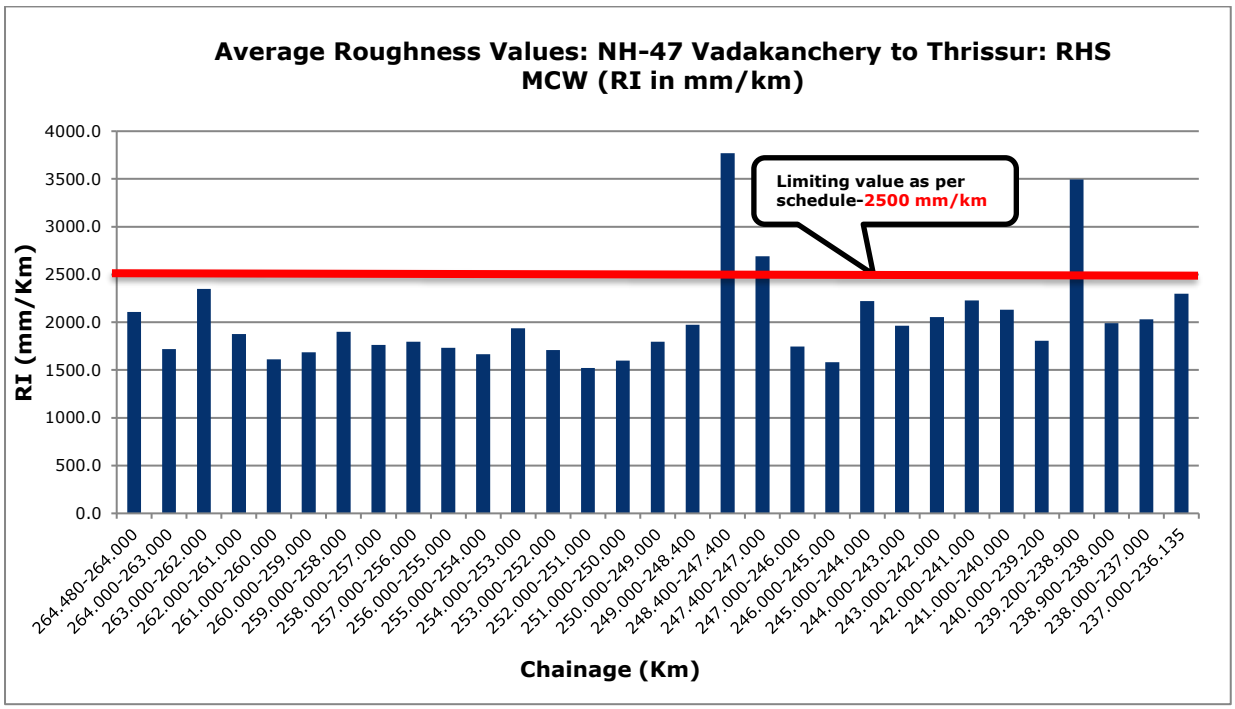


Figure 9-2: Illustrative summary of MCW roughness on RHS direction

9.3.2 Rutting

Rutting data of flexible pavement section is collected through digital laser profilers' system.

The obtained lane wise rutting summary is presented in Table 9-3 and graphical representation of rutting data is presented in Figure 9-3.

Table 9-3: Summary of MCW rutting data on both directions

Summary of Rutting Analysis of LHS & RHS direction		
Distress	**Depth**	**Length of the Road Effected with Rutting**

	(in mm)	LHS (Length in Km)			LHS (Length in %)			RHS (Length in Km)			RHS (Length in %)		
		Outer Lane	Middle Lane	Inner Lane	Outer Lane	Middle Lane	Inner Lane	Outer Lane	Middle Lane	Inner Lane	Outer Lane	Middle Lane	Inner Lane
Rutting	< 5 mm	23.945	20.745	23.580	93.7	81.2	92.3	25.475	23.435	22.495	97.5	92.5	92.2
	5- 10 mm	1.600	4.800	1.965	6.3	18.8	7.7	0.650	1.900	1.800	2.5	7.5	7.4
	> 10 mm	0.000	0.000	0.000	0.0	0.0	0.0	0.000	0.000	0.100	0.0	0.0	0.4
Total Length (in km)		25.545	25.545	25.545	100.0	100.0	100.0	26.125	25.335	24.395	100.0	100.0	100.0

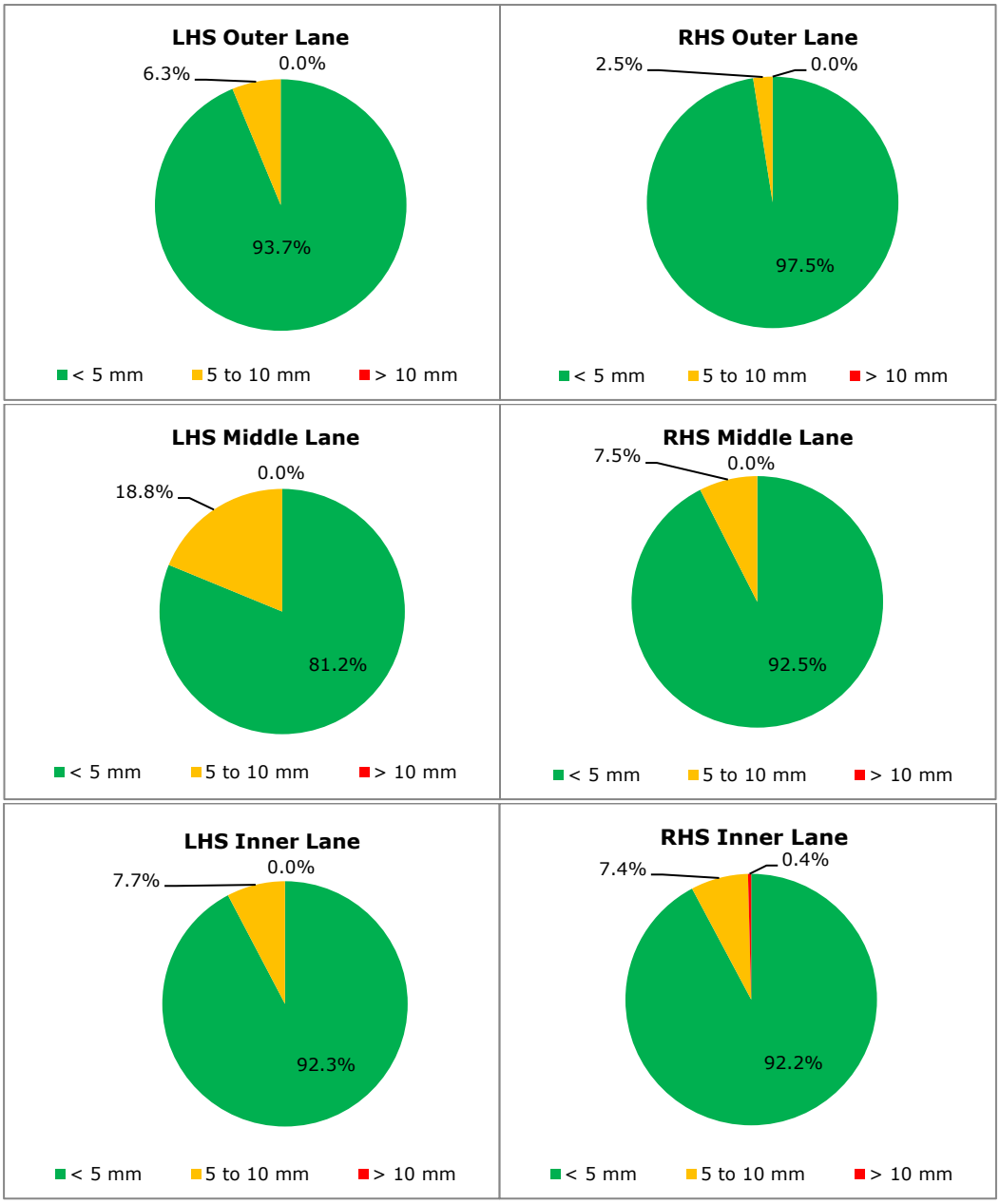


Figure 9-3: Illustrative summary of MCW rutting

Observations:

The desirable limit for rutting is not more than 10 mm.

- In the LHS, rutting values were within the desirable limit.

- In the RHS inner lane, a stretch of 0.100 km recorded rutting values exceeding 10 mm.

9.3.3 Pavement distress data of Flexible Pavement

The NSV software processes the collected data and automatically geotags each image and measurement with the corresponding GPS coordinates and chainage. It further classifies pavement distresses by type, location, magnitude, and severity, enabling precise mapping and assessment of roadway conditions.

Pavement distress data of Flexible pavement- Main carriageway and Service Road

The following Pavement distresses are considered for assessing the flexible pavement condition as per IRC: 82-2023 "Code of Practice for Maintenance of Bituminous Road Surfaces".

- Cracking
  - Longitudinal cracks
  - Transverse cracks
  - Alligator cracks/ Crocodile cracks
  - Multiple cracks
- Ravelling
- Shoving
- Bleeding
- Slippage/ Delamination
- Potholes
  - Area: Surface Area of the Pothole;
  - Numbers
- Edge break
- Patching
- Settlements, Depressions

All the above pavement distress will be provided at 100 m interval.

The detailed pavement condition analysis and distress rating is carried out as per Table 5.1 given in IRC 82:2023. The pavement distress summary is presented in Table 9-4. Few Sites investigation photographs in Figure 9-4 below.

Table 9-4: Summary of MCW Flexible pavement distresses

Distress	Severity (% of Area)	% Length of the Road Effected			% Length of the Road Effected		
		LHS			RHS		
		Inner Lane	Middle Lane	Outer Lane	Inner Lane	Middle Lane	Outer Lane
		Length in %	Length in %	Length in %	Length in %	Length in %	Length in %
Cracking	< 5%	99.59	94.02	98.76	100.00	100.00	100.00
	5% to 10%	0.41	1.44	0.82	0.00	0.00	0.00
	> 10%	0.00	4.54	0.41	0.00	0.00	0.00
Ravelling	< 1%	99.18	100.00	100.00	100.00	100.00	100.00
	1% to 10%	0.82	0.00	0.00	0.00	0.00	0.00
	> 10%	0.00	0.00	0.00	0.00	0.00	0.00
Potholes	Nil	100.00	100.00	100.00	100.00	100.00	100.00
	1 to 2	0.00	0.00	0.00	0.00	0.00	0.00

	>2	0.00	0.00	0.00	0.00	0.00	0.00
Patching	< 1%	98.76	95.88	97.94	97.06	91.35	98.79
	1% to 10%	1.24	4.12	2.06	2.94	8.24	1.21
	> 10%	0.00	0.00	0.00	0.00	0.42	0.00
Rut depth	< 5	91.90	80.20	93.40	91.79	92.09	97.38
	5 to 10	8.10	19.80	6.60	7.78	7.91	2.62
	> 10	0.00	0.00	0.00	0.43	0.00	0.00
IRI	< 2.55	53.95	23.51	24.31	65.70	47.87	48.20
	2.55 to 3.3	32.03	42.26	49.29	20.06	31.62	32.63
	> 3.3	14.02	34.23	26.40	14.24	20.51	19.17

9.3.4 Pavement distress data of Rigid Pavement (Toll Plaza & Tunnel)

The following Pavement distresses are considered for assessing the rigid pavement condition as per IRC SP: 83-2018 (Guidelines for Maintenance, Repair and Rehabilitation of Cement concrete pavements);

- Cracking
  - Longitudinal cracks
  - Transverse cracks/ Diagonal Cracks
  - Corner cracks/ Corner breaks
  - Multiple cracks
- Spalling of Joints
- Joint seal defects
- Joint Faulting/ Stepping
- Joint Separation
- Blow up/ Buckling
- Ravelling/ Scaling
- Potholes/ Pop outs

All the above pavement distresses will be provided at 10 m interval.

The existing distresses are measured in five level distress rating system as specified in IRC: SP: 83-2018. The five-level distress rating system is given in Table 9-5 below.

Table 9-5: Five-level distress rating system for the Rigid Pavement

Distress Rating	Slab Condition	Severity (Defects) Rating
0	Excellent	No Discernible
1	Very Good	Minor
2	Good/Average	Moderate
3	Fair	Major
4	Poor	Extreme
5	Very Poor	Unsafe/ Unserviceable

The condition survey of the rigid pavement was carried out by observing all the listed distresses as specified in IRC: SP: 83-2018 in conformity with proforma given code. Type of distresses and assessment rating as given in Table 4.5 of IRC: SP: 83-2018 is followed and the same is presented in the Table 9-6 below.

Table 9-6: Type of distresses and its assessment rating

S. No	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating
1	**CRACKING**			
	Single Discrete Cracks Not interaction with Any joint	w=width of crack L=length of crack d=depth of crack D=depth of slab	0	Nil, not discernible
			1	w<0.2 mm, hair cracks
			2	w= 0.2 -0.5 mm, discernible from slow-moving car
			3	w=0.5-1.5 mm, discernible from fast-moving car
			4	w=1.5-3.00 mm
			5	w>3 mm
2	Single Transverse (or Diagonal) Crack intersecting with one or more joints	w=width of crack L=length of crack d=depth of crack D=depth of slab	0	Nil, not discernible
			1	w<0.2 mm, hair cracks
			2	w=0.2 -0.5 mm, discernible from slow vehicle
			3	w=0.5-3.0 mm, discernible from fast vehicle
			4	w=3.0-6.0 mm
			5	w>6mm, usually associated with spalling, and/or slab rocking under traffic
3	Single Longitudinal Crack intersecting with one or more joints	w=width of crack L=length of crack d=depth of crack D=depth of slab	0	Nil, not discernible
			1	w<0.5 mm, discernible from slow vehicle
			2	w= 0.5 -3.0 mm. discernible from fast vehicle
			3	w=3.0-6.0 mm
			4	w=6.0-12. mm
			5	w>12mm, usually associated with spalling, and/or slab rocking under traffic
4	Multiple Cracks Intersecting with one or more joints or cracks	w=width of crack	0	Nil, not discernible
			1	w<0.2 mm, hair cracks
			2	w=0.2 - 0.5 mm, discernible from slow vehicle
			3	w=0.5-3.0 mm, discernible from fast vehicle
			4	w=3.0 - 6.0 mm panel broken into 2 or 3 pieces
			5	w > 6 mm and/or panel broken into more than 4 pieces
5	Corner Break	w=width of crack L=length of crack	0	Nil, not discernible
			1	w<0.5 mm only one corner broken
			2	w< 1.5 mm, L<0.6 m, only one corner broken
			3	w< 1.5 mm. L <0.6 m, two corners broken

S. No	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating
			4	w>1.5 mm, L >0.6 m, or Three corners broken
			5	Three or four corners broken
6	Punchout (Applicable to CRCP only)	w=width of crack L=length (m/m^2)	0	Nil, not discernible
			1	w< 0.5 mm; L< 3 m/m^2
			2	either w>0.5 mm or L<3 m/m^2
			3	w> 1.5 mm and L< 3 m/m^2
			4	w>3 mm, L<3 m/m^2 and deformation
			5	w>3 mm, L>3 m/m^2 and deformation
7	**SURFACE DEFECTS**			
	Ravelling or Honeycomb type surface	r= area damaged surface / total surface of slab (%) h=maximum depth of damage	0	Nil, not discernible
			1	r < 2 %
			2	r =2-10%
			3	r=10-25%
			4	r=25-50%
			5	r >50% and h>25 mm
8	Scaling	r= area damaged surface / total surface of slab (%) h=maximum depth of damage	0	Nil, not discernible
			1	r < 2 %
			2	r =2-10%
			3	r=10-20%
			4	r=20-30%
			5	r >30% and h>25 mm
9	Polished Surface/ Glazing	t=texture depth sand patch test	0	
			1	t > 1mm
			2	t=1-0.6 mm
			3	t=0.6-0.3 mm
			4	t=0.3-0.1 mm
			5	t<0.1 mm
10	Pop out (small Hole), Pothole Refer Para 8.4	n=number/m2 d=diameter h= maximum depth		
			0	d<50 mm; h<25 mm; n <1 per 5 m^2
			1	d=50-100 mm: h<50 mm: n<1 per 5 m^2
			2	d=50-100 mm: h>50 mm: n<1 per 5 m^2
			3	d=100-300 mm: h<100 mm: n<1 per 5 m^2
			4	d=100-300 mm: h>100 mm: n<1 per 5 m^2
			5	d>300 mm: h>100 mm: n>1 per 5 m^2
	JOINT DEFECTS			

S. No	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating
11	Joint Seal Defects	Loss or damage L=Length as % total joint length	0	Difficult to discern.
			1	Discernible, L<25% but of little immediate consequence eighth regard to ingress of water or trapping incompressible material.
			3	Notable, L>25% insufficient protection against ingress of water and trapping in incompressible material.
			5	Severe; w>3 mm negligible protection against ingress of water and trapping in incompressible material.
12	Spalling of Joints	w= width on either side of the joint L= Length as % total joint length		
			0	Nil, not discernible
			1	w<10 mm
			2	w=10-20 mm, L<25%
			3	w=20-40 mm, L >25%
			4	w=40-80mm, L >25%
			5	w>80mm, and L>25%
13	Faulting (or stepping) in Cracks or Joints	f=difference of level	0	Not discernible, f< 1 mm
			1	f< 3 mm
			2	f=3-6 mm
			3	f=6-12 mm
			4	f=12-18 mm
			5	f>18 mm
14	Blow up or buckling	h=vertical displacement from normal profile	0	Nil, not discernible
			1	h< 6 mm
			2	h=6-12 mm
			3	h=12-25 mm
			4	h>25 mm
			5	shattered slabs, i.e., 4 or more pieces
15	Depression	h= negative vertical displacement from profile L= Length		
			0	Nil, not discernible, h<5 mm
			1	h=5-15 mm
			2	h=15-30 mm. Nos < 20% joints
			3	h=30-50 mm
			4	h>50mm or >20% joints
			5	h>100 mm
16	Heave	h= positive vertical displacement from profile L= Length	0	Nil, not discernible, h<5 mm
			1	h=5-15 mm
			2	h=15-30 mm. Nos < 20% joints

S. No	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating
			3	h=30-50 mm
			4	h>50 mm or >20% joints
			5	h>100 mm
17	Bump	h=vertical displacement from normal profile	0	h<4 mm
			1	h=4-7 mm
			3	h= 7 - 15 mm
			5	h>15 mm
			0	Nil, not discernible f<5 mm
18	Lane to Shoulder Dropoff	f=difference of level	1	f=3-10 mm
			2	f=10-25 mm.
			3	f=25-50 mm
			4	f=50-75 mm
			5	f >75 mm
19	**DRAINAGE**			
	Pumping	quantity of fines and water expelled through open joints and cracks Nos/ 100 m stretch	0	Not discernible
			1 to 2	slight / occasional Nos <10%
			3 to 4	appreciable / Frequent 10-25%
			5	Abundant, crack development>25%
20	Ponding	Ponding on slabs due to blockage of drains	0-2	No discernible problem
			3 to 4	Blockages observed in drains, but water flowing
			5	Ponding, accumulation of water observed

The rigid pavement condition summary of each section in lane wise is presented below

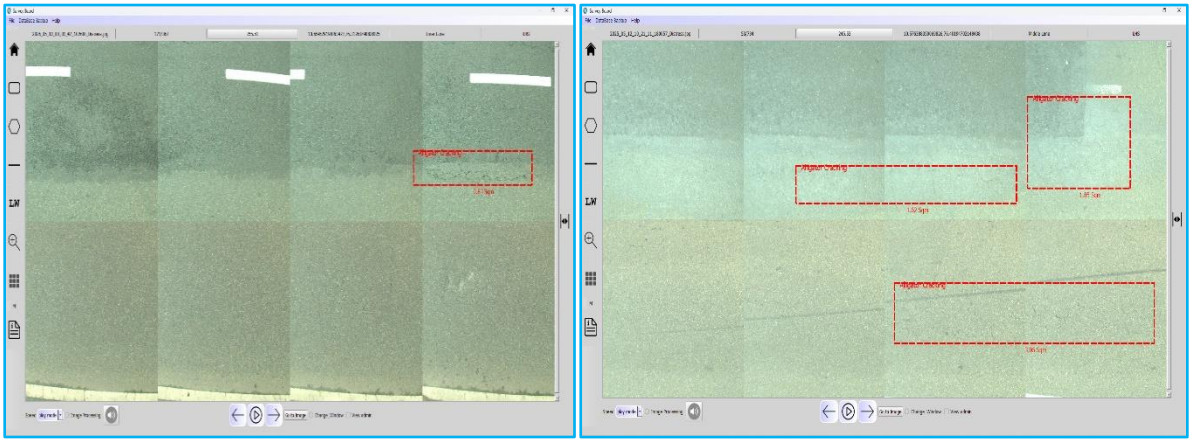
Table 9-7: Rigid Pavement Distress Summary (Toll Plaza & Tunnel):

Rigid Distress Summary					
Distress	**Unit**	**Tunnel LHS**	**Tunnel RHS**	**Toll LHS**	**Toll RHS**
Single discrete Cracks	Rm.	0.000	0.000	27.000	0.000
Transverse Cracks	Rm.	48.375	46.500	44.000	32.000
Longitudinal Cracks	Rm.	0.000	0.000	0.000	0.000
Multiple Cracks	Rm.	0.000	0.000	2.500	0.000
Corner Cracks	Rm.	1.600	0.100	1.000	0.700
Joint Seal Defects	Rm.	0.000	196.000	0.000	0.000
Joint Separation	Rm.	0.000	0.000	15.000	4.000

Joint Spalling	Rm.	42.750	88.800	15.000	28.000
Ravelling/ Scaling	Sq.m	0.000	30.750	31.500	31.500
Pothole	Sq.m	0.000	0.000	0.000	1.000



Figure 9-4: Field testing photographs captured during the NSV survey



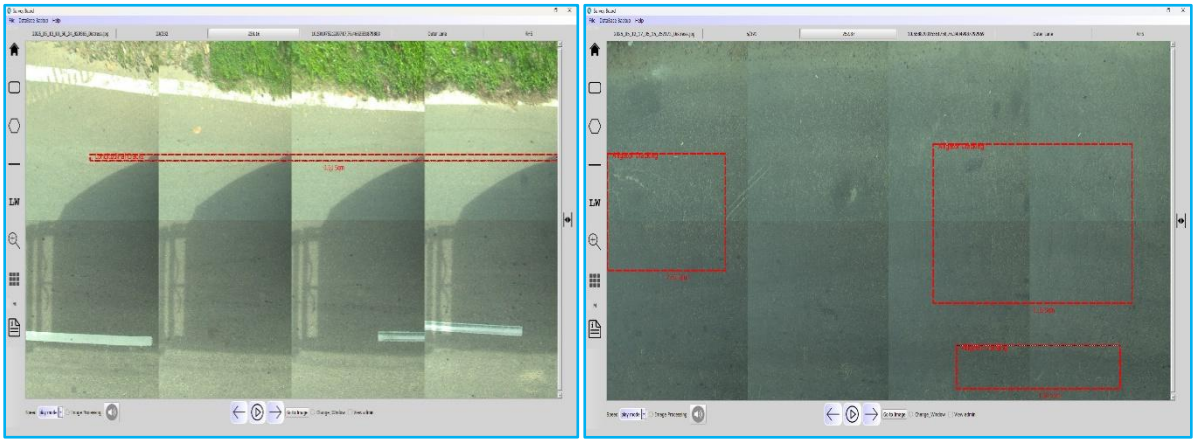


Figure 9-5: Distress Mapping Photographs- Flexible Pavement

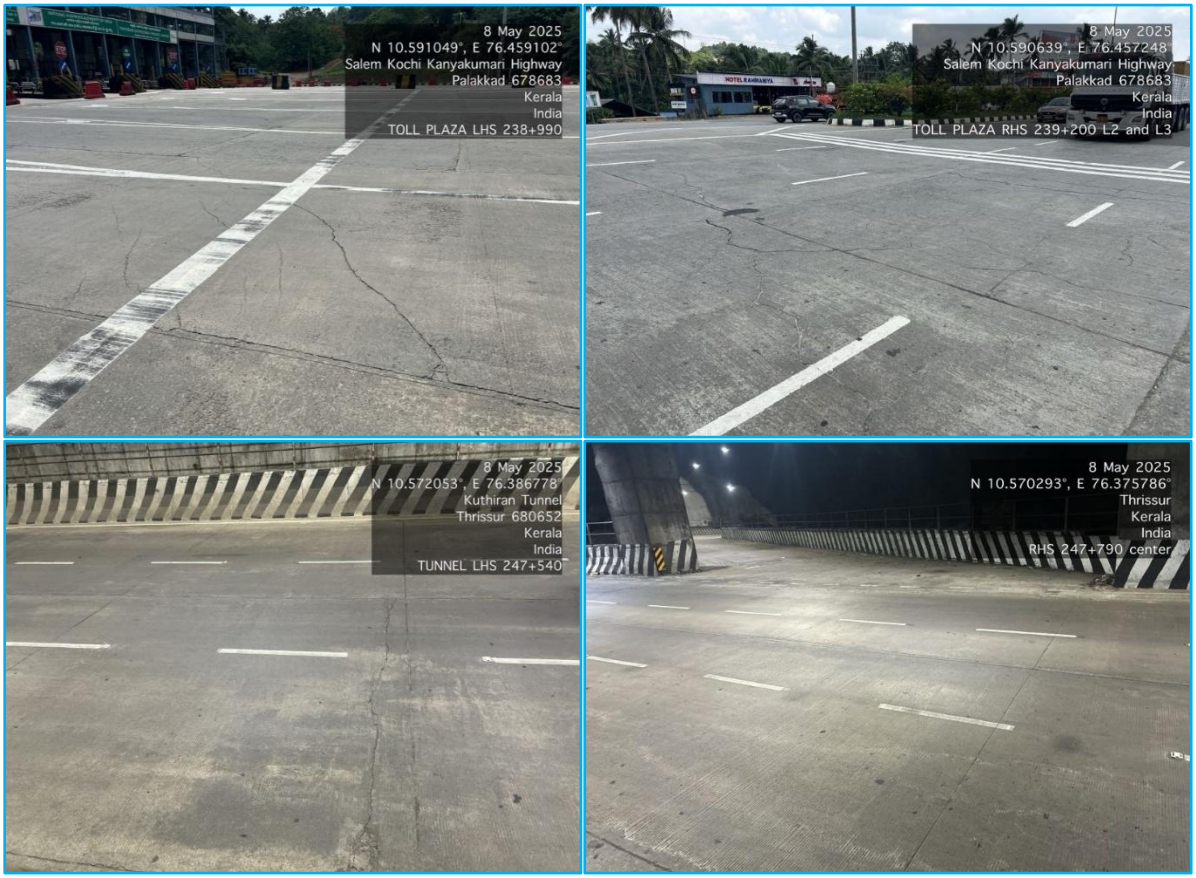


Figure 9-6: Investigation Photographs- Rigid Pavement (Toll Plaza & Tunnel)

9.4 Structural Evaluation of Flexible Pavement by Using FWD

9.4.1 Equipment Description and Test Methodology

Principle of Pavement Evaluation Using FWD

Performance of flexible pavements can be evaluated by applying loads on the pavements that simulate the actual traffic loading conditions, The recording of such responses is made by measuring the elastic deflection under such loads. The collected deflection data from survey is duly analysed considering the factors influencing the performance of pavement such as subgrade strength,

thickness and quality of each of the pavement layers, drainage conditions, pavement surface temperature etc.

Among the equipment available for structural evaluation of pavements, the Falling Weight Deflectometer (FWD) is extensively used world-wide because it simulates, to a large extent, the actual loading conditions of the pavement. When a moving wheel load passes over the pavement it produces load pulses. Normal stresses (vertical as well as horizontal) at a location in the pavement will increase in magnitude from zero to a peak value as the moving wheel load approaches the location. The time taken for the stress pulse to vary from zero to peak value is termed as 'rise time of the pulse'. As the wheel moves away from the location, magnitude of stress reduces from peak value to zero. The time during which the magnitude of stress pulse varies from 'zero-to-peak-to-zero' is the pulse duration. Peak load and the corresponding pavement responses are of interest for pavement evaluation.

The resulting load-deflection data can be interpreted through appropriate analytical techniques, such as back calculation technique, to estimate the elastic moduli of the pavement layers. The computed moduli are, in turn, used for (i) the strength evaluation of different layers of in-service pavements (ii) the estimation of the remaining life of in-service pavement (iii) determination of strengthening requirement, if any and (iv) evaluation of different rehabilitation alternatives (overlay, recycling, partial reconstruction, etc

Brief Description of Falling Weight Deflectometer (FWD)

Falling Weight Deflectometer is an impulse-generating device with a guide system. This device allows a variable weight to be dropped from a variable height. The apparatus has a loading plate which is used for uniform force distribution on the test layer. When the weight affects this plate, this loading plate ensures that the resulting force is applied perpendicularly to the test layer's surface. It also has a load cell for measuring the actual applied impulse. It also has one or more deflection sensors. (Note: Deflection basin tests require at least seven sensors). It also has a system for collecting, processing, and storing deflection data. Structural evaluation of pavements involves application of a standard load to the pavement and measuring its response in terms of stress, strain or deflection.

The basic working principle of the impulse loading equipment is to drop a mass on the pavement to produce an impulse load and measure the surface deflections. The mass is dropped on a spring system, which in turn transmits the load to the pavement through a loading plate. The resulting deflection bowl characteristics are observed and used in the back calculation of pavement material properties. The principle is illustrated in Figure 9-7

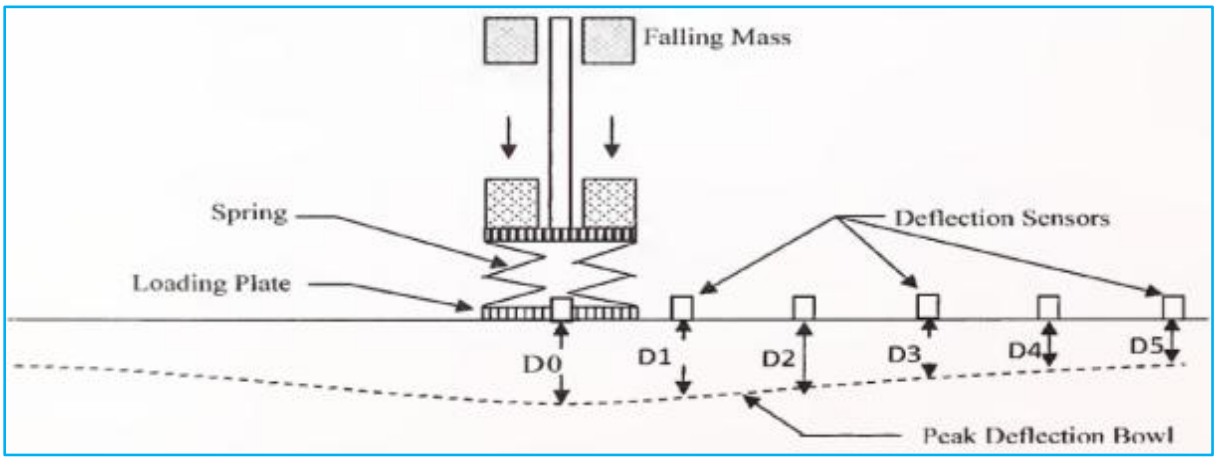


Figure 9-7: Working Principle of FWD

FWD Instrument Used for the Deflection Survey: ERAY-FWD 20VM

For conducting FWD survey on the project road ERAY-FWD20VM Fully Automatic Vehicle-mounted FWD. The FWD machines can apply a loading in the range of 12-150 kN, enabling them to simulate all type of vehicle loads on pavement surface. These models are equipped with a battery back-up and vehicle mounted set-up with all other accessories required for evaluation of pavement.

Moreover, this instruments mostly outperforms or matches all the criteria given in the IRC: 115-2014. Testing Procedure and Methodology

The detailed test methodology and procedure was described in IRC: 115-2014 "Guidelines for Structural Evaluation and Strengthening of Flexible Road Pavements Using Falling Weight Deflectometer (FWD) Technique". However, as per the client's requirement the sampling procedure was customized in this project. In adherence to the same, structural evaluation of the existing 'pavement and subgrade system' by measuring its response in terms of deflection was carried out using FWD for the project road in the month of May 2025 (07/05/2025 to 09/05/2025).

Evaluation of pavement structural strength is carried out in accordance with requirements of TOR and IRC: 115-2014.

Testing Equipment

The equipment used for the testing is:

- ERAY-20VM FWD Vehicle Mounted Falling Weight Deflectometer with 1 loading plate and 9 numbers of geophones placed at the spacing of 0, 200, 300, 450, 600, 900, 1200, 1500 and 1800mm from the centre of the loading plate.
- Air Temperature and Pavement Surface Temperature sensors as part of the FWD instrument.
- Glycerol and digital thermometer.
- Red flags and red cones and flashing lamps for traffic arrangement.

FWD Deflection Testing Points and Measurement

FWD deflection measurement has been carried out for each lane in both directions. FWD deflection measurement has been carried out at a test point along outer wheel path of each lane which is at an offset of 0.75m from the outer edge of outer lane, at 4.2m from the outer edge of outer lane as specified in section 5.4.5 of IRC: 115-2014. At every measurement location, four drops were made, such that the first drop is neglected as 'seating drop' and the rest three drops' deflections are recorded. Photographs of FWD test under progress at some locations are shown in Figure 9-8.







Figure 9-8: Photographs showing FWD survey under progress

Also, during survey pavement temperature of bituminous layer was recorded as per the procedure specified in section 5.4.7, xiii of IRC: 115-2014.

The following steps are carried out for measuring deflections at a test point:

i. Mark the test point on the pavement
ii. Centre the load plate over the test point
iii. Lower the loading plate onto the pavement ensuring there should be no standing water on the pavement surface. The loading plate should be in proper contact with pavement surface. The longitudinal and transverse slope of the pavement should not exceed 10 percent at the test location.
iv. Lower the frame holding the geophones so that the transducers are in contact with pavement surface.
v. Raise the mass to a pre-determined height required for producing a target load of 40 kN (+10%).
vi. Drop one seating load. The load and deflection data for this seating load is not recorded.
vii. Raise the mass and drop. Record the load and deflection data into the computer through data acquisition system. While peak load and peak deflections at different selected radial positions must be recorded. At least 2 drops should be made at one location for precision.
viii. If, during previous 2 steps, the deflections measured are giving variations or the deflections/load pulses are not proper, repeat the test drop.
ix. Raise the geophone frame and load plate and move to the next test location
x. Deflection measurements should not be made when the pavement temperature is more than 45°C.

9.4.2 Existing Pavement Composition Details

The crust composition details used for analysis are presented in Table 9-8.

Table 9-8: Pavement crust details

S. No.	LHS - BT Thickness			LHS - Granular Thickness		
	From	To	BT	From	To	Granular
1	236.135	238.525	190	236.135	240.25	500
2	238.525	244.1	280	240.25	245.75	490
3	244.1	247.575	200	245.75	251.1	410
4	247.575	251.1	240	251.1	264.49	410

5	251.1	254.525	180			
6	254.525	259.5	290			
7	259.5	264.49	230			
S. No.	**RHS - BT Thickness**			**RHS - Granular Thickness**		
	From	**To**	**BT**	**From**	**To**	**Granular**
1	236.135	240.425	150	236.135	242.475	420
2	240.425	241.15	220	242.475	245.95	300
3	241.15	242.4	180	245.95	256.595	530
4	242.4	247.375	200	256.595	264.49	490
5	247.375	256.45	220			
6	256.45	262.92	160			
7	262.92	264.49	140			

9.4.3 Pavement Condition

During the FWD survey, the pavement surface was generally observed to be in good condition throughout the entire project road. However, the LHS middle lane sections between chainages 258.000–259.000 and 261.000–262.000 were found to be in fair condition. The same condition is considered for providing the input for back-calculation as per IRC:115-2014.

9.4.4 In-put Data for BACK Calculation Analysis

(a) Processing of Load and Deflection data

The FWD test data collected from different drops at each test point primarily consists of peak load and peak deflections at different radial locations. Unrealistic deflection values and obviously erroneous data must be removed.

Average values of load and deflections are calculated from the three drop test data collected. FWD tests were carried out using 40 kN impulse load. However, since the FWD equipment does not impart the same load at every test point, normalization of all measured deflections was carried out to a common test load of 40 kN. Such 'normalization' of the data was carried out using the following formula:

$D_n = 40kN/L_m \times D_m$

where,

D_n = Normalized Deflection.

L_m = Imparted Load and

D_m = Measured Deflection

The "normalized deflection data" was then used for determining deflections, deflection bowl and finally in framing of homogeneous sections and calculation of overlay requirements.

(b) Back-calculation of Layer Moduli

Layer moduli have been back calculated using KGPBACK program. The pavement has been modelled as a three-layer system with bituminous layer, granular layer and subgrade. The following inputs have been provided for back analysis.

- Single wheel load 40 kN and contact pressure 0.56 MPa
- No. of deflection sensors: 9
- Radial Distances of the Geophones i.e., 0, 200, 300, 450, 600, 900, 1200, 1500 and 1800mm
- Measured Surface Deflections normalized to 40kN in mm

- Pavement Layer Thicknesses
- Poisson's ratio of 0.35 is considered for bituminous, granular and subgrade layers.
- Range of Possible modulus value (Lower and Upper limits) of bituminous layer, granular layer and subgrade

Range of different layers moduli given as input to KGPBACK for back-calculation. These ranges selected judiciously by an experienced pavement engineer taking into considerations about approximate age of pavement, visual assessment of the condition of bituminous layer, prevailing climatic conditions during deflection measurements and based on information available from test pits, laboratory tests conducted as detailed in the sections below:

(c) Range of modulus for existing subgrade:

The range of moduli of existing subgrade layers is taken as 50-100 MPa.

(d) Range of modulus value of existing granular layers i.e., base and subbase:

The range of moduli of existing granular layers is based on clause II.8.4 of IRC 115-2014.The range for combined (base and sub-base) is taken as 100-500 MPa.

(e) Range of modulus value of existing bituminous layers:

The range of moduli of existing thick bituminous layer has been determined based on condition data. If the road condition is good the range is considered as 750MPa to 3000MPa, for sections with pavement condition is Fair- Poor, the range specified for thick bituminous layer 400 MPa to 1500 MPa as stipulated in section III.8.4 of IRC: 115-2014 has been taken into consideration.

9.4.5 Correction for data analysis

Correction for Temperature

Back-calculated moduli values of the bituminous layers evaluated by FWD survey are influenced by the pavement temperature. The standard pavement temperature for India is recommended as 35°C, hence the back-calculated moduli obtained at temperatures other than the identified standard temperature will have to be corrected using a suitable correction factor using equations 4 and 5 of IRC:115-2014 and the same is extracted below for ready reference.

ET1 = λ ET2

Where,

λ, temperature correction factor, is given as

λ = (1-0.238 lnT1) / (1-0.238 lnT2)

Where,

ET1 = Back-calculated modulus (MPa) at temperature T1 (°C)

ET2 = Back-calculated modulus (MPa) at temperature T2 (°C)

Correction for Seasonal Variation

Moisture content affects the strength of subgrade and granular subbase/base layers. The below equations are provided for Summer and Winter Seasonal reference.

$E_{sub_mon} = 3.351 * (E_{sub_win})^{0.7688} - 28.9 \ldots (6)$

$E_{sub_mon} = 0.8554 * (E_{sub_sum}) - 8.461 \ldots (7)$

where,

E_{sub_mon} = subgrade modulus in monsoon (MPa)

Confidential

E_{sub_sum} = subgrade modulus in Summer (MPa)

E_{sub_win} = subgrade modulus in Winter (MPa)

$$E_{gran_mon=} -0.0003 * \left(E_{gran_sum}\right)^2 + 0.9584 * \left(E_{gran_sum}\right) - 32.989 \ldots (8)$$

$$E_{gran_mon=} 10.5523 * \left(E_{gran_win}\right)^{0.624} - 113.857 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (9)$$

where,

E_{gran_mon} = granular layer modulus in monsoon (MPa)

E_{gran_sum} = granular layer modulus in Summer (MPa)

E_{gran_win} = granular layer modulus in Winter (MPa)

Since the deflection measurements have been carried out during Monsoon, hence no seasonal correction factors are applied in the analysis.

9.5 Remaining life estimation

The in-service three-layer pavement system has been analysed with the back-calculated corrected layer moduli and layer thicknesses. The critical strains have been calculated by IITPAVE program. From the performance criteria equations, the residual/remaining rutting and fatigue life have been estimated.

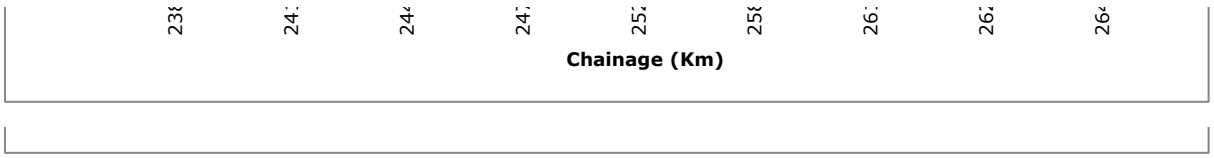


Figure 9-9 respectively.

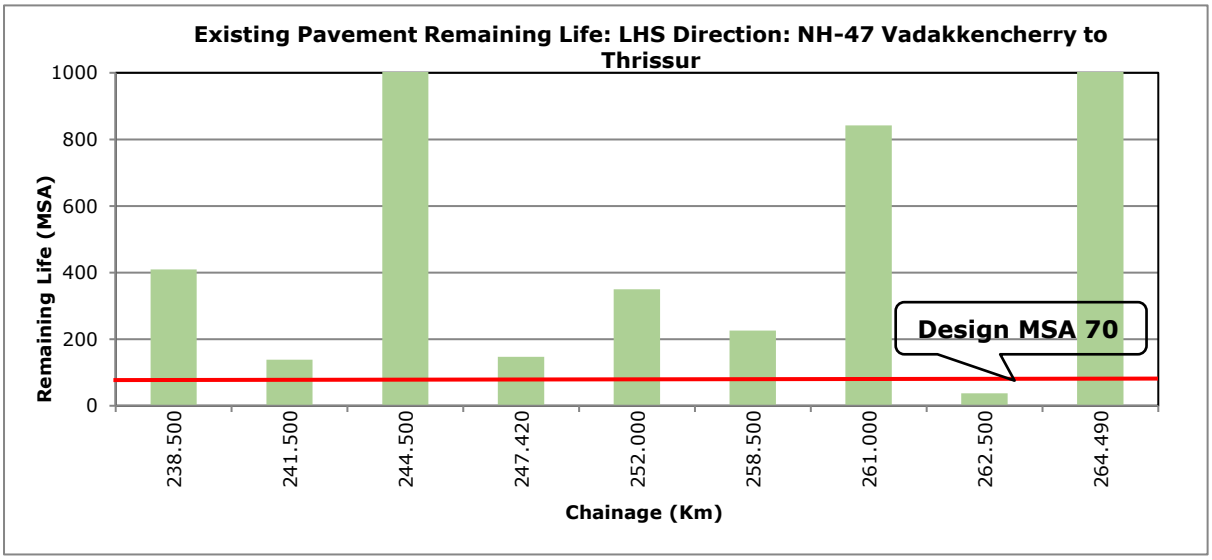
Table 9-9: Obtained remaining life of MCW on LHS direction

Chainage (km)		Remaining life - LHS Direction
From	To	
236.135	238.500	409.2
238.500	241.500	138.2
241.500	244.500	1385.4
244.500	247.420	146.5
248.420	252.000	349.6
252.000	258.500	225.4
258.500	261.000	841.8
261.000	262.500	37.5
262.900	264.490	1067.0

Table 9-10: Obtained remaining life of MCW on RHS direction

Chainage (km)		Remaining life -RHS Direction
From	To	
236.135	239.500	220.1
239.500	242.500	44.0
242.500	246.500	356.6
246.500	249.000	548.5

Chainage (km)		Remaining life -RHS Direction
From	To	
249.000	251.500	815.5
251.500	254.500	127.3
254.500	256.000	729.5
256.000	260.000	335.6
260.000	262.000	80.4
262.000	264.490	202.7



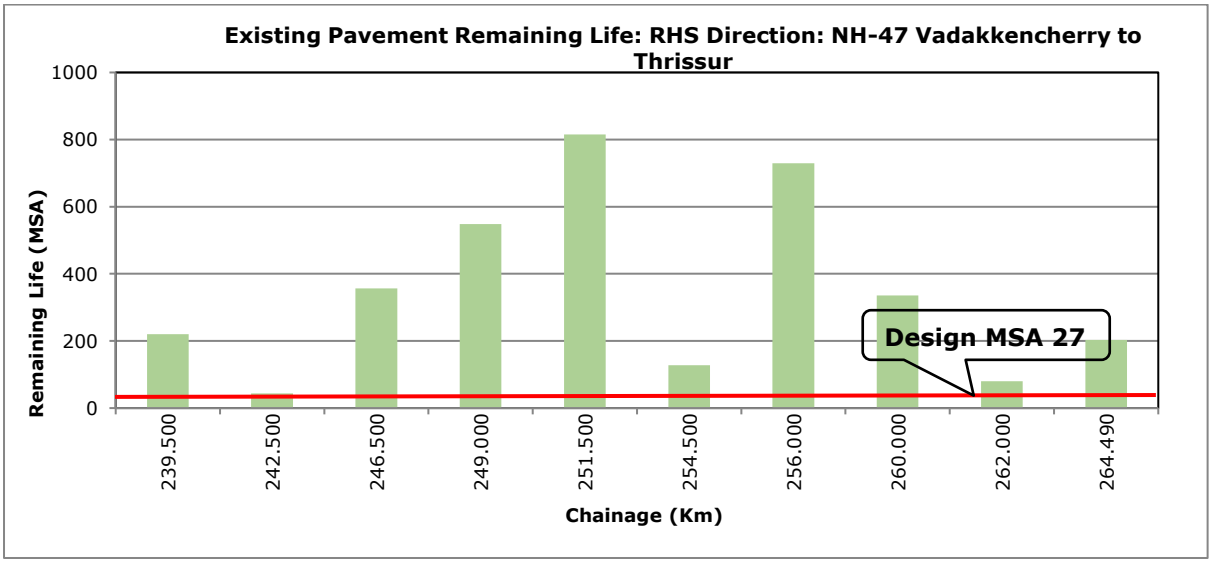


Figure 9-9: Illustrative summary of remaining life on both Directions (MCW)

9.6 Structural Evaluation of Rigid Pavements using FWD (Toll Plaza)

The structural evaluation was carried out in conformity with IRC: 117-2015, "Guidelines for The Structural Evaluation of Rigid Pavement by Falling Weight Deflectometer (FWD)".

9.6.1 Principle of Rigid pavement evaluation using FWD

Performance of Rigid pavements can be evaluated by applying loads on the pavements that simulate the traffic loading, recording the response to such loading by measuring the deflection under such loads, and analysing these data duly considering the factors influencing the performance such as PQC thickness and Load on the pavement.

Among the equipment available for structural evaluation of pavements, the Falling Weight Deflectometer (FWD) is extensively used worldwide because it simulates, to a large extent, the actual loading conditions of pavement.

The resulting load-deflection data can be interpreted through appropriate analytical techniques, to estimate the modulus of Subgrade reaction. The computed moduli are, in turn used for (i) the Elastic Modulus of Concrete and the Strength of Concrete (ii) the Flexural strength of the concrete slab of in-service pavements (iii) determination of Strengthening requirement, in the presence of voids if the deflections are much higher than normal and (iv) evaluation of different rehabilitation alternatives (Slab replacement etc.)

Structural evaluation exercise also includes Load transfer Efficiency at the transverse and longitudinal joints, (i) determination of Strengthening requirement, if any and (ii) evaluation of different rehabilitation alternatives (Retrofitting of Joints etc.)

9.6.2 Testing procedure & Methodology for Rigid pavements:

The detailed test methodology and procedure was described in IRC: 117-2015 "Guidelines for Structural Evaluation and Strengthening of Rigid Road Pavements Using Falling Weight Deflectometer (FWD) Technique". Deflection measurement points were taken as per the existing pavement condition. In adherence to the same, structural evaluation of the existing 'pavement and subgrade system' by measuring its response in terms of deflection. The survey was carried out using FWD for the project on 09/05/2025.

Evaluation of pavement structural strength would be carried out in accordance with requirements of TOR and IRC: 117-2015.

Testing Equipment

The equipment used for the testing is:

- ERAY 20VM FWD Vehicle Mounted Falling Weight Deflectometer with 1 loading plate and 9 numbers of geophones placed at the spacing of 0, 200, 300, 450, 600, 900, 1200, 1500 and 1800mm from the centre of the loading plate.
- GPS, Air Temperature and Pavement Surface Temperature sensors as part of the FWD instrument.
- Red flags and red cones and flashing lamps for traffic arrangement.

9.7 FWD Deflections points & measurement -Rigid pavement (Toll Plaza)

At every measurement location, four drops were made, such that the first drop was the 'seating drop' and with the remaining three drops deflections were recorded.

The following steps are carried out for measuring deflections at a test point:

i. Mark the test point on the pavement

ii. Centre the load plate over the test point

iii. Lower the loading plate onto the pavement ensuring there should be no standing water on the pavement surface. The loading plate should be in proper contact with pavement surface.

The longitudinal and transverse slope of the pavement should not exceed 10 percent at the test location.

iv. Lower the frame holding the geophones so that the transducers are in contact with pavement surface.

v. The target peak load in the range of 40 kN to 60 kN or higher may be applied on concrete pavements to get a reasonable deflection. Since pavements of major highways are very stiff and a higher load may be required to get a deflection of about 0.15 mm.

vi. Drop one seating load, load and deflection data for which need not be recorded.

vii. Raise the mass and drop. Record the load and deflection data into the computer through data acquisition system. While peak load and peak deflections at different selected radial positions must be recorded. At least 2 drops should be made at one location for precision.

viii. If, during previous 2 steps, the deflections measured are giving variations or the deflections/load pulses are not proper, repeat the drop.

ix. Raise the geophone frame and load plate and move to the next test location.

x. Deflection measurements should not be made when the pavement surface temperature is more than 40°C.

9.8 Rigid pavement composition

The PQC crust thickness considered for analysis is 330 mm on both LHS and RHS.

9.9 Rigid pavement composition and Pavement condition

a) Processing of Area and Deflection data.

A total of nine geophones were used to measure deflections; however, for the purpose of analysis, only the readings corresponding to radial distances of 0 mm, 300 mm, 600 mm, and 900 mm from the center of the loading point were considered.

The area of Deflection basin is calculated by.

$$A=6(1+2(D_1/D_0) +2(D_2/D_0) + (D_3/D_0))$$

Where,

A=Area parameter of the deflection basin

D_0=Deflection at center of the loading plate in mm

D_1= Deflection in mm at 300mm from center of the loading plate

D_2= Deflection in mm at 600mm from center of the loading plate

D_3= Deflection in mm at 900mm from center of the loading plate

From the area of deflection basin, Radius of relativeness (l) can be evaluated from the charts given in IRC: 117 (Appendix V) and the normalized deflections are found.

b) Evaluation of Subgrade Modulus, Elastic Modulus of concrete, Strength of concrete, Flexural Strength of concrete.

Subgrade moduli value can be found for normalized deflections and average of all should be taken as subgrade modulus.

$$k_i = \frac{Pd_i}{l^2 D_i}$$

Where,

i=1,2,3,4

l=Radius of relative stiffness, mm

P=Load in KN

D_i=Measured deflections in mm at various radial distance

d_i=Normalized deflections in mm at various radial distances

Elastic Modulus (MPa) of concrete can be found by using the formulae.

$$E_c = \frac{12(1-\mu_c)kl^4}{1000h^3}$$

Where,

μ_c= Poisson's Ratio of Concrete

h= Thickness of concrete layer in mm

l= Radius of relative stiffness in mm

k=modulus of subgrade reaction in MPa/m

E= Elastic modulus of concrete, MPa

Strength of concrete can be determined from the E_C from the following.

$$f_c = \sqrt{\left(\frac{E_C}{5000}\right)}$$

Flexural strength can be determined from the f_c of the concrete slab as given below:

$$f_{mr} = 0.7\sqrt{f_c}$$

Poisson's ratio for different layers i.e., 0.15 for concrete and 0.45 for subgrade.

c) Evaluation of Load Transfer Efficiency of Joints

Transverse as well as longitudinal joints deteriorate with traffic due to continuous loading. For a new pavement, the joint efficiency is 100 percent since the deflections on either side of the joint under a wheel load are almost equal and the ratio decreases as the joints deteriorate under repeated loading.

When deflection sensors are the either side of a joint with deflections D1 and D2 on the loaded and unloaded sides. Deflections on the Loaded and Unloaded side at a Joint is presented in Figure 9-10.

$$LTE = 100\left(\frac{D_2}{D_1}\right)$$

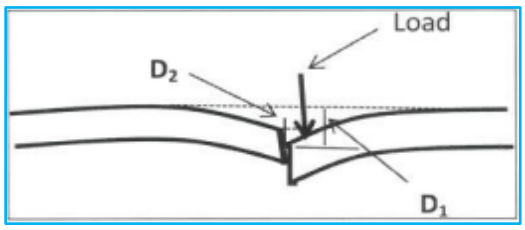


Figure 9-10: Deflections on the Loaded and Unloaded side at a Joint

For a new pavement, $D_1 = D_2$ but D_2 becomes less and less as the joints deteriorate.

If $D_2/D_1 < 0.5$ transverse joints in critical condition

If $D_2/D_1 < 0.4$ longitudinal joints in critical condition

Where,

D_1 is the deflection on the loaded side of the slab

& D_2 is the deflection on the unloaded side of the slab

9.10 Analysis of Rigid pavements

As per IRC: 117-2015, the rigid pavement analysis was carried out to determine the following PQC parameters.

- Evaluation of subgrade modulus, elastic modulus of concrete and flexural strength of concrete pavement.
- Detection of possible locations of voids underneath the rigid pavement
- Load Transfer Efficiency (LTE) of Joints (%)

9.10.1 Observations and findings

From the obtained test results the observations where draw-down. The range of Elastic Modulus and percentage of length is specified in Table 9-11 below;

Table 9-11: Pavement Material Property Ranges – Toll Plaza

Pavement Layer	Range	Percentage of Project Road			
		Toll Plaza			
		LHS		RHS	
		Interior	Interior & Corner	Interior	Interior & Corner
Elastic Modulus of PQC Layer (MPa)	> 30000	100.0%	83.3%	100.0%	100.0%
	30000 - 25000	0.0%	16.7%	0.0%	0.0%
	25000 - 20000	0.0%	0.0%	0.0%	0.0%
	20000 - 10000	0.0%	0.0%	0.0%	0.0%
	< 10000	0.0%	0.0%	0.0%	0.0%
Flexural Strength of PQC Layer (MPa)	> 4.5	100.0%	66.7%	100.0%	83.3%
	4.5 - 3.5	0.0%	33.3%	0.0%	16.7%
	3.5 - 2.5	0.0%	0.0%	0.0%	0.0%
	<2.5	0.0%	0.0%	0.0%	0.0%
Modulus of Subgrade Reaction, k (MPa/m)	> 55 (Equivalent CBR > 10%)	0.0%	0.0%	0.0%	0.0%
	55 to 50.3 (Equivalent CBR > 8-10%)	0.0%	16.7%	0.0%	0.0%
	< 50.3 (Equivalent CBR < 8%)	33.3%	16.7%	33.3%	33.3%

Further, the Elastic modulus, Flexural strength and LTE is assessed, and the summary of details are presented in Table 9-12 below;

Table 9-12: Summary of Obtained Rigid Pavement Parameters

Direction	Elastic Modulus (MPa) of PQC > 30000 MPa		Flexural Strength of PQC > 4.5 MPa		Transverse joint		Longitudinal joint	
					Load Transfer Efficiency (LTE)			
	Interior	Interior & Corner	Interior	Interior & Corner	>80%	Interior	Interior & Corner	Interior
LHS	100.0%	83.3%	100.0%	66.7%	LHS	100.0%	83.3%	100.0%
RHS	100.0%	100.0%	100.0%	83.3%	RHS	100.0%	100.0%	100.0%

9.10.2 Possible air voids underneath of the pavement

Table 9-13: Possible air Voids underneath of the Rigid Pavement

Parameter	Air Voids (Interior)		Air Voids (Corner)	
	LHS	RHS	LHS	RHS
Average deflection (in Micron)	160.3	155.1	169.9	164.1
Panels with Air Voids %	0.00%	0.00%	0.00%	0.00%

** The deflection more than 180 micron is assumed as air void under panels.*

9.11 Traffic Survey and Analysis

Axle load survey of 48 hrs has been conducted at Toll Plaza location. The AADT and growth rates required for the further computations are provided by the client.

9.11.1 Annual Average Daily Traffic

The Annual Average Daily Traffic (AADT) in the FY 2026 are presented in Table 9-14.

Table 9-14: AADT of commercial vehicles at toll plaza in both directions (FY 2026)

Vehicle Type	BUS	LCV	2-axle	3-axle	MAV
AADT	1176	2065	1710	939	3127

*For MSA calculation purposes, a direction distribution of 50% is considered for both LHS and RHS direction.

9.11.2 Vehicle Damage Factor

The axle load survey was conducted at toll plaza (Panniyankara); the number of equivalent 8.16 t standard axles for the different categories of commercial vehicles have been determined based on the axle load surveys.

The equations for computing equivalency factor for single, tandem and tridem axles given below is used as directed in the IRC: 37-2018 for converting different axle load repetitions into equivalent standard axle load repetitions.

- Single axle with single wheel on either side = {axle load in kN / 65}^{4}
- Single axle with dual wheel on either side = {axle load in kN / 80}^{4}
- Tandem axle with single wheel on either side = {axle load in kN /148}^{4}
- Tridem axle with dual wheel on either side = {axle load in kN /224}^{4}

Referring to section 4.4.3 of IRC 37-2018, some tandem axles have only one (single) wheel on each side of the axle. In such cases, each axle of the tandem axle set may be considered as two separate

single axles (with single wheels). Similarly, if the axle spectrum has a tridem axle with single wheels, it may be considered as three separate single axles having single wheels.

VDF values are obtained as per the analysis of 48hrs axle load data is presented in Table 9-15.

The sample photographs axle load survey is shown in Figure 9-11.

Table 9-15: Summary of Vehicle Damage Factor

Location/ Vehicle Type		BUS	LCV	2axle	3axle	MAV
Panniyankara Toll Plaza	LHS	1.362	1.373	2.756	6.199	10.534
	RHS	1.258	0.671	1.263	2.009	3.707



Figure 9-11: Photographs showing Axle load Survey

9.11.3 Design Traffic (Cumulative Number of Standard Axles)

The traffic loading in terms of the cumulative number of standard axles for the given period has been computed using the following relationship as given in IRC: 37-2018.

$$N = \frac{365 \times \left\{(1+r)^n - 1\right\}}{r} \times A \times D \times F$$

Where,

N = Cumulative number of standard axles to be catered for the design life in terms of MSA.

r = Annual growth rate of commercial vehicles

n = Design life in years

A = Initial traffic in the year of completion of construction in terms of number of commercial vehicles per day exceeding 3 ton

D = Lane distribution factor

F = Vehicle Damage Factor

Based on the preceding discussions, the traffic loading in terms of cumulative number of equivalent 8.16 t standard axle loads, the AADT was provided by concessionaire, and 5% growth rates are

considered on year on year, and the design traffic was projected till FY 2036. Design traffic for flexible pavement design is computed and summarized below.

Table 9-16: Design Traffic (MSA) till end of the Concession Period (FY 2035)

Location	Design Traffic (MSA)	
	LHS	RHS
Panniyankara Toll Plaza	70	27

9.12 Required Overlay Calculation as per FWD Analysis

Based on the remaining life assessment, it is observed that certain sections of the existing pavement do not meet the required design life till FY 2036, corresponding to 70 MSA and 27 MSA in the LHS and RHS directions, respectively. To ensure these sections can sustain the projected traffic load, the required additional overlay thicknesses have been computed using IIT-Pave.

For the SR, a design traffic of 5 MSA was considered for overlay calculations.

The summarised overlay thicknesses are presented in Table 9-17. The overall summary of different overlay thicknesses is presented in Table 9-18**.**

Table 9-17: Required Overlay as per FWD_MCW

Chainage (Km)		Side (LHS/ RHS)	Length (km)	Recommended Overlay (mm)	
From	To			BC (mm)	DBM (mm)
261.000	262.500	LHS	1.500	40	-

Table 9-18: Summary of required overlay thickness as per FWD

Rehabilitation/ Repairing Strategy	Treatment length in km	
	LHS	RHS
40mm BC Overlay (MCW)	1.500	-
30mm BC Overlay (SR)	3.000	8.280

10. DEVELOPMENT OF O&M STRATEGY

10.1 General

The Concessionaire is responsible for Operation & Maintenance of the Project Highway in accordance with the provisions of the Concession Agreement.

10.2 Maintenance Requirements as per Schedule K.

The concessionaire shall always maintain that during the Operation Period, the Project Highway conforms to the maintenance requirements set forth in Schedule K.

Repair/ Rectification of Defects and deficiencies specified in Schedule K within time limit set forth hereunder.

Table 10-1: Maintenance requirements with timelines

A: Schedule K		
S. No.	**Nature of Defect/ Deficiency**	**Timelines for Repair/ Rectification**
Project Highway		
(a)	**Carriageway and paved shoulders**	
(i)	Breach or blockade	Time Limit: Temporary restoration of traffic within 24 hours; permanent restoration within 15 (fifteen) days.
(ii)	Roughness value Exceeding 2,500 mm in a stretch of 1 km (as measured by a calibrated bump integrator)	Time Limit: 180 (One Hundred and Eighty) days
(iii)	Potholes	Time Limit: 48 hours
(iv)	Cracking in more than 5% of road surface in a stretch of 1 Km	Time Limit: 30 days
(v)	Rutting exceeding 10mm in more than 2% of the road surface in a stretch of 1 km	Time Limit: 30 days
(vi)	Bleeding / Skidding	Time Limit: 7 (Seven) days
(vii)	Ravelling / Stripping of Road surface exceeding 10 sq.m road	Time Limit: 15 (Fifteen) days.
(viii)	Damages to Pavement edges exceeding 10 cm	Time Limit: 15 (Fifteen) days.
(ix)	Removal of debris	Time Limit: 6 hours
(b)	**Hard / earth shoulders, side slopes, drains and culverts.**	
(i)	Variation by more than 2% in the prescribed slope of camber / cross fall	Time Limit: 30 (Thirty) days.
(ii)	Edge drop at shoulders exceeding 40 mm	Time Limit: 7 (Seven) days
(iii)	Variation by more than 15% in the prescribed side (embankment) slopes	Time Limit: 30 (Thirty) days
(iv)	Rain cuts / gullies in slope	Time Limit: 7 (Seven) days

A: Schedule K

S. No.	Nature of Defect/ Deficiency	Timelines for Repair/ Rectification
(v)	Damage to or silting of culverts and side drains during and immediately preceding the rainy season	Time Limit: 7 (Seven) days
(vi)	Desilting of drains in urban / semi-urban areas	Time Limit: 48 hours
(C)	**Roadside furniture including road signs and pavement marking**	
(i)	Damage to shape or position, poor visibility or loss of retro-reflectivity	Time Limit: 48 hours
(d)	**Street lighting and telecom (ATMS)**	
(i)	Any major failure of the system	Time Limit: 24 hours
(ii)	Faults and minor failures	Time Limit: 8 hours
(e)	**Trees and plantation**	
(i)	Obstruction in a minimum headroom of 5 m above carriageway or obstruction in visibility of road signs	Time Limit: 24 hours
(ii)	Deterioration in health of trees and bushes	Time Limit: Timely watering and treatment
(iii)	Trees and bushes requiring replacement	Time Limit: 90 days
(iv)	Removal of vegetation affecting sight line and road structures	Time Limit: 15 (Fifteen) days
(f)	**Rest areas**	
(i)	Cleaning of toilets	Time Limit: Every 4 hours
(ii)	Defects in electrical, water and sanitary installations	Time Limit: 24 hours
(g)	**Toll plaza**	
(i)	Failure of toll collection equipment or lighting	Time Limit: Every 8hours
(ii)	Damage to toll plaza	Time Limit: 7 (Seven) days
(h)	**Other Project Facilities and Approach roads**	
(i)	Damage in approach roads, pedestrian facilities, truck laybys, bus-bays, cattle crossings, (Traffic Aid Posts, Medical Aid Posts) and service road	Time Limit: 15 (Fifteen) days.
Bridges		
(a)	**Superstructure**	*Cracks* Temporary measures Time Limit: Within 48 Hours Permanent measures Time Limit: Within 45 days *Spalling / Scaling*

A: Schedule K		
S. No.	**Nature of Defect/ Deficiency**	**Timelines for Repair/ Rectification**
		Time Limit: Within 15 days
(b)	**Foundations**	Scouring and/or cavitation Time Limit: 15 (Fifteen) days
(c)	**Piers, abutments, return walls and wing walls**	*Cracks and damages including settlement and tilting.* Time Limit: 30 (Thirty) days
(d)	**Bearings (metallic) of bridges**	*Deformation* Time Limit: 15 (Fifteen) days;
(e)	**Joints in bridges**	*Loosening and malfunctioning of joints* Time Limit: 15 (Fifteen) days
(f)	**Other items relating to Bridges**	
(i)	Deforming of pads in elastomeric bearings	Time Limit: 7 (Seven) days
(ii)	Gathering of dirt in bearings and joints; or clogging of spouts, weep holes and vent-holes	Time Limit: 3 (Three) days
(iii)	Damage or deterioration in kerbs, parapets, handrails and crash barriers	Time Limit: 3 (Three) days.
(iv)	Rain-cuts or erosion of banks of the side slopes of approaches	Time Limit: 15 (Fifteen) days
(v)	Damage to wearing coat	Time Limit: 15 (Fifteen) days
(vi)	Damage or deterioration in approach slabs, pitching, apron, toes, floor or guide bunds	Time Limit: 30 (Thirty) days.
(vii)	Growth of vegetation affecting the structure or obstructing the waterway	Time Limit: 15 (Fifteen) days

10.3 Immediate Repair/ Rehabilitation-Combined (Surface Distress)

Functional evaluation of pavement is conducted with NSV equipment to assess the present condition of the road, and it is found that a few distresses are observed on pavement and at some locations roughness (BI) exceeding the limiting value (>2,500mm/km) specified in Annexure-I of Schedule-K. All appropriate technical and contractual parameters are carefully reviewed to assess and formulate the strategy of immediate repair. The quantities of flexible pavement immediate repair are presented in Table 10-2 and Table 10-3 for both MCW & SR respectively. The quantities of rigid pavement Immediate repair are presented below

.

Table 10-2: Recommended immediate repairing as per NSV in conformity with Schedule-K for MCW

Immediate Repairs/ Rehabilitation: NH-47: Section from Vadakanchery to Thrissur: MCW																
Summary	Proposed Pavement Thickness (m)							Obtained Pavement Materials Quantity								
	Area (Sq.m)	Proposed Milling Depth (m)	Scarification Depth (m)	BC	DBM	WMM	GSB	Milling Area (sq.m)	Scarification (Cu.m)	Soil/ Granular material for shoulder drops off (Cu.m)	GSB (Cu.m)	WMM (Cu.m)	Prime Coat (Sq.m)	DBM (Cu.m)	Tack Coat (Sq.m)	BC (cu.m)
Quantities due to Settlements																
40mm milling & Inlay at settlement portion	0.00	0.040		0.040				0.0							0.0	0.0
Quantities due to Rutting																
40mm Milling & Inlay	350.00	0.040		0.040				350.0							350.0	14.0
Quantities due to Cracking excluding Rutting locations																
Crack Sealing	1090.84															
Quantities due to Only Ravelling																
Slurry seal treatment	0.00															
Quantities due to Only Pothole Filling																
Fill Potholes with premix material	0.00														0.0	0.0

Immediate Repairs/ Rehabilitation: NH-47: Section from Vadakanchery to Thrissur: MCW																
Summary	**Proposed Pavement Thickness (m)**							**Obtained Pavement Materials Quantity**								
	Area (Sq.m)	**Proposed Milling Depth (m)**	**Scarification Depth (m)**	**BC**	**DBM**	**WMM**	**GSB**	**Milling Area (sq.m)**	**Scarification (Cu.m)**	**Soil/ Granular material for shoulder drops off (Cu.m)**	**GSB (Cu.m)**	**WMM (Cu.m)**	**Prime Coat (Sq.m)**	**DBM (Cu.m)**	**Tack Coat (Sq.m)**	**BC (cu.m)**
Quantities due to Roughness excluding Rutting locations																
40mm BC Overlay	26582.50			0.040						Covered under structural overlay					-	0.00
Quantities due to Edge break																
New BC layer	0.00			0.050											0.0	0.0
Quantities due to Slippage/ Delamination																
Patching area with premix material	5.19			0.008											5.2	0.0
Quantities due to Bleeding																
Application of Heated Coarse Sand (Passing 1.18mm sieve) with light rolling	7.72															
Quantities due to Shoulder drop off																
Soil/ Granular material	0.00									0.0						

Table 10-3: Recommended immediate repairing as per NSV in conformity with Schedule-K for SR

Immediate Repairs/ Rehabilitation: NH-47: Section from Vadakanchery to Thrissur: SR																
Summary	Proposed Pavement Thickness (m)							Obtained Pavement Materials Quantity								
	Area (Sq.m)	Proposed Milling Depth (m)	Scarification Depth (m)	BC	DBM	WMM	GSB	Milling Area (sq.m)	Scarification (Cu.m)	Soil/ Granular material for shoulder drops off (Cu.m)	GSB (Cu.m)	WMM (Cu.m)	Prime Coat (Sq.m)	DBM (Cu.m)	Tack Coat (Sq.m)	BC (cu.m)
Quantities due to Settlements																
40mm milling & Inlay at settlement portion	0.00	0.040		0.040				0.0							0.0	0.0
Quantities due to Rutting																
40mm Milling & Inlay	0.00	0.040		0.040				0.0							0.0	0.0
Quantities due to Cracking excluding Rutting locations																
Crack Sealing	716.65															
Quantities due to Only Ravelling																
Slurry seal treatment	0.00															
Quantities due to Only Pothole Filling																
Fill Potholes with premix material	0.00														0.0	0.0
Quantities due to Roughness excluding Rutting locations																
30mm BC Overlay	34140.00			0.030											34140.0	1024.2
Quantities due to Edge break																

Immediate Repairs/ Rehabilitation: NH-47: Section from Vadakanchery to Thrissur: SR															
Summary	**Proposed Pavement Thickness (m)**							**Obtained Pavement Materials Quantity**							
	Area (Sq.m)	**Proposed Milling Depth (m)**	**Scarification Depth (m)**	**BC**	**DBM**	**WMM**	**GSB**	**Milling Area (sq.m)**	**Scarification (Cu.m)**	**Soil/ Granular material for shoulder drops off (Cu.m)**	**GSB (Cu.m)**	**WMM (Cu.m)**	**Prime Coat (Sq.m)**	**DBM (Cu.m)**	**Tack Coat (Sq.m)**	**BC (cu.m)**
New BC layer	0.00			0.050											0.0	0.0
Quantities due to Slippage/ Delamination																
Patching area with premix material	207.64			0.008											207.6	0.5
Quantities due to Bleeding																
Application of Heated Coarse Sand (Passing 1.18mm sieve) with light rolling	3.17															
Quantities due to Shoulder drop off																
Soil/ Granular material	0.00									0.0						

Table 10-4: Recommended immediate repairing for Rigid pavement (Tunnel & Toll Plaza)

Immediate Repair Summary as per IRC SP 83-2018: NH-47 Vadakanchery to Thrissur

Treatment strategy	Units	Qty.				
		Tunnel LHS	Tunnel RHS	Toll LHS	Toll RHS	Overall Qty.
Seal with low viscosity EPOXY to secure broken parts (Corner Cracks)	Rm.	1.6	0.1	1.0	0.7	3.4
Route and Seal	Rm.	43	0.0	7.0	7.5	57.5
Seal and stitch	Rm.	5.375	0.0	37.0	24.5	66.9
Apply low viscous EPOXY RESIN / mortar in cracked section	Rm.	42.75	65.1	15.0	28.0	150.8
PDR/PWR 50mm deep	Cu.m	0	7.8	0.8	0.0	8.7
Local repair of areas damaged and liable to damage (Ravelling/ Scaling)	Sq.m	0	15.0	0.0	0.0	15.0
Bonded Inlay	Sq.m	0	15.8	31.5	31.5	78.8
Full Depth Repair	Cu.m	0	0.0	0.0	0.3	0.3
Seal without Delay	Rm.	0	0.0	27.0	0.0	27.0
Slot stitching	Rm.	0	0.0	15.0	4.0	19.0
Clean Joint and reapply the sealant at selected locations	Rm.	0	196.0	0.0	0.0	196.0

10.4 Major Maintenance Schedule

MM schedule for the main carriageway and service road is presented in Table 10-5.

Table 10-5: M&M Schedule- Main carriageway

Year	MM LHS of MCW	MM RHS of MCW	MM of SR	Remarks
YR 2025 - YR 2026	40 mm BC On 100% length 50mm DBM on 5% length	40 mm BC On 100% length 50mm DBM on 5% length	30 mm BC On 100% length	Base Year (MCW+SR)
YR 2028 - YR 2029				Pavement Marking & Kerb Painting
YR 2031 - YR 2032	40 mm BC On 100% length 50mm DBM on 10% length	30 mm BC On 100% length		1st Cycle MCW
YR 2034 - YR 2035			30 mm BC On 100% length	1st Cycle SR
YR 2035 – YR 2036	30 mm BC On 30% length	30 mm BC On 10% length		2nd Cycle MCW

11. COST ESTIMATE

11.1 General

Cost Estimates have been worked out for expenses on Immediate Works (CAPEX) and expenses on operations and maintenance (OPEX). The cost estimates have been worked out at present rates considering 2025-26 as the base year.

11.2 Assumptions

The cost estimates are based on the following assumptions:

(a) Bitumen is sourced from BPCL Kochi Refinery. The distance (to & fro) from the Project Highway is taken as 95 km. PMB 76-10 grade bitumen and VG-40 grade bitumen is considered in our cost estimate.

(b) Hire charges for the Machinery have been considered in accordance with 'Standard Data Book for Analysis of Rates' published by MORT&H and escalation have been considered 10% from the base price. Rates for various items of works have also been arrived from 'Standard Data Book for Analysis of Rates' published by MORT&H.

(c) Manpower rates have been taken from Central Wages Order, Government of India, Ministry of Labour and Employment issued on 28 March 2025.

(d) Material Rates are obtained from Local vendor of the project.

(e) Cement is procured from the nearest local market.

(f) Tata Steel rates are taken in cost estimate which are collected from Thrissur.

(g) Some of the rates are based on Consultant's experience on the similar ongoing projects in adjacent locations.

(h) Overheads and profits have been considered based on MORT&H Standard Data Book. Applicable taxes have been considered in the Rate Analysis.

11.3 CAPEX

Details of CAPEX are worked out under the following categories.

- Immediate maintenance / defect rectification.
- Periodic maintenance

11.3.1 Immediate Maintenance

Immediate Maintenance Cost is estimated towards immediate repair / maintenance / restoration of (i) Highway flexible pavement and Toll Plaza rigid pavement distress, (ii) minor repairs of structures, (iii) few TMS equipment replacements and (iv) Tunnel repairs. These immediate maintenances are considered as per site investigation.

11.3.2 Periodic / Major Maintenance

Cost estimate is prepared for Periodic maintenance of the highway pavement considering adjusted MMR cycle. The proposed interventions under this periodic maintenance plan include the replacement of structure bearings, replacement of expansion joints, and relaying of the wearing coat on structures. These activities are scheduled to be undertaken, aligning with the typical lifecycle of the equipment and ensuring uninterrupted toll operations and system reliability till end of concession period and beyond.

11.4 O&M Estimates

Operation and Maintenance estimates have been worked out under the following heads:

(a) Preventive Maintenance / Routine Maintenance

(b) Operations

11.4.1 Routine Maintenance - Categories

Routine Maintenance covers all activities required to maintain the road in traffic worthy condition to provide desired comforts to the road users. Routine Maintenance can be classified into following three categories:

(a) Routine or day to day maintenance

(b) Pre-monsoon maintenance

(c) Post monsoon maintenance

11.4.1.1 Routine or day to day maintenance

Routine maintenance is required continuously on the road stretch and structures and covers the following activities:

(a) Cleaning of the Road

(b) Pavement maintenance to include crack sealing and pothole repairs

(c) Shoulder repairs

(d) Maintenance of avenue plantation, horticulture, and median plantation

(e) Maintenance of signage, gantry boards and road furniture.

(f) Maintenance of culverts, bridge drainage spouts, expansion joints, side slopes and verges

(g) Surface cleaning, dust or vegetation control, sand removal from structures

(h) Reporting any damage caused to bridges by traffic accidents

(i) Maintenance of guard rails and crash barrier etc.

11.4.1.2 Pre-monsoon Maintenance

This is carried out prior to the monsoons and includes the following:

(a) Inspection of channels/streams to ensure that there are no accumulation of logs, trees and other debris in the vicinity of piers and abutments.

(b) Cleaning of roadside / median drains.

(c) Removal of vegetation growth on sub structures.

(d) Cleaning of culverts.

11.4.1.3 Post-monsoon Maintenance

This includes maintenance that is carried out immediately after the monsoons and includes the following:

(a) Inspection of all structures for any damages and taking appropriate actions.

(b) Cleaning of roadside drains, culverts etc.

11.5 Operations Estimates

11.5.1 Toll Plaza

This cost includes the following:

(a) Maintenance of Toll Plaza building, booths, and tolling equipment.

(b) Security of the booths, lanes, and toll plazas.

(c) Collection of toll and handling of cash till bank deposit.

(d) Provision of IT in-charge, IT supervisor, other staff at Toll Plaza location.

(e) Administration and essential facilities for the staff and road users.

(f) Maintenance of Toll Plaza equipment and replacement of expendable and short life items.

(g) Electricity cost including standby generator.

11.5.2 Highway

This cost includes the following:

(a) Providing patrolling vehicle including operating cost for round-the-clock patrolling of the Project Highway.

(b) Providing of ambulance at Toll Plaza for accident victims.

(c) Provision of crane with 30 MT and tow truck facilities for clearing the highway and evacuating the breakdown vehicles at Toll Plaza.

(d) Provision of one Broomer for cleaning of the highway.

(e) Expenditure on medical aid and provision of nursing staff.

11.5.3 Energy

Lighting is provided at the toll plaza, tunnel and highway with single and double arm lamp post. Streetlight luminaries, high mast lights with electricity tariff, provision of standby Genset are considered in the cost estimate including cost of replacing LED Light, high mast lamps and Spare Parts for highway lighting, and solar blinkers.

11.5.4 Miscellaneous

Reimbursement of IE and Insurance expensed are taken for cost estimate as per share data. Yearly charges for Survey & Investigation are also included

11.6 Summary of O&M Cost

Summary of yearly O&M cost at present rate is presented in Table 11-1:

Table 11-1: Summary of OPEX (without escalation)

Sl. No.	Item Head	Unit	Rate (in Rs.) (Per Km /Per Month) for 6 Lane	Monthly Cost	Annual Cost in (Rs.)
				For FY 2026	
1	Preventive Maintenance During Operation	Per Month	29,547	28.355	10,053,696
2	Routine Maintenance During Operation	Per Month	67,405	28.355	22,935,285
3	Highway Lighting	Per Month			15,188,701
4	Head Office, Admin Office, and Toll Operation manpower cost				

Sl. No.	Item Head	Unit	Rate (in Rs.) (Per Km /Per Month) for 6 Lane	Monthly Cost	Annual Cost in (Rs.)
				For FY 2026	
(a)	On roll & off roll staff	Per Month			65,044,130
5	Incident management expenses	Per Month			11,899,188
6	Toll system & AMC	Per Month			3,245,434
7	Admin Expenses	Per Month			3,435,425
8	Professional Fee Expense	Per Month			9,000,000
9	Insurance Fee	Per Month			7,000,000
10	Survey & Investigation charges	Per Month			682,562
	Total Annual Cost (including GST) in Rs.			**12,373,702**	**148,484,421**
	Total Annual Cost (including GST) in Crore.			**1.24**	**14.85**

11.7 Year Wise Summary of CAPEX & OPEX

Year-wise summary of CAPEX & OPEX for the balance concession period till FY 2036 is estimated and presented in Table 11-2.

Table 11-2: Summary of Year wise CAPEX & OPEX (TEL)

Abstract of Cost for Operation & Maintenance																						
Yr			CAPEX				Major Maintenance				OPEX											(CAPEX + MMR + OPEX)
Year in Nos	From	To	Pavement Repair	Structure Repair	TMS & ATMS Repair	Sub Total (A)	Periodic Repair - Highways	Periodic Repair - Structure	TMS & ATMS Replacement	Sub Total (B)	Preventive Maintenance	Routine Maintenance	Highway Lighting	SPV Staff (On & Off Roll)	Incident Management	AMC for TMS	Professional Fee	Insurance Fee	Survey & Investigation charges	Admin Expense	Sub Total (C)	Grand Total (D) = (A)+(B)+(C)
1	1-Apr-25	31-Mar-26	0.07	0.40	-	0.46	66.03		1.62	67.65	1.01	2.29	1.52	6.50	1.19	0.32	0.90	0.70	0.07	0.34	14.85	82.96
2	1-Apr-26	31-Mar-27				-				-	1.06	2.41	1.59	6.83	1.25	0.34	0.95	0.74	0.07	0.36	15.59	15.59
3	1-Apr-27	31-Mar-28				-				-	1.11	2.53	1.67	7.17	1.31	0.36	0.99	0.77	0.08	0.38	16.37	16.37
4	1-Apr-28	31-Mar-29				-	3.33	16.12		19.45	1.16	2.66	1.76	7.53	1.38	0.38	1.04	0.81	0.08	0.40	17.19	36.64
5	1-Apr-29	31-Mar-30				-				-	1.22	2.79	1.85	7.91	1.45	0.39	1.09	0.85	0.08	0.42	18.05	18.05
6	1-Apr-30	31-Mar-31				-				-	1.28	2.93	1.94	8.30	1.52	0.41	1.15	0.89	0.09	0.44	18.95	18.95
7	1-Apr-31	31-Mar-32				-	68.36	5.47	1.62	75.45	1.35	3.07	2.04	8.72	1.59	0.43	1.21	0.94	0.09	0.46	19.90	95.35
8	1-Apr-32	31-Mar-33				-				-	1.41	3.23	2.14	9.15	1.67	0.46	1.27	0.98	0.10	0.48	20.89	20.89
9	1-Apr-33	31-Mar-34				-				-	1.49	3.39	2.24	9.61	1.76	0.48	1.33	1.03	0.10	0.51	21.94	21.94
10	1-Apr-34	31-Mar-35				-	19.55			19.55	1.56	3.56	2.36	10.09	1.85	0.50	1.40	1.09	0.11	0.53	23.03	42.59
11	1-Apr-35	31-Mar-36				-	11.61			11.61	1.64	3.74	2.47	10.60	1.94	0.53	1.47	1.14	0.11	0.56	24.19	35.80
12	1-Apr-36	14-Sep-36				-				-	0.78	1.78	1.18	5.06	0.93	0.25	0.70	0.54	0.05	0.27	11.55	11.55
Total Cost (INR Crore)			**0.07**	**0.40**	**-**	**0.46**	**168.88**	**21.59**	**3.25**	**193.71**	**15.07**	**34.37**	**22.76**	**97.47**	**17.83**	**4.86**	**13.49**	**10.49**	**1.02**	**5.15**	**222.50**	**416.68**

Note: Cost includes 18% GST. An annual escalation of 5% for Opex and 2% for Major Maintenance is applied in projections.



DISCLAIMER

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ANNEXURE C – TRAFFIC REPORTS

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Crisil
Intelligence

Traffic & Revenue Assessment for Ahmedabad-Maliya Road section of SH-17 and SH-07 from Km 13.930 to Km 194.633 in the state of Gujarat

Final Report

November 2025



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Acronyms

Acronyms	Meaning
AADT	Annual Average Daily Traffic
ADT	Average Daily Traffic
APEDA	Agricultural and Processed Food Products Export Development Authority
APSEZ	Adani Ports and Special Economic Zone
CA	Concession Agreement
CAGR	Compound annual growth rate
CFS	Container Load
CONCOR	Container Corporation of India
CT	Container Terminal
DBFOT	Design Build Finance Operate and Transfer
DGCIS	Directorate General of Commercial Intelligence and Statistics
DPR	Detailed Project Report
DWT	Deadweight Tonnage
EAC	Expert Appraisal Committee
EXIM	Export Import
FMCG	Fast-moving consumer goods
FY	Fiscal Year
GDP	Gross Domestic Product
GIDC	Gujarat Industrial Development Corporation
GSDP	Gross State Domestic Product
GSR	General Statutory Rules
GVFL	Gujarat Venture Finance Limited
HME	Heavy Motor Vehicle
ICD	Inland Container Depots
IHMCL	Indian Highways Management Company Limited
IRC	Indian Road Congress
JNPT	Jawaharlal Nehru Port Trust/Authority
KASEZ	Kandla Special Economic Zone
KRCL	Kutch Railway Company Limited
LCL	Container Freight Station
LCV	Light Commercial Vehicle
LMT	lakh metric tonnes
LPG	Liquefied petroleum gas
MAV	Multi Axle Vehicle (Vehicles with more than 3 axles up to 6 axles)
MMLP	Multi-Modal Logistics Parks
MMT	million metric tons
MTPA	million tonnes per annum
NH	National Highways
NHAI	National Highways Authority of India
SH	State Highway
MBSIR	Mandal Becharaji Special Investment Region
VSIR	Viramgam Special Investment Region
OD	Origin-Destination

Acronyms	Meaning
OSV	Over Sized Vehicle (Vehicles with more than 6 axles)
PFT	Private Freight Terminal
PCU	Passenger Car Unit
SBM	Single Buoy Mooring
SCF	Seasonal Correction Factors
SPV	Special Purpose Vehicle
TEU	Twenty-foot Equivalent Units
TMS	Toll Management Systems
TVC	Traffic Volume Count
UAE	United Arab Emirates
UNESCO	United Nations Educational, Scientific and Cultural Organization
US	United State of America
WDFC	Western Dedicated Freight Corridor
WPI	Wholesale price index

1 Executive Summary

1.1 Project Details

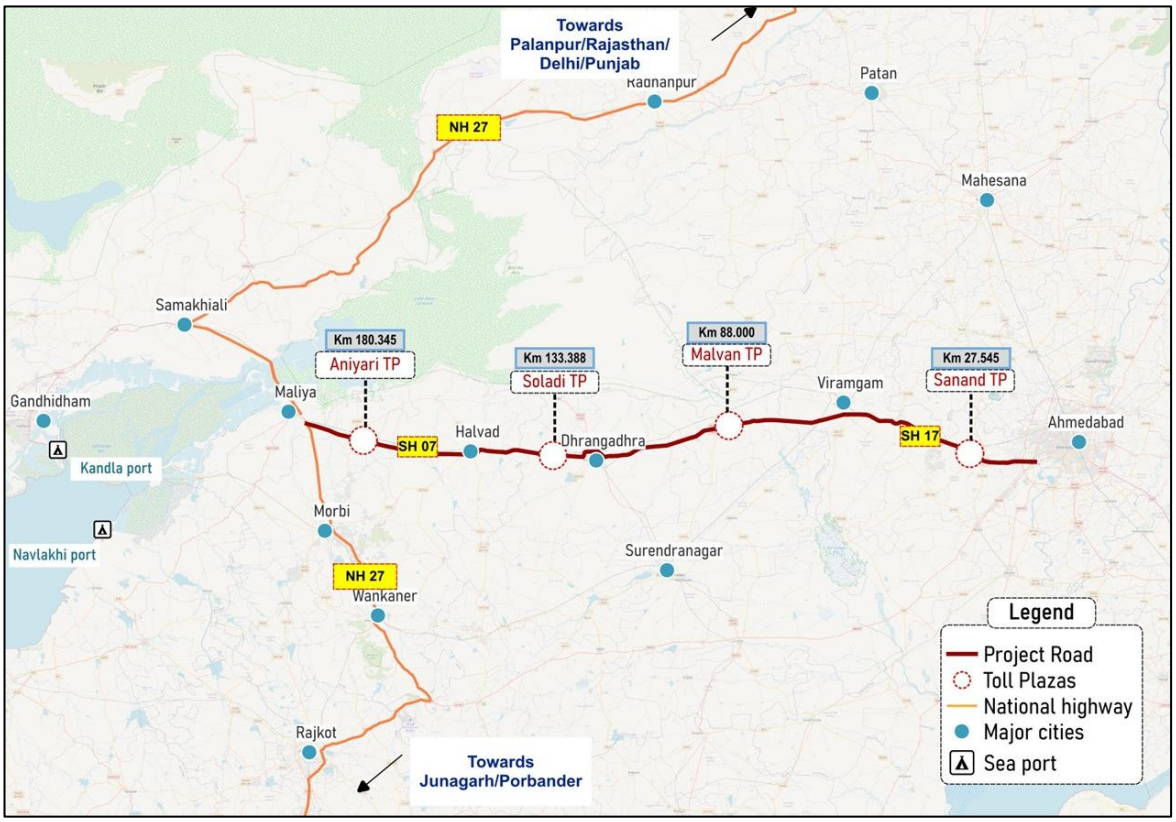
We understand that EAAA TransInfra Managers Limited is the Investment Manager, M/s EPIC Transnet Project Management Private Limited is the proposed Project Manager and M/s EPIC Transnet Infrastructure Private Limited is the sponsor of the Citius TransNet Investment Trust ("Trust" or "InvIT") and M/s Ahmedabad - Maliya Tollway Private Limited (“AMTPL”) is proposed to be part of the initial portfolio assets of the Trust. The Trust is registered with Securities and Exchange Board of India (“SEBI”) as an infrastructure investment trust under the SEBI InVIT Regulations.

M/s EPIC Transnet Infrastructure Private Limited (hereinafter “the Client”) as sponsor has appointed M/s CRISIL Limited (hereinafter referred as “Traffic Consultant”) to carry out Traffic and Revenue Due Diligence of operational asset of Four Laning of Ahmedabad-Viramgam-Maliya Road on BOT Toll Basis in the State of Gujarat (herein after refer as “the Project”) which is being operated by “M/s Ahmedabad - Maliya Tollway Private Limited" (hereinafter refer as “the Concessionaire or Company or AMTPL”).

1.2 Asset overview

Project road Ahmedabad-Maliya is a 4-lane, 180.70 km long stretch, on state highways SH-17 and SH-07 (state highways) in the state of Gujarat and passes through the districts of Ahmedabad, Surendranagar and Morbi. The project highway has been constructed on Design, Build, Finance, Operate and Transfer (DBFOT) basis with a four – lane divided configuration. The project road has a total of 4 toll plazas viz., Sanand (TP01), Malvan (TP02), Soladi (TP03) and Aniyari (TP04).

Figure 1-1: Project Road



Source: Open Street Map, Crisil Intelligence

by S&P Global

The Ahmedabad-Viramgam-Maliya section of SH-17 and SH-7 is one of many such critical corridors that had been four-laned considering the future capacity constraints. The project highway connects the industrial areas of Sanand, Chharodi and Khoda, the pharmaceutical hub at Moraiya, ceramic tiles manufacturing hub in Morbi. It also provides connectivity to the important ports of Kandla and Mundra. Also, the Kachchh district houses the largest sponge iron plant. The asset is strategically positioned between Gujarat's major urban center, Ahmedabad, and key port locations. This makes it a critical link for both industrial supply chains and port-based logistics. The corridor serves as a vital transit route connecting industrial clusters in central Gujarat with western coastal ports like Kandla and Mundra, enabling efficient inland and export-bound cargo movement.

Salient growth features and traffic generators

The project corridor has emerged as a powerhouse of industrial and logistics development in western India. This region’s strategic location, robust infrastructure, and presence of multiple Gujarat Industrial Development Corporation (GIDC) estates and industrial parks make it a central artery of economic activity, linking manufacturing and resource hubs with major ports and urban centers.

Sanand stands as the flagship industrial estate in this corridor, encompassing over 2,500 hectares and hosting more than 500 companies. GIDC Sanand is meticulously organized into specialized clusters for auto vendors, multinational corporations, plastics, engineering, electronics, pharmaceuticals, medical devices, and knowledge-based industries. Proximity to Ahmedabad's international airport and railway junctions further supports extensive passenger and freight movement. Viramgam’s industrial area is another key hub, featuring a mixture of textile, engineering, chemicals, pharmaceuticals, plastics, and metallurgy sectors. It covers more than 40 hectares and benefits from strategic connectivity via road and rail, including a dedicated crude oil depot on the Salya-Mathura pipeline. Dhrangadhra’s GIDC estate specializes in chemical manufacturing - particularly salt and soda ash - thanks to decades-old anchor companies like DCW Ltd. Additional estates and developing parks near Halvad, Aniyari, and Maliya facilitate expansion for ceramics, textiles, engineering, and agricultural processing.

The corridor is dominated by automotive manufacturing, led by Tata Motors, Ford (now Tata-owned), Suzuki, MG Motor India, Honda, Hero MotoCorp, and a vibrant ecosystem of parts and component suppliers all situated in Sanand and Becharaji. Together, these OEMs and ancillaries produce hundreds of thousands of vehicles - from passenger cars to two-wheelers - along with essential subassemblies, tires, electronics, and interior parts. The auto sector's growth draws significant investment, with supporting clusters for logistics, research, and business services.

Sanand and adjacent industrial parks also host leading FMCG and consumer goods companies such as Coca-Cola, Nestlé, Colgate-Palmolive, Procter & Gamble, Nivea, Parle, Marico, and Unicharm, primarily producing beverages, packaged foods, personal care products, and fast-moving consumables. The chemical cluster in Dhrangadhra, anchored by DCW Ltd., is a major national producer of soda ash, caustic soda, sodium bicarbonate, and industrial salt. The region is further strengthened by a robust textile sector, with spinning and ginning mills, as well as ceramics manufacturers, particularly around Thangadh, which houses more than 350 tiles and ceramics companies.

The project corridor also caters to the traffic from Morbi which is known for its ceramic production and is often referred to as the "Ceramic City" of India and houses over 1000+ ceramic factories with a combined annual production capacity exceeding 300 million square meters, which representing approximately 80% of India’s total ceramic production, producing a wide range of items including wall tiles, floor tiles, vitrified tiles, polished glazed vitrified tiles, and sanitary ware.

Freight traffic on SH17 and SH07 is primarily composed of agricultural produce, auto components and machinery,

bulk chemicals (especially soda ash and salt), iron and steel products, FMCG products, textiles, construction materials, and engineering goods. Bulk trucks and containers routinely transport goods between manufacturing estates and northern, western, and southern states, with major flow through ports like Kandla and Mundra. Raw materials—steel, chemicals, petroleum—also move inwards to supply factories, underscoring the corridor's significance for both inbound and outbound logistics.

Passenger traffic along the corridor is attributed by daily workforce commuting to numerous factories, with regular bus routes and private transport linking workers to industrial zones in Sanand, Viramgam, and Dhrangadhra. Logistics parks such as ESR Sanand and Ayodhya Industrial Park in Viramgam provide warehousing and distribution centers, enabling high volumes of containerized movement.

In sum, project corridor serves as Gujarat's industrial backbone: an ecosystem of large-format manufacturing, chemical and auto clusters, vast logistics infrastructure, and thriving passenger and freight flows.

1.3 Historical traffic data

The chart below shows the average daily traffic on Ahmedabad-Maliya stretch from the start of commercial operations to July 2025. The commercial operations for the toll plazas on the project road are:

- Sanand (TP01) - September 2012
- Malvan (TP02) – November 2012
- Soladi (TP03) – April 2012
- Aniyari (TP04) – May 2012

Figure 1-2: Historic Annual Average Daily Traffic (AADT) - Sanand (TP01)

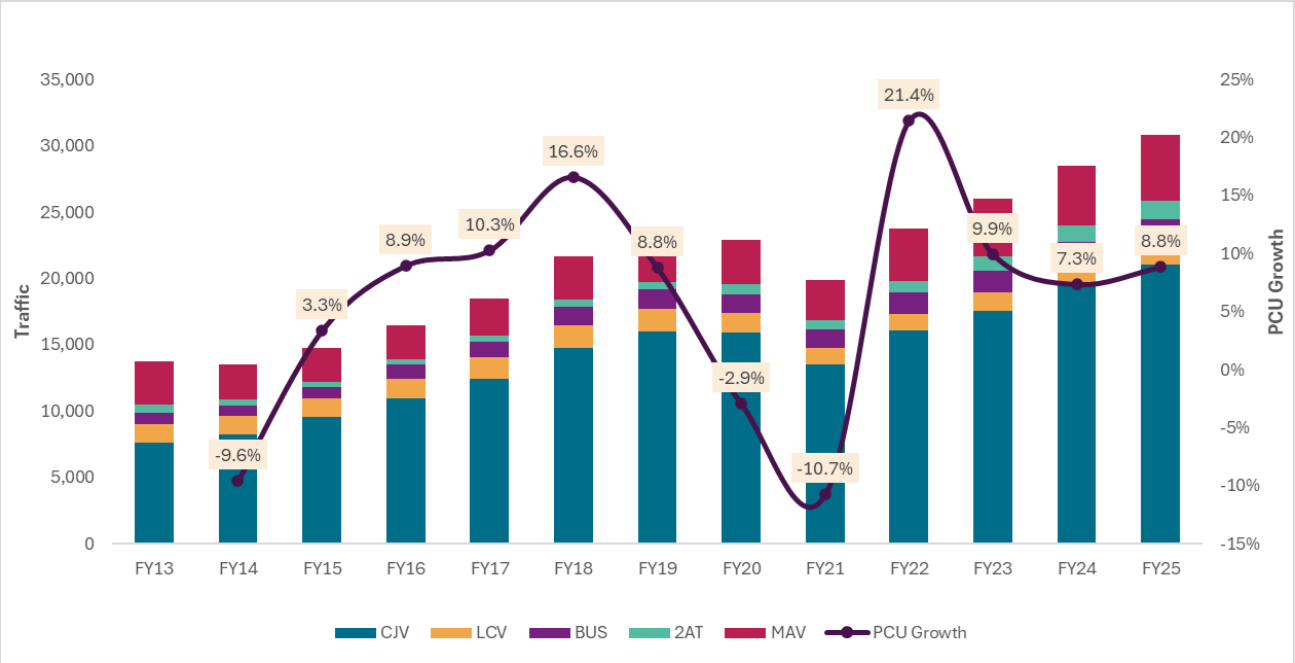


Figure 1-3: Historic Annual Average Daily Traffic (AADT) - Malvan (TP02)

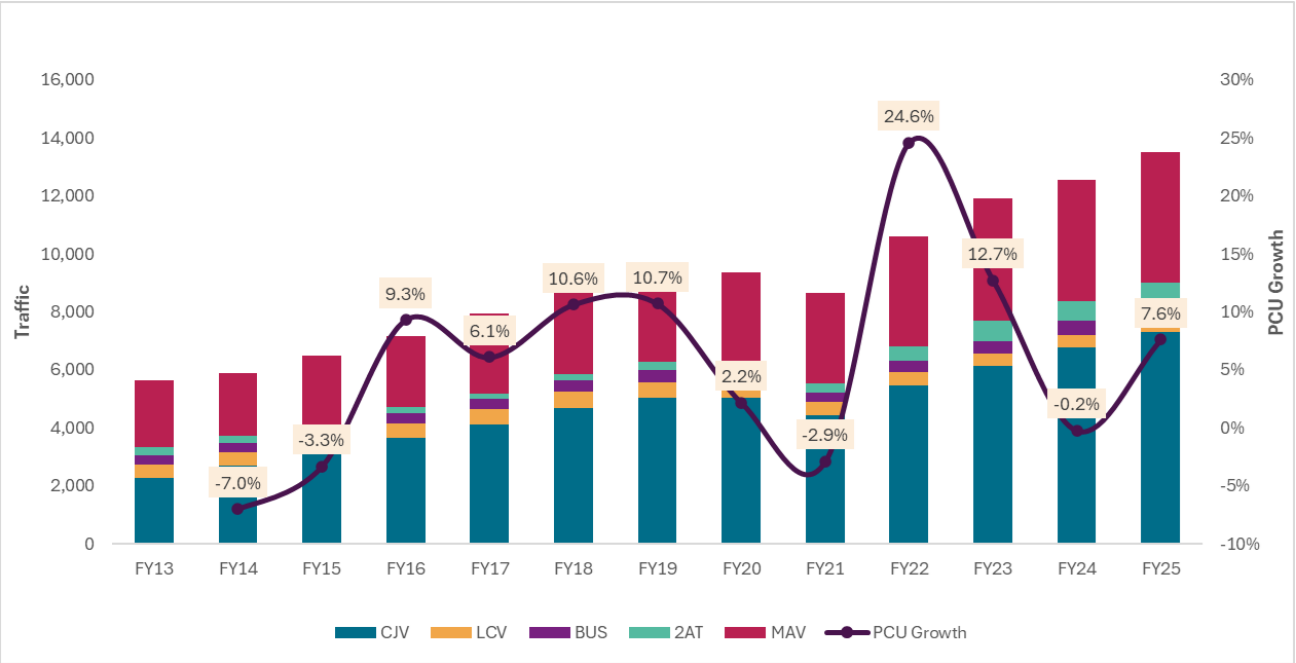


Figure 1-4: Historic Annual Average Daily Traffic (AADT) - Soladi (TP03)

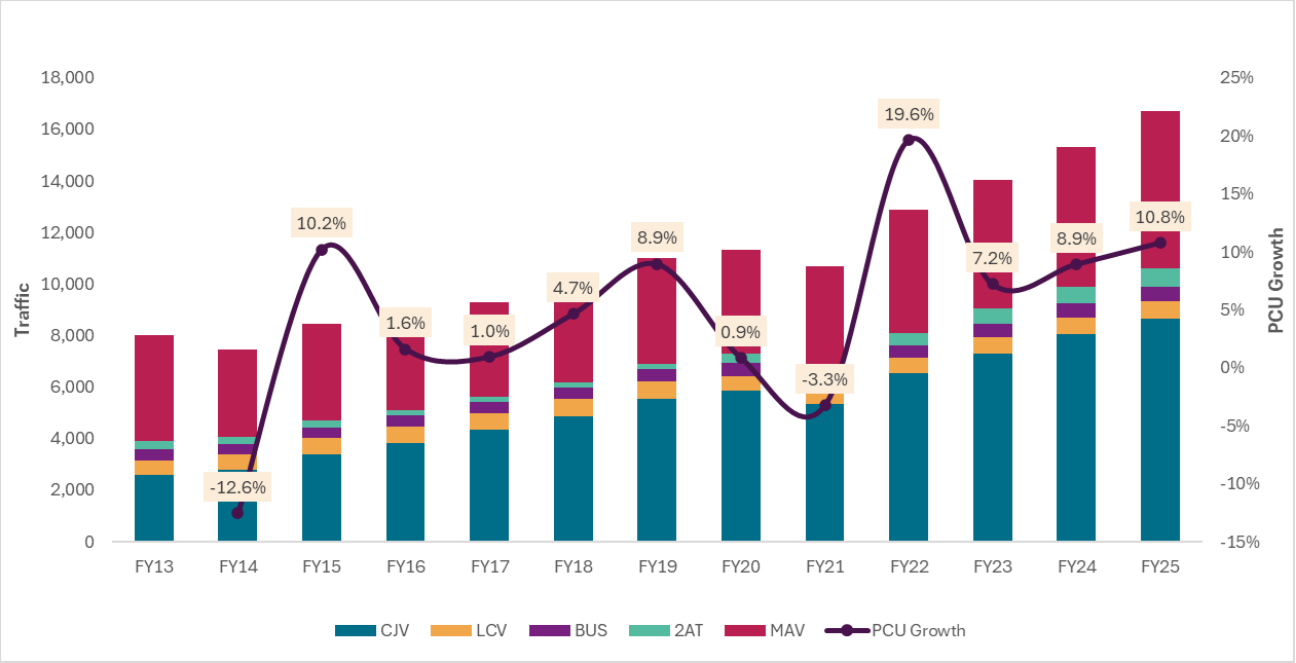
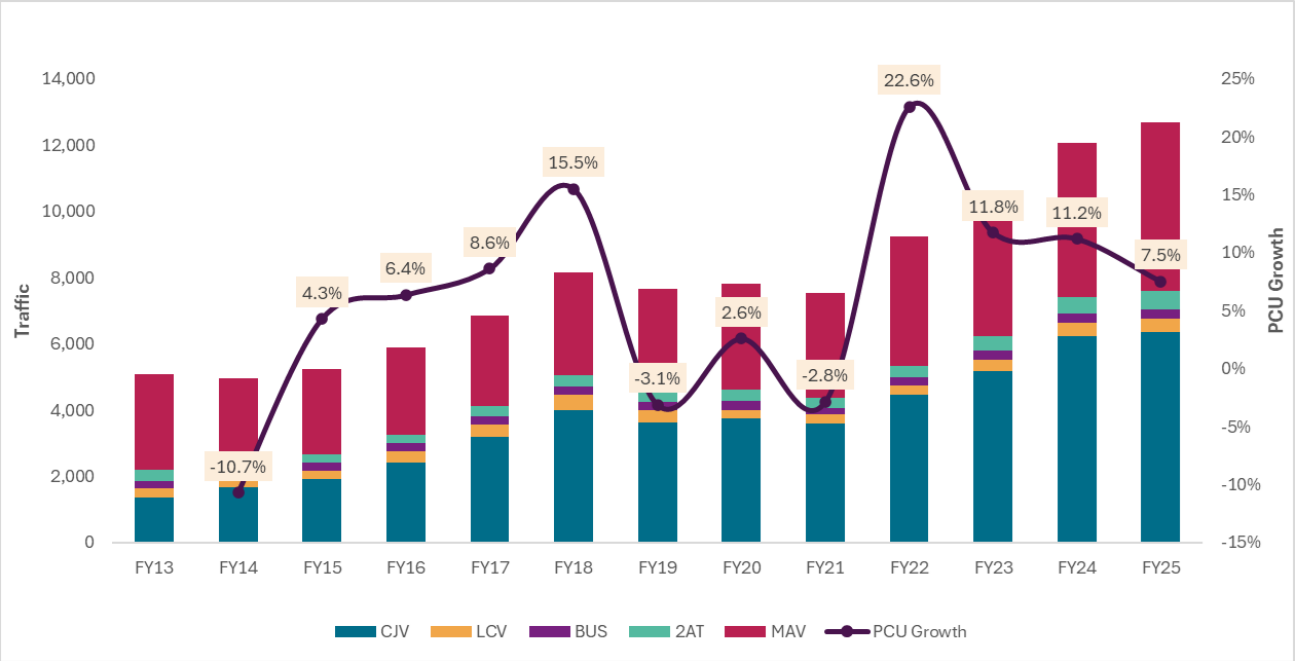


Figure 1-5: Historic Annual Average Daily Traffic (AADT) - Aniyari (TP04)



Source: Client Data, Crisil Intelligence

1.4 Base Traffic Estimation

For base traffic (annual average daily traffic) estimation of the present study, current fiscal 4-months (Apr-25 to July-25) of TMS traffic data were annualized using SCF factor of FY 24 & FY 25 ETC traffic data (excluding the Bijparjoy cyclone impact in FY 24 & excluding impact of Cyclone Asna in FY 25) to arrive at the annual average daily traffic (AADT) for FY 26.

The AADT estimation for the base case for FY26 is presented table below.

Table 1-1: Base Traffic Estimation - FY26 AADT

Particulars	FY Year	CJV	LCV	BUS	2AT	3-Axle	MAV	OSV	Vehicles	PCU
Sanand (TP01)										
ADT (Apr-July) *	FY 26	22,593	1,742	2,032	1,479	654	4,561	16	33,076	58,294
SCF	FY 24 & FY 25	1.02	1.01	1.01	1.00	1.05	1.05	1.05		
AADT	**FY 26**	**23,025**	**1,761**	**2,047**	**1,485**	**684**	**4,772**	**16**	**33,790**	**59,861**
Malvan (TP02)										
ADT (Apr-July) *	FY 26	7,622	521	464	771	296	4,469	10	14,151	33,148
SCF	FY 24 & FY 25	1.04	1.02	1.02	0.99	1.05	1.05	1.05		
AADT	**FY 26**	**7,927**	**531**	**472**	**765**	**310**	**4,684**	**10**	**14,701**	**34,493**
Soladi (TP03)										
ADT (Apr-July) *	FY 26	9,238	689	560	816	366	5,829	6	17,504	41,756
SCF	FY 24 & FY 25	1.03	1.02	1.01	1.04	1.08	1.08	1.08		

Particulars	FY Year	CJV	LCV	BUS	2AT	3-Axle	MAV	OSV	Vehicles	PCU
AADT	**FY 26**	**9,519**	**702**	**563**	**852**	**395**	**6,291**	**7**	**18,329**	**44,342**
Aniyari (TP04)										
ADT (Apr-July) *	FY 26	6,311	405	282	584	309	4,898	31	12,821	32,630
SCF	FY 24 & FY 25	1.09	1.09	1.03	1.08	1.10	1.10	1.10		
AADT	**FY 26**	**6,872**	**443**	**291**	**631**	**341**	**5,400**	**35**	**14,014**	**35,785**

**For August 2024 month data is considered till 24th august, rest of the days were affected by floods in Kutch region of Gujarat (Cyclone Asna)*
***June 2023 data is adjusted for the cyclone Bijparjoy Impact (Data from 14th June-19th June excluded).*
Source: Client TMS Data, Crisil Intelligence

1.4.1 Toll Segmentation

The toll fee of Car/Jeep/ Van/Two Wheeler/ Three Wheeler & Gujarat State Road Transport Corporation Buses have been exempted from date 15/08/2016 vide Government of Gujarat, Roads & Building Department Government of Gujarat, Road.

The historic toll traffic data for FY25 is used in adopting the segmentation for the project road for all the toll plazas and is presented below. It is to be noted that this segmentation is converted to an implied trip segmentation which is presented in Chapter 9, after considering the Car/Jeep/Van and Buses exemptions and calculated using the GSRDC claim process for the asset which is further used for revenue projections for the study.

Table 1-2: Toll segmentation at all the toll plazas on the project corridor-FY25

FY	Vehicle Type	Single	Return	Monthly	Local	Local Commercial (50 % Discounted Trip)	Exemption/Violation	Total
Sanand (TP01)								
2025	**CJV**	0.7%	0.6%	0.0%	0.0%	0.0%	98.7%	100.0%
	LCV/MINIBUS	46.0%	44.9%	3.6%	0.0%	0.0%	5.5%	100.0%
	BUS	10.9%	27.7%	22.4%	0.0%	0.0%	38.9%	100.0%
	TRUCK 2 AXLE	76.8%	22.1%	0.0%	0.0%	0.0%	1.1%	100.0%
	MAV+OSV	86.8%	12.9%	0.0%	0.0%	0.0%	0.2%	100.0%
Malvan (TP02)								
2025	**CJV**	1.2%	0.3%	0.0%	0.0%	0.0%	98.5%	100.0%
	LCV/MINIBUS	81.0%	17.2%	0.0%	0.0%	0.0%	1.9%	100.0%
	BUS	17.8%	8.3%	0.0%	0.0%	0.0%	74.0%	100.0%
	TRUCK 2 AXLE	82.8%	16.1%	0.0%	0.0%	0.0%	1.1%	100.0%
	MAV+OSV	92.0%	7.9%	0.0%	0.0%	0.0%	0.1%	100.0%
Soladi (TP03)								
2025	**CJV**	1.4%	0.2%	0.0%	0.0%	0.0%	98.3%	100.0%
	LCV/MINIBUS	75.1%	22.2%	0.0%	0.0%	0.0%	2.6%	100.0%
	BUS	16.0%	7.7%	0.0%	0.0%	0.0%	76.3%	100.0%
	TRUCK 2 AXLE	87.6%	11.0%	0.0%	0.4%	0.4%	0.6%	100.0%
	MAV+OSV	93.6%	6.2%	0.0%	0.0%	0.0%	0.1%	100.0%
Aniyari (TP04)								

FY	Vehicle Type	Single	Return	Monthly	Local	Local Commercial (50 % Discounted Trip)	Exemption/Violation	Total
2025	CJV	1.3%	0.2%	0.0%	0.0%	0.0%	98.5%	100.0%
	LCV/MINIBUS	79.3%	19.8%	0.0%	0.0%	0.0%	0.9%	100.0%
	BUS	27.4%	8.8%	0.0%	0.0%	0.0%	63.8%	100.0%
	TRUCK 2 AXLE	88.0%	11.1%	0.0%	0.0%	0.0%	0.8%	100.0%
	MAV+OSV	91.9%	8.0%	0.0%	0.0%	0.0%	0.1%	100.0%

Source: Crisil Intelligence

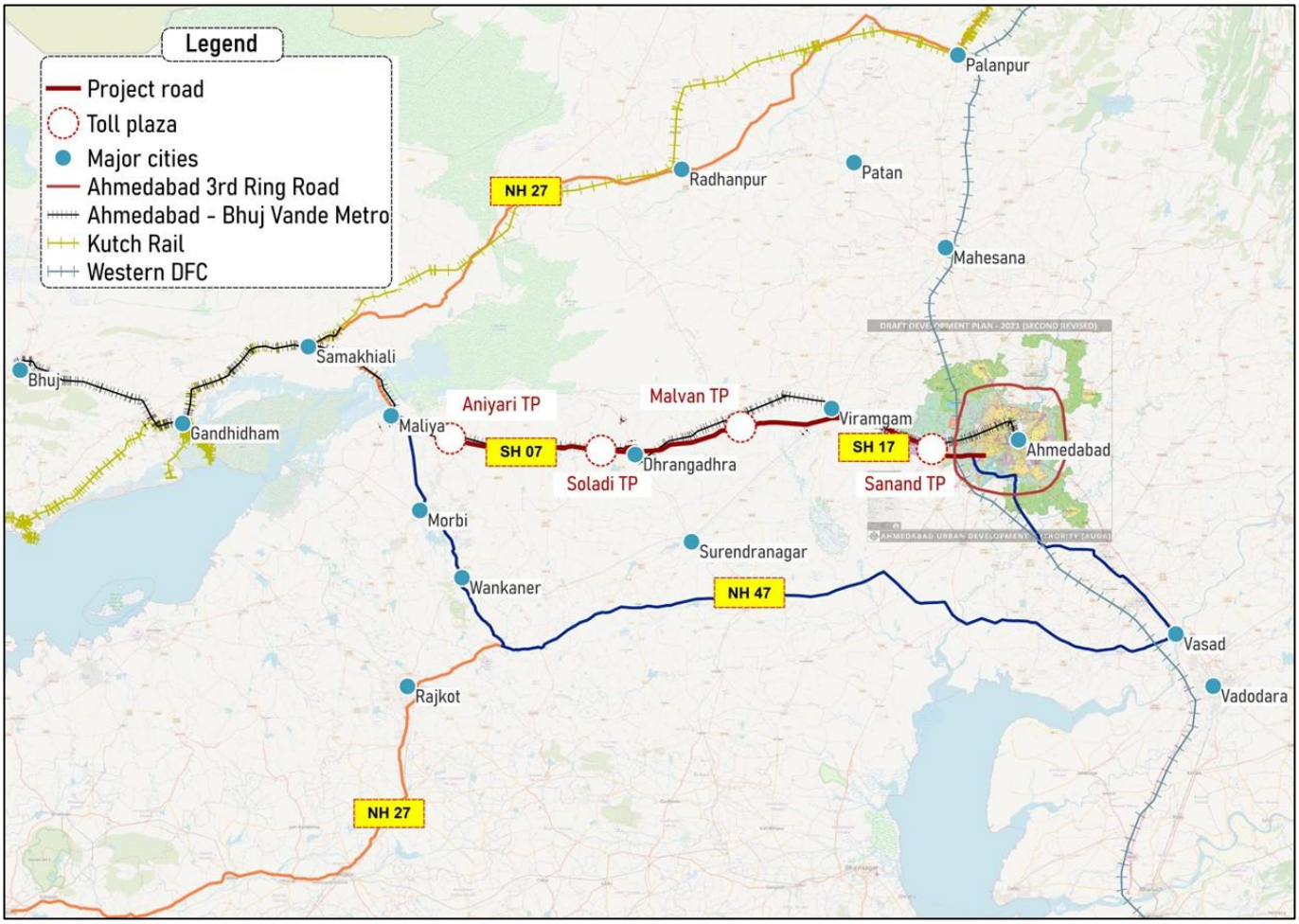
1.5 Network Developments in the Region

In the case of the project road, there are no short distance alternate routes available that will impact the traffic on the project road. However ongoing and upcoming short distance & long-distance networks that could impact the project road are:

- Western Dedicated Freight Corridor (WDFC)
- Impact of Ahmedabad-Bhuj Vande Metro Express
- Impact of 6 laning and operational tolling on NH47 /NH8A
- Construction of Ahmedabad 3rd Ring Road
- Impact of Private Freight Terminals and Cargo terminals – **Scenario 1**

The alignment of the developments along with the project road is presented below figure.

Figure 1-6: Network Development around project road



Source: Open Street Map, Crisil Intelligence

1.6 Traffic Projections

The table below provides the traffic growth rates considering various diversion/impacts, as provided by the Traffic Consultant:

Table 1-3: Projected Traffic Growth Rates

Vehicle category	FY 26 - FY 30	FY30-34	FY26-34	FY26-38	FY34-38
Sanand (TP01)					
CJV	7.5%	6.4%	6.9%	6.4%	5.2%
LCV/MINIBUS	3.6%	3.2%	3.4%	3.1%	2.6%
BUS	3.4%	3.1%	3.3%	3.1%	2.9%
TRUCK 2 AXLE	4.2%	3.6%	3.9%	3.6%	3.0%
TRUCK 3 AXLE	2.2%	1.6%	1.9%	1.6%	1.0%
MAV+OSV	5.3%	4.7%	5.0%	4.7%	4.1%
Total	**6.5%**	**5.7%**	**6.1%**	**5.6%**	**4.7%**
PCU	**5.7%**	**5.0%**	**5.4%**	**5.0%**	**4.3%**
Malvan (TP02)					
CJV	7.5%	6.4%	6.9%	6.4%	5.2%
LCV/MINIBUS	3.5%	3.0%	3.2%	3.0%	2.4%

BUS	3.4%	3.1%	3.3%	3.1%	2.9%
TRUCK 2 AXLE	4.1%	3.5%	3.8%	3.5%	2.8%
TRUCK 3 AXLE	2.1%	1.5%	1.8%	1.5%	0.9%
MAV+OSV	5.3%	4.6%	4.9%	4.6%	4.0%
Total	**6.2%**	**5.4%**	**5.8%**	**5.4%**	**4.5%**
PCU	**5.5%**	**4.8%**	**5.2%**	**4.8%**	**4.1%**
Soladi (TP03)					
CJV	7.5%	6.4%	6.9%	6.4%	5.2%
LCV/MINIBUS	3.2%	2.7%	3.0%	2.7%	2.2%
BUS	3.4%	3.1%	3.3%	3.1%	2.9%
TRUCK 2 AXLE	3.9%	3.3%	3.6%	3.3%	2.7%
TRUCK 3 AXLE	2.1%	1.5%	1.8%	1.5%	0.9%
MAV+OSV	5.4%	4.8%	5.1%	4.8%	4.1%
Total	**6.2%**	**5.4%**	**5.8%**	**5.4%**	**4.5%**
PCU	**5.6%**	**4.9%**	**5.2%**	**4.9%**	**4.2%**
Aniyari (TP04)					
CJV	7.5%	6.4%	6.9%	6.4%	5.2%
LCV/MINIBUS	3.2%	2.7%	3.0%	2.7%	2.2%
BUS	3.4%	3.1%	3.3%	3.1%	2.9%
TRUCK 2 AXLE	3.9%	3.3%	3.6%	3.3%	2.7%
TRUCK 3 AXLE	2.0%	1.4%	1.7%	1.4%	0.9%
MAV+OSV	5.3%	4.7%	5.0%	4.7%	4.0%
Total	**6.1%**	**5.4%**	**5.8%**	**5.3%**	**4.5%**
PCU	**5.5%**	**4.8%**	**5.2%**	**4.8%**	**4.1%**

Source: Crisil Intelligence

Table 1-4: Projected Traffic

FY Year	CJV	LCV/MINI BUS	BUS	2 AT	3 AT	MAV+OSV	Total Veh.	Total PCU	YoY Growth (%)
Sanand (TP01)									
FY-2026	23,025	1,761	2,047	1,485	684	4,788	33,790	59,861	
FY-2027	24,821	1,830	2,119	1,553	701	5,059	36,083	63,451	6.0%
FY-2028	26,699	1,898	2,191	1,619	717	5,333	38,457	67,127	5.8%
FY-2029	28,658	1,966	2,265	1,686	732	5,611	40,917	70,904	5.6%
FY-2030	30,698	2,032	2,339	1,752	746	5,893	43,460	74,775	5.5%
FY-2031	32,818	2,099	2,415	1,818	759	6,181	46,090	78,756	5.3%
FY-2032	34,971	2,167	2,491	1,885	771	6,476	48,761	82,806	5.1%
FY-2033	37,150	2,235	2,569	1,952	783	6,779	51,467	86,917	5.0%
FY-2034	39,350	2,301	2,647	2,019	794	7,083	54,193	91,051	4.8%
FY-2035	41,563	2,366	2,726	2,084	803	7,388	56,930	95,197	4.6%
FY-2036	43,784	2,430	2,805	2,148	812	7,694	59,672	99,346	4.4%
FY-2037	46,006	2,492	2,885	2,211	819	8,001	62,415	103,496	4.2%
FY-2038	48,225	2,554	2,966	2,274	826	8,315	65,160	107,671	4.0%
CAGR (26-34)	**6.4%**	**3.2%**	**3.1%**	**3.6%**	**1.6%**	**4.7%**	**5.7%**	**5.0%**	

FY Year	CJV	LCV/MINI BUS	BUS	2 AT	3 AT	MAV+OSV	Total Veh.	Total PCU	YoY Growth (%)
CAGR (26-38)	**6.4%**	**3.1%**	**3.1%**	**3.6%**	**1.6%**	**4.7%**	**5.6%**	**5.0%**	
Malvan (TP02)									
FY-2026	7,927	531	472	765	310	4,694	14,701	34,493	
FY-2027	8,546	551	489	799	318	4,957	15,661	36,499	5.8%
FY-2028	9,192	571	506	833	325	5,223	16,649	38,540	5.5%
FY-2029	9,867	591	523	866	331	5,491	17,669	40,623	5.4%
FY-2030	10,569	610	540	898	337	5,763	18,717	42,742	5.2%
FY-2031	11,299	629	557	931	343	6,040	19,799	44,914	5.0%
FY-2032	12,041	648	575	964	348	6,323	20,898	47,124	4.9%
FY-2033	12,791	667	593	997	353	6,612	22,012	49,371	4.7%
FY-2034	13,548	685	611	1,029	357	6,901	23,132	51,623	4.5%
FY-2035	14,310	703	629	1,061	361	7,191	24,255	53,876	4.3%
FY-2036	15,075	720	647	1,091	365	7,480	25,378	56,123	4.1%
FY-2037	15,840	737	666	1,121	368	7,769	26,500	58,368	4.0%
FY-2038	16,604	754	684	1,151	370	8,063	27,626	60,634	3.9%
CAGR (26-34)	**6.4%**	**3.0%**	**3.1%**	**3.5%**	**1.5%**	**4.6%**	**5.4%**	**4.8%**	
CAGR (26-38)	**6.4%**	**3.0%**	**3.1%**	**3.5%**	**1.5%**	**4.6%**	**5.4%**	**4.8%**	
Soladi (TP03)									
FY-2026	9,519	702	563	852	395	6,298	18,329	44,342	
FY-2027	10,262	727	582	888	405	6,660	19,524	46,949	5.8%
FY-2028	11,038	751	602	924	414	7,027	20,756	49,606	5.6%
FY-2029	11,848	775	623	959	422	7,400	22,025	52,318	5.4%
FY-2030	12,691	797	643	994	430	7,775	23,331	55,075	5.2%
FY-2031	13,568	820	664	1,028	437	8,161	24,678	57,910	5.1%
FY-2032	14,458	843	685	1,063	444	8,556	26,048	60,799	5.0%
FY-2033	15,359	865	706	1,097	450	8,960	27,438	63,739	4.8%
FY-2034	16,268	887	727	1,131	456	9,366	28,836	66,689	4.6%
FY-2035	17,183	908	749	1,165	462	9,771	30,238	69,642	4.4%
FY-2036	18,101	928	771	1,197	466	10,177	31,640	72,591	4.2%
FY-2037	19,020	947	793	1,229	470	10,583	33,042	75,539	4.0%
FY-2038	19,937	967	815	1,260	474	10,996	34,450	78,519	3.9%
CAGR (26-34)	**6.4%**	**2.7%**	**3.1%**	**3.3%**	**1.5%**	**4.8%**	**5.4%**	**4.9%**	
CAGR (26-38)	**6.4%**	**2.7%**	**3.1%**	**3.3%**	**1.5%**	**4.8%**	**5.4%**	**4.9%**	
Aniyari (TP04)									
FY-2026	6,872	443	291	631	341	5,435	14,014	35,785	
FY-2027	7,408	458	302	658	349	5,743	14,918	37,864	5.8%
FY-2028	7,969	474	312	684	356	6,054	15,848	39,977	5.5%
FY-2029	8,554	488	322	710	363	6,368	16,806	42,130	5.3%
FY-2030	9,163	503	333	736	369	6,686	17,789	44,317	5.1%
FY-2031	9,796	517	344	761	375	7,011	18,804	46,562	5.0%
FY-2032	10,438	531	355	787	381	7,344	19,836	48,851	4.9%
FY-2033	11,089	546	366	812	386	7,684	20,882	51,178	4.7%

FY Year	CJV	LCV/MINI BUS	BUS	2 AT	3 AT	MAV+OSV	Total Veh.	Total PCU	YoY Growth (%)
FY-2034	11,745	559	377	837	391	8,025	21,934	53,511	4.5%
FY-2035	12,406	573	388	862	395	8,366	22,989	55,845	4.3%
FY-2036	13,069	585	399	886	399	8,706	24,043	58,173	4.1%
FY-2037	13,732	598	411	909	402	9,046	25,097	60,498	4.0%
FY-2038	14,394	610	422	932	405	9,392	26,155	62,848	3.9%
CAGR (26-34)	**6.4%**	**2.7%**	**3.1%**	**3.3%**	**1.4%**	**4.7%**	**5.4%**	**4.8%**	
CAGR (26-38)	**6.4%**	**2.7%**	**3.1%**	**3.3%**	**1.4%**	**4.7%**	**5.3%**	**4.8%**	

Source: Crisil Intelligence

1.6.1 Tollable Length and Toll Rates

The total tollable lengths for each of the toll plazas on the project stretch is presented below:

Table 1-5: Tollable lengths at each toll plaza location

TP (Chainage)	TP01 **(Km 27.545)**	TP02 **(Km 88.000)**	TP03 **(Km 133.388)**	TP04 **(Km 180.345)**
Chainage	Km 13.930 - Km 61.430	Km 61.430 - Km 128.430	Km 128.430 - Km 154.568	Km 154.568 - Km 194.633
Section	Sarkhej-Viramgam	Viramgam-Dhrangadhra	Dhrangadhra-Halvad	Halvad-Maliya
Length (kms) for which Fee is Payable				
Car/Jeep/Van	47.50	67.00	26.138	40.065
LCV/Minibus	47.50	67.00	26.138	40.065
2 Axle Bus	47.50	67.00	26.138	40.065
2 Axle Truck	47.50	30.17	62.968	40.065
3A/MAV	47.50	30.17	62.968	40.065

Actual User Fee (Per Vehicle per one way trip) on 1st April, 2025 Calculated in accordance with Clause 7.2 of the toll Notification for single journey applicable at all the toll plazas on the project road for current fiscal (FY26) is provided below:

Table 1-6: Toll Rates for single journey

Type of vehicle	Sanand (TP01)	Malvan (TP02)	Soladi (TP03)	Aniyari (TP04)
Car/Jeep/Van	65	95	35	55
LCV/Mini Bus	120	165	65	100
2 Axle Bus	235	330	130	195
2 Axle Truck	235	150	310	195
3A/MAV	375	240	500	320

Source: Crisil Intelligence

1.7 Revenue Projections

The revenue in ₹ million for the project road is projected to grow at a CAGR of about 7.1 percent for the forecast period from FY26 to FY34 and is presented in the below table.

Table 1-7: Projected Revenue in ₹ Millions

FY Year	Sanand (TP01)	Malvan (TP02)	Soladi (TP03)	Aniyari (TP04)	Total
FY26	1,424.6	783.2	1,435.0	853.5	4,496.3
FY27	1,536.9	841.0	1,526.4	901.6	4,805.9
FY28	1,649.7	901.8	1,649.2	985.6	5,186.3
FY29	1,761.0	963.0	1,756.6	1,046.6	5,527.2
FY30	1,881.0	1,031.3	1,881.0	1,112.0	5,905.3
FY31	2,037.4	1,121.1	2,019.2	1,197.7	6,375.4
FY32	2,164.1	1,198.8	2,155.4	1,285.7	6,804.1
FY33	2,314.9	1,287.8	2,287.2	1,374.9	7,264.9
FY34	2,477.0	1,364.5	2,465.3	1,453.9	7,760.7
FY35	2,638.3	1,462.1	2,609.3	1,565.4	8,275.1
FY36	2,796.2	1,549.7	2,783.8	1,668.0	8,797.7
FY37	2,984.1	1,662.0	2,951.4	1,752.5	9,350.1
FY38	3,149.9	1,753.0	3,130.6	1,856.0	9,889.4
CAGR (FY26-34)	**7.2%**	**7.3%**	**7.1%**	**7.0%**	**7.1%**
CAGR (FY26-38)	**6.9%**	**7.0%**	**6.8%**	**6.7%**	**6.8%**

Source: Crisil Intelligence

2 Introduction

2.1 Asset Overview

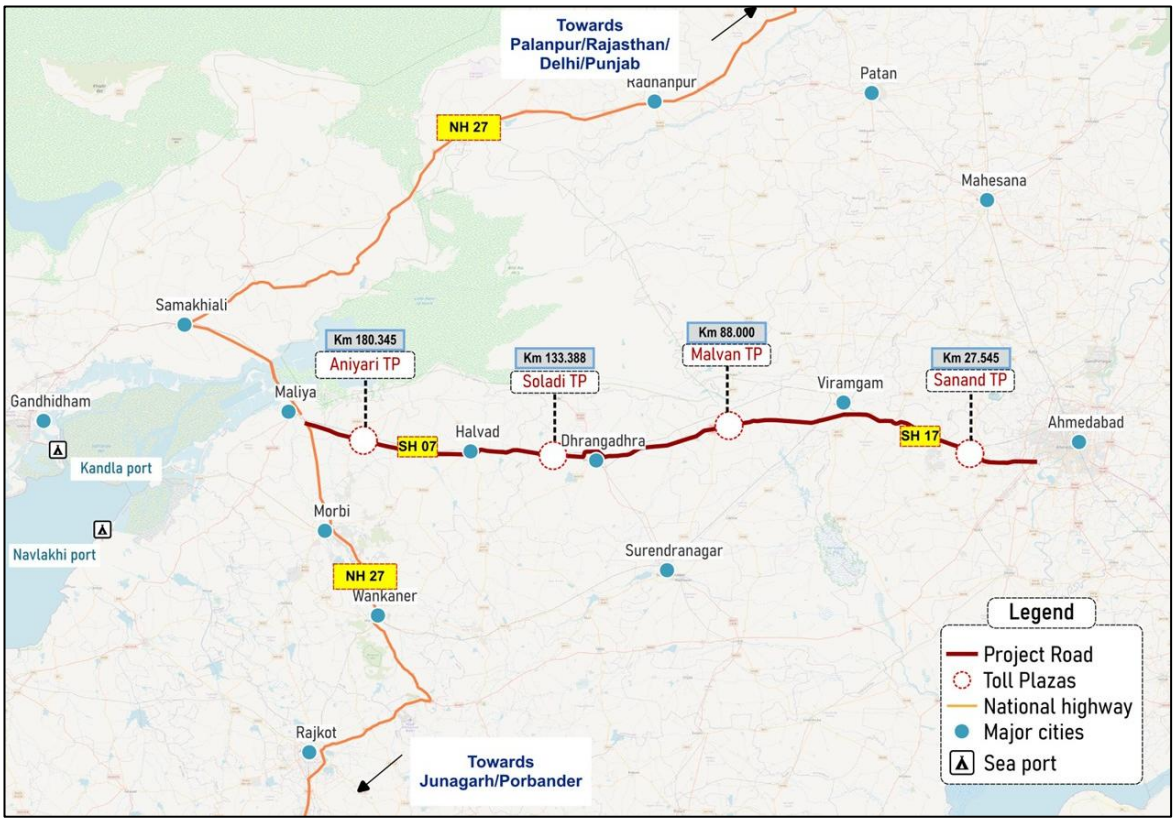
Project road Ahmedabad-Maliya is a 4-lane, 180.70 km long stretch, on state highways SH-17 and SH-07 (state highways) in the state of Gujarat and passes through the districts of Ahmedabad, Surendranagar and Morbi. The project highway has been constructed on Design, Build, Finance, Operate and Transfer (DBFOT) basis with a four – lane divided configuration. The project road has a total of 4 toll plazas viz., Sanand (TP01), Malvan (TP02), Soladi (TP03) and Aniyari (TP04). The project road provides seamless connectivity to the important Port towns of Kandla and Mundra to the hinterlands in Gujarat and up north - extending to Rajasthan, Haryana, Punjab and beyond.

Table 2-1: Details of the road stretch

Project stretch	State	Toll plaza	Length (km)
Ahmedabad-Maliya section of SH-17 and SH-07 from Km 13.930 to Km 194.633 in the state of Gujarat	Gujarat	Sanand (TP01)	180.70
		Malvan (TP02)	
		Soladi (TP03)	
		Aniyari (TP04)	

Source: Crisil Intelligence

Figure 2-1: Project stretch alignment



Source: Open Street Map, Crisil Intelligence

Table 2-2: Key details of project stretch

Project stretch	Ahmedabad-Maliya Road section of SH-17 and SH-07 from Km 13.930 to Km 194.633 in the state of Gujarat
Authority	Gujarat State Road Development Corporation (GSRDC)
Concessionaire	Ahmedabad-Maliya Tollway Private Limited
Project type	Build - Operate - Transfer
No. of lanes	4-lane configuration
Length of Project Stretch	180.70 Km
No. of Toll Plaza(s)	04
Name of Toll Plaza(s)	1. Sanand TP (Km 27.545) 2. Malvan TP (Km 88.000) 3. Soladi TP (Km 133.388) 4. Aniyari TP (180.345)
Concession Period	22 Years
Extension of concession period*	5 Years 7 months and 8 Days (2047 Days)
End of Concession Period	19 May 2037
CA Signed	17 September 2008
Appointed Date	12 October 2009
COD	1. Sanand TP - 27 Aug 2012 2. Malvan TP - 01 Nov 2012 3. Soladi TP - 7 Apr 2012 4. Aniyari TP - 05 May 2012

Source: Concession Agreement, Crisil Intelligence

** Extension of concession period : 2047 Days (602 Days on account of Target traffic extension and 1445 days on account of modification in concession period due to upgradation of Shantipura Chokdi to Khoraj GIDC Chokdi State Highway-17 from existing 4-Lane with Paved Shoulder to 6-Lane and Service Road on BOT (Toll) basis (Ch km 13+930 to km 42+683) which is a section of Ahmedabad-Viramgam stretch.*

2.2 Scope

The scope of the traffic assessment for the project road is divided into following four sections.

1. Detailed Assessment of the project road
   Include review of the Historic TMS Data, past traffic growth, detailed network assessment.
2. Primary Data collection & Analysis
   Conducting preliminary traffic surveys like TVC and Origin-Destination (O-D) to understand the traffic patterns, commodity profiles.
3. Network Impact Assessment
   To Analyse the upcoming network developments which may impact the project road traffic
4. Traffic and Revenue Projections
   Traffic & Revenue projections considering relevant growth drivers and network developments

Approach & Methodology is detailed out in Traffic Growth Estimation & Traffic forecast chapter.

2.3 Network Profile

The asset network is the principal transportation backbone for Asia's largest ceramic and tile manufacturing cluster, concentrated around Morbi and Wankaner, making it a vital link in Gujarat's industrial economy. The project road connects the important cities of Ahmedabad, Vadodara, Surat in southern & eastern Gujarat to Bhuj, Gandhidham and Kutchh region in the west. The corridor benefits in terms of traffic contributors Sanand Industrial Corridor, Mandal-Becharaji Special Investment Region and Viramgam Industrial Cluster. The project stretch is also a key connecting route between the largest ceramic cluster of India viz., Morbi and its key raw material providing regions of Rajasthan. The stretch experiences high-intensity freight movement, predominantly multi-axle heavy commercial vehicles (HCVs) carrying port-bound and export-oriented cargo. Acts as the trunk feeder route for traffic originating from central Gujarat and Saurashtra's industrial clusters toward Mundra and Kandla ports. Provides efficient access for industries in Sanand (automotive and engineering hub) and Morbi (ceramic and tile cluster) to the western export gateways. The corridor supports both inbound logistics (raw materials, fuel, packaging materials) and outbound exports (finished tiles, ceramics, and goods), ensuring balanced freight flow. This asset has alternate route of NH 8A, which is 90 km longer than the Project Road. And this is under construction for widening and structural toll rate in be enforced shortly. Therefore, traffic will not prefer to shift from the Project Road towards alternate. Hence, this asset is free from altern route threat. Moreover, this Project is under operation for more than 13 years and did not see any incident of diversion towards NH 8A at any circumstances.

In terms of the movement of traffic on the project road, the through traffic uses all the four plazas of the project corridor which is mainly the traffic which is originating/destined from/to Ahmedabad/Vadodara/Surat and beyond in the east and destined/originating to/from Maliya/Samakhiali/Gandhidham/Bhuj/Kandla/Mundra in the west. The presence of industrial estates near Sanand, Viramgam, Dhrangadhra makes the project corridor hold many mixed commodities and boasts of higher volumes of traffic on the project stretch. The road also has good rail connectivity with railway lines passing almost parallel to the project stretch due to the presence of many PFTs and ICDs along the project stretch which would be detailed out in the coming sections of the report.

As mentioned above, the project corridor also connects the Ceramic city of India viz., Morbi to northern states of Rajasthan, Delhi, Uttar Pradesh, Punjab, Haryana and beyond. The raw material required for the manufacturing of tiles in morbi i.e., felspar/powder/tile dust is sourced from Rajasthan particularly from areas near Udaipur, Bhilwara, Chittorgarh, Makrana, Ajmer, Rajsamand to name a few. This traffic rather than travelling via Palanpur-Radhanpur-Samakhiali-Morbi, the traffic takes the route Palanpur-Mehsana-Becharaji-Patdi-Malvan (A-B-C-D-E-F-G-H) joins the project road at Malvan (E) and further travels the project road and then after Halvad turns towards Morbi via SH-22 to reach Morbi. To avoid toll collection loss due to this leakage, 2A and above vehicles are made to pay higher toll at TP03. The section between G-H i.e., SH-22 is ungoing 4 laning and most of the section is already 4 laned (91% completion as per RnB Gujarat as of 25/07/2025) and operational thus bypassing TP04. Some of these trucks also travel via Ahmedabad thus crossing TP01, TP02 and TP03 for distributive purposes as some small and medium sized ceramic factories have also come up near Ahmedabad, Sanand and nearby GIDCs. However, some trucks destined towards north of Morbi prefer to cross TP04 and then turn towards Morbi via SH-321. This section is also ungoing 4 laning which is almost complete (96% completion as per RnB Gujarat as of 25/07/2025).

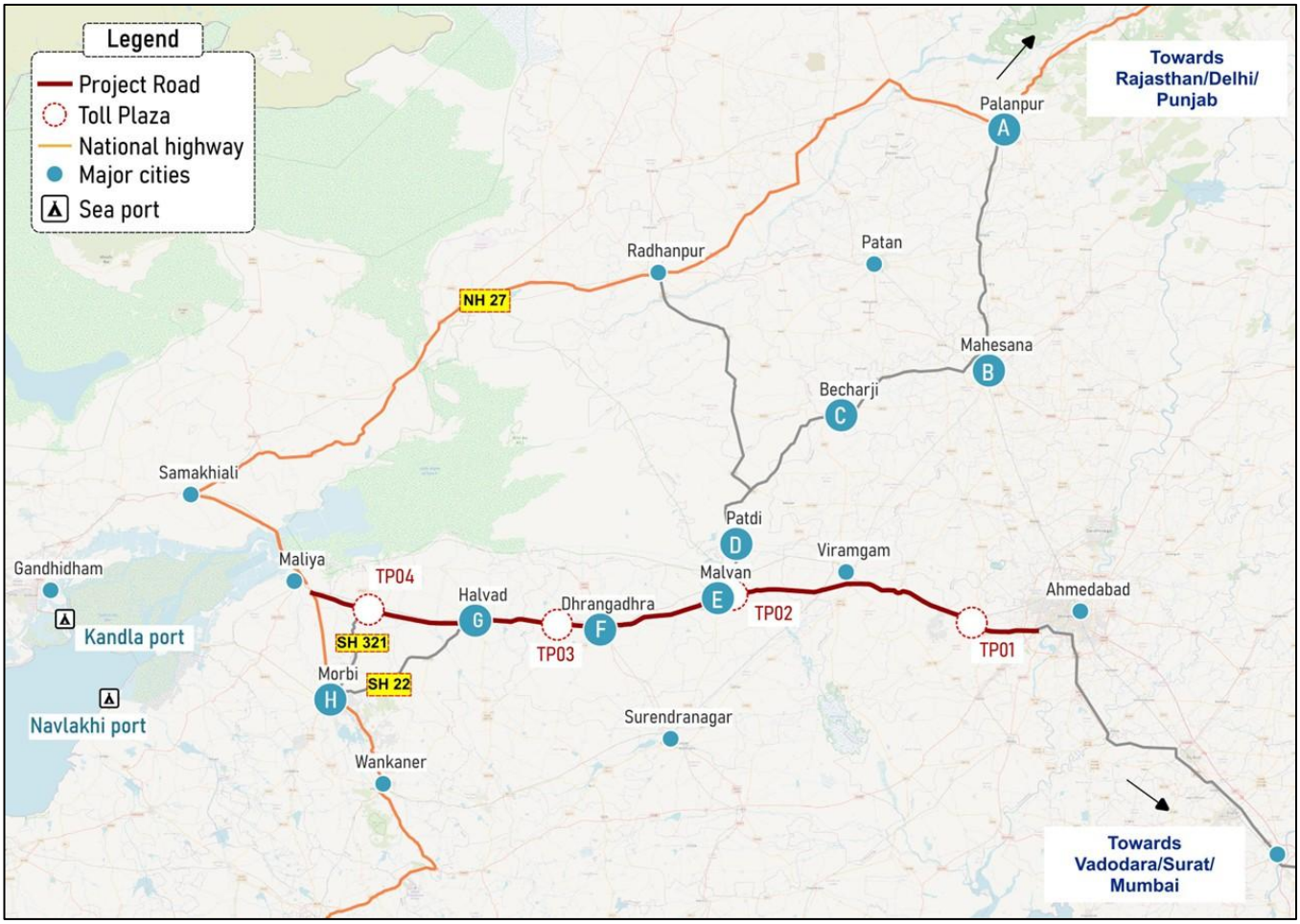
Owing to the rapid industrial growth in Sanand and the nearby areas of the Ahmedabad district, traffic on this SH17 i.e., the project road has increased substantially. The 28.8-kilometer-long road from Shantipura Chokdi to Khoraj GIDC Chokdi viz., which is a part of the first section of PR from Sanand-Viramgam will be upgraded into a six-lane highway, with service roads on both sides, widening of 13 bridges, and the construction of a six-lane elevated flyover. Upon completion, the project will benefit key industrial hubs like Sanand and Viramgam, along with long-

distance traffic heading to Surendranagar, Shankheshwar, Radhanpur, and Patan. The six-lane expansion will significantly enhance transportation infrastructure, reduce accidents, alleviate congestion, and save both fuel and travel time for commuters.

The traffic from GIDCs of Kadi, Chhatral and Kalol join the project road at Sachana thus bypassing TP01.

A regional connectivity map is presented in the figure below.

Figure 2-2: Regional Connectivity

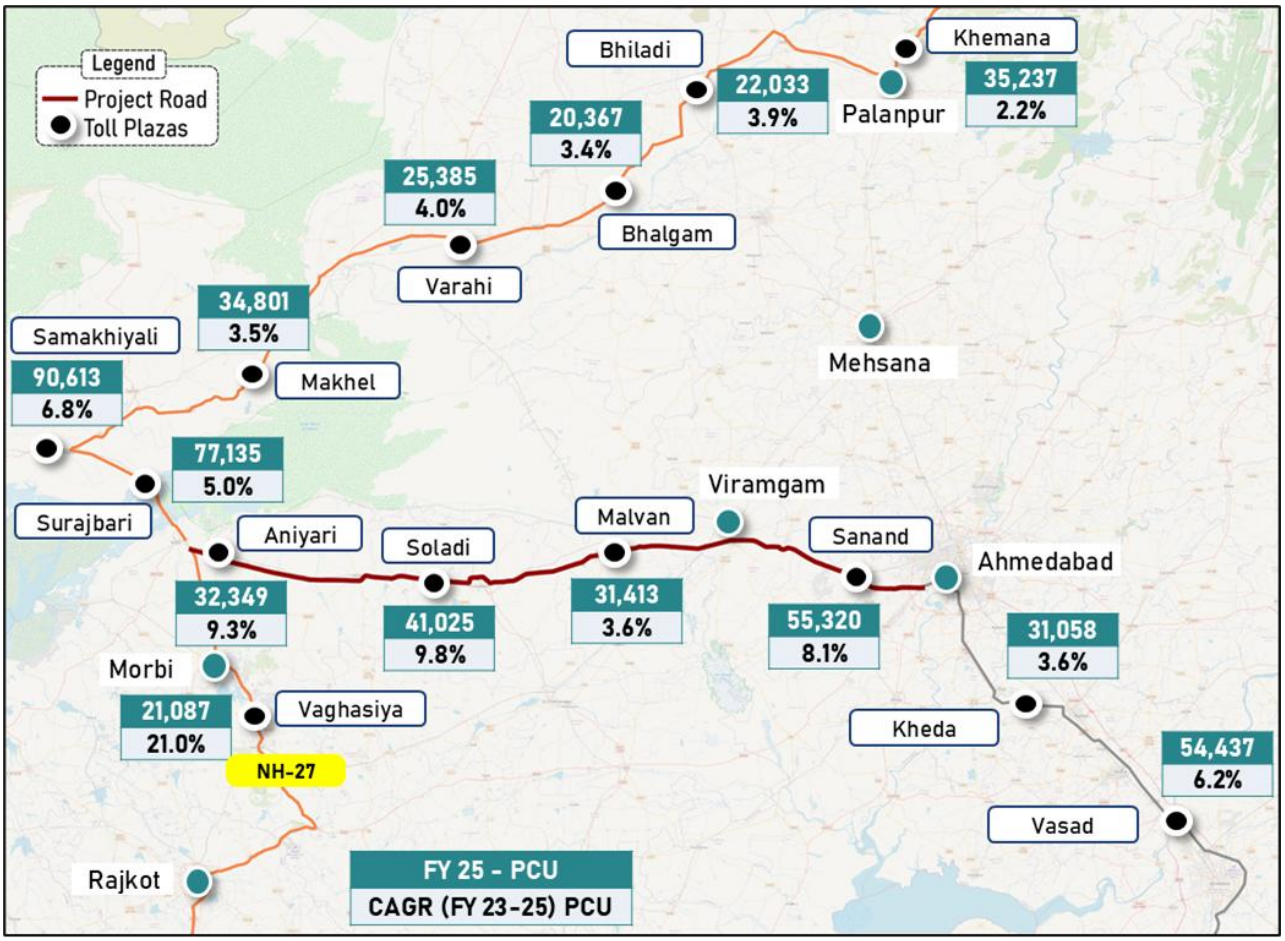


Source: Open Street Map, Crisil Intelligence

Neighbourhood project roads/assets have shown good traffic growth in the recent years

Indian Highways Management Company Limited (IHMCL) publishes toll plazas traffic data for the plazas on national highways and data is analyzed for neighboring plazas to understand traffic growth patterns in the region, nearby plazas have shown good traffic growth in recent years. FY 25 traffic PCU and CAGR PCU growth for FY23-FY25 is presented in the below figure.

Figure 2-3: Neighbourhood plazas traffic & growth



Source: Open Street Map, Crisil Intelligence, IHMCL Data

Industrial Profile on the project road

The Project Road provides connectivity of the Kandla and Mundra ports to the states of Maharashtra, Madhya Pradesh, and other western and southern states of India. It also connects Morbi, the largest ceramic and tile supplier of the country to Rajasthan and beyond states in the north. Due to the presence of GIDC and industrial developments between Ahmedabad and Viramgam, TP01 mostly serves the industrial traffic and the passenger traffic here is local in nature relating to work trips. The project stretch is dominated mixed commodities including Automotive, pharmaceuticals, engineering works, LPG, petroleum and gas bottling plants, courier parcels, textile and industrial products manufacturing including plastic products, electrical products etc. The project stretch has presence of many small and medium ceramic based tile manufacturing factories near the Bol MIDC, Vasna Iyava and in the Kadi, Chhatral and Kalol GIDCs. The project road has also has connectivity to major ICDs and PFTs along the project stretch notably ICD Sanand, PFT Sukhpur, ICD Sachana (DP World), ICD Viramgam (Gateway Distriparks) and Navkar Morbi ICD located along its stretch.

Sanand and Becharaji GIDCs

Sanand stands as the flagship industrial estate in this corridor, encompassing over 2,500 hectares and hosting more than 500 companies. GIDC Sanand is meticulously organized into specialized clusters for auto vendors, multinational corporations, plastics, engineering, electronics, pharmaceuticals, medical devices, and knowledge-based industries. Sanand and adjacent industrial parks also host leading FMCG and consumer goods companies such as Coca-Cola, Nestlé, Colgate-Palmolive, Procter & Gamble, Nivea, Parle, Marico, and Unicharm, primarily producing beverages, packaged foods, personal care products, and fast-moving consumables.

The corridor is dominated by automotive manufacturing, led by Tata Motors, Ford (now Tata-owned), Suzuki, MG Motor India, Honda, Hero MotoCorp, and a vibrant ecosystem of parts and component suppliers all situated in Sanand and Becharaji. Together, these OEMs and ancillaries produce hundreds of thousands of vehicles—from passenger cars to two-wheelers—along with essential subassemblies, tires, electronics, and interior parts. The auto sector's growth draws significant investment, with supporting clusters for logistics, research, and business services.

Logistics parks such as ESR Sanand and Ayodhya Industrial Park in Viramgam provide warehousing and distribution centers, enabling high volumes of containerized movement.

Viramgam and Dhrangadhra GIDCs

Viramgam’s industrial area is another key hub, featuring a mixture of textile, engineering, chemicals, pharmaceuticals, plastics, and metallurgy sectors. It covers more than 40 hectares and benefits from strategic connectivity via road and rail, including a dedicated crude oil depot on the Salya-Mathura pipeline. Dhrangadhra’s GIDC estate specializes in chemical manufacturing—particularly salt and soda ash—thanks to decades-old anchor companies like DCW Ltd.

The chemical cluster in Dhrangadhra, anchored by DCW Ltd., is a major national producer of soda ash, caustic soda, sodium bicarbonate, and industrial salt. The region is further strengthened by a robust textile sector, with spinning and ginning mills, as well as ceramics manufacturers, particularly around Thangadh, which houses more than 350 tiles and ceramics companies.

Ceramic Clusters of Morbi

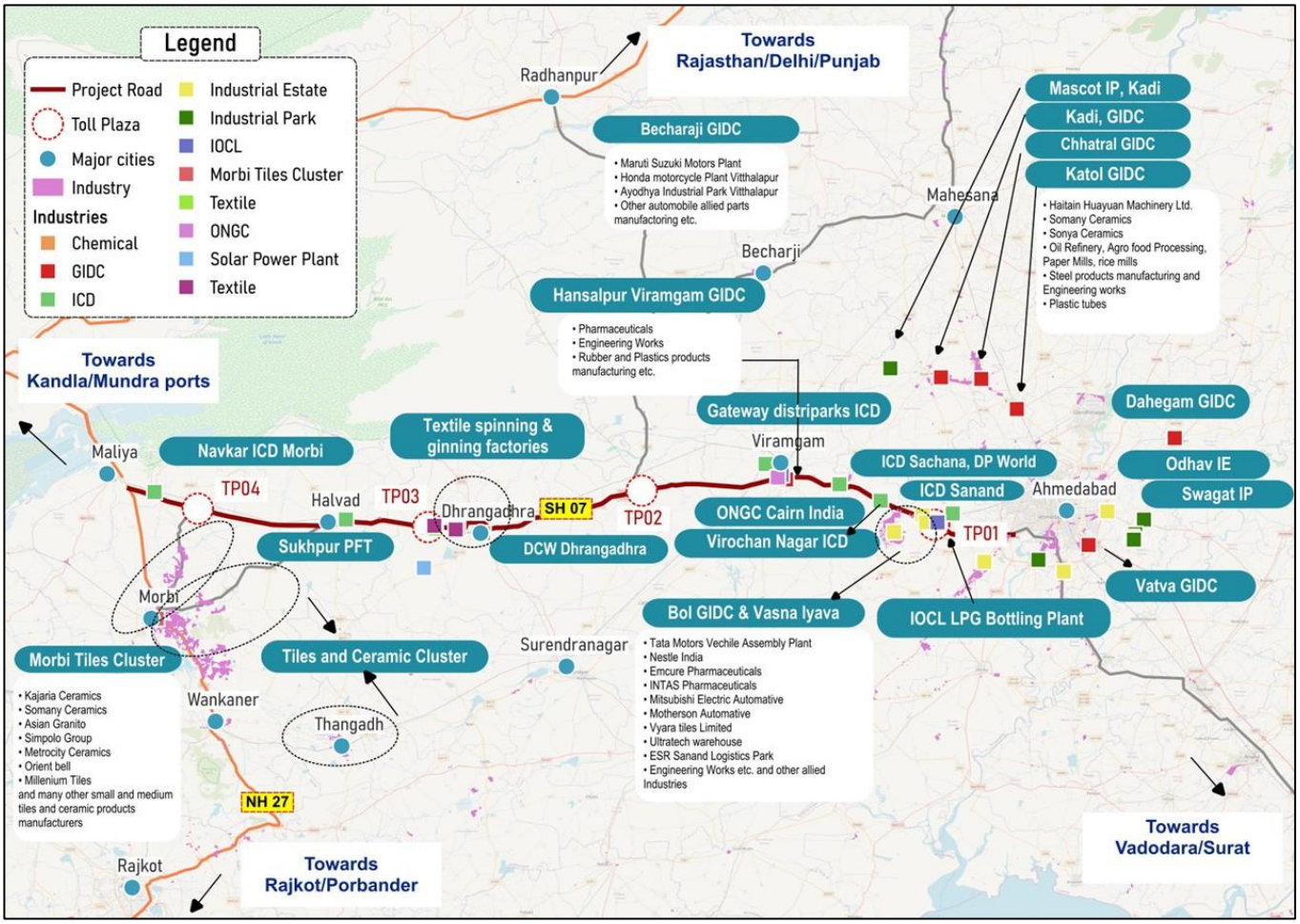
The project corridor also caters to the traffic from Morbi which is known for its ceramic production and is often referred to as the "Ceramic City" of India and houses over 1000+ ceramic factories with a combined annual production capacity exceeding 300 million square meters, which representing approximately 80% of India’s total ceramic production, producing a wide range of items including wall tiles, floor tiles, vitrified tiles, polished glazed vitrified tiles, and sanitary ware.

Additional estates and developing parks near Halvad, Aniyari, and Maliya facilitate expansion for ceramics, textiles, engineering, and agricultural processing.

Overall Freight traffic on SH17 and SH07 is primarily composed of agricultural produce, auto components and machinery, bulk chemicals (especially soda ash and salt), iron and steel products, FMCG products, textiles, construction materials, and engineering goods. Bulk trucks and containers routinely transport goods between manufacturing estates and northern, western, and southern states, with major flow through ports like Kandla and Mundra. Raw materials—steel, chemicals, petroleum—also move inwards to supply factories, underscoring the

corridor's significance for both inbound and outbound logistics.

Figure 2-4: Industries and Industrial estates along project road



Source: Open Street Map, Crisil Intelligence

2.4 Overview of Key Influence Area & Industrial profile

The project road entirely falls in the state of Gujarat passing through the districts of Ahmedabad, Surendranagar and Morbi. A brief description of key influencing district around the project section is presented below.

Ahmedabad District Profile

Ahmedabad district is located in the state of Gujarat, western India, and has a population of approximately 8.3 million as of 2021, with a growth rate of 15% from 2011. The district is a major producer of agricultural products such as cotton, tobacco, and wheat. The population growth rate is higher compared to the state average, indicating the district's attractiveness as a hub for economic activity and migration.

The major industries in the region include textiles, pharmaceuticals, and chemicals. The district is home to several large-scale industrial estates, including the Naroda Industrial Estate and the Vatva Industrial Estate. The industrial profile of the district is characterized by a mix of small, medium, and large-scale enterprises.

Additionally, the district is expected to benefit from several infrastructure projects, such as the Ahmedabad-Mumbai bullet train project, and the development of the Dholera Special Investment Region (DSIR), which will drive economic growth and create new opportunities for investment and employment. With its strategic location, diverse economy, and rich cultural heritage, Ahmedabad district is poised to become a major hub for economic activity and

tourism in the region.

Surendranagar District Profile

Surendranagar district is located in the state of Gujarat, western India, and has a population of approximately 1.7 million as of 2021, with a growth rate of 12% from 2011. The district is a major producer of agricultural products such as cotton, groundnuts, and wheat. The district has a significant rural population and is known for its agricultural produce.

The economy of Surendranagar district is primarily driven by agriculture, with a significant presence of small and medium-scale industries. The district is home to several industrial estates, including the Surendranagar Industrial Estate and the Wadhwan Industrial Estate. The district has a diverse economy with a strong presence of industries such as textiles, chemicals, and food processing.

With infrastructure projects like Delhi-Mumbai Industrial Corridor and the development of the Wadhwan industrial area, the district is on the way for a sustained economic growth and is bound to create new opportunities for investment and employment.

Morbi District Profile

Morbi district is located in the state of Gujarat, western India, and has a population of approximately 0.9 million as of 2021, with a growth rate of 10% from 2011. The district is a major producer of agricultural products such as cotton, tobacco, and vegetables. Morbi is known for its production of high-quality cotton and is often referred to as the "Cotton City" of India.

The economy of Morbi district is primarily driven by industries such as ceramics, textiles, and chemicals. The district is home to several industrial estates, including the Morbi Industrial Estate and the Wankaner Industrial Estate. Morbi is known for its ceramic production and is often referred to as the "Ceramic City" of India. The district has a diverse economy with a strong presence of small and medium-scale industries. The Indian ceramic tiles industry, which is a significant sector in the district, is expected to de-grow at 1-3% in terms of volume and remain flat in terms of value in fiscal 2025, due to domestic demand and export trends.

Despite the current challenges, Morbi district has immense potential for future development. The margins of organized players in the ceramic tiles industry are expected to increase in fiscal 2026, with the revival of retail demand and improvement in volumes and realizations.

While the industry faces current challenges including capacity underutilization and export headwinds, the long-term outlook remains positive. Major players are pursuing strategic expansions, technology upgrades, and market diversification initiatives. The combination of cost competitiveness, technological advancement, and export diversification positions Morbi to maintain its leadership in the global ceramic tile industry. Key infrastructure projects such as the development of the Morbi-Wankaner industrial area and the construction of the Morbi-Rajkot highway also provides a strong foundation for continued growth and global market expansion.

3 Primary Data Collection & Analysis

3.1 General

Primary traffic surveys, i.e. Traffic volume count and Origin Destination surveys were collected on the project road to understand the traffic and travel pattern of vehicles plying on the project road.

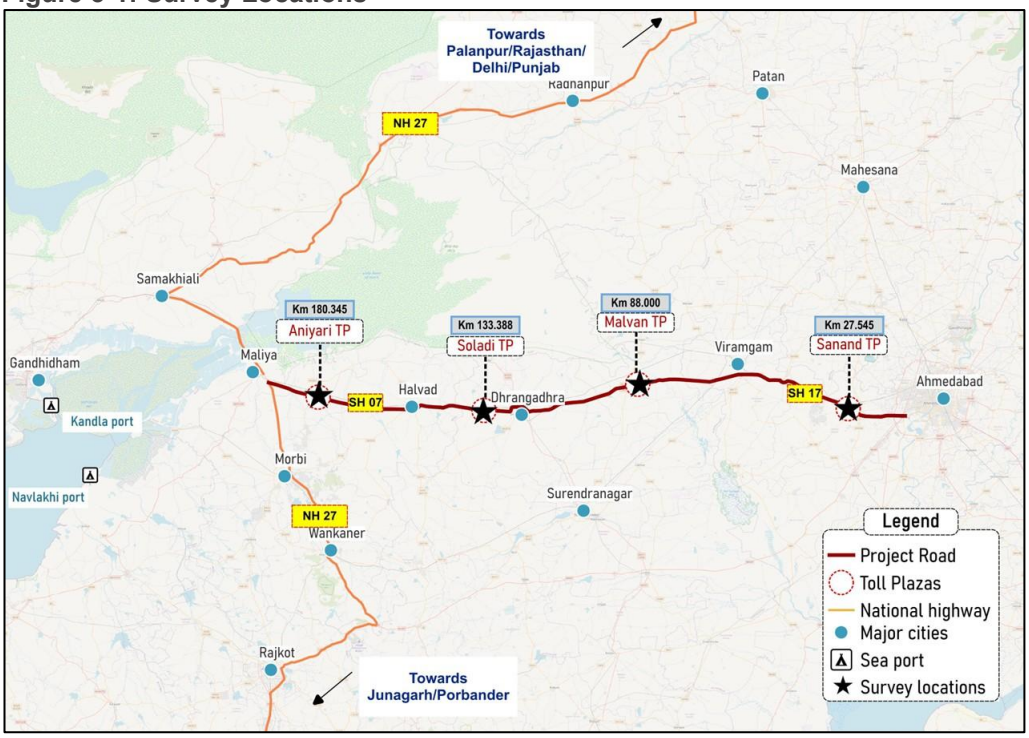
For the present study, seven days video-based traffic volume count and two days (48-Hours) origin destination survey conducted at the toll plaza location on the project road. The schedule of the traffic surveys carried out as part of the study on the project road are presented in the below table and figure.

Table 3-1: Type of Survey & Schedule

Type of Survey	Survey Duration	Location	Survey Date
Traffic Volume Count (TVC) Survey	7 Days	Sanand (TP01)	12th June 2025 to 18th June 2025
		Malvan (TP02)	
		Soladi (TP03)	
		Aniyari (TP04)	
Origin-Destination (O-D) Survey	2 Days	Sanand (TP01)	12th June 2025 and 13th June 2025
		Malvan (TP02)	16th June 2025 and 17th June 2025
		Soladi (TP03)	
		Aniyari (TP04)	12th June 2025 and 13th June 2025

Source: Crisil Intelligence

Figure 3-1: Survey Locations



Source: Open Street Map, Crisil Intelligence

3.2 TVC Analysis and key findings

The seven days traffic volume count was analysed to get existing traffic intensity, daily variations, and traffic composition.

The vehicle classification and there PCU values as suggested in IRC: 64-1990 are presented in below table.

Table 3-2: PCU Factors-IRC:64-1990

Mode	PCU
Car/Jeep	1.0
Two-Wheeler	0.5
Three-Wheeler	1.0
Minibus/School Bus	1.5
Bus (Govt/Pvt)	3.0
Mini LCV	1.0
LCV	1.5
2-Axle	3.0
3-Axle	3.0
MAV (4-6 Axles)	4.5
HME/OSV	4.5
Agricultural Tractor	1.5
Agricultural Tractor with Trailer	4.5
Cycle	0.5
Cycle Rickshaw	2.0
Animal Drawn Crat	6.0

Source: IRC:64-1990

The average daily tollable traffic volume at the toll plaza locations were analysed. The summary of ADT in terms of vehicles and PCUs is presented in table.

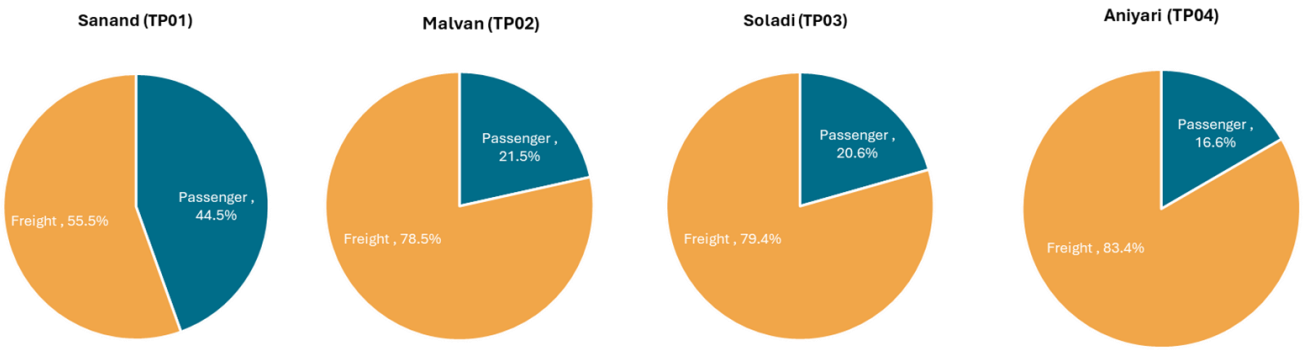
Table 3-3: Average Daily Traffic (ADT) for the Project Section

Mode	Ahmedabad-Maliya	Maliya-Ahmedabad	ADT
Sanand (TP01)			
Car	9,309	9,082	18,390
Minibus	155	151	306
Bus	985	1,005	1,990
Mini LCV	1,417	1,360	2,777
LCV	784	630	1,414
Truck-2 Axle	646	789	1,436
Truck-3Axle	276	285	560
MAV	2,233	2,204	4,437
OSV	10	9	20
Vehicles	**15,815**	**15,515**	**31,330**
PCU	**27,951**	**27,811**	**55,761**
Malvan (TP02)			
Car	2,755	2,723	5,478
Minibus	13	11	23
Bus	227	229	456

Mini LCV	580	615	1,195
LCV	233	294	526
Truck-2 Axle	353	329	682
Truck-3Axle	159	156	315
MAV	2,284	2,179	4,463
OSV	3	4	6
Vehicles	**6,606**	**6,539**	**13,145**
PCU	**16,211**	**15,757**	**31,968**
Soladi (TP03)			
Car	3,385	3,339	6,724
Minibus	23	19	43
Bus	283	281	564
Mini LCV	793	757	1,550
LCV	528	369	897
Truck-2 Axle	228	360	588
Truck-3Axle	191	200	391
MAV	2,798	3,155	5,953
OSV	7	6	13
Vehicles	**8,236**	**8,486**	**16,722**
PCU	**19,733**	**21,424**	**41,157**
Aniyari (TP04)			
Car	2,286	2,228	4,514
Minibus	9	7	16
Bus	138	137	275
Mini LCV	515	549	1,064
LCV	216	267	483
Truck-2 Axle	297	256	553
Truck-3Axle	156	154	310
MAV	2,458	2,528	4,985
OSV	5	7	12
Vehicles	**6,079**	**6,132**	**12,212**
PCU	**15,994**	**16,232**	**32,226**

Source: Crisil Intelligence

Figure 3-2: PCU share



Source: Survey Data, Crisil Intelligence

An analysis of TVC traffic at all the toll plazas on the project road is presented below.

- Passenger vehicles contribute highest at Sanand (TP01) at ~45% and about 17-21% at the other 3 toll plaza locations in terms of PCU. As for Goods, about ~55% is contributed by Sanand (TP01) and 78%-83% at the other 3 toll plaza.
- Car is having highest share with around 59% at Sanand (TP01), 42% at Malvan (TP02), 40% at Soladi (TP03) followed by MAV at 14% at Sanand (TP01), 34% at Malvan (TP02), 36% at Soladi (TP03). At Aniyari (TP04) MAV has highest share OF 41% followed by cars with 37% share.
- Average Daily traffic is about 31,330 at Sanand (TP01), 13,145 at Malvan (TP02), 31,968 at Soladi (TP03) and 12,212 at Aniyari (TP04) in terms of total traffic.
- In terms of PCU, ADT is about 55,761 at Sanand (TP01), 31,968 at Malvan (TP02), 41,157 at Soladi (TP03) and 32,226 at Aniyari (TP04).

TVC survey data for the seven-day period is presented in the below table.

Table 3-4: Daily traffic volume at all plazas based on TVC survey

Date	CJV	LCV+2A	Bus	Truck 3A	MAV	OSV	Total	PCU
Sanand (TP01)								
12 June 25	23,010	3,622	2,177	602	4,732	11	34,154	60,645
13 June 25	21,671	3,562	2,174	665	4,952	54	33,078	60,370
14 June 25	21,191	3,267	1,818	557	4,585	22	31,440	56,216
15 June 25	19,881	2,261	1,239	502	4,210	13	28,106	49,064
16 June 25	22,243	3,161	2,134	514	4,095	12	32,159	55,555
17 June 25	20,377	3,174	2,229	538	4,247	9	30,574	54,663
18 June 25	20,068	3,331	2,158	544	4,241	17	30,359	54,586
WADT	**21,206**	**3,197**	**1,990**	**560**	**4,437**	**20**	**31,410**	**55,871**
Malvan (TP02)								
12 June 25	7,336	1,365	460	363	4,780	5	14,309	34,495
13 June 25	6,918	1,408	446	399	4,944	12	14,127	35,040
14 June 25	7,275	1,468	465	324	4,612	5	14,149	33,849
15 June 25	7,467	1,176	459	292	4,491	3	13,888	32,727
16 June 25	6,531	1,101	469	249	4,006	8	12,364	29,327
17 June 25	5,997	1,227	450	304	4,148	5	12,131	29,753
18 June 25	5,447	1,035	442	272	4,262	7	11,465	29,138
WADT	**6,710**	**1,254**	**456**	**315**	**4,463**	**6**	**13,205**	**32,047**
Soladi (TP03)								
12 June 25	9,158	1,823	548	459	6,415	13	18,416	45,452
13 June 25	8,490	1,744	568	431	6,710	20	17,963	45,162
14 June 25	8,770	1,491	579	402	6,122	10	17,374	42,183
15 June 25	9,060	1,524	576	384	6,080	4	17,628	42,399
16 June 25	8,200	1,227	568	289	5,228	8	15,520	36,774
17 June 25	7,348	1,547	546	400	5,485	17	15,343	37,998
18 June 25	7,001	1,490	560	371	5,631	18	15,071	38,503
WADT	**8,290**	**1,549**	**564**	**391**	**5,953**	**13**	**16,759**	**41,210**

Aniyari (TP04)								
12 June 25	6,256	1,257	272	382	5,341	16	13,524	35,133
13 June 25	5,822	1,222	275	330	5,662	19	13,330	35,954
14 June 25	5,974	1,126	289	348	5,239	7	12,983	34,006
15 June 25	5,979	1,053	300	280	5,072	10	12,694	32,892
16 June 25	5,495	869	268	235	4,367	3	11,237	28,754
17 June 25	4,939	1,042	263	293	4,456	12	11,005	29,185
18 June 25	4,697	953	256	300	4,760	16	10,982	30,049
WADT	**5,595**	**1,075**	**275**	**310**	**4,985**	**12**	**12,251**	**32,282**

Source: Survey Data, Crisil Intelligence

Toll Management system (TMS) data was provided survey days, and comparison is made with TVC (survey data). Overall variations of traffic are <1% at all the toll plazas in terms of total traffic and which is within tolerable limits.

Table 3-5: Weekly Average Daily Traffic Variation - TVC vs TMS

Date	CJV	LCV+2A	Bus	3A+MAV+OSV	Total	PCU
Sanand (TP01)						
WADT (TVC)	21,206	3,197	1,990	5,017	31,410	55,871
WADT (TMS)	21,220	3,199	2,001	5,047	31,467	56,910
Variations	-0.1%	-0.1%	-0.6%	-0.6%	-0.2%	-1.8%
Malvan (TP02)						
WADT (TVC)	6,710	1,254	456	4,784	13,205	32,047
WADT (TMS)	6,789	1,251	462	4,821	13,323	32,862
Variations	-1.2%	0.3%	-1.3%	-0.8%	-0.9%	-2.5%
Soladi (TP03)						
WADT (TVC)	8,290	1,549	564	6,357	16,759	41,210
WADT (TMS)	8,299	1,473	554	6,405	16,730	42,170
Variations	-0.1%	5.2%	1.7%	-0.7%	0.2%	-2.3%
Aniyari (TP04)						
WADT (TVC)	5,595	1,075	275	5,307	12,251	32,282
WADT (TMS)	5,676	997	277	5,359	12,310	32,986
Variations	-1.4%	7.8%	-0.9%	-1.0%	-0.5%	-2.1%

Source: Survey Data, Crisil Intelligence

3.3 Origin-Destination (OD) and Commodity Analysis

Origin-Destination survey was carried out at all 4 toll plazas for 2 Days (48-hours), by roadside interview method as described in IRC: 102-1988. A random sampling approach was employed to interview both passenger and freight vehicles traversing the project road at the toll plaza locations. The survey aimed to gather information on various aspects, including origin, destination, frequency of trips, purpose of travel and for freight vehicles, the type of commodity being transported.

The regional distribution of tollable vehicles at all the toll plaza locations has been estimated based on OD matrices is presented in below table and figure.

The project influencing states will provide an overview of the factors likely to influence the pattern of economic

development and hence the flows and volumes of traffic on the project road.

3.3.1 Regional Influence

The key influencing regions from the origin destination survey are Ahmedabad, Sanand, Viramgam, Halvad, Dhrangadhra, and Morbi for passenger traffic and for goods traffic Ahmedabad, Sanand, Morbi and Rajasthan. Regional distribution for passenger traffic and goods traffic is given in the below table.

Table 3-6: Regional Distribution in % for passenger traffic

State/Region	Sanand (TP01)	Malvan (TP02)	Soladi (TP03)	Aniyari (TP04)
Gujarat	96.4%	96.1%	98.8%	96.2%
Maharashtra	1.2%	1.4%	0.1%	0.6%
Rajasthan	0.2%	0.2%	0.2%	1.6%
Madhya Pradesh	1.7%	2.0%	0.4%	0.9%
Rest of India	0.5%	0.3%	0.5%	0.8%
Total	100.0%	100.0%	100.0%	100.0%

Table 3-7: Regional Distribution in % for goods traffic

State/Region	Sanand (TP01)	Malvan (TP02)	Soladi (TP03)	Aniyari (TP04)
Gujarat	75.6%	78.3%	76.7%	71.3%
Maharashtra	7.0%	7.5%	2.9%	7.0%
Rajasthan	9.1%	7.6%	10.0%	6.1%
Madhya Pradesh	2.3%	3.0%	2.7%	4.8%
Delhi	3.1%	0.4%	1.9%	0.0%
Uttar Pradesh	0.9%	0.8%	1.5%	3.7%
Rest of India	1.9%	2.4%	4.3%	7.0%
Total	100.0%	100.0%	100.0%	100.0%

Source: Crisil Intelligence

Sanand (TP01)

Passenger Traffic

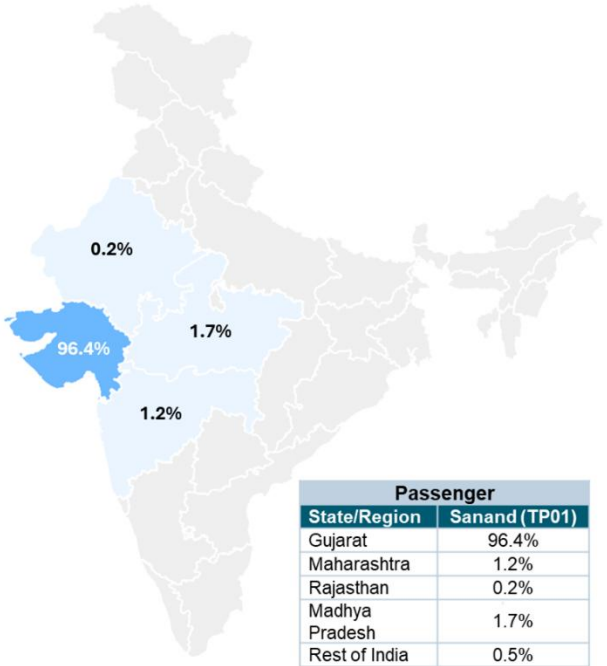
- **Gujarat** contribute to 96.4% passenger traffic and followed by **Madhya Pradesh and Rajasthan** with 1.7% and 1.2% respectively.
- **Ahmedabad-Viramgam and Ahmedabad-Surendranagar** and vice versa are the major OD pairs in car traffic**.** This is due to the presence of industrial estates in and around Ahmedabad, Sanand, Viramgam, Surendranagar etc and daily commute trips to work attributing to car.

Freight Traffic

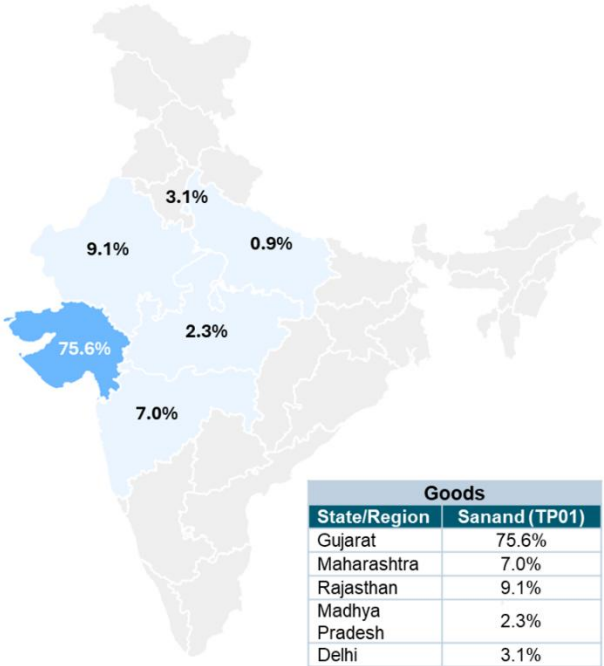
- **Gujarat** contribute to 75.6% of freight traffic followed by **Rajasthan and Maharashtra** with 9.1% and 7.0% respectively.
- Ahmedabad-Morbi and Ahmedabad-Gandhidham/Mundra and vice versa are the top OD pair in MAV traffic attributing to the growing real estate demand and construction materials viz., finished tiles and sanitary ware from Morbi for the wholesalers and retailers in Ahmedabad. Also, the imported commodities from port

areas of Gandhidham and Mundra along with the industrial produce to export from the industrial estates and GIDCs of Ahmedabad contribute to the high number of trips to these regions.

Figure 3-3: State influence for Passenger and Goods at Sanand (TP01)



Passenger	
State/Region	Sanand (TP01)
Gujarat	96.4%
Maharashtra	1.2%
Rajasthan	0.2%
Madhya Pradesh	1.7%
Rest of India	0.5%
Total	100.0%



Goods	
State/Region	Sanand (TP01)
Gujarat	75.6%
Maharashtra	7.0%
Rajasthan	9.1%
Madhya Pradesh	2.3%
Delhi	3.1%
Uttar Pradesh	0.9%
Rest of India	1.9%
Total	100.0%

Source: Crisil Intelligence

Malvan (TP02)

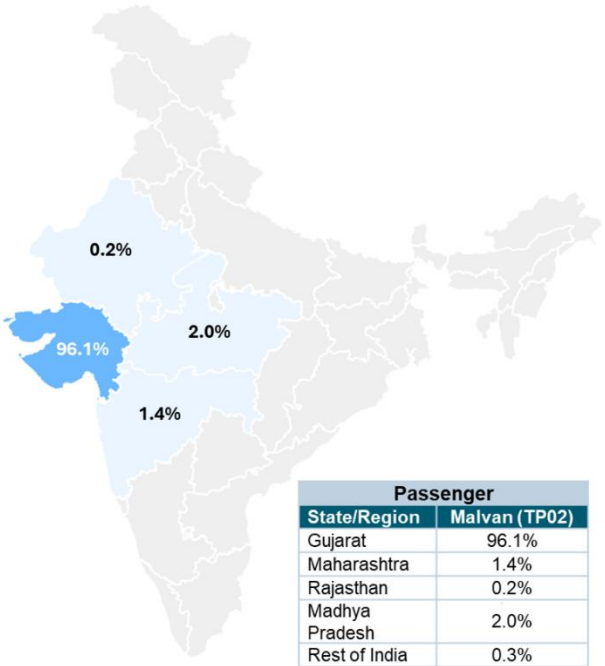
Passenger Traffic

- **Gujarat** contribute to 96.1% passenger traffic and followed by **Madhya Pradesh and Rajasthan** with 2.0% and 1.4% respectively.
- **Ahmedabad-Morbi and Ahmedabad-Gandhidham** and vice versa are the major OD pairs in car traffic. There are few industries in proximity to TP02 and therefor the long-distance trips from Ahmedabad-Morbi/Gandhidham are observed at TP02

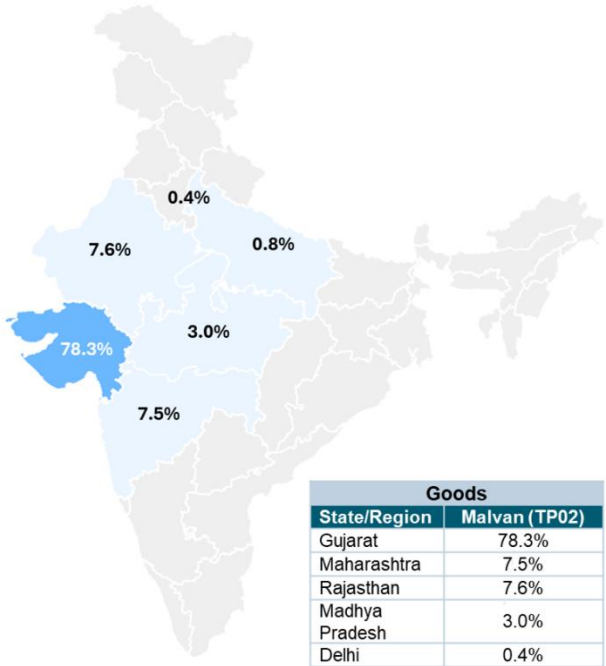
Freight Traffic

- **Gujarat** contribute to 78.3% of freight traffic followed by **Rajasthan and Maharashtra** with 7.6% and 7.5% respectively.
- Ahmedabad-Gandhidham/Mundra and Ahmedabad-Morbi and vice versa are the top OD pair in MAV traffic attributing to the growing real estate demand and imports and exports demand as mentioned earlier.

Figure 3-4: State influence for Passenger and Goods at Malvan (TP02)



Passenger	
State/Region	Malvan (TP02)
Gujarat	96.1%
Maharashtra	1.4%
Rajasthan	0.2%
Madhya Pradesh	2.0%
Rest of India	0.3%
Total	100.0%



Goods	
State/Region	Malvan (TP02)
Gujarat	78.3%
Maharashtra	7.5%
Rajasthan	7.6%
Madhya Pradesh	3.0%
Delhi	0.4%
Uttar Pradesh	0.8%
Rest of India	2.4%
Total	100.0%

Soladi (TP03)

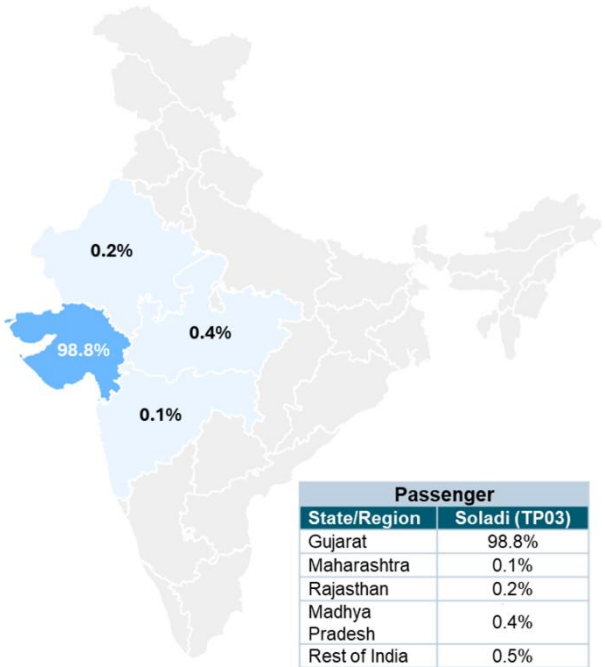
Passenger Traffic

- **Gujarat** contribute to 98.8% passenger traffic and followed by **Madhya Pradesh and Rajasthan** with 0.4% and 0.2% respectively.
- **Ahmedabad-Morbi and Dhrangadhra-Halvad** and vice versa are the major OD pairs in car traffic. It is to be noted that DCW Dhrangadhra employs many people in the region along with many textile-based industries generating employment. People travel to Dhrangadhra from nearby cities of Halvad and Malvan for work purposes. Also, the long-distance trips from Ahmedabad-Morbi are observed at TP03.

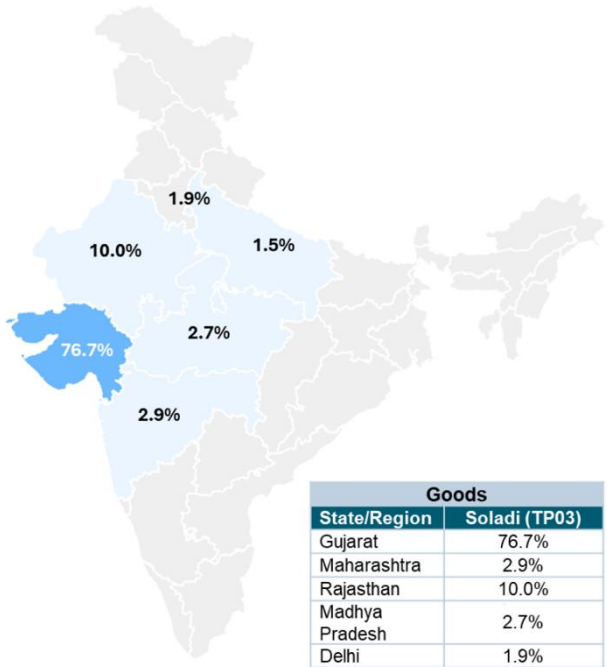
Freight Traffic

- **Gujarat** contribute to 76.7% of freight traffic followed by **Rajasthan and Maharashtra** with 10.0% and 2.9% respectively. Higher % of Rajasthan is seen at TP03 due to the road joining the PR at Malvan as mentioned in network characteristics.
- Ahmedabad-Gandhidham/Mundra and Ahmedabad-Morbi and vice versa are the top OD pair in MAV traffic attributing to the growing real estate demand and imports and exports demand as mentioned earlier. At TP03, as explained in network characteristics, the traffic from Rajasthan also joins in carrying felspar/tile powder/tile dust which is used as a raw material for tile manufacturing, thus OD pairs like Udaipur/Kishangarh-Morbi are also seen at TP03.

Figure 3-5: State influence for Passenger and Goods at Soladi (TP03)



Passenger	
State/Region	Soladi (TP03)
Gujarat	98.8%
Maharashtra	0.1%
Rajasthan	0.2%
Madhya Pradesh	0.4%
Rest of India	0.5%
Total	100.0%



Goods	
State/Region	Soladi (TP03)
Gujarat	76.7%
Maharashtra	2.9%
Rajasthan	10.0%
Madhya Pradesh	2.7%
Delhi	1.9%
Uttar Pradesh	1.5%
Rest of India	4.3%
Total	100.0%

Source: Crisil Intelligence

Aniyari (TP04)

Passenger Traffic

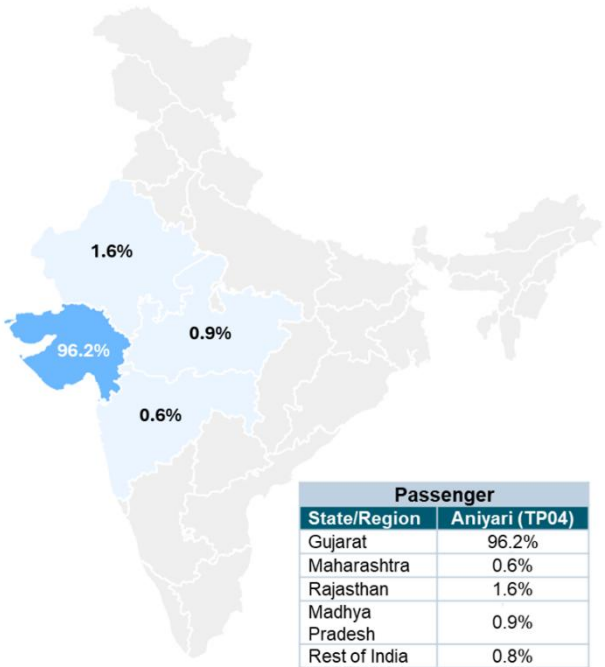
- **Gujarat** contribute to 96.2% passenger traffic and followed by **Rajasthan and Madhya Pradesh** with 1.6% and 0.9% respectively.
- **Halvad-Maliya and Halvad-Samakhiali** and vice versa are the major OD pairs in car traffic. The industries after the end of project road viz., at Maliya and Samakhiali also employs people from cities of Halvad, Aniyari and other small and medium towns surrounding Halvad, thus crossing TP04 for work purposes.

Freight Traffic

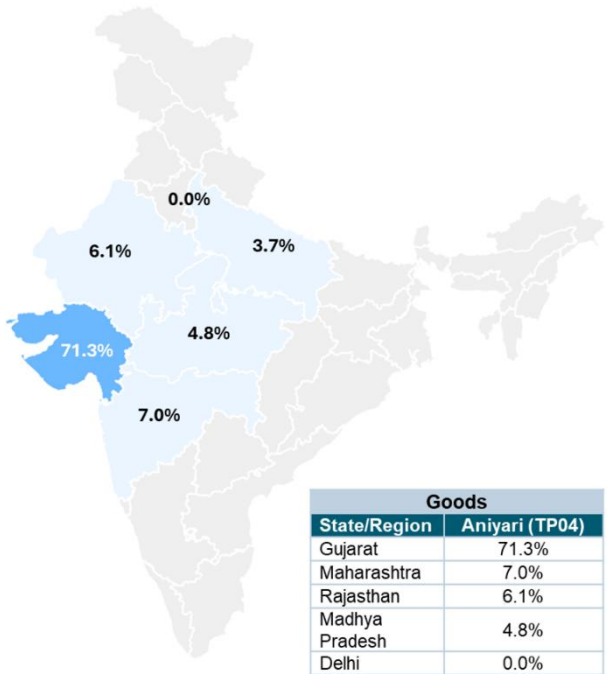
- **Gujarat** contribute to 71.3% of freight traffic followed by **Maharashtra and Rajasthan** with 6.1% and 7.0% respectively. As mentioned in network context, some trucks carrying felspar from Rajasthan are also destined to the tiles clusters situated north of Morbi, which prefer to cross TP04 and then turn towards morbi via SH-321.

- Ahmedabad-Gandhidham/Mundra and Surat-Gandhidham/Kandla and vice versa are the top OD pair in MAV traffic attributing to the growing real estate demand and imports and exports demand as mentioned earlier catering to the long-distance MAV traffic from Ahmedabad/Surat-Gandhidham/Mundra/Kandla.

Figure 3-6: State influence for Passenger and Goods at Aniyari (TP04)



Passenger	
State/Region	Aniyari (TP04)
Gujarat	96.2%
Maharashtra	0.6%
Rajasthan	1.6%
Madhya Pradesh	0.9%
Rest of India	0.8%
Total	100.0%



Goods	
State/Region	Aniyari (TP04)
Gujarat	71.3%
Maharashtra	7.0%
Rajasthan	6.1%
Madhya Pradesh	4.8%
Delhi	0.0%
Uttar Pradesh	3.7%
Rest of India	7.0%
Total	100.0%

3.3.2 Zonal Influence

The key influencing zones/regions at TP01 from the origin destination survey are Ahmedabad, GIDCs of Sanand, Viramgam, Hansalpur, Surendranagar, Vadodara, Gandhinagar and Morbi for Passenger traffic, indicating more local movements and for goods traffic key influencing zones/regions are Ahmedabad, Morbi, Mundra, Gandhidham, Bhuj, Samakhiali, Udaipur & Kandla.

Table 3-8: Zonal influence in % for passenger and goods traffic at Sanand (TP01)

Zone	% Influence
Passenger	
Ahmedabad	19.6%
Sanand/Telav/Gibpura	10.1%
Viramgam/Hansalpur	9.0%
Surendranagar/Rajsitapur/ Limbdi/Chotila	5.5%
Gandhinagar/Kalol	5.4%
GIDC Sanand/Bol GIDC/Bol Industrial Estate/Chharodi	4.6%
Morbi	4.4%
Malvan/Kherva/Akhiyana/Manpur	4.0%

Zone	% Influence
Goods	
Ahmedabad	13.6%
Morbi	10.1%
Gandhidham	9.2%
Surat/Bharuch/Hazira Port	7.2%
Mundra/Mandvi Port	6.3%
Bhuj	6.1%
Viramgam/Hansalpur	2.3%
Udaipur	2.3%

Vadodara	4.0%	Kandla Port	2.3%
Samakhiali/Bhachau	2.0%	Bhuj	3.2%

Source: Crisil Intelligence

The key influencing zones/regions at TP02 from the origin destination survey are Ahmedabad, Morbi, Gandhidham, Viramgam, Hansalpur, Gandhinagar, Bhuj, Dhrangadhra, Malvan for Passenger traffic, indicating movement along the project corridor and for goods traffic key influencing zones/regions are Ahmedabad, Sanand, Morbi, Mundra, Gandhidham, Bhuj, Samakhiali, Udaipur, & Kandla.

Table 3-9: Zonal influence in % for passenger and goods traffic at Malvan (TP02)

Zone	% Influence	Zone	% Influence
Passenger		**Goods**	
Ahmedabad	21.4%	Ahmedabad	17.4%
Morbi	11.1%	Gandhidham	13.2%
Gandhidham	6.9%	Morbi	12.5%
Viramgam/Hansalpur	6.6%	Mundra/Mandvi Port	7.8%
Gandhinagar/Kalol	5.9%	Bhuj	5.4%
Bhuj	5.7%	Surat/Bharuch/Hazira Port	4.5%
Mundra/Mandvi Port	5.4%	Kandla Port	3.3%
Dhrangadhra/Rajgadh/ Dudapur/Soladi	3.7%	Udaipur	2.9%
Malvan/Kherva/Akhiyana/Manpur	3.5%	Gandhinagar/Kalol	2.2%
Samakhiali/Bhachau	3.3%	Sanand/Telav/Gibpura	1.9%

Source: Crisil Intelligence

The key influencing zones/regions at TP03 from the origin destination survey are Ahmedabad, Morbi, Gandhidham, Surendranagar, Bhuj, Dhrangadhra, Malvan and Rann of Kutch for Passenger traffic, indicating movement along the project corridor and for goods traffic key influencing zones/regions are Ahmedabad, Morbi, Mundra, Gandhidham, Bhuj, Samakhiali, Surat, & Kandla.

Table 3-10: Zonal influence in % for passenger and goods traffic at Soladi (TP03)

Zone	% Influence	Zone	% Influence
Passenger		**Goods**	
Ahmedabad	13.6%	Morbi	15.0%
Halvad	12.7%	Ahmedabad	13.0%
Morbi	11.6%	Gandhidham	8.1%
Dhrangadhra/Rajgadh/Dudapur/Soladi	7.5%	Mundra/Mandvi Port	6.5%
Surendranagar/Rajsitapur/ Limbdi/Chotila	5.1%	Samakhiali/Bhachau	5.1%
Malia/Khirai/Manaba/Rapar	4.8%	Surat/Bharuch/Hazira Port	4.1%
Malvan/Kherva/Akhiyana/ Manpur	4.4%	Kandla Port	3.8%
Bhuj	3.5%	Kandla Port	3.8%
Gandhidham	3.3%	Vadodara	3.8%
Rann of Kutch/Dholavira	2.8%	Rann of Kutch/Dholavira	3.1%

Source: Crisil Intelligence

The key influencing zones/regions at TP03 from the origin destination survey are Ahmedabad, Morbi, Gandhidham,

Surendranagar, Bhuj, Dhrangadhra, Malvan, Malia and Samakhiali for Passenger traffic, indicating movement along the project corridor and for goods traffic key influencing zones/regions are Ahmedabad, Morbi, Mundra, Gandhidham, Bhuj, Samakhiali, Surat, & Kandla.

Table 3-11: Zonal influence in % for passenger and goods traffic at Aniyari (TP04)

Zone	% Influence
Passenger	
Halvad	10.9%
Samakhiali/Bhachau	9.9%
Malia/Khirai/Manaba/Rapar	8.7%
Ahmedabad	7.8%
Bhuj	7.5%
Gandhidham	7.1%
Dhrangadhra/Rajgadh/Dudapur/Soladi	6.9%
Surendranagar/Rajsitapur/Limbdi/Chotila	5.2%
Gandhinagar/Kalol	3.0%
Morbi	2.9%

Zone	% Influence
Goods	
Gandhidham	10.1%
Ahmedabad	8.8%
Mundra/Mandvi Port	7.4%
Bhuj	6.5%
Surat/Bharuch/Hazira Port	6.4%
Kandla Port	5.4%
Malia/Khirai/Manaba/Rapar	4.0%
Morbi	3.5%
Vadodara	3.4%
Samakhiali/Bhachau	3.4%

3.3.3 Top OD Pairs

Key OD pairs-Car and MAV traffic

Sanand (TP01)

Passenger vehicle movement is largely limited to Gujarat state itself. Ahmedabad/Sanand to Viramgam/Morbi/ /Surendranagar contributes to highest no. of trips at the toll plaza. Ahmedabad/Surat/Mumbai to Morbi/Gandhidham/Mundra are major contributors in terms of freight traffic.

Top 10 OD pairs contribute to nearly 36% in car traffic and 32% of the traffic in MAV. The top 10 OD pairs are presented in the below table.

Table 3-12: Top OD pairs for car traffic and MAV traffic at Sanand (TP01)

OD Pair	% Influence
Car	
Ahmedabad To Viramgam	8.8%
Ahmedabad To Surendranagar	4.0%
Ahmedabad To Morbi	3.5%
Sanand To Viramgam	3.3%
Ahmedabad To Malvan	2.9%
Ahmedabad To GIDC Sanand	2.8%
Ahmedabad To Vasna Iyava	2.7%
Vadodara To Surendranagar	2.7%
Sanand To GIDC Sanand	2.4%
Vadodara To Viramgam	2.4%

OD Pair	% Influence
MAV	
Ahmedabad To Morbi	5.5%
Ahmedabad To Gandhidham	4.9%
Ahmedabad To Mundra	3.9%
Surat To Morbi	3.4%
Ahmedabad To Bhuj	3.0%
Surat To Bhuj	2.7%
Surat To Mundra	2.3%
Surat To Gandhidham	2.0%
Mumbai To Gandhidham	2.0%
Mumbai To Morbi	1.9%

Malvan (TP02)

Passenger vehicle movement is largely limited to Gujarat state itself. Ahmedabad/Viramgam/Gandhinagar to Morbi/Gandhidham/Bhuj contributes to highest no. of trips at the toll plaza. Ahmedabad/Udaipur/Surat/Mumbai to Morbi/Gandhidham/Mundra are major contributors in terms of freight traffic.

Top 10 OD pairs contribute to nearly 42% in car traffic and 44% of the traffic in MAV. The top 10 OD pairs are presented in the below table.

Table 3-13: Top OD pairs for car traffic and MAV traffic at Malvan (TP02)

OD Pair	% Influence
Car	
Ahmedabad To Morbi	12.0%
Ahmedabad To Gandhidham	6.6%
Ahmedabad To Mundra	4.4%
Ahmedabad To Bhuj	4.2%
Ahmedabad To Dhrangadhra	2.9%
Viramgam To Morbi	2.5%
Ahmedabad To Malvan	2.5%
Ahmedabad To Khavda	2.3%
Gandhinagar To Morbi	2.3%
Ahmedabad To Samakhiali	2.2%

OD Pair	% Influence
MAV	
Ahmedabad To Gandhidham	11.1%
Ahmedabad To Morbi	6.6%
Ahmedabad To Mundra	5.5%
Udaipur To Morbi	5.2%
Ahmedabad To Bhuj	3.7%
Surat To Gandhidham	3.6%
Ahmedabad To Kandla Port	2.4%
Jodhpur To Morbi	2.2%
Surat To Morbi	1.8%
Sanand To Mundra	1.6%

Soladi (TP03)

Passenger vehicle movement is largely limited to Gujarat state itself. Ahmedabad/Dhrangadhra/Surendranagar to Morbi/Halvad/Gandhidham contributes to highest no. of trips at the toll plaza. Ahmedabad/Udaipur/Surat to Morbi/Gandhidham/Mundra are major contributors in terms of freight traffic.

Top 10 OD pairs contribute to nearly 37% in car traffic and 31% of the traffic in MAV. The top 10 OD pairs are presented in the below table.

Table 3-14: Top OD pairs for car traffic and MAV traffic at Soladi (TP03)

OD Pair	% Influence
Car	
Ahmedabad To Morbi	7.0%
Dhrangadhra To Halvad	5.9%
Ahmedabad To Halvad	4.8%
Surendranagar To Halvad	4.2%
Dhrangadhra To Morbi	3.1%
Malvan To Halvad	2.7%
Ahmedabad To Gandhidham	2.7%
Ahmedabad To Malia	2.4%
Surendranagar To Morbi	2.2%
Ahmedabad To Bhuj	2.2%

OD Pair	% Influence
MAV	
Ahmedabad To Morbi	6.1%
Ahmedabad To Gandhidham	4.4%
Surat To Morbi	3.5%
Ahmedabad To Mundra	3.4%
Udaipur To Morbi	2.8%
Vadodara To Morbi	2.5%
Jaipur To Morbi	2.3%
Ahmedabad To Samakhiali	2.1%
Kishangarh To Morbi	2.0%
Ahmedabad To Kandla Port	1.9%

Aniyari (TP04)

Passenger vehicle movement is largely limited to Gujarat state itself. Ahmedabad/Halvad/Gandhinagar to Gandhidham/Samakhiali/Malia/Bhuj contributes to highest no. of trips at the toll plaza. Ahmedabad/Surat/Mumbai to Gandhidham/Mundra/Kandla are major contributors.

Top 10 OD pairs contribute to nearly 31% in car traffic and 22% of the traffic in MAV. The top 10 OD pairs are presented in the below table.

Table 3-15: Top OD pairs for car traffic and MAV traffic at Aniyari (TP04)

OD Pair	% Influence
Car	
Halvad To Malia	5.8%
Halvad To Samakhiali	4.6%
Ahmedabad To Bhuj	3.2%
Ahmedabad To Gandhidham	3.1%
Dhrangadhra To Samakhiali	2.8%
Dhrangadhra To Malia	2.6%
Halvad To Bhuj	2.5%
Surendranagar To Samakhiali	2.3%
Ahmedabad To Samakhiali	2.2%
Halvad To Gandhidham	2.2%

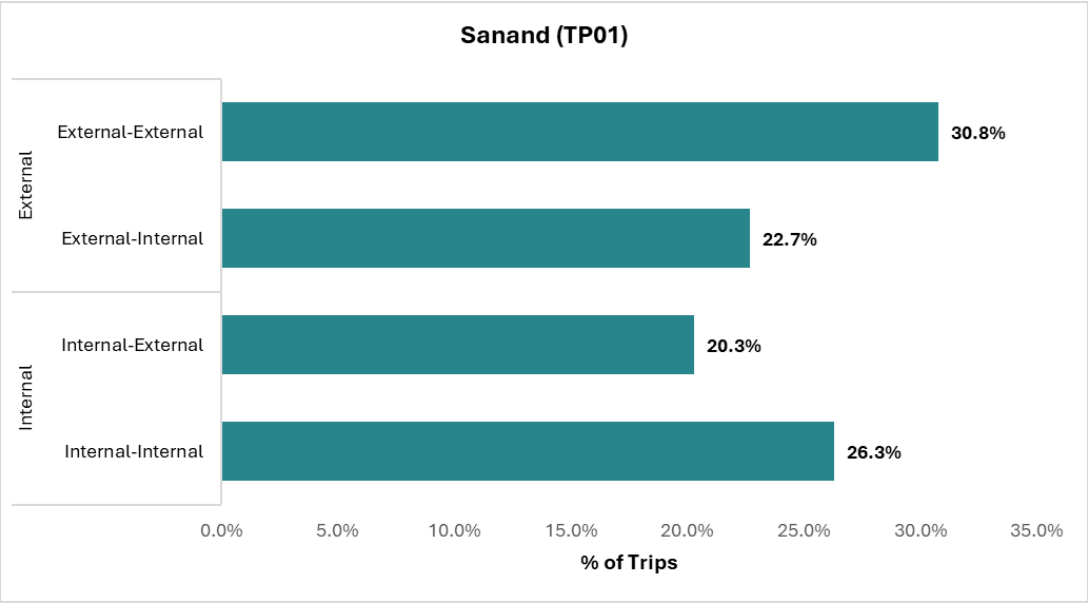
OD Pair	% Influence
MAV	
Ahmedabad To Gandhidham	3.1%
Ahmedabad To Mundra	2.8%
Surat To Gandhidham	2.5%
Surat To Kandla Port	2.5%
Surat To Bhuj	2.2%
Ahmedabad To Kandla Port	2.0%
Ahmedabad To Navlakhi Port	2.0%
Surat To Mundra	1.7%
Ahmedabad To Bhuj	1.5%
Ahmedabad To Malia	1.3%

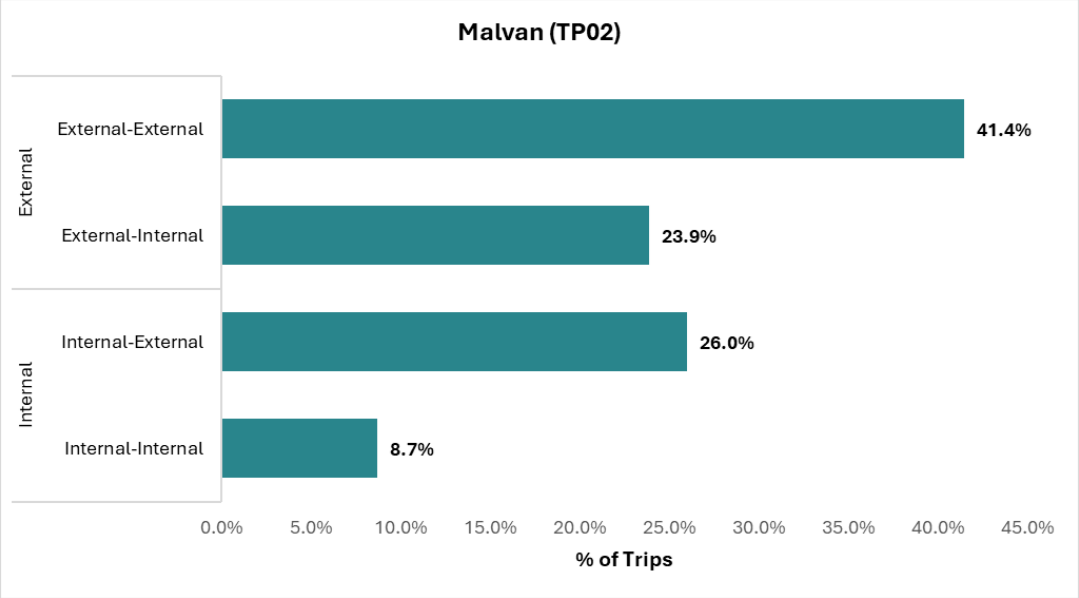
Source: Crisil Intelligence

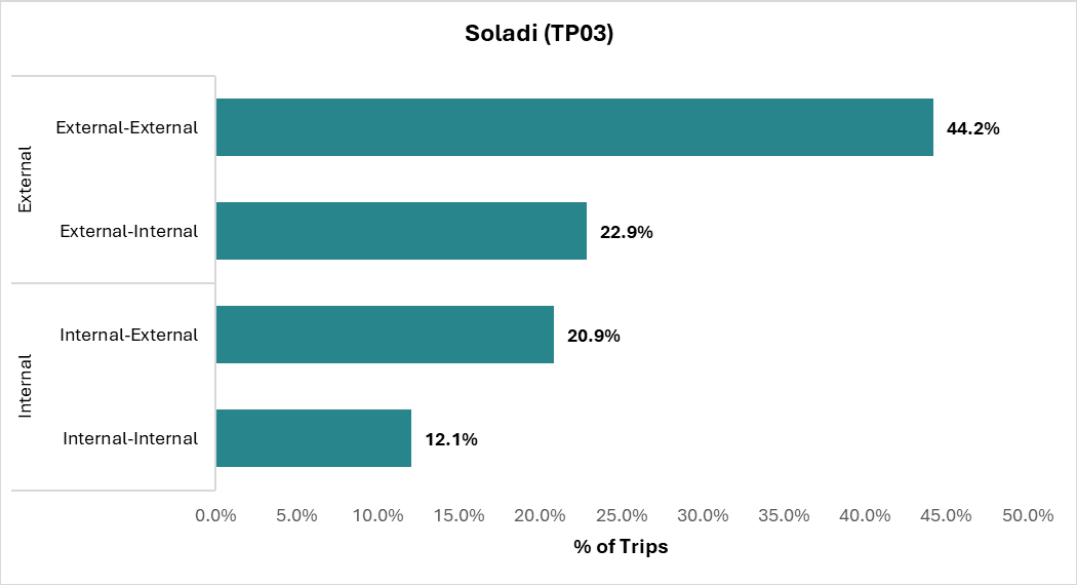
3.3.4 Internal External Analysis

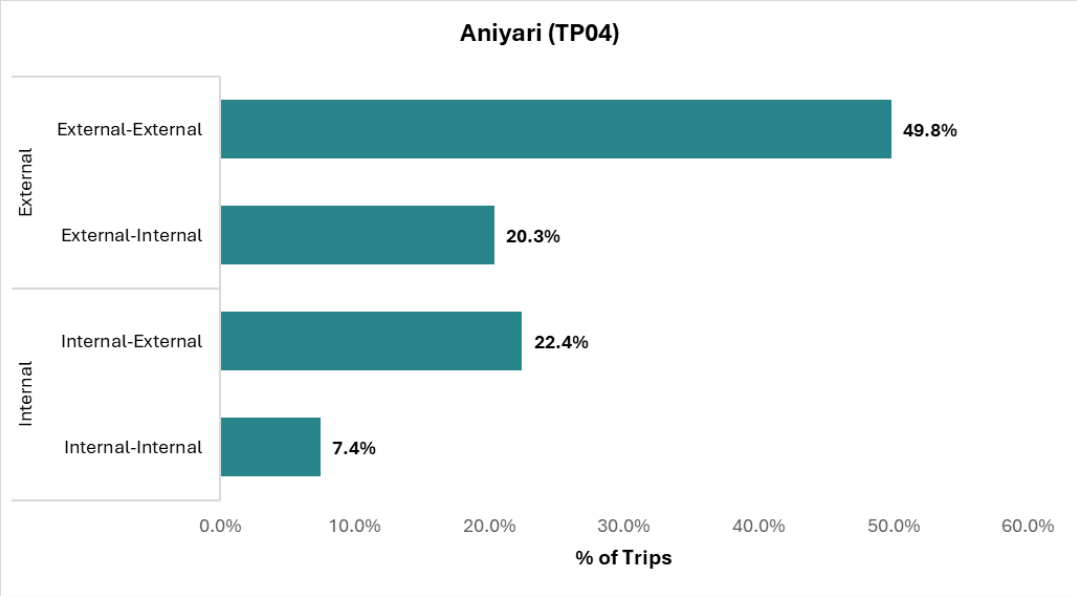
To understand the influence of the zones, present along the project corridor and the dependency and impact of traffic from outside of the project road, internal-external analysis has been done. The zones which fall along the project road and very near project road are considered as internal zones and other zones are considered as external zones. If both end of the trips are internal, those trips are internal-internal trips. If one end of the trips is internal and other is external those trips are internal to external and external to internal trips. If both ends of the trips are external, those are external-external trips. Internal-External analysis is presented in the below figure.

Figure 3-7: Internal-External Influence at all the toll plazas









Source: Crisil Intelligence

A broad travel characteristic of the traffic plying on the project road section is presented below.

Short Distance: Short-distance traffic in the Ahmedabad region is primarily concentrated between Ahmedabad and nearby industrial hubs such as Sanand GIDC, Morbi's ceramic cluster units, and surrounding industries. This movement is largely driven by the flow of raw materials and finished goods between the city and these key manufacturing zones.

Medium Distance: Medium-distance traffic from Ahmedabad extends towards industrial and logistics hubs such as Becharaji, Viramgam, Maliya, and Gandhidham. This corridor supports the movement of goods between Ahmedabad and key manufacturing, port-linked, and industrial zones, facilitating regional connectivity and trade flow

Long distance: Long-distance traffic in the region primarily originates from Kandla Port and the Morbi ceramic tile cluster, moving towards the southern and eastern parts of India. This flow is driven by the distribution of export-

import cargo and finished ceramic products to major consumption markets across the country, highlighting the strategic importance of these industrial zones in long-haul freight movement.

To summarise the data shown in **Figure 3-7**, it can be observed that owing to the higher industrial concentration at TP01 and proximity to Ahmedabad, Sanand and Viramgam and their industrial bases, higher number of Internal-internal trips has been observed at 26%, while for other plazas these trips lie in the range of 7-12 percent depending upon the proximity to settlements and nearby industrial hubs. Internal-External and External-Internal trips lies almost in similar ranges indicating the demand and supply requirements for the project corridor. It is to be noted that the external to internal trips are higher at TP01 and TP03 indicating that the requirement of raw materials for the GIDCs near TP01 and the Morbi near TP03 is higher. The External-External trips have increased going from start of project road near Ahmedabad to end of project road near Maliya, which could be attributed to the industrial concentration which decreases along the project corridor.

3.4 Commodity Distribution

Analysis was carried out to understand the various freight vehicles being used to transport different commodities. Table below presents the commodity distribution for all the toll plazas in project road.

Table 3-16: Commodity Distribution (in %) on the project road

Commodity	LCV	2 AT	3 AT	MAV	Total
Sanand (TP01)					
Agri Produce	11.7%	5.4%	4.1%	4.2%	7.3%
Automobiles	0.9%	0.7%	1.2%	1.8%	1.3%
Boulder/Marble/Granite/Sand Stone/Slate - Bulk items	0.9%	1.5%	1.9%	3.2%	2.0%
Cement	0.4%	2.6%	1.9%	3.0%	1.9%
Chemical products	0.4%	1.0%	1.7%	1.3%	0.9%
Coal	3.0%	6.0%	4.0%	8.5%	5.8%
Construction materials	0.8%	3.6%	4.8%	3.6%	2.6%
Consumer Foods	5.5%	9.6%	10.5%	7.4%	7.1%
Consumer Products	0.5%	0.7%	0.3%	0.4%	0.5%
Container	2.4%	4.8%	3.5%	8.2%	5.2%
Courier & parcel	12.7%	10.4%	7.2%	4.2%	8.5%
Electrical and Electronic Items	0.0%	0.3%	0.0%	0.2%	0.1%
Empty	37.8%	18.7%	20.3%	14.1%	24.3%
Iron & Steel Products	2.3%	8.2%	8.5%	10.9%	7.1%
Machinery	2.2%	2.0%	1.5%	1.5%	1.9%
Milk & Animal Food	0.9%	0.6%	0.3%	0.9%	0.8%
Other Minerals	0.0%	0.0%	0.0%	0.0%	0.0%
Others	4.7%	0.9%	0.7%	0.9%	2.4%
Petroleum Products	2.1%	6.3%	10.0%	6.1%	4.8%
Pharmaceuticals	0.1%	0.4%	0.4%	0.2%	0.2%
Plastic products	1.3%	0.9%	2.5%	2.4%	1.8%
Plywood & Timber products	2.6%	2.1%	2.1%	3.0%	2.7%
Powder	0.7%	2.8%	5.5%	4.8%	3.0%
Rubber products	0.3%	0.6%	0.2%	0.3%	0.3%
Textile & Footwear	0.8%	2.4%	0.3%	1.6%	1.3%
Tiles & Ceramic products	4.9%	7.5%	6.6%	7.4%	6.4%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Commodity	LCV	2 AT	3 AT	MAV	Total
Malvan (TP02)					
Agri Produce	14.7%	4.6%	7.0%	5.3%	7.7%
Automobiles	1.1%	1.5%	0.8%	1.3%	1.3%
Boulder/Marble/Granite/Sand Stone/Slate - Bulk items	0.2%	1.5%	3.7%	4.7%	3.2%
Cement	0.2%	0.4%	0.6%	0.8%	0.6%
Chemical products	0.2%	1.9%	3.7%	2.7%	2.0%
Coal	4.5%	4.7%	4.4%	4.5%	4.5%
Construction materials	0.4%	2.0%	2.9%	3.9%	2.8%
Consumer Foods	10.8%	18.5%	12.3%	6.8%	9.1%
Consumer Products	1.1%	1.5%	1.9%	0.9%	1.0%
Container	1.2%	2.9%	3.4%	8.0%	5.6%
Courier & parcel	7.7%	11.4%	4.2%	3.5%	5.4%
Electrical and Electronic Items	0.5%	1.0%	1.1%	0.9%	0.8%
Empty	14.8%	12.0%	18.7%	13.0%	13.6%
Iron & Steel Products	3.5%	5.6%	5.5%	8.1%	6.6%
Machinery	1.0%	1.1%	1.8%	1.9%	1.6%
Milk & Animal Food	8.7%	3.0%	0.7%	0.9%	3.1%
Other Minerals	0.0%	0.0%	0.0%	0.0%	0.0%
Others	4.3%	4.1%	3.8%	0.9%	2.2%
Petroleum Products	1.9%	4.1%	4.2%	6.6%	5.1%
Pharmaceuticals	0.0%	2.8%	1.8%	1.0%	0.9%
Plastic products	3.9%	4.3%	4.6%	4.0%	4.0%
Plywood & Timber products	2.6%	2.5%	1.8%	3.8%	3.3%
Powder	3.5%	1.8%	2.6%	8.0%	6.0%
Rubber products	8.5%	2.1%	1.3%	0.9%	2.9%
Textile & Footwear	0.8%	1.5%	2.7%	1.1%	1.1%
Tiles & Ceramic products	4.1%	3.5%	4.7%	6.5%	5.5%
Grand Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Soladi (TP03)					
Agri Produce	20.0%	4.8%	5.5%	6.1%	9.5%
Automobiles	1.5%	0.4%	0.2%	1.0%	1.1%
Boulder/Marble/Granite/Sand Stone/Slate - Bulk items	1.8%	2.4%	4.3%	5.2%	4.1%
Cement	0.8%	1.0%	1.9%	2.5%	1.9%
Chemical products	0.7%	0.9%	1.2%	1.3%	1.1%
Coal	3.7%	4.7%	4.3%	3.7%	3.8%
Construction materials	0.5%	1.0%	0.7%	1.5%	1.2%
Consumer Foods	7.8%	6.9%	5.8%	6.2%	6.7%
Consumer Products	1.6%	2.1%	1.5%	0.3%	0.8%
Container	3.2%	5.8%	6.4%	5.9%	5.3%
Courier & parcel	3.0%	7.0%	4.2%	5.9%	5.2%
Electrical and Electronic Items	0.0%	0.0%	0.0%	0.0%	0.0%
Empty	29.6%	19.9%	13.7%	7.7%	14.5%
Iron & Steel Products	1.1%	4.4%	5.4%	4.6%	3.7%
Machinery	1.3%	4.3%	2.1%	3.0%	2.7%

Commodity	LCV	2 AT	3 AT	MAV	Total
Milk & Animal Food	7.6%	0.9%	1.2%	0.3%	2.2%
Other Minerals	0.3%	6.2%	3.7%	4.5%	3.6%
Others	2.8%	1.8%	3.8%	2.2%	2.4%
Petroleum Products	2.3%	8.6%	8.4%	3.5%	3.8%
Pharmaceuticals	0.2%	0.4%	0.4%	0.1%	0.2%
Plastic products	1.3%	1.8%	3.6%	5.8%	4.2%
Plywood & Timber products	2.7%	4.2%	7.2%	4.7%	4.2%
Powder	1.7%	2.5%	4.0%	10.5%	7.4%
Rubber products	0.1%	0.0%	0.0%	0.0%	0.0%
Textile & Footwear	0.5%	3.6%	1.4%	1.0%	1.1%
Tiles & Ceramic products	4.0%	4.4%	9.3%	12.4%	9.5%
Grand Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Aniyari (TP04)					
Agri Produce	14.7%	6.7%	3.8%	3.2%	5.7%
Automobiles	0.3%	1.6%	0.9%	1.8%	1.5%
Boulder/Marble/Granite/Sand Stone/Slate - Bulk items	3.2%	1.7%	2.3%	3.9%	3.5%
Cement	0.0%	1.1%	0.8%	1.0%	0.8%
Chemical products	0.3%	1.2%	1.7%	1.7%	1.4%
Coal	1.2%	7.6%	7.5%	6.2%	5.4%
Construction materials	0.0%	0.4%	0.4%	0.9%	0.6%
Consumer Foods	6.0%	8.0%	5.4%	4.1%	4.8%
Consumer Products	3.5%	1.1%	4.1%	0.9%	1.6%
Container	7.0%	5.0%	4.0%	3.8%	4.5%
Courier & parcel	1.2%	6.2%	5.4%	2.5%	2.7%
Electrical and Electronic Items	0.0%	0.0%	0.1%	0.4%	0.3%
Empty	30.7%	22.5%	20.3%	12.8%	17.3%
Iron & Steel Products	0.3%	2.1%	5.8%	8.9%	6.6%
Machinery	7.6%	0.0%	2.0%	2.9%	3.5%
Milk & Animal Food	3.2%	0.0%	0.2%	0.2%	0.8%
Other Minerals	0.0%	0.0%	0.0%	0.0%	0.0%
Others	1.9%	0.5%	0.9%	0.5%	0.8%
Petroleum Products	3.7%	4.3%	8.5%	4.9%	4.8%
Pharmaceuticals	0.0%	0.0%	0.0%	0.0%	0.0%
Plastic products	0.0%	5.0%	5.7%	9.4%	7.1%
Plywood & Timber products	1.5%	14.5%	7.6%	7.7%	7.1%
Powder	10.0%	1.9%	4.9%	14.4%	12.2%
Rubber products	0.0%	0.0%	0.0%	0.0%	0.0%
Textile & Footwear	0.0%	2.7%	1.4%	2.3%	1.9%
Tiles & Ceramic products	3.4%	6.0%	6.3%	5.5%	5.2%
Grand Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: Crisil Intelligence

- The analysis of freight movement across the toll plaza reveals that the major commodities being transported include Agri produce, container, construction materials, iron and steel products, consumer foods and products, tiles and ceramic products.
- Agri Produce majorly consisting of fruits & vegetables and foodgrains is majorly carried by LCV.

- 4-8 percent of MAV at all plaza locations are carrying container traffic is also seen plying on the project road as the project corridor connects the ports of Kandla, Mundra and Tuna to the important cities in eastern Gujarat and rest of the state.
- In 3 Axle Trucks, traffic is largely contributed by tile powder, consumer foods, container and iron and steel products.
- In MAV, traffic is largely contributed by containers, tiles and ceramic products and iron and steel products.

Direction wise commodity distribution is presented in the below tables.

Table 3-17: Commodity Distribution (in %) direction wise for Sanand (TP01)

Commodity	LCV	2 AT	3 AT	MAV	Total	LCV	2 AT	3 AT	MAV	Total
	Ahmedabad-Maliya					Maliya-Ahmedabad				
Agri Produce	7.6%	5.7%	5.4%	7.1%	7.0%	16.5%	5.0%	2.5%	1.1%	7.6%
Automobiles	1.6%	1.1%	1.5%	2.5%	1.9%	0.1%	0.3%	0.8%	1.0%	0.6%
Boulder/Marble/Granite/Sand Stone/Slate - Bulk items	1.6%	1.9%	3.5%	6.0%	3.6%	0.0%	1.0%	0.0%	0.2%	0.2%
Cement	0.0%	0.4%	0.9%	0.5%	0.3%	0.8%	5.2%	3.0%	5.8%	3.7%
Chemical products	0.1%	1.0%	0.9%	1.1%	0.7%	0.8%	1.0%	2.6%	1.4%	1.2%
Coal	1.2%	1.3%	4.8%	1.7%	1.6%	5.3%	11.3%	3.0%	16.1%	10.6%
Construction materials	1.5%	1.3%	4.0%	2.3%	2.0%	0.0%	6.2%	5.8%	4.9%	3.3%
Consumer Foods	7.2%	11.3%	12.8%	8.3%	8.5%	3.5%	7.5%	7.8%	6.3%	5.5%
Consumer Products	0.9%	1.0%	0.6%	0.6%	0.8%	0.0%	0.4%	0.0%	0.1%	0.1%
Container	3.5%	4.0%	3.9%	8.1%	5.5%	1.2%	5.7%	3.0%	8.3%	4.9%
Courier & parcel	13.5%	15.0%	8.1%	6.0%	10.3%	11.7%	5.2%	6.0%	2.3%	6.5%
Electrical and Electronic Items	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	0.0%	0.3%	0.2%
Empty	30.1%	24.9%	20.4%	20.8%	25.0%	46.9%	11.6%	20.1%	6.7%	23.5%
Iron & Steel Products	3.5%	9.1%	9.1%	12.3%	8.2%	0.9%	7.2%	7.8%	9.4%	5.8%
Machinery	3.1%	2.9%	1.6%	1.7%	2.4%	1.3%	1.0%	1.4%	1.3%	1.2%
Milk & Animal Food	1.2%	1.1%	0.6%	1.4%	1.2%	0.5%	0.0%	0.0%	0.3%	0.3%
Other Minerals	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Others	7.8%	1.3%	0.9%	1.2%	3.8%	1.2%	0.4%	0.5%	0.6%	0.8%
Petroleum Products	3.4%	9.0%	15.1%	8.6%	7.0%	0.7%	3.3%	3.9%	3.5%	2.4%
Pharmaceuticals	0.2%	0.8%	0.3%	0.3%	0.3%	0.0%	0.0%	0.5%	0.2%	0.1%
Plastic products	1.7%	0.7%	2.1%	2.3%	1.8%	0.8%	1.1%	3.1%	2.4%	1.7%
Plywood & Timber products	3.4%	1.5%	2.1%	1.6%	2.3%	1.7%	2.8%	2.1%	4.5%	3.1%
Powder	0.5%	0.4%	0.6%	2.8%	1.4%	1.0%	5.7%	11.3%	7.0%	4.8%
Rubber products	0.4%	0.7%	0.3%	0.4%	0.4%	0.1%	0.4%	0.0%	0.1%	0.1%
Textile & Footwear	1.5%	3.7%	0.6%	2.3%	2.0%	0.0%	1.0%	0.0%	0.9%	0.5%
Tiles & Ceramic products	4.7%	0.0%	0.0%	0.1%	1.9%	5.1%	16.1%	14.7%	15.5%	11.5%
Grand Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Crisil Intelligence

Table 3-18: Commodity Distribution (in %) direction wise for Malvan (TP02)

Commodity	LCV	2 AT	3 AT	MAV	Total	LCV	2 AT	3 AT	MAV	Total
	Ahmedabad-Maliya					Maliya-Ahmedabad				
Agri Produce	9.9%	5.2%	9.5%	8.6%	8.7%	19.4%	4.1%	4.6%	2.0%	6.7%
Automobiles	1.8%	1.6%	0.8%	1.6%	1.6%	0.4%	1.3%	0.8%	1.0%	0.9%

Commodity	LCV	2 AT	3 AT	MAV	Total	LCV	2 AT	3 AT	MAV	Total
	Ahmedabad-Maliya					Maliya-Ahmedabad				
Boulder/Marble/Granite/Sand Stone/Slate - Bulk items	0.5%	1.6%	5.5%	6.6%	4.5%	0.0%	1.3%	2.0%	2.8%	1.9%
Cement	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.7%	1.2%	1.6%	1.2%
Chemical products	0.0%	0.8%	2.0%	1.4%	1.0%	0.4%	2.9%	5.3%	4.0%	3.0%
Coal	5.0%	3.6%	3.0%	1.8%	2.8%	4.1%	5.7%	5.6%	7.2%	6.2%
Construction materials	0.0%	1.2%	1.4%	2.7%	1.8%	0.8%	2.8%	4.3%	5.1%	3.7%
Consumer Foods	20.1%	15.6%	15.4%	7.0%	11.5%	1.5%	21.3%	9.3%	6.5%	6.8%
Consumer Products	2.3%	1.6%	2.2%	1.6%	1.8%	0.0%	1.3%	1.5%	0.2%	0.3%
Container	1.2%	4.4%	4.1%	10.7%	7.4%	1.1%	1.4%	2.7%	5.3%	3.8%
Courier & parcel	2.7%	14.4%	4.9%	4.7%	5.1%	12.6%	8.4%	3.5%	2.4%	5.6%
Electrical and Electronic Items	0.9%	2.0%	2.2%	1.8%	1.6%	0.0%	0.0%	0.0%	0.1%	0.0%
Empty	16.0%	15.6%	17.8%	16.6%	16.4%	13.6%	8.6%	19.5%	9.4%	10.8%
Iron & Steel Products	6.9%	7.7%	4.9%	9.6%	8.5%	0.0%	3.5%	6.1%	6.6%	4.6%
Machinery	1.7%	0.8%	2.8%	2.2%	2.0%	0.4%	1.3%	0.8%	1.6%	1.2%
Milk & Animal Food	9.5%	1.2%	1.4%	0.8%	3.1%	7.9%	4.8%	0.0%	1.1%	3.1%
Other Minerals	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Others	2.1%	2.8%	5.1%	0.3%	1.2%	6.5%	5.4%	2.6%	1.4%	3.1%
Petroleum Products	0.9%	5.6%	2.6%	2.6%	2.5%	2.8%	2.6%	5.8%	10.5%	7.6%
Pharmaceuticals	0.0%	3.7%	2.8%	1.4%	1.3%	0.0%	2.0%	0.8%	0.6%	0.6%
Plastic products	0.9%	4.0%	3.0%	2.9%	2.5%	6.8%	4.7%	6.1%	5.1%	5.5%
Plywood & Timber products	0.8%	1.6%	0.6%	1.7%	1.4%	4.4%	3.5%	3.0%	6.0%	5.2%
Powder	3.3%	0.8%	2.6%	10.1%	7.2%	3.7%	2.8%	2.6%	6.0%	4.9%
Rubber products	13.4%	2.8%	0.6%	1.2%	4.4%	3.6%	1.3%	2.0%	0.5%	1.4%
Textile & Footwear	0.0%	1.6%	4.6%	1.7%	1.4%	1.5%	1.3%	0.8%	0.6%	0.9%
Tiles & Ceramic products	0.0%	0.0%	0.0%	0.3%	0.2%	8.2%	7.0%	9.3%	12.6%	10.8%
Grand Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 3-19: Commodity Distribution (in %) direction wise for Soladi (TP03)

Commodity	LCV	2 AT	3 AT	MAV	Total	LCV	2 AT	3 AT	MAV	Total
	Ahmedabad-Maliya					Maliya-Ahmedabad				
Agri Produce	12.4%	3.7%	7.3%	7.3%	8.3%	27.7%	5.9%	3.8%	4.9%	10.7%
Automobiles	2.1%	0.8%	0.4%	0.8%	1.1%	0.9%	0.0%	0.0%	1.2%	1.0%
Boulder/Marble/Granite/Sand Stone/Slate - Bulk items	2.9%	4.1%	6.4%	7.8%	6.2%	0.7%	0.6%	2.3%	2.6%	2.0%
Cement	1.0%	1.4%	2.4%	1.6%	1.4%	0.7%	0.6%	1.3%	3.3%	2.4%
Chemical products	0.8%	0.0%	0.4%	0.4%	0.5%	0.5%	1.8%	2.0%	2.1%	1.7%
Coal	2.1%	3.7%	5.9%	2.2%	2.5%	5.2%	5.8%	2.7%	5.1%	5.1%
Construction materials	0.9%	0.8%	1.4%	2.4%	1.9%	0.0%	1.1%	0.0%	0.6%	0.5%
Consumer Foods	10.8%	7.9%	8.3%	6.6%	7.8%	4.9%	6.0%	3.4%	5.9%	5.5%
Consumer Products	2.1%	3.0%	3.0%	0.5%	1.3%	1.0%	1.2%	0.0%	0.1%	0.4%
Container	5.8%	11.6%	11.5%	10.3%	9.3%	0.7%	0.0%	1.3%	1.6%	1.2%
Courier & parcel	2.6%	5.9%	4.2%	7.9%	6.3%	3.4%	8.2%	4.3%	3.9%	4.1%
Electrical and Electronic Items	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Commodity	LCV	2 AT	3 AT	MAV	Total	LCV	2 AT	3 AT	MAV	Total
	Ahmedabad-Maliya					Maliya-Ahmedabad				
Empty	28.1%	19.2%	14.0%	8.9%	14.9%	31.0%	20.7%	13.4%	6.5%	14.2%
Iron & Steel Products	1.1%	3.7%	5.1%	5.4%	4.1%	1.2%	5.1%	5.8%	3.8%	3.3%
Machinery	1.2%	2.2%	1.9%	4.0%	3.1%	1.3%	6.4%	2.3%	2.1%	2.2%
Milk & Animal Food	9.2%	0.0%	1.4%	0.3%	2.6%	6.0%	1.8%	1.0%	0.3%	1.9%
Other Minerals	0.0%	0.8%	0.0%	0.0%	0.1%	0.5%	11.7%	7.4%	9.0%	7.1%
Others	3.8%	1.7%	3.4%	3.0%	3.1%	1.9%	1.8%	4.1%	1.3%	1.6%
Petroleum Products	3.8%	16.0%	12.1%	5.7%	6.4%	0.7%	1.1%	4.6%	1.2%	1.2%
Pharmaceuticals	0.4%	0.8%	0.7%	0.3%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%
Plastic products	2.2%	3.0%	1.8%	2.8%	2.6%	0.4%	0.6%	5.3%	8.7%	5.7%
Plywood & Timber products	2.4%	3.8%	2.4%	1.8%	2.1%	3.0%	4.6%	11.9%	7.6%	6.3%
Powder	3.3%	3.8%	5.7%	19.1%	13.3%	0.0%	1.1%	2.3%	2.0%	1.4%
Rubber products	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%
Textile & Footwear	0.8%	2.1%	0.5%	0.8%	0.9%	0.2%	5.1%	2.3%	1.3%	1.4%
Tiles & Ceramic products	0.0%	0.0%	0.0%	0.0%	0.0%	8.0%	8.8%	18.6%	24.9%	19.0%
Grand Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 3-20: Commodity Distribution (in %) direction wise for Aniyari (TP04)

Commodity	LCV	2 AT	3 AT	MAV	Total	LCV	2 AT	3 AT	MAV	Total
	Ahmedabad-Maliya					Maliya-Ahmedabad				
Agri Produce	0.0%	13.4%	6.7%	6.0%	5.5%	29.2%	0.0%	1.0%	0.3%	5.9%
Automobiles	0.0%	0.7%	0.0%	0.2%	0.2%	0.6%	2.4%	1.9%	3.5%	2.8%
Boulder/Marble/Granite/Sand Stone/Slate - Bulk items	6.5%	1.1%	2.0%	6.1%	5.6%	0.0%	2.4%	2.6%	1.7%	1.4%
Cement	0.0%	2.2%	0.5%	0.0%	0.2%	0.0%	0.0%	1.0%	1.9%	1.4%
Chemical products	0.0%	0.0%	0.8%	1.2%	0.8%	0.6%	2.4%	2.6%	2.2%	1.9%
Coal	0.0%	0.0%	0.8%	0.3%	0.2%	2.4%	15.1%	14.3%	12.2%	10.6%
Construction materials	0.0%	0.7%	0.7%	1.7%	1.3%	0.0%	0.0%	0.0%	0.0%	0.0%
Consumer Foods	6.5%	11.6%	6.6%	2.2%	4.0%	5.5%	4.4%	4.1%	6.0%	5.7%
Consumer Products	6.5%	2.2%	1.7%	1.0%	2.2%	0.6%	0.0%	6.6%	0.8%	0.9%
Container	10.3%	2.9%	3.5%	4.1%	5.1%	3.7%	7.1%	4.5%	3.5%	3.9%
Courier & parcel	1.9%	8.3%	9.7%	3.1%	3.6%	0.6%	4.0%	1.0%	1.8%	1.7%
Electrical and Electronic Items	0.0%	0.0%	0.2%	0.7%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%
Empty	27.4%	23.6%	30.7%	21.6%	23.3%	34.0%	21.5%	9.9%	3.9%	11.4%
Iron & Steel Products	0.0%	2.2%	3.7%	7.1%	5.2%	0.6%	2.0%	7.9%	10.8%	8.0%
Machinery	15.3%	0.0%	1.0%	4.3%	5.9%	0.0%	0.0%	3.0%	1.5%	1.1%
Milk & Animal Food	6.5%	0.0%	0.5%	0.3%	1.5%	0.0%	0.0%	0.0%	0.1%	0.1%
Other Minerals	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Others	0.0%	1.1%	0.5%	0.4%	0.4%	3.7%	0.0%	1.2%	0.5%	1.1%
Petroleum Products	1.9%	6.5%	14.7%	5.0%	5.0%	5.6%	2.0%	2.2%	4.8%	4.6%
Pharmaceuticals	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Plastic products	0.0%	3.3%	1.7%	2.1%	1.8%	0.0%	6.8%	9.7%	16.6%	12.3%
Plywood & Timber products	0.0%	9.8%	4.6%	5.2%	4.5%	3.0%	19.1%	10.7%	10.3%	9.6%
Powder	15.3%	1.8%	2.0%	22.0%	18.2%	4.9%	2.0%	7.9%	6.9%	6.2%

Commodity	LCV	2 AT	3 AT	MAV	Total	LCV	2 AT	3 AT	MAV	Total
	Ahmedabad-Maliya					Maliya-Ahmedabad				
Rubber products	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Textile & Footwear	0.0%	1.4%	1.7%	4.4%	3.2%	0.0%	4.0%	1.0%	0.2%	0.5%
Tiles & Ceramic products	1.9%	7.2%	5.7%	0.8%	1.7%	4.9%	4.8%	6.9%	10.3%	8.7%
Grand Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: Crisil Intelligence

- For Ahmedabad-Maliya direction, container traffic is higher than the Maliya-Ahmedabad direction, indicating more exports. Petroleum products, followed by construction materials are among the top commodities.
- For Maliya-Ahmedabad direction, Agri produce traffic is higher than Ahmedabad-Maliya direction for LCV owing to the demand for fresh fruits and vegetables every day for the city of Ahmedabad, same is the trend followed by courier and parcel among the top commodities. Coal is also higher on this direction which can be attributed to the industrial uses and coal requirements for the GIDCs near Ahmedabad.

  Rest of the commodities have a fairly equal directional distribution due to demand and supply requirements.

Tiles and ceramic products along with Powder is the topmost commodity on the stretch

Tiles and ceramic products along with tile powder and bulk items like Boulder/Marble/Granite/Sandstone/Slate contributes to the highest share of traffic on the project corridor. Tiles and ceramic products include finished tiles, sanitary fittings and other ceramic based products required for real estate construction activities, while tile powder/tile dust and boulder/marble/granite/sandstone are the raw material sourced from Rajasthan for the Morbi tile cluster which eventually manufactures finished tiles. In terms of MAV, these commodities amount to 15.4 percent and 19.2 percent at TP01 and TP02 respectively, the high volume reflects continuous infrastructure development and construction activities in the region, including residential, industrial, and port-related projects. This percentage is higher at TP03 and TP04 which stands at 28.1 percent and 23.8 percent respectively. As mentioned in the network characteristics section, the traffic destined or originating from Rajasthan, Delhi or other north Indian states joins the project road after TP02 at Malvan and then travels towards morbi either via SH-22 after crossing TP03 or via SH-321 after crossing TP03 and TP04.

Container is the second most commodity on the stretch

Container traffic also amounts to about 5-6 percent of traffic on the project stretch. There are many ICDs and PFTs present on the project stretch, therefore most of the containerised cargo travels via rail but others travel via road using the project corridor. Major container traffic is originating/destined Ahmedabad, Sanand, Surat within Gujarat State. Long distance traffic from basmati rice from states Punjab & Haryana and other commodities related to exports and imports from other states of India. Project road gives connectivity to two important seaports in the region which are Mundra Port and Kandla Port. Mundra Port, located in Gujarat, India, is the largest commercial port in the country and a critical hub for container traffic. It handles a significant volume of cargo, including containers, dry bulk, liquid bulk, and automobiles. The port's strategic location on the western coast of India allows it to serve the vast hinterland regions, including the National Capital Region, Gujarat, Punjab, Rajasthan, and Madhya Pradesh. Mundra Port operates five container terminals across 12 berths, with a combined capacity of 9.5 million TEUs (twenty-foot equivalent units). India’s container traffic decadal growth (FY14-FY24) is around 7.7% and Mundra port’s container traffic decadal growth (FY14-FY24) is around 12.0%.

Agri produce is one of the major commodities

Agri accounts for 12-14% at all toll plazas for LCV and 4-7% in terms of 2AT, 3AT and MAV. This category comprises of rice, wheat, vegetables, and fruits.

Fresh fruits and vegetables from smaller towns located on the project road are destined towards Ahmedabad/Vadodara and other bigger cities to meet the increasing demand for consumption.

Basmati Rice is major contributor among agricultural produce. Basmati rice belt in India primarily spans the northern regions, particularly in the states of Punjab, Haryana, Himachal Pradesh, Uttarakhand, and parts of Uttar Pradesh and Jammu & Kashmir. These areas are known for their ideal climatic conditions and fertile soil, which are perfect for cultivating high-quality Basmati rice. Rice gets exported from Mundra port.

Coal is one the major commodity

Coal is another major commodity amounting to 4-6 percent on the project corridor, which is imported and travels on the road stretch. However, a huge portion of this commodity travels via railways, a meaningful portion also travels via road. In Gujarat, it originates/destined to Morbi, Ahmedabad etc. These are smaller packets of coal, travelling towards brick mills or some captive power plant in Rajasthan, Delhi or North India. Chemical plants and morbi tiles clusters and other small and medium sized industries use coal for some or other industrial applications.

Iron and Steel products

Iron and Steel products commodity on the stretch largely includes iron products, metal scrap and some proportion of steel products. Iron commodity on the stretch is primarily importing driven and steel pipe manufacturing in the region, which travels to the various parts of the country. These commodities are also used for the purpose of construction in the region. Strong growth prospects and upcoming manufacturing capacities in the districts of Ahmedabad, Surendranagar and Morbi will drive the growth of the commodity. There are many iron and steel products manufacturing industries along the project corridor some of the prominent being ones viz.,POSCO India Processing center in Sanand, Hi-Tech Pipes limited Sanand Works unit, Laxcon Steels Limited in the Changeodhan GIDC near Sanand, Chamunda and Prasum metal industries in Morbi etc.

Consumer Foods

The commodities travelling the project stretch in consumer food category are sugar, salt, edible oil and other FMCG goods. Largely the purpose of these commodities is for export purpose, and some portion is for consumption purpose in the Kutch region. India is very much dependent on edible oil imports, and this import demand is expected to continue. Salt production is strong in the vicinity regions and overall Gujarat. Salt travels for exports and consumption purpose on the stretch. Gujarat account for nearly 75% of India's salt production. Owing to the proximity of the project stretch to the important cities of Ahmedabad, Vadodara, Surat, Viramgam, Dhrangadhra, Morbi, Bhuj, Gandhidham etc, the demand for many processed food and daily need items viz., FMCG has increased significantly. The project road carries around 5-9 percent of traffic laden with consumer foods.

Courier and Parcels

The increasing demand for e commerce goods and SME trade along the route has increased the demand for courier and parcels significantly in the past few years. The project road connects major cities of cities like Ahmedabad, Vadodara, Surat, Mumbai to the cities of Viramgam, Dhrangadhra, Morbi, Bhuj, Gandhidham and Jamnagar on the western side of Gujarat. The increasing urbanisation on the corridor has led to about 5-8 percent of traffic on the project road carry courier and parcel to the city centres for consumption. The wide range shows

variation in demand across different toll plazas.

3.4.1 Trip Length Distribution

Trip Length Distribution analysis gives distance-based patterns for project road traffic. Trip length is categorized into nine trip length groups. Trip length distribution table for different vehicle types is presented below.

Table 3-21: Trip Length Distribution

Trip Length Group (Kms)	Cars	Bus	LCV	2 AT	3 AT	MAV
Sanand (TP01)						
0 to 20	3.9%	6.9%	4.5%	0.9%	0.3%	0.2%
21 to 40	10.8%	9.7%	8.4%	2.1%	2.3%	0.8%
41 to 100	25.4%	18.0%	11.5%	3.6%	4.2%	2.0%
101 to 200	24.9%	21.6%	8.2%	6.9%	10.1%	8.4%
201 to 350	24.4%	30.1%	28.5%	29.7%	27.6%	29.0%
351 to 500	4.7%	5.9%	11.6%	17.0%	13.5%	18.4%
501 to 750	2.2%	1.9%	13.4%	16.9%	19.4%	18.3%
751 to 1000	1.4%	1.7%	6.5%	7.4%	11.0%	7.9%
Beyond 1000 Km	2.2%	4.2%	7.5%	15.6%	11.6%	15.0%
Grand Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Malvan (TP02)						
0 to 20	0.3%	0.0%	3.1%	0.0%	0.0%	0.0%
21 to 40	1.3%	1.3%	1.9%	0.0%	0.9%	0.2%
41 to 100	6.7%	6.1%	2.4%	1.5%	1.4%	0.7%
101 to 200	29.0%	21.3%	13.2%	18.3%	13.9%	9.0%
201 to 350	48.4%	54.8%	45.0%	39.4%	41.0%	39.9%
351 to 500	7.6%	10.5%	11.3%	11.5%	15.0%	20.4%
501 to 750	3.9%	2.7%	19.1%	17.9%	15.9%	16.5%
751 to 1000	1.8%	1.5%	1.9%	4.2%	5.0%	5.8%
Beyond 1000 Km	1.1%	1.7%	2.0%	7.1%	6.9%	7.5%
Grand Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Soladi (TP03)						
0 to 20	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
21 to 40	5.9%	3.5%	3.0%	0.5%	0.3%	0.2%
41 to 100	16.1%	13.9%	7.3%	1.3%	1.1%	1.1%
101 to 200	37.8%	42.0%	23.2%	12.9%	15.3%	8.1%
201 to 350	34.2%	33.7%	45.1%	44.3%	36.5%	27.8%
351 to 500	3.2%	4.8%	8.2%	17.4%	15.5%	17.7%
501 to 750	1.4%	0.8%	6.0%	10.8%	14.9%	20.7%
751 to 1000	0.6%	0.5%	3.9%	6.7%	6.2%	12.5%
Beyond 1000 Km	0.8%	0.9%	3.3%	6.1%	10.3%	12.0%
Grand Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Aniyari (TP04)						
0 to 20	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%
21 to 40	2.2%	0.4%	0.0%	0.0%	0.0%	0.0%
41 to 100	20.0%	9.6%	2.2%	1.3%	2.9%	1.7%
101 to 200	31.5%	26.5%	3.2%	13.7%	8.4%	5.1%

Trip Length Group (Kms)	Cars	Bus	LCV	2 AT	3 AT	MAV
201 to 350	35.4%	46.3%	55.0%	41.5%	36.6%	25.5%
351 to 500	5.1%	10.9%	16.3%	23.2%	27.7%	26.2%
501 to 750	2.2%	2.6%	14.1%	11.1%	9.6%	18.4%
751 to 1000	1.7%	0.0%	6.8%	1.4%	3.3%	8.3%
Beyond 1000 Km	1.8%	3.7%	2.4%	7.7%	11.6%	14.8%
Grand Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: Crisil Intelligence

Cars are mostly short distance trip, about 40% of trip travel within 100 kms of TP01 due to Sanand, Ahmedabad and Viramgam industries. This % lowers at TP02 amounting to 8% and increases to 22% each at TP03 and TP04. TP03 and TP04 are closer to industrial towns of Dhrangadhra and Morbi and people from these towns and surrounding areas like Halvad/Viramgam/Surendranagar contribute to these trips.

In MAV about 65%-75% of trips lie between 200-750 km attributing to the trips from/to Ahmedabad/Vadodara/Surat/Gandhinagar to/from Morbi/Gandhidam/Bhuj/Kandla/Mundra etc.

4 Review of Historic Traffic & Revenue

4.1 General

This section summarizes the historical performance of the project section in order to understand baseline traffic patterns comprising of historical tollable traffic and revenue growth, traffic and revenue composition, trip distribution, trip factors, seasonality and trend of traffic over the available data set.

The historical tollable traffic data mode wise was made available by client for all the toll plazas on the project road as per following:

Table 4-1: Historical Traffic and Revenue Data Availability

Data Source	Type of Data	Period
TMS Data	Traffic & Revenue Data Vehicle Wise	Sanand (TP01) - September 2012 to July 2025
		Malvan (TP02) - November 2012 to July 2025
		Soladi (TP03) - April 2012 to July 2025
		Aniyari (TP04) - May 2012 to July 2025

Source: Client, Crisil Intelligence

Project road has seen healthy traffic CAGR growth of 7.5 at TP01, 7.8% at TP02, 5.9% at TP03 and 7.8% at TP04 in PCU terms from FY 2015 to FY 2025. The summary of historic tollable TMS traffic data is presented in below table.

Table 4-2: Historic Traffic

FY	CJV	LCV/MINIBUS	BUS	2 AT	MAV+OSV	Vehicles	PCU
Sanand (TP01)							
2013	7,642	1,400	858	569	3,282	13,751	28,790
2014	8,258	1,346	819	419	2,674	13,516	26,025
2015	9,582	1,339	911	378	2,541	14,751	26,892
2016	10,936	1,495	1,068	396	2,606	16,501	29,298
2017	12,419	1,611	1,164	458	2,800	18,453	32,305
2018	14,772	1,719	1,366	524	3,254	21,634	37,661
2019	15,964	1,749	1,484	536	3,624	23,358	40,958
2020	15,896	1,498	1,437	730	3,358	22,920	39,758
2021	13,546	1,192	1,385	695	3,091	19,909	35,486
2022	16,086	1,262	1,568	910	3,928	23,754	43,089
2023	17,582	1,340	1,621	1,101	4,357	26,000	47,364
2024	19,596	1,433	1,718	1,240	4,494	28,481	50,842
2025	21,018	1,601	1,851	1,405	4,922	30,797	55,335
2026	22,593	1,742	2,032	1,479	5,231	33,076	58,294
CAGR (FY13-25)	**8.8%**	**1.1%**	**6.6%**	**7.8%**	**3.4%**	**7.0%**	**5.6%**
CAGR (FY15-25)	**8.2%**	**1.8%**	**7.3%**	**14.0%**	**6.8%**	**7.6%**	**7.5%**

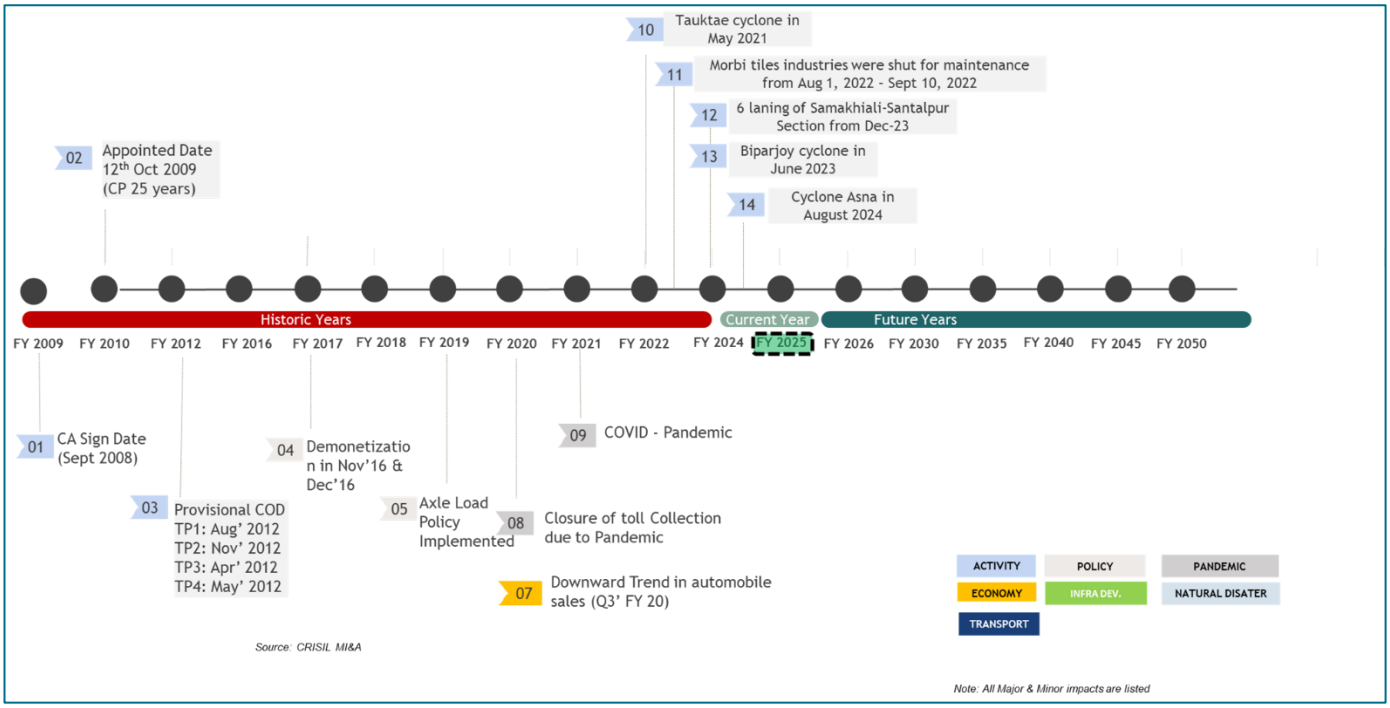
FY	CJV	LCV/MINIBUS	BUS	2 AT	MAV+OSV	Vehicles	PCU
CAGR (FY20-25)	**5.7%**	**1.3%**	**5.2%**	**14.0%**	**7.9%**	**6.1%**	**6.8%**
Malvan (TP02)							
2013	2,251	449	339	322	2,563	5,924	16,442
2014	2,316	465	328	277	2,325	5,712	15,293
2015	2,678	474	324	246	2,152	5,875	14,786
2016	3,066	496	338	212	2,379	6,490	16,164
2017	3,563	502	348	199	2,487	7,099	17,149
2018	4,144	528	355	192	2,755	7,974	18,973
2019	4,675	554	375	217	3,049	8,870	21,004
2020	4,957	522	420	253	3,045	9,197	21,462
2021	4,424	481	314	319	3,067	8,604	20,843
2022	5,467	446	392	523	3,797	10,626	25,970
2023	6,143	412	452	688	4,243	11,938	29,277
2024	6,657	445	456	689	4,100	12,347	29,210
2025	7,166	479	466	715	4,445	13,271	31,429
2026	7,622	521	464	771	4,775	14,151	33,148
CAGR (FY13-25)	**10.1%**	**0.5%**	**2.7%**	**6.9%**	**4.7%**	**7.0%**	**5.5%**
CAGR (FY15-25)	**10.3%**	**0.1%**	**3.7%**	**11.3%**	**7.5%**	**8.5%**	**7.8%**
CAGR (FY20-25)	**7.7%**	**-1.7%**	**2.1%**	**23.1%**	**7.9%**	**7.6%**	**7.9%**
Soladi (TP03)							
2013	2,594	565	431	334	4,083	8,006	24,107
2014	2,798	576	430	265	3,408	7,477	21,081
2015	3,387	622	438	252	3,743	8,443	23,235
2016	3,827	635	450	200	3,751	8,863	23,611
2017	4,339	641	451	191	3,691	9,313	23,836
2018	4,878	652	452	190	3,814	9,985	24,945
2019	5,538	681	466	214	4,128	11,027	27,176
2020	5,875	561	500	360	4,025	11,321	27,409
2021	5,333	560	381	396	4,003	10,672	26,517
2022	6,561	588	474	494	4,750	12,866	31,721
2023	7,318	605	543	602	4,966	14,034	34,008
2024	8,073	612	552	675	5,416	15,328	37,043
2025	8,660	656	562	749	6,101	16,729	41,036
2026	9,238	689	560	816	6,201	17,504	41,756
CAGR (FY13-25)	**10.6%**	**1.3%**	**2.2%**	**7.0%**	**3.4%**	**6.3%**	**4.5%**
CAGR (FY15-25)	**9.8%**	**0.5%**	**2.5%**	**11.5%**	**5.0%**	**7.1%**	**5.9%**
CAGR (FY20-25)	**8.1%**	**3.2%**	**2.4%**	**15.8%**	**8.7%**	**8.1%**	**8.4%**
Aniyari (TP04)							
2013	1,371	260	239	316	2,893	5,080	16,445
2014	1,685	286	236	346	2,406	4,958	14,684
2015	1,911	271	223	264	2,565	5,233	15,318
2016	2,430	333	230	276	2,632	5,902	16,294
2017	3,185	388	238	300	2,738	6,849	17,701
2018	3,995	456	246	342	3,112	8,152	20,450
2019	3,643	349	242	328	3,097	7,659	19,814

FY	CJV	LCV/MINIBUS	BUS	2 AT	MAV+OSV	Vehicles	PCU
2020	3,750	255	273	348	3,185	7,811	20,328
2021	3,604	275	192	300	3,169	7,539	19,749
2022	4,459	288	234	352	3,903	9,237	24,215
2023	5,192	332	287	436	4,268	10,514	27,063
2024	6,247	378	290	511	4,640	12,067	30,100
2025	6,361	393	289	551	5,088	12,682	32,368
2026	6,311	405	282	584	5,239	12,821	32,630
CAGR (FY13-25)	**13.6%**	**3.5%**	**1.6%**	**4.7%**	**4.8%**	**7.9%**	**5.8%**
CAGR (FY15-25)	**12.8%**	**3.8%**	**2.7%**	**7.6%**	**7.1%**	**9.3%**	**7.8%**
CAGR (FY20-25)	**11.1%**	**9.1%**	**1.2%**	**9.6%**	**9.8%**	**10.2%**	**9.8%**

**For August 2024 month data is considered till 24th august, rest of the days were affected by floods in Kutch region of Gujarat (Cyclone Asna)*
***June 2023 data is adjusted for the cyclone Bijparjoy Impact (Data from 14th June-19th June excluded).*
FY26 Data is till July 2025, and a split for 3A MAV and OSV is considered for calculation of total PCU for FY26 (PCU factor of 3 is applied for 3A and 4.5 for MAV/OSV)

Source: Client TMS Data, Crisil Intelligence

Figure 4-1: Historic calendar of events



Source: Crisil Intelligence

Historic traffic has seen some changes in trend due to some events which has occurred during this period. Over the years Gujarat has witnessed cyclones, in June 2023 witnessed cyclone Bijparjoy and in last week of august 2024 witnessed cyclone Asna. Traffic also depends on the ceramic cluster of Morbi region. Tiles & ceramics export has been fluctuating over the years due to various factors like antidumping, industry shutdowns, employee strikes. Mundra port also witnessed red sea crisis impact in October 2023.

The tile exports had 4% growth in volume in FY23 Post COVID-19 and a staggering 28% in FY24 resulting in a industry growth of 14% in FY24 in terms of volume. FY25 is estimated to have witnessed a decline of 10-13% in the exports volume compared to the previous year. The decline is majorly on account of high freight rates and

subdued demand in European nations and the USA. Meanwhile, despite the European Union announcing anti-dumping duty on ceramic tiles from India in 2023. Domestic demand remains moderate between 5-7% between FY23-FY25 but with issues in the export market in FY25, 10-13% of export volumes from Morbi had shifted to the domestic market. However, oversupply in the industry has exerting significant pricing pressure. The shift from export to domestic market in FY25 had led to storage of the oversupply of tiles to the warehouses by tile retailers and wholesalers resulting in increased traffic at TP03 and TP04 destined towards Rajasthan, Delhi and other north Indian states and in the cities of Ahmedabad, Vadodara, Surat, Gujarat and cities of Madhya Pradesh which crosses TP01 and TP02 as well. Other developments in region viz., new factories and plants coming up in Sanand, Becharaji, and GIDCs near Ahmedabad along with high value infrastructure projects near the project road also has a role to play in the recent high growth observed at all the toll plazas.

It is to be noted that there was a steady growth in completion of real estate projects in the state which points. The completions of real estate projects surpassed pre covid levels and is expected to see a healthy growth in FY26. Domestic demand has is expected to grow from 5-6% in FY25 to 6-7% in FY26.

Vehicle registration of cars in Gujarat state has shown CAGR growth of around 7% in the recent five years and project has shown decadal growth of around 7.3%, the growth in cars with core reasons including rapid urbanization, poor public transport, economic growth in the region and raising tourism infrastructure and rising affluence in the state.

Growth in Goods traffic is mainly due to rapid cargo growth in Mundra port and Kandla port in the region which is primarily due to capacity expansion of the ports, project road has shown around 6.8% CAGR (FY15-FY25) in the last decade.

4.2 Historic Toll Segmentation

Recent years toll segmentation has been analysed from vehicle wise and toll segmentation toll data provided by client. The toll fee of Car/Jeep/ Van/Two Wheeler/ Three Wheeler & Gujarat State Road Transport Corporation Buses have been exempted from date 15/08/2016 vide Government of Gujarat, Roads & Building Department Government of Gujarat, Road. As the variations the recent years has been minimal, we have adopted latest FY 25 toll segmentation for future projections. The table below presents segmentation arrived using the historic traffic data and does not consider the Car/Jeep/Van and Buses exemptions. As the variations the recent years has been minimal, we have adopted latest FY 25 implied toll segmentation for future projections which includes the impact of GSRDC claim for Car and buses.

Table 4-3: Historic Toll Segmentation at all the toll plazas on the project road

FY	Vehicle Type	Single	Return	Monthly	Local	Local Commercial (50 % Discounted Trip)	Exemption/Violation	Total
Sanand (TP01)								
2023	**CJV**	0.7%	0.6%	0.1%	0.0%	0.0%	98.5%	100.0%
	LCV/MINIBUS	42.9%	37.0%	11.8%	0.0%	0.0%	8.3%	100.0%
	BUS	10.4%	17.1%	37.1%	0.0%	0.0%	35.4%	100.0%
	TRUCK 2 AXLE	73.8%	24.6%	0.0%	0.0%	0.0%	1.6%	100.0%
	MAV+OSV	88.8%	10.9%	0.0%	0.0%	0.0%	0.3%	100.0%
2024	**CJV**	0.7%	0.7%	0.0%	0.0%	0.0%	98.6%	100.0%

FY	Vehicle Type	Single	Return	Monthly	Local	Local Commercial (50 % Discounted Trip)	Exemption/Violation	Total
	LCV/MINIBUS	45.6%	40.3%	6.9%	0.0%	0.0%	7.2%	100.0%
	BUS	11.4%	22.8%	28.3%	0.0%	0.0%	37.6%	100.0%
	TRUCK 2 AXLE	75.9%	22.8%	0.0%	0.0%	0.0%	1.3%	100.0%
	MAV+OSV	87.0%	12.8%	0.0%	0.0%	0.0%	0.3%	100.0%
2025	CJV	0.7%	0.6%	0.0%	0.0%	0.0%	98.7%	100.0%
	LCV/MINIBUS	46.0%	44.9%	3.6%	0.0%	0.0%	5.5%	100.0%
	BUS	10.9%	27.7%	22.4%	0.0%	0.0%	38.9%	100.0%
	TRUCK 2 AXLE	76.8%	22.1%	0.0%	0.0%	0.0%	1.1%	100.0%
	MAV+OSV	86.8%	12.9%	0.0%	0.0%	0.0%	0.2%	100.0%
Malvan (TP02)								
2023	CJV	1.8%	0.3%	0.0%	0.0%	0.0%	97.9%	100.0%
	LCV/MINIBUS	79.0%	19.0%	0.0%	0.0%	0.0%	2.0%	100.0%
	BUS	33.4%	14.6%	0.0%	0.0%	0.0%	52.1%	100.0%
	TRUCK 2 AXLE	76.8%	20.0%	0.0%	0.0%	0.0%	3.2%	100.0%
	MAV+OSV	92.5%	7.3%	0.0%	0.0%	0.0%	0.2%	100.0%
2024	CJV	1.5%	0.3%	0.0%	0.0%	0.0%	98.2%	100.0%
	LCV/MINIBUS	80.7%	16.9%	0.0%	0.0%	0.0%	2.4%	100.0%
	BUS	21.8%	9.2%	0.0%	0.0%	0.0%	69.0%	100.0%
	TRUCK 2 AXLE	80.0%	18.3%	0.0%	0.0%	0.0%	1.6%	100.0%
	MAV+OSV	91.8%	8.2%	0.0%	0.0%	0.0%	0.1%	100.0%
2025	CJV	1.2%	0.3%	0.0%	0.0%	0.0%	98.5%	100.0%
	LCV/MINIBUS	81.0%	17.2%	0.0%	0.0%	0.0%	1.9%	100.0%
	BUS	17.8%	8.3%	0.0%	0.0%	0.0%	74.0%	100.0%
	TRUCK 2 AXLE	82.8%	16.1%	0.0%	0.0%	0.0%	1.1%	100.0%
	MAV+OSV	92.0%	7.9%	0.0%	0.0%	0.0%	0.1%	100.0%
Soladi (TP03)								
2023	CJV	1.6%	0.3%	0.0%	0.0%	0.0%	98.1%	100.0%
	LCV/MINIBUS	74.9%	22.2%	0.0%	0.0%	0.0%	2.9%	100.0%
	BUS	29.9%	14.6%	0.0%	0.0%	0.0%	55.5%	100.0%
	TRUCK 2 AXLE	83.6%	12.7%	0.0%	1.4%	1.4%	1.0%	100.0%
	MAV+OSV	93.1%	6.7%	0.0%	0.0%	0.0%	0.1%	100.0%
2024	CJV	1.5%	0.2%	0.0%	0.0%	0.0%	98.3%	100.0%
	LCV/MINIBUS	74.3%	22.7%	0.0%	0.0%	0.0%	3.0%	100.0%
	BUS	20.3%	9.0%	0.0%	0.0%	0.0%	70.7%	100.0%
	TRUCK 2 AXLE	85.9%	11.5%	0.0%	1.0%	1.0%	0.7%	100.0%
	MAV+OSV	93.4%	6.5%	0.0%	0.0%	0.0%	0.1%	100.0%
2025	CJV	1.4%	0.2%	0.0%	0.0%	0.0%	98.3%	100.0%
	LCV/MINIBUS	75.1%	22.2%	0.0%	0.0%	0.0%	2.6%	100.0%
	BUS	16.0%	7.7%	0.0%	0.0%	0.0%	76.3%	100.0%

FY	Vehicle Type	Single	Return	Monthly	Local	Local Commercial (50 % Discounted Trip)	Exemption/Violation	Total
	TRUCK 2 AXLE	87.6%	11.0%	0.0%	0.4%	0.4%	0.6%	100.0%
	MAV+OSV	93.6%	6.2%	0.0%	0.0%	0.0%	0.1%	100.0%
Aniyari (TP04)								
2023	**CJV**	1.5%	0.2%	0.0%	0.0%	0.0%	98.3%	100.0%
	LCV/MINIBUS	77.7%	20.3%	0.0%	0.0%	0.0%	2.0%	100.0%
	BUS	42.0%	13.1%	0.0%	0.0%	0.0%	44.9%	100.0%
	TRUCK 2 AXLE	83.2%	13.3%	0.0%	1.0%	1.0%	1.5%	100.0%
	MAV+OSV	91.2%	8.6%	0.0%	0.0%	0.0%	0.2%	100.0%
2024	**CJV**	1.6%	0.2%	0.0%	0.0%	0.0%	98.2%	100.0%
	LCV/MINIBUS	78.0%	20.4%	0.0%	0.0%	0.0%	1.6%	100.0%
	BUS	32.3%	9.6%	0.0%	0.0%	0.0%	58.1%	100.0%
	TRUCK 2 AXLE	86.8%	12.4%	0.0%	0.0%	0.0%	0.9%	100.0%
	MAV+OSV	92.4%	7.6%	0.0%	0.0%	0.0%	0.1%	100.0%
2025	**CJV**	1.3%	0.2%	0.0%	0.0%	0.0%	98.5%	100.0%
	LCV/MINIBUS	79.3%	19.8%	0.0%	0.0%	0.0%	0.9%	100.0%
	BUS	27.4%	8.8%	0.0%	0.0%	0.0%	63.8%	100.0%
	TRUCK 2 AXLE	88.0%	11.1%	0.0%	0.0%	0.0%	0.8%	100.0%
	MAV+OSV	91.9%	8.0%	0.0%	0.0%	0.0%	0.1%	100.0%

Source: Client TMS Data, Crisil Intelligence

5 Base traffic estimation

5.1 Seasonality Factors

Traffic volumes on roads varies throughout the year, influenced by socio-economic activities in the surrounding regions. To accurately estimate the Annual Average Daily Traffic (AADT) for the road, it is crucial to account for these seasonal variations.

To achieve this, a seasonal correction factor is applied, which is derived from secondary data sources such as historical traffic data, fuel sales and similar indicators. In this assessment as long historic traffic data is available, consultants have the traffic data for seasonality

Seasonal correction Factors (SCF)

Seasonal correction factors for the latest years of FY 24 & FY 25 are tabulated below.

Table 5-1: Seasonal correction factors for FY 24 and FY 25

FY	Month	CJV	LCV/MINIBUS	BUS	2 AT	MAV+OSV
Sanand (TP01)						
2024	Apr	1.01	1.04	1.03	1.00	1.02
	May	0.99	1.02	1.02	1.01	1.08
	Jun*	0.85	0.84	0.84	0.89	0.92
	Jul	1.12	1.05	1.02	1.08	1.08
	Aug	1.10	1.04	1.03	1.05	1.02
	Sep	1.07	1.05	1.04	1.06	1.05
	Oct	1.04	1.04	1.03	1.02	0.99
	Nov	0.98	1.14	1.06	1.16	1.19
	Dec	0.98	0.98	1.00	1.03	0.96
	Jan	0.98	0.98	0.97	0.99	0.94
	Feb	0.91	0.89	0.96	0.86	0.88
	Mar	0.99	0.96	0.99	0.90	0.94
2025	Apr	1.03	1.08	1.02	1.00	1.08
	May	1.01	1.00	1.02	1.00	1.03
	Jun	1.06	1.02	1.05	0.99	1.05
	Jul	1.09	1.03	1.05	1.06	1.11
	Aug*	0.88	0.87	0.86	0.89	0.92
	Sep	1.11	1.01	1.03	1.03	1.04
	Oct	1.05	1.00	1.06	1.00	0.99
	Nov	0.95	1.08	1.06	1.13	1.08
	Dec	0.96	0.96	0.99	0.98	0.91
	Jan	0.97	0.98	0.97	1.02	0.94
	Feb	0.90	0.94	0.93	0.94	0.90
	Mar	1.00	1.01	0.96	0.98	0.99
Malvan (TP02)						
2024	Apr	0.98	1.03	1.00	0.86	1.00
	May	0.95	1.01	1.01	0.96	1.07
	Jun*	0.91	0.87	0.90	0.87	0.94

FY	Month	CJV	LCV/MINIBUS	BUS	2 AT	MAV+OSV
	Jul	1.22	1.05	1.11	1.26	1.04
	Aug	1.17	1.06	1.07	1.16	1.01
	Sep	1.06	1.13	1.04	1.23	1.05
	Oct	1.10	0.99	1.05	0.99	0.99
	Nov	0.86	1.17	0.98	1.27	1.19
	Dec	0.95	0.95	0.96	0.87	0.96
	Jan	0.98	0.99	0.95	1.00	0.97
	Feb	0.92	0.87	0.98	0.85	0.90
	Mar	1.00	0.94	0.98	0.92	0.95
2025	Apr	**1.09**	**1.04**	**1.01**	**1.00**	**1.11**
	May	0.98	0.99	0.97	0.95	1.06
	Jun	1.08	1.05	1.03	0.97	1.06
	Jul	1.16	1.13	1.12	1.17	1.12
	Aug*	0.92	1.06	0.89	1.10	0.95
	Sep	1.17	1.08	1.08	1.22	1.05
	Oct	1.09	0.98	1.05	1.10	1.00
	Nov	0.84	1.02	0.97	1.11	1.04
	Dec	0.96	0.90	0.94	0.84	0.90
	Jan	0.94	0.94	0.96	0.89	0.91
	Feb	0.89	0.92	0.98	0.84	0.89
	Mar	0.98	0.96	1.01	1.00	0.97
Soladi (TP03)						
2024	Apr	0.99	0.96	1.00	0.96	1.10
	May	0.94	1.01	0.99	1.10	1.15
	Jun*	0.91	0.88	0.88	0.97	1.02
	Jul	1.22	1.13	1.10	1.16	1.13
	Aug	1.17	1.11	1.06	1.09	0.99
	Sep	1.08	1.16	1.04	1.14	1.02
	Oct	1.10	0.95	1.04	0.96	0.93
	Nov	0.87	1.12	0.98	1.17	1.10
	Dec	0.95	0.92	0.96	0.90	0.92
	Jan	0.99	1.00	0.96	0.99	0.96
	Feb	0.90	0.88	0.99	0.85	0.88
	Mar	0.97	0.94	0.99	0.85	0.90
2025	Apr	**1.05**	**1.01**	**1.01**	**1.00**	**1.08**
	May	0.95	0.98	0.96	1.02	1.04
	Jun	1.07	1.03	1.02	1.04	1.03
	Jul	1.17	1.17	1.08	1.11	1.07
	Aug*	0.92	1.07	0.88	0.96	0.91
	Sep	1.19	1.09	1.08	1.10	1.00
	Oct	1.11	0.99	1.06	1.03	0.99
	Nov	0.86	1.04	1.00	1.15	1.10
	Dec	0.95	0.88	0.95	0.90	0.93
	Jan	0.96	0.97	0.97	0.96	0.96
	Feb	0.88	0.94	1.00	0.90	0.92

FY	Month	CJV	LCV/MINIBUS	BUS	2 AT	MAV+OSV
	Mar	0.99	0.92	1.01	0.90	0.99
Aniyari (TP04)						
2024	Apr	1.04	1.09	1.00	1.02	1.12
	May	1.00	1.13	1.02	1.14	1.18
	Jun*	0.97	0.95	0.92	1.00	1.03
	Jul	1.25	1.10	1.15	1.13	1.14
	Aug	1.13	1.03	1.08	1.04	0.98
	Sep	0.99	1.08	1.07	1.08	0.99
	Oct	0.99	0.89	1.07	0.92	0.89
	Nov	0.82	1.01	0.96	1.12	1.10
	Dec	0.93	0.87	0.92	0.93	0.92
	Jan	1.00	1.01	0.91	0.99	0.95
	Feb	0.94	0.93	0.96	0.86	0.89
	Mar	1.03	0.97	0.99	0.87	0.92
2025	Apr	**1.09**	**1.10**	**1.02**	**1.04**	**1.10**
	May	0.99	1.07	0.97	1.07	1.06
	Jun	1.15	1.10	1.05	1.10	1.06
	Jul	1.28	1.21	1.14	1.14	1.12
	Aug*	0.99	1.10	0.92	1.01	0.95
	Sep	1.19	1.09	1.10	1.14	1.04
	Oct	1.09	0.97	1.06	1.04	0.99
	Nov	0.82	0.92	0.97	1.05	1.09
	Dec	0.90	0.81	0.91	0.90	0.90
	Jan	0.89	0.91	0.91	0.91	0.92
	Feb	0.85	0.91	0.96	0.84	0.88
	Mar	0.97	0.97	1.02	0.87	0.95

**For August 2024 month data is considered till 24th august, rest of the days were affected by floods in Kutch region of Gujarat (Cyclone Asna)*
***June 2023 data is adjusted for the cyclone Bijparjoy Impact (Data from 14th June-19th June excluded).*
Source: Client TMS Data, Crisil Intelligence

5.2 Base Traffic Estimation

For base traffic (annual average daily traffic) estimation of the present study, current fiscal 4-months (Apr-25 to July-25) of TMS traffic data were annualized using SCF factor of FY 24 & FY 25 ETC traffic data (excluding the Bijparjoy cyclone impact in FY 24 & excluding impact of Cyclone Asna in FY 25) to arrive at the annual average daily traffic (AADT) for FY 26.

The AADT estimation for the base case for FY26 is presented table below

Table 5-2: Base Traffic Estimation -FY26 AADT

Particulars	FY Year	CJV	LCV	Bus	2AT	3AT	MAV	OSV	Total	PCU
Sanand (TP01)										
ADT (Apr-July) *	FY 26	22,593	1,742	2,032	1,479	654	4,561	16	33,076	58,294
SCF	FY 24 & FY 25	1.02	1.01	1.01	1.00	1.05	1.05	1.05		
AADT	**FY 26**	**23,025**	**1,761**	**2,047**	**1,485**	**684**	**4,772**	**16**	**33,790**	**59,861**
Malvan (TP02)										
ADT (Apr-July) *	FY 26	7,622	521	464	771	296	4,469	10	14,151	33,148
SCF	FY 24 & FY 25	1.04	1.02	1.02	0.99	1.05	1.05	1.05		
AADT	**FY 26**	**7,927**	**531**	**472**	**765**	**310**	**4,684**	**10**	**14,701**	**34,493**
Soladi (TP03)										
ADT (Apr-July) *	FY 26	9,238	689	560	816	366	5,829	6	17,504	41,756
SCF	FY 24 & FY 25	1.03	1.02	1.01	1.04	1.08	1.08	1.08		
AADT	**FY 26**	**9,519**	**702**	**563**	**852**	**395**	**6,291**	**7**	**18,329**	**44,342**
Aniyari (TP04)										
ADT (Apr-July) *	FY 26	6,311	405	282	584	309	4,898	31	12,821	32,630
SCF	FY 24 & FY 25	1.09	1.09	1.03	1.08	1.10	1.10	1.10		
AADT	**FY 26**	**6,872**	**443**	**291**	**631**	**341**	**5,400**	**35**	**14,014**	**35,785**

**For August 2024 month data is considered till 24th august, rest of the days were affected by floods in Kutch region of Gujarat (Cyclone Asna)*
***June 2023 data is adjusted for the cyclone Bijparjoy Impact (Data from 14th June-19th June excluded).*

Source: Client TMS Data, Crisil Intelligence

For estimating the base revenue, the toll rates applicable for FY 26 is multiplied with base year FY 26 ADDT traffic numbers by adopting the trip segmentation which is mentioned section 9 and Table 9-3.

Table 5-3: Base Revenue -FY26

Revenue in ₹ Millions	FY Year	CJV	LCV	Bus	2AT	3AT	MAV+OSV	Total
Sanand (TP01)	**FY 26**	358.6	68.9	150.6	120.3	91.1	637.4	1,426.8
Malvan (TP02)		228.8	30.9	53.6	40.1	26.7	404.5	784.7
Soladi (TP03)		99.3	15.9	24.7	93.1	71.1	1,133.9	1,438.0
Aniyari (TP04)		113.3	15.5	19.9	43.6	39.1	623.9	855.4

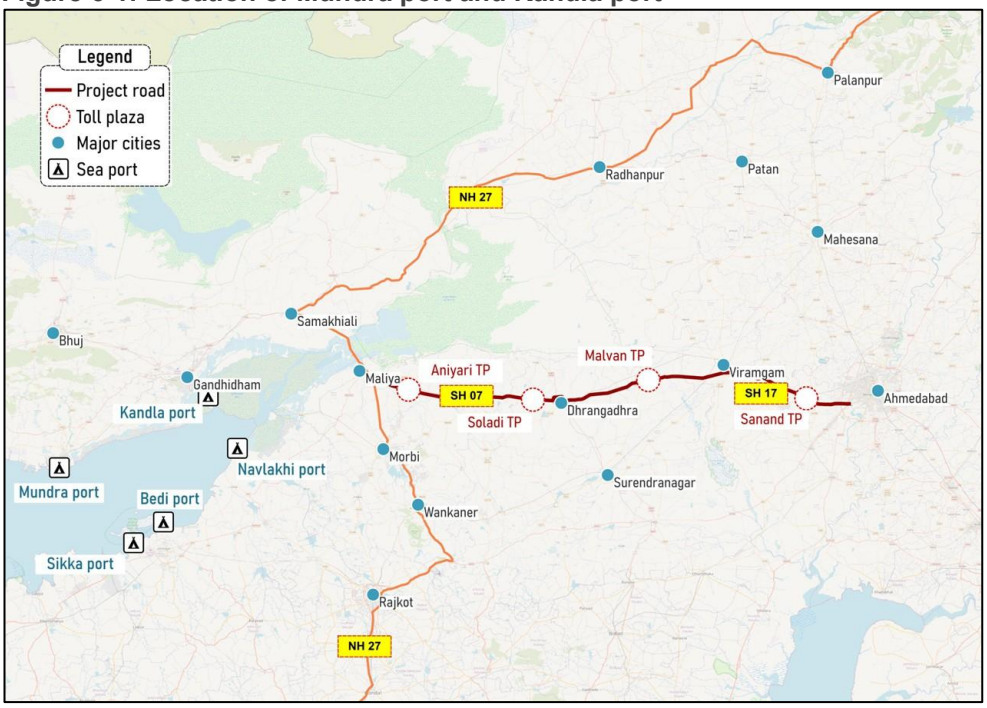
Source: Crisil Intelligence

6 Key Influencing factors

6.1 Ports in the vicinity of the project road

The project road is in close proximity to two of the largest Indian ports viz., Mundra port and Kandla port and acts as a connector between Ahmedabad/Vadodara/Rest of eastern Gujarat/Rest of India to these ports. Mundra port container traffic directly influences project road traffic.

Figure 6-1: Location of Mundra port and Kandla port

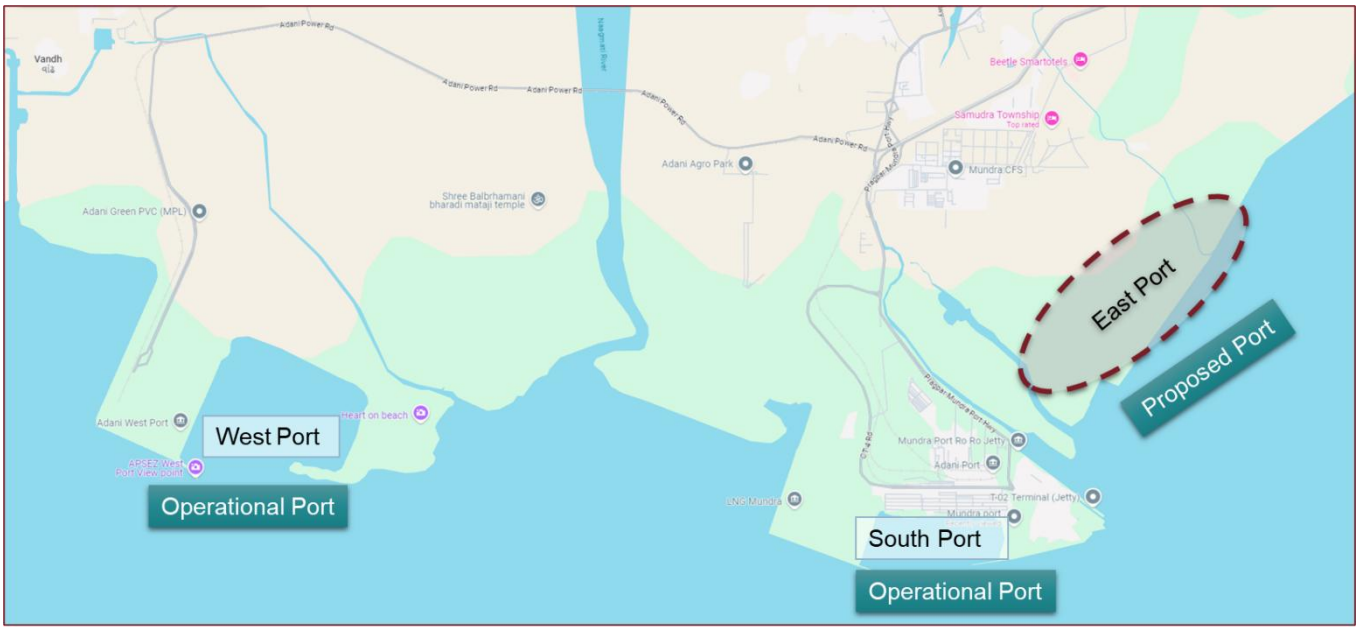


Source: Open Street Map, Crisil Intelligence

6.1.1 Mundra Port

Mundra Port, located in Gujarat, is India's largest commercial port and handles a significant amount of container traffic. It is an all-weather port with state-of-the-art facilities for handling various types of cargo, including containers, crude oil, dry bulk, breakbulk, automobiles, and liquid cargo.

Figure 6-2: Layout Plan for Mundra port



Source: Google Maps, Crisil Intelligence

Mundra Port has cargo capacity of 264 MMT (million metric tons). It has total of 5 container terminals, 12 container berths with combined capacity of 9.5 million TEU's (Twenty Foot Equivalent Units).

Mundra port made history in FY 2025 by becoming India's first port to exceed 200 MMT in annual cargo handling, reaching 200.5 MMT. This represents 11.8% year-on-year growth and establishes Mundra as India's largest commercial port in India.

Container terminal 1 (CT 1) commenced operation in 2003, operated by Mundra International Container Terminal Pvt Ltd (a unit of DP World), CT1 has a capacity of 1.3 million TEUs (Twenty-foot Equivalent Units) annually. The container terminal 2 or CT2 – Adani Mundra Container Terminal – with a city to handle 1.8 million TEUs is run by APSEZ itself. This terminal was originally designed to handle 1.3 million TEUs, but as demand grew, APSEZ converted an adjacent dry and break-bulk cargo handling terminal into a container handling facility some four years ago, adding 0.5 million TEUs of capacity. It began operation in 2007.

An equal joint venture between APSEZ and Terminal Investment Ltd, a unit of Mediterranean Shipping Co S A, the world's top container carrier by capacity, runs the container terminal 3 (CT3) – Adani International Container Terminal Pvt with a capacity to handle 3.1 million TEUs. It began operations in 2013. The 1.3 million TEU capacity container terminal 4 (CT4) – Adani CMA Mundra Terminal Pvt Ltd - is operated by an equal joint venture between APSEZ and CMA CGM S A. IT began operation in 2017. A new berth - T3 - with a capacity of 0.8 million TEUs is being commissioned to cater to the rising volumes at Mundra Port.

Figure 6-3: Container terminals at Mundra's south port



Source: Google Maps, Crisil Intelligence

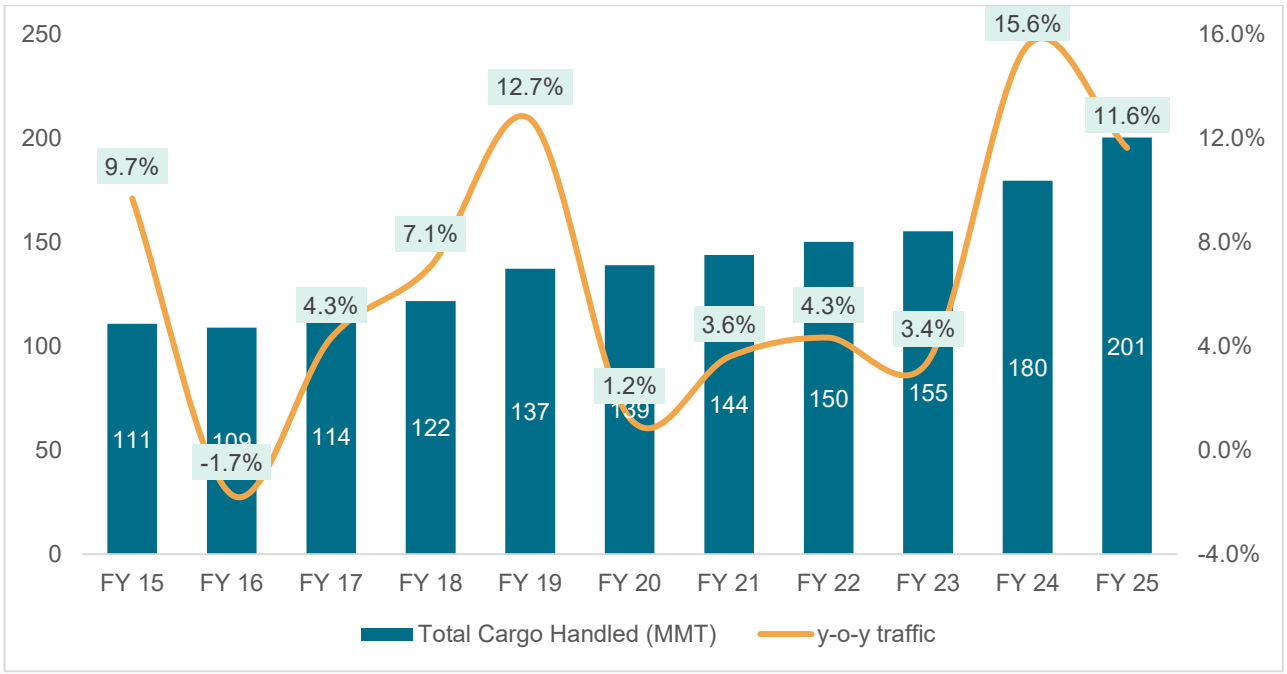
Table 6-1: Container Terminals and extensions for Mundra Port

Terminal	Player	Commissioned Year
CT1	Mundra International Container (MICT)	2003
CT2	Adani Mundra Container Terminal (AMCT 2)	2007
CT3	Adani International Container (AICTPL)	2013
CT4	JV of APSEZ and CMA CGM SA (ACMT)	2017
T2 Extn	Adani Mundra Container Terminal (AMCT 2 Ext)	2022
T3	Adani Mundra Container Terminal (AMCT T3)	2023

Trend in traffic at Mundra port

Mundra port made history in FY 25 by becoming India's first port to exceed 200 MMT in annual cargo handling, reaching 200.7 MMT. This represents 11.6% year-on-year growth (FY 25 vs FY24) and establishes Mundra as India's largest commercial port. Key advantages of services availed at Mundra is access to major mother line ships and huge efficiency gains as compared to major public ports of the country. Mundra is well connected to the railway network of the country and is currently facing capacity & scheduled delivery issues from railways, pertaining to container traffic. Mundra port has achieved a 5-year CAGR of 7.6% from FY 20-FY25. Growth is fuelled by expansions at Mundra port.

Figure 6-4: Trend in cargo handled in million metric tonne (MMT) at Mundra port

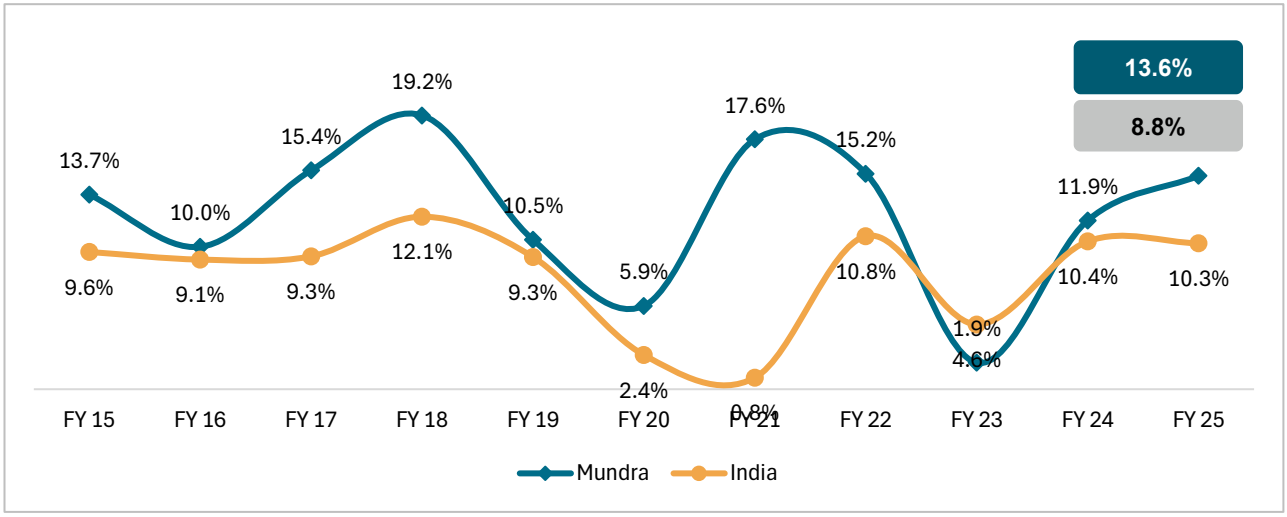


Source: Adani ports and special economic zone limited (APSEZ), Crisil Intelligence

Historic container traffic in India and Mundra port

Decadal growth of container traffic in India has shown CAGR (FY15-FY25) of 8.8% with expansion across various major ports across India and western region. Mundra port has shown grown faster than India's container growth with CAGR (FY15-FY25) of 13.6% fuelled by capacity additions at Mundra port.

Figure 6-5: Mundra's container traffic vis-à-vis India's container traffic for last decade

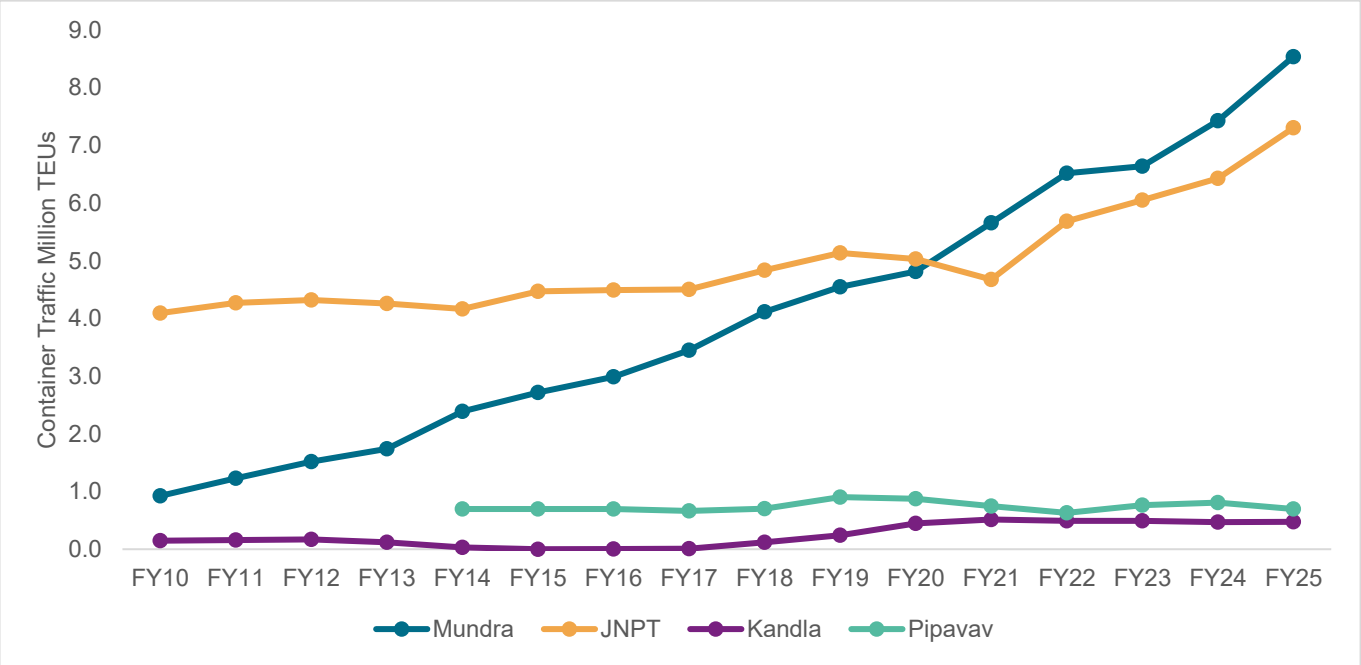


Source: Indian Ports Association, Port websites, Industry, Crisil Intelligence

Mundra Port's container traffic has grown significantly more than other competitive ports like JNPT due to factors like its high operational efficiency, which includes quick turnaround times and effective container evacuation strategies, added capacity whenever the utilization has crossed 70% levels, invested heavily in modern infrastructure, including deep draft berths that can handle large vessels. In contrast, while JNPT (Jawaharlal Nehru

Port Trust) remains a major container handling port in India, it has faced challenges such as congestion and limited expansion capacity.

Figure 6-6: Container traffic at competing ports



Source: Crisil Intelligence

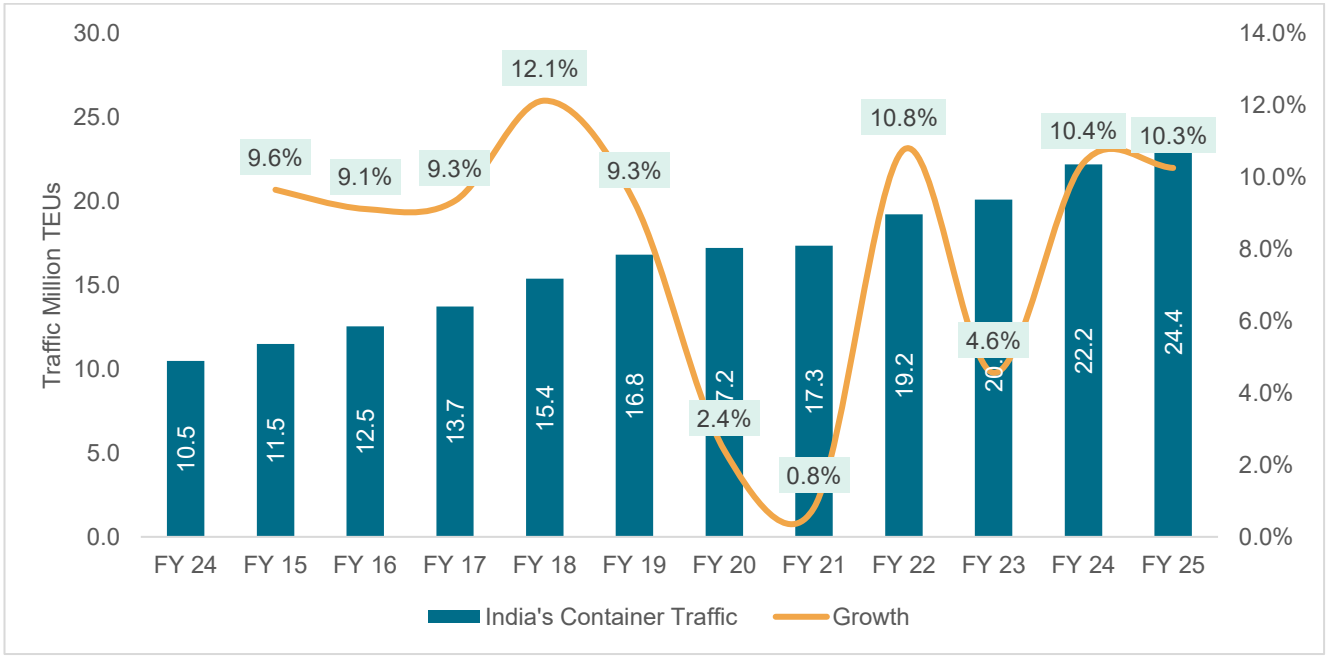
India container traffic growth trends

Consultants have investigated the India's container traffic from FY 2014 to FY 2025. Consultants have looked at the decadal growth of container traffic in India has shown CAGR (FY14-FY25) of 8.8%. India's container growth has been notable in recent years, driven by several key factors like

- India's expanding role in global supply chains has led to a rise in both exports and imports. This growth necessitates efficient logistics solutions, particularly containerized shipping.
- Programs like the Sagarmala Project and the Maritime India Vision 2030 aim to enhance port infrastructure and logistics capabilities.
- The rapid growth of e-commerce in India has transformed logistics and distribution channels.
- Investments in port infrastructure, such as the development of dedicated freight corridors and inland container depots, have improved the efficiency of cargo movement.
- India's strategic partnerships and trade agreements with countries like the UAE and the US have enhanced access to global markets, boosting containerized trade.

The overall economic growth in India has led to increased demand for goods, further driving the need for containerized transport.

Figure 6-7: India's Container traffic

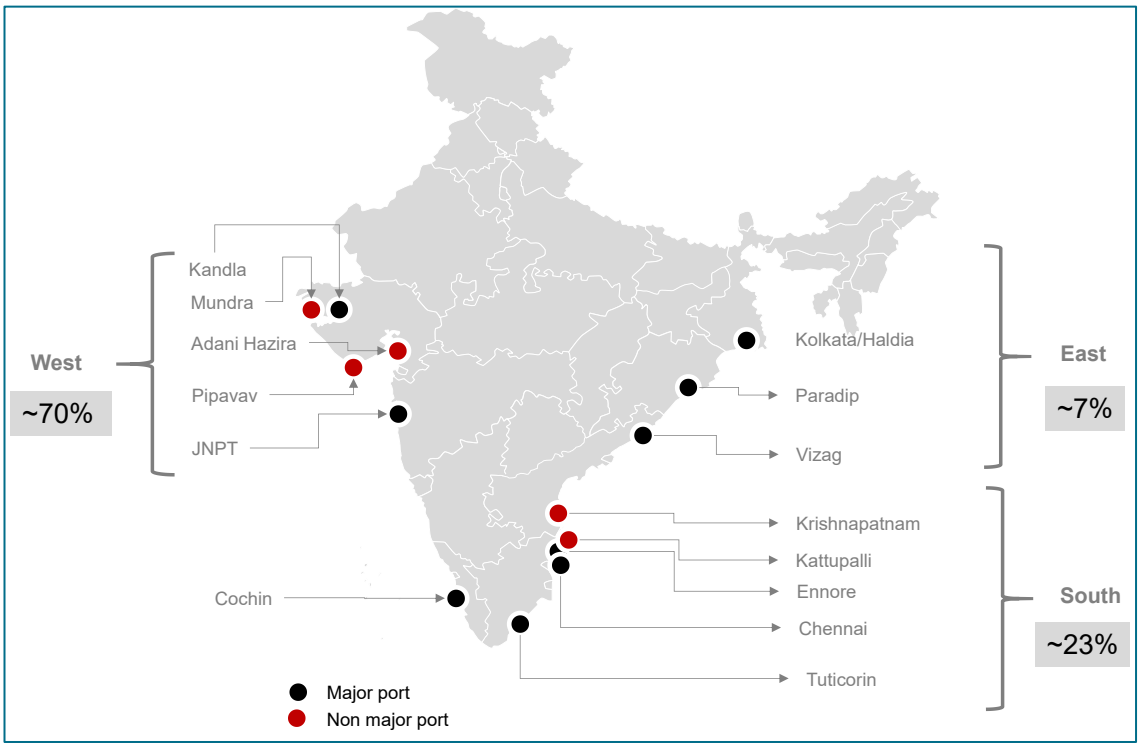


Source: Crisil Intelligence

Share of Western Ports

The container traffic share of the western ports over the years has remained the same, which is around ~70% of the overall India's container traffic share.

Figure 6-8: Western port share in India's Container traffic



Boxes represent share of region's ports in container traffic of India

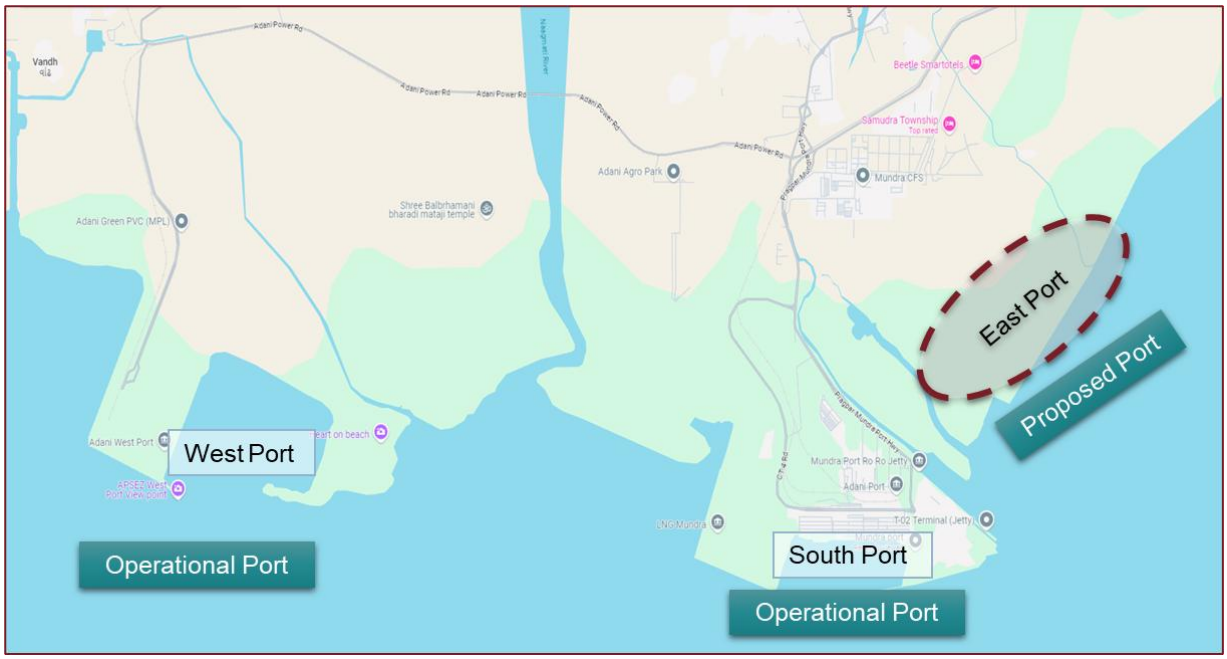
Source: Indian Ports Association, Port websites, Industry, Crisil Intelligence

Mundra port got environmental and coastal regulation zone clearance for Expansion

Adani Ports & Special Economic Zone Ltd (APSEZ) has received environmental and coastal regulation zone clearance from the Centre to double the capacity of Mundra port at a cost of Rs 45,000 crore.

APSEZ applied to the Expert Appraisal Committee (EAC) of the Ministry of Environment, Forest, and Climate Change to increase the Mundra Port's capacity by 289 million tonnes to 514 million tonnes as part of an expansion plan covering 3,335 hectares. The details of the proposed expansion are given below. The proposed expansion will be carried out in east port of Mundra.

Figure 6-9: Proposed expansion of Mundra Port



Source: Google maps, Crisil Intelligence

Table 6-2: Proposed expansion of Mundra Port

Description	Approved till 2009	Already developed	Proposed Expansion	Cumulative after Expansion	Remarks
Quay Length (m)	22000	7870	8890	16760	The proposed quay length is envisaged due to optimization of layout for multi-purpose cargo handling. (Existing 7870m quay length will also be optimized for multipurpose cargo handling)

Source: Adani ports and special economic zone limited (APSEZ), Crisil Intelligence

Table 6-3: Details of Cargo handling after expansion of Waterfront Development Plan (Proposed)

Cargo Type	Cargo Handling Capacity (MMTPA)
Dry Bulk & Break Bulk Cargo	140
Containers	250 (25 million TEUs)
Liquid Cargo	84
Gas/Cryogenics/Liquid	40

Cargo Type	Cargo Handling Capacity (MMTPA)
Total	**514**

Source: Adani ports and special economic zone limited (APSEZ), Crisil Intelligence

6.1.2 Kandla Port

Kandla is one of the major ports of the country located on the west coast. Overall traffic has been growing at a good pace about 5.0% decadal growth, and it is supported by the super normal growth in the container segment. Coal is another major commodity on the port travelling via road, almost ~80-85% of the coal at Kandla port travels via road. Of the total throughput, ~60% of the coal traffic is directed towards Rajasthan & North region for end uses such as cement plants, steel rolling mills and brick mills. The usage of railways at Kandla, in containers as well as coal division is minimal, but could increase as they expand their EXIM business over the coming years.

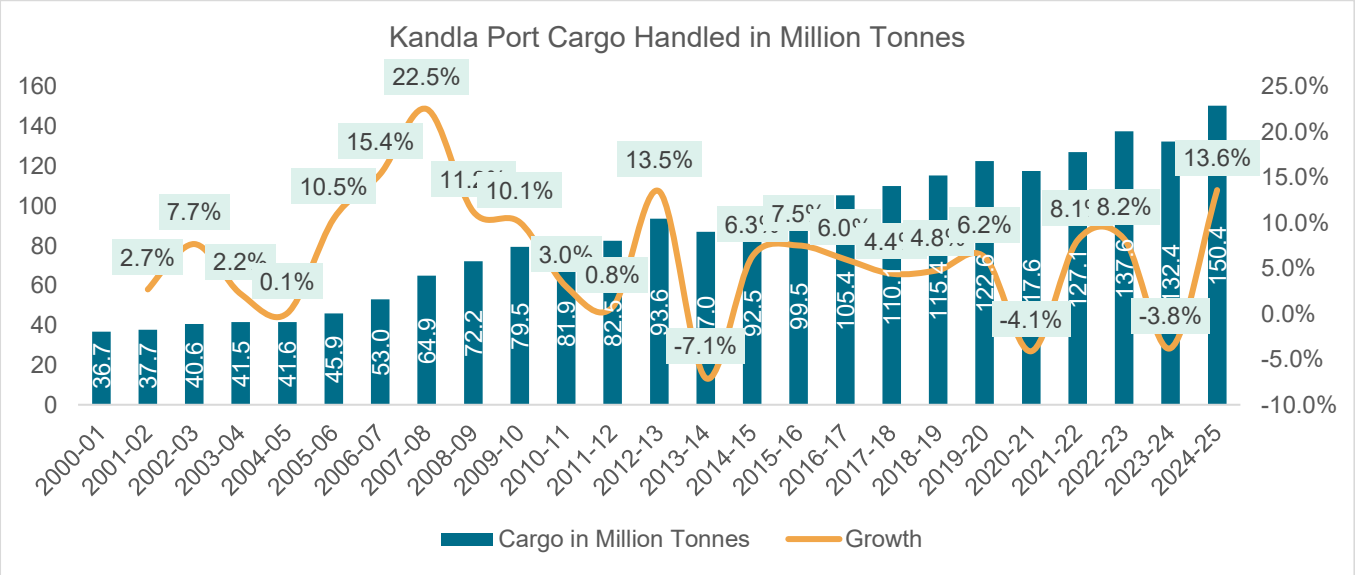


Figure 6-10: Cargo Handled at Kandla Port

Source: Crisil Intelligence, Indian port association, Basic port statistics report

Expansion Plans for Kandla Port

The Kandla Port expansion plan involves a massive investment of ₹57,000 crore to enhance its capacity and efficiency. The project includes two major initiatives: a mega shipbuilding project worth ₹30,000 crore and a new cargo terminal outside Kandla Creek valued at ₹27,000 crore. The shipbuilding facility will be spread over 8,000 acres and will have the capability to manufacture 32 new ships and repair 50 vessels annually, including Very Large Crude Carriers (VLCCs) with capacities up to 3,20,000 tonnes DWT.

The new cargo terminal will add 135 million tonnes per annum (MTPA) to Kandla Port's existing capacity and handle dry bulk cargo with advanced equipment and efficient evacuation systems. This development aims to significantly improve waiting times and turnaround times for liquid tanker vessels, enhancing the overall efficiency of Kandla Port. Additionally, the existing port will be repurposed to handle liquid cargo, improving turnaround times and reducing waiting periods for liquid tankers.

The expansion plan also includes other projects such as:

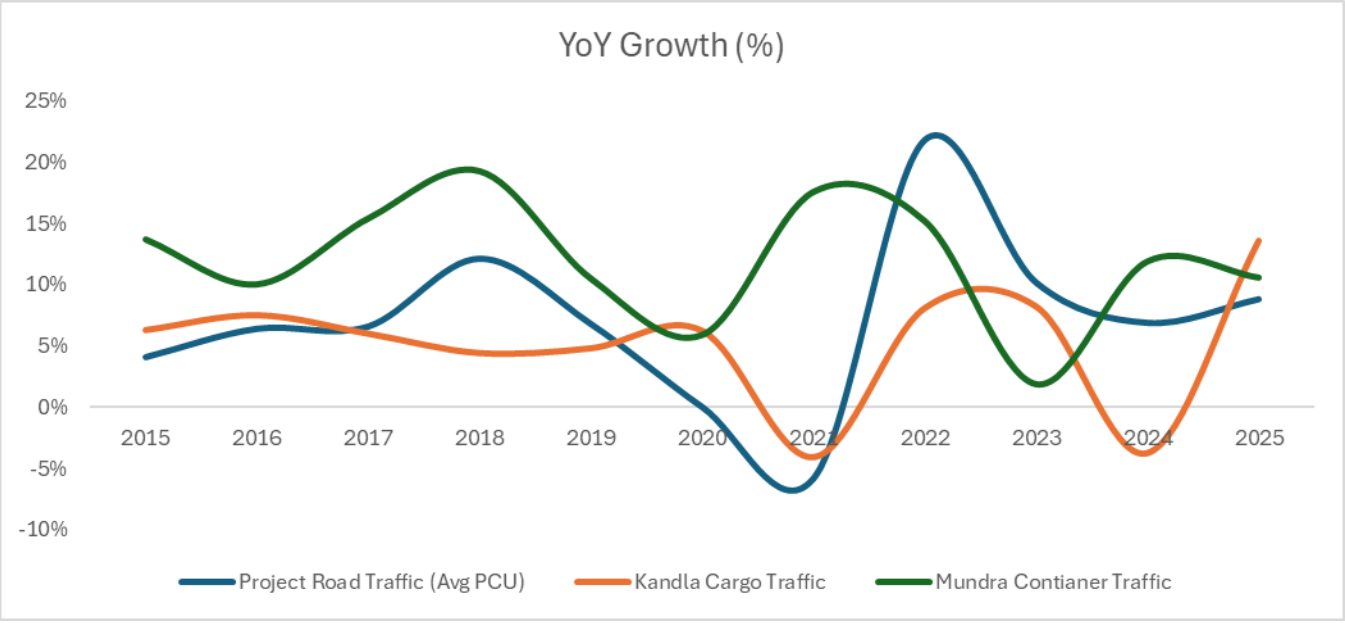
- Mega Cargo Terminal at Tuna Tekra: A new terminal being developed under Public-Private Partnership (PPP) mode with a capacity of 2.19 million Twenty-foot Equivalent Units (TEU).
- Multi Cargo Terminal at Tuna Tekra*: Adding 18.33 MTPA capacity to Kandla Port.
- New Oil Jetties: Enhancing liquid cargo handling capacity by 10 MTPA.
- Single Buoy Mooring (SBM) and Product Jetties at Vadinar: Boosting liquid cargo capacity by 24.5 MTPA.
- Ship Repair Facility at Vadinar: Capable of servicing 32 vessels annually.

Strong long-term correlation observed between stretch's AADT & Kandla port traffic and Mundra Container Traffic

The project road provides seamless connectivity to the important Port towns of Kandla and Mundra to the hinterlands in Gujarat and up north - extending to Rajasthan, Haryana, Punjab and beyond. Traffic at all the plazas on the project stretch has shown a significant correlation with respect port traffic at both Mundra and Kandla over the years. It is to be noted that the project stretch traffic is also influenced by various other commodities as well except port traffic.

For last decade, the correlation co-efficient (R^2) for project road traffic with respect to Kandla port traffic is around 0.95 and for Mundra port container traffic it is around 0.92.

Figure 6-11: YoY Growth Comparison of project road traffic, Kandla port Cargo traffic & Mundra port container traffic



Source: Crisil Intelligence, Indian port association, Basic port statistics report, Client Data

Table 6-4: Corelation coefficient

Parameters	Period	Correlation Co-efficient (R^2)
Project Road Traffic – Kandla Port Cargo Traffic	FY 15-25	0.95

Parameters	Period	Correlation Co-efficient (R^2)
Project Road Traffic – Mundra Port Container Traffic	FY 15-25	0.92

6.2 Industrial Landscape and Growth Potentials

The Ahmedabad district as well as Morbi District in Gujarat which lies within the influence area of the project corridor is undergoing a significant phase of industrial expansion, primarily driven by its Gujarat Industrial Development Corporation (GIDC) estates, which form the backbone of the region's manufacturing and industrial ecosystem. Some of these which stand out as pivotal hubs shaping the district's industrial future are:

1. Sanand Industrial Corridor: Gujarat's Manufacturing Hub
2. Mandal-Becharaji Special Investment Region (MBSIR)
3. Viramgam Industrial Cluster
4. Morbi – The Ceramic Cluster of India
5. Cargo Terminals

6.2.1 Sanand Industrial Corridor: Gujarat's Manufacturing Hub

The Sanand Industrial Corridor comprises multiple industrial estates managed by Gujarat Industrial Development Corporation (GIDC), strategically located near Ahmedabad. The corridor includes the main Sanand GIDC estate spanning 2,056 hectares, Sanand II (Bol) Industrial Estate covering additional acreage, and Sanand III (Khoraj) Industrial Estate spread across 1,512 acres (612 hectares). The main Sanand estate houses over 500 industries across diverse sectors including automobiles and ancillary units, pharmaceuticals, engineering, plastic engineering, electronics, and FMCG manufacturing. The industrial corridor has attracted multinational corporations from over 15 countries, establishing it as one of India's premier manufacturing destinations.

Major Industries and Manufacturing Activities

The Sanand Industrial Corridor hosts prominent global manufacturers across multiple sectors. Leading automotive companies include Tata Motors (famous for the Nano plant), Ford Motor Company, JBM Auto Systems, Maxxis Tyres, and Bosch. The FMCG sector is represented by major brands like Nestle India, Coca-Cola, Colgate Palmolive, P&G, Nivea, Unicharm India, and Marico. Engineering and industrial equipment manufacturers include Inductotherm, Voltas-Beko, Mitsubishi Electric, Alstom Bharat Forge, and Visteon Automotive. The pharmaceutical sector features companies like Emcure Pharmaceuticals and Teva, while the packaging industry includes Uflex Limited and Oji India Packaging. These companies manufacture products ranging from automobiles, auto components, consumer goods, industrial equipment, pharmaceuticals, and packaging materials to serve both domestic and international markets.

Recent Developments and New Companies

The Sanand Industrial Corridor has witnessed significant expansion in the semiconductor and advanced technology sectors since 2023. Micron Technology's $2.75 billion semiconductor assembly and test facility is under construction, with production expected to commence by December 2025. Trutzschler India inaugurated their new Textile machinery manufacturing facility in May 2025. CG Power and Industrial Solutions launched India's first Outsourced Semiconductor Assembly and Test (OSAT) facility in August 2025, marking a major milestone in the country's semiconductor journey. Tata Passenger Electric Mobility commenced production at its new state-of-the-

art facility in September 2025, adding 300,000 units per annum manufacturing capacity. Additionally, Kaynes Semicon received government approval for a Rs 3,300 crore semiconductor unit with a capacity to produce 60 lakh chips per day expected to be operational soon. American multinational firm, Jabil has announced a 2,000 Cr investment in Sanand currently in project implementation stage. Hi-tech pipes phase 2 expansion ongoing expected completion by Q4 2025.

Future Expansion Plans

The Sanand Industrial Corridor's expansion strategy focuses on creating specialized industrial zones and enhanced connectivity infrastructure. Sanand III (Khoraj) has been designated as a Japanese Industrial Township spanning 1,438 hectares, with 612 hectares already developed to attract approximately $1 billion in Japanese investments. The government has recently approved six-laning of connectivity project from Shantipura to Khoraj of the project corridor to enhance industrial area accessibility. Future developments include a multi-modal logistics park covering 200 hectares in partnership with DMIDC, dedicated defense and aerospace clusters at Khoraj.

Sanand-III (Khoraj) Industrial Estate is under active development, focusing on aerospace, defense, auto ancillaries, and electronics. This phase includes notable expansions such as a $100 million investment by Bansal Wire Industries and ongoing growth of the Japanese Industrial Township as mentioned earlier which is attracting $1 billion in investments with an emphasis on sustainable and smart infrastructure

Japanese Industrial Township at Khoraj, Sanand, Gujarat

The Japanese Industrial Township (JIT) at Khoraj near Sanand represents Gujarat's most ambitious country-specific industrial development initiative, established as part of the strategic partnership between India and Japan under the Delhi-Mumbai Industrial Corridor (DMIC) framework based on the township concept emerged from the success and subsequent saturation of Gujarat's first Japanese Industrial Park at Mandal-Becharaji. Located approximately 25 kilometers from Ahmedabad and 5 kilometers from the existing Sanand Industrial Estate, this township is designed to create a comprehensive ecosystem that accommodates Japanese companies while providing residential, commercial, and cultural amenities. JIT is a planned to spread across 350 hectares in Phase I after significantly reducing it from initially planned 1,555 Ha to 612 Ha and now 350 Ha after COVID 19 pandemic, with provisions for future expansion based on demand.

The township is strategically positioned to attract Japanese companies across multiple sectors, with particular emphasis on automotive and auto ancillary industries, aerospace and defense, engineering, electronics, and pharmaceuticals. The proximity to existing automotive giants like Suzuki Motor Gujarat, Honda Motorcycle and Scooter India, and the Tata Motors plants creates a natural clustering effect for Japanese auto component manufacturers and suppliers. Beyond automotive, the township is designed to accommodate companies in pharmaceuticals, engineering goods, electronics manufacturing, and food processing industries.

As of 2025, the Japanese Industrial Township at Khoraj is in an advanced stage of infrastructure development but faces challenges in attracting the initially projected level of Japanese investment. The township has experienced a slower uptake than initially anticipated, particularly following the COVID-19 pandemic's impact on global investment patterns. The Gujarat government has demonstrated flexibility in adapting to market conditions, with provisions to utilize unused land for alternative industrial purposes, including a proposed toy manufacturing park or integration with the existing automotive hub at Sanand.

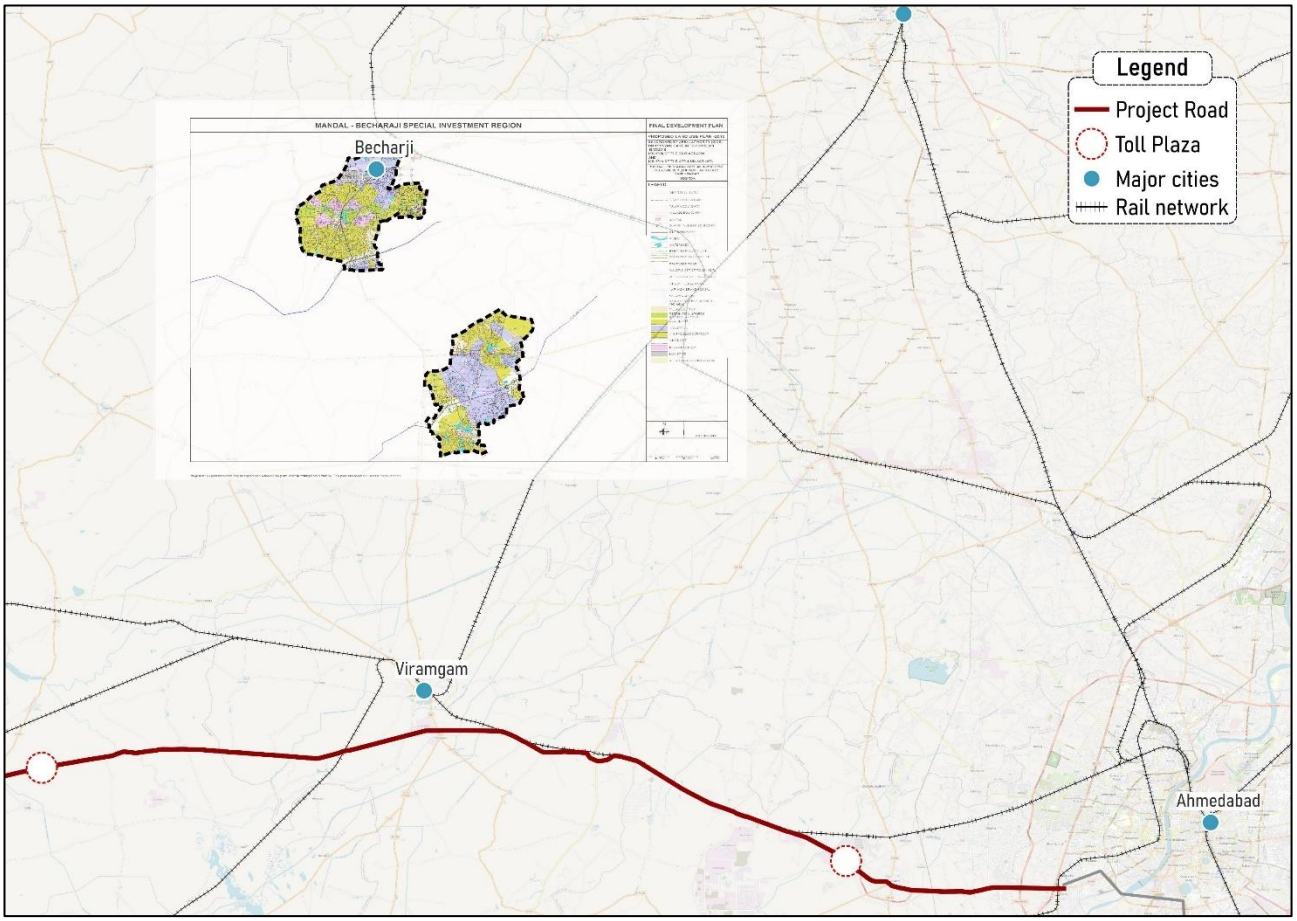
The current timeline indicates a phased approach with basic infrastructure largely completed and selective company operations beginning as market conditions improve and Japanese investment interest resurges. However, no clear timeline is provided as per the information available in public domain.

6.2.2 Mandal-Becharaji Special Investment Region (MBSIR)

The Mandal Becharaji Special Investment Region (MBSIR) spans 102 square kilometers across nine villages including Hansalpur, Sitapur, Ughroj, Ughrojpura, Bhagapura, Gitapur, Ukardi, Chandanaki, and Shihore, strategically positioned within the Delhi-Mumbai Industrial Corridor (DMIC) influence zone. The region consists of two main clusters - Cluster A and Cluster B - located 20 kilometers apart, developed to promote automobile and auxiliary industries. Key industrial estates include Vitthalapur GIDC, which serves as a major Japanese industrial zone, Bhagapura Industrial Area covering approximately 273 hectares, Ukardi estate spanning around 40 hectares, and the IndoSpace Industrial Park in Becharaji covering 44 acres with 10,24,028 square feet of chargeable area.

As per the final development plan, the proposed landuse and the site location in context of the project road for MBSIR provided by the Mandal Becharaji Special Investment Regional Development Authority, Gandhinagar is presented below.

Figure 6-12: Mandal Becharaji Special Investment Region



Source: Crisil Intelligence, Mandal Becharaji Special Investment Regional Development Authority

Major Industries and Manufacturing Activities

The region hosts over 350 companies, primarily concentrated around automobile manufacturing and ancillary industries. Major anchor companies include Maruti Suzuki India Limited at Hansalpur with a Rs 13,400 crore investment producing 750,000 cars annually, Honda Motorcycle & Scooter India Private Limited at Vitthalapur with Rs 1,350 crore investment manufacturing 1.2 million two-wheelers per annum. Supporting industries include Minda

Group for auto components, Toyota Tsusho India for trading and logistics, JNS Instruments Limited, and numerous Japanese companies operating in the designated Japanese Industrial Township. The industrial ecosystem produces a diverse range of automotive products including passenger cars, two-wheelers, auto components, tires, and engineering parts. The region also supports manufacturing of construction equipment, machinery manufacturing and other specialized products. Service industries include industrial construction services, logistics and warehousing operations and plug-and-play infrastructure development through projects like Ayodhya Industrial Park.

Recent Developments and Future Expansion

MBSIR has received significant infrastructure investments totalling Rs 760 Cr for road infrastructure development and other physical infrastructure development purposes. Notable recent developments include Honda Cars India's exit from Vitthalapur in April 2023, selling 380 acres to Mascot Group for industrial township development, while Maruti Suzuki plans to commission a second manufacturing plant within Cluster B. The upcoming Vibrant Gujarat Regional Conference in Mehsana (October 2025) is expected to attract additional investments, with the region targeting expansion into electric vehicle manufacturing and further Japanese industrial partnerships.

This concise overview highlights the scale, industrial diversity, ongoing developments, and future focus areas of the Mandal Becharaji Special Investment Region demonstrates its importance as a pivotal growth center in Gujarat's industrial landscape.

6.2.3 Viramgam Industrial Cluster

Viramgam region encompasses multiple industrial estates including the established Viramgam GIDC spanning 42 hectares, Hansalpur GIDC which hosts major automotive manufacturers, and Dholka GIDC located nearby. These estates are strategically located along the Delhi-Mumbai Industrial Corridor (DMIC) influence zone, benefiting from excellent connectivity through NH-8, broad gauge railway networks connecting Ahmedabad to Kutch ports (Mundra and Kandla) via our project road, and proximity to Sardar Vallabhbhai Patel Airport. The region is classified as a saturated estate by GIDC, indicating full land utilization and high industrial activity.

Major Industries and Manufacturing activities

The industrial landscape encompasses diverse manufacturing sectors with over 200 established companies across various GIDC estates. The anchor automotive industry includes Suzuki Motor Gujarat Private Limited at Hansalpur, operating four manufacturing plants with a combined annual capacity of 1 million vehicles producing popular models like Swift, Baleno, Dzire, and Fronx. Supporting this ecosystem are major component suppliers including SKH Y-TEC India Private Limited at Becharaji with capacity for 500,000 cars annually, PPAP Automotive Limited specializing in plastic and rubber automotive components, and TDS-G (joint venture of Toshiba, Denso, and Suzuki) providing automotive electronics. Other industries include pharmaceutical and chemical processing units, and other while engineering industries, machinery manufacturing, steel fabrication and electrical appliances manufacturing. Export-oriented industries focus on electrical engineering items, pharmaceutical products, chemical derivatives, and automotive components primarily serving domestic and international markets through major ports connectivity.

Recent Developments and Future Expansion

Recent infrastructure developments include a Rs 640 crore government investment announced in October 2024 for comprehensive development projects covering roads, utilities, and industrial infrastructure. Shree Ramji Buildcon

Group is a key developer with flagship projects including the 1,100-acre Ayodhya Global Tech City township combining residential, industrial, and commercial spaces, and Ayodhya Industrial Park at Vithalapur offering hi-tech facilities for logistics and light manufacturing. Future expansion plans include enhanced connectivity infrastructure, potential electric vehicle manufacturing integration at existing automotive plants, and continued development of the DMIC corridor positioning Viramgam as a critical link between major industrial hubs like Sanand, Becharaji, and Dholera Special Investment Region.

6.2.4 Morbi – The Ceramic Cluster of India

Morbi is the world's second largest ceramic tile manufacturing cluster and India's undisputed ceramic capital. Morbi houses over 1,000+ ceramic factories with a combined daily production capacity of 4 million square meters. This translates to an annual production capacity exceeding 300 million square meters, representing approximately 80% of India's total ceramic production. The cluster also dominates India's sanitary ware production with an 85% market share

Current Production Capacity and Utilisation

The Morbi tile industry currently operates with significant capacity but faces utilization challenges. Industry reports indicate that many plants are operating at approximately 70% capacity utilization, with some facilities rúnning below optimal levels due to market oversupply conditions that emerged in recent years. The total installed capacity across the region represents a cumulative investment of over INR 20,000 crores 2, making it one of India's largest industrial clusters.

Current Market Conditions

The industry is experiencing mixed conditions. Morbi tile exports declined 20% year-over-year in FY25 to INR 16,000 crores due to high ocean freight costs caused by geopolitical tensions. The Morbi Ceramic Association implemented a 10% price increase effective February 2025 to stabilize prices and inventory

Domestic demand remains moderate; however, oversupply in the industry is exerting significant pricing pressure. With issues in the export market in FY25, 10-13% of export volumes from Morbi have shifted to the domestic market. This diversion has resulted in dumping of excess inventory in the domestic market, leading to intense competition and additional stress on pricing. The completions of real estate projects surpassed pre covid levels is expected to see a healthy growth in FY26.

Major Players in the ceramic market

Larger players includes Kajaria Ceramics that leads the industry. As India's largest tile manufacturer and the 8th largest globally, Kajaria operates facilities in Sikandrabad (UP), Gailpur (Rajasthan), Malootana (Rajasthan), Morbi (Gujarat), Srikalahasti (Andhra Pradesh), and Balanagar (Telangana). Millennium Tiles - the company has ambitious plans to expand to 100 MSM capacity to serve global markets more effectively. Others include Asian Granito India Ltd (AGL), Somany Ceramics - the company recently commissioned a new 4.5 MSM facility in Morbi specifically for large format tiles production. Orient Bell has multiple facilities across India with a large outsourced capacity from Morbi. Other medium players include Simpolo group and metrocity tiles.

Expansion plans and future growth

Simpolo Group has announced the most aggressive expansion plan, committing Rs 1,000 crores over three years to triple its existing manufacturing capacity. Quotone Ceramics expected to increase 8 msm facilities coming up at Gujarat by FY27. Asian Granito India Ltd continues its expansion strategy with ongoing investments targeting Rs 6,000 crores annual revenue. The company recently commissioned a sanitaryware plant with 0.66 million pieces per annum capacity and is focusing on comprehensive bathroom solutions. Millennium Tiles has set ambitious targets to expand from 74 MSM to 100 MSM capacity as part of its vision to become a leading global tile producer by 2023.

The industry is currently adopting a cautious expansion approach due to recent oversupply concerns. Most companies are focusing on Capacity optimization rather than aggressive expansion, product mix improvement toward higher-value segments, Technology upgrades including digital printing and large-format tile capabilities, and Export market diversification to reduce dependence on traditional markets.

While the industry faces current challenges including capacity underutilization and export headwinds, the long-term outlook remains positive. Major players are pursuing strategic expansions, technology upgrades, and market diversification initiatives. The combination of cost competitiveness, technological advancement, and export diversification positions Morbi to maintain its leadership in the global ceramic tile industry. The industry's commitment to sustainability, innovation, and quality improvement, coupled with India's growing domestic market and emerging export opportunities, provides a strong foundation for continued growth and global market expansion.

6.2.5 Cargo Terminals

The project corridor connecting Ahmedabad to Maliya through Sanand, Viramgam, Dhrangadhra, Halvad, and Morbi represents one of Gujarat's most strategically important freight transportation routes. This region hosts a significant concentration of private freight terminals (PFTs) and inland container depots (ICDs) that serve as crucial logistics hubs for the state's industrial belt, particularly supporting the ceramic, salt, chemical, and textile industries.

Table 6-5: Major cargo terminals present in the region

Sr. No.	Name	Managed by
1	Thar Dry Port ICD Sanand	Hasti Petro Chemical and Shipping Limited (HPCSL)
2	Viramgam PFT	Continental Warehousing Corporation (CWCNSL)
3	DP World ICD Sachana	DP World India
4	ICD Viramgam	Gateway Distriparks
5	Maliya PFT	Aarya Ocean Logistics Park Pvt Ltd
6	Navkar ICD Morbi	Navkar Corporation Limited (now JSW Infrastructure subsidiary)
7	SPPL Sukhpur PFT (former SCRPL)	Shivam PFT Pvt Ltd (SPPL)
8	Virochan Nagar ICD	Adani Logistics Limited

Source: CRISIL Intelligence, FOIS, Indian Railways

Expansion plans and future growth

Western Carriers Devaliya Terminal at Halvad was inaugurated in 2025, representing a new 30-acre Gati Shakti Multi-Modal Cargo Terminal designed to serve both container and wagon rake systems. This facility strategically benefits the salt industry in Maliya and the ceramic industry in Morbi, which accounts for over 80% of India's ceramic production. New Sanjali Gati Shakti Cargo Terminal near Surat, inaugurated in July 2025, marks India's first privately developed terminal along the Western Dedicated Freight Corridor. Spanning 120 acres, this facility includes a 28-acre ICD, 650,000 square feet of warehousing space, and direct connectivity to major ports including

Dahej, Hazira, and JNPT.

Current Challenges and Future Outlook

The new and upcoming facilities collectively enhance the freight handling capacity along the corridor, support modal shift of containerized cargo from road to rail, and contribute to reducing highway congestion by facilitating efficient container movement directly linked with major industrial and port locations. This shift supports India's environmental goals under its Net Zero 2070 commitment while reducing logistics costs from 8-14% of GDP to under 5%. The terminals have created substantial employment opportunities, with hundreds of direct positions in operations, logistics, and warehousing, while indirectly supporting thousands more through related industries. The development of bonded warehousing and duty-deferred zones has attracted fresh investments from export-driven firms, particularly benefiting SMEs seeking to expand their operations.

The long-term benefits of modal shift to rail and improved multimodal connectivity are projected to reduce overall road congestion and enhance the region's competitiveness as a logistics hub for western India.

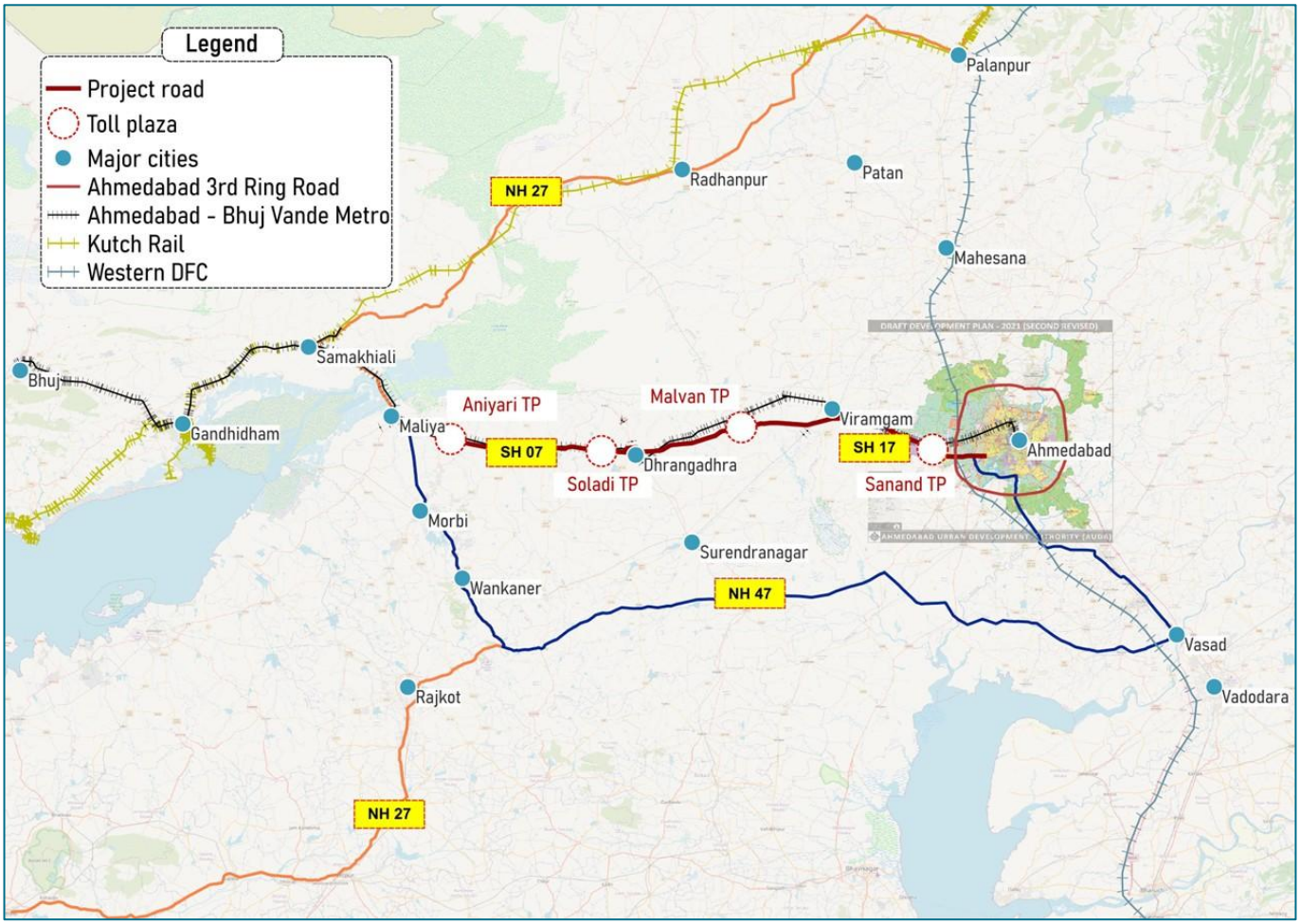
7 Network and Industrial developments in the Region

In the case of the project road, there are no short distance alternate routes available that will impact the traffic on the project road. However ongoing and upcoming short distance & long-distance networks that could impact the project road are:

- Western Dedicated Freight Corridor (WDFC)
- Impact of Ahmedabad-Bhuj Vande Metro Express
- Impact of 6 laning and operational tolling on NH47 /NH8A
- Construction of Ahmedabad 3rd Ring Road
- Impact of Private Freight Terminals and Cargo terminals – **Scenario 1**

The alignment of the developments along with the project road is presented below figure.

Figure 7-1: Network Development around project road



Source: Open Street Map, Crisil Intelligence

The details of the development in term of milestone, expected completion date and possible impact to project road traffic is presented in below table.

Table 7-1: Details of Network Development and Possible impact

S. No	Details of Development	Milestone/Completion	Possible Impact
1	**WDFC** • 1,506 km long • The freight corridor will pass through the state of Delhi, Uttar Pradesh, Haryana, Rajasthan, Gujarat and Maharashtra **KRCL Line connecting Mundra to Palanpur** • Kutch Railway Company Limited which connects Mundra to Palanpur station of WDFC	93.2% section is commissioned and rest of section between Sachin – JNPT is under construction. Doubling of the existing railway line completing electrification of the same and these works were completed in February 2023 and May 2023, respectively	The potential impact of the WDFC and KRCL Railway which connects the North India region to Mundra Region since the operations of the KRCL line from 2023 and the balance impact of the WDFC is assessed in the current study. It is to be noted that in-scope traffic for WDFC is almost negligible on our Project Road, and as the section which would impact the project road is already operational, the traffic has already shifted and impact is played out. Thus, No Impact.
2	**Impact of Ahmedabad-Bhuj Vande Metro Express**	The Ahmedabad-Bhuj Vande Metro Express was the first Vande Bharat launched in India and had started operations from September 2024.	No Impact. As the train has been operational from over a year, the passenger traffic willing to shift to Vande Bharat might already have shifted.
3	**Impact of 6 laning and operational tolling on NH47 /NH8A**	The asset has an alternative route via NH-8A, which is 90 kms longer than the project road and passes through the towns of Bagodara, Limbdi and Chotila. It is currently a 4/6 lane facility with 6 laning being largely completed. The official expected timelines for the entire project 6 laning is December 2025.	No Impact. Widening to 6-lanes of the NH-8A has largely been completed and a structural toll rate on the entire section will be enforced soon. As a result, no incremental traffic switch-over from the project road to the alternative route is likely. Furthermore, the project road has been operational for more than 13 years without any recorded incidents of traffic diversion towards NH-8A.
4	**Construction of Ahmedabad 3rd Ring Road**	The third ring road for Ahmedabad is currently in the planning stages, with a new draft development plan and land acquisition action plan expected by the end of 2025.	No Impact. As per the alignment presented in the figure, the 3rd ring road hits before TP01, thus not impacting the traffic on the project road. There are no daytime restrictions on the currently available Sardar

S. No	Details of Development	Milestone/Completion	Possible Impact
			Patel ring road and thus to decongest the traffic on SPRR, the traffic will shift from SPRR to 3rd ring road but eventually meet the project road before TP01.
5	**Scenario 1 - Impact of Private Freight Terminals and Cargo terminals**	There are many PFTs and ICDs already operational along the project corridor	The in-scope traffic suggests around 2.5% of MAV would shift to PFTs and ICDs. Impact considered from base year FY26 in a phased manner. It is unlikely that there will be a significant impact with further development of PFTs and cargo terminals on the route given there are large number of PFT and cargo terminals already operational on the route. However, in an unlikely scenario if the shift is assumed to shift to railways, impact is calculated.

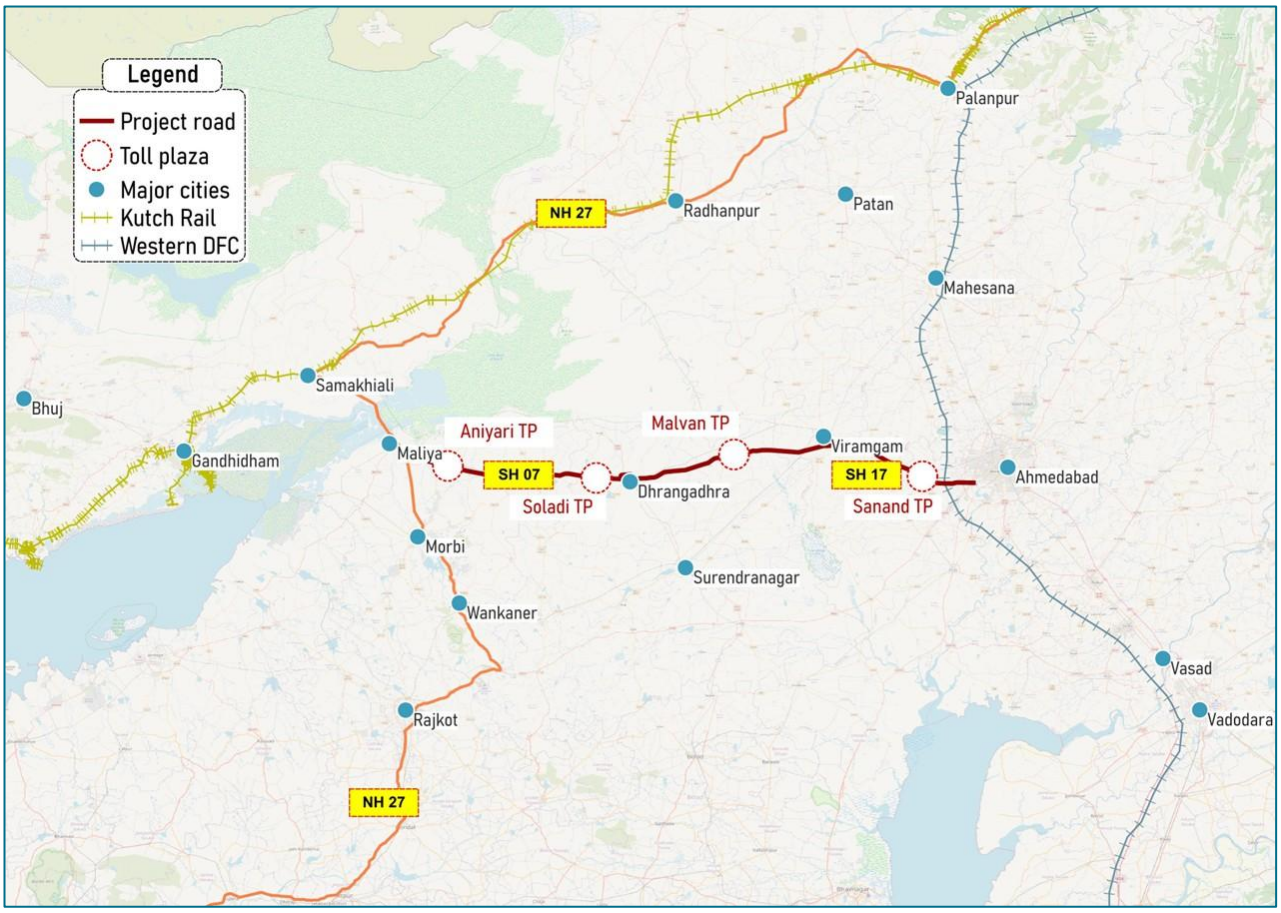
Source: Crisil Intelligence

7.1 Impact of Western Dedicated Freight Corridor (WDFC)

The Western Dedicated Freight Corridor (Western DFC) is an ambitious under-construction project spanning 1,506 km in India. It aims to connect Dadri, near Delhi in Uttar Pradesh, to Jawaharlal Nehru Port in Navi Mumbai, Maharashtra. Being developed by the Dedicated Freight Corridor Corporation of India Limited (DFCCIL), a public-sector unit under the Ministry of Railways, the Western DFC will feature electrified double-line operation.

The alignment of the WDFC and the project section is presented in below figure.

Figure 7-2: Alignment of WDFC



Source: Open Street Map, Crisil Intelligence

KRCL was incorporated in January 2004 as an SPV for converting the existing meter gauge to broad gauge on the existing 301-km railway line between Gandhidham and Palanpur in Gujarat. KRCL took up the project for doubling the existing railway line and completing electrification of the same and these works were completed in February 2023 and May 2023, respectively. KRCL railway line which provides connectivity to two major seaports [Adani Port (erstwhile Mundra Port) and Deen-Dayal Port (erstwhile Kandla Port) with the northern mainland. It will also be a feeder route to the Western Dedicated Freight Corridor (WDFC).

Table 7-2: Status of WDFC

Section	Distance (Km)	Status	Completion Date
Dadri – Rewari	127	Operational	2024 January
Rewari - Madar	306	Operational	2021 January
Madar -Palanpur	353	Operational	2022 June
Palanpur - Makarpura	290	Operational	2023 October
Makarpura - Sachin	135	Operational	2023 June
Sachin - Vaitarna	193	Operational	2024 December
Vaitarna - JNPT	102	Under construction	2025 December*
Total	1,504		

Source: Dedicated Freight Corridor Corporation of India Limited, Crisil Intelligence

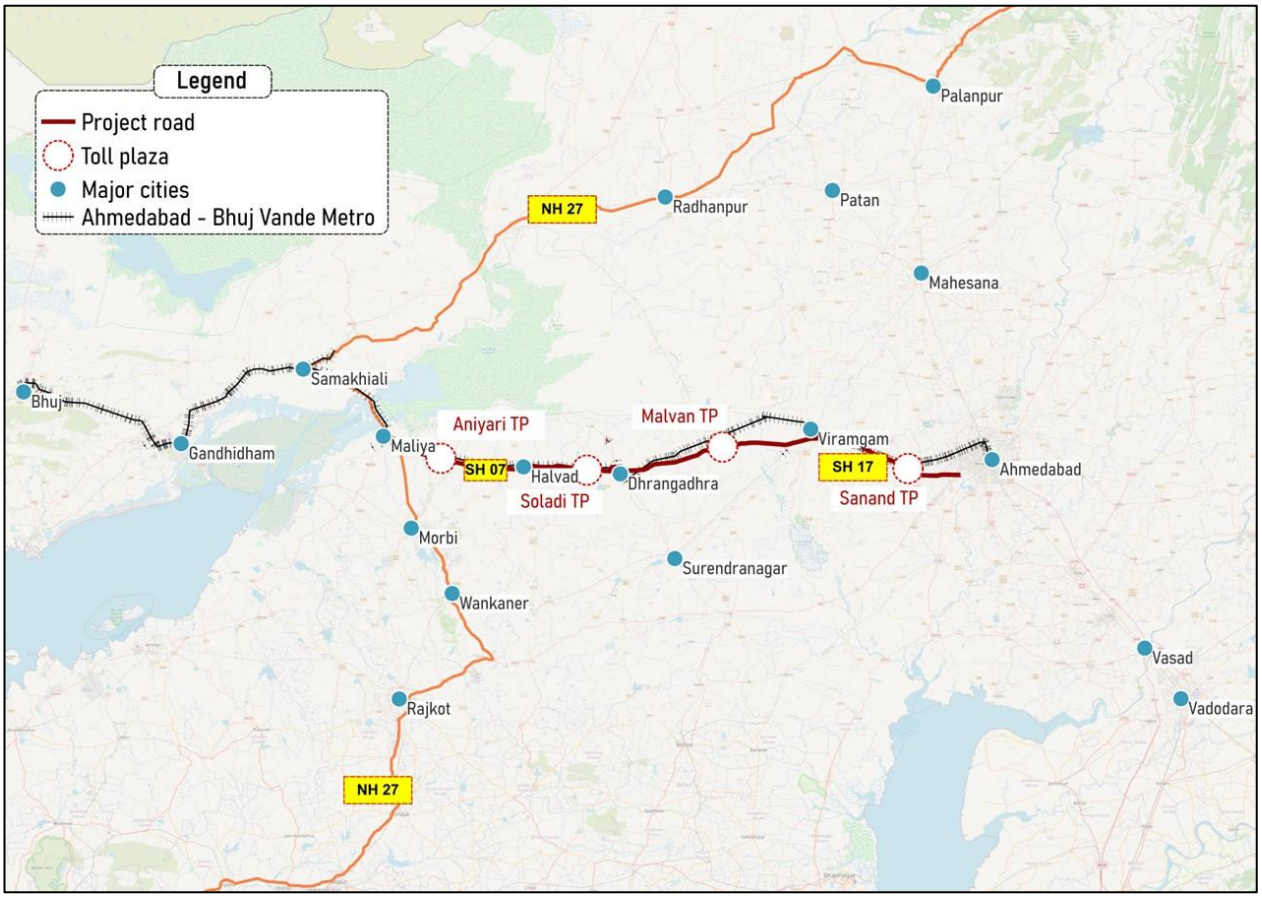
It is worth noting that the in-scope traffic volume for the Western Dedicated Freight Corridor (WDFC) on our Project Road is minimal. Furthermore, as the section of the WDFC that intersects with our Project Road is already operational, the traffic diversion has already occurred, and the potential impact on our project has been fully realized

7.2 Impact of Ahmedabad-Bhuj Vande Metro Express

Ahmedabad-Bhuj Vande Metro Express or Namo Bharat Rapid Rail developed on the same platform as the Vande Bharat Express is a self-propelled train set designed for short-distance inter-city travel aiming to enhance intercity connectivity. However, unlike Vande Bharat which is a semi-high speed 160 kmph train set, the Vande Metro trains has a maximum speed limit of 130 kmph. The new train from Indian Railways is a fresh offering for short-distance premium travel experience for the common man and unreserved passengers over non-suburban sections offering all air-conditioned travel. Vande Metro has been built to offer 'world-class' comforts to the passengers. The train runs from Ahmedabad Junction and terminates at Bhuj passing via Sabarmati, Chandoliya, Viramgam, Dhrangadhra, Halvad, Samakhiali, Bhachau, Gandhidham and Anjar before reaching Bhuj, reducing the travel time between Ahmedabad and Bhuj to a mere 5 hr 40 minutes.

The alignment of the same is presented below.

Figure 7-3: Alignment and route of Ahmedabad-Bhuj Vande Metro Express



Source: Open Street Map, Crisil Intelligence

The Ahmedabad-Bhuj Vande Metro Express was the first Vande Bharat launched in India and had started operations from September 2024. Given that the train has been in operation for over a year, it is likely that the passenger traffic that was inclined to switch to the Vande Bharat service has already done so. As a result, the potential for further modal shift to Vande Bharat may be limited, as the initial wave of passengers who were willing

to adopt the new service have already made the transition

7.3 Impact of 6 laning and operational tolling on NH47 /NH8A

The traffic travelling from/to Surat/Vadodara/Mumbai and beyond to/from Gandhidham/Bhuj/Kandla/Mundra has 2 route choices:

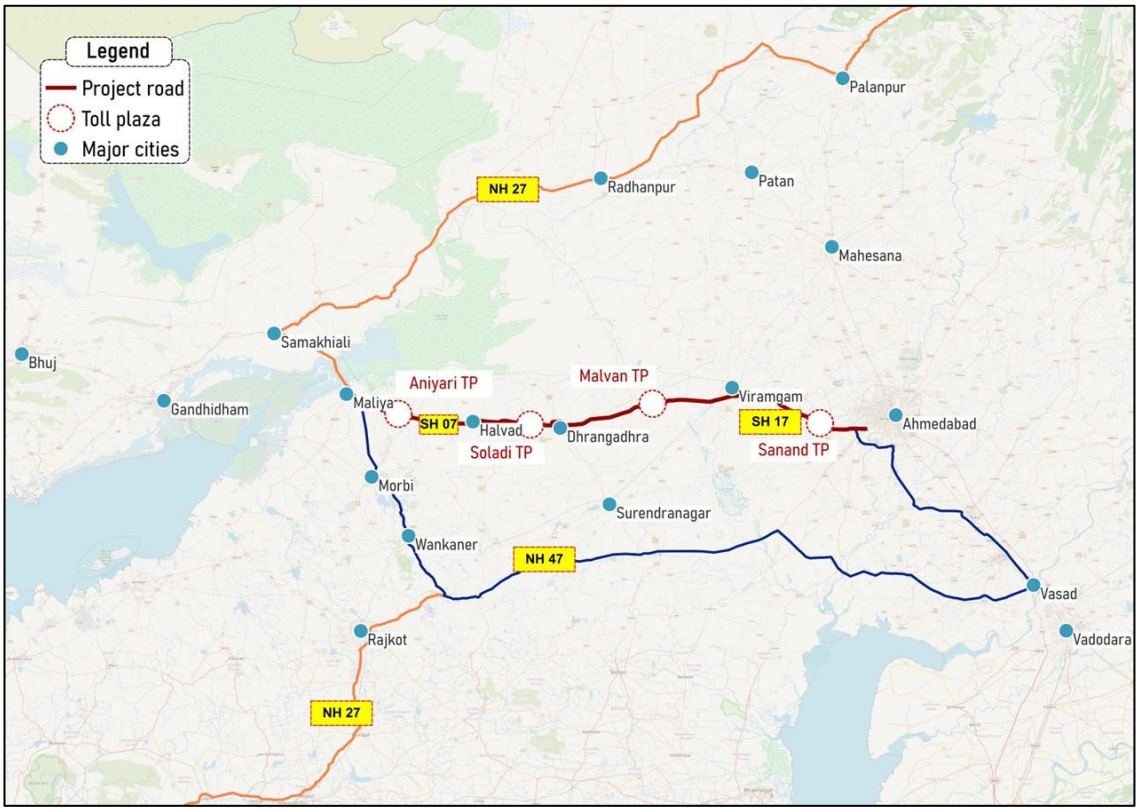
a) Vadodara-Nadiad-Ahmedabad-Maliya (NH-64-Sardar Patel Ring Road -PR-Maliya)

Route Length: 279.1 Km and 4-lane configuration from Vadodara-start of SPRR, then 4-lane configuration of SPRR and PR

b) Vadodara-Tarapur-Vataman-Bagodara-Chotila-Bamanbore-Morbi-Maliya (NH751D-NH47-NH27)

Route Length: 308.8 Km and 6-lane configuration from Vadodara till Bamambore and 4-lane from till Maliya

Figure 7-4: Alignment *of NH47 vs PR*



Source: Open Street Map, Crisil Intelligence

The route via NH-47/NH8A between Ahmedabad-Rajkot passing via Bagodara and Chotila is almost 6 laned, and as of Dec 2024, approximately 98% of 197 km stretch is already 6 laned with only minor portions especially around Chotila left to finish. The official expected timeline for completion of the entire project is December 2025.

The inscope traffic for the impact is presented below.

Table 7-3: Inscope Traffic for NH-487/NH8A

In-scope traffic	Sanand (TP01)	Malvan (TP02)	Soladi (TP03)	Aniyari (TP04)
2 AT	11.6%	22.2%	20.5%	27.4%
3 AT	10.9%	23.7%	19.7%	22.7%
MAV	21.1%	21.2%	16.7%	19.3%
Total Vehicles	18.1%	21.5%	17.3%	20.3%
PCU	18.9%	21.4%	17.2%	20.0%

Source: Crisil Intelligence

The section is currently mostly 6 laned but the tolling operational is for 4-lane. As most of the 6 laning work is already complete, the traffic would have already shifted and the inscope traffic which is present on the project road is the traffic which has been already using the project road.

7.4 Construction of Ahmedabad 3rd Ring Road

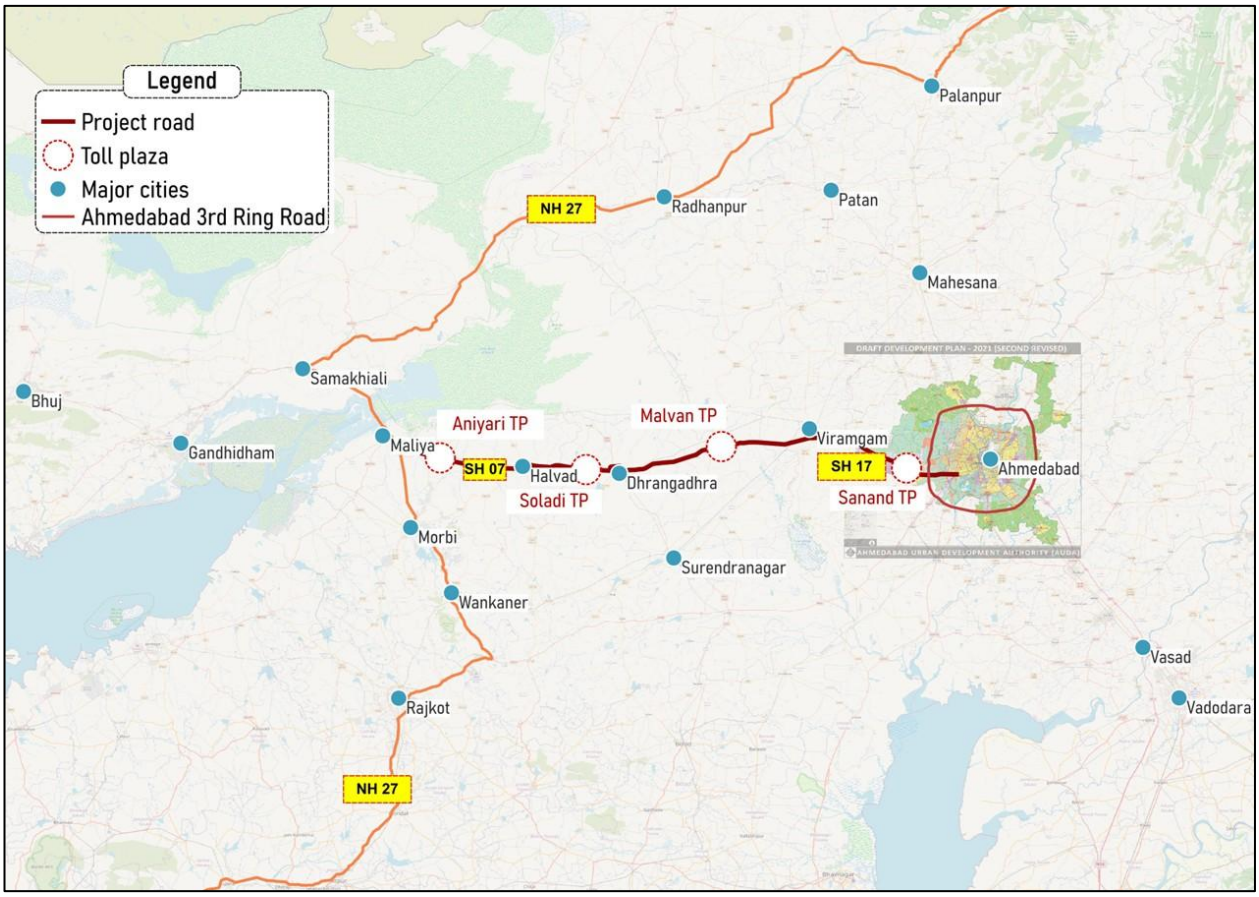
The third ring road of Ahmedabad was initially a part of draft development plan 19 years ago but saw no progress in terms of land acquisition or groundwork. Ahmedabad gearing up for its rapid development and the upcoming 2036 Olympics. Given the rising pressure on the existing 132-ft Ring Road and Sardar Patel Ring Road, as well as a growing need for enhanced connectivity, the state govt has decided to accelerate the third ring road project.

To facilitate swift land acquisition, over 100 Town Planning (TP) schemes are being proposed. The Ahmedabad Urban Development Authority (AUDA), Ahmedabad Municipal Corporation (AMC), and the urban development department (UDD) are collaborating to expedite this initiative. Traditional road development methods through revenue rules often lead to legal issues and delays. Instead, TP schemes offer a more structured approach, ensuring faster land acquisition and planned growth along the corridor and ensures both quicker land acquisition and planned growth along the corridor.

As per the information available in the public domain, the new development plan will incorporate the third ring road as a top priority, possibly with route adjustments. Experts have broadly agreed to proceed with the previously proposed alignment, with small modifications if necessary.

The current alignment as per the previous development plan is presented below

Figure 7-5: Alignment of 3rd Ahmedabad Ring Road



Source: Open Street Map, Crisil Intelligence

As per the alignment presented in the figure, the 3rd ring road hits before TP01, thus not impacting the traffic on the project road. There are no daytime restrictions on the currently available Sardar Patel ring road and thus to decongest the traffic on SPRR, the traffic will shift from SPRR to 3rd ring road but eventually meet the project road before TP01.

7.5 Scenario 1 - Impact of Private Freight Terminals and Cargo terminals

The project corridor hosts a significant concentration of private freight terminals (PFTs) and inland container depots (ICDs) that serve as crucial logistics hubs for the state's industrial belt, particularly supporting the ceramic, salt, chemical, and textile industries.

Some of the major PFTs and ICDs present along the project corridor is presented below.

Table 7-4: Major PFTs and ICDs present along the project corridor

Sr. No.	Name	Managed by	Commodities Handled
1	Thar Dry Port ICD Sanand	Hasti Petro Chemical and Shipping Limited (HPCSL)	General containers, industrial cargo
2	Viramgam PFT	Continental Warehousing Corporation (CWCNSL)	General cargo, containers from Sanand, Kadi, Kalol industrial areas
3	DP World ICD Sachana	DP World India	Steel Cargo, general containers, custom bonded goods
4	ICD Viramgam	Gateway Distriparks	EXIM containers

Sr. No.	Name	Managed by	Commodities Handled
5	Maliya PFT	Aarya Ocean Logistics Park Pvt Ltd	Ceramic tiles, salt, chemicals (serves Morbi ceramic industry)
6	Navkar ICD Morbi	Navkar Corporation Limited (now JSW Infrastructure subsidiary)	Cement, iron and steel, salt, ceramic tiles, general containerised cargo
7	SPPL Sukhpur PFT (former SCRPL)	Shivam PFT Pvt Ltd (SPPL)	Ceramic tiles and related cargo (serves Morbi ceramic industry)
8	Virochan Nagar ICD	Adani Logistics Limited	General EXIM containers

Source: CRISIL Intelligence, FOIS, Indian Railways

The project corridor hosts a significant concentration of private freight terminals (PFTs) and inland container depots (ICDs) that serve as crucial logistics hubs for the state's industrial belt, particularly supporting the ceramic, salt, chemical, and textile industries. These cargo terminals carry huge volume of containerised cargo for EXIM or domestic purposes from the industries in and around the project corridor and also to major ports of Kandla, Mundra, Navlakhi etc for Exports and Import purposes.

Owing to the governments increased focus on promoting movement of freight via rail, the data from FOIS (Freight Operations Information System) available with the consultant suggests that the volumes handled at these cargo terminals (automobiles and container) have given a double-digit growth in the past 2-3 years along with traffic ramp up at recently commissioned PFTs Therefore, it is anticipated that the freight travelling via road would shift to rail in the future years and as most of these ICDs and PFTs are already operational, impact would start from base year FY26 itself. Thus we have considered a 50% shift for the traffic pair of traffic plying on the project road. Inscope traffic comprises of MAV pairs travelling between Ahmedabad/Viramgam-Kutchh/Jamnagar/Morbi/Surendranagar districts. The inscope traffic and diverted traffic which may be at risk due to these cargo terminals as derived from OD surveys is presented below.

Table 7-5: Inscope Traffic for PFTs and ICDs

	Sanand (TP01)	Malvan (TP02)	Soladi (TP03)	Aniyari (TP04)
Inscope Traffic				
Container	2.5%	2.5%	2.0%	2.3%
Automobiles	0.2%	0.2%	0.2%	0.2%
Total	**2.7%**	**2.7%**	**2.2%**	**2.5%**
Diverted Traffic (50% of Inscope)				
Container	1.2%	1.2%	1.0%	1.1%
Automobiles	0.1%	0.1%	0.1%	0.1%
Total	**1.4%**	**1.4%**	**1.1%**	**1.2%**

Source: Crisil Intelligence

The impact is considered from base year but in a phased manner, with 25% in FY26, 50% in FY27, 75% in FY28 and 100% in FY29.

In conclusion, it is unlikely that there will be a significant impact with further development of PFTs and cargo terminals on the route given there are large number of PFT and cargo terminals already operational on the route. However, in an unlikely scenario if the shift is assumed to shift to railways, impact is calculated.

8 Traffic Growth Estimation & Traffic Forecast

8.1 Approach and Methodology

Crisil, based on its coverage of 80+ sectors and the MSME industry, has developed a knowledge base to understand the growth of industries and demand across various regions and clusters. The growth expectations for various industries are applied to each vehicle category based on the commodity composition of the vehicle category. For example, the share of light commercial vehicles (LCVs) carrying agricultural commodities is expected to grow as per agricultural output growth; the share of LCVs carrying consumer products is expected to grow as per the volume growth of durables; and the share of Multi axle vehicles (MAVs) carrying steel commodities is expected to grow as per demand/supply volume of steel products based on regional dynamics. This approach helps Crisil provide a more accurate growth rate of commercial traffic in the region.

For passenger traffic, Crisil assesses the sale of passenger cars in the region, growth of vehicular population, purpose and frequency of passenger travel, population growth, expansion of the city, and infrastructure development in the catchment area.

Further, Crisil also examines the various factors that will impact traffic over the concession period, such as upcoming alternative road routes, truck aggregation by logistics players, dedicated freight corridors and other transportation options. Thus, the analysis considers the impact of central and state policies, growth in production and consumption centres along the stretch, and infrastructure in the adjoining regions. The report covers both growth drivers and restraints for the traffic along the stretch. Crisil has enumerated and detailed the parameters that will positively/negatively impact the traffic on the stretch in the future.

Crisil has used its proprietary traffic projection methodology to project traffic using regional industry growth assumptions, macroeconomic developments, infra development and consumption centre growth factors of the catchment area and adjacent regions.

Figure 8-1: Commodity based approach: Illustrative example for Commercial vehicles

Commodity	MAV (Vehicles) Year 1	YoY growth	MAV (Vehicles) Year 2
Construction materials	300	9%	327
Consumer products	100	4%	104
Agri Produce	200	3%	206
Iron & Steel products	50	9%	55
Chemical products	200	5%	210
Total vehicles	XX		YY

Commodity	LCV (Vehicles) Year 1	YoY growth	LCV (Vehicles) Year 2
Construction materials	100	9%	109
Consumer products	200	4%	208
Agri Produce	50	3%	52
Iron & Steel products	300	9%	327
Chemical products	200	5%	210
Total vehicles	XX		YY

Growth rates for commodities are based on commodity specific demand/supply drivers and regional dynamics

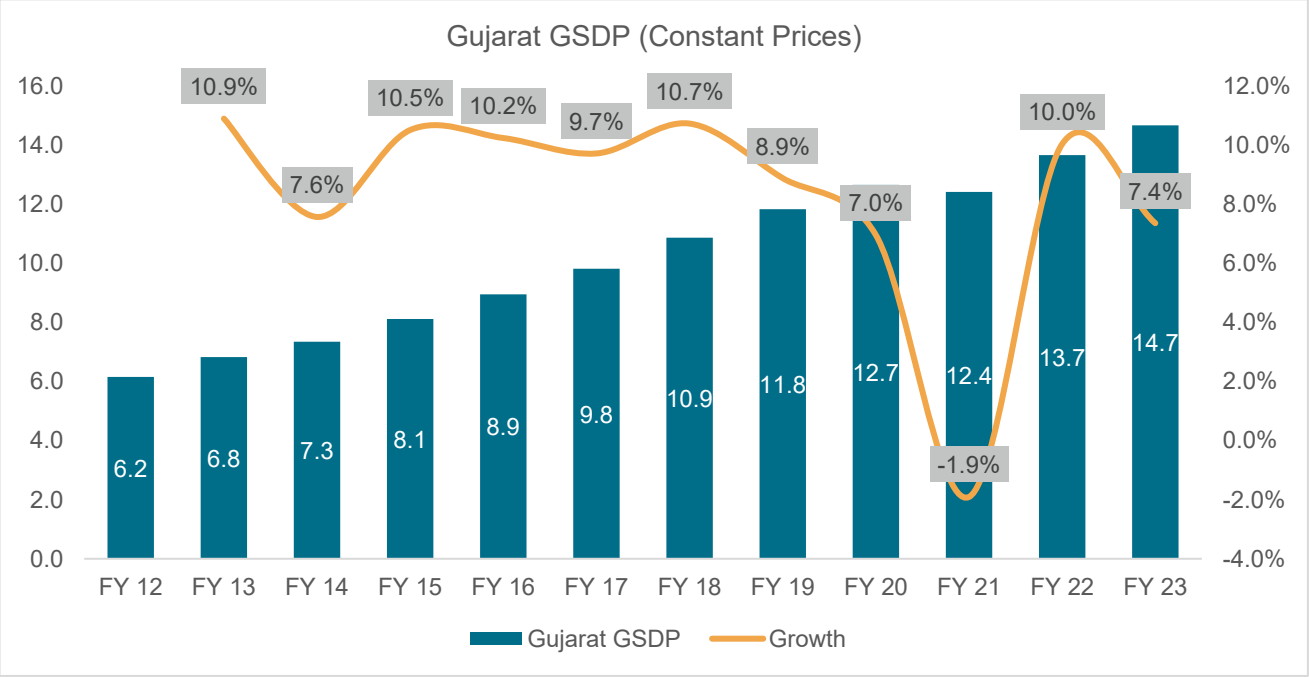
8.2 Gujarat State profile

Gujarat is one of the most economically developed states in India, with a strong and diversified industrial base. The state has a high GDP growth rate, with an average annual growth rate of **7.9%** from fiscal year 2013 to fiscal year 23. The state's economy is driven by a range of industries, including textiles, pharmaceuticals, petrochemicals, and automotive manufacturing. The state is also a major hub for small and medium-sized enterprises (SMEs), with a large number of units operating in the state. The state's strategic location on the western coast of India, with a long coastline and several major ports, including the Port of Kandla and the Port of Mundra, makes it an important centre for international trade.

Gujarat is also a major producer of agricultural products, including cotton, groundnuts, and tobacco. The state is home to a number of major agricultural processing industries, including textile mills, oilseed processing plants, and tobacco manufacturing units. The state government has also implemented a number of initiatives to promote agriculture and allied activities, including the development of irrigation infrastructure and the provision of subsidies and other support to farmers. In addition to its industrial and agricultural sectors, Gujarat is also a popular tourist destination, with a number of major attractions, including the Gir Forest National Park, the Somnath Temple, and the city of Ahmedabad, which is a UNESCO World Heritage City.

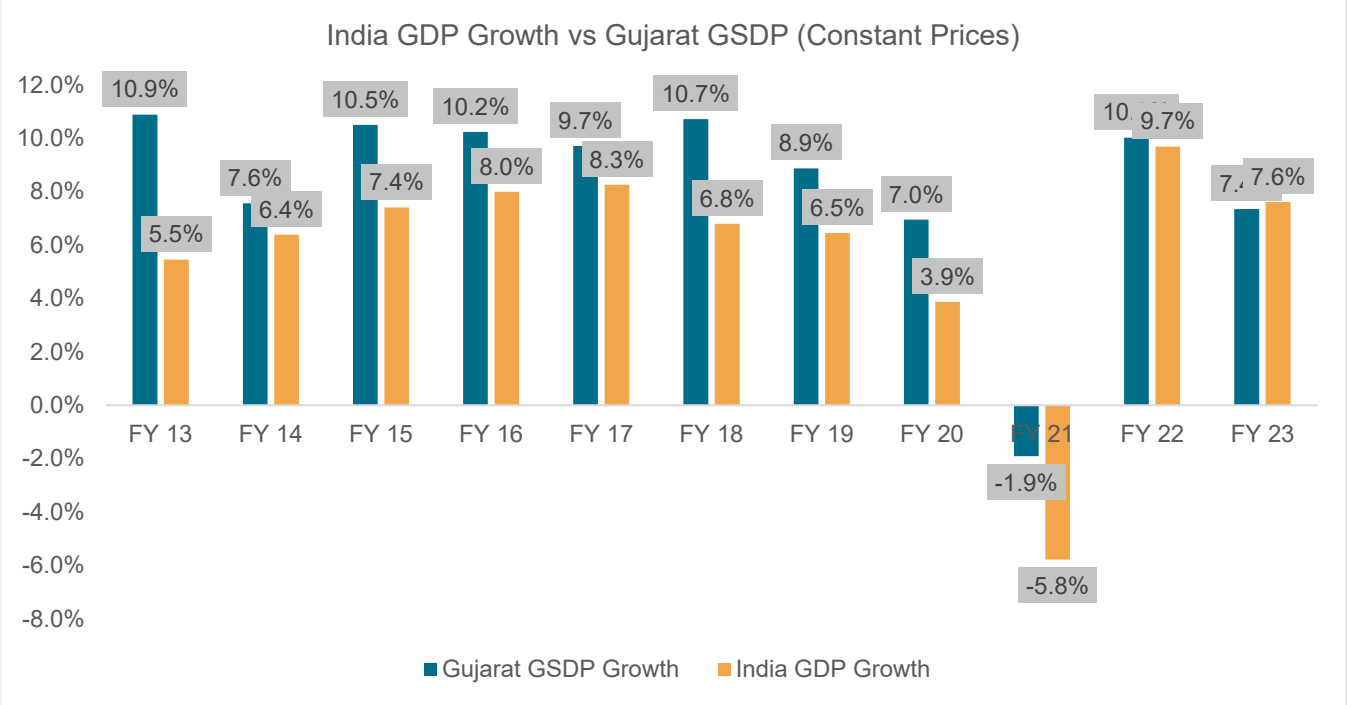
The state government has implemented a number of policies and initiatives to promote economic growth and development in Gujarat, including the development of special economic zones (SEZs), industrial estates, and infrastructure projects such as roads, ports, and airports. The state has also established a number of institutions and organizations to support entrepreneurship and innovation, including the Gujarat Industrial Development Corporation (GIDC) and the Gujarat Venture Finance Limited (GVFL). Overall, Gujarat's strong economy, favourable business environment, and high standard of living make it an attractive destination for investors, entrepreneurs, and tourists alike. The state's economic profile is characterized by a high level of economic activity, a diverse range of industries, and a strong focus on innovation and entrepreneurship.

Figure 8-2: Gujarat GSDP



Source: MOSPI, Crisil Intelligence

Figure 8-3: Gujarat GSDP vs India GDP



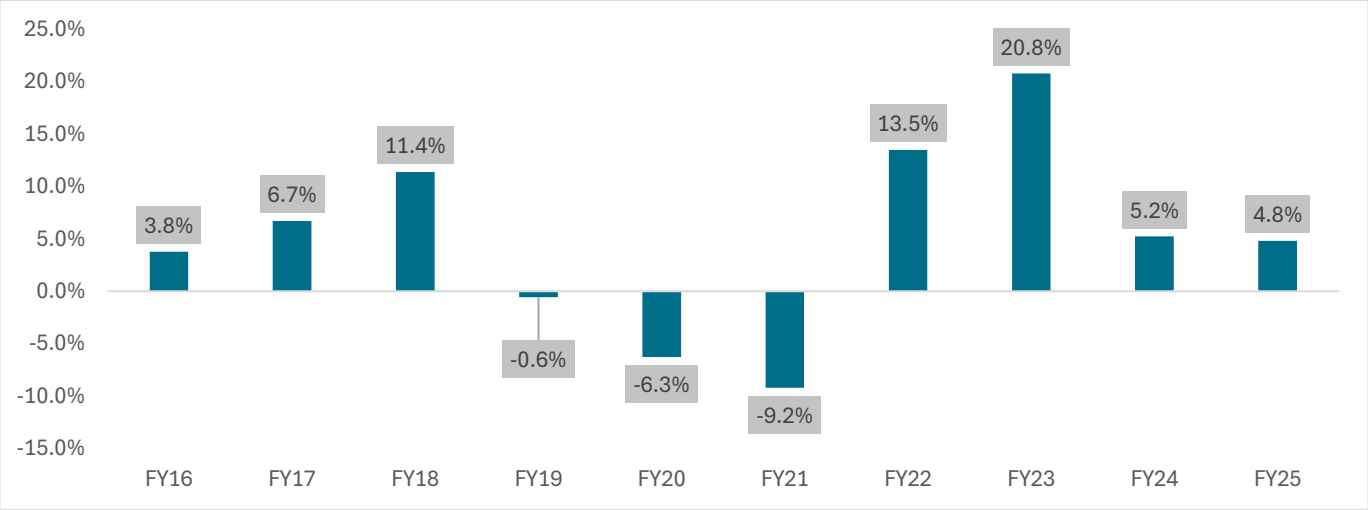
Source: MOSPI, Crisil Intelligence

8.3 Outlook for Car growth

The rate of car ownership in India has increased from 6.6 per 1,000 people in 2001 to 25 per 1,000 people in 2019. Despite India's car fleet growing at an annual rate of 10% for nearly 25 years, the rate of car ownership remains low compared to countries with similar economic status and significantly lower than developed countries, which have a rate of around 450 per 1,000 people. This low rate of car ownership indicates potential for continued growth in the coming years. With the ongoing increase in car ownership and improvements in the road network, the use of cars for inter-urban travel is showing a growing trend.

Vahan Dashboard by Ministry of Road Transport & Highways (MoRTH), shows good growth in motors cars for last decade has shown 4.7% registered vehicle growth. Motor cars data for Gujarat state from Vahan dashboard is compiled in the below chart.

Figure 8-4: Motor Car vehicle registration growth



Source: Vahan Dashboard, Ministry of Road Transport & Highways (MoRTH)

8.4 Commodity Overview

As mentioned in section primary data collection & analysis, the analysis of freight movement across the toll plaza reveals that the major commodities being transported include containers, tiles & ceramics, agri produce and consumer foods.

Containers

Container traffic holds major share around 6% in the overall traffic at all the toll plazas on the project road. Project road gives connectivity to two important seaports in the region which are Mundra Port and Kandla Port. Mundra Port, located in Gujarat, India, is the largest commercial port in the country and a critical hub for container traffic. It handles a significant volume of cargo, including containers, dry bulk, liquid bulk, and automobiles. The port's strategic location on the western coast of India allows it to serve the vast hinterland regions, including the National Capital Region, Gujarat, Punjab, Rajasthan, and Madhya Pradesh. Mundra Port operates five container terminals across 12 berths, with a combined capacity of 9.5 million TEUs (twenty-foot equivalent units). India’s container traffic decadal growth (FY14-FY24) is around 7.7% and Mundra port’s container traffic decadal growth (FY14-FY24) is around 12.0%.

As detailed out in the chapter of key influencing factors for the asset, the following future expansion planned in the region.

- Mundra port got the environmental clearance for the port expansion with investment of ₹45,000 crores to more than double the overall capacity to handle 514 MTPA and container cargo handling capacity of 25 million TEUs.
- DP World container terminal, DP World is constructing container terminal with capacity of 2.19 million TEUs at Tuna Tekra Port with investment of approximately ₹4,200 crores.

Considering above expansion plans of the ports in the regions and increasing focus on developing railway infrastructure for freight movement, Crisil expects CAGR of 5.8% from fiscal FY 26-FY 37 for container traffic.

Tiles & Ceramics

The Morbi Ceramic Cluster, located in Gujarat, India, is one of the largest and most significant ceramic industry clusters in the world. It is situated about 250 km from Ahmedabad and is renowned for its extensive production of ceramic products. The cluster comprises over 1000 units, producing a wide range of items including wall tiles, floor tiles, vitrified tiles, polished glazed vitrified tiles, and sanitary ware.

Morbi's ceramic industry is known for its advanced technology and high-quality products, with many units utilizing state-of-the-art equipment imported from around the globe.

The Morbi Ceramic Cluster provides direct employment to about 68,000 people and indirectly supports many more through related businesses and professions. The industry is a major contributor to the local economy, fostering growth and development in the region. The cluster's products are not only supplied domestically but also exported to various international markets, enhancing its global footprint.

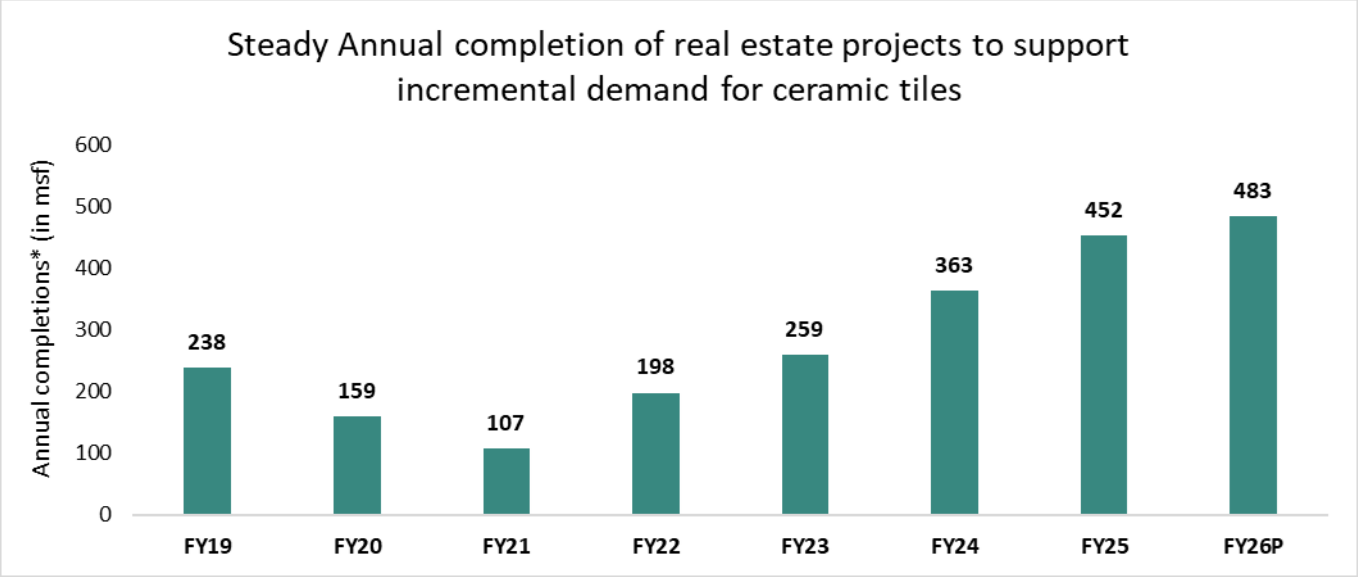
Overall, the Morbi Ceramic Cluster is a vital industrial hub that significantly contributes to India's ceramic production

and export capabilities. Its continuous growth and adoption of new technologies ensure that it remains a key player in the global ceramic industry.

FY25 witnessed a decline of 10-13% in the exports volume compared to the previous year. The decline was majorly on account of high freight rates and subdued demand in European nations and the USA. Meanwhile, despite the European Union announcing anti-dumping duty on ceramic tiles from India in 2023, the same is lesser for ceramic tiles from India as compared to tiles from competitors like Turkey and China giving India an added advantage with regards to expansion in exports to European nations. This is majorly on the back of superior quality tiles being produced in India at comparatively affordable prices. Globally, ceramic tiles import from India are well preferred due to these factors.

It is to be noted that there is a steady growth in completion of real estate projects in the state as presented below

Figure 8-5: Steady growth in annual completion of real estate projects

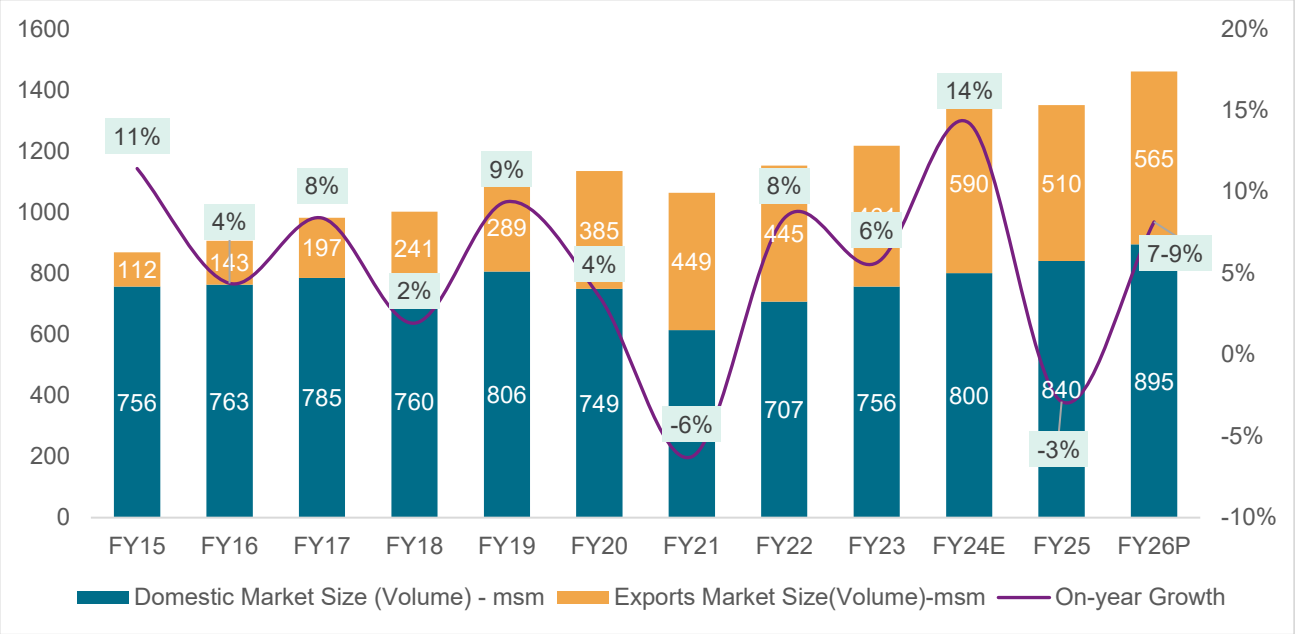


Source: Crisil Intelligence

The completions of real estate projects surpassed pre covid levels and is expected to see a healthy growth in FY26. Going forward as well, we expect growth momentum to continue owing to continued cost competitiveness of Indian manufacturers as well as major global importers wanting to reduce their dependence on sole supplier i.e. China.

Domestic demand remains moderate; however, oversupply in the industry is exerting significant pricing pressure. With issues in the export market in FY25, 10-13% of export volumes from Morbi have shifted to the domestic market. This diversion has resulted in dumping of excess inventory in the domestic market, leading to intense competition and additional stress on pricing. Crisil expects CAGR of 5.5% from fiscal FY 26-FY37 for tiles & ceramics related traffic on the project road.

Figure 8-6: Ceramic industry volumes growth (domestic and exports)



Source: Crisil Intelligence, Directorate General of Foreign Trade (DGFT)

Coal

Coal is another commodity, which is imported and travels on the road stretch amounting to 5-6 % of traffic on project corridor owning to the presence of Chemical processing industries in some processes involved in morbi for foundry operations, chemical processing, auxiliary boiler steam generation and some other metallurgical applications, not particularly in ceramic tile manufacturing. Major chunk of this coal is for exports which are destined to nearby ports for industrial uses. A huge portion of this commodity travels via railways, however a meaningful portion also travels via road as well. These are smaller packets of coal, travelling towards brick mills or some captive power plant in Rajasthan, Delhi, or North India. On the ports of Gujarat, Coal is majorly imported from the US, Indonesia, Australia and South Africa. Majority of the coal on the Kandla & Mundra port is consumed by power plants located closer to the port itself. A portion of coal which is transported via road is primarily for the end use in brick kilns, captive power plants and rolling mills. Coal traffic transported through the project stretch is typically for consumption in small volumes and travels towards Ahmedabad and Morbi within Gujarat state.

India's policy to reduce coal imports by boosting domestic production and promoting energy transition has caused recent overall coal imports to dip over the years in the future, However, ongoing power sector mandates to operate imported coal plants at full capacity, especially during demand peaks, sustain import volumes at major ports and India expects domestic non-coking coal production to grow at healthy growth, on account of increased production by Coal India Ltd.

Non-coking coal imports are expected to decline as rise in domestic coal production will increasingly substitute the demand for imported coal. Coking coal imports to remain main source as demand sustains though stabilizes over the next five years. As the construction activity has started to revive, we have observed revival of output from brick mills, the rolling mills faced some issues in the form availability of raw material in the initial period but are expected to revive back in the last quarter. Some portion of demand for imported coal both in brick mills and captive power plants could be substituted by domestic coal. Non-coking coal imports are expected to decline as rise in domestic coal production will increasingly substitute demand for imported coal. The project road is heavily influenced by the

Morbi town cluster which has shifted all its operations from coal to Piped Natural Gas (PNG) with very few processes requiring coal. Chemical industries like DCW Dhrangadhra has also shifted to using salt and limestone as raw materials with very minimal processes using coal.

Considering all these factors Crisil expects CAGR of 2.4% from fiscal FY 26-FY37 for coal related traffic on the project road.

Construction Materials

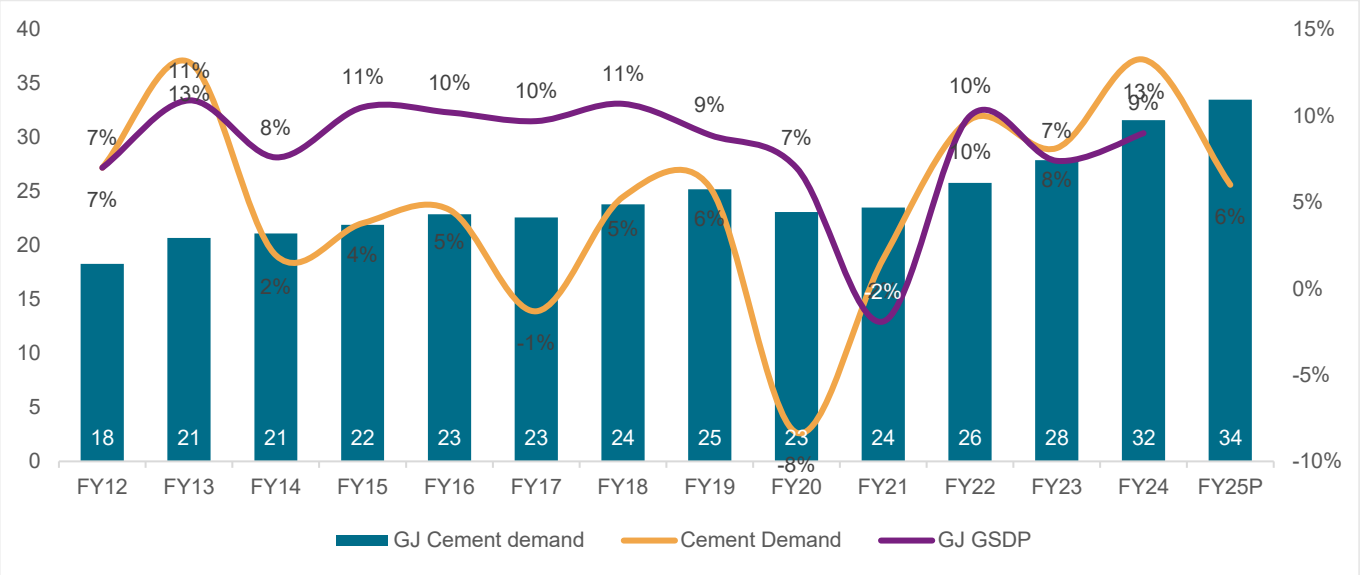
Construction materials account for 6-7% of the overall freight traffic at all the toll plazas. This is attributed to the ongoing industrial developments and increased real estate projects in major cities owing to urbanization along the corridor, which has led to an increased demand for construction materials such as cement, sand, stones, and aggregates.

Gujarat has witnessed ~8% CAGR growth in the past decade driven by factors such as rapid infrastructure development, industrialization, and urbanization. It is expected to grow on similar pace in future years driven by factors such as ongoing infrastructure projects, renewed focus on industrial capex, and growth in the housing segment.

Cement demand is expected to grow by 5.5-6.5% in upcoming 5 years majorly led by infra segment despite healthy base. Growth on our project stretch is expected to grow by 5.5-6.5% driven by factors such as increasing demand from the industrial and commercial segments on project corridor and catchment areas.

Cement demand outlook is shown in the image below.

Figure 8-7: Cement Demand growth in Gujarat



Source: CMA, Industry, Crisil Research Estimates

Also as mentioned above in the ceramics section, there is a steady growth in completion of real estate projects in the state. The completions of real estate projects surpassed pre covid levels and is expected to see a healthy growth in FY26. Crisil expects CAGR of 5.4% from fiscal FY 26-FY37 for construction materials related traffic on the project road.

Courier and Parcel

The project road connects major cities of cities like Ahmedabad, Vadodara, Surat, Mumbai to the cities of

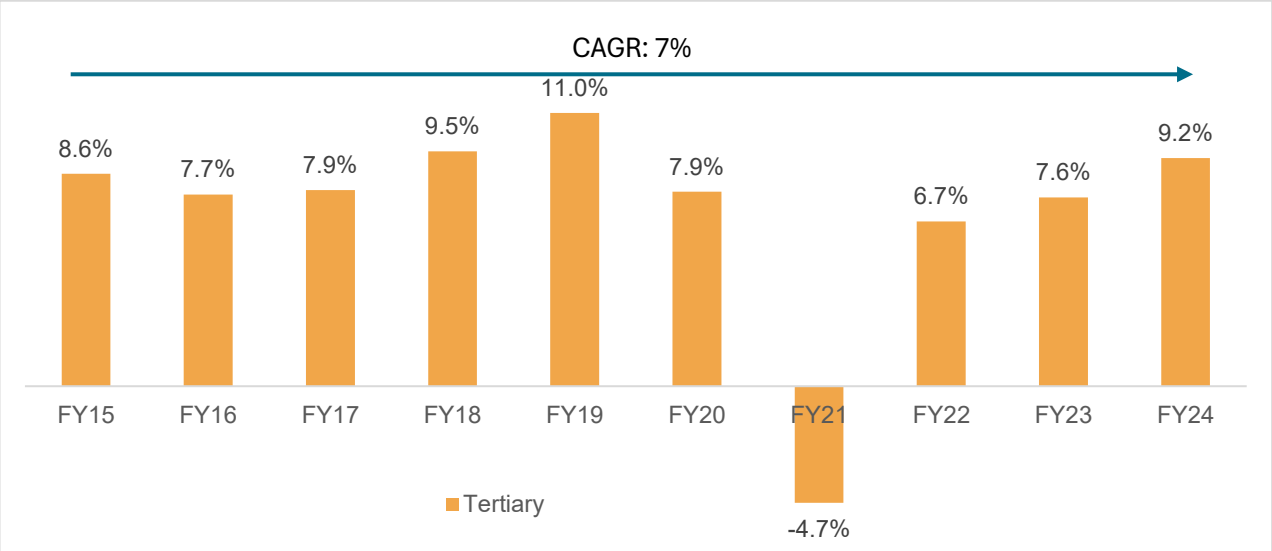
Viramgam, Dhrangadhra, Morbi, Bhuj, Gandhidham and Jamnagar on the western side of Gujarat.

As statewide developments are rapidly increasing, Tertiary sector growth is also in line with the same. Heavy proposed capex will increase in future growth of tertiary activities and hence the demand.

- Low online penetration, rising internet penetration and increasing online shoppers to drive growth in online retail

Tertiary sector growth for Gujarat is shown in the image below.

Figure 8-8: Tertiary sector growth



Source: MOSPI, Crisil Intelligence

The e-commerce industry is on a rise with increasing consumption levels and moderating inflation and project corridor being an important link in connecting the important cities of Gujarat, Crisil expects CAGR of 6.3% from fiscal FY 26-FY37 for Courier and parcels related traffic on the project road.

8.5 Commodity Outlook

Crisil Intelligence has forecasted the freight traffic growth based on the growth in relevant sectors influencing traffic in the region. Industry growth has been analysed and forecasted based on our proprietary database of industries for the surrounding regions that impact traffic on project road as well as our internal assessment on a relevant set of sectors at the pan India level.

Package wise forecast incorporates the regional dynamics including, but not limited to, investments, commodity trends, district output (GDDP) profile (primary/secondary, construction/manufacturing) etc.

The traffic for the coming years is projected by factoring in the impact of these parameters on commodity wise growth rates and is presented in below table.

Table 8-1: Commodity outlook for the Project section

Commodity Type	Commodity Shares				Commodity Growth				
	TP01	TP02	TP03	TP04	FY 26 - FY 30	FY30-33	FY33-37	FY26-33	FY26-37
Agri Produce	7.3%	7.7%	9.5%	5.7%	2.4%	2.0%	1.7%	2.2%	2.0%
Automobiles	1.3%	1.3%	1.1%	1.5%	5.2%	4.7%	4.1%	4.9%	4.6%
Chemical products	0.9%	2.0%	1.1%	1.4%	6.5%	5.8%	5.1%	6.2%	5.7%
Coal	5.8%	4.5%	3.8%	5.4%	2.7%	2.4%	2.1%	2.6%	2.4%
Construction materials	6.5%	6.6%	7.1%	5.0%	6.1%	5.4%	4.8%	5.8%	5.4%
Consumer Foods	7.1%	9.1%	6.7%	4.8%	4.2%	3.7%	3.2%	3.9%	3.6%
Consumer Products	0.6%	1.9%	0.8%	1.8%	4.2%	3.7%	3.2%	3.9%	3.6%
Container	5.2%	5.6%	5.3%	4.5%	6.6%	6.0%	5.2%	6.3%	5.8%
Courier & parcel	8.5%	5.4%	5.2%	2.7%	7.0%	6.4%	5.6%	6.7%	6.3%
Iron & Steel Products	7.1%	6.6%	3.7%	6.6%	5.5%	5.0%	4.4%	5.3%	4.9%
Machinery	1.9%	1.6%	2.7%	3.5%	5.2%	4.6%	4.0%	4.9%	4.5%
Milk & Animal Food	0.8%	3.1%	2.2%	0.8%	4.2%	3.7%	3.2%	3.9%	3.6%
Others	2.4%	2.2%	2.4%	0.8%	4.2%	3.7%	3.2%	3.9%	3.6%
Paper products	0.0%	0.0%	3.6%	0.0%	4.2%	3.7%	3.2%	3.9%	3.6%
Petroleum Products	4.8%	5.1%	3.8%	4.8%	2.6%	2.0%	1.7%	2.3%	2.1%
Pharmaceuticals	0.2%	0.9%	0.2%	0.0%	4.0%	3.4%	2.9%	3.7%	3.4%
Plastic products	1.8%	4.0%	4.2%	7.1%	6.5%	5.8%	5.1%	6.2%	5.7%
Plywood & Timber products	2.7%	3.3%	4.2%	7.1%	4.7%	4.2%	3.6%	4.4%	4.1%
Rubber products	0.3%	2.9%	0.0%	0.0%	4.7%	4.2%	3.6%	4.4%	4.1%
Textile & Footwear	1.3%	1.1%	1.1%	1.9%	3.2%	2.7%	2.3%	3.0%	2.7%
Tiles & Ceramic products/powder	9.4%	11.6%	16.8%	17.4%	6.1%	5.6%	5.0%	5.9%	5.5%

Source: Industry, Crisil Intelligence

8.6 Implied growth rate for the project section

Mode wise implied growth rates adopted for the project road is presented in the below table.

Table 8-2: Implied Growth Rates

Vehicle category	FY 26 - FY 30	FY30-34	FY26-34	FY26-38	FY34-38
Sanand (TP01)					
CJV	7.5%	6.4%	6.9%	6.4%	5.2%
LCV/MINIBUS	3.6%	3.2%	3.4%	3.1%	2.6%
BUS	3.4%	3.1%	3.3%	3.1%	2.9%
TRUCK 2 AXLE	4.2%	3.6%	3.9%	3.6%	3.0%
TRUCK 3 AXLE	2.2%	1.6%	1.9%	1.6%	1.0%
MAV+OSV	5.3%	4.7%	5.0%	4.7%	4.1%

Total	**6.5%**	**5.7%**	**6.1%**	**5.6%**	**4.7%**
PCU	**5.7%**	**5.0%**	**5.4%**	**5.0%**	**4.3%**
Malvan (TP02)					
CJV	7.5%	6.4%	6.9%	6.4%	5.2%
LCV/MINIBUS	3.5%	3.0%	3.2%	3.0%	2.4%
BUS	3.4%	3.1%	3.3%	3.1%	2.9%
TRUCK 2 AXLE	4.1%	3.5%	3.8%	3.5%	2.8%
TRUCK 3 AXLE	2.1%	1.5%	1.8%	1.5%	0.9%
MAV+OSV	5.3%	4.6%	4.9%	4.6%	4.0%
Total	**6.2%**	**5.4%**	**5.8%**	**5.4%**	**4.5%**
PCU	**5.5%**	**4.8%**	**5.2%**	**4.8%**	**4.1%**
Soladi (TP03)					
CJV	7.5%	6.4%	6.9%	6.4%	5.2%
LCV/MINIBUS	3.2%	2.7%	3.0%	2.7%	2.2%
BUS	3.4%	3.1%	3.3%	3.1%	2.9%
TRUCK 2 AXLE	3.9%	3.3%	3.6%	3.3%	2.7%
TRUCK 3 AXLE	2.1%	1.5%	1.8%	1.5%	0.9%
MAV+OSV	5.4%	4.8%	5.1%	4.8%	4.1%
Total	**6.2%**	**5.4%**	**5.8%**	**5.4%**	**4.5%**
PCU	**5.6%**	**4.9%**	**5.2%**	**4.9%**	**4.2%**
Aniyari (TP04)					
CJV	7.5%	6.4%	6.9%	6.4%	5.2%
LCV/MINIBUS	3.2%	2.7%	3.0%	2.7%	2.2%
BUS	3.4%	3.1%	3.3%	3.1%	2.9%
TRUCK 2 AXLE	3.9%	3.3%	3.6%	3.3%	2.7%
TRUCK 3 AXLE	2.0%	1.4%	1.7%	1.4%	0.9%
MAV+OSV	5.3%	4.7%	5.0%	4.7%	4.0%
Total	**6.1%**	**5.4%**	**5.8%**	**5.3%**	**4.5%**
PCU	**5.5%**	**4.8%**	**5.2%**	**4.8%**	**4.1%**

Source: Crisil Intelligence

The implied growth rates for the Impact of PFTs scenario is presented below:

Table 8-3: Implied Growth Rates – Scenario: Impact of PFT

Vehicle category	FY 26 - FY 30	FY30-34	FY26-34	FY26-38	FY34-38
Sanand (TP01)					
CJV	7.5%	6.4%	6.9%	6.4%	5.2%
LCV/MINIBUS	3.6%	3.2%	3.4%	3.1%	2.6%
BUS	3.4%	3.1%	3.3%	3.1%	2.9%
TRUCK 2 AXLE	4.2%	3.6%	3.9%	3.6%	3.0%
TRUCK 3 AXLE	2.2%	1.6%	1.9%	1.6%	1.0%
MAV+OSV	5.1%	4.7%	4.9%	4.6%	4.1%
Total	**6.5%**	**5.7%**	**6.1%**	**5.6%**	**4.7%**
PCU	**5.6%**	**5.0%**	**5.3%**	**5.0%**	**4.3%**
Malvan (TP02)					
CJV	7.5%	6.4%	6.9%	6.4%	5.2%

LCV/MINIBUS	3.5%	3.0%	3.2%	3.0%	2.4%
BUS	3.4%	3.1%	3.3%	3.1%	2.9%
TRUCK 2 AXLE	4.1%	3.5%	3.8%	3.5%	2.8%
TRUCK 3 AXLE	2.1%	1.5%	1.8%	1.5%	0.9%
MAV+OSV	5.0%	4.6%	4.8%	4.5%	4.0%
Total	**6.1%**	**5.4%**	**5.8%**	**5.4%**	**4.5%**
PCU	**5.3%**	**4.8%**	**5.1%**	**4.8%**	**4.1%**
Soladi (TP03)					
CJV	7.5%	6.4%	6.9%	6.4%	5.2%
LCV/MINIBUS	3.2%	2.7%	3.0%	2.7%	2.2%
BUS	3.4%	3.1%	3.3%	3.1%	2.9%
TRUCK 2 AXLE	3.9%	3.3%	3.6%	3.3%	2.7%
TRUCK 3 AXLE	2.1%	1.5%	1.8%	1.5%	0.9%
MAV+OSV	5.2%	4.8%	5.0%	4.7%	4.1%
Total	**6.1%**	**5.4%**	**5.8%**	**5.4%**	**4.5%**
PCU	**5.4%**	**4.9%**	**5.2%**	**4.8%**	**4.2%**
Aniyari (TP04)					
CJV	7.5%	6.4%	6.9%	6.4%	5.2%
LCV/MINIBUS	3.2%	2.7%	3.0%	2.7%	2.2%
BUS	3.4%	3.1%	3.3%	3.1%	2.9%
TRUCK 2 AXLE	3.9%	3.3%	3.6%	3.3%	2.7%
TRUCK 3 AXLE	2.0%	1.4%	1.7%	1.4%	0.9%
MAV+OSV	5.1%	4.7%	4.9%	4.6%	4.0%
Total	**6.1%**	**5.4%**	**5.7%**	**5.3%**	**4.5%**
PCU	**5.3%**	**4.8%**	**5.1%**	**4.8%**	**4.1%**

8.7 Traffic Projections

The total traffic projected in terms of PCUs based on most likely growth rates is presented in below table.

Table 8-4: Traffic projections

FY Year	CJV	LCV/MINI BUS	BUS	2 AT	3 AT	MAV+OSV	Total Veh.	Total PCU	YoY Growth (%)
Sanand (TP01)									
FY-2026	23,025	1,761	2,047	1,485	684	4,788	33,790	59,861	
FY-2027	24,821	1,830	2,119	1,553	701	5,059	36,083	63,451	6.0%
FY-2028	26,699	1,898	2,191	1,619	717	5,333	38,457	67,127	5.8%
FY-2029	28,658	1,966	2,265	1,686	732	5,611	40,917	70,904	5.6%
FY-2030	30,698	2,032	2,339	1,752	746	5,893	43,460	74,775	5.5%
FY-2031	32,818	2,099	2,415	1,818	759	6,181	46,090	78,756	5.3%
FY-2032	34,971	2,167	2,491	1,885	771	6,476	48,761	82,806	5.1%
FY-2033	37,150	2,235	2,569	1,952	783	6,779	51,467	86,917	5.0%
FY-2034	39,350	2,301	2,647	2,019	794	7,083	54,193	91,051	4.8%
FY-2035	41,563	2,366	2,726	2,084	803	7,388	56,930	95,197	4.6%
FY-2036	43,784	2,430	2,805	2,148	812	7,694	59,672	99,346	4.4%

FY Year	CJV	LCV/MINI BUS	BUS	2 AT	3 AT	MAV+OSV	Total Veh.	Total PCU	YoY Growth (%)
FY-2037	46,006	2,492	2,885	2,211	819	8,001	62,415	103,496	4.2%
FY-2038	48,225	2,554	2,966	2,274	826	8,315	65,160	107,671	4.0%
CAGR (26-34)	**6.4%**	**3.2%**	**3.1%**	**3.6%**	**1.6%**	**4.7%**	**5.7%**	**5.0%**	
CAGR (26-38)	**6.4%**	**3.1%**	**3.1%**	**3.6%**	**1.6%**	**4.7%**	**5.6%**	**5.0%**	
Malvan (TP02)									
FY-2026	7,927	531	472	765	310	4,694	14,701	34,493	
FY-2027	8,546	551	489	799	318	4,957	15,661	36,499	5.8%
FY-2028	9,192	571	506	833	325	5,223	16,649	38,540	5.5%
FY-2029	9,867	591	523	866	331	5,491	17,669	40,623	5.4%
FY-2030	10,569	610	540	898	337	5,763	18,717	42,742	5.2%
FY-2031	11,299	629	557	931	343	6,040	19,799	44,914	5.0%
FY-2032	12,041	648	575	964	348	6,323	20,898	47,124	4.9%
FY-2033	12,791	667	593	997	353	6,612	22,012	49,371	4.7%
FY-2034	13,548	685	611	1,029	357	6,901	23,132	51,623	4.5%
FY-2035	14,310	703	629	1,061	361	7,191	24,255	53,876	4.3%
FY-2036	15,075	720	647	1,091	365	7,480	25,378	56,123	4.1%
FY-2037	15,840	737	666	1,121	368	7,769	26,500	58,368	4.0%
FY-2038	16,604	754	684	1,151	370	8,063	27,626	60,634	3.9%
CAGR (26-34)	**6.4%**	**3.0%**	**3.1%**	**3.5%**	**1.5%**	**4.6%**	**5.4%**	**4.8%**	
CAGR (26-38)	**6.4%**	**3.0%**	**3.1%**	**3.5%**	**1.5%**	**4.6%**	**5.4%**	**4.8%**	
Soladi (TP03)									
FY-2026	9,519	702	563	852	395	6,298	18,329	44,342	
FY-2027	10,262	727	582	888	405	6,660	19,524	46,949	5.8%
FY-2028	11,038	751	602	924	414	7,027	20,756	49,606	5.6%
FY-2029	11,848	775	623	959	422	7,400	22,025	52,318	5.4%
FY-2030	12,691	797	643	994	430	7,775	23,331	55,075	5.2%
FY-2031	13,568	820	664	1,028	437	8,161	24,678	57,910	5.1%
FY-2032	14,458	843	685	1,063	444	8,556	26,048	60,799	5.0%
FY-2033	15,359	865	706	1,097	450	8,960	27,438	63,739	4.8%
FY-2034	16,268	887	727	1,131	456	9,366	28,836	66,689	4.6%
FY-2035	17,183	908	749	1,165	462	9,771	30,238	69,642	4.4%
FY-2036	18,101	928	771	1,197	466	10,177	31,640	72,591	4.2%
FY-2037	19,020	947	793	1,229	470	10,583	33,042	75,539	4.0%
FY-2038	19,937	967	815	1,260	474	10,996	34,450	78,519	3.9%
CAGR (26-34)	**6.4%**	**2.7%**	**3.1%**	**3.3%**	**1.5%**	**4.8%**	**5.4%**	**4.9%**	
CAGR (26-38)	**6.4%**	**2.7%**	**3.1%**	**3.3%**	**1.5%**	**4.8%**	**5.4%**	**4.9%**	
Aniyari (TP04)									
FY-2026	6,872	443	291	631	341	5,435	14,014	35,785	
FY-2027	7,408	458	302	658	349	5,743	14,918	37,864	5.8%
FY-2028	7,969	474	312	684	356	6,054	15,848	39,977	5.5%
FY-2029	8,554	488	322	710	363	6,368	16,806	42,130	5.3%

FY Year	CJV	LCV/MINI BUS	BUS	2 AT	3 AT	MAV+OSV	Total Veh.	Total PCU	YoY Growth (%)
FY-2030	9,163	503	333	736	369	6,686	17,789	44,317	5.1%
FY-2031	9,796	517	344	761	375	7,011	18,804	46,562	5.0%
FY-2032	10,438	531	355	787	381	7,344	19,836	48,851	4.9%
FY-2033	11,089	546	366	812	386	7,684	20,882	51,178	4.7%
FY-2034	11,745	559	377	837	391	8,025	21,934	53,511	4.5%
FY-2035	12,406	573	388	862	395	8,366	22,989	55,845	4.3%
FY-2036	13,069	585	399	886	399	8,706	24,043	58,173	4.1%
FY-2037	13,732	598	411	909	402	9,046	25,097	60,498	4.0%
FY-2038	14,394	610	422	932	405	9,392	26,155	62,848	3.9%
CAGR (26-34)	**6.4%**	**2.7%**	**3.1%**	**3.3%**	**1.4%**	**4.7%**	**5.4%**	**4.8%**	
CAGR (26-38)	**6.4%**	**2.7%**	**3.1%**	**3.3%**	**1.4%**	**4.7%**	**5.3%**	**4.8%**	

Source: Crisil Intelligence

Table 8-5: Traffic projections - Scenario: Impact of PFT

FY Year	CJV	LCV/MINI BUS	BUS	2 AT	3 AT	MAV+OSV	Total Veh.	Total PCU	YoY Growth (%)
Sanand (TP01)									
FY-2026	23,025	1,761	2,047	1,485	684	4,771	33,774	59,786	
FY-2027	24,821	1,830	2,119	1,553	701	5,024	36,048	63,292	5.9%
FY-2028	26,699	1,898	2,191	1,619	717	5,277	38,402	66,877	5.7%
FY-2029	28,658	1,966	2,265	1,686	732	5,533	40,839	70,553	5.5%
FY-2030	30,698	2,032	2,339	1,752	746	5,811	43,378	74,407	5.5%
FY-2031	32,818	2,099	2,415	1,818	759	6,095	46,004	78,369	5.3%
FY-2032	34,971	2,167	2,491	1,885	771	6,386	48,671	82,401	5.1%
FY-2033	37,150	2,235	2,569	1,952	783	6,684	51,373	86,493	5.0%
FY-2034	39,350	2,301	2,647	2,019	794	6,984	54,094	90,608	4.8%
FY-2035	41,563	2,366	2,726	2,084	803	7,285	56,827	94,735	4.6%
FY-2036	43,784	2,430	2,805	2,148	812	7,587	59,565	98,865	4.4%
FY-2037	46,006	2,492	2,885	2,211	819	7,890	62,304	102,996	4.2%
FY-2038	48,225	2,554	2,966	2,274	826	8,199	65,044	107,151	4.0%
CAGR (26-34)	**6.4%**	**3.2%**	**3.1%**	**3.6%**	**1.6%**	**4.7%**	**5.7%**	**5.0%**	
CAGR (26-38)	**6.4%**	**3.1%**	**3.1%**	**3.6%**	**1.6%**	**4.6%**	**5.6%**	**5.0%**	
Malvan (TP02)									
FY-2026	7,927	531	472	765	310	4,678	14,684	34,418	
FY-2027	8,546	551	489	799	318	4,922	15,625	36,341	5.6%
FY-2028	9,192	571	506	833	325	5,167	16,594	38,290	5.4%
FY-2029	9,867	591	523	866	331	5,414	17,591	40,273	5.2%
FY-2030	10,569	610	540	898	337	5,681	18,636	42,375	5.2%
FY-2031	11,299	629	557	931	343	5,954	19,713	44,529	5.1%
FY-2032	12,041	648	575	964	348	6,233	20,808	46,721	4.9%
FY-2033	12,791	667	593	997	353	6,518	21,918	48,949	4.8%

FY Year	CJV	LCV/MINI BUS	BUS	2 AT	3 AT	MAV+OSV	Total Veh.	Total PCU	YoY Growth (%)
FY-2034	13,548	685	611	1,029	357	6,804	23,034	51,183	4.6%
FY-2035	14,310	703	629	1,061	361	7,089	24,153	53,417	4.4%
FY-2036	15,075	720	647	1,091	365	7,374	25,272	55,647	4.2%
FY-2037	15,840	737	666	1,121	368	7,659	26,390	57,873	4.0%
FY-2038	16,604	754	684	1,151	370	7,948	27,512	60,120	3.9%
CAGR (26-34)	**6.4%**	**3.0%**	**3.1%**	**3.5%**	**1.5%**	**4.6%**	**5.4%**	**4.8%**	
CAGR (26-38)	**6.4%**	**3.0%**	**3.1%**	**3.5%**	**1.5%**	**4.5%**	**5.4%**	**4.8%**	
Soladi (TP03)									
FY-2026	9,519	702	563	852	395	6,282	18,312	44,268	
FY-2027	10,262	727	582	888	405	6,625	19,489	46,791	5.7%
FY-2028	11,038	751	602	924	414	6,972	20,700	49,356	5.5%
FY-2029	11,848	775	623	959	422	7,321	21,947	51,966	5.3%
FY-2030	12,691	797	643	994	430	7,693	23,249	54,706	5.3%
FY-2031	13,568	820	664	1,028	437	8,075	24,592	57,523	5.1%
FY-2032	14,458	843	685	1,063	444	8,466	25,958	60,393	5.0%
FY-2033	15,359	865	706	1,097	450	8,866	27,343	63,314	4.8%
FY-2034	16,268	887	727	1,131	456	9,267	28,737	66,245	4.6%
FY-2035	17,183	908	749	1,165	462	9,668	30,135	69,179	4.4%
FY-2036	18,101	928	771	1,197	466	10,069	31,533	72,108	4.2%
FY-2037	19,020	947	793	1,229	470	10,471	32,931	75,037	4.1%
FY-2038	19,937	967	815	1,260	474	10,880	34,334	77,997	3.9%
CAGR (26-34)	**6.4%**	**2.7%**	**3.1%**	**3.3%**	**1.5%**	**4.8%**	**5.4%**	**4.9%**	
CAGR (26-38)	**6.4%**	**2.7%**	**3.1%**	**3.3%**	**1.5%**	**4.7%**	**5.4%**	**4.8%**	
Aniyari (TP04)									
FY-2026	6,872	443	291	631	341	5,419	13,997	35,711	
FY-2027	7,408	458	302	658	349	5,708	14,883	37,706	5.6%
FY-2028	7,969	474	312	684	356	5,998	15,793	39,726	5.4%
FY-2029	8,554	488	322	710	363	6,290	16,728	41,779	5.2%
FY-2030	9,163	503	333	736	369	6,604	17,707	43,947	5.2%
FY-2031	9,796	517	344	761	375	6,925	18,718	46,175	5.1%
FY-2032	10,438	531	355	787	381	7,254	19,746	48,445	4.9%
FY-2033	11,089	546	366	812	386	7,590	20,788	50,754	4.8%
FY-2034	11,745	559	377	837	391	7,927	21,836	53,068	4.6%
FY-2035	12,406	573	388	862	395	8,263	22,886	55,383	4.4%
FY-2036	13,069	585	399	886	399	8,599	23,936	57,692	4.2%
FY-2037	13,732	598	411	909	402	8,935	24,986	59,998	4.0%
FY-2038	14,394	610	422	932	405	9,276	26,040	62,330	3.9%
CAGR (26-34)	**6.4%**	**2.7%**	**3.1%**	**3.3%**	**1.4%**	**4.7%**	**5.4%**	**4.8%**	
CAGR (26-38)	**6.4%**	**2.7%**	**3.1%**	**3.3%**	**1.4%**	**4.6%**	**5.3%**	**4.8%**	

Source: Crisil Intelligence

The concession agreement for the project specifies the design capacity to be 60,000 PCUs for a four-lane project highway. The CA also mentions that if the average daily traffic of PCUs in any accounting year shall exceed the design capacity of the project highway, the Authority at its option may cause preparation of Detailed Project Report (DPR). In context of this, the total projected traffic for the project road exceeds 60,000 PCUs in FY32 for TP03 as per the projections based on the traffic growth rates. The base year traffic at TP01 suggests that toll plaza is already operating at its design capacity and therefore GSRDC has recently approved the six laning of Shantipura near Ahmedabad to Khoraj near Viramgam section of the project road. This development is expected to bolster connectivity to the Sanand industrial hub, facilitating better access for businesses and encouraging further investments in the region.

8.8 Modification in concession period

As per clause 29.1 of concession agreement, the authority and concessionaire acknowledge that the traffic as on October 1st, 2021 (the Target Date) is estimated to be 43,250 PCUs per day (Target traffic) for TP01, 21,000 each for TP02, TP03 and TP04 and hereby to determine the modification in concession period, if the Actual Average Traffic shall have fallen short of or exceeded the target traffic by more than 2.5 percent, then there will be an increase or reduction in concession period.

As per clause 29.2 of concession agreement, in the event actual average traffic exceed the target traffic, then for every 1 percent increase, the concession period shall be decreased by 0.75 percent thereof; provided that such reduction in concession period shall not any case exceed 10 per cent of the concession period.

As per the communications/letters of authority it is be noted that the concession period is increased by a total of 602 days (365 days extension for target traffic, 51 days due to COVID-19 and186 days on account of other factors viz., 103 of extension on account of material adverse effect (MAE) as per supplementary agreement dated 18th dec 2015, 77 days toll suspension on account of Demon, 1 days for flood impact and 5 days for truckers strike vide Settlement agreement dated 27th Apr 2023. Thus, the end of concession period after all the above extension comes to 4 June 2033. However, with the upgradation of Shantipura Chokdi to Khoraj GIDC Chokdi State Highway-17 from existing 4-Lane with Paved Shoulder to 6-Lane and Service Road on BOT (Toll) basis (Ch km 13+930 to km 42+683) which is a section of Ahmedabad-Viramgam stretch, the concession agreement is further modified and an extension of 1445 days viz., 3 years, 11 months and 15 days has been granted to the concessionaire and the end of concession period comes to 19th May, 2037 i.e FY38.

9 Revenue forecast

9.1 General

The project section is under “open tolling system” which enables the concessionaire to collect tolls from long distance as well as short distance traffic joining the project from adjoining highways.

9.2 User Fee Schedule

Government of Gujarat enacted the Gujarat Infrastructure Development Act, 1999 (Gujarat Act No. 11 of 1999) to provide a regulatory framework for the participation of the private sector in Financing, Construction, Maintenance and Operation of structure and other development projects on BOT basis in the State of Gujarat. The GOG pursuant to the aforementioned policy had set up the Gujarat State Road Development Corporation Limited (hereinafter referred as GSRDC) which further resolved to augment the existing road from 13.930 to 194.633 between Ahmedabad-Viramgam-Halvad-Maliya i.e., PR and implement the work of four laning on a Build, Operate and Transfer (BOT) basis under Viability Gap Funding Scheme of Government of India. GSRDC then went into an agreement with Larsen & Tourbo limited, the concessionaire which in turn formed an SPV L&T Ahmedabad-Maliya Tollway Private Limited for the same.

In recognition of the concessionaire’s right under the concession agreement, the Government of Gujarat orders that a charge shall be collected in accordance with the concession agreement and fee notification set forth in Schedule-R.

The concessions of traffic have been provided under the categories/ toll tickets as presented in below table.

Table 9-1: Tolling Tickets

Ticket	Maximum number of one-way journeys allowed	Period of validity
Single/Normal	Single	-
Daily Pass	Multiple	24 hours
Monthly Pass	Multiple	One month from the date of payment
Local Personal	Multiple	One month from the date of payment
Local Commercial	Single	-

9.3 Toll Segmentation

As mentioned in traffic assessment of the project stretch section, historical toll data of FY 25 is used in adopting the segmentation for the project road and is presented below.

Table 9-2: Toll segmentation in % - FY25

FY	Vehicle Type	Single	Return	Monthly	Local	Local Commercial (50 % Discounted Trip)	Exemption/Violation	Total
Sanand (TP01)								

FY	Vehicle Type	Single	Return	Monthly	Local	Local Commercial (50 % Discounted Trip)	Exemption/Violation	Total
2025	CJV	0.7%	0.6%	0.0%	0.0%	0.0%	98.7%	100.0%
	LCV/MINIBUS	46.0%	44.9%	3.6%	0.0%	0.0%	5.5%	100.0%
	BUS	10.9%	27.7%	22.4%	0.0%	0.0%	38.9%	100.0%
	TRUCK 2 AXLE	76.8%	22.1%	0.0%	0.0%	0.0%	1.1%	100.0%
	MAV+OSV	86.8%	12.9%	0.0%	0.0%	0.0%	0.2%	100.0%
Malvan (TP02)								
2025	CJV	1.2%	0.3%	0.0%	0.0%	0.0%	98.5%	100.0%
	LCV/MINIBUS	81.0%	17.2%	0.0%	0.0%	0.0%	1.9%	100.0%
	BUS	17.8%	8.3%	0.0%	0.0%	0.0%	74.0%	100.0%
	TRUCK 2 AXLE	82.8%	16.1%	0.0%	0.0%	0.0%	1.1%	100.0%
	MAV+OSV	92.0%	7.9%	0.0%	0.0%	0.0%	0.1%	100.0%
Soladi (TP03)								
2025	CJV	1.4%	0.2%	0.0%	0.0%	0.0%	98.3%	100.0%
	LCV/MINIBUS	75.1%	22.2%	0.0%	0.0%	0.0%	2.6%	100.0%
	BUS	16.0%	7.7%	0.0%	0.0%	0.0%	76.3%	100.0%
	TRUCK 2 AXLE	87.6%	11.0%	0.0%	0.4%	0.4%	0.6%	100.0%
	MAV+OSV	93.6%	6.2%	0.0%	0.0%	0.0%	0.1%	100.0%
Aniyari (TP04)								
2025	CJV	1.3%	0.2%	0.0%	0.0%	0.0%	98.5%	100.0%
	LCV/MINIBUS	79.3%	19.8%	0.0%	0.0%	0.0%	0.9%	100.0%
	BUS	27.4%	8.8%	0.0%	0.0%	0.0%	63.8%	100.0%
	TRUCK 2 AXLE	88.0%	11.1%	0.0%	0.0%	0.0%	0.8%	100.0%
	MAV+OSV	91.9%	8.0%	0.0%	0.0%	0.0%	0.1%	100.0%

Source: Historical toll data, Crisil Intelligence

The above-mentioned traffic segmentation has been converted to an implied segmentation to include the claim amount from GSRDC for CJV, GSRTC MiniBus as well as buses which is eventually used for revenue calculations. The segmentation is presented below. The tolling segmentation in (%) adopted for the present study for FY26 onwards is presented in below table.

Table 9-3: Implied Toll segmentation in % - FY25

FY	Vehicle Type	Single	Return	Monthly	Local	Local Commercial (50 % Discounted Trip)	Exemption/Violation	Total
Sanand (TP01)								
2025	CJV	30.5%	42.8%	0.7%	17.0%	0.0%	9.0%	100.0%
	LCV/MINIBUS	48.6%	47.8%	3.6%	0.0%	0.0%	0.0%	100.0%
	BUS	29.6%	48.0%	22.4%	0.0%	0.0%	0.0%	100.0%

FY	Vehicle Type	Single	Return	Monthly	Local	Local Commercial (50 % Discounted Trip)	Exemption/Violation	Total
	TRUCK 2 AXLE	76.8%	22.1%	0.0%	0.0%	0.0%	1.1%	100.0%
	MAV+OSV	86.8%	12.9%	0.0%	0.0%	0.0%	0.2%	100.0%
Malvan (TP02)								
2025	CJV	57.9%	32.1%	0.0%	1.0%	0.0%	9.0%	100.0%
	LCV/MINIBUS	82.3%	17.7%	0.0%	0.0%	0.0%	0.0%	100.0%
	BUS	71.0%	29.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	TRUCK 2 AXLE	82.8%	16.1%	0.0%	0.0%	0.0%	1.1%	100.0%
	MAV+OSV	92.0%	7.9%	0.0%	0.0%	0.0%	0.1%	100.0%
Soladi (TP03)								
2025	CJV	55.4%	30.6%	0.0%	6.0%	0.0%	8.0%	100.0%
	LCV/MINIBUS	76.9%	23.1%	0.0%	0.0%	0.0%	0.0%	100.0%
	BUS	64.8%	35.2%	0.0%	0.0%	0.0%	0.0%	100.0%
	TRUCK 2 AXLE	87.6%	11.0%	0.0%	0.4%	0.4%	0.6%	100.0%
	MAV+OSV	93.6%	6.2%	0.0%	0.0%	0.0%	0.1%	100.0%
Aniyari (TP04)								
2025	CJV	60.3%	26.7%	0.0%	5.0%	0.0%	8.0%	100.0%
	LCV/MINIBUS	80.0%	20.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	BUS	79.7%	20.3%	0.0%	0.0%	0.0%	0.0%	100.0%
	TRUCK 2 AXLE	88.0%	11.1%	0.0%	0.0%	0.0%	0.8%	100.0%
	MAV+OSV	91.9%	8.0%	0.0%	0.0%	0.0%	0.1%	100.0%

Source: Historical toll data, Crisil Intelligence

9.4 Trip Rates

The trip rates are adopted based on the FY 25 historic traffic data and trip rates for the present study for FY26 onwards is presented in below table.

Table 9-4: Adopted Trip Rates

Vehicle category	Single	Return	Monthly Pass	Local Commercial	Local Pass
Car/Jeep/Van	1.00	2.00	20.00	1.00	21.00
Minibus	1.00	2.00	20.00	1.00	
2 Axle Bus	1.00	2.00	20.00	1.00	
LCV	1.00	2.00	20.00	1.00	
2 Axle Truck	1.00	2.00	20.00	1.00	
3 Axle Truck	1.00	2.00	20.00	1.00	
MAV	1.00	2.00	20.00	1.00	
OSV	1.00	2.00	20.00	1.00	

Source: Historical toll data, Crisil Intelligence

9.4.1 Tolling lengths

The tollable lengths for the project section for plaza is presented in below table.

Table 9-5: Tolling Lengths

TP (Chainage)	TP01 **(Km 27.545)**	TP02 **(Km 88.000)**	TP03 **(Km 133.388)**	TP04 **(Km 180.345)**
Chainage	Km 13.930 - Km 61.430	Km 61.430 - Km 128.430	Km 128.430 - Km 154.568	Km 154.568 - Km 194.633
Section	Sarkhej-Viramgam	Viramgam-Dhrangadhra	Dhrangadhra-Halvad	Halvad-Maliya
Length (kms) for which Fee is Payable				
Car/Jeep/Van	47.50	67.00	26.138	40.065
LCV/Minibus	47.50	67.00	26.138	40.065
2 Axle Bus	47.50	67.00	26.138	40.065
2 Axle Truck	47.50	30.17	62.968	40.065
3A/MAV	47.50	30.17	62.968	40.065

Source: Concession Agreement, Crisil Intelligence

9.4.2 Toll Rates Estimation

Rate of base fees to be recovered from the users of the SH-17 and SH-7 of the project section in the state of Gujarat, applicable as on 1st April, 2007 as per the concession agreement for different vehicle categories are presented in the below table.

Table 9-6: Base Rate in Rs/km

Vehicle Type	Base rate of fee per km for base year from 1st April 2007 (in Rupees)
Car, Jeep, Van, or Light Motor Vehicle	0.61
Light Commercial Vehicle, Light Goods Vehicle or Minibus	1.07
Bus or Truck (Two Axles)	2.13
Three-axle commercial vehicles	3.43
Heavy Construction Machinery (HCM) or Earth Moving Equipment (EME) or Multi Axle Vehicle (MAV) (four to six axles)	3.43
Oversized Vehicles (seven or more axles)	3.43

Source: Concession Agreement, AMTPL

Actual User Fee (Per Vehicle per one way trip) on 1st April, 2025 Calculated in accordance with Clause 7.2 of the toll Notification for single journey applicable at all the toll plazas on the project road for current fiscal (FY26) is provided below:

Table 9-7: Toll Rates for Single Journey (in INR)

Type of vehicle	Sanand (TP01)	Malvan (TP02)	Soladi (TP03)	Aniyari (TP04)
Car/Jeep/Van	65	95	35	55
LCV/Mini Bus	120	165	65	100
2 Axle Bus	235	330	130	195
2 Axle Truck	235	150	310	195
3A/MAV	375	240	500	320

Source: Crisil Intelligence

It is to be noted that the toll fee of Car/Jeep/ Van/Two Wheeler/ Three Wheeler & Gujarat State Road Transport Corporation Buses exempted from dated15/08/2016 vide Government of Gujarat, Roads & Building Department Government of Gujarat, Road

9.4.3 Review and Outlook of Whole-Sale price index (WPI)

The projected toll rates are dependent on Wholesale Price Index (WPI) assumptions for 2024 to 2036. For WPI projection, Crisil Intelligence has relied on inputs from Client. Past and outlook WPI growth is presented in below table.

Table 9-8: WPI

Year	WPI	Expected Year-on-year growth
2025	253.9	
2026	261.5	3.0%
2027	272.6	4.3%
2028	284.2	4.3%
2029	296.3	4.3%
2030	308.7	4.2%
2031	321.7	4.2%
2032	335.2	4.2%
2033	349.1	4.2%
2034	363.6	4.2%
2035	378.7	4.2%
2036	394.2	4.1%
2036	410.3	4.1%
2037	427.2	4.1%

Source: Projected WPI (P): - Client Input

9.5 Revenue Estimates

The revenue projections for the project road are presented in the below table.

Table 9-9: Mode wise Revenue in ₹ Millions for the Project Section

FY Year	CJV	LCV/MINIBUS	BUS	2 AT	3 AT	MAV+OSV	Total	YoY Growth (%)
Sanand (TP01)								
FY-2026	358.6	68.9	150.6	120.3	91.1	637.4	1,426.8	
FY-2027	410.1	71.6	157.2	126.1	94.5	682.1	1,541.7	8.1%
FY-2028	442.4	75.3	165.8	134.5	99.5	739.8	1,657.4	7.5%
FY-2029	484.8	80.5	174.9	142.7	102.6	786.5	1,771.9	6.9%
FY-2030	519.5	83.2	184.7	151.4	107.2	846.8	1,892.7	6.8%
FY-2031	586.5	88.8	193.9	160.1	111.6	909.2	2,050.0	8.3%
FY-2032	626.8	92.9	204.9	169.8	115.2	967.8	2,177.6	6.2%
FY-2033	678.7	98.6	216.7	181.7	119.5	1,034.2	2,329.2	7.0%
FY-2034	740.9	102.6	228.0	191.5	123.9	1,105.5	2,492.4	7.0%
FY-2035	798.9	108.7	238.5	201.0	128.2	1,179.2	2,654.6	6.5%

FY Year	CJV	LCV/MINIBUS	BUS	2 AT	3 AT	MAV+OSV	Total	YoY Growth (%)
FY-2036	844.1	115.2	251.3	211.7	132.8	1,258.6	2,813.7	6.0%
FY-2037	928.2	119.0	263.1	221.3	136.6	1,334.4	3,002.7	6.7%
FY-2038	973.2	125.5	278.8	235.3	140.7	1,416.0	3,169.5	5.6%
CAGR (26-34)	**9.5%**	**5.1%**	**5.3%**	**6.0%**	**3.9%**	**7.1%**	**7.2%**	
CAGR (26-38)	**8.7%**	**5.1%**	**5.3%**	**5.7%**	**3.7%**	**6.9%**	**6.9%**	
Malvan (TP02)								
FY-2026	228.8	30.9	53.6	40.1	26.7	404.5	784.7	
FY-2027	249.2	33.0	56.3	41.9	27.9	435.9	844.1	7.6%
FY-2028	278.5	34.3	59.3	45.1	28.6	460.8	906.7	7.4%
FY-2029	301.0	36.4	62.8	46.9	29.7	493.2	970.0	7.0%
FY-2030	325.5	38.6	65.9	50.2	30.9	527.7	1,038.8	7.1%
FY-2031	359.9	39.9	69.1	53.5	32.6	574.2	1,129.2	8.7%
FY-2032	388.1	42.3	73.3	55.7	33.8	614.3	1,207.5	6.9%
FY-2033	428.5	44.6	77.3	59.1	34.8	652.7	1,297.1	7.4%
FY-2034	453.8	47.0	80.8	62.9	35.9	693.9	1,374.3	6.0%
FY-2035	498.7	49.4	85.3	66.6	37.0	735.6	1,472.5	7.1%
FY-2036	531.2	51.0	90.3	68.9	38.1	781.5	1,560.8	6.0%
FY-2037	578.0	53.2	94.0	72.4	39.6	836.6	1,673.8	7.2%
FY-2038	610.7	55.8	98.9	76.4	40.6	883.0	1,765.5	5.5%
CAGR (26-34)	**8.9%**	**5.4%**	**5.3%**	**5.8%**	**3.8%**	**7.0%**	**7.3%**	
CAGR (26-38)	**8.5%**	**5.1%**	**5.2%**	**5.5%**	**3.5%**	**6.7%**	**7.0%**	
Soladi (TP03)								
FY-2026	99.3	15.9	24.7	93.1	71.1	1,133.9	1,438.0	
FY-2027	107.0	16.5	25.8	98.6	73.6	1,211.3	1,532.7	6.6%
FY-2028	126.6	17.1	27.6	104.5	76.9	1,306.8	1,659.6	8.3%
FY-2029	135.5	18.8	28.5	110.0	79.8	1,398.8	1,771.3	6.7%
FY-2030	148.7	19.4	30.4	117.3	82.8	1,498.2	1,896.8	7.1%
FY-2031	159.0	20.1	31.6	123.2	86.5	1,615.8	2,036.2	7.4%
FY-2032	169.9	20.7	33.7	129.7	89.7	1,730.0	2,173.7	6.7%
FY-2033	180.0	22.6	34.9	137.4	92.5	1,839.4	2,306.6	6.1%
FY-2034	211.6	23.1	37.0	145.5	96.1	1,972.7	2,486.1	7.8%
FY-2035	223.5	23.9	39.3	152.0	98.9	2,093.8	2,631.4	5.8%
FY-2036	236.1	25.8	40.8	160.7	102.7	2,241.3	2,807.4	6.7%
FY-2037	252.7	26.5	43.0	166.9	105.8	2,381.6	2,976.5	6.0%
FY-2038	264.9	28.4	45.7	175.6	109.2	2,533.5	3,157.3	6.1%
CAGR (26-34)	**9.9%**	**4.8%**	**5.2%**	**5.7%**	**3.8%**	**7.2%**	**7.1%**	
CAGR (26-38)	**8.5%**	**4.9%**	**5.3%**	**5.4%**	**3.6%**	**6.9%**	**6.8%**	
Aniyari (TP04)								
FY-2026	113.3	15.5	19.9	43.6	39.1	623.9	855.4	
FY-2027	122.2	16.1	21.1	46.6	40.1	659.7	905.7	5.9%
FY-2028	142.5	16.7	22.4	49.7	42.3	718.5	992.2	9.6%
FY-2029	152.6	17.9	23.7	52.8	43.6	765.4	1,056.0	6.4%

FY Year	CJV	LCV/MINIBUS	BUS	2 AT	3 AT	MAV+OSV	Total	YoY Growth (%)
FY-2030	163.4	18.5	24.5	54.7	45.0	815.8	1,122.0	6.3%
FY-2031	177.1	19.9	25.9	57.9	47.1	880.6	1,208.5	7.7%
FY-2032	200.7	20.6	27.4	61.5	48.6	938.3	1,297.2	7.3%
FY-2033	215.4	21.9	28.8	64.7	50.5	1,006.0	1,387.3	6.9%
FY-2034	228.1	22.6	30.4	68.2	51.9	1,065.8	1,466.9	5.7%
FY-2035	257.6	24.0	31.9	71.7	53.8	1,140.3	1,579.4	7.7%
FY-2036	272.1	24.7	33.7	75.5	55.9	1,221.1	1,683.0	6.6%
FY-2037	288.5	26.2	35.3	78.9	57.0	1,282.5	1,768.3	5.1%
FY-2038	302.4	26.8	37.0	82.6	58.8	1,365.1	1,872.8	5.9%
CAGR (26-34)	**9.1%**	**4.8%**	**5.4%**	**5.7%**	**3.6%**	**6.9%**	**7.0%**	
CAGR (26-38)	**8.5%**	**4.7%**	**5.3%**	**5.5%**	**3.5%**	**6.7%**	**6.7%**	

Source: Crisil Intelligence

Table 9-10: Total Projected Revenue in ₹ Millions

FY Year	Sanand (TP01)	Malvan (TP02)	Soladi (TP03)	Aniyari (TP04)	Total
FY26	1,426.8	784.7	1,438.0	855.4	4,504.9
FY27	1,541.7	844.1	1,532.7	905.7	4,824.2
FY28	1,657.4	906.7	1,659.6	992.2	5,215.8
FY29	1,771.9	970.0	1,771.3	1,056.0	5,569.3
FY30	1,892.7	1,038.8	1,896.8	1,122.0	5,950.3
FY31	2,050.0	1,129.2	2,036.2	1,208.5	6,424.0
FY32	2,177.6	1,207.5	2,173.7	1,297.2	6,856.0
FY33	2,329.2	1,297.1	2,306.6	1,387.3	7,320.2
FY34	2,492.4	1,374.3	2,486.1	1,466.9	7,819.8
FY35	2,654.6	1,472.5	2,631.4	1,579.4	8,337.9
FY36	2,813.7	1,560.8	2,807.4	1,683.0	8,864.9
FY37	3,002.7	1,673.8	2,976.5	1,768.3	9,421.3
FY38	3,169.5	1,765.5	3,157.3	1,872.8	9,965.1
CAGR (FY26-34)	**7.2%**	**7.3%**	**7.1%**	**7.0%**	**7.1%**
CAGR (FY26-38)	**6.9%**	**7.0%**	**6.8%**	**6.7%**	**6.8%**

Source: Crisil Intelligence

Table 9-11: Mode wise Revenue in ₹ Millions for the Project Section - Scenario: Impact of PFT

FY Year	CJV	LCV/MINIBUS	BUS	2 AT	3 AT	MAV+OSV	Total	YoY Growth (%)
Sanand (TP01)								
FY-2026	358.6	68.9	150.6	120.3	91.1	635.2	1,424.6	
FY-2027	410.1	71.6	157.2	126.1	94.5	677.4	1,536.9	7.9%
FY-2028	442.4	75.3	165.8	134.5	99.5	732.1	1,649.7	7.3%
FY-2029	484.8	80.5	174.9	142.7	102.6	775.6	1,761.0	6.7%
FY-2030	519.5	83.2	184.7	151.4	107.2	835.0	1,881.0	6.8%

FY Year	CJV	LCV/MINIBUS	BUS	2 AT	3 AT	MAV+OSV	Total	YoY Growth (%)
FY-2031	586.5	88.8	193.9	160.1	111.6	896.6	2,037.4	8.3%
FY-2032	626.8	92.9	204.9	169.8	115.2	954.4	2,164.1	6.2%
FY-2033	678.7	98.6	216.7	181.7	119.5	1,019.8	2,314.9	7.0%
FY-2034	740.9	102.6	228.0	191.5	123.9	1,090.2	2,477.0	7.0%
FY-2035	798.9	108.7	238.5	201.0	128.2	1,162.8	2,638.3	6.5%
FY-2036	844.1	115.2	251.3	211.7	132.8	1,241.1	2,796.2	6.0%
FY-2037	928.2	119.0	263.1	221.3	136.6	1,315.9	2,984.1	6.7%
FY-2038	973.2	125.5	278.8	235.3	140.7	1,396.3	3,149.9	5.6%
CAGR (26-34)	**9.5%**	**5.1%**	**5.3%**	**6.0%**	**3.9%**	**7.0%**	**7.2%**	
CAGR (26-38)	**8.7%**	**5.1%**	**5.3%**	**5.7%**	**3.7%**	**6.8%**	**6.8%**	
Malvan (TP02)								
FY-2026	228.8	30.9	53.6	40.1	26.7	403.1	783.2	
FY-2027	249.2	33.0	56.3	41.9	27.9	432.8	841.0	7.4%
FY-2028	278.5	34.3	59.3	45.1	28.6	455.9	901.8	7.2%
FY-2029	301.0	36.4	62.8	46.9	29.7	486.2	963.0	6.8%
FY-2030	325.5	38.6	65.9	50.2	30.9	520.2	1,031.3	7.1%
FY-2031	359.9	39.9	69.1	53.5	32.6	566.1	1,121.1	8.7%
FY-2032	388.1	42.3	73.3	55.7	33.8	605.6	1,198.8	6.9%
FY-2033	428.5	44.6	77.3	59.1	34.8	643.5	1,287.8	7.4%
FY-2034	453.8	47.0	80.8	62.9	35.9	684.1	1,364.5	6.0%
FY-2035	498.7	49.4	85.3	66.6	37.0	725.2	1,462.1	7.2%
FY-2036	531.2	51.0	90.3	68.9	38.1	770.4	1,549.7	6.0%
FY-2037	578.0	53.2	94.0	72.4	39.6	824.8	1,662.0	7.2%
FY-2038	610.7	55.8	98.9	76.4	40.6	870.5	1,753.0	5.5%
CAGR (26-34)	**8.9%**	**5.4%**	**5.3%**	**5.8%**	**3.8%**	**6.8%**	**7.2%**	
CAGR (26-38)	**8.5%**	**5.1%**	**5.2%**	**5.5%**	**3.5%**	**6.6%**	**6.9%**	
Soladi (TP03)								
FY-2026	99.3	15.9	24.7	93.1	71.1	1,130.9	1,435.0	
FY-2027	107.0	16.5	25.8	98.6	73.6	1,204.9	1,526.4	6.4%
FY-2028	126.6	17.1	27.6	104.5	76.9	1,296.5	1,649.2	8.0%
FY-2029	135.5	18.8	28.5	110.0	79.8	1,384.0	1,756.6	6.5%
FY-2030	148.7	19.4	30.4	117.3	82.8	1,482.4	1,881.0	7.1%
FY-2031	159.0	20.1	31.6	123.2	86.5	1,598.8	2,019.2	7.3%
FY-2032	169.9	20.7	33.7	129.7	89.7	1,711.7	2,155.4	6.7%
FY-2033	180.0	22.6	34.9	137.4	92.5	1,820.0	2,287.2	6.1%
FY-2034	211.6	23.1	37.0	145.5	96.1	1,951.9	2,465.3	7.8%
FY-2035	223.5	23.9	39.3	152.0	98.9	2,071.7	2,609.3	5.8%
FY-2036	236.1	25.8	40.8	160.7	102.7	2,217.7	2,783.8	6.7%
FY-2037	252.7	26.5	43.0	166.9	105.8	2,356.5	2,951.4	6.0%
FY-2038	264.9	28.4	45.7	175.6	109.2	2,506.8	3,130.6	6.1%
CAGR (26-34)	**9.9%**	**4.8%**	**5.2%**	**5.7%**	**3.8%**	**7.1%**	**7.0%**	

FY Year	CJV	LCV/MINIBUS	BUS	2 AT	3 AT	MAV+OSV	Total	YoY Growth (%)
CAGR (26-38)	**8.5%**	**4.9%**	**5.3%**	**5.4%**	**3.6%**	**6.9%**	**6.7%**	
Aniyari (TP04)								
FY-2026	113.3	15.5	19.9	43.6	39.1	622.0	853.5	
FY-2027	122.2	16.1	21.1	46.6	40.1	655.6	901.6	5.6%
FY-2028	142.5	16.7	22.4	49.7	42.3	711.9	985.6	9.3%
FY-2029	152.6	17.9	23.7	52.8	43.6	756.0	1,046.6	6.2%
FY-2030	163.4	18.5	24.5	54.7	45.0	805.8	1,112.0	6.3%
FY-2031	177.1	19.9	25.9	57.9	47.1	869.7	1,197.7	7.7%
FY-2032	200.7	20.6	27.4	61.5	48.6	926.8	1,285.7	7.3%
FY-2033	215.4	21.9	28.8	64.7	50.5	993.6	1,374.9	6.9%
FY-2034	228.1	22.6	30.4	68.2	51.9	1,052.7	1,453.9	5.7%
FY-2035	257.6	24.0	31.9	71.7	53.8	1,126.3	1,565.4	7.7%
FY-2036	272.1	24.7	33.7	75.5	55.9	1,206.1	1,668.0	6.6%
FY-2037	288.5	26.2	35.3	78.9	57.0	1,266.7	1,752.5	5.1%
FY-2038	302.4	26.8	37.0	82.6	58.8	1,348.3	1,856.0	5.9%
CAGR (26-34)	**9.1%**	**4.8%**	**5.4%**	**5.7%**	**3.6%**	**6.8%**	**6.9%**	
CAGR (26-38)	**8.5%**	**4.7%**	**5.3%**	**5.5%**	**3.5%**	**6.7%**	**6.7%**	

Table 9-12: Total Projected Revenue in ₹ Millions - Scenario: Impact of PFT

FY Year	Sanand (TP01)	Malvan (TP02)	Soladi (TP03)	Aniyari (TP04)	Total
FY26	1,424.6	783.2	1,435.0	853.5	4,496.3
FY27	1,536.9	841.0	1,526.4	901.6	4,805.9
FY28	1,649.7	901.8	1,649.2	985.6	5,186.3
FY29	1,761.0	963.0	1,756.6	1,046.6	5,527.2
FY30	1,881.0	1,031.3	1,881.0	1,112.0	5,905.3
FY31	2,037.4	1,121.1	2,019.2	1,197.7	6,375.4
FY32	2,164.1	1,198.8	2,155.4	1,285.7	6,804.1
FY33	2,314.9	1,287.8	2,287.2	1,374.9	7,264.9
FY34	2,477.0	1,364.5	2,465.3	1,453.9	7,760.7
FY35	2,638.3	1,462.1	2,609.3	1,565.4	8,275.1
FY36	2,796.2	1,549.7	2,783.8	1,668.0	8,797.7
FY37	2,984.1	1,662.0	2,951.4	1,752.5	9,350.1
FY38	3,149.9	1,753.0	3,130.6	1,856.0	9,889.4
CAGR (FY26-34)	**7.2%**	**7.2%**	**7.0%**	**6.9%**	**7.1%**
CAGR (FY26-38)	**6.8%**	**6.9%**	**6.7%**	**6.7%**	**6.8%**



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Traffic & Revenue Assessment for Maharashtra Karnataka Border to Sangareddy section of NH-65 (Deccan Tollways Private Limited – DTPL)

Final Report

November 2025



by S&P Global

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List of Acronyms

AADT	Annual Average Daily Traffic
ADT	Average Daily Traffic
BOT	Build Operate and Transfer
CA	Concession Agreement
CAGR	Compound Annual Growth Rate
COD	Commercial Operation Date
CPG	Consumer Packed Goods
Cr.	Crore
DPR	Detailed Project Report
DME	Delhi Mumbai Expressway
DTPL	Deccan Toll Ways Private Limited
E-E	External to External
E-I	External to Internal
FMCG	Fast-Moving Consumer Goods
FY	Financial Year
GC	Generalized Cost
GDP	Gross Domestic Product
GQ	Golden Quadrilateral
GSDP	Gross State Domestic Product
IRC	Indian Roads Congress
IHMCL	Indian Highway Management Company Limited
KA	Karnataka
Kms	Kilometres
LCV	Light Commercial Vehicle
LDC	Local District Count
MADT	Monthly Average Daily Traffic
MAV	Multi-axle Vehicle (4 to 6 Axles)
MH	Maharashtra
Mn.	Millions
MSME	Ministry of Micro, Small and Medium Enterprises
MoSPI	Ministry of Statistics and Programme Implementation
NCR	National Capital Region
NE	National Expressway
NH	National Highway
NHAI	National Highways Authority of India
NHDP	National Highways Development Project
NCR	National Capital Region
O-D	Origin – Destination
OSV	Over Sized Vehicle (more than 6 Axles)
PCI	Per Capita Income
PCU	Passenger Car Unit
PIA	Project Influence Area
PR	Project Road
SCF	Seasonal Correction Factor
SH	State Highway
TLFD	Trip Length Frequency Distribution

TP	Toll Plaza
TVC	Traffic Volume Count
UNESCO	United Nations Educational, Scientific and Cultural Organization
VOC	Vehicle Operating Cost
VOT	Value of Time
WPI	Wholesale Price Index
YOY	Year on Year
ZIF	Zonal Influence Factor
2AT	2 Axle Truck
3AT	3 Axle Truck
TP 1	Mangalgi Toll Plaza
TP 2	Kamkole Toll Plaza

1 Executive Summary

1.1 Project Details/background

We understand that EAAA TransInfra Managers Limited is the Investment Manager, EPIC Transnet Project Management Private Limited is the proposed Project Manager and EPIC Transnet Infrastructure Private Limited is the sponsor of the Citius TransNet Investment Trust ("Trust" or "InvIT") and M/s Deccan Tollways Private Limited (“DTPL”) is proposed to be part of the initial portfolio assets of the Trust. The Trust is registered with Securities and Exchange Board of India (“SEBI”) as an infrastructure investment trust under the SEBI InVIT Regulations.

M/s EPIC Transnet Infrastructure Private Limited (hereinafter “the Client”) as sponsor has appointed M/s Crisil Limited (hereinafter referred as “Traffic Consultant”) to carry out Traffic Due Diligence of operational asset of Four Laning of MH/KA Border to Sangareddy on BOT Toll Basis in the State of Telangana and Karnataka (herein after refer as “the Project”) which is being operated by “M/s Deccan Tollways Private Limited" (hereinafter refer as “the Concessionaire or Company or DTPL”).

1.2 Asset overview

On February 2, 2012, the NHAI and DTPL entered into a concession agreement for a 4 lane project of the existing road from km 348.80 to km 493.00 (approximately 144.95 km) on the Maharashtra/ Karnataka border – Sangareddy section of NH- 9 in the states of Karnataka and Telangana on design, build, finance, operate and transfer on toll basis, for a concession period of 25 years with the appointed date being April 1, 2014. The project road is a crucial section of NH 65, linking major cities like Pune, Mumbai, Solapur, Aurangabad, Hyderabad, and Vijayawada.

Figure 1-1: Project Road



Source: Open Street Map, Crisil Intelligence

Table 1-1: Key details of project stretch

Project stretch	MH/KA Border to Sangareddy Section of NH 65
Authority	National Highway Authority of India
Concessionaire	Deccan Toll ways Private Limited (DTPL)
Project type	Design, build, finance, operate, and transfer (DBFOT)
No. of lanes	4-lane configuration
Length of Project Stretch	145 Km
No. of Toll Plaza(s)	02
Name of Toll Plaza(s)	Mangalgi Toll Plaza & Kamkole Toll Plaza
Concession Period	25 Years
CA Signed	February 2012
Appointed Date	01 April 2014
Commercial operation date*	14-Oct-17
Concession End Date as Scheduled	31-Mar-39
Concession End Date including approved Extensions	6-Apr-44

Note: The Commercial operational date as per the letter is 14 Oct 2017, however actual operations started on 17 Oct 2017.
Source: Concession Agreement, Crisil Intelligence

Salient growth features and traffic generators

Project road provides critical connectivity to the western and eastern regions of the country and connects major cities such as Mumbai-Pune-Solapur-Hyderabad-Vijayawada-Visakhapatnam. The stretch largely transports consumption (Food, Agri, Durables, E-commerce, and parcel) related goods among the major cities mentioned above. The stretch also sees traffic from agriculture goods, food processing sector, e-commerce parcels, automotive sector, chemicals and pharmaceutical sector and other industrial goods. Here is a consistent flow of commercial traffic along the entire project road, with TP-1 near Mangalgi (MH-KNK Border) witnessing predominantly commercial traffic while TP-2 caters to both passengers and commercial vehicles. According to the latest traffic study, apart from the Chennai Surat Expressway, there are no major alternative routes at the local or larger network level. The proposed Dedicated Freight Corridors (DFC) are significantly distant from the project highway, thereby not foreseeing any substantial impact or mode shift from road to rail.

1.3 Historical traffic data

The below tables show the Historical Annual average daily traffic on Project stretch from FY 19 to FY 25.

- The Passenger traffic at both toll plazas has consistently increasing since the COD of the project. Cars has witnessed a growth of **10.7%** at TP 1 and **10.2%** at TP 2 in last 6 years period.
- In terms of MAV traffic also, Project Road witnessed a significant growth at both toll plazas **6.8%** at TP 1 and **7.2%** at TP 2 respectively, Interms of Overall PCUs at TP 1 is **5.5%** and 5.**9%** at TP2.

Table 1-2: Historical traffic data at Toll Plaza 1 (Mangalgi TP)

FY	CJV	LCV/Minibus	Bus	2AT	3AT	MAV	Total	PCU
2018*	2,609	534	398	964	1,078	1,271	6,855	16,451
2019	3,161	530	452	939	945	1,436	7,463	17,425
2020	3,482	506	473	936	854	1,423	7,675	17,436
2021	3,622	529	235	978	814	1,594	7,772	17,669
2022	4,502	548	338	1,164	907	1,896	9,356	21,086
2023	5,668	523	515	1,318	897	2,179	11,101	24,448
2024	5,860	541	514	1,332	814	2,143	11,205	24,298
2025	5,829	554	514	1,340	754	2,128	11,119	24,061
CAGR (FY 19 - FY 25)	**10.7%**	**0.7%**	**2.2%**	**6.1%**	**-3.7%**	**6.8%**	**6.9%**	**5.5%**
CAGR (FY 20 - FY 25)	**10.8%**	**1.8%**	**1.7%**	**7.4%**	**-2.5%**	**8.4%**	**7.7%**	**6.7%**

*2018 is data available for 5.5 months as operations started from Oct 2017

Note: MAV comprises (vehicles with more than 3 axles up to 6 axles) and OSV (vehicles with more than 6 axles).

Source: Client TMS Data, Crisil Intelligence

Table 1-3: Historical traffic data at Toll Plaza 2 (Kamkole TP)

FY	CJV	LCV/Minibus	Bus	2AT	3AT	MAV	Total	PCU
2018*	6,343	939	893	1,231	1,311	1,384	12,100	24,281
2019	7,353	926	936	1,177	1,200	1,583	13,175	25,804
2020	8,061	840	923	1,197	1,050	1,557	13,627	25,836
2021	7,802	840	611	1,127	975	1,726	13,081	24,970
2022	9,252	874	769	1,359	1,078	2,022	15,355	29,282
2023	11,197	841	1,009	1,548	1,071	2,359	18,025	33,959
2024	12,403	859	989	1,652	1,048	2,381	19,331	35,472
2025	13,203	908	950	1,761	993	2,399	20,214	36,472
CAGR (FY 19 - FY 25)	**10.2%**	**-0.3%**	**0.2%**	**6.9%**	**-3.1%**	**7.2%**	**7.4%**	**5.9%**
CAGR (FY 20 - FY 25)	**10.4%**	**1.6%**	**0.6%**	**8.0%**	**-1.1%**	**9.0%**	**8.2%**	**7.1%**

*2018 is data available for 5.5 months as operations started from Oct 2017

Note: MAV comprises (vehicles with more than 3 axles up to 6 axles) and OSV (vehicles with more than 6 axles).

Source: Client TMS Data, Crisil Intelligence

1.4 Base Traffic Estimation

For base traffic (annual average daily traffic) estimation of the present study, current fiscal 4-months (Apr-25 to July-25) of TMS traffic data were annualized using SCF factor of FY 23 & FY 25 to arrive at the annual average daily traffic (AADT) for FY 26.

The AADT estimation for the base case for FY26 is presented table below

Table 1-4: Base Traffic Estimation -FY26 AADT _ TP 1 (Mangalgi TP)

Particulars	FY Year	CJV	LCV/Minibus	Bus	2AT	3AT	MAV	OSV	Total	PCU
ADT (Apr-July)	FY 26	6090	563	546	1321	693	2119	3	11,335	24,163
SCF	FY 23 & FY 25	0.97	0.99	0.99	1.03	1.00	1.03	1.05		
AADT	**FY 26**	**5,927**	**556**	**541**	**1,360**	**695**	**2,183**	**3**	**11,266**	**24,389**

Source: Client TMS Data, Crisil Intelligence

Table 1-5: Base Traffic Estimation -FY26 AADT _ TP 2 (Kamkole TP)

Particulars	FY Year	CJV	LCV/Minibus	Bus	2AT	3AT	MAV	OSV	Total	PCU
ADT (Apr-July)	FY 26	14399	941	1022	1785	907	2453	4	21,510	38,006
SCF	FY 23 & FY 25	1.00	1.02	1.00	1.04	1.01	1.05	1.06		
AADT	**FY 26**	**14,385**	**960**	**1,024**	**1,855**	**915**	**2,568**	**4**	**21,711**	**38,778**

Source: Client TMS Data, Crisil Intelligence

1.4.1 Toll Segmentation

The table below presents a segmentation which is considered for the traffic based on the historic data (FY25).

Table 1-6: Toll segmentation _ TP 1 (Mangalgi TP)

Vehicle category	Single journey	Return journey	Monthly Pass	Local Commercial	Local Passenger	Violations/ Exemptions	Total
Car/Jeep/Van	45.6%	46.9%	0.0%	0.5%	4.0%	3.0%	100.0%
LCV/Minibus	65.7%	33.8%	0.0%	0.3%	0.0%	0.3%	100.0%
Bus	13.3%	60.9%	5.8%	20.0%	0.0%	0.1%	100.0%
2 Axle Truck	80.2%	19.3%	0.0%	0.3%	0.0%	0.3%	100.0%
3 Axle Truck	80.5%	18.5%	0.0%	0.8%	0.0%	0.1%	100.0%
MAV	89.2%	10.5%	0.0%	0.1%	0.0%	0.1%	100.0%
OSV	96.8%	1.5%	0.0%	0.0%	0.0%	1.7%	100.0%

Source: Crisil Intelligence

Table 1-7: Toll segmentation _ TP 2 (Kamkole TP)

Vehicle category	Single journey	Return journey	Monthly Pass	Local Commercial	Local Passenger	Violations/ Exemptions	Total
Car/Jeep/Van	31.8%	57.3%	0.0%	1.3%	7.0%	2.6%	100.0%
LCV/Minibus	46.8%	46.7%	0.0%	5.9%	0.0%	0.6%	100.0%
Bus	7.6%	58.9%	9.7%	23.7%	0.0%	0.1%	100.0%
2 Axle Truck	70.5%	26.5%	0.0%	2.0%	0.0%	0.9%	100.0%
3 Axle Truck	67.7%	23.4%	0.0%	8.0%	0.0%	0.9%	100.0%
MAV	83.1%	14.1%	0.0%	2.6%	0.0%	0.2%	100.0%
OSV	92.8%	6.5%	0.0%	0.0%	0.0%	0.7%	100.0%

Source: Crisil Intelligence

1.5 Traffic Characteristics and Commodity Profile

The DTPL asset functions as a critical multi-commodity corridor, facilitating seamless freight movement between two of South India's most significant cities. The corridor intersects several major north–south routes, effectively forming feeder and distribution channels for long-haul freight. It connects with major corridors of NH 48 (Mumbai–Chennai Corridor) near Pune and NH 44 (Delhi–Bengaluru Corridor) near Hyderabad along with NH 16 (Kolkata–Chennai Coastal Corridor) near Vijayawada. Apart from the Chennai Surat Expressway, there are no major alternative routes at the local or larger network level. Even micro alternate routes were identified and arrested the leakages by installing check plaza.

Traffic Characteristics:

Short Distance: Short-distance traffic for DTPL primarily flows between Humnabad, Bidar, and Zaheerabad, serving the industries located along this corridor and extending towards Hyderabad. This route facilitates local movement of raw materials and finished goods within these industrial and urban centres.

Medium Distance: Medium-distance traffic flows between the cement hubs in Kalaburagi and key industrial centers such as Bidar, Zaheerabad's Mahendra plant, MRF industries, and sugarcane processing units along the corridor. This movement primarily supports the transport of cement, industrial goods, and agricultural products within the region.

Long distance: Long-distance traffic moves from Gujarat, Mumbai, and Pune to Zaheerabad, Hyderabad, Bangalore, and Chennai, carrying a diverse mix of commodities including tiles, agricultural products, and auto components. This corridor plays a key role in connecting major industrial and commercial centers across western and southern India.

Commodity Profile:

The assets handle a wide range of commodity categories, indicating a robust and balanced traffic base not overly reliant on a single sector.

- **Courier/Parcel Commodities:** Strong movement of parcel freight highlights the corridor's role in express logistics and e-commerce. Includes courier shipments, general merchandise, and packaged goods.
- **Construction/Building Materials:** A key contributor to freight volume, reflecting active construction and infrastructure development in regions connected by the corridor. Likely, it includes cement, steel, sand, and aggregates.
- **Automobile/Manufacturing Goods:** Indicates the presence of industrial and automotive supply chains, particularly between Pune's industrial hubs and Hyderabad's manufacturing zones.
- **Empty Vehicle Movements:** Reflects directional cargo flows, especially from high-consumption areas to production hubs. High percentage of empty return trips is common in corridors with uneven cargo demand.
- **Agricultural Commodities:** A substantial component of freight volume, likely comprising food grains, pulses, vegetables, and perishables. Demonstrates the corridor's importance in Agri-trade and rural supply chains.

1.6 Future Network Developments in the Region

In the case of the project road, there are no short distance alternate routes available that will impact the traffic on the project road. However ongoing and upcoming long-distance network that could impact the project road are:

- Chennai Surat Expressway –

  The impact has considered for two pairs of traffic i.e.

  1. The traffic from Northen Maharashtra (Dhule/Aurangabad/Nashik/Ahmednagar) to Chennai Traffic will get the impact
  2. The traffic from Mumbai/Pune to Chennai traffic

Apart from the above Negative impact, Some of the Gujarat bound traffic impacted by the traffic restrictions on Dhule Aurangabad section. However, in the view of consultant, the traffic will be coming back in future once the restrictions are lifts/ Construction of Autram ghat Completes. The brief traffic assessment is provided below. The detailed network impacts have provided in Network developments chapter.

Table 1-8: Details of Network Development and Possible impact

S. No	Details of Development	Milestone/Completion	Impact type	Impact Plazas
1	Chennai Surat Expressway	Northen Part of Expressway: Surat – 513.25 km Surat – Nashik – Ahmednagar – Solapur Economic Corridor (NH-150C), also known as Surat – Solapur Expressway, is a 6 lane partially access-controlled highway approved by NHAI with a route alignment connecting Gujarat and Maharashtra. It forms the northern section of the 1271 km Surat – Chennai Expressway and consists of 2 sections: Surat – Ahmednagar (288 km) and Ahmednagar – Solapur – Akkalkot – MH/KN Border (225.25 km)	Negative	TP 1 & TP 2
2	Regain of MAV traffic due to loss of Authram ghat Closure	The traffic restriction has begun in Aug 2023. The loss of traffic estimated based on the FY 24 data.	Positive	TP 1 & TP 2
3	Hyderabad MMLP	Development of MMLP Hyderabad is in Pipeline, around 315 Acres of land identified for MMLP Hyderabad.	Positive	TP 1 & TP 2

Source: Crisil Intelligence

Figure 1-2: Chennai Surat Alignment



Source: Open Street Map, Crisil Intelligence

1.7 Traffic Projections

The table below provides the traffic growth rates considering various diversion/impacts, as provided by the Traffic Consultant:

Table 1-9: Projected Traffic Growth Rates _ TP 1(Mangalgi TP)

Vehicle Type	FY 26 - FY 31	FY 31 - FY 36	FY 36 - FY 41	FY 41 – FY 44	FY 26 - FY 44
Car/Jeep/Van	5.5%	4.7%	3.9%	3.4%	4.5%
LCV/Minibus	4.4%	4.2%	3.7%	3.2%	3.9%
2 Axle Bus	2.8%	2.6%	2.4%	2.2%	2.5%
Truck	4.6%	4.4%	3.8%	3.3%	4.1%
3 Axle Truck	-0.3%	1.2%	-0.6%	-1.3%	-0.1%
MAV	5.7%	5.3%	4.6%	4.0%	5.0%
OSV	5.7%	5.3%	4.6%	3.3%	5.0%
Total	**4.9%**	**4.5%**	**3.8%**	**3.4%**	**4.2%**
PCU	**4.8%**	**4.5%**	**3.9%**	**3.4%**	**4.2%**

Source: Crisil Intelligence

Table 1-10: Projected Traffic Growth Rates _ TP 2(Kamkole TP)

Vehicle Type	FY 26 - FY 31	FY 31 - FY 36	FY 36 - FY 41	FY 41 – FY 44	FY 26 - FY 44
Car/Jeep/Van	6.0%	5.1%	4.2%	3.7%	4.9%
LCV/Minibus	3.9%	3.7%	3.2%	2.8%	3.5%
2 Axle Bus	2.9%	2.6%	2.4%	2.2%	2.5%
Truck	4.5%	4.3%	3.7%	3.2%	4.0%
3 Axle Truck	-0.5%	0.7%	-0.8%	-1.4%	-0.4%
MAV	5.4%	5.2%	4.4%	4.0%	4.8%
OSV	5.4%	5.2%	4.4%	3.5%	4.8%
Total	**5.3%**	**4.7%**	**4.0%**	**3.4%**	**4.5%**
PCU	**4.9%**	**4.5%**	**3.9%**	**3.7%**	**4.3%**

Source: Crisil Intelligence

Table 1-11: Year wise Projected Traffic _TP 1(Mangalgi TP)

FY Year	Car/Jeep/Van	LCV/Minibus	Bus	2A Truck	3A Truck	MAV	OSV	Total	PCU	PCU Growth
FY 2026	5,927	556	541	1,360	695	2,183	3	11,266	24,389	
FY 2027	6,283	585	557	1,432	698	2,316	3	11,875	25,662	5.2%
FY 2028	6,647	614	574	1,506	701	2,455	4	12,500	26,974	5.1%
FY 2029	7,011	640	590	1,574	697	2,612	4	13,127	28,324	5.0%
FY 2030	7,381	665	606	1,640	691	2,763	4	13,751	29,644	4.7%
FY 2031	7,757	690	622	1,706	684	2,876	4	14,339	30,791	3.9%
FY 2032	8,145	719	639	1,778	679	3,014	5	14,978	32,093	4.2%
FY 2033	8,539	752	656	1,870	725	3,215	5	15,761	33,909	5.7%
FY 2034	8,937	783	673	1,949	725	3,370	5	16,441	35,338	4.2%
FY 2035	9,340	815	690	2,033	726	3,542	5	17,151	36,870	4.3%
FY 2036	9,747	848	707	2,118	727	3,718	6	17,870	38,430	4.2%
FY 2037	10,156	880	724	2,202	727	3,897	6	18,593	40,001	4.1%
FY 2038	10,568	913	742	2,287	721	4,075	6	19,313	41,554	3.9%
FY 2039	10,982	947	759	2,375	720	4,265	6	20,054	43,183	3.9%
FY 2040	11,396	981	777	2,463	713	4,453	7	20,789	44,793	3.7%
FY 2041	11,812	1,015	794	2,552	706	4,646	7	21,532	46,429	3.7%
FY 2042	12,227	1,048	812	2,638	698	4,837	7	22,266	48,038	3.5%
FY 2043	12,642	1,081	829	2,725	689	5,032	7	23,005	49,669	3.4%
FY 2044	13,056	1,115	847	2,812	680	5,231	8	23,748	51,320	3.3%
CAGR (FY 26 – FY 44)	4.5%	3.9%	2.5%	4.1%	-0.1%	5.0%	5.0%	4.2%	4.2%	

Source: Crisil Intelligence

Table 1-12: Year wise Projected Traffic _TP 1(Kamkole TP)

FY Year	Car/Jeep/Van	LCV/Minibus	Bus	2A Truck	3A Truck	MAV	OSV	Total	PCU	PCU Growth
FY 2026	14,385	960	1,024	1,855	915	2,568	4	21,711	38,778	
FY 2027	15,321	1,003	1,055	1,949	916	2,718	4	22,966	40,836	5.3%
FY 2028	16,274	1,043	1,085	2,040	912	2,847	4	24,207	42,784	4.8%

FY Year	Car/Jeep/Van	LCV/Minibus	Bus	2A Truck	3A Truck	MAV	OSV	Total	PCU	PCU Growth
FY 2029	17,252	1,083	1,116	2,131	906	3,020	4	25,512	44,946	5.1%
FY 2030	18,252	1,122	1,147	2,220	898	3,188	5	26,831	47,096	4.8%
FY 2031	19,279	1,163	1,179	2,314	890	3,340	5	28,170	49,224	4.5%
FY 2032	20,327	1,205	1,211	2,409	882	3,496	5	29,536	51,396	4.4%
FY 2033	21,393	1,252	1,243	2,526	925	3,716	5	31,061	54,102	5.3%
FY 2034	22,477	1,298	1,275	2,633	924	3,904	6	32,517	56,516	4.5%
FY 2035	23,575	1,345	1,308	2,743	923	4,097	6	33,996	58,974	4.3%
FY 2036	24,687	1,392	1,340	2,854	920	4,295	6	35,495	61,474	4.2%
FY 2037	25,811	1,438	1,373	2,965	917	4,496	7	37,007	63,995	4.1%
FY 2038	26,945	1,485	1,406	3,077	908	4,697	7	38,524	66,510	3.9%
FY 2039	28,087	1,533	1,439	3,192	903	4,909	7	40,070	69,112	3.9%
FY 2040	29,236	1,580	1,472	3,307	893	5,122	7	41,618	71,705	3.8%
FY 2041	30,390	1,629	1,506	3,424	882	5,339	8	43,178	74,332	3.7%
FY 2042	31,548	1,675	1,539	3,537	870	5,555	8	44,732	76,932	3.5%
FY 2043	32,707	1,721	1,573	3,652	858	5,775	8	46,294	79,560	3.4%
FY 2044	33,867	1,768	1,606	3,767	845	6,000	9	47,862	82,212	3.3%
CAGR (FY 26 – FY 44)	4.9%	3.5%	2.5%	4.0%	-0.4%	4.8%	4.8%	4.5%	4.3%	

Source: Crisil Intelligence

1.7.1 Tollable Length and Toll Rates

The total length for the project road is about 144.95 kms and tollable length at TP 1 is 76.48kms and at TP 2 is 77.60kms. toll rates are revised every year on April 1st as per notification by the Ministry of Road Transport and Highways in the National Gazette. The present toll rates are determined with reference to the published base toll rates and are adjusted annually at the beginning of each fiscal year equal to 40% of the movement in the wholesale price index in December of the preceding year plus a fixed 3%.

As per Gazette notification dated 05.12.2008, under National Highways Fee (Determination of Rates and Collection) Rules 2008 [GSR 838 (E)], Toll rates at both toll Plazas applicable for current fiscal (FY26) is provided below:

Table 1-13: Toll Rates (INR) _ TP 1 (Mangalgi TP)

Type of vehicle	Single Journey	Return Journey	Monthly Pass	Local Commercial	Local Pass
Car/Jeep/Van	115	175	3,870	60	350
LCV/Minibus	190	280	6,255	95	
2 Axle Bus	395	590	13,105	195	
Truck	395	590	13,105	195	
3 Axle Truck	430	645	14,295	215	
MAV	615	925	20,550	310	
OSV	750	1,125	25,015	375	

Source: Crisil Intelligence

Table 1-14: Toll Rates (INR) _ TP 2 (Kamkole TP)

Type of vehicle	Single Journey	Return Journey	Monthly Pass	Local Commercial	Local Pass
Car/Jeep/Van	120	175	3,930	60	350
LCV/Minibus	190	285	6,345	95	
2 Axle Bus	400	600	13,295	200	
Truck	400	600	13,295	200	
3 Axle Truck	435	655	14,505	220	
MAV	625	940	20,850	315	
OSV	760	1,140	25,385	380	

Source: Crisil Intelligence

1.8 Revenue Projections

The revenue in ₹ millions for the project road is projected to grow at a CAGR of about 8.9 percent for the forecast period from FY26 to FY44 and is presented in the below table. The actual Concession period will be ending on 31st March 2039. However, Concession period estimated to extend by 5 years as per target traffic provisions in the CA and COVID related extension is 8 Days. The revised concession period will get complete on 6th April 2044.

Table 1-15: Projected Revenue in ₹ Millions

FY Year	TP 1 _ Mangalgi TP	TP 2 _Kamkole TP	Total DTPL
FY 2026	1,063	1,574	2,637
FY 2027	1,161	1,716	2,877
FY 2028	1,279	1,886	3,165
FY 2029	1,400	2,066	3,466
FY 2030	1,533	2,258	3,791
FY 2031	1,665	2,463	4,128
FY 2032	1,816	2,700	4,515
FY 2033	2,007	2,965	4,971
FY 2034	2,182	3,225	5,407
FY 2035	2,383	3,519	5,901
FY 2036	2,603	3,866	6,469
FY 2037	2,827	4,178	7,005
FY 2038	3,066	4,546	7,613
FY 2039	3,332	4,940	8,272
FY 2040	3,620	5,362	8,982
FY 2041	3,913	5,796	9,709
FY 2042	4,233	6,269	10,501
FY 2043	4,576	6,785	11,360
FY 2044	4,956	7,333	12,288
FY 2045*	88	130	218
CAGR (FY 26 – FY 44)	8.9%	8.9%	8.9%

Source: Crisil Intelligence
**FY45 revenue is only for 6 days.*

2 Introduction

2.1 Asset Overview

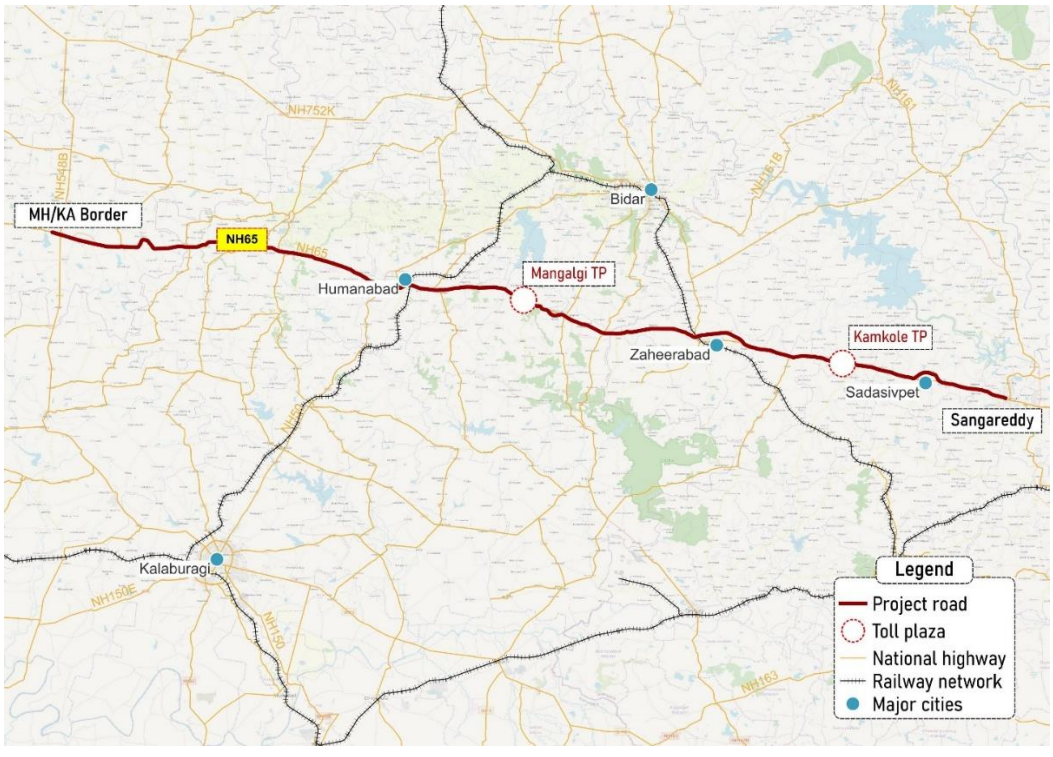
DTPL asset is four-lane, 145 km road connecting Sangareddy to Karnataka/Maharashtra on a DBFOT (Design-Build-Finance-Operate-Transfer) basis. The road is a crucial section of NH 65, The National Highway-65 (Old NH-9) originates from Pune in the state of Maharashtra and ends at Machilipatnam in the state of Andhra Pradesh. The highway passes through several important cities such as Indapur, Solapur, Omerga, Humnabad, Zaheerabad, Hyderabad, Suryapet and Vijayawada with a total length of 920km. The Project Road section of 145 km starts from Maharashtra/Karnataka border in Karnataka and ends at Sangareddy in the state of Telangana. The DTPL asset is strategically situated on a key corridor connecting two major economic and industrial centers of India—Pune and Hyderabad. This alignment makes the assets a critical link for freight movement between Maharashtra and Telangana, serving both intra-state and inter-state logistics needs. Given its location, a significant share of commercial and industrial traffic between Pune and Hyderabad naturally passes through this corridor, ensuring steady and high-volume usage.

Table 2-1: Details of the road stretch

Project stretch	State	Toll plaza	Length (km)
MH/KA Border to Sangareddy section of NH-65	Karnataka & Telangana	Mangalgi TP & Kamkole TP	145

Source: Crisil Intelligence

Figure 2-1: Project stretch alignment



Source: Open Street Map, Crisil Intelligence

Table 2-2: Key details of project stretch

Project stretch	MH/KA Border to Sangareddy Section of NH 65
Authority	National Highway Authority of India
Concessionaire	Deccan Toll ways Private Limited (DTPL)
Project type	Design, build, finance, operate, and transfer (DBFOT)
No. of lanes	4-lane configuration
Length of Project Stretch	145 Km
No. of Toll Plaza(s)	02
Name of Toll Plaza(s)	Mangalgi Toll Plaza & Kamkole Toll Plaza
Concession Period	25 Years
CA Signed	February 2012
Appointed Date	01 April 2014

Source: Concession Agreement, Crisil Intelligence

2.2 Scope

The scope of the traffic assessment for the project road is divided into following four sections.

1. Detailed Assessment of the project road
   Include review of the Historic TMS Data, past traffic growth, detailed network assessment.
2. Primary Data collection & Analysis
   Conducting preliminary traffic surveys like TVC and Origin-Destination (O-D) to understand the traffic patterns, commodity profiles.
3. Network Impact Assessment
   To Analyse the upcoming network developments which may impact the project road traffic
4. Traffic and Revenue Projections
   Traffic & Revenue projections considering relevant growth drivers and network developments

Approach & Methodology is detailed out in Traffic Growth Estimation & Traffic forecast chapter.

2.3 Network Profile and traffic characteristics

The DTPL asset functions as a critical multi-commodity corridor, facilitating seamless freight movement between two of South India's most significant cities. The corridor intersects several major north–south routes, effectively forming feeder and distribution channels for long-haul freight. It connects with major corridors of NH 48 (Mumbai–Chennai Corridor) near Pune and NH 44 (Delhi–Bengaluru Corridor) near Hyderabad along with NH 16 (Kolkata–Chennai Coastal Corridor) near Vijayawada. Apart from the Chennai Surat Expressway, there are no major alternative routes at the local or larger network level. Even micro alternate routes were identified and arrested the leakages by installing check plaza.

Figure 2-2: Regional Connectivity

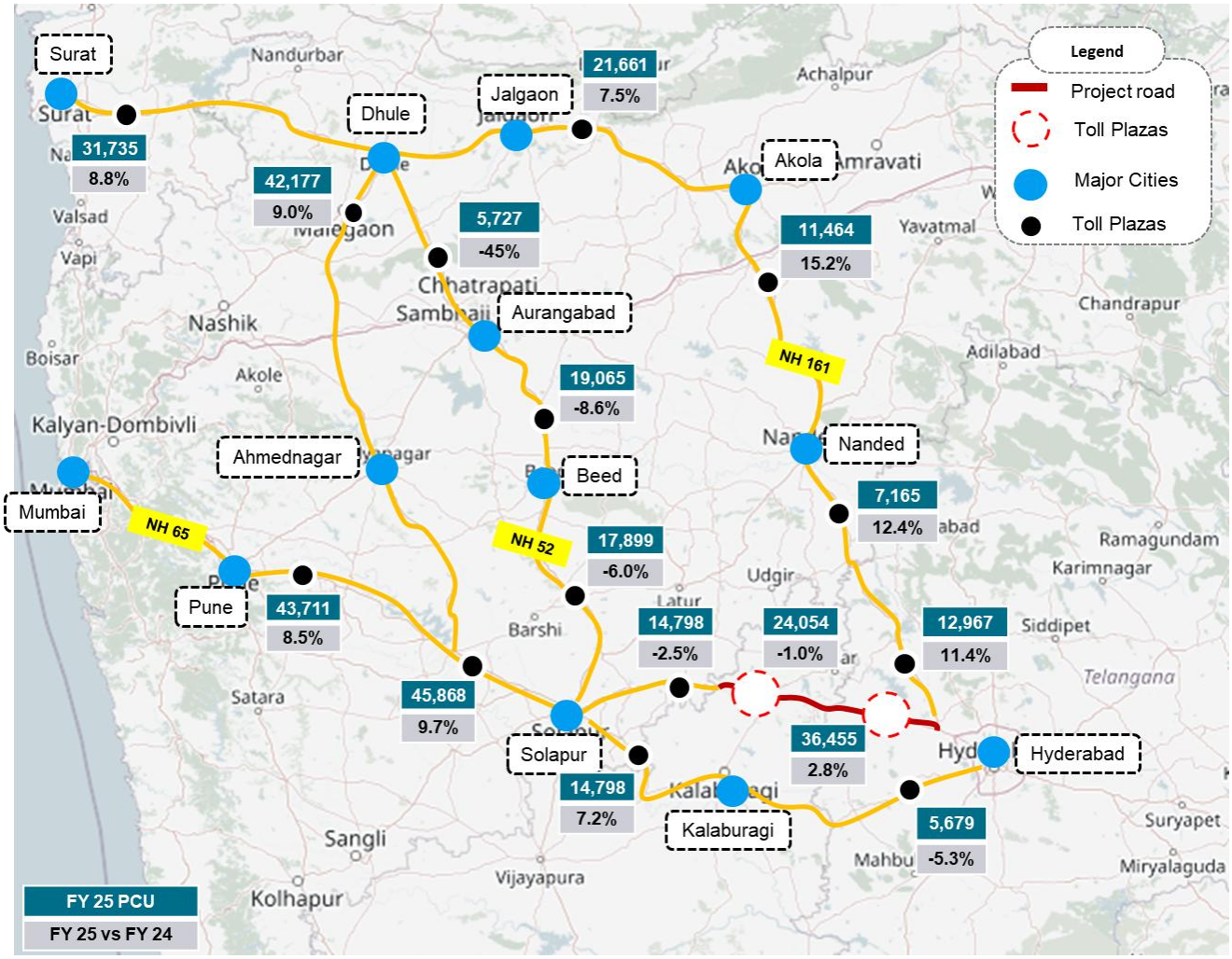


Source: Open Street Map, Crisil Intelligence

Neighbourhood project roads/assets have shown good traffic growth in the recent years

Indian Highways Management Company Limited (IHMCL) publishes toll plazas traffic data for the plazas on national highways and data is analyzed for few neighboring plazas to understand traffic growth patterns in the region, nearby plazas have shown good traffic growth in recent years. However, the project road plazas have shown muted growth in FY 25 due to subsequent stretches construction activities / traffic restrictions on Dhule Aurangabad section. The detailed impacts have detailed out in Diversion & Development chapter. FY 25 traffic PCU and PCU growth for FY24-FY25 are presented in the below figure. The alternate route networks are present since long back, the traffic pattern has already been established.

Figure 2-3: Neighbourhood/Regional plazas traffic & growth

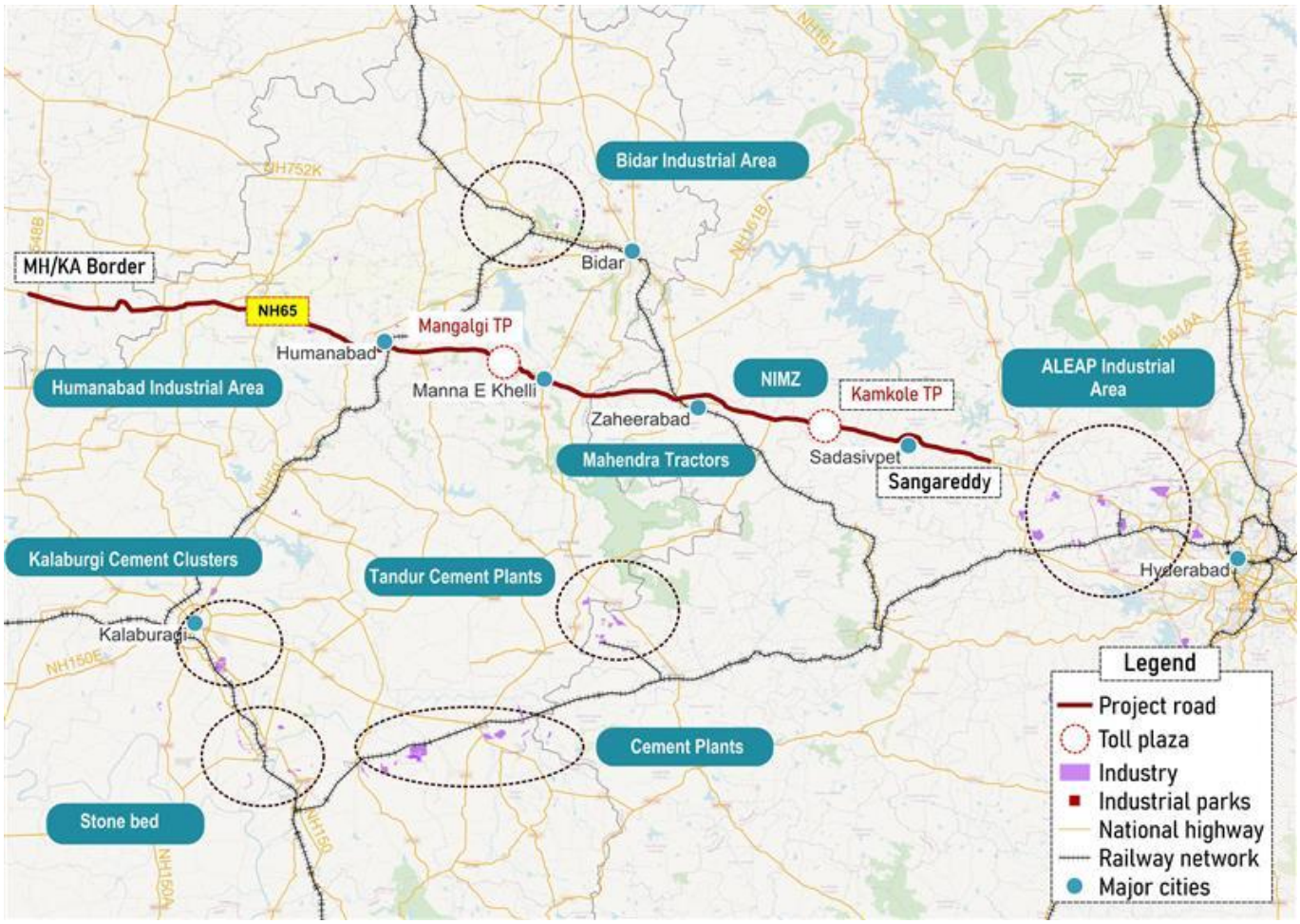


Source: Open Street Map, Crisil Intelligence, IHMCL Data

Industries near Project Stretch

Asset is spanning in between 2 states namely Telangana State and Karnataka. Key industrial clusters in and around project corridor are Hyderabad, Bidar, Humnabad, Zaheerabad, Kalaburagi, Sangareddy. Map shown below represents industrial areas near catchment of project stretch.

Figure 2-4: Industries near Project vicinity



Source: Open Street Map, Crisil Intelligence

2.4 Overview of Key Influence Area & Industrial profile

The project road entirely falls in the states of Karnataka and Telangana. A brief description of key influencing district around the project section is presented below.

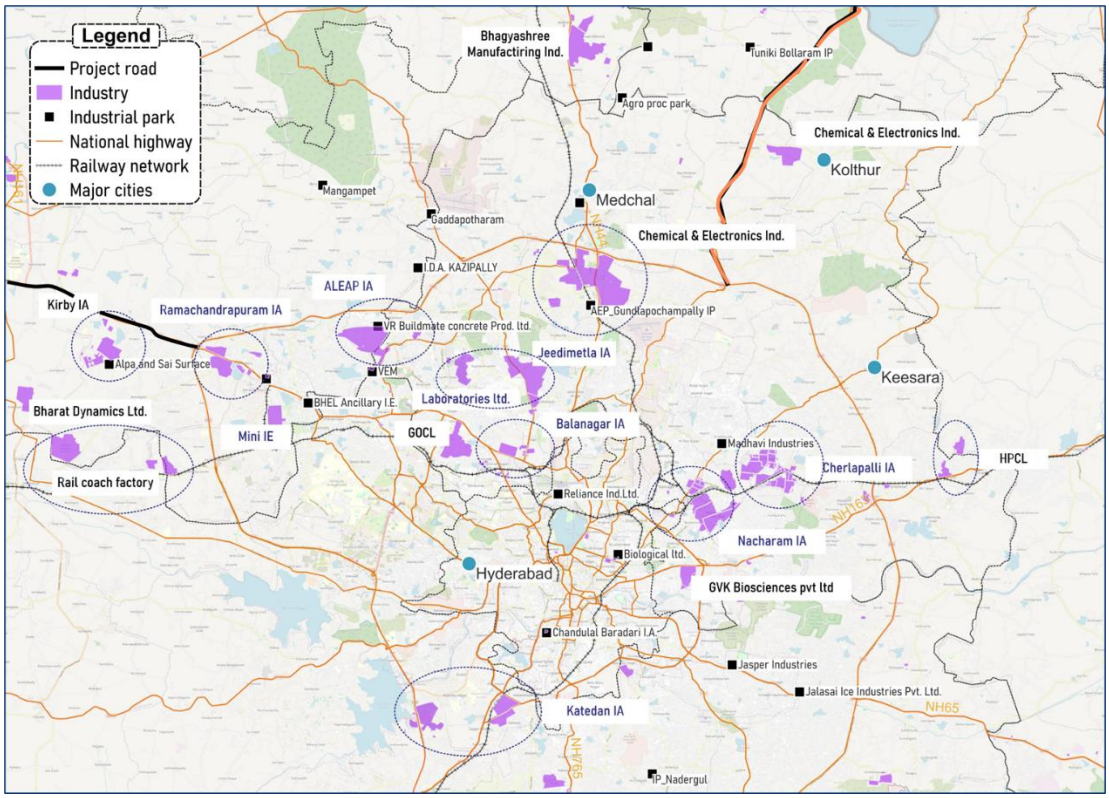
Hyderabad District Profile

The Hyderabad Metropolitan Development Authority (HMDA) was formed in the year 2008, with an area of 7,257 Sq Km under its purview. HMDA jurisdiction covers (7) Districts, (70) Mandals, 1032 Villages including Greater Hyderabad Municipal Corporation consisting of 175 Villages and 40 Municipalities / Nagar Panchayats consisting of 138 villages and remaining 719 Villages under jurisdiction of the HMDA.

The Hyderabad metropolitan region had a population of approximately 7.67 million in 2011 and is estimated to reach around 11.23 million by 2025, reflecting sustained urban growth and rising demand on infrastructure and logistics. Hyderabad hosts several large-scale industrial clusters, including Jeedimetla (machinery and manufacturing), Jeedimetla MSMEs and government-supported zones, as well as major biotech and pharma parks like Genome Valley, Jeedimetla, Balanagar, Jeedimetla, and the upcoming Hyderabad Pharma City—a planned 19,000-acre pharmaceutical cluster designed to attract global investment and generate substantial employment. The city also serves as a national IT and life-sciences hub. In FY 2024–25, Hyderabad's STPI (Software Technology

Parks of India) units exported around ₹1.43 lakh crore in software, supported startups and innovation labs, while global firms like Eli Lilly have opened large technology and innovation centres, further strengthening Hyderabad's role in high-value service and industrial supply chains.

Figure 2-5: Industrial areas in Hyderabad district



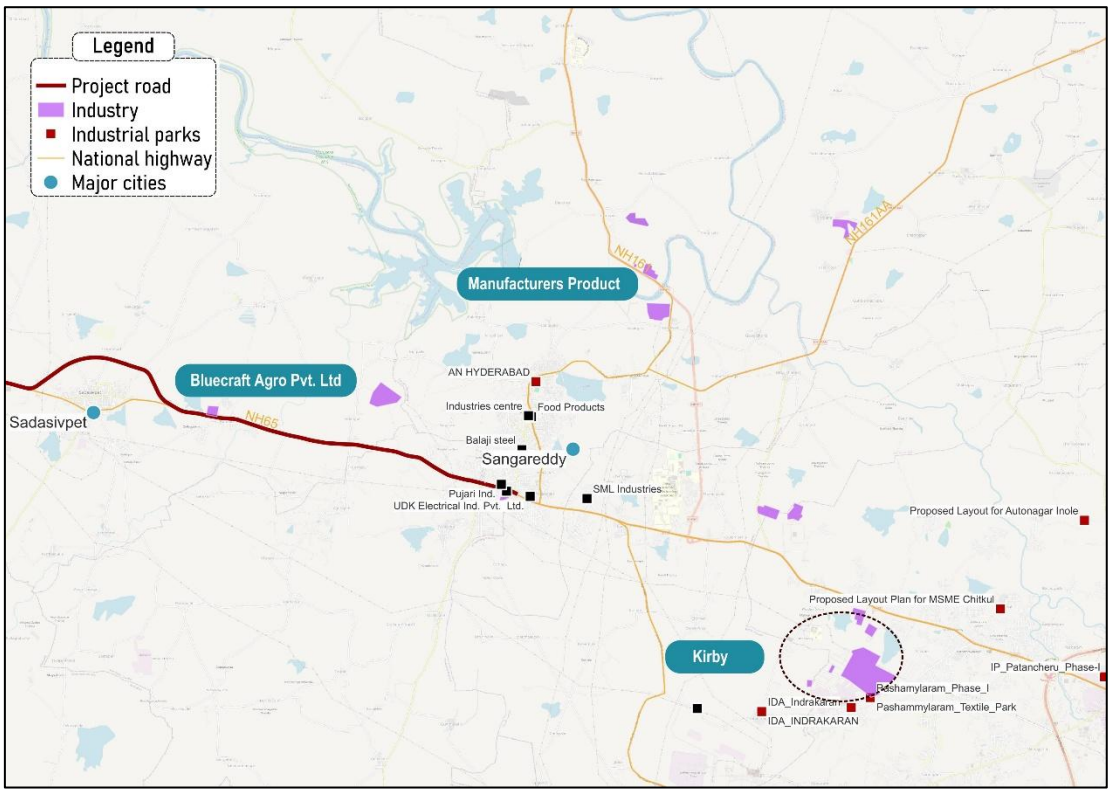
Source: Open Street Map, Crisil Intelligence

Sangareddy District Profile

Sangareddy District is located in the northern region of the Indian state of Telangana. The district is spread over an area of 4,464.87 square kms (1,723.90 sq mi). As of 2011 Census of India, the district has a population of 15,27,628. The district will have three revenue divisions of Narayankhed, Sangareddy and Zaheerabad are sub-divided into 26 mandals.

The city has three large-scale public sector industries in its constituency. These are BHEL, BDL, Ordnance Factory Medak. The district has many industries are like MRF Factory in Sadashivpet, Mahindra Factory in Zaheerabad and Aurobindo Pharma in Patancheru Mandal. Sangareddy is also an institutional and pharmaceutical hub with presence of education institute Listed Pharma companies such as Gland Pharma, Aurobindo pharma, Biocon limited etc. derives the growth of the district. The city has mainly an agricultural economy (rice, sugarcane, and oilseeds) and is noted for the manufacture of brass, silverware, and silk cloth.

Figure 2-6: Industrial areas in Sangareddy district



Source: Open Street Map, Crisil Intelligence

3 Primary Data Collection & Analysis

3.1 General

Primary traffic surveys, i.e. Traffic volume count and Origin Destination surveys were collected on the project road to understand the traffic and travel pattern of vehicles plying on the project road.

For the present study, seven days video-based traffic volume count and two days (48-Hours) origin destination survey conducted at the toll plaza locations on the project road. The schedule of the traffic surveys carried out as part of the study on the project road are presented in the below table and figure.

Table 3-1: Type of Survey & Schedule

Location	Type of Survey	Survey Duration	Survey Date
DTPL	Traffic Volume Count (TVC) Survey _Both Plazas	7 Days	5th May 2025 to 11th June 2025
	Origin-Destination (O-D) Survey _TP 1	2 Days	8th May 202t to 9th May 2025
	Origin-Destination (O-D) Survey _TP 2	2 Days	9th May 202t to 10th May 2025

Source: Crisil Intelligence

Figure 3-1: Survey Locations



Source: Open Street Map, Crisil Intelligence

3.2 TVC Analysis and key findings

The seven days traffic volume count was analysed to get existing traffic intensity, daily variations, and traffic composition.

The vehicle classification and there PCU values as suggested in IRC: 64-1990 are presented in below table.

Table 3-2: PCU Factors-IRC:64-1990

Mode	PCU
Car/Jeep	1.0
Two-Wheeler	0.5
Three-Wheeler	1.0
Minibus/School Bus	1.5
Bus (Govt/Pvt)	3.0
Mini LCV	1.0
LCV	1.5
2-Axle	3.0
3-Axle	3.0
MAV (4-6 Axles)	4.5
HME/OSV	4.5
Agricultural Tractor	1.5
Agricultural Tractor with Trailer	4.5
Cycle	0.5
Cycle Rickshaw	2.0
Animal Drawn Crat	6.0

Source: IRC:64-1990

The average daily tollable traffic volume at the toll plaza locations were analysed. The summary of ADT in terms of vehicles and PCUs is presented in table.

Table 3-3: Average Daily Traffic (ADT) for the TP 1 _ Mangalgi Toll Plaza

Vehicle	Hyderabad to Solapur	Solapur to Hyderabad	ADT
Car	3,245	3,382	6,626
Minibus	19	22	41
Bus	274	271	545
LCV	529	567	1,095
Truck 2A	458	459	917
Truck 3A	356	342	698
MAV	999	1,068	2,068
OSV	1	1	2
Total	**5,881**	**6,112**	**11,994**
PCU	**11,834**	**12,295**	**24,129**

Source: Crisil Intelligence

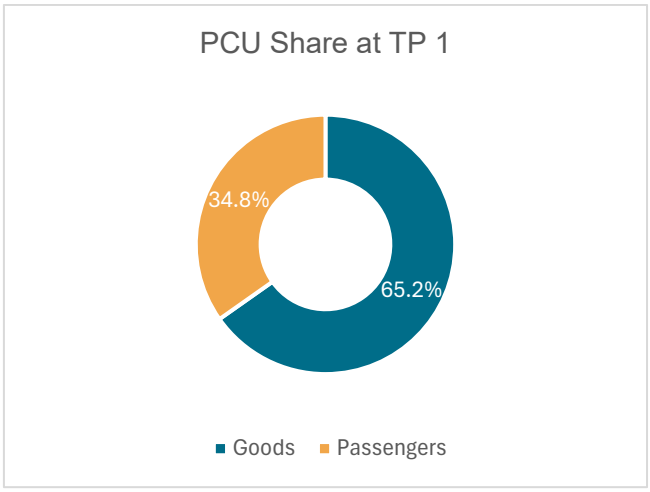
Table 3-4: Average Daily Traffic (ADT) for the TP 2 _ Kamkole Toll Plaza

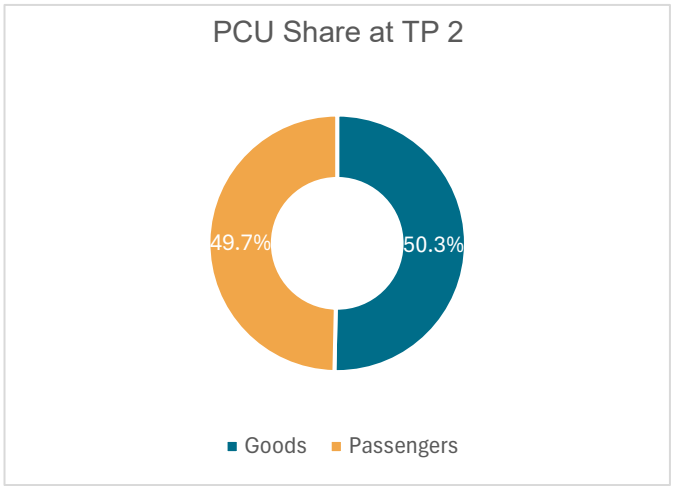
Vehicle	Hyderabad to Solapur	Solapur to Hyderabad	ADT
Car	7,721	7,971	15,692
Minibus	37	43	80
Bus	527	531	1,058
LCV	778	777	1,555
Truck 2A	626	648	1,274
Truck 3A	436	448	884

MAV	1,130	1,219	2,349
OSV	2	1	3
Total	**11,256**	**11,638**	**22,893**
PCU	**18,801**	**19,571**	**38,372**

Source: Crisil Intelligence

Figure 3-2: PCU share _TP 1 & TP 2





Source: Survey Data, Crisil Intelligence

An analysis of TVC traffic at Mangalgi Plaza is presented below.

- Passenger vehicles constitute 35% of the tollable traffic and Goods 65% of the tollable traffic in PCU terms.
- MAV is having highest PCU share with around 39%, followed by cars with 27% share.
- Average Daily traffic is about 11,994 and 24,129 in traffic vehicles and PCU terms respectively.

An analysis of TVC traffic at Kamkole Plaza is presented below.

- Passenger vehicles constitute 49.7% of the tollable traffic and Goods 50.3% of the tollable traffic in PCU terms.
- Cars is having highest PCU share with around 41%, followed by MAV with 28% share.
- Average Daily traffic is about 22,893 and 38,372 in traffic vehicles and PCU terms respectively.

TVC survey data for the seven-day period is presented in the below table.

Table 3-5: Daily traffic volume at Mangalgi Plaza based on TVC survey

Date	Car	LCV+2A	Bus	Truck-3Axle	MAV	OSV	Total
5/5/2025	6,875	1,815	569	600	1,832	0	11,691
5/6/2025	5,919	1,925	573	658	1,946	2	11,023
5/7/2025	5,734	2,095	566	689	2,032	5	11,121
5/8/2025	6,489	2,193	561	724	2,154	5	12,126
5/9/2025	6,005	2,056	549	650	2,201	1	11,462
5/10/2025	6,662	2,253	574	704	2,043	1	12,237
5/11/2025	8,700	2,038	579	708	2,267	3	14,295

Source: Survey Data, Crisil Intelligence

Toll Management system (TMS) data was provided survey days, and comparison is made with TVC (survey data).

Overall variations of traffic are about **0.4%** and which is within tolerable limits.

Table 3-6: TMS vs TVC Variations at Mangalgi TP

Data	CJV	LCV+2AT	Bus	3AT	MAV+OSV	Total
WADT (TVC)	6,626	2,053	567	674	2,068	11,989
WADT (TMS)	6,703	1,875	563	700	2,094	11,935
Variations	**-1.1%**	**9.5%**	**0.7%**	**-3.8%**	**-1.2%**	**0.4%**

Table 3-7: Daily traffic volume at Kamkole Plaza based on TVC survey

Date	Car	LCV+2A	Bus	Truck-3Axle	MAV	OSV	Total
5/5/2025	15,935	2,756	1,107	838	2,244	1	22,881
5/6/2025	13,423	2,846	1,071	878	2,247	2	20,467
5/7/2025	13,416	2,954	1,072	865	2,308	8	20,623
5/8/2025	15,102	3,098	1,073	874	2,479	4	22,630
5/9/2025	17,054	2,848	1,067	906	2,474	0	24,349
5/10/2025	15,725	3,103	1,093	875	2,418	1	23,215
5/11/2025	19,186	2,752	1,079	796	2,271	3	26,087

Source: Survey Data, Crisil Intelligence

Toll Management system (TMS) data was provided survey days, and comparison is made with TVC (survey data). Overall variations of traffic are about**- 1.0%,** and which is within tolerable limits.

Table 3-8: TMS vs TVC Variations at Kamkole TP

Data	CJV	LCV+2AT	Bus	3AT	MAV+OSV	Total
WADT (TVC)	15,692	2,908	1,080	862	2,351	22,893
WADT (TMS)	16,006	2,743	1,039	883	2,365	23,036
Variations	**-2.0%**	**6.0%**	**4.0%**	**-2.4%**	**-0.6%**	**-0.6%**

3.3 Origin-Destination (OD) and Commodity Analysis

Origin-Destination survey was carried out at both toll Plazas for 2 Days (48-hours), by roadside interview method as described in IRC: 102-1988. A random sampling approach was employed to interview both passenger and freight vehicles traversing the project road at the toll plaza locations. The survey aimed to gather information on various aspects, including origin, destination, frequency of trips, purpose of travel and for freight vehicles, the type of commodity being transported.

The regional distribution of tollable vehicles at the toll plaza locations has been estimated based on OD matrices is presented in below table and figure.

The project influencing states will provide an overview of the factors likely to influence the pattern of economic development and hence the flows and volumes of traffic on the project road.

3.3.1 Regional Influence

The key influencing regions from the origin destination survey are Hyderabad, Sangareddy, Zaheerabad, Kalaburagi

and Bidar for passenger traffic and for goods traffic Hyderabad, Mumbai, Pune, Solapur and Andhra Pradesh. Regional distribution for passenger traffic and goods traffic is given in the below table.

Table 3-9: Regional Distribution in % for TP 1

State/Region	Cars	Buses	LCV	2AT	3AT	MAV
Maharashtra	22.8%	17.5%	35.2%	35.2%	36.5%	35.8%
Telangana	36.9%	34.5%	39.0%	39.5%	39.6%	37.2%
Karnataka	37.5%	42.9%	16.4%	15.1%	11.1%	11.2%
Andhra Pradesh	1.1%	0.4%	4.9%	4.2%	5.0%	7.0%
Gujarat	0.7%	0.1%	1.8%	3.1%	4.6%	5.4%
Tamil Nadu	0.3%	0.4%	1.7%	1.7%	1.9%	2.4%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Source: Crisil Intelligence

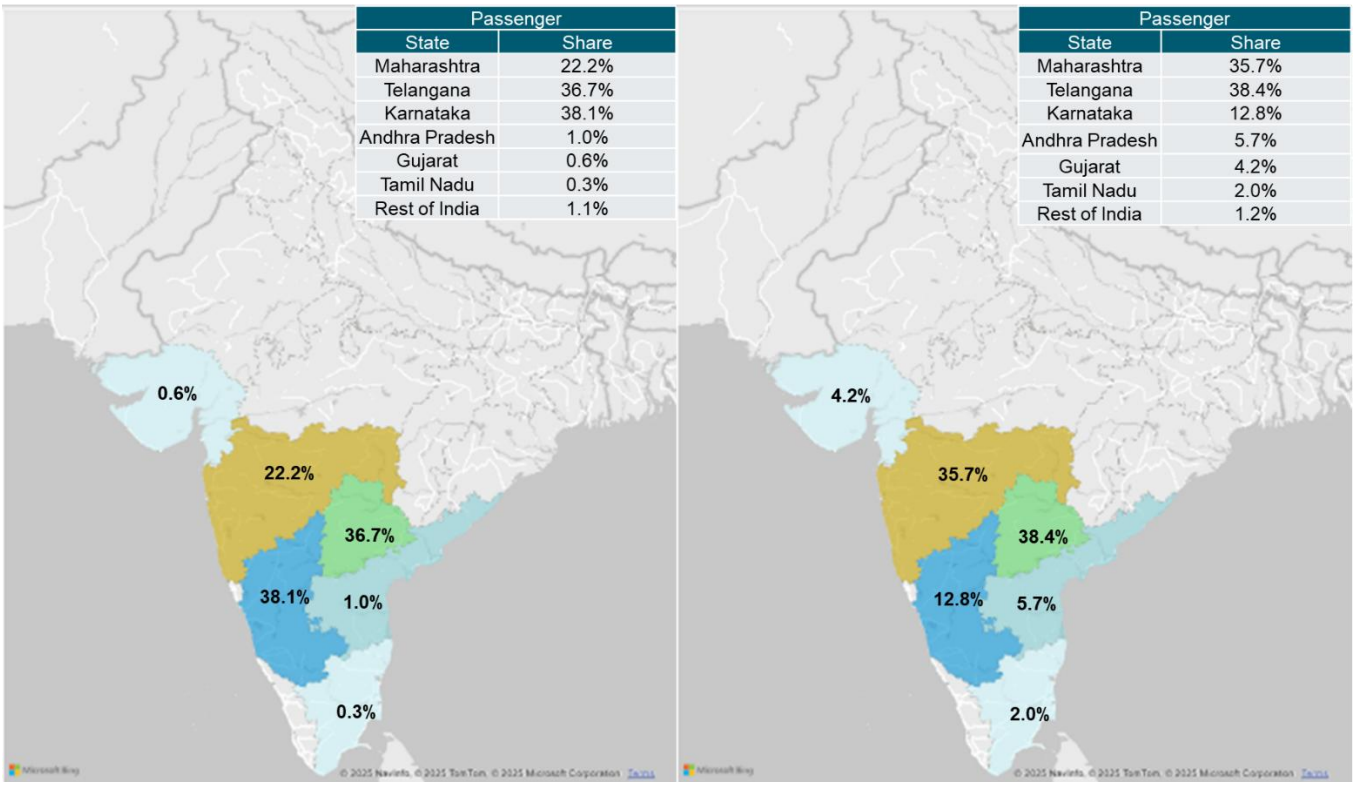
Table 3-10: Regional Distribution in % for TP 2

State/Region	Cars	Buses	LCV	2AT	3AT	MAV
Maharashtra	8.4%	7.1%	17.4%	25.1%	26.4%	28.7%
Telangana	70.4%	73.2%	63.4%	52.3%	48.6%	44.4%
Karnataka	18.9%	17.4%	10.3%	9.4%	10.0%	8.8%
Andhra Pradesh	0.8%	0.3%	2.7%	4.9%	5.8%	6.6%
Gujarat	0.5%	0.5%	3.3%	4.6%	4.5%	5.4%
Tamil Nadu	0.4%	0.7%	1.4%	2.5%	2.7%	3.8%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Source: Crisil Intelligence

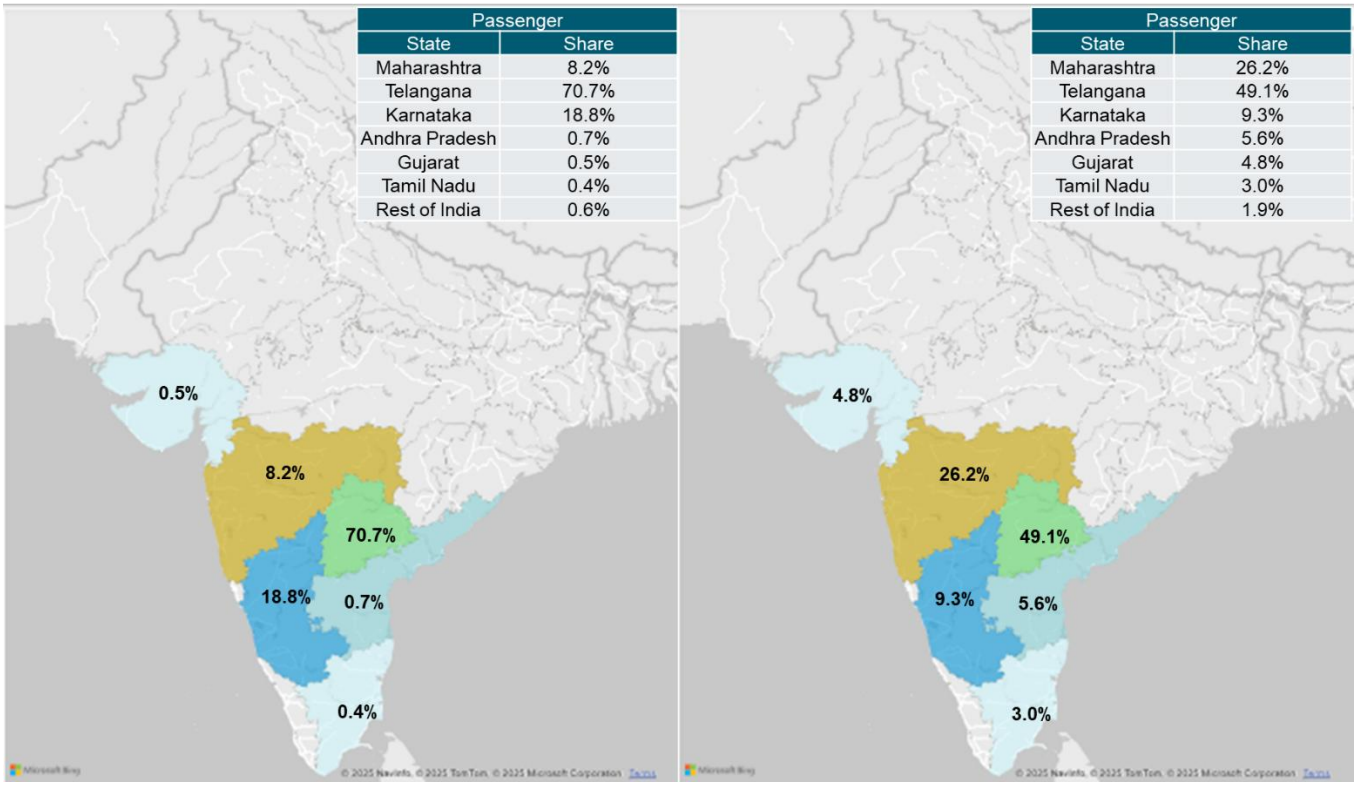
- *At* overall level, Telangana and Maharashtra state traffic influence is highest and followed by Karnataka and Andhra Pradesh.
- At TP 1, TG, KA and MH Contributing similar share as plaza located near the Maharashtra Karnataka Border.
- At TP 1. more than 35% MAV share observed from Telangana and Maharashtra as major traffic originating from Hyderabad city to wards Pune, Mumbai.
- At TP 2, 70% cars from Telangana are majorly driven by nearby urban settlement areas Sangareddy, Zaheerabad and Hyderabad. And 44% MAV traffic from Telangana.

Figure 3-3: State Influence for Passengers and Goods Vehicles at TP 1



Source: Crisil Intelligence

Figure 3-4: State Influence for Passengers and Goods Vehicles at TP 2



Source: Crisil Intelligence

3.3.2 Top OD Pairs

Key OD pairs-Car traffic

At toll plaza 1, Hyderabad to Kalvabuggi is a top od pair accounting for 9.0% of the car traffic followed by Hyderabad to Solapur, Hyderabad to Mumbai and Hyderabad to Humnabad etc. (OD pairs includes both direction movements). Top 10 OD pairs contribute to nearly 58% of the traffic in overall cars traffic at this plaza.

Similarly at toll plaza 2, Hyderabad to Zaheerabad is top od pair accounting for ~10% of the car traffic at toll plaza followed by Hyderabad to Bidar, Sangareddy to Zaheerabad and Hyderabad to Mumbai etc. (OD pairs includes both direction movements). Top 10 OD pairs contribute to nearly 43% of the traffic in cars and top 10 OD pairs traffic for both plazas are presented in the below table.

Table 3-11: Top OD pairs for car traffic

OD Pair _TP 1	% Influence	OD Pair _TP 2	% Influence
Hyderabad To Kalvabuggi	9.0%	Hyderabad To Zaheerabad	9.8%
Hyderabad To Solapur	8.9%	Hyderabad To Bidar	8.9%
Hyderabad To Mumbai	7.8%	Sangareddy To Zaheerabad	7.4%
Hyderabad To Humnabad	6.2%	Hyderabad To Mumbai	3.7%
Hyderabad To Pune	5.9%	Sangareddy To Bidar	2.8%
Bidar To Humnabad	4.6%	Hyderabad To Kamkole	2.6%
Mannaekhelli To Humnabad	4.2%	Hyderabad To Mannaekhelli	2.1%
Zaheerabad To Humnabad	4.0%	Hyderabad To Pune	2.1%
Hyderabad To Basavakalyan	3.5%	Sadashivpet To Zaheerabad	2.0%
Bidar To Kalvabuggi	3.4%	Patancheruvu To Zaheerabad	2.0%

Source: Crisil Intelligence

Key OD pairs-MAV traffic

At toll plaza 1, Hyderabad to Mumbai is a top OD pair accounting for 19.0% of the MAV traffic followed by Hyderabad to Pune, Hyderabad to Solapur and Vijayawada to Mumbai etc. (OD pairs includes both direction movements). Top 10 OD pairs contribute to nearly 58% of the traffic in overall cars traffic at this plaza.

Similarly at toll plaza 2, Hyderabad to Mumbai is top od pair accounting for ~14% of the MAV traffic at toll plaza followed by Hyderabad to Pune, Hyderabad to Solapur and Hyderabad to Zaheerabad etc. (OD pairs includes both direction movements). Top 10 OD pairs contribute to nearly 42% of the traffic in cars and top 10 OD pairs traffic for both plazas are presented in the below table.

Table 3-12: Top OD pairs for MAV traffic

OD Pair _TP 1 _Mangalgi TP	% Influence	OD Pair _TP 2 _Kamkole TP	% Influence
Hyderabad To Mumbai	19.3%	Mumbai To Hyderabad	13.5%
Hyderabad To Pune	12.4%	Pune To Hyderabad	6.5%
Hyderabad To Solapur	7.5%	Solapur To Hyderabad	4.3%
Guntur/Vijayawada to Mumbai	3.6%	Zaheerabad To Hyderabad	4.0%
Hyderabad To Surat	3.2%	Bidar To Hyderabad	3.1%
Hyderabad To Ahmedabad	3.0%	Mumbai To Guntur/Vijayawada	2.5%
Guntur/Vijayawada to Pune	2.3%	Mumbai To Sangareddy	2.1%

Hyderabad To Kalvabuggi	2.3%	Mumbai To Chennai	2.1%
Chennai To Mumbai	2.1%	Ahmedabad To Hyderabad	2.0%
Hyderabad To Basavakalyan	2.0%	Latur To Hyderabad	1.8%

Source: Crisil Intelligence

3.3.3 Internal External Analysis

The zones which fall along the project road and very near project road are considered as internal zones and other zones are considered as external zones. If both end of the trips are internal, those trips are internal-internal trips. If one end of the trips is internal and other is external those trips are internal to external and external to internal trips. If both ends of the trips are external, those are external-external trips. Internal-External analysis is presented in the below figure, its shows about 7.4% trips move within the project road at TP 1 and 13% at TP 2. 82% of MAV trips are External to External at TP 1 And 73% are at TP 2. Vehicle category wise zones analysis provided below.

Figure 3-5: Internal-External Influence – Toll Plaza 1

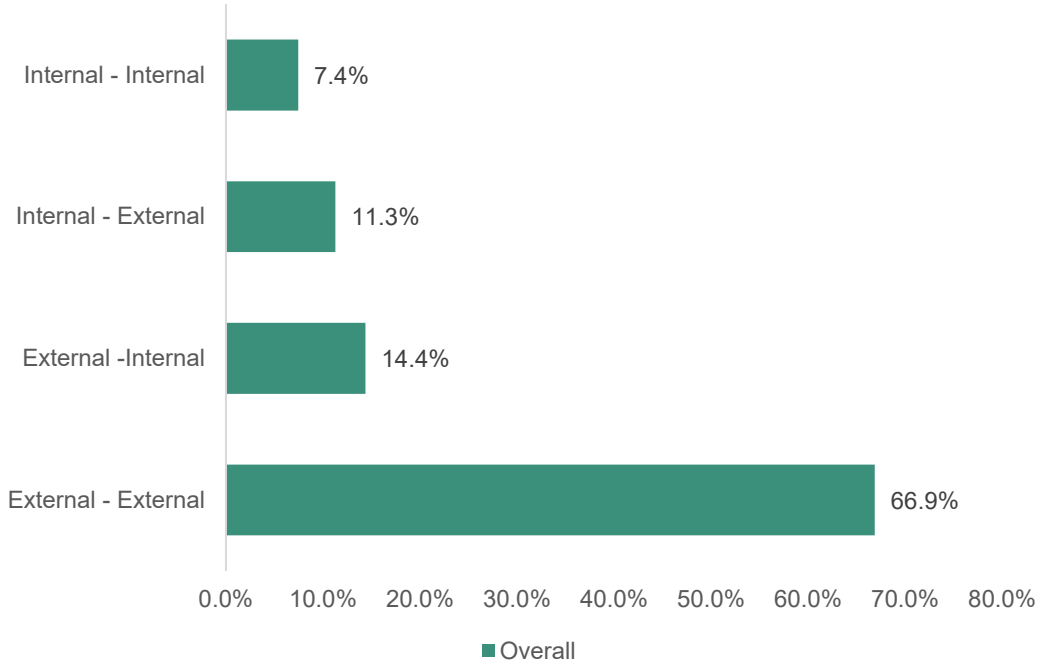
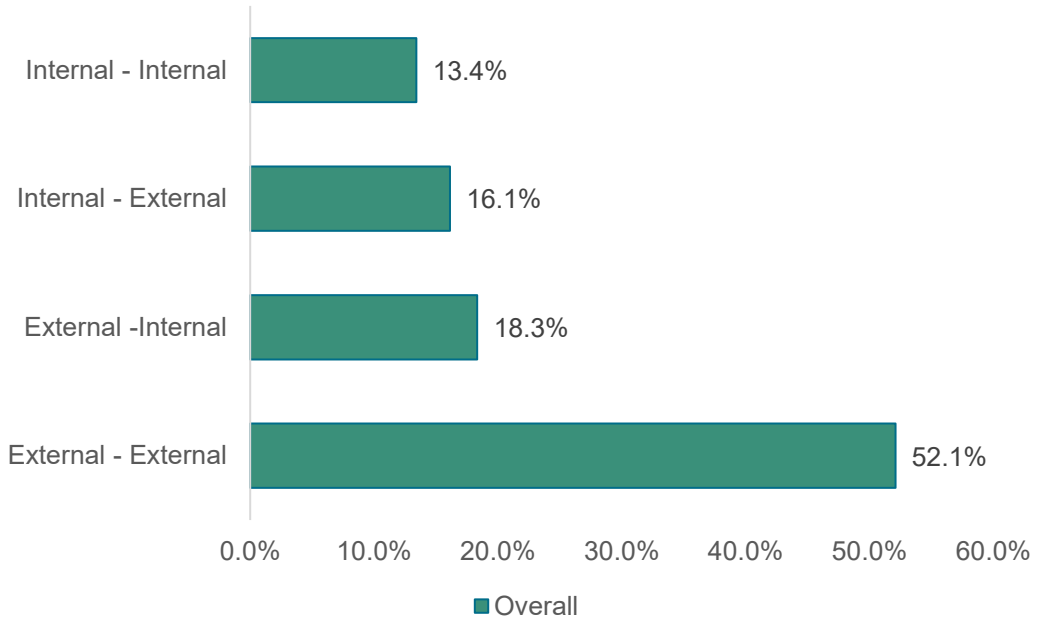


Figure 3-6: Internal-External Influence – Toll Plaza 2



3.4 Commodity Distribution

Analysis was carried out to understand the various freight vehicles being used to transport different commodities. Table below presents the commodity distribution for Mangalgi toll Plaza.

Table 3-13: Commodity Distribution (in %) for Mangalgi Plaza

Commodity	LCV	2 Axle Truck	3 Axle Truck	MAV	Total
Empty	20.0%	20.1%	14.8%	16.0%	17.4%
Courier & parcel	21.0%	16.6%	18.3%	13.6%	15.9%
Consumer Foods	14.1%	12.4%	13.4%	11.7%	12.4%
Agri Produce	7.7%	10.1%	10.4%	8.0%	8.9%
Construction materials	2.8%	4.0%	5.7%	9.7%	6.7%
Automobiles	4.8%	4.9%	5.5%	4.8%	4.9%
Iron & Steel Products	2.0%	3.2%	3.3%	5.8%	4.3%
Chemical products	1.4%	2.9%	3.7%	5.0%	3.8%
Consumer Products	2.8%	4.0%	5.5%	3.2%	3.7%
Petroleum Products	3.6%	2.4%	3.2%	4.2%	3.5%
Plastic products	4.4%	3.2%	2.9%	3.1%	3.2%
Others	2.0%	3.4%	2.8%	2.5%	2.7%
Machinery	2.8%	3.0%	1.3%	1.9%	2.2%
Pharmaceuticals	3.2%	2.9%	1.8%	1.6%	2.2%
Textile & Footwear	3.2%	1.7%	2.0%	2.3%	2.2%
Plywood & Timber products	2.2%	2.0%	2.0%	1.8%	1.9%
Tiles & Ceramic products	0.6%	0.8%	1.7%	2.3%	1.6%
Paper products	0.8%	1.0%	0.8%	1.0%	1.0%
Container	0.2%	0.6%	0.4%	0.6%	0.6%

Commodity	LCV	2 Axle Truck	3 Axle Truck	MAV	Total
Rubber products	0.4%	0.4%	0.3%	0.4%	0.4%
Milk & Animal Food	0.2%	0.1%	0.4%	0.5%	0.3%
Coal	0.0%	0.0%	0.0%	0.1%	0.0%
Alluminium	0.0%	0.1%	0.0%	0.0%	0.0%
Grand Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: Crisil Intelligence

- Agri Produce, Courier & parcel, Construction Materials and consumer driven goods contribute to ~50% traffic on project stretch.
- Courier and Parcel are the major commodity on project road, as project is connecting the major cities Mumbai, Pune, Solapur to Hyderabad/Vijayawada.
- Consumer foods and Products is the second largest commodity as majorly between Hyderabad to Mumbai/Pune/Kalaburagi Solapur.
- Agri Produce is also major commodity on project road with Fruits, Vegetables, Onions as sub commodity which is using for domestic purpose.
- Auto mobiles have also significant share as auto clusters has located near Hyderabad and Pune.

Table 3-14: Commodity Distribution (in %) for Kamkole Plaza

Commodity	LCV	2 Axle Truck	3 Axle Truck	MAV	Total
Empty	34.7%	22.7%	20.5%	20.8%	22.6%
Agri Produce	16.9%	16.1%	16.8%	14.7%	15.7%
Courier & parcel	10.4%	16.7%	15.1%	12.2%	13.6%
Consumer Foods	8.6%	11.0%	10.2%	10.1%	10.1%
Others	6.0%	4.2%	3.0%	4.1%	4.1%
Construction materials	1.5%	2.2%	3.8%	5.6%	4.0%
Petroleum Products	3.4%	2.6%	3.6%	4.7%	3.9%
Iron & Steel Products	2.6%	2.8%	4.0%	4.6%	3.9%
Plastic products	3.2%	4.1%	3.8%	3.2%	3.5%
Consumer Products	3.1%	4.0%	3.8%	2.9%	3.4%
Chemical products	1.4%	1.6%	3.3%	3.9%	3.0%
Automobiles	1.3%	2.4%	1.7%	3.1%	2.5%
Plywood & Timber products	1.4%	2.2%	2.7%	2.3%	2.3%
Textile & Footwear	1.4%	1.4%	1.7%	1.2%	1.4%
Paper products	1.1%	1.8%	1.6%	1.1%	1.4%
Machinery	0.8%	1.0%	1.1%	1.4%	1.2%
Pharmaceuticals	1.4%	1.2%	0.9%	0.9%	1.1%
Tiles & Ceramic products	0.2%	0.3%	0.8%	1.6%	1.0%
Container	0.1%	0.9%	0.9%	1.0%	0.9%
Milk & Animal Food	0.5%	0.2%	0.2%	0.1%	0.2%
Coal	0.0%	0.0%	0.1%	0.2%	0.1%
Rubber products	0.0%	0.0%	0.1%	0.0%	0.1%
Alluminium	0.0%	0.0%	0.0%	0.0%	0.0%
Grand Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: Crisil Intelligence

- At TP 2 also, Agri Produce, Courier & parcel and consumer driven goods contribute to 50% traffic on project stretch.
- Agri Produce is a major commodity on project road TP 2 with Fruits, Vegetables, Onions as sub commodity which is using for domestic purpose.
- Courier and Parcel are the second major commodity on project road, as project is connecting the major cities Mumbai, Pune, Solapur to Hyderabad/Vijayawada.
- Consumer foods and Products is the second largest commodity, majorly between Hyderabad to Mumbai/Pune/Kalaburagi/Solapur.

Courier and Parcel is the topmost commodity on the stretch

Parcel / e-commerce commodity driven by demand from Hyderabad and near districts. Parcel and e-commerce traffic is long – distance traffic with Mumbai – Pune – Hyderabad – Vijayawada contributing to higher share than intermediate locations. The warehousing activity in Hyderabad is largely concentrated in three major clusters of Medchal, Patancheru and Shamshabad. There are more warehouses planned near the airport in the southern side of the Hyderabad city. These are the Medchal cluster in the north located along the Hyderabad-Nagpur highway, the Patancheru cluster in the west on the Mumbai-Hyderabad highway, and the Shamshabad cluster in the south located along the Bengaluru-Hyderabad highway. Shamshabad cluster contributes to higher share among the three clusters. Warehousing demand is dominated by e-commerce, retail and the fast-moving consumer goods (FMCG) industries. Courier Parcel commodity is contributing ~12 – 13% of Project Road MAV traffic.

Agriculture porduce is the second most commodity on the stretch

Agri produce commodity is the second most carried commodity in the project road, and it accounts for 12% total traffic on the project stretch. This category comprises of Fruits, Vegetables, Onions and rice.

Fruits is the major contributor among agricultural produce followed by the Onions. Hyderabad is a major consumption centre for farm produces, processed food, the commodities travel towards the city and town centres. Supply commodity from Hyderabad is both within the state (Zaheerabad, Adilabad, Rangareddy, Sangareddy) and outside the state (Mumbai, Pune, Solapur).

The majority of Onions commodity is coming from Maharashtra state and destined towards Hyderabad and southern states. Maharashtra ranks first in Onion production with a share of 35% followed by Madhya Pradesh with a share of 17 % in 2023-24.

Automotive and Auto Components

Presence of Mahindra Tractor plant and MRF tyre plant along with Pune Auto cluster influence the traffic on the project stretch. 75% of the traffic moves towards Hyderabad for consumption. Hyderabad automotive traffic largely originates from western region. Hyderabad accounts for 60% of down traffic followed by Vishakhapatnam and Vijayawada Chennai. The region has major production presence for tractors, 3-W LCV, Scooters and Tyres. Zaheerabad is major auto hub with presence of Mahindra, MRF and upcoming National Investment and Manufacturing Zone (NIMZ) at Zaheerabad by year 2030 will support higher growth

Consumer Foods

The commodities travelling the project stretch in consumer food category are Edible oil, Dairy Items and products, Eggs and other FMCG goods. Largely the purpose of these commodities is for consumption purpose in the Hyderabad, Mumbai, Pune, Sangareddy and Zaheerabad regions. A portion of edible oils which is transported via

road is primarily supply driven. The commodity traffic is largely driven by supply from Telangana state; down (towards Mumbai) traffic of the commodity contributes major edible oil traffic. Consumer food and products is contributing ~15% of project road goods traffic.

4 Review of Historic Traffic & Revenue

4.1 General

This section summarizes the historical performance of the project section in order to understand baseline traffic patterns comprising of historical tollable traffic and revenue growth, traffic and revenue composition, trip distribution, trip factors, seasonality and trend of traffic over the available data set.

The historical tollable traffic and revenue data mode wise was made available by client from September 2010 to July 2025 and is presented in below table.

Table 4-1: Historical Traffic and Revenue Data Availability

Data Source	Type of Data	Period
TMS Data	Traffic Data Vehicle Wise	FY 18 – Jul FY 26

Source: Client, Crisil Intelligence

Cars & MAVs contribute Major traffic at both Plazas

- The Passenger traffic at both toll plazas has consistently increasing since the COD of the project. Cars has witnessed a growth of **10.7%** at TP 1 and **10.2%** at TP 2 in last 6 years period.
- Interms of MAV traffic also, Project Road witnessed a significant growth at both toll plazas **6.8%** at TP 1 and **7.2%** at TP 2 respectively, Interms of Overall PCUs at TP 1 is **5.5%** and 5.**9%** at TP2.

Table 4-2: Historical traffic data at Toll Plaza 1 (Mangalgi TP)

FY	CJV	LCV/Minibus	Bus	2AT	3AT	MAV	Total	PCU
2018	2,609	534	398	964	1,078	1,271	6,855	16,451
2019	3,161	530	452	939	945	1,436	7,463	17,425
2020	3,482	506	473	936	854	1,423	7,675	17,436
2021	3,622	529	235	978	814	1,594	7,772	17,669
2022	4,502	548	338	1,164	907	1,896	9,356	21,086
2023	5,668	523	515	1,318	897	2,179	11,101	24,448
2024	5,860	541	514	1,332	814	2,143	11,205	24,298
2025	5,829	554	514	1,340	754	2,128	11,119	24,061
CAGR (FY 19 - FY 25)	**10.7%**	**0.7%**	**2.2%**	**6.1%**	**-3.7%**	**6.8%**	**6.9%**	**5.5%**
CAGR (FY 20 - FY 25)	**10.8%**	**1.8%**	**1.7%**	**7.4%**	**-2.5%**	**8.4%**	**7.7%**	**6.7%**

Source: Client Data, Crisil Intelligence

*2018 is data available for 5.5 months as operations started from Oct 2017

Table 4-3: Historical traffic data at Toll Plaza 2 (Kamkole TP)

FY	CJV	LCV/Minibus	Bus	2AT	3AT	MAV	Total	PCU
2018	6,343	939	893	1,231	1,311	1,384	12,100	24,281
2019	7,353	926	936	1,177	1,200	1,583	13,175	25,804
2020	8,061	840	923	1,197	1,050	1,557	13,627	25,836
2021	7,802	840	611	1,127	975	1,726	13,081	24,970

2022	9,252	874	769	1,359	1,078	2,022	15,355	29,282
2023	11,197	841	1,009	1,548	1,071	2,359	18,025	33,959
2024	12,403	859	989	1,652	1,048	2,381	19,331	35,472
2025	13,203	908	950	1,761	993	2,399	20,214	36,472
CAGR (FY 19 - FY 25)	**10.2%**	**-0.3%**	**0.2%**	**6.9%**	**-3.1%**	**7.2%**	**7.4%**	**5.9%**
CAGR (FY 20 - FY 25)	**10.4%**	**1.6%**	**0.6%**	**8.0%**	**-1.1%**	**9.0%**	**8.2%**	**7.1%**

Source: Client Data, Crisil Intelligence

*2018 is data available for 5.5 months as operations started from Oct 2017

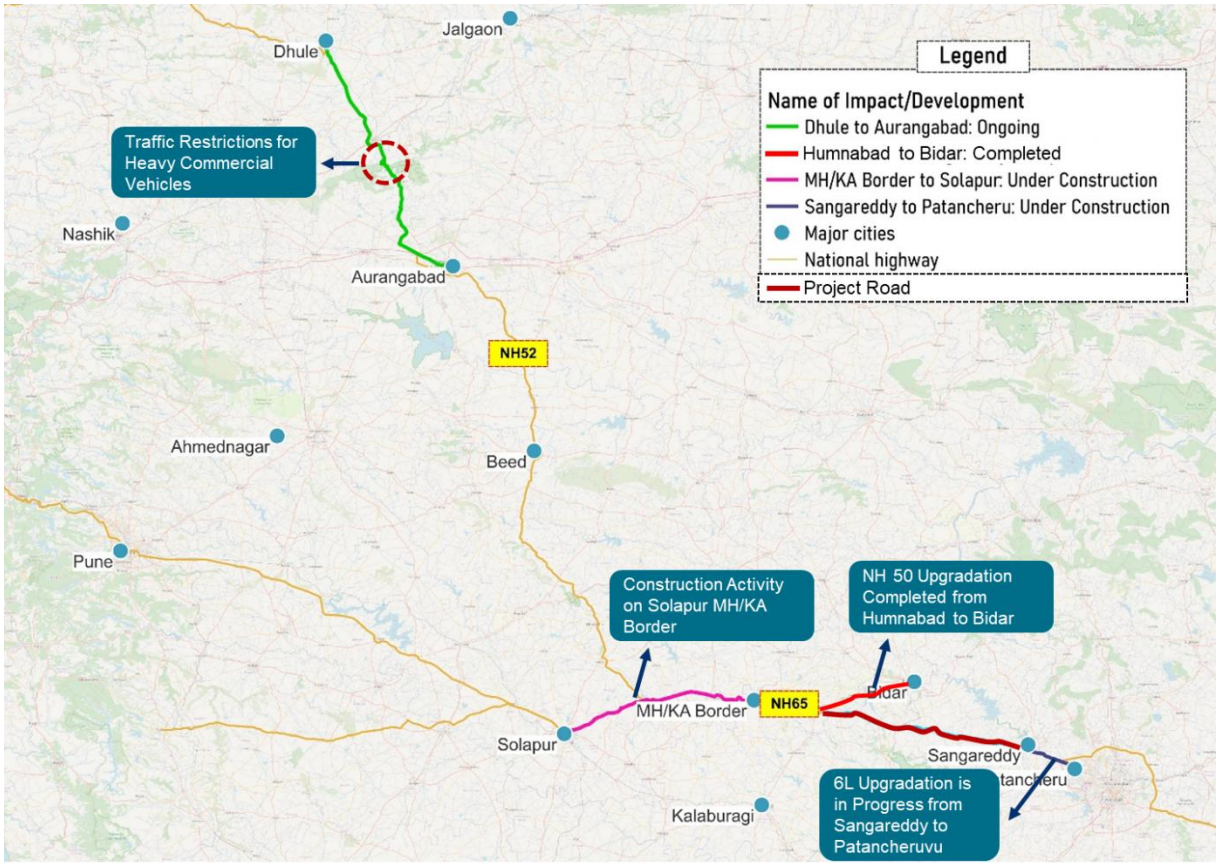
The traffic growth for MAVs has been muted in recent years, specifically in FY24 and FY25, mainly due to traffic restrictions on the Dhule-Aurangabad section and construction activities on subsequent stretches. The restrictions, which began in August 2023, were implemented for heavy construction vehicles due to safety issues on the ghat section of Dhule-Aurangabad. Prior to the restrictions, traffic coming from Surat and beyond generally used NH 52 until Solapur and then connected to NH 65. However, after the restrictions were put in place, traffic has been diverting at Dhule and using the Akola-Nanded Road (NH 161) to reach Hyderabad.

Also, at Mangalgi TP the muted cars, and MAV in FY 25 is mainly due to the upgradation of NH 50 from Humnabad to Bidar has been completed and now the traffic from Mumbai/Pune/Solapur to Bidar traffic is missing at the plaza. The upgradation has completed in Aug/Sept 2024. The Detailed network is presented in below.

Recent network developments/restrictions causing lower growth at both Plazas in FY 25

Currently there are few network developments are undergoing and few recently completed. The below list/map is showing developments which causing the lower traffic growth in recent years.

Figure 4-1: Recent Network Developments impacting the traffic



Source: Open street maps, Crisil Intelligence

Table 4-4: Recent Network developments and sensitivity

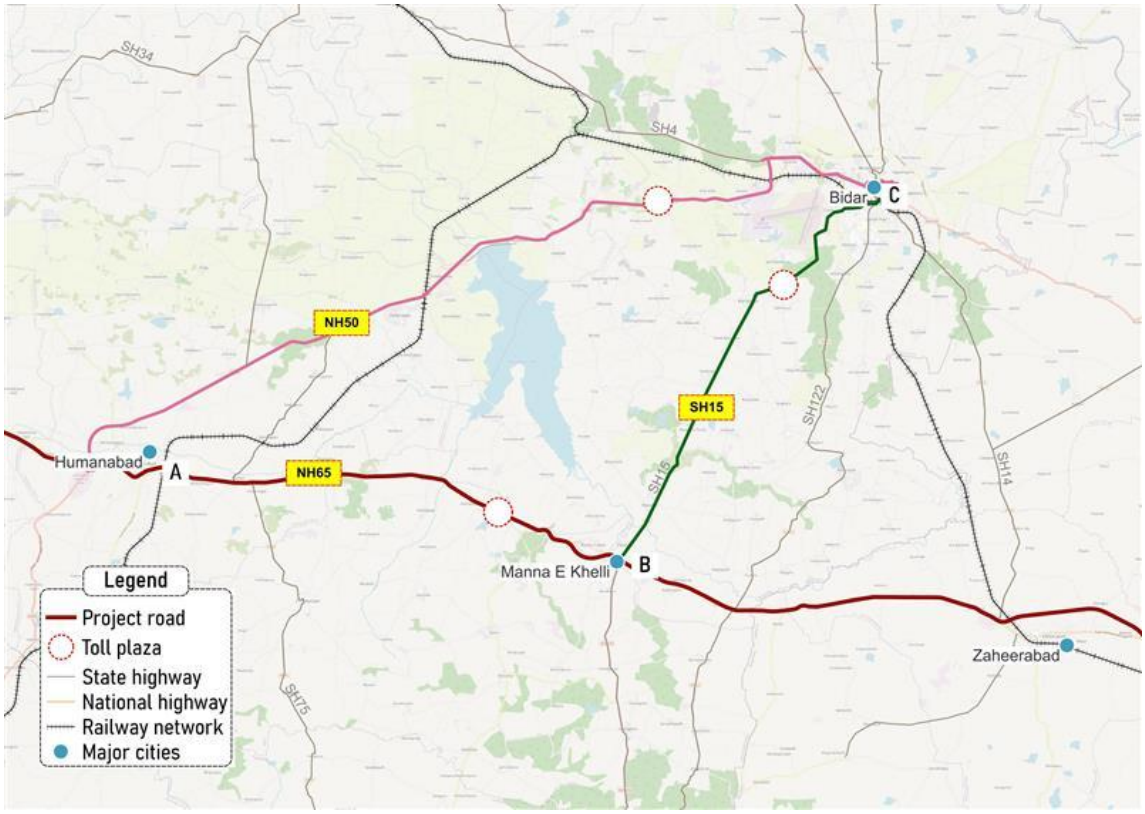
#	Name of Impact/Development	Impact Description	Impact Sensitivity			Status
			One time	Temporary	Permanent	
1	Restrictions on Authram Ghat (Dhule to Aurangabad Section)	Due to Restrictions on ghat section some of the traffic has diverted to NH 161.				Ongoing
2	NH 50 Upgradation (Humnabad to Bidar)	NH 50 Upgradation from Humnabad to Bidar has completed in Aug/sept 2024, which causes the traffic reduction at TP 1.				Completed
3	Construction Activity on STPL (MH ka Border to Solapur)	The Subsequent stretch, STPL Currently has not achieved Full COD as few sections of project road construction work is still pending.				Under Construction
4	Sangareddy to Patancheruvu Construction	The section from Sangareddy to Patancheruvu 6L upgradation work has started in FY 24 which causes bottlenecks to users.				Under Construction

Source: Crisil Intelligence

- Consultant Expects that there will be some positive traffic in future for heavy commercial vehicles once the restrictions has been lifted on Dhule Aurangabad section. The detailed analysis is provided in network developments chapter.

- NH 50 upgradation Completed in Aug/Sept 2024. Nh 50 is 8kms shorter and 65% lower toll rates than the project road. However, the alternate road is operational in the last 8 months consultant assumes that the impact has already panned out in base year traffic Hence Consultant is not expecting any further impact in future. The generalized cost comparison is provided below. The network and generalized cost comparison is provided in below map and table.
    - ✓ Existing Route: **A – B – C**
    - ✓ Current Route: **A- C**

Figure 4-2: NH 50 vs Project Road Network Comparison



Source: Crisil Intelligence

Table 4-5: Generalized Cost Comparison Project Road vs NH 50 (Humnabad to Bidar) _Cars

#	Parameter	Project Road	Alternate Road (NH 50)
A	**Distance Kms**	60	54
B	**Lane Configuration**	4L & 2L	2L
C	**VOC _INR**	657	530
D	**VOT _INR**	198	114
E	**Toll _ INR**	140	50
F	**GC (C+D+E)**	995	694
G	**Cost Ratio (NH 50/ NH 65)**	**0.70**	

4.2 Historic Toll Segmentation

Recent years toll segmentation has been analysed from vehicle wise and toll segmentation toll data provide by client. As the variations the recent years has been minimal, Consultant adopted latest FY 25 toll segmentation for future projections.

Table 4-6: Toll segmentation _ TP 1 (Mangalgi TP)

FY	Vehicle category	Single journey	Return journey	Monthly Pass	Local Commercial	Local Passenger	Violations/ Exemptions	Total
FY 23	Car/Jeep/Van	45.4%	46.8%	0.0%	0.6%	4.0%	3.2%	100.0%
	LCV/Minibus	65.3%	34.0%	0.0%	0.3%	0.0%	0.4%	100.0%
	Bus	15.2%	55.8%	8.2%	20.7%	0.0%	0.1%	100.0%
	2 Axle Truck	80.5%	18.8%	0.0%	0.6%	0.0%	0.2%	100.0%
	3 Axle Truck	81.2%	18.2%	0.0%	0.5%	0.0%	0.0%	100.0%
	MAV	90.9%	8.9%	0.0%	0.1%	0.0%	0.1%	100.0%
	OSV	95.5%	2.5%	0.0%	0.0%	0.0%	2.0%	100.0%
FY 24	Car/Jeep/Van	45.7%	46.7%	0.0%	0.5%	3.9%	3.2%	100.0%
	LCV/Minibus	65.0%	34.3%	0.0%	0.3%	0.0%	0.3%	100.0%
	Bus	13.7%	56.4%	8.8%	21.0%	0.0%	0.1%	100.0%
	2 Axle Truck	80.5%	18.8%	0.0%	0.4%	0.0%	0.2%	100.0%
	3 Axle Truck	80.6%	18.6%	0.0%	0.7%	0.0%	0.1%	100.0%
	MAV	90.6%	9.0%	0.0%	0.3%	0.0%	0.1%	100.0%
	OSV	97.9%	1.2%	0.0%	0.0%	0.0%	0.9%	100.0%
FY 25	Car/Jeep/Van	45.6%	46.9%	0.0%	0.5%	4.0%	3.0%	100.0%
	LCV/Minibus	65.7%	33.8%	0.0%	0.3%	0.0%	0.3%	100.0%
	Bus	13.3%	60.9%	5.8%	20.0%	0.0%	0.1%	100.0%
	2 Axle Truck	80.2%	19.3%	0.0%	0.3%	0.0%	0.3%	100.0%
	3 Axle Truck	80.5%	18.5%	0.0%	0.8%	0.0%	0.1%	100.0%
	MAV	89.2%	10.5%	0.0%	0.1%	0.0%	0.1%	100.0%
	OSV	96.8%	1.5%	0.0%	0.0%	0.0%	1.7%	100.0%

Source: Client TMS Data, Crisil Intelligence

Table 4-7: Toll segmentation _ TP 2 (Kamkole TP)

FY	Vehicle category	Single journey	Return journey	Monthly Pass	Local Commercial	Local Passenger	Violations/ Exemptions	Total
FY 23	Car/Jeep/Van	32.9%	56.1%	0.0%	1.7%	6.4%	2.9%	100.0%
	LCV/Minibus	45.4%	47.9%	0.0%	5.9%	0.0%	0.8%	100.0%
	Bus	9.5%	57.7%	11.4%	21.4%	0.0%	0.1%	100.0%
	2 Axle Truck	71.5%	25.5%	0.0%	2.1%	0.0%	0.9%	100.0%
	3 Axle Truck	72.1%	23.3%	0.0%	4.4%	0.0%	0.1%	100.0%
	MAV	85.6%	13.8%	0.0%	0.4%	0.0%	0.2%	100.0%
	OSV	90.5%	8.1%	0.0%	0.0%	0.0%	1.4%	100.0%
FY 24	Car/Jeep/Van	32.3%	56.9%	0.0%	1.4%	6.8%	2.7%	100.0%
	LCV/Minibus	46.1%	48.4%	0.0%	4.8%	0.0%	0.7%	100.0%
	Bus	7.8%	56.1%	11.6%	24.6%	0.0%	0.1%	100.0%
	2 Axle Truck	71.8%	25.6%	0.0%	1.7%	0.0%	0.9%	100.0%
	3 Axle Truck	67.0%	23.3%	0.0%	9.4%	0.0%	0.3%	100.0%
	MAV	84.8%	14.2%	0.0%	0.9%	0.0%	0.2%	100.0%
	OSV	95.6%	3.6%	0.0%	0.0%	0.0%	0.9%	100.0%
FY 25	Car/Jeep/Van	31.8%	57.3%	0.0%	1.3%	7.0%	2.6%	100.0%
	LCV/Minibus	46.8%	46.7%	0.0%	5.9%	0.0%	0.6%	100.0%

	Bus	7.6%	58.9%	9.7%	23.7%	0.0%	0.1%	100.0%
	2 Axle Truck	70.5%	26.5%	0.0%	2.0%	0.0%	0.9%	100.0%
	3 Axle Truck	67.7%	23.4%	0.0%	8.0%	0.0%	0.9%	100.0%
	MAV	83.1%	14.1%	0.0%	2.6%	0.0%	0.2%	100.0%
	OSV	92.8%	6.5%	0.0%	0.0%	0.0%	0.7%	100.0%

Source: Client TMS Data, Crisil Intelligence

5 Base traffic estimation

5.1 Seasonality Factors

Traffic volumes on roads varies throughout the year, influenced by socio-economic activities in the surrounding regions. To accurately estimate the Annual Average Daily Traffic (AADT) for the road, it is crucial to account for these seasonal variations.

To achieve this, a seasonal correction factor is applied, Project Road is having enough historical data to arrive the seasonal correction factors. Hence consultant adopted the same factors to arrive base year AADT. Consultant considered few years data as listed below due traffic has been impacted by specific nuances.

Table 5-1: Adopted seasonality

S.no	FY	Remarks
1	FY 19	Not Considered for seasonality due to Axle load policy change
2	FY 20	Not Considered due to Lockdown restrictions in March on account of Covid Ph 1
3	FY 21	Not Considered due to Lockdown restrictions account of Covid Ph 1
4	FY 22	Not Considered due to Covid Ph 2
5	FY 23	Considered for seasonality
6	FY 24	Not Considered for Seasonality due to Traffic restrictions started in Aug 2023 on Dhule Aurangabad Stretch
7	FY 25	Considered for Seasonality

Consultant Recommends that the average of FY 23 and FY 25 years for seasonality factors.

Table 5-2: Monthly Adopted Seasonal correction factors for TP 1

Month	CJV	Bus	LCV/Minibus	2AT	3AT	MAV
Apr	1.02	1.02	0.97	0.97	0.97	1.03
May	0.85	0.97	0.96	1.03	0.99	1.02
Jun	0.94	0.96	0.98	1.05	0.99	1.01
Jul	1.13	1.02	1.04	1.07	1.07	1.07
Aug	1.07	1.03	1.00	1.06	1.07	1.04
Sep	1.19	1.07	1.02	1.01	1.07	1.04
Oct	0.93	1.02	1.03	1.06	1.10	1.05
Nov	0.96	0.98	1.04	1.07	1.02	1.00
Dec	0.90	0.97	1.00	1.00	0.90	0.92
Jan	0.99	0.97	1.06	0.97	0.93	0.96
Feb	1.00	0.99	0.97	0.88	0.94	0.93
Mar	1.14	1.00	0.94	0.87	0.99	0.95

Source: Client TMS Data, Crisil Intelligence

Table 5-3: Monthly Adopted Seasonal correction factors for TP 2

Month	CJV	Bus	LCV/Minibus	2AT	3AT	MAV
Apr	1.03	1.04	0.99	0.98	0.97	1.05
May	0.90	0.97	1.00	1.03	0.99	1.04
Jun	0.97	0.97	1.02	1.05	0.99	1.02
Jul	1.12	1.03	1.07	1.09	1.09	1.08
Aug	1.04	1.01	1.02	1.07	1.09	1.03
Sep	1.16	1.05	1.06	1.04	1.10	1.05
Oct	1.00	1.01	1.04	1.06	1.14	1.06
Nov	0.98	0.99	1.02	1.06	1.00	0.99
Dec	0.91	0.98	0.97	0.98	0.86	0.90
Jan	0.98	0.97	1.01	0.96	0.93	0.95
Feb	0.94	0.97	0.90	0.87	0.90	0.92
Mar	1.04	1.00	0.92	0.86	1.01	0.94

Source: Client TMS Data, Crisil Intelligence

5.2 Base Traffic Estimation

For base traffic (annual average daily traffic) estimation of the present study, current fiscal 4-months (Apr-25 to July-25) of TMS traffic data were annualized using SCF factor of FY 23 & FY 25 to arrive at the annual average daily traffic (AADT) for FY 26.

The AADT estimation for the base case for FY26 is presented table below

Table 5-4: Base Traffic Estimation -FY26 AADT _ TP 1 (Mangalgi TP)

Particulars	FY Year	CJV	LCV/Minibus	Bus	2AT	3AT	MAV	OSV	Total	PCU
ADT (Apr-July)	FY 26	6,090	563	546	1,321	693	2,119	3	11,335	24,163
SCF	FY 23 & FY 25	0.97	0.99	0.99	1.03	1.00	1.03	1.05		
AADT	**FY 26**	**5,927**	**556**	**541**	**1,360**	**695**	**2,183**	**3**	**11,266**	**24,389**

Source: Client TMS Data, Crisil Intelligence

Table 5-5: Base Traffic Estimation -FY26 AADT _ TP 2 (Kamkole TP)

Particulars	FY Year	CJV	LCV/Minibus	Bus	2AT	3AT	MAV	OSV	Total	PCU
ADT (Apr-July)	FY 26	14,399	941	1,022	1,785	907	2,453	4	21,510	38,006
SCF	FY 23 & FY 25	1.00	1.02	1.00	1.04	1.01	1.05	1.06		
AADT	**FY 26**	**14,385**	**960**	**1,024**	**1,855**	**915**	**2,568**	**4**	**21,711**	**38,778**

Source: Client TMS Data, Crisil Intelligence

Table 5-6: Base Revenue in Millions -FY26

Toll Plaza	CJV	LCV/Minibus	Bus	2AT	3AT	MAV	OSV	Total
Mangalgi TP _ TP 1	205	35	57	186	104	476	1	1,063
Kamkole TP _ TP 2	477	56	106	248	130	556	1	1,574
Total DTPL	**681**	**91**	**163**	**433**	**233**	**1,033**	**2**	**2,637**

Source: Crisil Intelligence

6 Network and Industrial developments in the Region

In the case of the project road, there are no short distance alternate routes available that will impact the traffic on the project road. However ongoing and upcoming long-distance networks that could impact the project road are:

- Chennai Surat Expressway

Apart from the above impact, Some of the Gujarat bound traffic impacted by the traffic restrictions on Dhule Aurangabad section. However, in the view of consultant, the traffic will be coming back in future once the restrictions are lifts/ Construction of Autram ghat Completes. The brief traffic assessment is provided below,

Table 6-1: Details of Network Development and Possible impact

S. No	Details of Development	Milestone/Completion	Impact type	Impact Plazas
1	Chennai Surat Expressway	Northen Part of Expressway: Surat – 513.25 km Surat – Nashik – Ahmednagar – Solapur Economic Corridor (NH-150C), also known as Surat – Solapur Expressway, is a 6 lane partially access-controlled highway approved by NHAI with a route alignment connecting Gujarat and Maharashtra. It forms the northern section of the 1271 km Surat – Chennai Expressway and consists of 2 sections: Surat – Ahmednagar (288 km) and Ahmednagar – Solapur – Akkalkot – MH/KN Border (225.25 km)	Negative	TP 1 & TP 2
2	Regain of MAV traffic due to loss of Authram ghat Closure	The traffic restriction has begun in Aug 2023. The loss of traffic estimated based on the FY 24 data.	Positive	TP 1 & TP 2
3	Hyderabad MMLP	Development of MMLP Hyderabad is in Pipeline, around 315 Acres of land identified for MMLP Hyderabad.	Positive	TP 1 & TP 2

Source: Crisil Intelligence

Figure 6-1: Chennai Surat Expressway Alignment with Project road



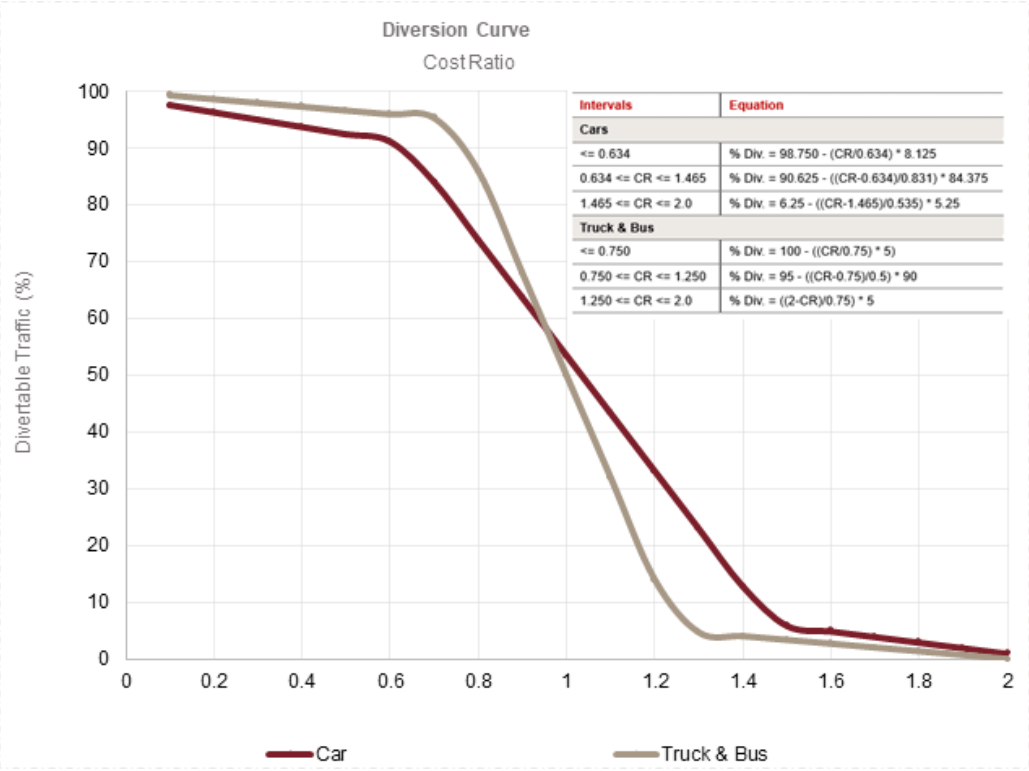
Source: Open Street Map, Crisil Intelligence

The details of the development in term of milestone, expected completion date and possible impact to project road traffic is presented in below table.

6.1 Approach and Methodology for Diversion Analysis

The assessment of traffic diversion if any away from the project road has been done using cost ratio analysis. The road user cost is estimated based on the vehicle operating cost (VOC) and Value of time (VOT) as mentioned in IRC: SP30-2019. Using the generalized cost (VOC+VOT+Toll rates) for the project road and alternate/proposed route cost ratio is estimated using the diversion curve using the binary logit method, which computes the expected diversion percentage based on the perceived cost on the existing and alternate/proposed facility. The diversion percentages are then applied on the in-scope traffic derived from the OD analysis to estimate the traffic that would shift to/from the project road. Diversion curve (equation) mentioned in IRC:108-2015 and is presented below.

Figure 6-2: Diversion curve as per IRC:108-2015



Intervals	Equation
Cars	
<= 0.634	% Div. = 98.750 - (CR/0.634) * 8.125
0.634 <= CR <= 1.465	% Div. = 90.625 - ((CR-0.634)/0.831) * 84.375
1.465 <= CR <= 2.0	% Div. = 6.25 - ((CR-1.465)/0.535) * 5.25
Truck & Bus	
<= 0.750	% Div. = 100 - ((CR/0.75) * 5)
0.750 <= CR <= 1.250	% Div. = 95 - ((CR-0.75)/0.5) * 90
1.250 <= CR <= 2.0	% Div. = ((2-CR)/0.75) * 5

Source: Crisil Intelligence

6.2 Impact of Chennai Surat Expressway

1220 km Surat – Chennai Expressway by NHAI is an Under bidding/construction 6 lane partially access-controlled highway with an alignment passing by Nasik, Ahmednagar, Solapur, Kalaburagi, Kurnool, Kadapa & Tirupati to link Gujarat, Maharashtra, Telangana and Tamil Nadu. The Impact has been divided into two parts, i.e.

1. The traffic is from Surat and beyond, Nashik, Ahmednagar to Chennai / Rest of Tamil Nadu
   Current Travel pattern: Surat – Aurangabad - Solapur– Hyderabad – Ongole – Chennai
   Future route Choice: Surat to Chennai Via Expressway
2. The traffic is from Mumbai/Pune to Chennai/Rest of Tamil Nadu
   Current Travel pattern: Mumbai – Pune - Solapur– Hyderabad – Ongole - Chennai
   Future route Choice: Mumbai – Pune – Solapur to Chennai via Eway

The impact has analysed separately for both pairs of traffic.

NHAI has recently Announced the Upper part of expressway under BOT toll mode. The section compromises Development of 6 lane Greenfield Nashik – Ahmednagar – Solapur – Akkalkot section of NH-60 in the state of Maharashtra under NH(O) on BOT (Toll) Mode. The current proposal is developed in two packages as follows.

Table 6-2: Details of Nashik – Ahmednagar – Solapur – Akkalkot section

#	Details	Status
Project	Development of 6 lane Greenfield Nashik – Ahmednagar -Solapur – Akkalkot section of NH-60 in the state of Maharashtra under NH(O) on BOT (Toll) Mode"	RFP issued, bids pending NHAI has invited the Bids for Construction of Project.
Packages	Package 1: Nashik to Ahmednagar _ 152 Kms	
	Package 2: Ahmednagar to Akkalkot _ 222 Kms	
Model	BOT	

Source NHAI, Crisil Intelligence

In the view of consultant, it is expected that the entire section will get completed by 2031 (Award of Project 6-12 Months and Construction 3-4 Years) and impact has started from FY 32.

Table 6-3: Details of Akkalkot to Chennai Section

S.no	Package Details	Status
1	Akkalkot – MH/KN border New Greenfield corridor from Km 512.000 to Km 548.400 of NH-150C (part of Akkalkot – KN/TS Border section) (Package – XIV)	Under Construction
2	6L of MH/KN Border (Nimbal Village) to KN/TS Border (Singnodi Village) from Km. 26.000 to Km. 97.000 in Gulbarga of NH-150C (Pkg-II)	Under Construction (AD issued)
3	6L of MH/KN Border (Nimbal Village) to KN/TS Border (Singnodi Village) from Km. 97.000 to Km. 162.500 in Yadgir of NH-150C (Pkg-III)	Under Construction (AD issued)
4	6L of MH/KN Border (Nimbal Village) to KN/TS Border (Singnodi Village) from Km. 162.5 to Km. 203.100 in Raichur of NH-150C (Pkg-IV)	PCC Issued, CC Pending
5	6L Access Controlled Greenfield Highway of Nandinne village to Julekal village from Km 202.900 to Km 242.200 (Pkg-1)	Under Construction (AD issued)
6	6L Access Controlled Greenfield Highway of Julekal village to Dinnedevarapadu village from Km 242.200 to Km 280.400 (Pkg-2)	Under Construction (AD issued)
7	4L of Kadapa – China Orampadu section of NH-716 (Package I of Kadapa-Renigunta section)	Awarded, Not Appointed
8	4 L of China Orampadu-Renigunta section of NH-716 (Package-II of Kadapa-Renigunta section)	Awarded, Not Appointed
9	Strengthening & Improvement of 2-lane + PS from Renigunta to Kadapa Section from Km.0+000 to Km.123+600 (length 123.6Km.) in Andhra Pradesh on item rate (percentage) basis	Balance for Award
10	6L of Veera Kaveri Raja Puram to Pondavakkam from km 61.380 to km 96.040 of NH 716B (Pkg-III)	PCC Issued, CC Pending
11	6L of Pondavakkam to Kannigaipair from km 96.040 to km 116.100 of NH 716B (Pkg-IV)	Under Construction (AD issued)

Source NHAI, Crisil Intelligence

In the view of consultant, most of the sections are under construction stage and expected to be completed by FY 28 and Impact starts from FY 29 for the Mumbai/Pune to Chennai traffic.

Apart from the diversion share from the model, the project road stickiness factor applied as Hyderabad centrally

located for Gujarat and Chennai traffic and for some of the traffic might be the commodity loading and unloading point.

Table 6-4: Diverted Traffic at TP 1 & TP 2

Veh type	Pair 1	Pair 2	Pair 1 Div Share	Pair 2 Div Share	Project road Stickiness factor	Total Impacted Traffic	Impact on TP 1 Traffic	Impact on TP 2 Traffic
Cars	3	25	74.0%	76.2%	0%	21	0.4%	0.1%
Bus	1	3	83.5%	87.3%	50%	2	0.3%	0.2%
LCV	4	22	86.7%	90.2%	50%	11	2.0%	1.2%
2AT	12	33	89.3%	92.0%	40%	25	1.8%	1.3%
3AT	13	24	94.6%	99.5%	40%	22	3.1%	2.4%
MAV	36	106	91.5%	93.8%	25%	99	4.5%	3.9%
Total	**68**	**213**				**180**	**1.6%**	**0.8%**
PCU	**248**	**715**				**629**	**2.6%**	**1.6%**

Source: Crisil Intelligence

Note: stickiness factor is a parameter which assuming some of the traffic will use project road even after alternate road operational.

6.3 Impact of Autram Ghat Closure (Dhule to Aurangabad Section)

The traffic from Dhule and beyond is using the NH 52 and joins the NH 65 at Solapur. The traffic must cross the kannad ghat section near chalisgaon. The High court of judicature of Bombay bench at Aurangabad issued an order in public interest litigation on 4th August 2023, stating the closure of kannad ghat section for usage of heavy commercial vehicles, from 11th August 2023. Heavy commercial vehicles were diverted via Chalisgaon - Nandgaon - Talwada ghat – Aurangabad and vis versa for the opposite direction as well.

Hence the Usage of NH 52 gradually got reduced as drivers need to travel 55Km additionally via the diversion and usage of NH 161 got increased on account of which drop in commercial traffic is observed in both TP of project road. The Actual route and diverted routes are provided in below map.

- ✓ Actual Route: **A – B – C – D – E – I**
- ✓ Diverted Route: **A – B – F– G – H – I**

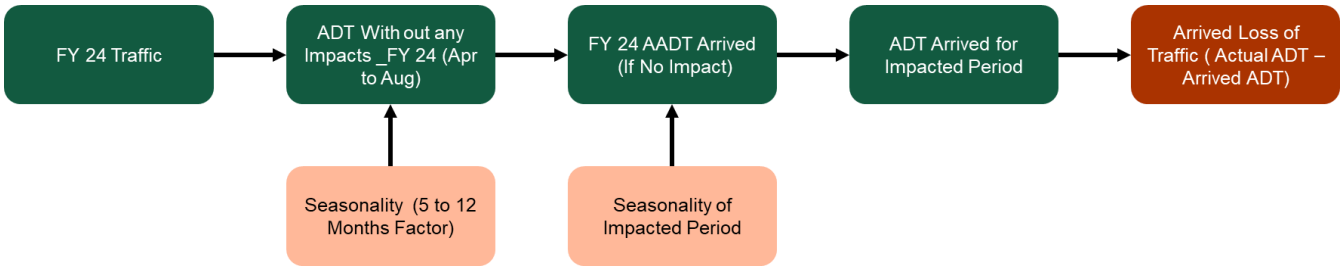
However, there is no official information on reopening of ghat section, Consultant Considering 3 years if any construction of tunnel. Consultant assumes that the loss of traffic will get back from the FY 29. The Estimation of loss of traffic is followed below methodology.

Figure 6-3: Alignment of Actual route and Diverted route



Source: Open Street Map, Crisil Intelligence

Figure 6-4: Adopted Methodology for Estimating the Loss of Traffic



Source: Crisil Intelligence

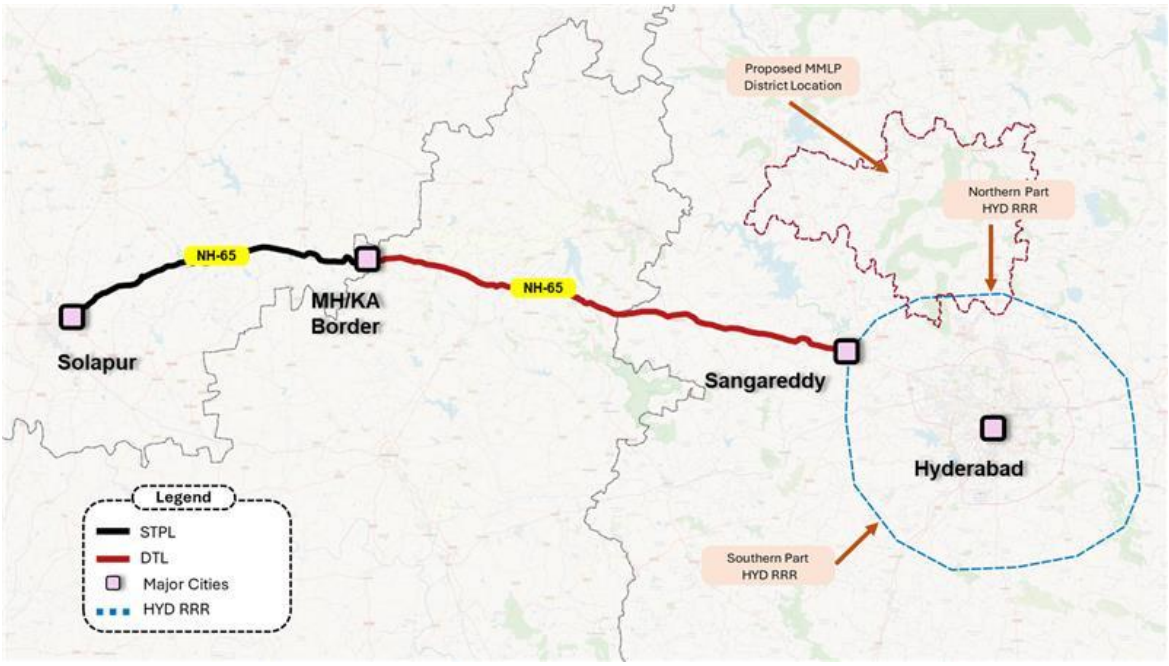
As mentioned above methodology the loss of traffic arrived 211 MAVs, however some of the traffic using the Chalisgaon - Nandgaon - Talwada ghat – Aurangabad route, estimates the final loss by analysing the shares of impacted zones from OD surveys before and after the restrictions. According to the current OD survey, it shows a share of around 7.0% for GJ and beyond zones; in contrast, a share of 10.6% was observed in the previous OD survey for these zones. Consultant expects the remaining traffic to come back to the project road once the restrictions

are lifted. The expected positive traffic at TP 1 is 3.5% of MAVs and at TP 2 is 3.0% of MAVs

6.4 Development of Hyderabad Multi Model Logistic Park (MMLP)

Development of MMLP Hyderabad is in Pipeline, around 315 Acres of land identified for MMLP Hyderabad. The land parcel has been identified the Telangana government at parkibanda village in Medak district. The proposed Hyderabad MMLP Which will encompass a comprehensive logistics eco system. In the view of consultant, the project will take time to materialize and may start the operations from FY 32. Currently The project detailed feasibility report is in progress.

Figure 6-5: Location of Proposed MMLP and Project Road



Source: Open Street Map, Crisil Intelligence

The positive Impact is considered from FY 32 for project road. The overall Positive impact in PCU terms is 2.0% at TP1 and 1.6% at TP 2.

6.5 National Investment & Manufacturing Zone (NIMZ)

The National Investment & Manufacturing Zone (NIMZ) is a specialized economic area situated in Zaheerabad, Telangana, functioning as a special economic zone (SEZ). Established in 2012 by the Telangana State Industrial Infrastructure Corporation Limited (TSIIC), it covers 12,635-acre in area. It acts as a growth driver to the project road in future. However, consultant has not included NIMZ positive impact on revenue projections.

The primary objective of the NIMZ project is to draw diverse industries, including Electrical Machinery, Metals, Food Processing, Non-metallic Minerals, Automobiles, Machinery, and Transport Equipment. The zone provides various incentives such as tax benefits and concessional land rates.

Several companies have already set up their operations in the NIMZ, including VEM Technologies, One Moto, and the National Aerospace Laboratories. Here are some notable features of NIMZ, Zaheerabad:

- Positioned in Zaheerabad, a significant industrial and agricultural center in Telangana, the NIMZ offers convenient access to key regional markets, including Hyderabad, which is a prominent hub for IT and

pharmaceuticals.

- The NIMZ is being developed with state-of-the-art infrastructure, including well-connected roads, railways, airports, and reliable power supply, facilitating easy establishment and operation of businesses within the zone.
- In addition to tax breaks and concessional land rates, the NIMZ provides access to top-notch infrastructure.

Recent announced Investments at NIMZ Zaheerabad

- ✓ Hyundai's ₹8528 crore investment in NIMZ Zaheerabad for a Global Innovation R&D Centre creating 4276 jobs approved by Telangana committee.
- ✓ VEM Technologies investing 1000 crores in defence facility at NIMZ Zaheerabad

7 Traffic Growth Estimation & Traffic Forecast

7.1 Approach and Methodology

Crisil, based on its coverage of 80+ sectors and the MSME industry, has developed a knowledge base to understand the growth of industries and demand across various regions and clusters. The growth expectations for various industries are applied to each vehicle category based on the commodity composition of the vehicle category. For example, the share of light commercial vehicles (LCVs) carrying agricultural commodities is expected to grow as per agricultural output growth; the share of LCVs carrying consumer products is expected to grow as per the volume growth of durables; and the share of Multi axle vehicles (MAVs) carrying steel commodities is expected to grow as per demand/supply volume of steel products based on regional dynamics. This approach helps Crisil provide a more accurate growth rate of commercial traffic in the region.

For passenger traffic, Crisil assesses the sale of passenger cars in the region, growth of vehicular population, purpose and frequency of passenger travel, population growth, expansion of the city, and infrastructure development in the catchment area.

Further, Crisil also examines the various factors that will impact traffic over the concession period, such as upcoming alternative road routes, truck aggregation by logistics players, dedicated freight corridors and other transportation options. Thus, the analysis considers the impact of central and state policies, growth in production and consumption centres along the stretch, and infrastructure in the adjoining regions. The report covers both growth drivers and restraints for the traffic along the stretch. Crisil has enumerated and detailed the parameters that will positively/negatively impact the traffic on the stretch in the future.

Crisil has used its proprietary traffic projection methodology to project traffic using regional industry growth assumptions, macroeconomic developments, infra development and consumption centre growth factors of the catchment area and adjacent regions.

Figure 7-1: Commodity based approach: Illustrative example for Commercial vehicles

Commodity	MAV (Vehicles) Year 1	YoY growth	MAV (Vehicles) Year 2
Construction materials	300	9%	327
Consumer products	100	4%	104
Agri Produce	200	3%	206
Iron & Steel products	50	9%	55
Chemical products	200	5%	210
Total vehicles	XX		YY

Commodity	LCV (Vehicles) Year 1	YoY growth	LCV (Vehicles) Year 2
Construction materials	100	9%	109
Consumer products	200	4%	208
Agri Produce	50	3%	52
Iron & Steel products	300	9%	327
Chemical products	200	5%	210
Total vehicles	XX		YY

Growth rates for commodities are based on commodity specific demand/supply drivers and regional dynamics

7.2 Telangana State profile

Telangana, a state in southern India, became the country's 29th state on June 2, 2014. It shares its borders with Maharashtra to the north and west, Chhattisgarh to the northeast, Karnataka to the west, and Andhra Pradesh to the south and east. Hyderabad is the state capital. Telangana is ranked 12th in the country in terms of population, with 350.04 Lakh residents as per the 2011 Census and ranked 11th in area (1,12,077 sq. km). The population is distributed across the state's 33 districts, each with unique socio-economic characteristics. The Godavari and Krishna rivers have majorly drained the region, with 79% and 69% of the catchment areas, respectively. The official languages of the state are Telugu and Urdu. The state has 620 mandals and 12,769 Gram Panchayats.

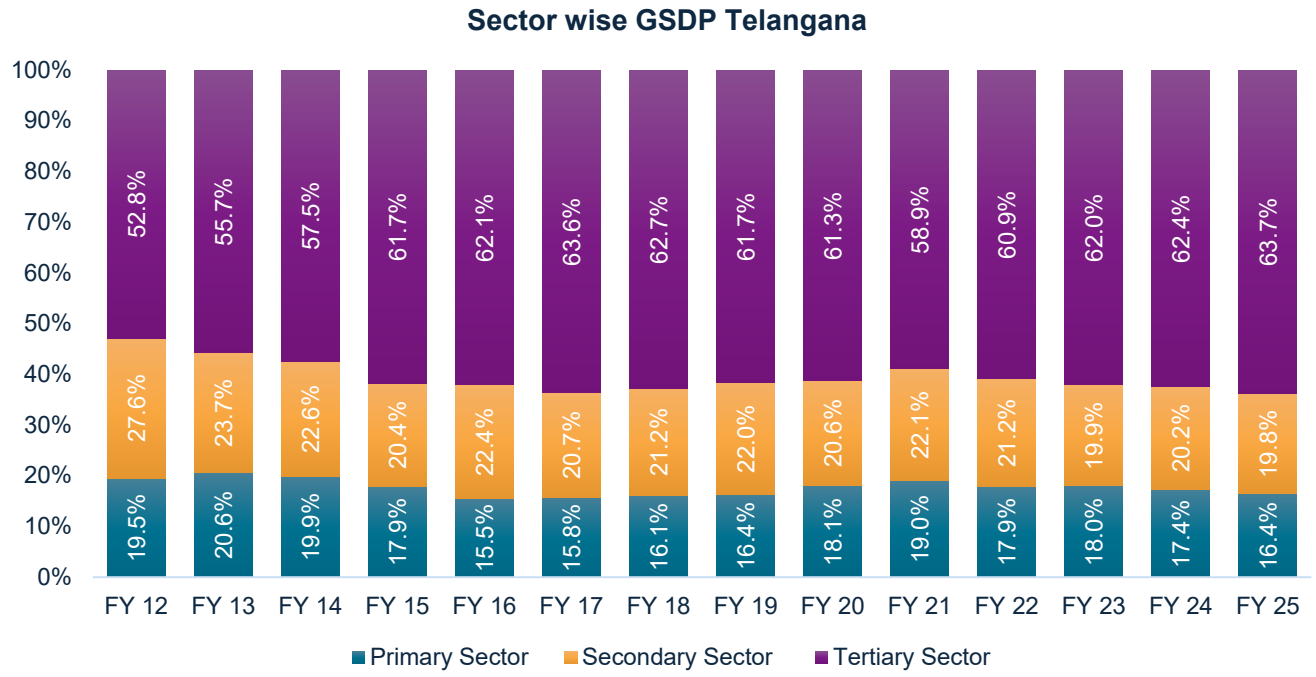
The Service sector has been contributing to Telangana's Gross State Value Added (GSVA), followed by Industrial, and Agriculture & Allied sectors. According to the Advance Estimates for 2024-25, the Service sector accounted for 63.7% of Telangana's GSVA at constant prices, with the Industrial sector, including mining and quarrying, contributing 19.8%, and the Agriculture and Allied sector contributing 16.4%. Telangana has seen a rise in Per Capita Income from Rs. 1,13,238 in 2014-15 to Rs. 2,12,922 in 2024-25.

Despite rapid industrialization and urbanization, agriculture remains a crucial sector. The state government is dedicated to enhancing agricultural productivity, promoting sustainable practices, improving irrigation facilities, and supporting farmers through various schemes and initiatives. This highlights the enduring importance of agriculture in fostering balanced economic growth, social development, and environmental sustainability. The economy of Telangana is mainly driven by agriculture. Two important rivers of India, the Godavari and Krishna, flow through the state, providing irrigation. Farmers in Telangana mainly depend on rain-fed water sources for irrigation. Rice is the major food crop. Other important crops are cotton, sugar cane, mango, and tobacco.

The government is intensifying its support for the agriculture sector through initiatives like the Rythu Bharosa program, which aims to prioritize genuine farmers and realign existing schemes to better meet their needs. The introduction of a farm loan waiver program is set to relieve farmers of debt burdens, fostering more confi dent investment in agricultural activities. Additionally, plans are underway to implement a comprehensive crop insurance scheme to mitigate risks associated with crop production, offering fi nancial security against unforeseen events such as adverse weather, pests, and diseases

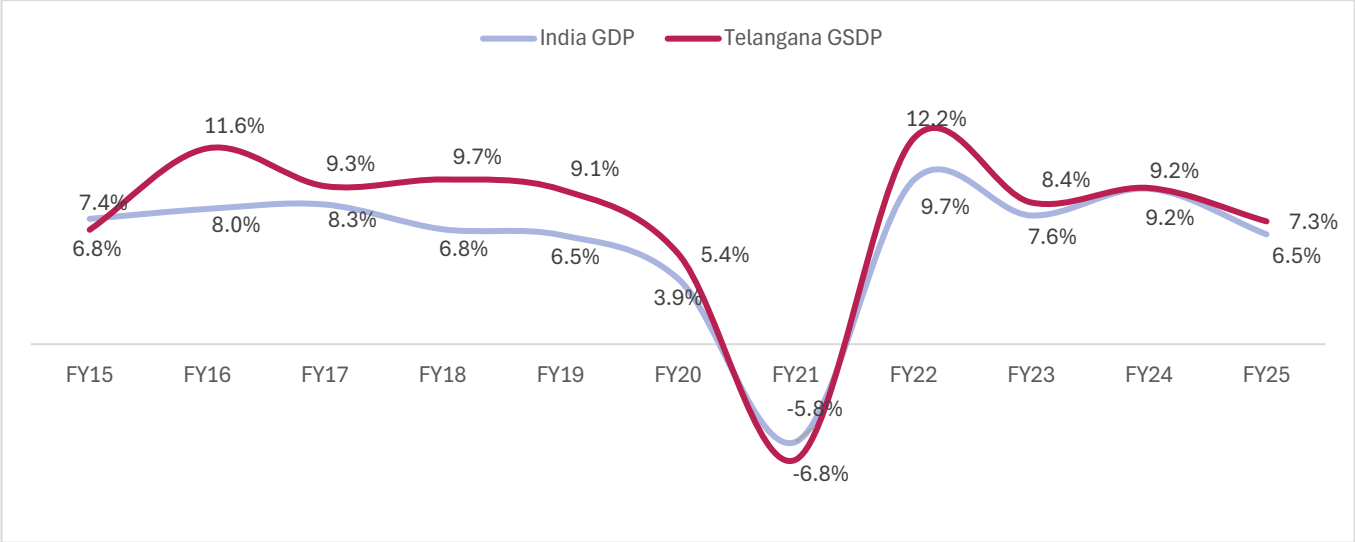
Industrial and service sectors contribute significantly to employment generation, income growth, and overall economic development. Industries ranging from information technology to textiles and manufacturing provide diverse job opportunities and contribute substantially to the state's Gross State Domestic Product (GSDP). Furthermore, the service sector, including IT services, healthcare, education, and hospitality, enhances the quality of life and attracts investments, fostering a dynamic economic environment. Telangana's industrial and service sectors form the backbone of its economic prosperity and growth trajectory by fostering innovation, infrastructure development, and skilled workforce enhancement.

Figure 7-2: Sector wise Telangana GSDP at constant price



Source: MOSPI, Crisil Intelligence

Figure 7-3: Telangana GSDP vs India GDP



Source: MOSPI, Crisil Intelligence

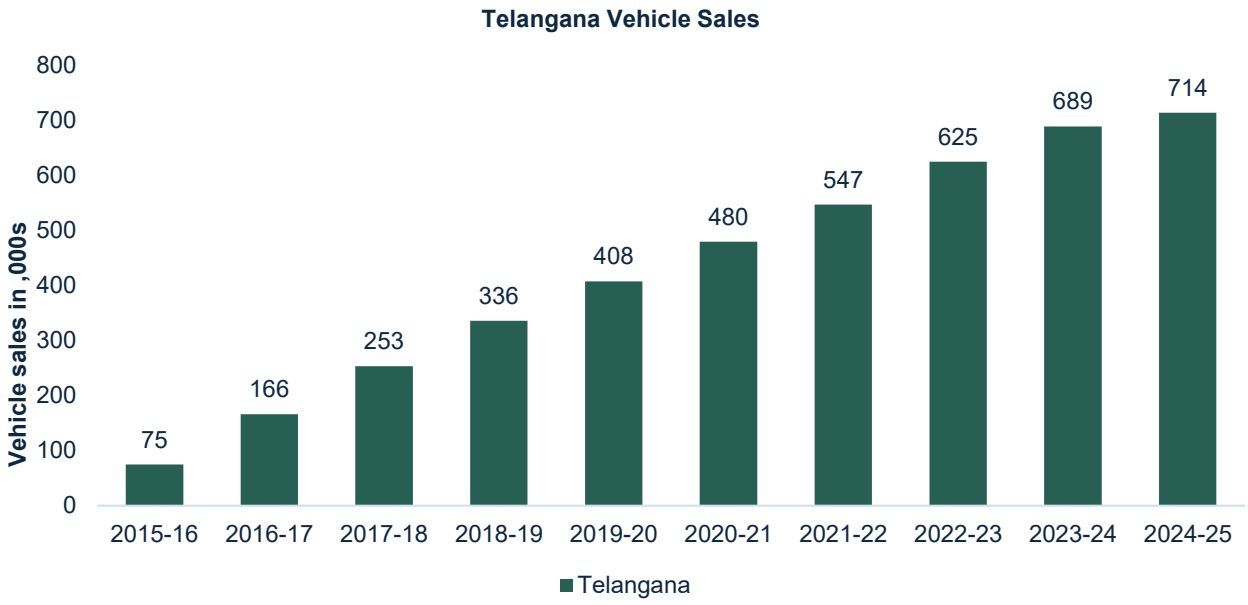
7.3 Outlook for Car growth

The rate of car ownership in India has increased from 6.6 per 1,000 people in 2001 to 25 per 1,000 people in 2019. Despite India's car fleet growing at an annual rate of 10% for nearly 25 years, the rate of car ownership remains low compared to countries with similar economic status and significantly lower than developed countries, which have a rate of around 450 per 1,000 people. This low rate of car ownership indicates potential for continued growth in the coming years. With the ongoing increase in car ownership and improvements in the road network, the use of cars for inter-urban travel is showing a growing trend.

Project road Cars has majority share from Telangana, Karnataka and Maharashtra. Telangana has grown at 11%

Passenger vehicles sales.

Figure 7-4: Passenger Car vehicle Sales growth



Source: SIAM, Ministry of Road Transport & Highways (MoRTH)

7.4 Commodity Overview

As mentioned in section primary data collection & analysis, the analysis of freight movement across the toll plaza reveals that the major commodities being transported include Courier and Parcel, Agri Produce, Consumer food and products, auto mobile and Construction materials.

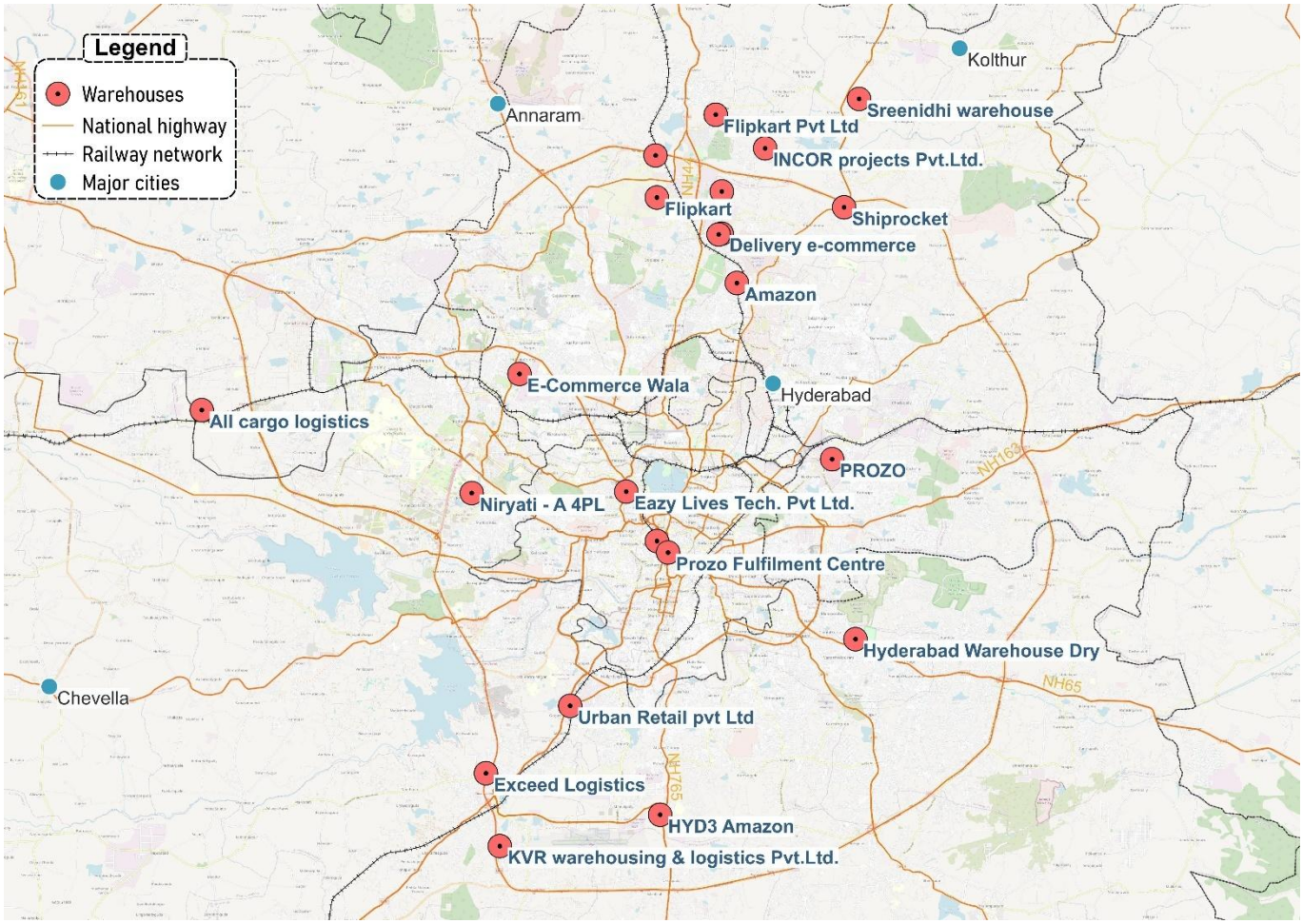
Courier and Parcel

Courier and Parcel commodity is contributing ~14-15% of goods traffic. Parcel / e-commerce commodity driven by demand from Hyderabad and near districts. Parcel and e-commerce traffic is long – distance traffic with Mumbai – Pune – Hyderabad – Vijayawada contributing to higher share than intermediate locations. The warehousing activity in Hyderabad is largely concentrated in three major clusters of Medchal, Patancheru and Shamshabad. There are more warehouses planned near the airport in the southern side of the Hyderabad city. These are the Medchal cluster in the north located along the Hyderabad-Nagpur highway, the Patancheru cluster in the west on the Mumbai-Hyderabad highway, and the Shamshabad cluster in the south located along the Bengaluru-Hyderabad highway. Shamshabad cluster contributes to higher share among the three clusters. Warehousing demand is dominated by e-commerce, retail and the fast-moving consumer goods (FMCG) industries. Solapur, Pune, Hyderabad, Vizag, Vijayawada, and other town in the vicinity will drive e-commerce traffic growth.

Major e-commerce players including Flipkart, Zomato, and DMart have established mega-distribution facilities within 10-15 km of key logistics corridors. Amazons have a largest fulfilment center in India operates from Hyderabad. Medchal, Patancheru, and Kandlakoya have become primary warehousing clusters which is located near the project road vicinity.

Considering above Crisil expects CAGR of 7.4% from fiscal FY 27-FY 31 for the near team.

Figure 7-5: Major E commerce operator Hyderabad



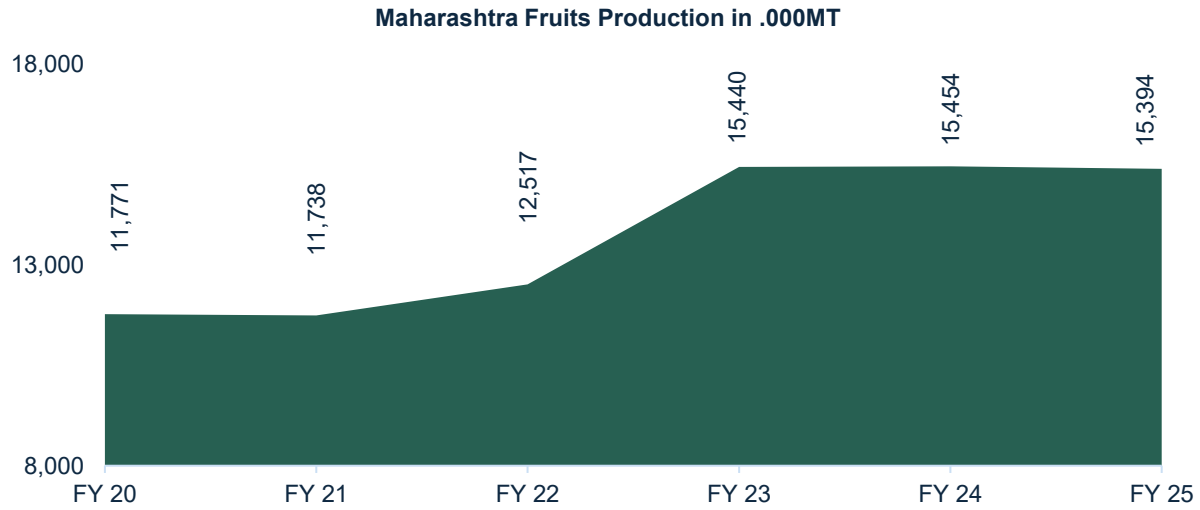
Source: Open Street Map, Crisil Intelligence

Agri Produce

Agri produce commodity is the second most carried commodity in the project road, and it accounts for 12% total traffic on the project stretch. This category comprises of Fruits, Vegetables, Onions and rice.

Fruits is the major contributor among agricultural produce followed by the Onions. Majority of fruits commodity is originating from Maharashtra and Hyderabad is a major consumption centre for farm produces, processed food, the commodities travel towards the city and town centres. Supply commodity from Hyderabad is both within the state (Zaheerabad, Adilabad, Rangareddy, Sangareddy) and outside the state (Mumbai, Pune, Solapur). Maharashtra fruits production has grown at 5.5% in last 5 years period.

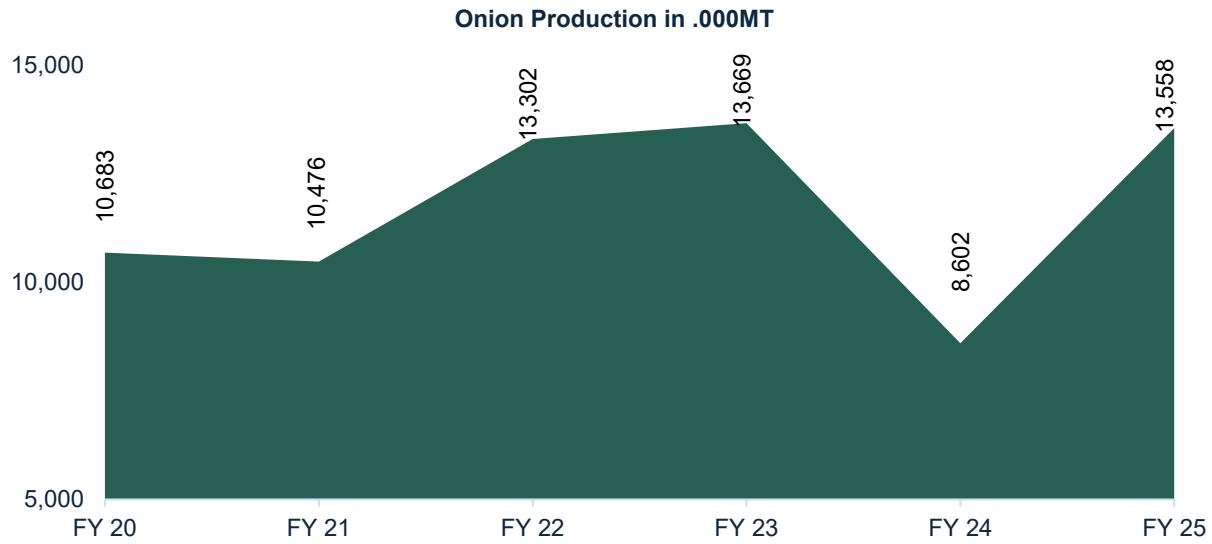
Figure 7-6: Maharashtra Fruits Production



Source: Department of agriculture and farmers welfare, Crisil Intelligence

Also, the majority of Onions commodity is coming from Maharashtra state and destined towards Hyderabad and southern states. Maharashtra ranks first in Onion production with a share of 35% followed by Madhya Pradesh with a share of 17 % in 2023-24. Maharashtra onion production has grown at 4.9% in last 5 years period.

Figure 7-7: Maharashtra Onion Production



Source: Department of agriculture and farmers welfare, Crisil Intelligence

Outlook for Agri produce

India's agriculture sector is expected to grow by around ~3% in FY 2026, with key support from robust monsoon and government interventions. Crisil expects 2.7% Agri produce growth in the next 5 years as Project Road holds ~65% of Onions and fruits share. The decent past growth seen in Horticulture crops along the project road influence areas.

Automotive and Auto Components

Auto motive and auto components commodity is contributing 5% at TP 1 and 3% at TP 2 in overall goods traffic.

Crisil expects 5.4% Auto mobile components growth in the next 5 years as the presence of Mahindra Tractor plant and MRF tyre plant along with Pune Auto cluster influence the traffic on the project stretch. 75% of the traffic moves towards Hyderabad for consumption. Hyderabad automotive traffic largely originates from western region. Hyderabad accounts for 60% of down traffic followed by Vishakhapatnam and Vijayawada Chennai. The region has major production presence for tractors, 3-W LCV, Scooters and Tyres. Zaheerabad is major auto hub with presence of Mahindra, MRF and upcoming NIMZ by year 2030 will support higher growth. In NIMZ 22% of allocated area is allotted for development and production of EVs. With setting up of NMIZ by FY30, SME players in the cluster have exposure to passenger vehicles and tractors segments, which have performed better. The market Automotive sector in the country will evolve in the context of several larger trends, some specific to India, and some relevant globally.

Consumer Foods

Consumer foods and products commodity holds ~15% of overall goods traffic. Crisil expects 4.5% commodity growth in the next 5 years as the project road connect major hubs Hyderabad and Mumbai/Pune. The commodities travelling the project stretch in consumer food category are Edible oil, Dairy Items and products, Eggs and other FMCG goods. Largely the purpose of these commodities is for consumption purpose in the Hyderabad, Mumbai, Pune, Sangareddy and Zaheerabad regions. A portion of edible oils which is transported via road is primarily supply driven. The commodity traffic is largely driven by supply from Telangana state; down (towards Mumbai) traffic of the commodity contributes major edible oil traffic.

7.5 Commodity Outlook

Crisil Intelligence has forecasted the freight traffic growth based on the growth in relevant sectors influencing traffic in the region. Industry growth has been analysed and forecasted based on our proprietary database of industries for the surrounding regions that impact traffic on project road as well as our internal assessment on a relevant set of sectors at the pan India level.

Package wise forecast incorporates the regional dynamics including, but not limited to, investments, commodity trends, district output (GDDP) profile (primary/secondary, construction/manufacturing) etc.

The traffic for the coming years is projected by factoring in the impact of these parameters on commodity wise growth rates and is presented in below table.

Table 7-1: Commodity outlook for the Project section

Commodity	TP 1	TP 2	FY 27 - FY 31	FY 32 - FY 36	FY 37 - FY 41	FY 27 - FY 45
Agri Produce	8.9%	15.7%	2.7%	2.3%	2.0%	2.2%
Automobiles	4.9%	2.5%	5.4%	4.6%	4.1%	4.4%
Chemical products	3.8%	3.0%	4.5%	3.9%	3.4%	3.7%
Coal	0.0%	0.1%	1.8%	1.5%	1.4%	1.5%
Construction materials	6.7%	4.0%	5.9%	5.0%	4.4%	4.8%
Consumer Foods	12.4%	10.1%	4.5%	3.9%	3.4%	3.7%
Consumer Products	3.7%	3.4%	4.5%	3.9%	3.4%	3.7%
Container	0.6%	0.9%	4.6%	3.9%	3.5%	3.8%
Courier & parcel	15.9%	13.6%	7.4%	6.3%	5.6%	6.1%
Iron & Steel Products	4.3%	3.9%	5.9%	5.0%	4.4%	4.8%

Commodity	TP 1	TP 2	FY 27 - FY 31	FY 32 - FY 36	FY 37 - FY 41	FY 27 - FY 45
Machinery	2.2%	1.2%	4.5%	3.9%	3.4%	3.7%
Milk & Animal Food	0.3%	0.2%	3.6%	3.1%	2.7%	3.0%
Others	2.7%	4.1%	5.4%	4.6%	4.1%	4.4%
Paper products	1.0%	1.4%	4.5%	3.9%	3.4%	3.7%
Petroleum Products	3.5%	3.9%	2.7%	2.3%	2.0%	2.2%
Pharmaceuticals	2.2%	1.1%	3.6%	3.1%	2.7%	3.0%
Plastic products	3.2%	3.5%	5.0%	4.3%	3.7%	4.1%
Plywood & Timber products	1.9%	2.3%	4.5%	3.9%	3.4%	3.7%
Rubber products	0.4%	0.1%	5.4%	4.6%	4.1%	4.4%
Textile & Footwear	2.2%	1.4%	4.5%	3.9%	3.4%	3.7%
Tiles & Ceramic products	1.6%	1.0%	4.5%	3.9%	3.4%	3.7%

Source: Industry, Crisil Intelligence

7.6 Implied growth rate for the project section

Mode wise implied growth rates adopted for the project road is presented in the below table.

Table 7-2: Projected Traffic Growth Rates _ TP 1(Mangalgi TP) _Pre Diversion

Vehicle Type	FY 26 - FY 31	FY 31 - FY 36	FY 36 - FY 41	FY 41 – FY 44	FY 26 - FY 44
Car/Jeep/Van	5.6%	4.7%	3.9%	3.4%	4.5%
LCV/Minibus	4.8%	4.2%	3.7%	3.2%	4.0%
2 Axle Bus	2.9%	2.6%	2.4%	2.2%	2.5%
Truck	4.9%	4.3%	3.8%	3.3%	4.2%
3 Axle Truck	0.1%	-0.5%	-1.0%	-1.4%	-0.6%
MAV	5.7%	5.1%	4.6%	4.1%	5.0%
OSV	5.7%	5.1%	4.6%	4.1%	5.0%
Total	**5.1%**	**4.4%**	**3.8%**	**3.3%**	**4.2%**
PCU	**4.9%**	**4.3%**	**3.9%**	**3.4%**	**4.2%**

Source: Crisil Intelligence

Post traffic growth rates include the impacts Chennai Surat Expressway Negative Impact, Regain traffic of loss due to Dhule Aurangabad ghat sections and Positive impact of Hyderabad MMLP.

Table 7-3: Projected Traffic Growth Rates _ TP 1(Mangalgi TP) _Post Impacts

Vehicle Type	FY 26 - FY 31	FY 31 - FY 36	FY 36 - FY 41	FY 41 – FY 44	FY 26 - FY 44
Car/Jeep/Van	5.5%	4.7%	3.9%	3.4%	4.5%
LCV/Minibus	4.4%	4.2%	3.7%	3.2%	3.9%
2 Axle Bus	2.8%	2.6%	2.4%	2.2%	2.5%
Truck	4.6%	4.4%	3.8%	3.3%	4.1%
3 Axle Truck	-0.3%	1.2%	-0.6%	-1.3%	-0.1%
MAV	5.7%	5.3%	4.6%	4.0%	5.0%
OSV	5.7%	5.3%	4.6%	3.3%	5.0%
Total	**4.9%**	**4.5%**	**3.8%**	**3.4%**	**4.2%**
PCU	**4.8%**	**4.5%**	**3.9%**	**3.4%**	**4.2%**

Source: Crisil Intelligence

Table 7-4: Projected Traffic Growth Rates _ TP 1(Kamkole TP) _Pre Diversion

Vehicle Type	FY 26 - FY 31	FY 31 - FY 36	FY 36 - FY 41	FY 41 – FY 44	FY 26 - FY 44
Car/Jeep/Van	6.1%	5.1%	4.2%	3.7%	4.9%
LCV/Minibus	4.1%	3.6%	3.2%	2.8%	3.5%
2 Axle Bus	2.9%	2.6%	2.4%	2.2%	2.5%
Truck	4.8%	4.2%	3.7%	3.3%	4.1%
3 Axle Truck	-0.2%	-0.7%	-1.2%	-1.6%	-0.8%
MAV	5.5%	4.9%	4.5%	4.0%	4.8%
OSV	5.5%	4.9%	4.5%	4.0%	4.8%
Total	5.4%	4.7%	4.0%	3.5%	4.5%
PCU	5.0%	4.4%	3.9%	3.4%	4.3%

Source: Crisil Intelligence

Post traffic growth rates include the impacts Chennai Surat Expressway Negative Impact, Regain traffic of loss due to Dhule Aurangabad ghat sections and Positive impact of Hyderabad MMLP.

Table 7-5: Projected Traffic Growth Rates _ TP 2(Kamkole TP)

Vehicle Type	FY 26 - FY 31	FY 31 - FY 36	FY 36 - FY 41	FY 41 – FY 44	FY 26 - FY 44
Car/Jeep/Van	6.0%	5.1%	4.2%	3.7%	4.9%
LCV/Minibus	3.9%	3.7%	3.2%	2.8%	3.5%
2 Axle Bus	2.9%	2.6%	2.4%	2.2%	2.5%
Truck	4.5%	4.3%	3.7%	3.2%	4.0%
3 Axle Truck	-0.5%	0.7%	-0.8%	-1.4%	-0.4%
MAV	5.4%	5.2%	4.4%	4.0%	4.8%
OSV	5.4%	5.2%	4.4%	3.5%	4.8%
Total	**5.3%**	**4.7%**	**4.0%**	**3.4%**	**4.5%**
PCU	**4.9%**	**4.5%**	**3.9%**	**3.7%**	**4.3%**

Source: Crisil Intelligence

7.7 Traffic Projections

The total traffic projected in terms of PCUs based on most likely growth rates and after impacts is presented in below table.

Table 7-6: Year wise Post impacted Projected Traffic _TP 1(Mangalgi TP)

FY Year	Car/Jeep/Van	LCV/Minibus	Bus	2A Truck	3A Truck	MAV	OSV	Total	PCU	PCU Growth
FY 2026	5,927	556	541	1,360	695	2,183	3	11,266	24,389	
FY 2027	6,283	585	557	1,432	698	2,316	3	11,875	25,662	5.2%
FY 2028	6,647	614	574	1,506	701	2,455	4	12,500	26,974	5.1%
FY 2029	7,011	640	590	1,574	697	2,612	4	13,127	28,324	5.0%
FY 2030	7,381	665	606	1,640	691	2,763	4	13,751	29,644	4.7%
FY 2031	7,757	690	622	1,706	684	2,876	4	14,339	30,791	3.9%
FY 2032	8,145	719	639	1,778	679	3,014	5	14,978	32,093	4.2%

FY Year	Car/Jeep/Van	LCV/Minibus	Bus	2A Truck	3A Truck	MAV	OSV	Total	PCU	PCU Growth
FY 2033	8,539	752	656	1,870	725	3,215	5	15,761	33,909	5.7%
FY 2034	8,937	783	673	1,949	725	3,370	5	16,441	35,338	4.2%
FY 2035	9,340	815	690	2,033	726	3,542	5	17,151	36,870	4.3%
FY 2036	9,747	848	707	2,118	727	3,718	6	17,870	38,430	4.2%
FY 2037	10,156	880	724	2,202	727	3,897	6	18,593	40,001	4.1%
FY 2038	10,568	913	742	2,287	721	4,075	6	19,313	41,554	3.9%
FY 2039	10,982	947	759	2,375	720	4,265	6	20,054	43,183	3.9%
FY 2040	11,396	981	777	2,463	713	4,453	7	20,789	44,793	3.7%
FY 2041	11,812	1,015	794	2,552	706	4,646	7	21,532	46,429	3.7%
FY 2042	12,227	1,048	812	2,638	698	4,837	7	22,266	48,038	3.5%
FY 2043	12,642	1,081	829	2,725	689	5,032	7	23,005	49,669	3.4%
FY 2044	13,056	1,115	847	2,812	680	5,231	8	23,748	51,320	3.3%
CAGR (FY 26 – FY 44)	4.5%	3.9%	2.5%	4.1%	-0.1%	5.0%	5.0%	4.2%	4.2%	

Source: Crisil Intelligence

Table 7-7: Year wise Post impacted Projected Traffic _TP 1(Kamkole TP)

FY Year	Car/Jeep/Van	LCV/Minibus	Bus	2A Truck	3A Truck	MAV	OSV	Total	PCU	PCU Growth
FY 2026	14,385	960	1,024	1,855	915	2,568	4	21,711	38,778	
FY 2027	15,321	1,003	1,055	1,949	916	2,718	4	22,966	40,836	5.3%
FY 2028	16,274	1,043	1,085	2,040	912	2,847	4	24,207	42,784	4.8%
FY 2029	17,252	1,083	1,116	2,131	906	3,020	4	25,512	44,946	5.1%
FY 2030	18,252	1,122	1,147	2,220	898	3,188	5	26,831	47,096	4.8%
FY 2031	19,279	1,163	1,179	2,314	890	3,340	5	28,170	49,224	4.5%
FY 2032	20,327	1,205	1,211	2,409	882	3,496	5	29,536	51,396	4.4%
FY 2033	21,393	1,252	1,243	2,526	925	3,716	5	31,061	54,102	5.3%
FY 2034	22,477	1,298	1,275	2,633	924	3,904	6	32,517	56,516	4.5%
FY 2035	23,575	1,345	1,308	2,743	923	4,097	6	33,996	58,974	4.3%
FY 2036	24,687	1,392	1,340	2,854	920	4,295	6	35,495	61,474	4.2%
FY 2037	25,811	1,438	1,373	2,965	917	4,496	7	37,007	63,995	4.1%
FY 2038	26,945	1,485	1,406	3,077	908	4,697	7	38,524	66,510	3.9%
FY 2039	28,087	1,533	1,439	3,192	903	4,909	7	40,070	69,112	3.9%
FY 2040	29,236	1,580	1,472	3,307	893	5,122	7	41,618	71,705	3.8%
FY 2041	30,390	1,629	1,506	3,424	882	5,339	8	43,178	74,332	3.7%
FY 2042	31,548	1,675	1,539	3,537	870	5,555	8	44,732	76,932	3.5%
FY 2043	32,707	1,721	1,573	3,652	858	5,775	8	46,294	79,560	3.4%
FY 2044	33,867	1,768	1,606	3,767	845	6,000	9	47,862	82,212	3.3%
CAGR (FY 26 – FY 44)	4.9%	3.5%	2.5%	4.0%	-0.4%	4.8%	4.8%	4.5%	4.3%	

Source: Crisil Intelligence

The concession agreement for the project specifies the design capacity to be 60,000 PCUs for a six-lane project highway. The CA also mentions that if the average daily traffic of PCUs in any accounting year shall exceed the design capacity of the project highway, the Authority at its option may cause preparation of Detailed Project Report

(DPR). In context of this, the total projected average traffic for the project road exceeds 60,000 PCUs in FY41 as per the projections based on the traffic growth rates.

7.8 Modification in concession period

As per clause 29.1 of concession agreement, the authority and concessionaire acknowledge that the traffic as on April 1, 2021 (the Target Date) is estimated to be 26,331 PCUs per day (Target traffic) and hereby to determine the modification in concession period. if the Actual Average Traffic shall have fallen short of or exceeded the target traffic by more than 2.5 percent, then there will be an increase or reduction in concession period.

Subject the provisions of clause 29.1.2, in the event actual average traffic shall have fallen short of the target traffic, then for every 1% short fall as compared to the target traffic, the concession period shall, subject to payment of concession fee in accordance with this agreement, be increased by 1.5% there of: provided that such increase in concession period shall not in any case exceed to 20% of concession period.

As per the traffic during the target period, Concession period shall increase by 20%. As per the target traffic calculations the concession extension is estimated by 5 years and on account of covid extension is 8 Days. The overall estimated concession period is extended by 1833 days i.e. will end on 6th April 2044.

8 Revenue forecast

8.1 General

The project section is under “open tolling system” which enables the concessionaire to collect tolls from long distance as well as short distance traffic joining the project from adjoining highways.

8.2 User Fee Schedule

As per Gazette notification dated 05.12.2008, under the National Highways Fee (Determination of Rates and Collection) Rules 2008 [GSR 838 (E) and concession agreement the per km toll rates applicable from 2007/08 for normal tolling length and permanent structure, the revision basis and concessions are provided.

The concessions of traffic have been provided under the categories/ toll tickets as presented in below table.

Table 8-1: Tolling Tickets

Ticket	Maximum number of one-way journeys allowed	Period of validity
Single/Normal	Single	-
Daily/Return	Two	24 hours
Monthly Pass	Fifty	One month from the date of payment
Local Personal	Multiple	One month from the date of payment
Local Commercial	Single	-

8.3 Toll Segmentation

As mentioned in traffic assessment of the project stretch section, historical toll data of FY 25 is used in adopting the segmentation for the project road. The traffic tolling segmentation in (%) adopted for the present study for FY26 onwards is presented in below table.

Table 8-2: Toll segmentation _ TP 1 (Mangalgi TP)

Vehicle category	Single journey	Return journey	Monthly Pass	Local Commercial	Local Passenger	Violations/ Exemptions	Total
Car/Jeep/Van	45.6%	46.9%	0.0%	0.5%	4.0%	3.0%	100.0%
LCV/Minibus	65.7%	33.8%	0.0%	0.3%	0.0%	0.3%	100.0%
Bus	13.3%	60.9%	5.8%	20.0%	0.0%	0.1%	100.0%
2 Axle Truck	80.2%	19.3%	0.0%	0.3%	0.0%	0.3%	100.0%
3 Axle Truck	80.5%	18.5%	0.0%	0.8%	0.0%	0.1%	100.0%
MAV	89.2%	10.5%	0.0%	0.1%	0.0%	0.1%	100.0%
OSV	96.8%	1.5%	0.0%	0.0%	0.0%	1.7%	100.0%

Source: Crisil Intelligence

Table 8-3: Toll segmentation _ TP 2 (Kamkole TP)

Vehicle category	Single journey	Return journey	Monthly Pass	Local Commercial	Local Passenger	Violations/ Exemptions	Total
Car/Jeep/Van	31.8%	57.3%	0.0%	1.3%	7.0%	2.6%	100.0%
LCV/Minibus	46.8%	46.7%	0.0%	5.9%	0.0%	0.6%	100.0%
Bus	7.6%	58.9%	9.7%	23.7%	0.0%	0.1%	100.0%
2 Axle Truck	70.5%	26.5%	0.0%	2.0%	0.0%	0.9%	100.0%
3 Axle Truck	67.7%	23.4%	0.0%	8.0%	0.0%	0.9%	100.0%
MAV	83.1%	14.1%	0.0%	2.6%	0.0%	0.2%	100.0%
OSV	92.8%	6.5%	0.0%	0.0%	0.0%	0.7%	100.0%

Source: Crisil Intelligence

8.4 Trip Rates

The trip rates are adopted based on the FY 25 historic traffic data and trip rates for the present study for FY26 onwards is presented in below table.

Table 8-4: Trip rates _ TP 1 (Mangalgi TP)

Vehicle category	Single journey	Return journey	Monthly Pass	Local Commercial	Local Passenger
Car/Jeep/Van	1.00	2.00	50.00	1.00	17.00
LCV/Minibus	1.00	2.00	50.00	1.00	
Bus	1.00	2.00	47.43	1.00	
2 Axle Truck	1.00	2.00	50.00	1.00	
3 Axle Truck	1.00	2.00	50.00	1.00	
MAV	1.00	2.00	50.00	1.00	
OSV	1.00	2.00	50.00	1.00	

Source: TMS Data, Crisil Intelligence

Table 8-5: Trip rates _ TP 2 (Kamkole TP)

Vehicle category	Single journey	Return journey	Monthly Pass	Local Commercial	Local Passenger
Car/Jeep/Van	1.00	2.00	50.00	1.00	14.37
LCV/Minibus	1.00	2.00	50.00	1.00	
Bus	1.00	2.00	44.58	1.00	
2 Axle Truck	1.00	2.00	50.00	1.00	
3 Axle Truck	1.00	2.00	50.00	1.00	
MAV	1.00	2.00	50.00	1.00	
OSV	1.00	2.00	50.00	1.00	

Source: TMS Data, Crisil Intelligence

8.4.1 Tolling lengths

The tollable lengths and tollable lengths for the project section for plaza is presented in below table.

Table 8-6: Tolling Lengths

No.	#	Mangalgi TP _ TP 1	Kamkole TP _ TP 2
A	Normal Highway length _Kms	71.60	55.100
B	Bypass Length	3.250	15.00
C	Structure Length	-	-
D	Total Length **(A+B+C)**	**74.850**	**70.100**
E	Total Tollable length **(A+1.5*B+C*10)**	**76.475**	**77.600**

Source: Concession Agreement, Crisil Intelligence

8.4.2 Toll Rates Estimation

The toll rates that are likely to be applicable on the project section during the project study are in accordance with the National Highways Fee (Determination of Rates and Collection) Rules 2008 [GSR 838 (E),2008 and article 27 of the concession agreement.

The toll rates (Rs/km) for the base year 2007-08 for different vehicle categories are as per fee rule/concession agreement mentioned above and are presented in below table.

Table 8-7: Base Rate in Rs/km

Vehicle Type	Base rate of fee per km for the Base Year 2007-08 (in Rupees)
Car, Jeep, Van, or Light Motor Vehicle	0.65
Light Commercial Vehicle, Light Goods Vehicle or Minibus	1.05
Bus or Truck (Two Axles)	2.20
Three-axle commercial vehicles	2.40
Heavy Construction Machinery (HCM) or Earth Moving Equipment (EME) or Multi Axle Vehicle (MAV) (four to six axles)	3.45
Oversized Vehicles (seven or more axles)	4.20

Source: NHAI-Determination of Rates and Collection Rule 2008

As per Gazette notification dated 05.12.2008, under National Highways Fee (Determination of Rates and Collection) Rules 2008 [GSR 838 (E)], Toll rates at both Toll Plaza applicable for current fiscal (FY26) is provided below:

Table 8-8: Toll Rates (INR) _ TP 1 (Mangalgi TP)

Type of vehicle	Single Journey	Return Journey	Monthly Pass	Local Commercial	Local Pass
Car/Jeep/Van	115	175	3,870	60	350
LCV/Minibus	190	280	6,255	95	
2 Axle Bus	395	590	13,105	195	
Truck	395	590	13,105	195	
3 Axle Truck	430	645	14,295	215	
MAV	615	925	20,550	310	
OSV	750	1,125	25,015	375	

Source: Crisil Intelligence

Table 8-9: Toll Rates (INR) _ TP 2 (Kamkole TP)

Type of vehicle	Single Journey	Return Journey	Monthly Pass	Local Commercial	Local Pass
Car/Jeep/Van	120	175	3,930	60	350
LCV/Minibus	190	285	6,345	95	
2 Axle Bus	400	600	13,295	200	
Truck	400	600	13,295	200	
3 Axle Truck	435	655	14,505	220	
MAV	625	940	20,850	315	
OSV	760	1,140	25,385	380	

Source: Crisil Intelligence

8.4.3 Review and Outlook of Whole-Sale price index (WPI)

The projected toll rates are dependent on Wholesale Price Index (WPI) assumptions for 2024 to 2045. For WPI projection, Crisil Intelligence has relied on inputs from Client. Past and outlook WPI growth is presented in below table.

Table 8-10: WPI outlook

Year	WPI	Expected Year-on-year growth
2025	478.6	
2026	492.9	3.0%
2027	513.9	4.3%
2028	535.7	4.3%
2029	558.5	4.3%
2030	581.9	4.2%
2031	606.4	4.2%
2032	631.8	4.2%
2033	658.1	4.2%
2034	685.4	4.2%
2035	713.8	4.2%
2036	743.1	4.1%
2037	773.5	4.1%

Year	WPI	Expected Year-on-year growth
2038	805.3	4.1%
2039	837.9	4.1%
2040	871.8	4.1%
2041	907.1	4.1%
2042	943.4	4.0%
2043	981.1	4.0%
2044	1020.4	4.0%

Source: Projected WPI (P): IHS: Client

8.5 Revenue Estimates

The revenue projections for the project road are presented in the below table. The actual Concession period will be ending on 31st March 2039. However, Concession period estimated extend by 5 years as per target traffic provisions in the CA and COVID related extension is 8 Days. The revised estimated concession period will get complete on 6th April 2044.

Table 8-11: Revenue in ₹ Millions for the Mangalgi TP _ TP 1

FY Year	Car/Jeep/Van	LCV/Minibus	Bus	2A Truck	3A Truck	MAV	OSV	Total	Growth
FY 2026	205	35	57	186	104	476	1	1,063	
FY 2027	225	38	61	203	108	526	1	1,161	9.2%
FY 2028	250	42	65	222	113	585	1	1,279	10.2%
FY 2029	275	46	70	242	117	649	1	1,400	9.5%
FY 2030	305	50	75	264	122	716	1	1,533	9.5%
FY 2031	334	54	81	289	126	780	1	1,665	8.6%
FY 2032	366	59	87	315	131	858	2	1,816	9.1%
FY 2033	404	64	93	346	146	952	2	2,007	10.5%
FY 2034	438	69	100	374	153	1,046	2	2,182	8.7%
FY 2035	478	76	107	411	160	1,149	2	2,383	9.2%
FY 2036	525	82	115	448	168	1,263	2	2,603	9.3%
FY 2037	571	89	123	484	175	1,382	3	2,827	8.6%
FY 2038	617	97	132	526	181	1,510	3	3,066	8.5%
FY 2039	674	104	141	571	189	1,649	3	3,332	8.6%
FY 2040	731	113	151	620	197	1,806	3	3,620	8.6%
FY 2041	790	123	161	671	203	1,962	4	3,913	8.1%
FY 2042	855	132	172	725	209	2,136	4	4,233	8.2%
FY 2043	927	142	183	782	216	2,321	4	4,576	8.1%
FY 2044	999	154	196	848	223	2,530	5	4,956	8.3%
FY 2045*	18	3	3	15	4	45	0	88	
CAGR (FY 26 – FY 44)	9.2%	8.6%	7.1%	8.8%	4.4%	9.7%	9.7%	8.9%	

Source: Crisil Intelligence

**FY45 revenue is only for 6 days.*

Table 8-12: Revenue in ₹ Millions for the Kamkole TP _ TP 2

FY Year	Car/Jeep/Van	LCV/Minibus	Bus	2A Truck	3A Truck	MAV	OSV	Total	Growth
FY 2026	477	56	106	248	130	556	1	1,574	
FY 2027	524	62	113	270	135	612	1	1,716	9.0%
FY 2028	587	67	122	297	140	673	1	1,886	9.9%
FY 2029	649	72	131	323	146	743	1	2,066	9.5%
FY 2030	717	78	140	352	151	818	2	2,258	9.3%
FY 2031	790	85	150	382	157	897	2	2,463	9.1%
FY 2032	881	92	162	416	163	984	2	2,700	9.6%
FY 2033	961	100	174	455	178	1,095	2	2,965	9.8%
FY 2034	1,047	108	187	497	185	1,198	2	3,225	8.8%
FY 2035	1,151	117	200	540	194	1,314	2	3,519	9.1%
FY 2036	1,278	128	215	592	203	1,448	3	3,866	9.9%
FY 2037	1,376	138	230	639	210	1,581	3	4,178	8.1%
FY 2038	1,512	148	246	694	217	1,726	3	4,546	8.8%
FY 2039	1,655	159	263	752	227	1,881	3	4,940	8.7%
FY 2040	1,794	172	282	819	235	2,056	4	5,362	8.5%
FY 2041	1,945	186	300	880	241	2,239	4	5,796	8.1%
FY 2042	2,108	199	321	951	249	2,435	4	6,269	8.1%
FY 2043	2,294	214	343	1,030	257	2,642	5	6,785	8.2%
FY 2044	2,478	230	367	1,110	265	2,878	5	7,333	8.1%
FY 2045*	44	4	6	20	4	51	0	130	
CAGR (FY 26 – FY 44)	9.6%	8.1%	7.1%	8.7%	4.0%	9.6%	9.5%	8.9%	

Source: Crisil Intelligence

**FY45 revenue is only for 6 days.*

Table 8-13: Projected Revenue in ₹ Millions

FY Year	TP 1 _ Mangalgi TP	TP 2 _Kamkole TP	Total DTPL
FY 2026	1,063	1,574	2,637
FY 2027	1,161	1,716	2,877
FY 2028	1,279	1,886	3,165
FY 2029	1,400	2,066	3,466
FY 2030	1,533	2,258	3,791
FY 2031	1,665	2,463	4,128
FY 2032	1,816	2,700	4,515
FY 2033	2,007	2,965	4,971
FY 2034	2,182	3,225	5,407
FY 2035	2,383	3,519	5,901
FY 2036	2,603	3,866	6,469

FY Year	TP 1 _ Mangalgi TP	TP 2 _Kamkole TP	Total DTPL
FY 2037	2,827	4,178	7,005
FY 2038	3,066	4,546	7,613
FY 2039	3,332	4,940	8,272
FY 2040	3,620	5,362	8,982
FY 2041	3,913	5,796	9,709
FY 2042	4,233	6,269	10,501
FY 2043	4,576	6,785	11,360
FY 2044	4,956	7,333	12,288
FY 2045*	88	130	218
CAGR (FY 26 – FY 44)	8.9%	8.9%	8.9%

Source: Crisil Intelligence
**FY45 revenue is only for 6 days.*

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Traffic & Revenue assessment for Panipat Elevated Corridor Limited (PECL)

Final Report

November 2025



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Abbreviation

AADT	Annual Average Daily Traffic
ADT	Average Daily Traffic
CA	Concession Agreement
PECL	Panipat Elevated Corridor Limited
PR	Project Road
CAGR	Compound annual growth rate
BOT	Built Operate and Transfer
FMCG	Fast-moving consumer goods
FY	Fiscal Year
GDP	Gross Domestic Product
HME	Heavy Motor Vehicle
IHMCL	Indian Highways Management Company Limited
IRC	Indian Road Congress

MLCV	Mini-Light Commercial Vehicle
LCV	Light Commercial Vehicle
LPG	Liquefied petroleum gas
MAV	Multi Axle Vehicle
NH	National Highways
NHAI	National Highways Authority of India
OD	Origin-Destination
OSV	Over Sized Vehicle
PCU	Passenger Car Unit
SCF	Seasonal Correction Factors
SPV	Special Purpose Vehicle
TMS	Toll Management Systems
TVC	Traffic Volume Count
WPI	Wholesale price index
Truck	Truck comprises of 2 axle, 3 axle, MAV (vehicles with more than 3 axles up to 6 axles) and OSV (vehicles with more than 6 axles)

1. Executive summary

1.1 Project Details

We understand that EAAA TransInfra Managers Limited is the Investment Manager, EPIC Transnet Project Management Private Limited is the proposed Project Manager and M/s Epic Transnet Infrastructure Private Limited is the sponsor of the Citius TransNet Investment Trust ("Trust" or "InvIT") and - M/s Panipat Elevated Corridor Limited ("PECL") is proposed to be part of the initial portfolio assets of the Trust. The Trust is registered with Securities and Exchange Board of India ("SEBI") as an infrastructure investment trust under the SEBI InVIT Regulations.

M/s Epic Transnet Infrastructure Private Limited (hereinafter "the Client") as sponsor has appointed M/s CRISIL Limited (hereinafter referred as "Technical Consultant") to carry out Traffic and Revenue Due Diligence of operational asset of Six Laning of Panipat Elevated Corridor Limited on BOT Toll Basis in the State of Haryana (herein after refer as "the Project") which is being operated by "M/s Panipat Elevated Corridor Limited ("PECL")" (hereinafter refer as "the Concessionaire or Company or PECL").

1.2 Asset Overview

Project section is 10 km long in the state of Haryana. The project section is six-lane elevated road that provides bypass to the through traffic. The project road has one toll plaza at km 95.000 in the end of the elevated structure.

- PECL

Project was awarded by the National Highways Authority of India (NHAI) for a Concession Period of 20 years including construction period of 2.5 years. The detail of the section is presented in **Table 1-1**.

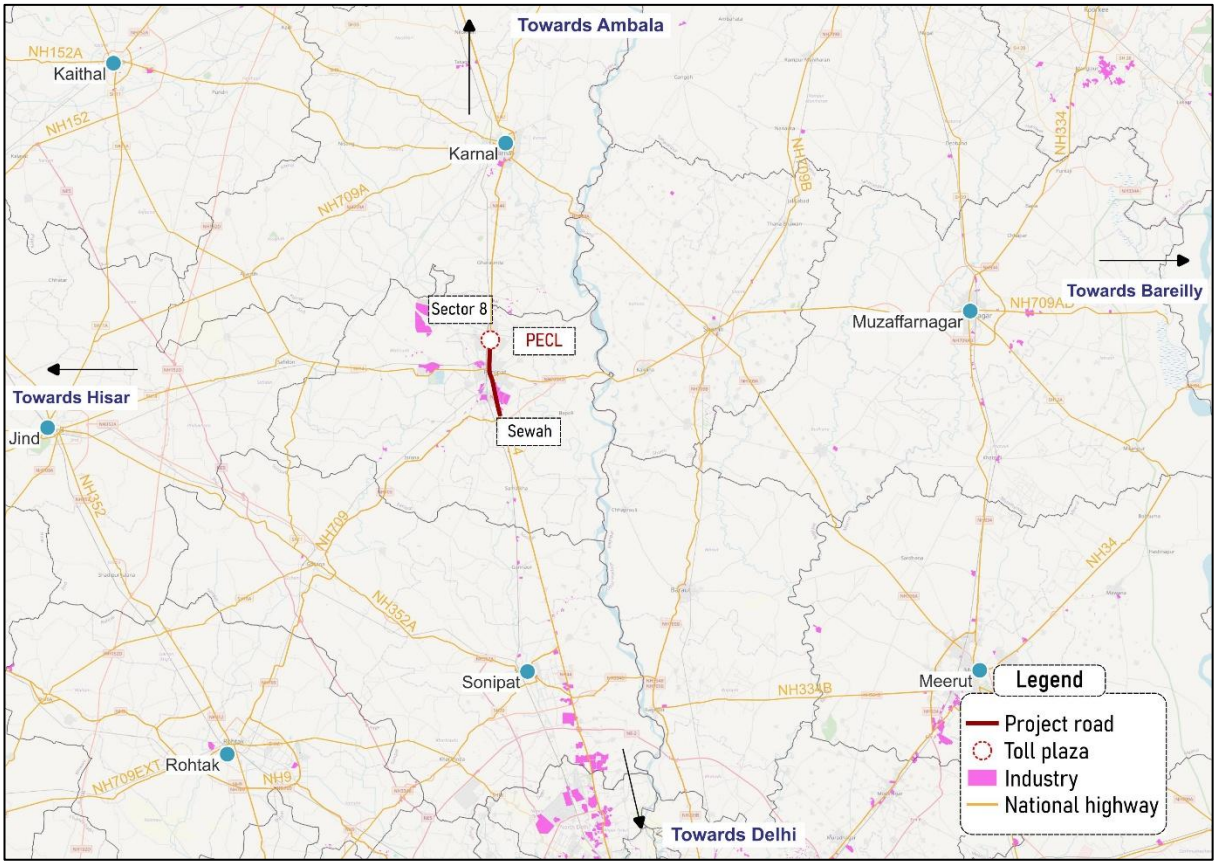
Table 1-1: Toll Plaza Details

Toll Plaza	Length
PECL (95.000 km)	10 km

The alignment of the project section in **Figure 1.1**.



Figure 1-1: Alignment of Project Section



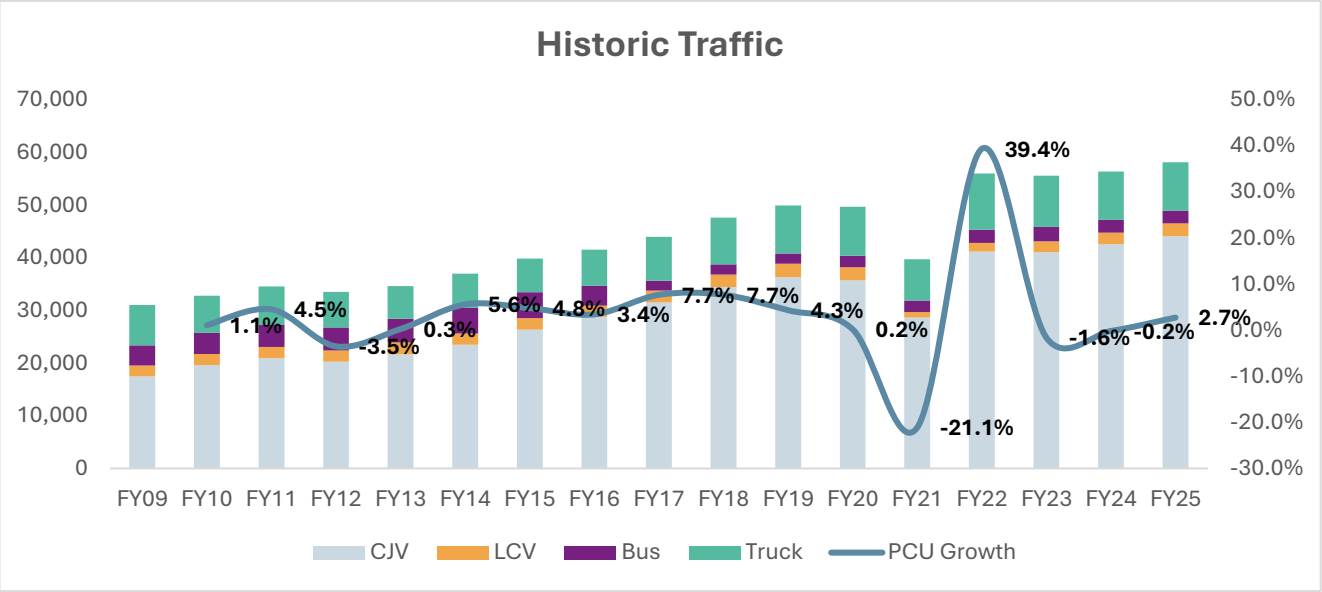
Source: Open Street Maps, Crisil Intelligence

1.3 Historical Traffic Data

The historical traffic data mode wise was made available by client from April-09 to July-25.

The chart below shows the average daily traffic on Panipat Elevated Corridor Limited stretch from FY09 to FY25.

Figure 1-2: Historic Annual Average Daily Traffic (AADT)



Note: PCU value for Truck is considered 3, Truck comprises of 2 axle, 3 axle, MAV (vehicles with more than 3 axles up to 6 axles) and OSV (vehicles with more than 6 axles)

Source: PECL, Crisil Intelligence

Table 1-2: Historical mode wise traffic and growth

Toll Plaza	Veh Type	PECL
CAGR (FY 23 - FY 25)	Cars	3.7%
	Bus	8.2%
	LCV	-5.8%
	Truck	-2.7%
	Total	**2.3%**
	PCU	**1.3%**

Source: PECL, Crisil Intelligence, Truck comprises of 2 axle, 3 axle, MAV (vehicles with more than 3 axles up to 6 axles) and OSV (vehicles with more than 6 axles)

Overall traffic growth in terms of PCU for the period FY25 vs FY23 is about 1.3% at PECL

1.4 Base Traffic Estimation

For the base year traffic estimation for present study, the 4-months (April-25 to July-25) of traffic for the toll plaza was annualized using 4-12 Month (April-July) SCF factors derived from the year FY25 for all modes.

The AADT estimation for the base case for FY26 is presented in **Table 1-3**.

Table 1-3: Base Traffic Estimation (AADT)-FY26

AADT FY26	PECL
CJV	45,712
LCV	2,531
Bus	2,388
2A	2,462

AADT FY26	PECL
3A	1,878
MAV	5,313
Total	**60,284**
PCU	**93,603**

Source: Crisil Intelligence, Truck comprises of 2 axle, 3 axle, MAV (vehicles with more than 3 axles up to 6 axles) and OSV (vehicles with more than 6 axles)

1.5 Toll Segmentation

The table below presents a segmentation which is considered for the traffic based on the historic data (FY25).

Table 1-4: Historical mode wise traffic segmentation in %

Ticket Type	Single	Local Commercial	Discount Local Monthly Pass Trips	Local Personal Traffic	Exempt	Violation	Total
			FY25				
Car	82.7%	0.5%	2.7%	6.9%	7.1%	0.1%	100.0%
LCV	95.0%	4.2%	0.0%	0.0%	0.9%	0.0%	100.0%
Bus	96.6%	3.1%	0.0%	0.0%	0.3%	0.0%	100.0%
Truck	97.7%	1.8%	0.0%	0.0%	0.5%	0.0%	100.0%

Source: PECL, Crisil Intelligence

1.6 Network Development in the Region

In the case of Project Road, there are no short distance alternate routes available that will impact traffic on the project road. However ongoing and upcoming short distance & long-distance networks that could impact the project road are:

- Trans-Haryana Expressway (NH-152D)
- Upgradation of Karnal-Shamli Stretch (NH-709A)
- Delhi-Amritsar-Katra Expressway (NE-5)

The details of the development in term of milestone, expected completion date and possible impact to project road traffic is presented in **Table 6-1**.

Table 1-5: Details of Network Development and Possible impact

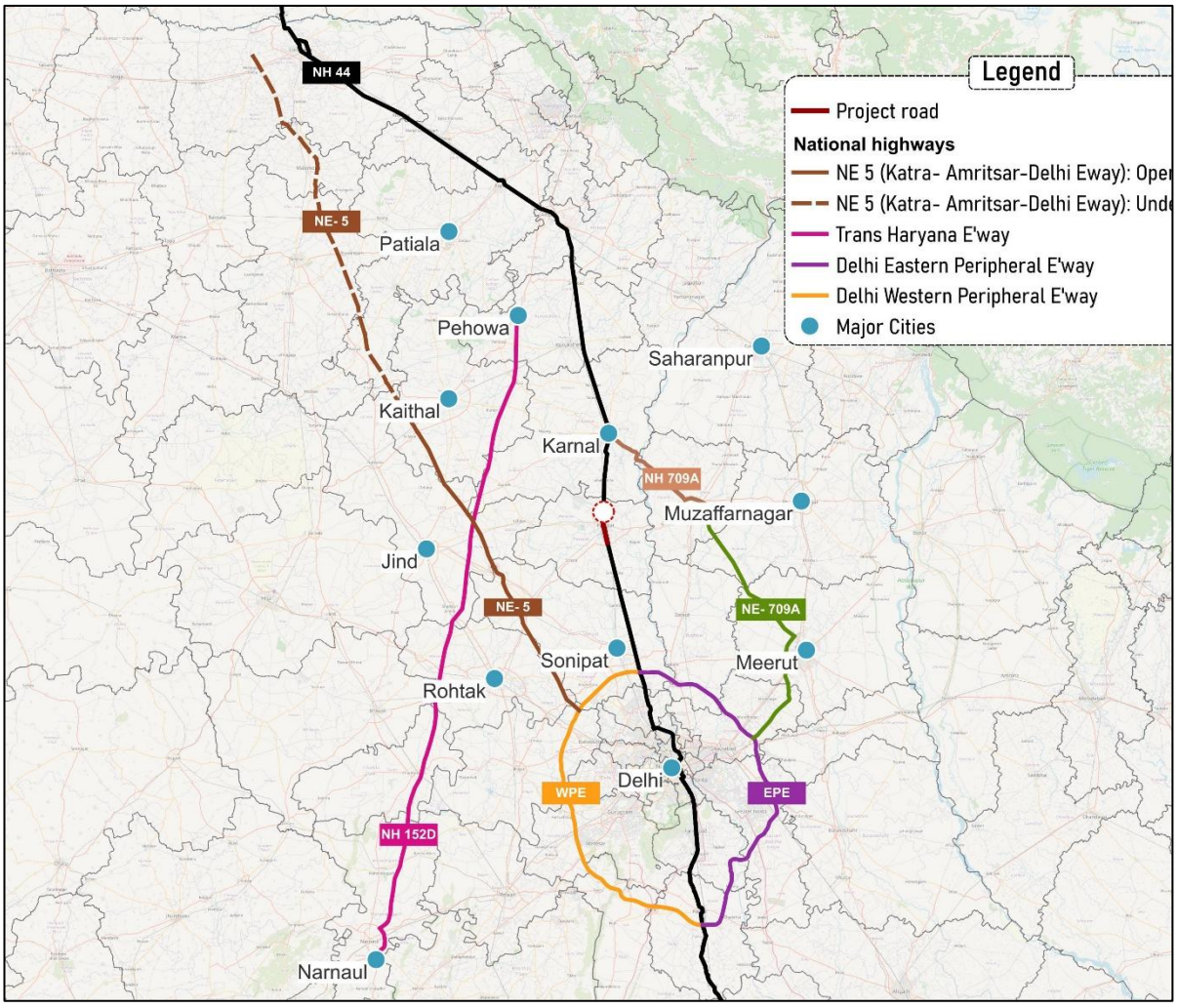
S. No	Details of Development	Milestone/Completion	Impact Year
1	**Trans-Haryana Expressway (NH-152D)** • 227 km long • 6 Lane access-controlled • NHAI	Construction of this expressway was started in July 2020 and was completed and opened for traffic in August 2022	This route has already been operational since August 2022, so no impact has been considered on the project road.
2	**Upgradation of Karnal-Shamli Stretch (NH-709A)**	This section has already been upgraded to 4-Lane and tolling has been started at Patnipartapur TP in	This route is already operational, so no impact has been considered on the project road.

S. No	Details of Development	Milestone/Completion	Impact Year
		Nov-2023 and at Bhuni TP in July-2024.	
3	**Delhi-Amritsar-Katra Expressway** • 670 km long • 4 Lane access-controlled • NHAI	**Haryana Section:** The section traversing through Haryana is operational since November-24 **Punjab Section:** Punjab section facing land acquisition issue due to farmers' protest and some portion in under construction **Jammu section**: The section under Jammu is under construction and nearing completion.	As per the information available in the public domain, the construction of the expressway might be completed by June 2026. However, for some sections, land acquisition is under process. Due to delay in land acquisition and construction of expressway, it is assumed that expressway will not impact the project road until the end of concession period

Source: Crisil Intelligence

The alignment of the developments along with the project road is presented below figure.

Figure 1-3: Alignment of the Project Road and Alternate Road



Source: Open Street Maps, Crisil Intelligence

1.7 Traffic Projections

The total traffic projected in terms of PCUs based on the most likely growth rates is presented in **Table 1-6**.

Table 1-6: Traffic Projection in PCUs

FY	PECL
FY26E	93,634
FY27P	97,984
Growth (FY27 vs FY26)	**4.6%**

Source: Crisil Intelligence

1.8 Revenue Projections

The total revenue in Rs millions at the toll plaza is projected to grow at 10.5% percent for the forecast period from FY26 to FY27 and is presented in **Table 1-7**.

Table 1-7: Total Revenue Projections in millions

FY	PECL
FY26E	1,166.8
FY27P	1,289.3
Growth (FY27 vs FY26)	**10.5%**

Source: Crisil Intelligence

2. Introduction

2.1 Asset Overview

The project road starts at Km 86.000 near Sewah (start of Panipat district) and ends at Km 96.000 near Faridpur with a total length of 10km. The project road falls under the jurisdiction of Panipat district in the state of Haryana. There is one toll plaza towards the end of the elevated section at Km 95.000 and the collection started from 17 July 2008.

The Panipat Elevated Corridor Limited (PECL) is strategically located in the state of Haryana, serving as a key link between Delhi and Chandigarh. The corridor spans approximately 10 kilometers, including a 3.4-kilometer six-lane elevated section that traverses the city of Panipat in a south-to-north direction. The entire corridor is access-controlled, meaning entry and exit are restricted to designated points located at either end of the road. Alongside the main carriageway, local service roads run parallel on both sides and are also included under the concession scope. A single toll plaza is positioned at the northern end of the corridor, north of Panipat, while a U-turn just south of the toll plaza enables toll-free movement for local traffic. The road infrastructure is of consistently high quality throughout, with access control ensuring that the main carriageway remains free from interference by non-motorized or low-speed local traffic, thereby enhancing safety and traffic efficiency. The corridor runs through a region with strong industrial presence, enabling diverse freight movement and a steady flow of both raw materials and finished goods. This asset has one of the longest operation histories in the entire portfolio. Traffic trend has seen different cycle and travel pattern is stabilized and consistent in the movement.

Project was awarded by the National Highways Authority of India (NHAI) for a Concession Period of 20 years starting from appointed date 17th July 2008 including the construction period. The project road section details are presented in **Table 2-1**.

Table 2-1: Project Section Details

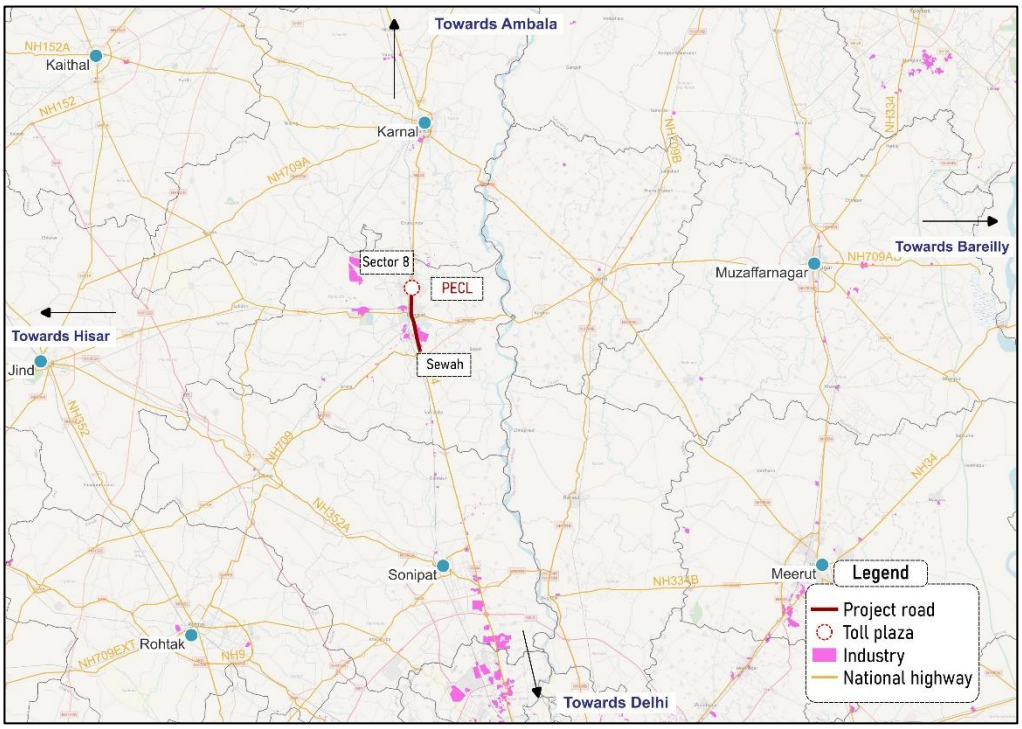
Aspect	Details
Concessionaire	Panipat Elevated Corridor Limited (PECL)
Authority	National Highway Authority of India (NHAI)
Concession Period	20 years
No of Lanes	6-lane configuration (elevated)
Type	BOT
Length of Stretch	10 km
No of Toll Plaza	One Viz PECL (KM 95.000)
CA Signed	17-July-2008
Concession period End	01-Feb-27 (including Extension)
Extension	350 days

Source: Crisil Intelligence

An extension of 350 days has been approved by the competent authority (NHAI) in view of the farmers' agitation from 25-Dec-2020 to 28-Jan-2021 (33 days) and from 29- Jan-2021 to 13-Dec-2021 (317 days), therefore revised date of concession period is 01-Feb-2027.

The Alignment of the project section under study is presented in **Figure 2-1.**

Figure 2-1: Alignment of the Project Section



Source: Google maps, Crisil Intelligence

2.2 Scope

The scope of the traffic assessment for the project road is divided into following four sections.

- **Detailed Assessment of the project road**: - Include review of the Historic TMS Data, past traffic growth, detailed network assessment.
- **Primary Data collection & Analysis**: - Conducting preliminary traffic surveys like TVC and Origin-Destination (O-D) to understand the traffic patterns, commodity profiles.
- **Network Impact Assessment**: - To Analyse the upcoming network developments which may impact on the project road traffic
- **Traffic and Revenue Projections**: -Traffic & Revenue projections considering relevant growth drivers and network developments

Approach & Methodology is detailed out in Traffic Growth Estimation & Traffic forecast chapter.

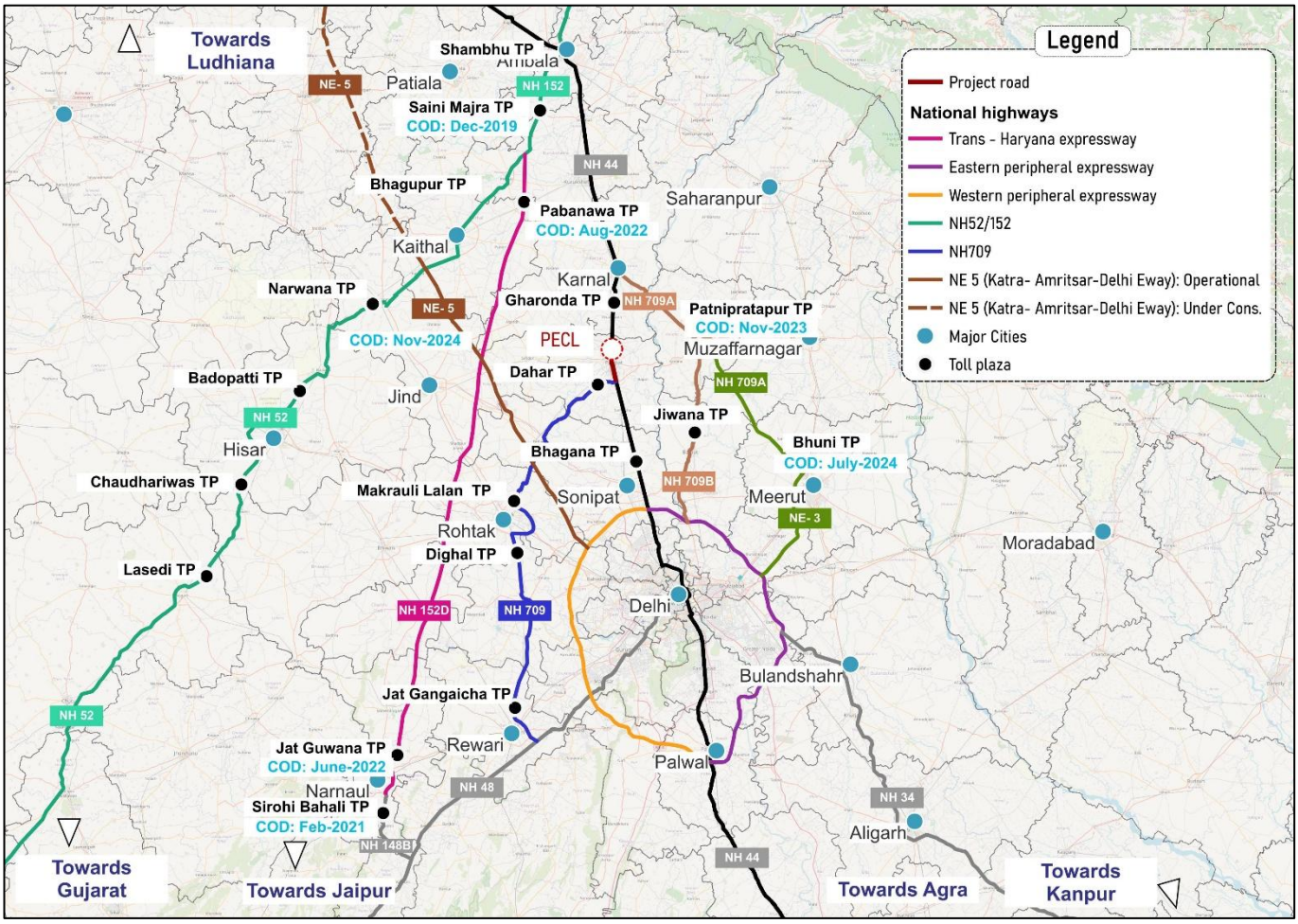
2.3 Network Profile

The Asset connects Delhi with northern states like Punjab, Himachal Pradesh, and Jammu & Kashmir. It plays a vital role in regional trade, business, and passenger movement. Delhi/NCR, a major hub for business, employment, and travel, sees heavy traffic flow from Punjab and Haryana. The route provides year-round access to key urban and industrial centers in Haryana, including Karnal, Panipat, Sonipat, and Kundli. The project road provides elevated crossing over the congested areas of Gohana road, Sanuali road, Assand road and Panipat city roads.

The Project Corridor is a part of the longest national highway in India. It passes through the Union Territory of Jammu & Kashmir, in addition to the states of Punjab, Haryana, Delhi, Uttar Pradesh, Rajasthan, Madhya Pradesh, Maharashtra, Telangana, Andhra Pradesh, Karnataka, and Tamil Nadu spanning a length of 4,112 kms. This highway, formed through the amalgamation of seven national highways, spans various regions, beginning with the Jammu-Srinagar National Highway (formerly NH 1A) from Srinagar in Jammu and Kashmir, extending through the former NH 1 in Punjab and Haryana, to reach Delhi. It incorporates parts of the former NH 2 from Delhi to Agra, including the former NH 3 (popularly known as Agra-Bombay National Highway) from Agra to Gwalior. The highway also comprises former NH 75 and former NH 26 to Jhansi, and former NH 7 via various cities such as Lakhnadon, Seoni, Nagpur, Adilabad, Hyderabad etc.

However, several major network developments in the surrounding region, which have influenced travel behavior A schematic representation of these network developments within the project influence area is presented in **Figure 2-2**.

Figure 2-2: Network development around the project influence area



Source: Google maps, Crisil Intelligence

- **Trans-Haryana Expressway (NH-152D)**: Commissioned in August 2022, the Trans-Haryana Expressway has emerged as a crucial alternate route, significantly affecting traffic volumes on the project corridor. The

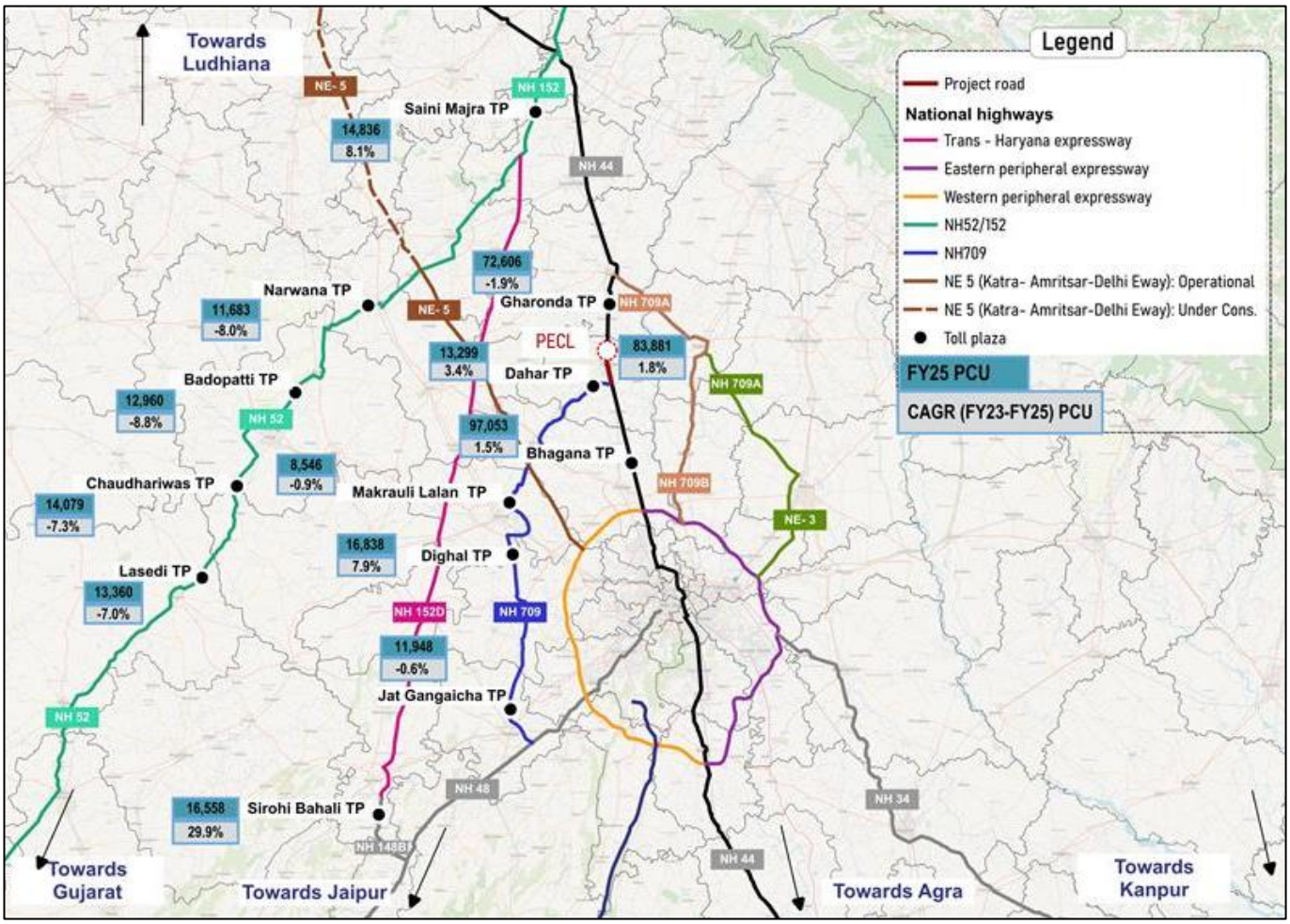
expressway provides a faster and more direct connection for vehicles traveling between Ambala–Ludhiana and onward to Gurugram, Rajasthan, and other southern destinations. By offering improved travel efficiency and reduced congestion, this corridor has diverted a considerable portion of long-distance through traffic away from the project road.

- **Upgradation of Karnal–Shamli Stretch (NH-709A):** The improvement of this stretch Patnipratapur toll plaza (Nov-2023) and Bhuni toll plaza (Jul-2024) have improved travel comfort and reduced travel time, encouraging traffic - especially to/from Karnal and beyond from/to Aligarh/Bulandshahr and beyond
- **Shambhu Border Diversions Due to Farmer Protests**: Periodic protests and associated roadblocks near the Shambhu Border from Feb 24 to March 25 caused traffic diversions, affecting traffic patterns
- **Delhi-Amritsar-Katra Expressway (NE-5):** The completion of the Haryana section of NE-5 in November 2024, in conjunction with the Trans Haryana expressway, has significantly altered regional connectivity. The upgraded corridor now provides a seamless high-speed route connecting Ambala/ Ludhiana and further north to Gurgaon/Delhi, thereby drawing both passenger and commercial traffic away from the project road.

Overall, these developments have enhanced regional connectivity and travel efficiency but have concurrently impacted the traffic load on the project corridor. The redistribution of long-distance and through-traffic to these newly developed or upgraded roads has suppressed traffic growth on the existing alignment. The total traffic FY25 vs FY24 (IHMCL) growth on adjacent toll plazas is presented in **Figure 2-3**.

Mode wise traffic growth on the adjacent toll plazas is presented in section **4.2**.

Figure 2-3: FY25 vs FY24 Growth on Adjacent Toll Plazas



Source: Google maps, Crisil Intelligence

2.4 Overview of Key Influence Area

The project road entirely falls in the state of Haryana. A brief description of key influencing states and districts around the project section is presented below.

Panipat District Profile

Panipat, located in the northern part of India, is one of the 21 districts within Haryana. The historic town of Panipat functions as the administrative center for the district, which covers an area of 1,268 sqkm. Established on November 1, 1989, Panipat District was formed from the previous Karnal district. The district is divided into two sub-divisions, namely Panipat and Samalkha, each further divided into three tehsils: Panipat, Samalkha, and Israna. The district is represented in the legislative assembly by four Vidhan Sabha constituencies: Panipat Rural, Panipat City, Israna, and Samalkha.

Panipat, known in India as the "City of Weavers" and "Textile City," also holds the title of the "cast-off capital" due to its international reputation in textile recycling. The city features a robust textile and carpet industry, establishing itself as the largest center for high-quality blankets and carpets in India, with a significant presence of hand loom weaving.

Importantly, Panipat is recognized as the world's leading center for the production of "shoddy yarn," highlighting its global importance in this textile sector. Beyond its textile industry, Panipat is acknowledged for the Samalkha subdivision, which has gained recognition for its foundry specializing in agricultural tools.

Delhi District Profile

Delhi is located in the northern region of the country and was designated as a Union Territory in 1956. With the implementation of the National Capital Territory Act in 1991, it acquired a Legislative Assembly. Delhi serves as the capital of India and is a significant metropolitan area. It stands as the hub of international politics and commerce within India. As per current estimates, the advance projection of the Gross State Domestic Product (GSDP) for Delhi was recorded at Rs 10.4 trillion in the fiscal year 2023, marking a growth of over 15% in comparison to fiscal year 2022.

In terms of its economic structure, the Service Sector is the dominant component of Delhi's economy, making a substantial contribution to the Gross State Value Added (at current prices) with a notable share of 84.8% for the fiscal year 2022-23. A significant portion of Delhi's workforce is involved in trade, finance, public administration, and professional services. Following this, the Secondary Sector accounted for 12.5%, while the Primary Sector contributed 2.6%. This distribution highlights the city's dependence on service-oriented economic activities.

Delhi's Per Capita Income, assessed at current prices for the year 2022-23, is ₹444,768, indicating a remarkable growth of 14.2% compared to the previous fiscal year (2021-22), when it was ₹389,529. It is important to note that Delhi's Per Capita Income consistently remains approximately 2.6 times higher than the national average, both in current and constant prices. This persistent margin emphasizes the city's economic affluence relative to the wider national landscape.

Tourism Influence

Furthermore, the Haryana Tourism Corporation (HTC) has established 43 tourist complexes named after various birds along the highways traversing the state. These complexes are highly favored by visitors. Several of these complexes are located adjacent to heritage sites, lakes, bird sanctuaries, and golf courses.

HTC has also developed 21 tourism hubs situated in Ambala, Bhiwani, Faridabad, Fatehabad, Gurgaon, Hisar, Jhajjar, Jind, Kaithal, Karnal, Kurukshetra, Panchkula, Sirsa, Sonipat, Panipat, Rewari, Rohtak, Yamunanagar, Palwal, and Mahendergarh. Haryana is included in the proposed Mahabharata and Krishna tourism development circuit initiated by both the central and state governments.

2.5 Key Economic Activities & Industrial Profile

Panipat District

The key economic activities in Panipat are primarily Textile & Handloom, Agriculture, Industries and Manufacturing units, Ancillary and Service Industries etc.

Textile and Handloom Industry

- Panipat is renowned as the "city of weavers" and is one of India's largest textile and carpet manufacturing centers.
- The textile cluster in Panipat consists of about 3,095 MSMEs, mainly producing home furnishing items like blankets, carpets, bed covers, mats, and floor coverings.

- The city accounts for roughly 75% of India’s total blanket production, and its handlooms and power looms supply products both nationally and internationally.
- Key export items include cotton durries, carpets, bathmats, rugs, curtains, terry towels, and furnishing fabrics.

Agriculture

- Panipat is situated in the heart of Haryana's green revolution belt, with rice and wheat being the dominant crops.
- Other significant agricultural outputs include sugarcane, oilseeds, pulses, and horticultural produce.
- Livestock rearing, especially buffaloes, is also vital to the local economy.

Large-scale Industries and Manufacturing

- Indian Oil Corporation (Oil Refinery)
- Panipat Thermal Power Plant
- National Fertilizers Limited
- Nestle (Natural Food Products)
- Shree Cement and Grasim Industries (cement plants).

The district also has foundries for agricultural instruments, especially in the Samalkha subdivision.

Ancillary and Service Industries

- Ancillary industries supply goods and services to large and medium industries, with around 300-400 such units.
- There are also engineering units, chemical-based industries, electrical machinery manufacturing, and active repair/service sectors related to textiles and machinery.
- Other small enterprises include wood-based furniture, leather products, paper products, metal fabrication, and petrochemical units.

Sonipat District

Key economic activities in Sonipat include agriculture, industrial manufacturing, and development of education hub, with significant momentum from infrastructure expansion and new investments in logistics, automotive, and commercial sectors.

Agriculture

- Agriculture remains foundational, with crops such as rice, sugarcane, and fruits (banana, papaya, mango, citrus, guava) cultivated in the area.
- The region also supports allied activities like horticulture and animal husbandry.

Industrial Manufacturing

- Sonipat has four major industrial zones (Sonipat, Kundli, Rai, Barhi) hosting small, medium, and large-scale units.
- Key manufacturing sectors include auto parts, stainless steel products, soft drinks, paper products, chemicals, pharmaceuticals, textiles, precision tools, and sports goods.
- Notable industries are Maruti Suzuki’s Kharkhoda automotive plant, Yakult (probiotic beverages), and various engineering, food processing, and homeware units.

Educational Hub

Sonipat is widely recognized as an educational hub in the National Capital Region, anchored by the Rajiv Gandhi Education City and a diverse ecosystem of universities, specialized institutes, and top-tier schools. Sonipat hosts about 13 universities including highly ranked national and international institutes.

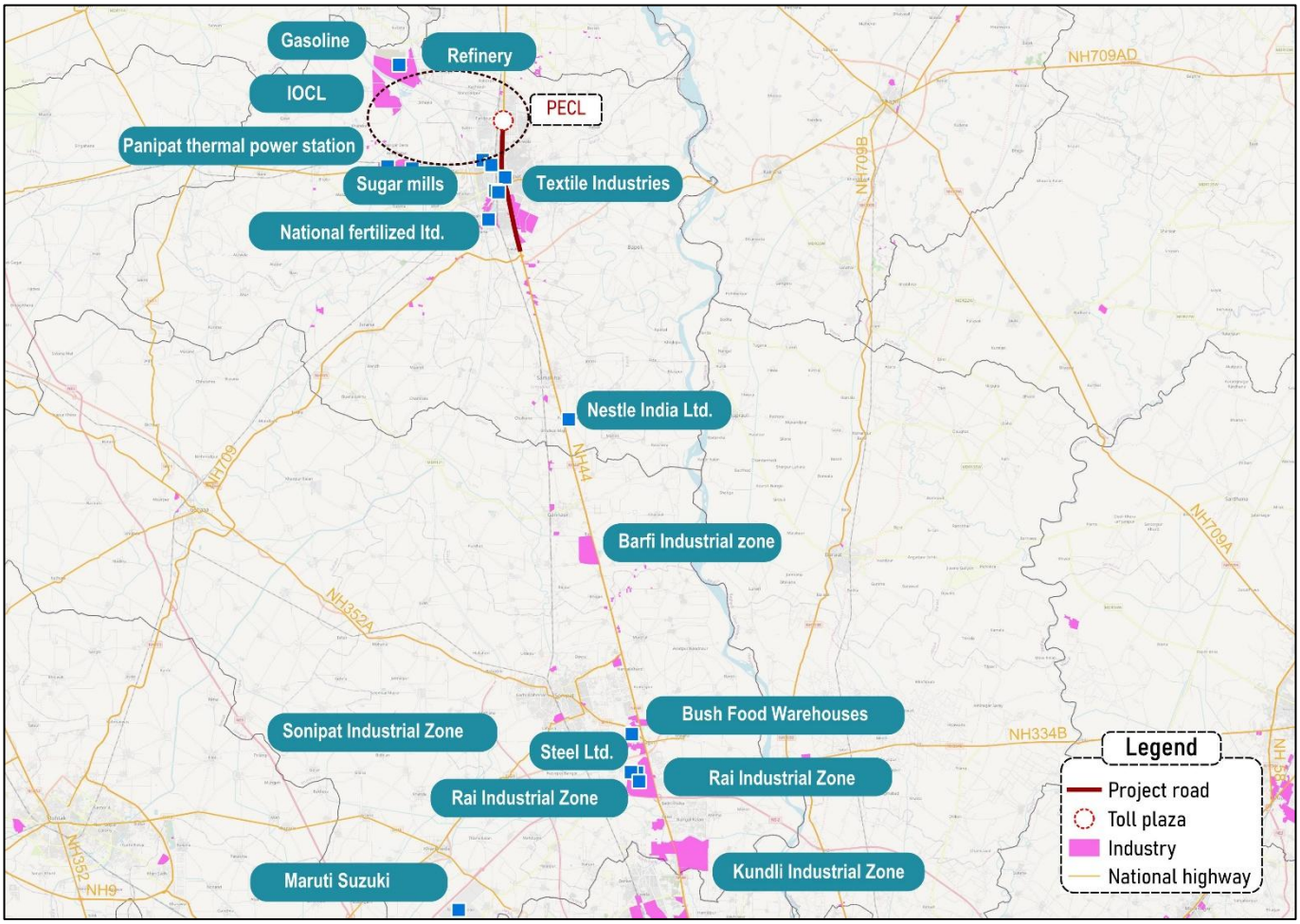
- DCRUST (Deenbandhu Chhotu Ram University of Science and Technology) specializes in engineering and applied sciences.
- Bhagat Phool Singh Mahila Vishwavidyalaya (women's university) and associated colleges emphasize women's education.
- Hindu College and Hindu College of Engineering cater to a broad spectrum of academic and professional disciplines

Rajiv Gandhi Education City (RGEC)

RGEC is a flagship 2,026-acre campus designed to cluster premier institutions of higher learning, research, and technical education. It houses institutions such as O.P. Jindal Global University (law, liberal arts, management), Ashoka University (liberal arts, sciences), Indian Institute of Information Technology (IIIT) Sonepat (technology), IIT Delhi, Sonipat Campus, National Institute of Food Technology Entrepreneurship and Management (NIFTEM), Dr. B.R. Ambedkar National Law University, SRM University, Haryana (multidisciplinary), World University of Design.

Major Industries around the Project corridor are presented in **Figure 2-4**.

Figure 2-4: Major Industries around the PR



Source: Open Street Maps, Crisil Intelligence

3. Primary Data Collection & Analysis

3.1 General

Primary traffic surveys, i.e. Traffic volume count and Origin Destination surveys were collected on the project road to understand the traffic and travel pattern of vehicles plying on the project road.

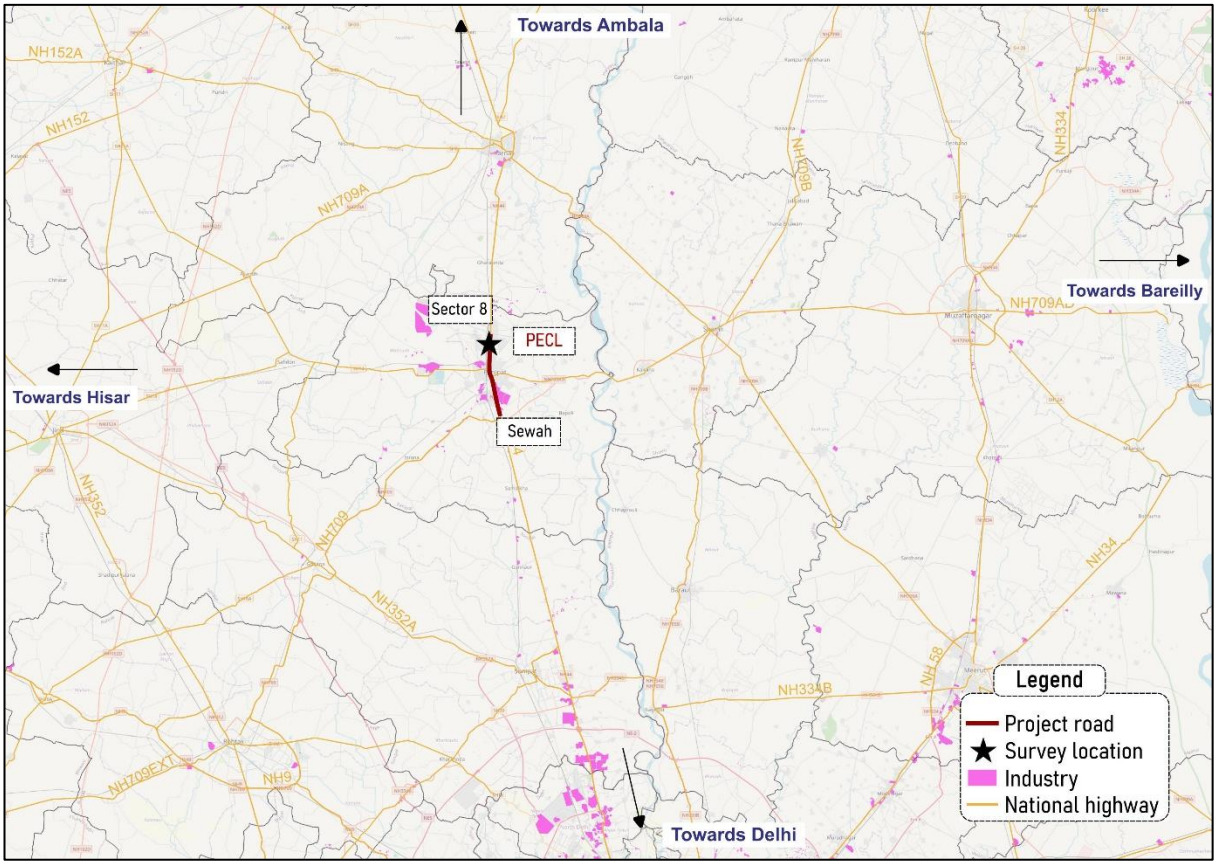
For the present study, seven days video-based traffic volume count and two days (48-Hours) origin destination survey conducted at the toll plaza location on the project road. The schedule of the traffic surveys carried out as part of the study on the project road is presented in **Table 3-1**.

Table 3-1: Type of Survey & Schedule

Location	Type of Survey	Survey Duration	Survey Date
PECL	Traffic Volume Count (TVC) Survey	7 Days	28th April 2025 to 4th May 2025
	Origin-Destination (O-D) Survey	2 Days	29th April 2025 to 30th April 2025

Source: Crisil Intelligence

Figure 3-1: Survey Location



Source: Open Street Maps, Crisil Intelligence

3.2 Traffic Characteristics

The seven days traffic volume count was analyzed to get existing traffic intensity, daily variations, and traffic composition.

The vehicle classification and their PCU values as suggested in IRC: 64-1990 are presented in **Table 3-2**.

Table 3-2: PCU Factors-IRC:64-1990

Mode	PCU
Car/Jeep	1.0
Two-Wheeler	0.5
Three-Wheeler	1.0
Minibus/School Bus	1.5
Bus (Govt/Pvt)	3.0
Mini LCV	1.0
LCV	1.5
2-Axle	3.0
3-Axle	3.0
MAV (4-6 Axles)	4.5
HME/OSV	4.5
Agricultural Tractor	1.5
Agricultural Tractor with Trailer	4.5
Cycle	0.5
Cycle Rickshaw	2.0
Animal Drawn Crat	6.0

Source: IRC:64-1990, Crisil Intelligence

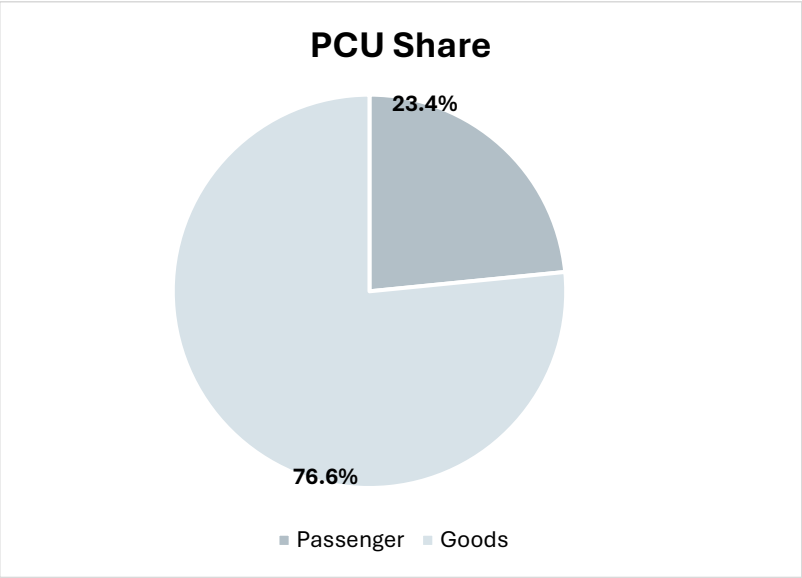
The average daily tollable traffic volume at the toll plaza location was analyzed. The summary of ADT in terms of vehicles and PCUs is presented in **Table 3-3**.

Table 3-3: Average Daily Traffic (ADT) for the Project Section

Mode	Ambala to Delhi	Delhi to Ambala	ADT
Car	19,960	20,842	40,801
Minibus	278	288	565
Bus	1,143	1,143	2,286
Mini LCV	1,407	1,455	2,863
LCV	1,821	2,242	4,063
Truck-2 Axle	776	943	1,719
Truck-3Axle	661	650	1,311
MAV	1,802	1,908	3,709
OSV	1	1	1
Vehicles	**27,848**	**29,471**	**57,319**
PCU	**40,366**	**42,886**	**83,253**

Source: Survey Data, Crisil Intelligence

Figure 3-2: PCU Share



Source: Survey Data, Crisil Intelligence

An analysis of TVC traffic at PECL is presented below.

- Passenger vehicles constitute ~58% of the tollable traffic and Goods ~42% of the tollable traffic in vehicle terms.
- In goods category, LCV has highest share with 38% followed by MAV with 34%.
- Average Daily traffic is about 57,319 and 83,253 in traffic vehicles and PCU terms respectively.

Short Distance: Most of the traffic on the Delhi–Ambala route originates from Delhi, with Panipat and Sonipat also contributing significantly. Karnal and Ambala function as key hubs, attracting traffic from various northern regions. Additionally, Sonipat and Panipat serve as common destinations for vehicles traveling along this corridor.

Medium Distance: The medium-distance traffic along the Delhi–Ludhiana corridor primarily originates from Delhi, with Ludhiana acting as a major destination. Along the route, key cities such as Panipat, Karnal, Kurukshetra, and Ambala contribute to both originating and terminating traffic. This corridor supports a mix of regional and intercity movement, with Ludhiana serving as a significant industrial and commercial hub drawing traffic from various points along the way.

Long Distance: The long-distance traffic on this corridor extends beyond Ludhiana, with a notable portion heading towards Punjab and further into Jammu & Kashmir. These regions contribute to the overall traffic flow, with Punjab being a major destination due to its industrial and agricultural significance, while Jammu & Kashmir attracts long-haul movement related to trade and connectivity with northernmost parts of the country.

TVC survey data for the seven-day period is presented in the below table.

Table 3-4: Daily traffic volume at PECL based on TVC survey

Date	Car+MLCV	LCV+2A	Bus	3A+MAV+OSV	Total	PCU
28-Apr-25	42,319	5,404	2,371	4,629	54,723	79,044

Date	Car+MLCV	LCV+2A	Bus	3A+MAV+OSV	Total	PCU
29-Apr-25	40,580	6,924	2,245	5,312	55,061	82,288
30-Apr-25	45,476	7,120	2,204	5,443	60,243	87,848
1-May-25	44,395	6,787	2,293	5,359	58,834	86,100
2-May-25	41,903	6,204	2,206	4,803	55,116	80,390
3-May-25	44,139	6,516	2,304	5,063	58,022	84,065
4-May-25	46,837	5,473	2,382	4,541	59,233	83,035
WADT	**43,664**	**6,347**	**2,286**	**5,021**	**57,319**	**83,253**

Source: Survey Data, Crisil Intelligence

Toll Management system (TMS) data was provided survey days, and comparison is made with TVC (survey data). Overall variations of traffic are about -2.8% and which is within tolerable limits and is presented in **Table 3-5**.

Table 3-5: TVC and TMS Comparison

Date	Car+MLCV	LCV+2A	Bus	3A+MAV+OSV	Total	PCU
WADT (TVC)	43,664	6,347	2,286	5,021	57,319	83,253
WADT (TMS)	44,172	6,485	2,406	4,994	58,056	85,681
Variations (TVC/TMS)	**-1.1%**	**-2.1%**	**-5.0%**	**0.6%**	**-1.3%**	**-2.8%**

Source: Survey Data, Crisil Intelligence

3.3 Origin-Destination (OD) Analysis

Origin-Destination survey was carried out at PECL for 2 Days (48-hours), by roadside interview method as described in IRC: 102-1988. A random sampling approach was employed to interview both passenger and freight vehicles traversing the project road at the toll plaza locations. The survey aimed to gather information on various aspects, including origin, destination, frequency of trips, purpose of travel and freight vehicles, and the type of commodity being transported.

3.3.1. Regional Influence

The regional distribution of tollable vehicles at toll plaza location has been estimated based on OD matrices and is presented below. The project influencing states will provide an overview of the factors likely to influence the pattern of economic development and hence the flows and volumes of traffic on the project road.

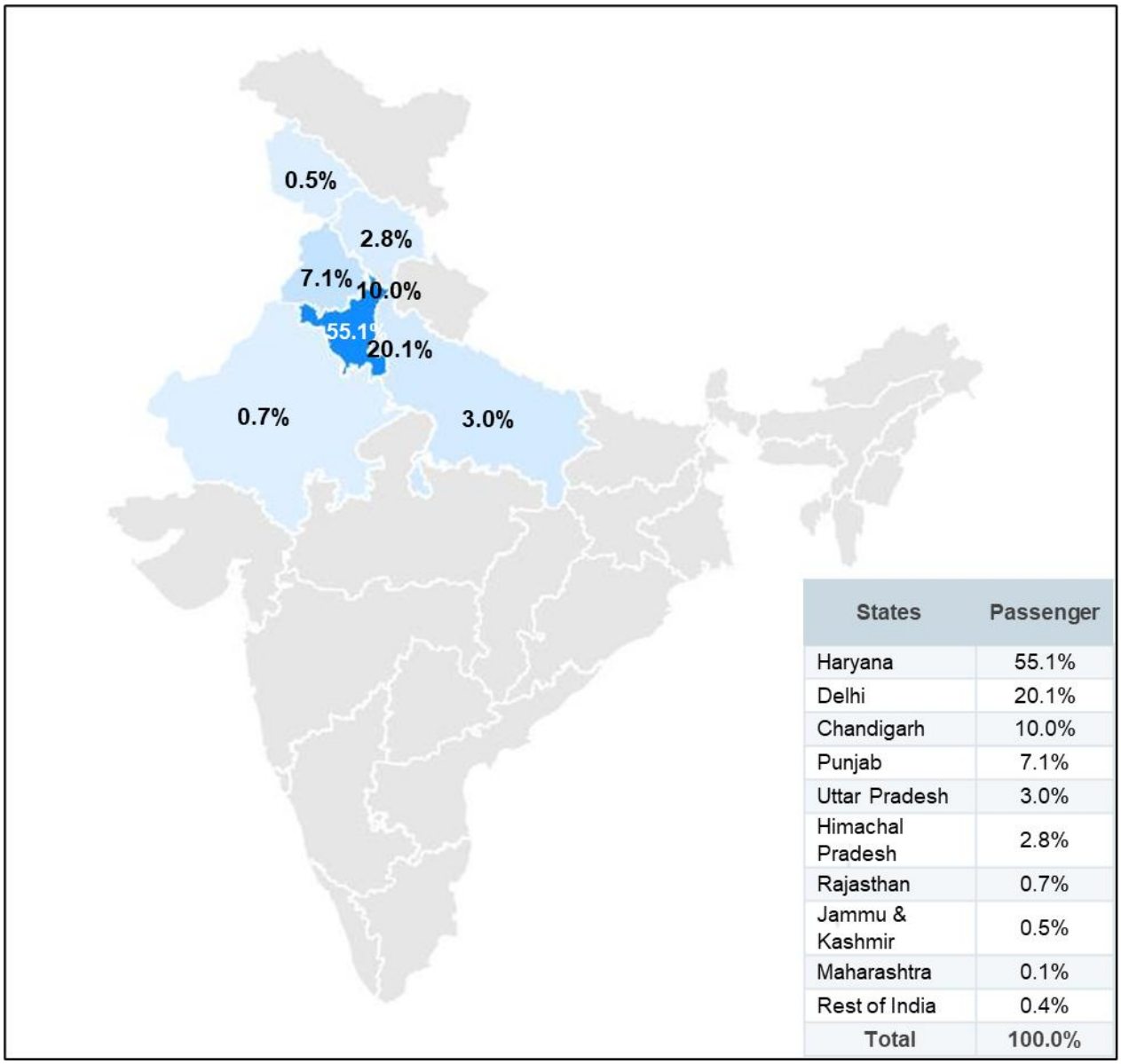
Table 3-6: Regional Traffic Distribution

States	Passenger	Goods
Haryana	55.1%	58.0%
Delhi	20.1%	13.3%
Chandigarh	10.0%	3.8%
Punjab	7.1%	8.7%
Uttar Pradesh	3.0%	4.3%
Himachal Pradesh	2.8%	2.8%
Rajasthan	0.7%	1.6%

States	Passenger	Goods
Jammu & Kashmir	0.5%	2.0%
Maharashtra	0.1%	0.9%
Rest of India	0.4%	4.6%
Total	**100.0%**	**100.0%**

Source: Survey Data, Crisil Intelligence

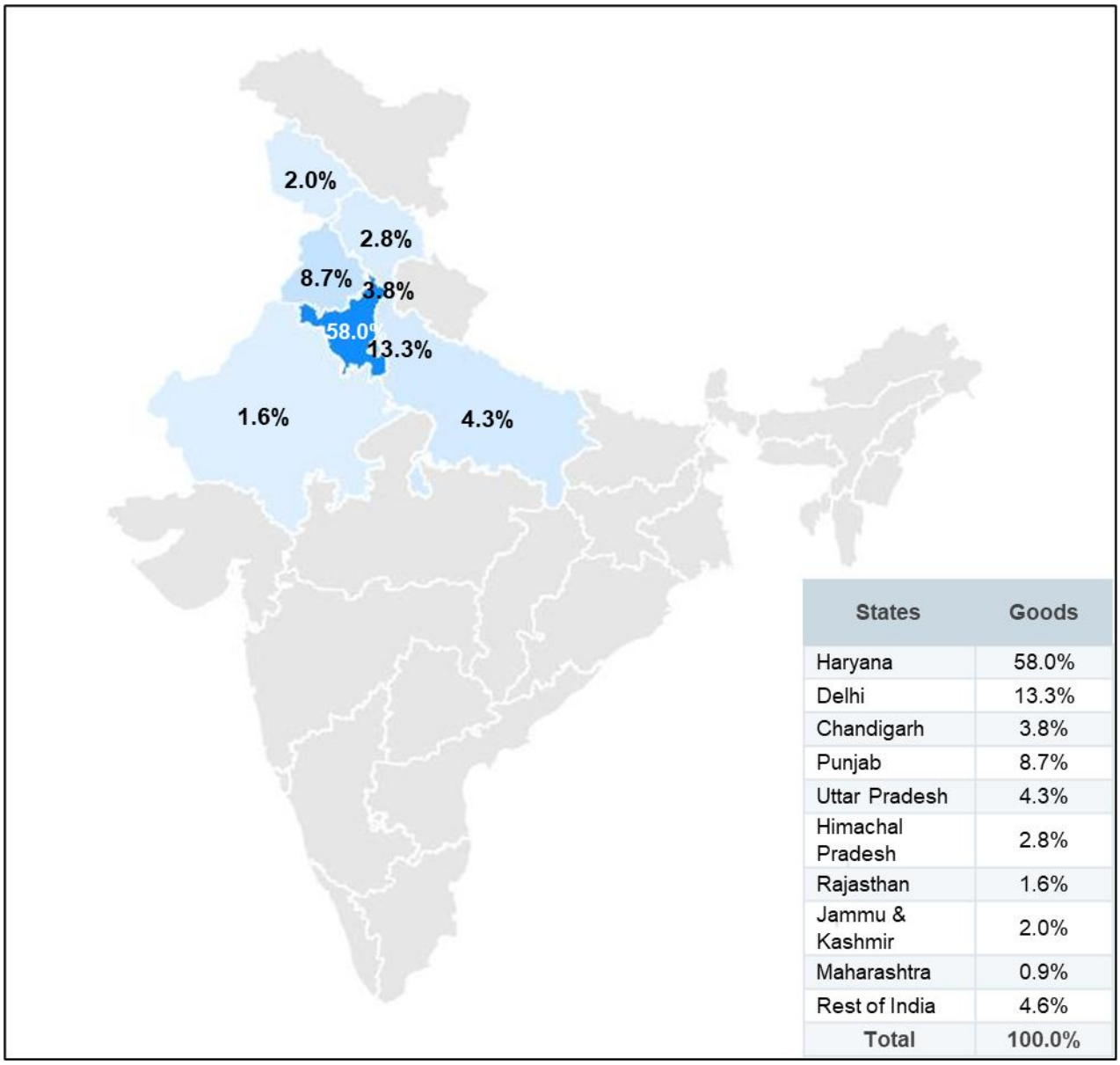
Figure 3-3: State Influence: Passenger



States	Passenger
Haryana	55.1%
Delhi	20.1%
Chandigarh	10.0%
Punjab	7.1%
Uttar Pradesh	3.0%
Himachal Pradesh	2.8%
Rajasthan	0.7%
Jammu & Kashmir	0.5%
Maharashtra	0.1%
Rest of India	0.4%
Total	**100.0%**

Source: Open Street Maps, Crisil Intelligence

Figure 3-4: State Influence: Goods



States	Goods
Haryana	58.0%
Delhi	13.3%
Chandigarh	3.8%
Punjab	8.7%
Uttar Pradesh	4.3%
Himachal Pradesh	2.8%
Rajasthan	1.6%
Jammu & Kashmir	2.0%
Maharashtra	0.9%
Rest of India	4.6%
Total	100.0%

Source: Open Street Maps, Crisil Intelligence

Passenger Traffic

- Haryana is a major contributor, accounting for about 55 percent across all the passenger modes, followed by Delhi which accounts to 20 percent followed by Chandigarh with 10 percent.
- Panipat to Karnal and North Delhi to Karnal and vice versa are the major OD pairs in passenger category.

Goods Traffic

- Haryana accounts to about 58 percent followed by Delhi which accounts for 13 percent. In addition, Punjab and Uttar Pradesh accounts to about 8.7 percent and 4.3 percent respectively
- Panipat to Karnal and Sonipat to Karnal and vice versa are the major OD pairs in the goods category.

3.3.2. Zonal Influence

The key influencing zones/regions from the origin destination survey are Delhi, Karnal, Sonipat, Chandigarh and Panipat for passenger traffic, indicating more local movements and for goods traffic key influencing zones/regions are Karnal, Delhi, Sonipat, Panipat and Ludhiana.

Table 3-7: Zonal Influence- Passenger Vehicles

S.no	Passenger	% Trips
1	Delhi	20.1%
2	Karnal	16.5%
3	Sonipat	10.2%
4	Chandigarh	10.0%
5	Panipat	9.1%

Source: Survey Data, Crisil Intelligence

Table 3-8: Zonal Influence- Goods Vehicles

S.no	Goods	% Trips
1	Karnal	19.2%
2	Delhi	13.3%
3	Sonipat	10.6%
4	Panipat	9.3%
5	Ludhiana	5.7%

Source: Survey Data, Crisil Intelligence

3.3.3. Top OD Pairs

Passenger Traffic

Panipat to Karnal is the top OD pair, accounting for 4.9% in passenger traffic, followed by North Delhi to Karnal and Sonipat to Karnal etc. Top 10 OD pairs contribute nearly 34% of the passenger traffic. The Top 10 OD pairs of passenger traffic are presented in **Table 3-9**.

Table 3-9: Top 10 OD Pairs-Passenger Traffic

S.no	Passenger	% Trips
1	Panipat To Karnal	4.9%
2	North Delhi To Karnal	4.9%
3	Sonipat To Karnal	4.4%
4	North Delhi To Chandigarh	3.5%
5	North Delhi To Ambala	3.4%
6	West Delhi To Chandigarh	3.0%
7	Panipat To Chandigarh	2.6%
8	West Delhi To Karnal	2.5%
9	South Delhi To Ludhiana	2.5%
10	Sonipat To Chandigarh	2.3%

Source: Survey Data, Crisil Intelligence

Goods Traffic

Panipat to Karnal is the top OD pair, accounting for 5.3% in goods traffic, followed by Sonipat to Karnal and North Delhi to Karnal etc. Top 10 OD pairs contribute nearly 26% of the goods traffic. The top 10 OD pairs of passenger traffic are presented in **Table 3-10**.

Table 3-10: Top 10 OD Pairs-Goods Traffic

S.no	Goods	% Trips
1	Panipat To Karnal	5.3%
2	Sonipat To Karnal	4.0%
3	North Delhi To Karnal	3.0%
4	North Delhi To Ludhiana	2.6%
5	Panipat To Gharonda	2.4%
6	West Delhi To Karnal	1.9%
7	North Delhi To Chandigarh	1.8%
8	Sonipat To Gharonda	1.8%
9	Sonipat To Ambala	1.7%
10	North Delhi To Ambala	1.6%

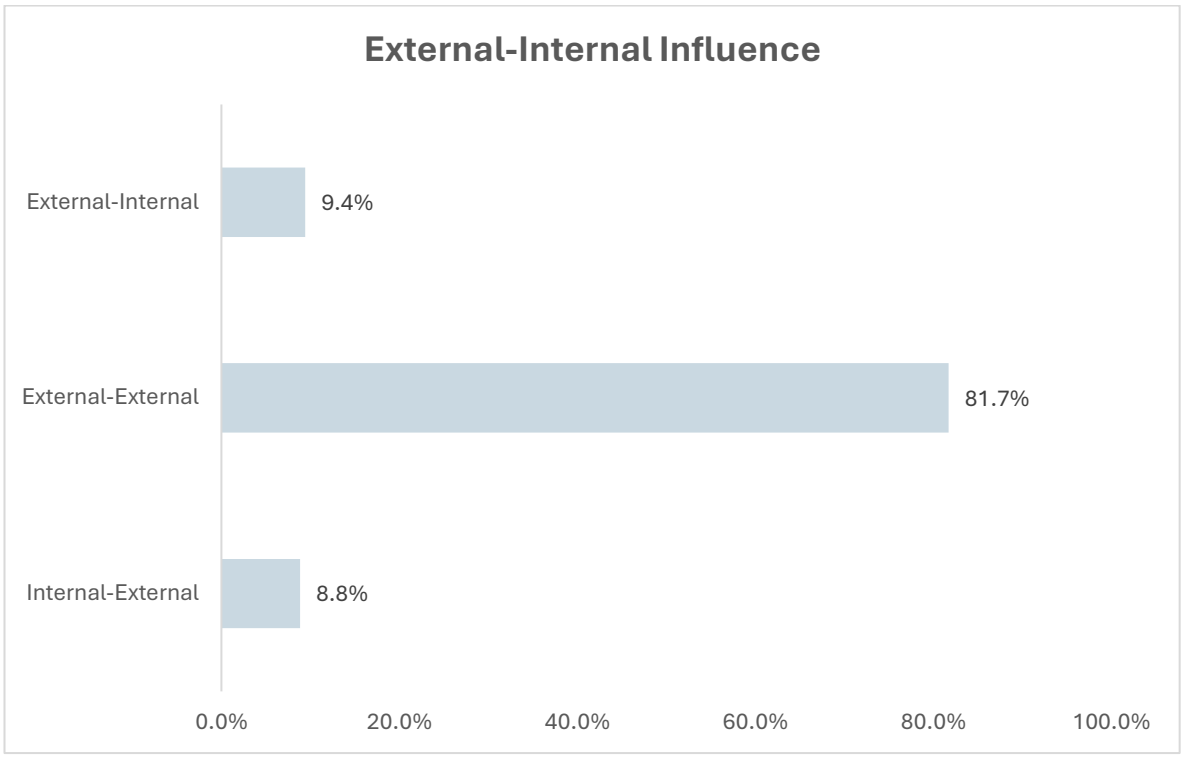
Source: Survey Data, Crisil Intelligence

3.3.4. Internal-External Analysis

The zones which fall along the project road and very near project road are considered as Internal zones, and other zones that falls outside the internal category are conserved as External zones.

Majority of the trips are between external-to-external zones with 81.7% trips. Internal to Internal trips are very less as compared to external traffic as there only 3 zones that lies in the internal category of zones.

Figure 3-5: Internal-External Influence



Source: Survey Data, Crisil Intelligence

3.3.5. Trip Length Frequency Distribution

Trip Length Distribution analysis gives distance-based patterns for project road traffic. Trip length is categorized into nine trip length groups. Trip length distribution table for different vehicle types is presented below.

Table 3-11: Trip Length Frequency Distribution

Trip Length Groups (Km)	Cars	Bus	LCV	2 Axle Truck	3 Axle Truck	MAV
0 to 20	0.9%	0.7%	3.0%	1.9%	2.3%	2.4%
21 to 40	5.4%	3.6%	7.0%	5.7%	5.3%	5.8%
41 to 100	11.0%	7.8%	13.0%	13.6%	10.2%	11.2%
101 to 200	36.8%	26.8%	31.4%	26.5%	25.8%	30.3%
201 to 350	34.2%	40.2%	26.2%	26.7%	29.1%	22.6%
351 to 500	9.1%	15.3%	8.6%	9.8%	8.8%	9.7%
501 to 750	1.8%	3.4%	5.0%	6.3%	6.0%	5.3%
751 to 100	0.2%	1.1%	1.0%	1.1%	1.8%	2.5%
Beyond 1000 Km	0.7%	1.1%	4.8%	8.5%	10.6%	10.1%

Source: Survey Data, Crisil Intelligence

- Majority of the car trips are in the range of 100-200km with 36.8% followed by 200-350km group with 34.2%.
- About 30% trips of MAV are in the range of 100-200km and around 22% trips are in the range of 200-350km.

3.4 Commodity Distribution

Analysis was carried out to understand the various freight vehicles being used to transport different commodities.

Table 3-12: Commodity Distribution – Both Direction (in %)

Commodity	Both Direction			
	LCV	2A	3A	MAV
Agri Produce	12.4%	10.0%	10.8%	11.0%
Automobiles	1.7%	2.9%	3.3%	3.5%
Chemical products	1.0%	2.4%	3.0%	2.5%
Coal	0.0%	0.0%	0.0%	0.0%
Construction materials	1.3%	2.9%	3.5%	7.4%
Consumer Foods	3.6%	5.1%	4.2%	3.4%
Consumer Products	13.5%	11.1%	12.6%	7.2%
Container	0.0%	0.0%	0.0%	0.0%
Courier & parcel	18.3%	16.8%	12.1%	8.7%
Iron & Steel Products	3.4%	5.0%	8.6%	9.6%
Machinery	2.1%	3.4%	3.0%	2.6%
Milk & Animal Food	1.7%	0.8%	1.3%	1.1%
Others	3.3%	3.0%	2.2%	6.3%
Paper products	1.0%	0.6%	1.1%	0.5%
Petroleum Products	1.1%	4.9%	3.6%	3.0%
Pharmaceuticals	1.7%	1.7%	1.5%	1.1%
Plastic products	2.1%	2.1%	1.8%	1.8%
Plywood & Timber products	3.7%	3.7%	4.1%	3.1%
Rubber products	0.3%	0.6%	0.3%	0.3%
Textile & Footwear	7.5%	6.3%	4.9%	4.8%
Tiles & Ceramic products	0.4%	0.4%	0.7%	1.6%
Empty	19.7%	16.2%	17.0%	19.8%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: Survey Data, Crisil Intelligence

- The analysis of freight movement across the toll plaza reveals that the major commodities being transported include Agri produce, Courier parcel and Consumer Food & Consumer Products and Iron and steel products are top commodities plying on the project section.
- About 16.8 percent of two axle trucks, around 12.1 percent of three axle trucks and around 8.7 percent of MAV (4-6) trucks at the toll plaza location are found to carry couriers and parcels which can be attributed to increasing e-commerce demand and proximity to Delhi NCR region
- Significant portion of vehicles, specifically 10 percent of two axle trucks, about 10.8 percent of three axle trucks and around 11 percent of MAV (4-6) trucks are engaged in the transportation of Agri produce. Especially rice, wheat and vegetables across the vehicle categories. It is to be noted that Azadpur mandi is proximity to the project road section which influences this commodity movement for the demand and consumption centers across the project influence area. Therefore, Agri produce has a higher share in Ambala to Delhi direction.

- In the case of MAV (4-6) trucks around 9.6 percent at toll plaza location are engaged in transporting iron and steel products. This is linked to the presence of an iron and steel manufacturing plant at Sonepat. The distribution of these commodities underscores the industrial and commercial linkages between the regions served by this toll plaza.
- Also, about 16 percent of LCV, trucks and 3A and around 10 percent of MAV are found to be transporting consumer foods and products.

Figure 3-6: Commodity Distribution – Direction Wise (in %)

Commodity	Delhi-Ambala				Ambala-Delhi			
	LCV	2A	3A	MAV	LCV	2A	3A	MAV
Agri Produce	11.3%	9.3%	7.4%	8.0%	13.5%	10.6%	14.2%	14.0%
Automobiles	2.1%	2.8%	4.4%	5.5%	1.3%	3.0%	2.2%	1.5%
Chemical products	0.7%	1.6%	2.6%	1.8%	1.3%	3.2%	3.3%	3.2%
Coal	0.5%	0.2%	0.5%	0.5%	0.1%	0.2%	0.3%	0.8%
Construction materials	1.2%	1.7%	1.5%	2.9%	1.5%	4.1%	5.4%	12.0%
Consumer Foods	3.3%	3.2%	3.6%	2.5%	3.9%	7.0%	4.9%	4.4%
Consumer Products	15.1%	14.5%	13.9%	7.4%	11.8%	7.7%	11.4%	6.9%
Container	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Courier & parcel	20.1%	20.8%	10.5%	6.9%	16.6%	12.7%	13.6%	10.4%
Iron & Steel Products	2.5%	4.3%	9.6%	12.5%	4.3%	5.8%	7.6%	6.7%
Machinery	2.0%	3.4%	3.6%	3.5%	2.1%	3.4%	2.4%	1.7%
Milk & Animal Food	2.0%	0.7%	2.0%	1.4%	1.4%	0.9%	0.6%	0.9%
Others	3.8%	3.3%	2.8%	9.6%	2.9%	2.6%	1.5%	3.0%
Paper products	1.3%	1.0%	2.0%	0.6%	0.8%	0.2%	0.2%	0.4%
Petroleum Products	0.6%	2.3%	2.8%	2.7%	1.5%	7.5%	4.4%	3.3%
Pharmaceuticals	1.1%	1.6%	1.1%	0.8%	2.3%	1.7%	1.8%	1.3%
Plastic products	2.5%	2.1%	1.8%	1.3%	1.7%	2.0%	1.8%	2.4%
Plywood & Timber products	4.9%	3.2%	3.8%	3.2%	2.4%	4.2%	4.5%	3.0%
Rubber products	0.4%	0.8%	0.3%	0.2%	0.2%	0.3%	0.3%	0.4%
Textile & Footwear	8.4%	7.1%	4.3%	4.2%	6.6%	5.5%	5.4%	5.4%
Tiles & Ceramic products	0.4%	0.4%	0.8%	1.3%	0.4%	0.5%	0.7%	1.9%
Empty	16.1%	15.5%	20.7%	23.3%	23.3%	17.0%	13.4%	16.3%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: Survey Data, Crisil Intelligence

- Agri-Produce has higher share in the direction of Ambala to Delhi due to the presence of Azadpur mandi in Delhi contributing about 10.6% of 2A, 14.2% of 3A and 14.0% of MAV.

- Courier & parcel has a higher share in the direction of Delhi to Ambala due to the increase in e-commerce demand and the Delhi & NCR region of various warehouses present to cater these demands.

Courier & Parcel is the topmost commodity on the stretch

Courier & Parcel is the largest commodity plying on the project road, accounting for 16.8% in 2A, 12.1% in 3A and 8.7% in MAV. Courier/Parcel traffic on the project section forms a significant proportion of the commercial traffic and is majorly for the purpose of consumption in domestic market in the urban and semi urban regions of Panipat, Ambala, Sonipat, Karnal, Chandigarh and nearby regions of the catchment. Traffic on the project stretch originates from Panipat, Karnal and the northern part of the state. Courier/Parcel traffic is destined for National capital region and longer distances.

India has been becoming a significant domestic shipment market, with significant companies entering and expanding networks in the market. The industry was flush with early-stage and venture capital funding that led to growing e-commerce penetration in different retail product segments. Apart from primary growth, drivers such as increasing internet penetration, higher disposable incomes, and rising urbanization, factors such as user-friendly interface of portals offered by players, ease of shopping, increasing awareness, relatively higher pricing discounts (in comparison with brick-and-mortar stores), and easy delivery and innovation, have propelled growth. Pandemics have brought about a shift in buying behaviour with more and more people taking the online route.

High domestic consumption of e-commerce goods is expected to lead to export growth. Going forward it is expected that the demand will remain high along with the pick-up in domestic consumption.

Agriculture produce is the second most commodity on the stretch

Agri produce commodity is the second most carried commodity in the project road, and it accounts for 12.4% in LCV, 10.0% each in 2A & 3A and 11.0% in MAV. This category is comprised of rice, wheat and vegetables.

Agri produce is one of the major goods carried in the project corridor since the districts though which the project corridor passes are largely agrarian in nature. The key commodities in the region are grown in surrounding districts such as Karnal, Ambala, Ludhiana, Amritsar, etc.

Food grain production in Haryana and Punjab has been growing at a healthy pace in recent years due to sufficient rainfall coupled with increasing acreage. Haryana and Punjab is highly dependent on rainfall for Agri production. Hence the production of food grains which are water dependent such as paddy are highly influenced by the vagaries of nature. Going forward, the production of food grains is expected to grow at a consistent pace, however, rainfall quantity and spread and the timing will also be a key monitorable. Horticulture crops which can't be stored for longer durations such as fruits and vegetables are expected to grow faster as they need to be consumed faster. Also, seasonal crops can produce higher income.

Consumer foods & products are one of the major commodities

The fast-moving consumer goods (FMCG) industry or consumer packaged goods (CPG) industry is mainly responsible for producing, distributing, and marketing fast-moving consumer goods. Fast-moving consumer goods (FMCG) sector is India's fourth-largest sector and has been expanding at a healthy rate over the years because of rising disposable income, a rising youth population, and rising brand awareness among consumers.

Changing food habits and consumption patterns post the pandemic, rising demand for healthy products, increasing appetite for discretionary spends on processed foods and increasing focus on health and sanitation, shift in demand

from loose to branded packaging to support growth. Demand is also expected to be supported by new product launches, rising distribution network with players catering to multiple segments.

Iron and Steel Products

Punjab and Haryana are significant players in India's iron and steel industry, contributing notably to the nation's production capacity. Punjab, with its industrial hubs like Ludhiana, is home to several major steel plants and manufacturers, including Hero Steels Limited and Avon Ispat and Power Limited. These companies are pivotal in producing a wide range of steel products, from rolled products to alloy steel.

Haryana, on the other hand, has a robust steel industry supported by its strategic location and industrial infrastructure. The state hosts numerous steel manufacturing units that cater to various sectors, including automotive, construction, and engineering. The presence of major industrial areas and the availability of raw materials make Haryana a key contributor to the steel industry.

In FY24, India's crude steel production reached 143.6 million tonnes, with Punjab and Haryana playing essential roles in this output. Both states are expected to benefit from this increasing demand, with ongoing investments and expansions in their steel industries.

Despite global economic uncertainties, the steel industries in Punjab and Haryana remain resilient due to robust domestic demand and favourable policies. These states are well-positioned to continue their significant contributions to India's steel production and consumption goals.

4. Review of Historical Traffic & Revenue

4.1 General

This section summarizes the historical performance of the project section to understand baseline traffic patterns comprising of historical traffic and revenue growth, traffic and revenue composition, trip distribution, trip factors, seasonality and trend of traffic over the available data set.

The historical traffic data mode wise was made available by client from April 2009 till July 2025 and is presented in **Table 4-1**.

Table 4-1: Historical Traffic and Revenue data availability

Notation	Toll Plaza	Details
TP01	PECL	April 2009 to July 2025

Source: PECL, Crisil Intelligence

4.2 Historical Traffic and composition

Mode wise historical traffic and composition is presented in the table below.

Table 4-2: Historical mode wise traffic and growth at PECL

FY	CJV	Bus	LCV	Truck	Total	PCU
FY09	17,484	2,087	3,817	7,668	31,057	52,477
FY10	19,632	2,087	4,023	7,038	32,780	53,040
FY11	20,922	2,179	4,255	7,201	34,557	55,444
FY12	20,269	2,155	4,360	6,743	33,527	53,502
FY13	21,695	2,203	4,525	6,183	34,607	53,643
FY14	23,517	2,116	4,834	6,511	36,979	56,651
FY15	26,381	2,182	4,918	6,353	39,835	59,365
FY16	28,805	2,099	3,806	6,864	41,573	61,400
FY17	31,532	2,244	1,869	8,350	43,995	66,118
FY18	34,414	2,387	1,923	8,913	47,638	71,200
FY19	36,293	2,560	1,963	9,123	49,939	74,286
FY20	35,702	2,520	2,176	9,302	49,699	74,430
FY21	28,653	1,054	2,157	7,887	39,750	58,710
FY22	41,204	1,626	2,482	10,672	55,984	81,822
FY23	41,042	2,062	2,752	9,715	55,572	80,504
FY24	42,580	2,217	2,419	9,171	56,387	80,373
FY25	44,101	2,416	2,442	9,187	58,147	82,575
CAGR (FY09-FY25)	**6.0%**	**0.9%**	**-2.8%**	**1.1%**	**4.0%**	**2.9%**
CAGR (FY23-FY25)	**3.7%**	**8.2%**	**-5.8%**	**-2.8%**	**2.3%**	**1.3%**
FY23-FY24	**3.7%**	**7.5%**	**-12.1%**	**-5.6%**	**1.5%**	**-0.2%**

**Note: PCU value for Truck is considered 3, Truck comprises of 2 axle, 3 axle, MAV (vehicles with more than 3 axles up to 6 axles) and OSV (vehicles with more than 6 axles)*

Source: PECL, Crisil Intelligence

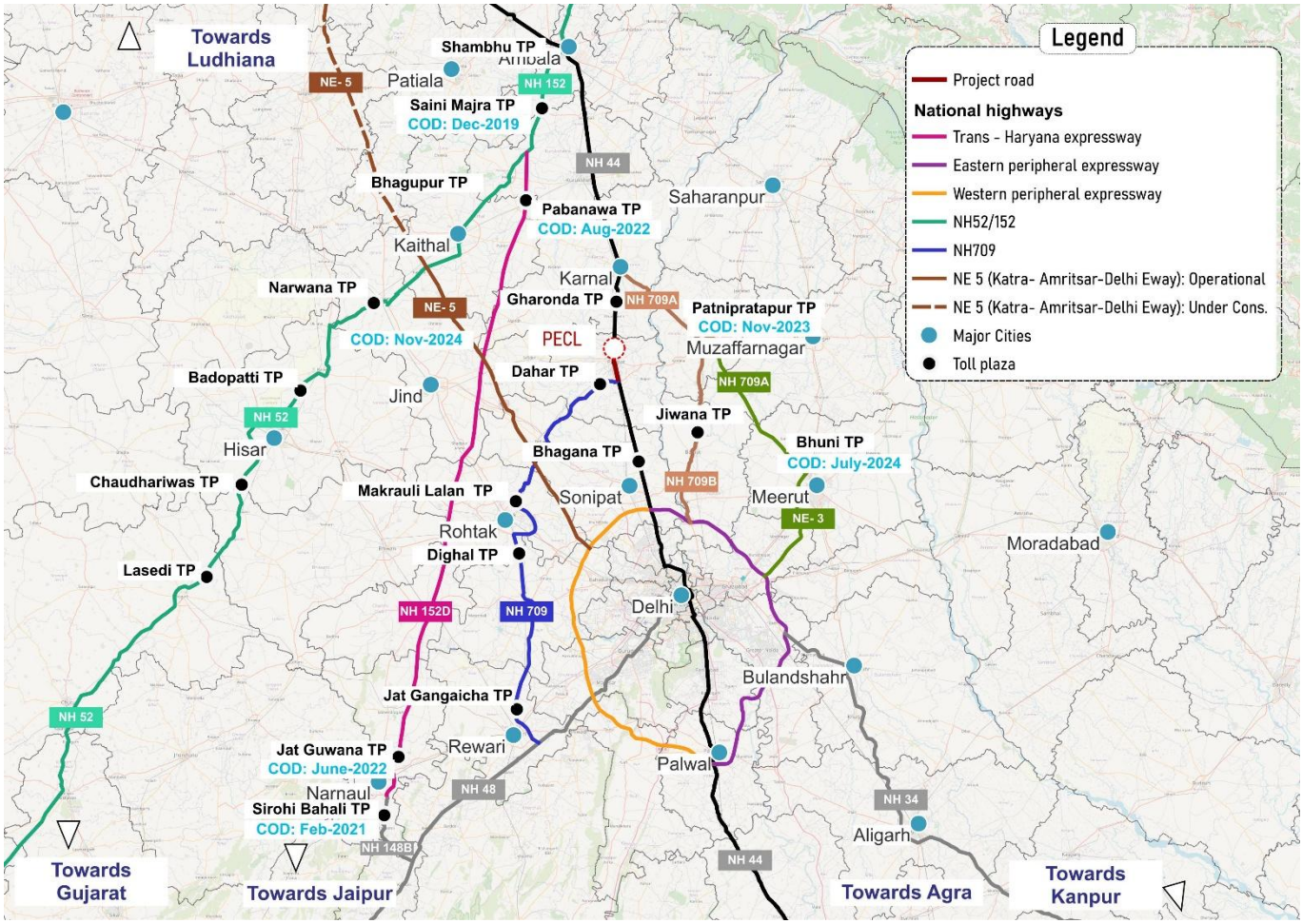
PECL

Overall traffic growth in terms of PCU for the period FY25 vs FY23 is about 1.3%. It shows the marginal historical traffic growth at the toll plaza location. Also, PCU growth for the period FY24 vs FY23 is -0.2%. This subdued growth is largely attributable to the impact of several major network developments in the surrounding region, which have influenced travel behavior and diverted traffic away from the project road. Notable network development as follows:

- Trans-Haryana Eway (NH-152D)
- Upgradation of Karnal-Shamli-Meerut (NH-709A)
- Shambhu Border diversion (Farmer protest)
- Delhi-Amritsar-Katra/NE-5 opened for traffic (Haryana section)

A schematic representation of these network developments within the project influence area is presented in **Figure 4-1**.

Figure 4-1: Network development around the project influence area



Source: Google maps, Crisil Intelligence

A comparison of FY25 vs FY24 traffic has been made in order to understand the traffic pattern on the nearby assets and is presented in **Table 4-3**.

Table 4-3: Traffic Growth on the nearby assets (IHMCL): FY25 vs FY24

Section	Toll Plazas	Car	LCV	Truck	3A	MAV	Total	PCU
NH-44	PECL	3.8%	1.3%	5.9%	-2.5%	-1.7%	3.3%	2.6%
	Bhagan	1.3%	3.5%	4.8%	-4.3%	-2.7%	1.3%	1.0%
	Gharonda	2.5%	0.4%	2.3%	-2.2%	-11.1%	1.2%	-0.8%
NH-52/NH-152	Saini Majra	-7.0%	-0.5%	3.2%	-8.4%	-15.9%	-6.6%	-7.2%
	Narwana	-0.7%	-2.7%	-10.7%	-29.7%	-20.3%	-7.0%	-12.9%
	Badopatti	2.6%	6.3%	-0.5%	-10.4%	-5.4%	0.5%	-1.8%
	Chaudhariwas	-1.9%	-3.3%	-1.7%	-13.0%	-5.7%	-3.4%	-4.7%
	Lasedi	-3.5%	-10.3%	-3.4%	-13.2%	-5.1%	-4.7%	-5.3%
Rohtak-Panipat (NH-709)	Dahar	19.7%	4.2%	8.0%	-1.3%	1.8%	14.5%	9.6%
	Makrauli	14.1%	-1.8%	3.4%	16.8%	5.7%	11.0%	8.4%
	Dighal	-5.7%	8.0%	6.5%	0.9%	2.7%	-2.7%	0.0%
	Jat Ganghaicha	-13.2%	8.1%	1.7%	-1.6%	13.3%	-3.5%	3.1%
Trans Haryana (NH-152D)	Sirohi Bahali	0.0%	19.7%	9.9%	0.9%	17.7%	6.6%	11.1%
	Pabnawa	5.6%	14.6%	23.7%	3.5%	26.9%	10.7%	16.1%
Karnal-Shamli (NH-709A)	Patnipartapur*	24.7%	18.0%	25.1%	15.7%	25.3%	23.9%	23.9%

**Note FY25 vs FY24 (Nov-Mar)*

Source: IHMCL, Crisil Intelligence

- A notable decline in traffic trends has been observed at Saini Majra TP especially in MAV category, primarily due to the diversion at the Shambhu border and the operationalization of NE-5/Delhi-Amritsar-Katra Expressway.
- Traffic originating from Punjab has increasingly utilized the Patiala-Kaithal route to access NE-5, leading to a reduction in traffic flow at Saini Majra TP.
- Traffic at Sirohi Bahali, which serves as a feeder route to the Trans-Haryana Expressway, has exhibited a consistent upward trend over recent months.
- Patnipartapur TP has been operational since November 2023. Average daily traffic at Patnipartapur plaza has been in gradual uptrend since COD. It provides connectivity between Shamli to Karnal and Ambala. Traffic from Hapur, Bulandshahr, Moradabad and beyond, travelling to Ambala has more likelihood of choosing NH709A.

A comparison of FY26 vs FY25 (April-July) traffic after the opening of Shambu border has been made in order to understand the traffic pattern on the nearby assets and is presented in **Table 4-3**.

Table 4-4: Traffic Growth on the nearby assets (IHMCL): FY26 vs FY25 (April-July)

Section	Toll Plazas	Car	LCV	Truck	3A	MAV	Total	PCU
NH-44	PECL	2.7%	3.8%	2.4%	4.4%	6.3%	3.0%	3.4%
	Bhagan	1.1%	2.7%	-0.1%	0.3%	-2.9%	0.8%	0.1%
	Gharonda	5.8%	1.9%	-4.4%	0.8%	-9.9%	3.1%	-0.2%

Section	Toll Plazas	Car	LCV	Truck	3A	MAV	Total	PCU
NH-52/NH-152	Saini Majra	11.1%	21.3%	7.9%	5.0%	13.9%	10.9%	10.8%
	Narwana	1.4%	-1.8%	1.6%	4.7%	-0.1%	1.1%	0.9%
	Badopatti	3.9%	7.8%	-4.0%	-9.8%	2.8%	2.4%	1.2%
	Chaudhariwas	4.2%	-8.9%	-6.7%	-18.3%	-6.4%	-0.6%	-4.2%
	Lasedi	3.1%	-2.7%	-11.7%	-18.8%	-7.8%	-3.0%	-6.7%
Rohtak-Panipat (NH-709)	Dahar	0.7%	13.8%	12.5%	32.0%	7.8%	4.0%	6.8%
	Makrauli	1.6%	-8.3%	-1.0%	13.5%	-22.4%	-2.1%	-7.1%
	Dighal	-17.9%	2.6%	-6.7%	-16.8%	-15.0%	-15.3%	-13.9%
	Jat Ganghaicha	23.2%	9.1%	3.4%	5.5%	-4.7%	10.8%	3.6%
Trans Haryana (NH-152D)	Sirohi Bahali	5.1%	10.2%	1.4%	7.3%	14.6%	7.5%	9.7%
	Pabnawa	26.1%	29.5%	12.7%	15.7%	10.5%	21.6%	17.0%
Karnal-Shamli (NH-709A)	Patnipartapur	14.9%	6.6%	8.7%	-7.3%	15.5%	11.6%	10.9%

Source: IHMCL, Crisil Intelligence

- PECL has shown a positive growth across all modes, especially in MAV with 6.3%, this is due to the opening of Shambu border.

- Saini Majra on NH-52/152 (Shambhu Border) has shown a positive growth across all modes with 11% in Car and 13.9% in MAV which was negative in last financial year when Shambhu border was closed.

4.3 Historical Total Revenue

Table 4-5: Historical revenue at plaza location

FY	PECL
FY23	1,045.2
FY24	1,074.9
FY25	1,113.5
CAGR (FY23 – FY25)	**3.2%**

Source: PECL, Crisil Intelligence

- It is observed that the project stretch has shown revenue growth of 3.2% at the toll plaza location.

4.4 Traffic Segmentation

Mode wise traffic ticket segmentation in % for FY24 and FY25 is presented in **Table 4-6**.

Table 4-6: Historical mode wise traffic segmentation in %

Ticket Type	Single	Local Commercial	Discount Local Monthly Pass Trips	Local Personal Traffic	Exempt	Violation	Total
			FY25				
Car	82.7%	0.5%	2.7%	6.9%	7.1%	0.1%	100.0%
LCV	95.0%	4.2%	0.0%	0.0%	0.9%	0.0%	100.0%

Ticket Type	Single	Local Commercial	Discount Local Monthly Pass Trips	Local Personal Traffic	Exempt	Violation	Total
Bus	96.6%	3.1%	0.0%	0.0%	0.3%	0.0%	100.0%
Truck	97.7%	1.8%	0.0%	0.0%	0.5%	0.0%	100.0%
			FY24				
Car	83.3%	0.4%	2.4%	6.9%	6.9%	0.0%	100.0%
LCV	94.7%	4.3%	0.0%	0.0%	1.0%	0.0%	100.0%
Bus	96.2%	3.5%	0.0%	0.0%	0.3%	0.0%	100.0%
Truck	97.8%	1.7%	0.0%	0.0%	0.5%	0.0%	100.0%

Source: PECL, Crisil Intelligence

- Traffic segmentation by ticket type remains consistent across FY24 and FY25.

5. Base Traffic Estimation

5.1 Seasonality Factors

Traffic volumes on roads vary throughout the year, influenced by socio-economic activities in the surrounding regions. To accurately estimate the Annual Average Daily Traffic (AADT) for the road, it is crucial to account for these seasonal variations.

To achieve this, a seasonal correction factor is applied, which is derived from secondary data sources such as historical traffic data, fuel sales and similar indicators. In this assessment as long historic traffic data is available, consultants have the traffic data for seasonality.

Seasonal correction factors for the latest years of FY24 & FY25 are presented in **Table 5-1**.

Table 5-1: Seasonal correction factors for FY24 and FY25

Mode	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
FY25												
Car	1.01	1.03	0.92	1.13	1.09	1.12	1.04	0.90	0.96	0.99	0.91	0.95
LCV	1.04	0.97	0.94	0.96	1.04	0.98	0.97	1.06	1.00	1.03	0.99	1.03
Bus	1.00	0.95	0.96	1.01	1.09	1.06	1.03	1.01	0.98	0.98	0.96	0.98
Truck	1.06	1.05	1.06	1.02	1.06	1.00	0.87	0.90	0.95	1.02	1.01	1.04
FY24												
Car	1.00	1.01	0.90	1.21	1.08	1.05	1.00	0.90	0.89	0.96	1.09	0.99
LCV	0.96	0.95	0.93	0.97	1.01	0.97	0.95	1.05	1.02	1.09	1.10	1.05
Bus	1.02	0.96	0.94	1.02	1.08	1.05	0.95	0.99	0.93	0.94	1.15	1.03
Truck	1.05	1.08	1.08	1.01	1.04	0.96	0.83	0.87	0.93	1.09	1.12	1.06

Source: PECL, Crisil Intelligence

- Passenger traffic, especially CJV, is higher in the months of Nov and Dec due to major festivals across the nation at the toll plaza and, during June owing to vacation period.
- July, August and September are lower across all categories of vehicles due to the monsoon season at the toll plaza location.
- In the case of freight vehicles (2A,3A and MAV) the highest traffic was observed during the period October/November to December at the toll plaza location.
- Also, it is to be noted that the network development across the financial years might have an impact on seasonality variation as presented above.

5.2 Base Traffic Estimation

For base traffic (annual average daily traffic) estimation of the present study, current fiscal 4-months (Apr-25 to July-25) of TMS traffic data were annualized using 4-12 Month (April-July) SCF factors derived from the year FY25 for all modes.

It is to be noted that the split of truck mode has been taken from the average of 7-day TVC conducted at the toll plaza.

The AADT estimation for the base case for FY26 is presented **Table 5-2**.

Table 5-2: Base Traffic Estimation - FY26

Particulars	Cars	LCV	Bus	2A	3A	MAV	Total	PCU
F26 ADT (Apr-July)	44,939	2,591	2,434	2,350	1,792	5,071	59,176	91,370
SCF (Apr-July)	1.02	0.98	0.98	1.05	1.05	1.05		
FY26 AADT	**45,751**	**2,530**	**2,388**	**2,462**	**1,877**	**5,312**	**60,321**	**93,634**

Source: Crisil Intelligence

6. Network And Industrial Development In The Region

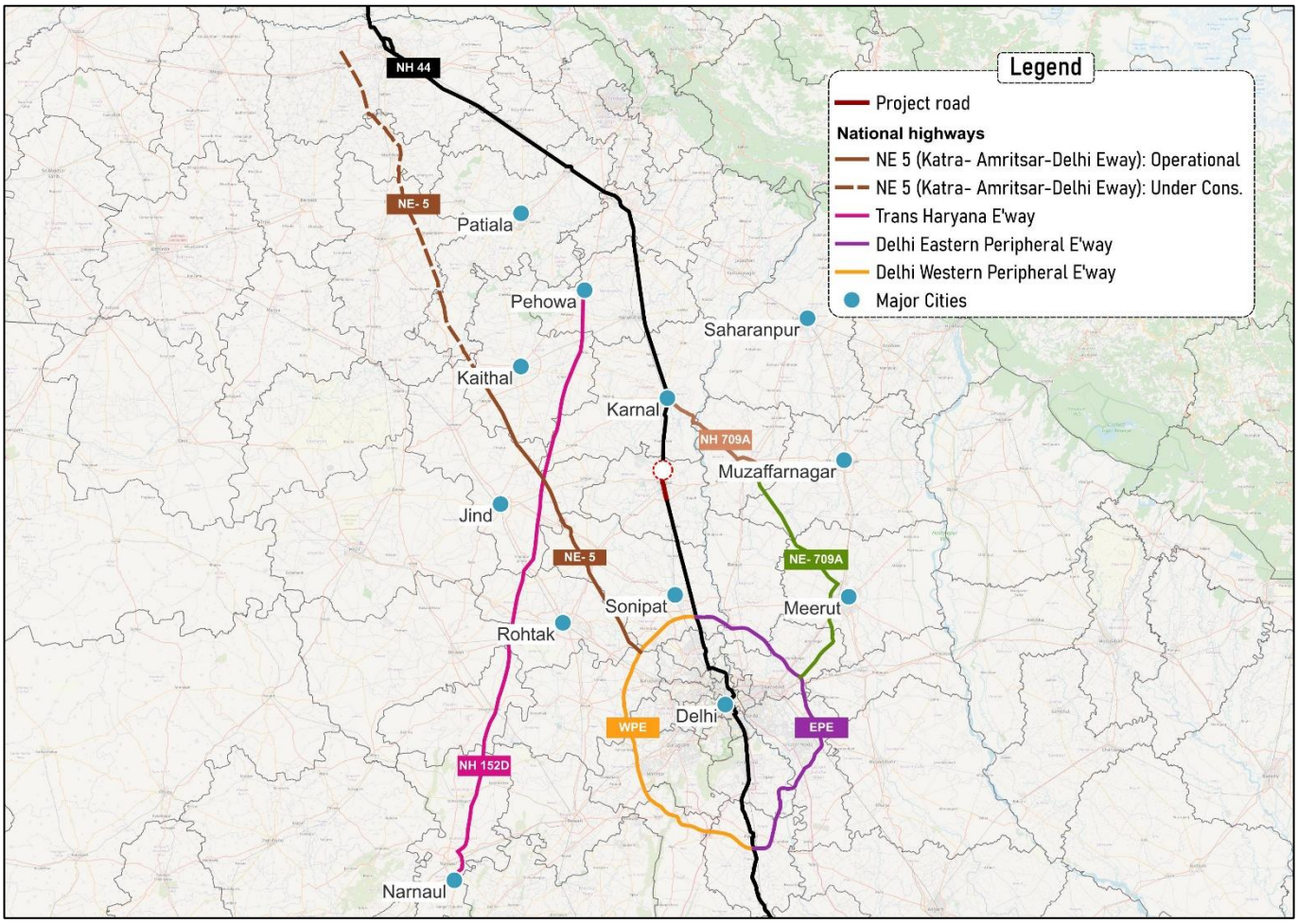
6.1 Network Development

In the case of the project road, there are no short distance alternate routes available that will impact the traffic on the project road. However ongoing and upcoming short distance & long-distance networks that could impact the project road are:

- Trans-Haryana Expressway (NH-152D)
- Upgradation of Karnal-Shamli Stretch (NH-709A)
- Delhi-Amritsar-Katra Expressway (NE-5)

The alignment for the same is presented in **Figure 6-1**.

Figure 6-1: Alignment of the Project Road and Alternate Road



Source: Open Street Maps, Crisil Intelligence

The details of the development in term of milestone, expected completion date and possible impact to project road traffic is presented in **Table 6-1**.

Table 6-1: Details of Network Development and Possible impact

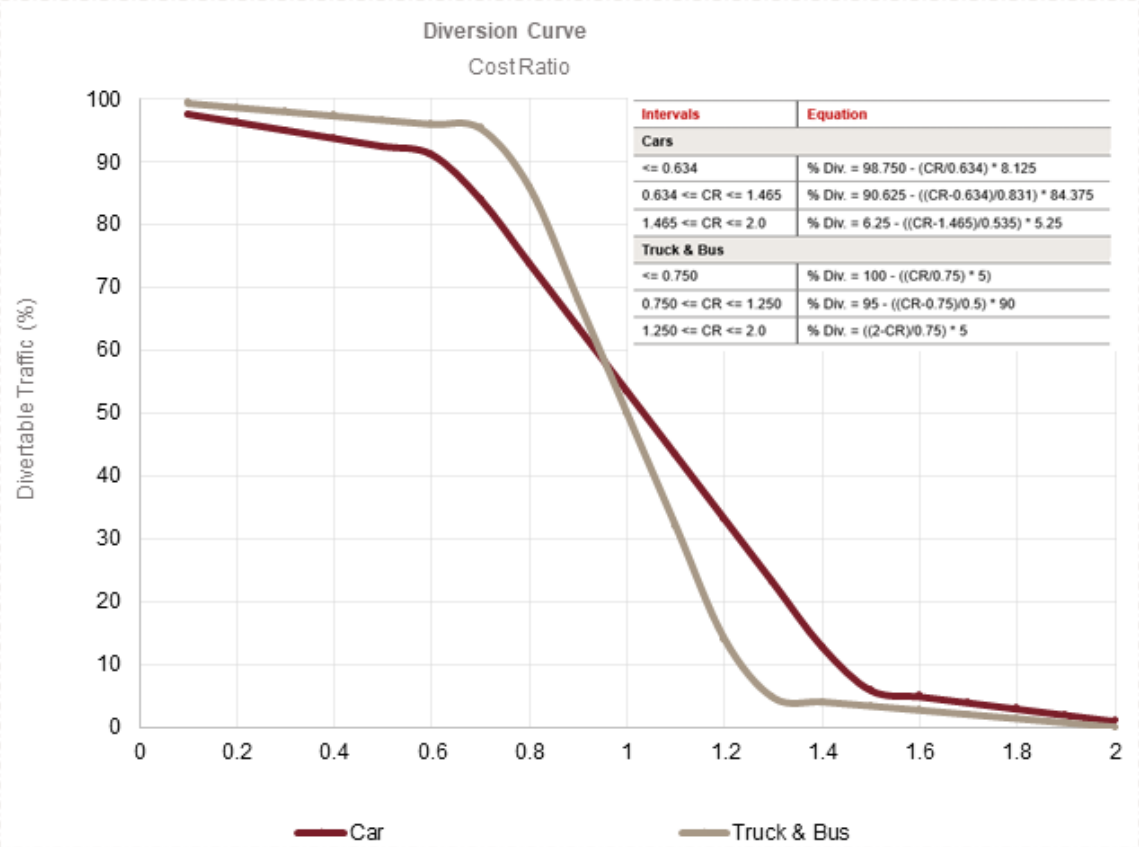
S. No	Details of Development	Milestone/Completion	Impact Year
1	**Trans-Haryana Expressway (NH-152D)** • 227 km long • 6 Lane access-controlled • NHAI	Construction of this expressway was started in July 2020 and was completed and opened for traffic in August 2022	This route has already been operational since August 2022, so no impact has been considered on the project road.
2	**Upgradation of Karnal-Shamli Stretch (NH-709A)**	This section has already been upgraded to 4-Lane and tolling has been started at Patnipartapur TP in Nov-2023 and at Bhuni TP in July-2024.	This route is already operational, so no impact has been considered on the project road.
3	**Delhi-Amritsar-Katra Expressway** • 670 km long • 4 Lane access-controlled • NHAI	**Haryana Section:** The section traversing through Haryana is operational since November-24 **Punjab Section:** Punjab section facing land acquisition issue due to farmers' protest and some portion in under construction **Jammu section**: The section under Jammu is under construction and nearing completion.	As per the information available in the public domain, the construction of the expressway might be completed by June 2026. However, for some sections, land acquisition is under process. Due to delay in land acquisition and construction of expressway, it is assumed that expressway will not impact the project road until the end of concession period

Source: Crisil Intelligence

6.2 Approach and Methodology for Diversion Analysis

The assessment of traffic diversion if any away from the project road has been done using cost ratio analysis. The road user cost is estimated based on the vehicle operating cost (VOC) and Value of time (VOT) as mentioned in IRC: SP30-2019. Using the generalized cost (VOC+VOT+Toll rates) for the project road and alternate/proposed route cost ratio is estimated using the diversion curve using the binary logit method, which computes the expected diversion percentage based on the perceived cost on the existing and alternate/proposed facility. The diversion percentages are then applied on the in-scope traffic derived from the OD analysis to estimate the traffic that would shift to/from the project road. Diversion curve (equation) mentioned in IRC:108-2015 and is presented in **Figure 6-2**.

Figure 6-2: Diversion curve as per IRC: 108-2015



Source: Crisil Intelligence

6.3 Trans-Haryana Expressway (NH-152D)

The Trans-Haryana Expressway, also known as the Ambala–Narnaul Expressway (NH-152D), is a 227-km, 6-lane greenfield access-controlled highway in Haryana, India, connecting Ambala with Narnaul. This expressway was commissioned in August 2022.

Trans-Haryana Expressway has emerged as a crucial alternate route, significantly affecting traffic volumes on the project corridor. The expressway provides a faster and more direct connection for vehicles traveling between Ambala–Ludhiana and onward to Gurugram, Rajasthan, and other southern destinations. By offering improved travel efficiency and reduced congestion, this corridor has diverted a considerable portion of long-distance through traffic away from the project road.

Since the expressway is operational from August 2022 and the traffic has stabilized on the project road, so no impact of this expressway has been considered on the project road

6.4 Upgradation of Karnal-Shamli Stretch (NH-709A & 709B)

Upgradation of Karnal-Shamli section is a part of Bareilly-Ludhiana Economic Corridor which is 6-lane access-controlled expressway and is 450km long. The Karnal-Shamli Section is a part of the National Highway 709A (NH 709A), which connects Karnal, Haryana, to Meerut, Uttar Pradesh. NH 709A is a four-lane that runs through both states, providing an important link between the two cities and connecting to other major highways like the Delhi-Yamnotri Highway.

The improvement of this stretch Patnipratapur toll plaza (Nov-2023) and Bhuni toll plaza (Jul-2024) have improved travel comfort and reduced travel time, encouraging traffic - especially to/from Karnal and beyond from/to Aligarh/Bulandshahr and beyond.

Since the section has already been upgraded to 4-lane road and the traffic has stabilized on the project road, no impact of this expressway has been considered on the project road

6.5 Impact of Delhi-Amritsar-Katra Expressway (NE-5)

The Delhi–Amritsar–Katra Expressway is an approved infrastructure project spanning 670 km with a 4-lane configuration, expandable to 8 lanes. This controlled-access expressway will connect the Bahadurgarh border near Delhi to Katra in Jammu and Kashmir, traversing through Haryana and Punjab. Additionally, a spur section will link Nakodar to the Sri Guru Ram Das Ji International Airport in Amritsar.

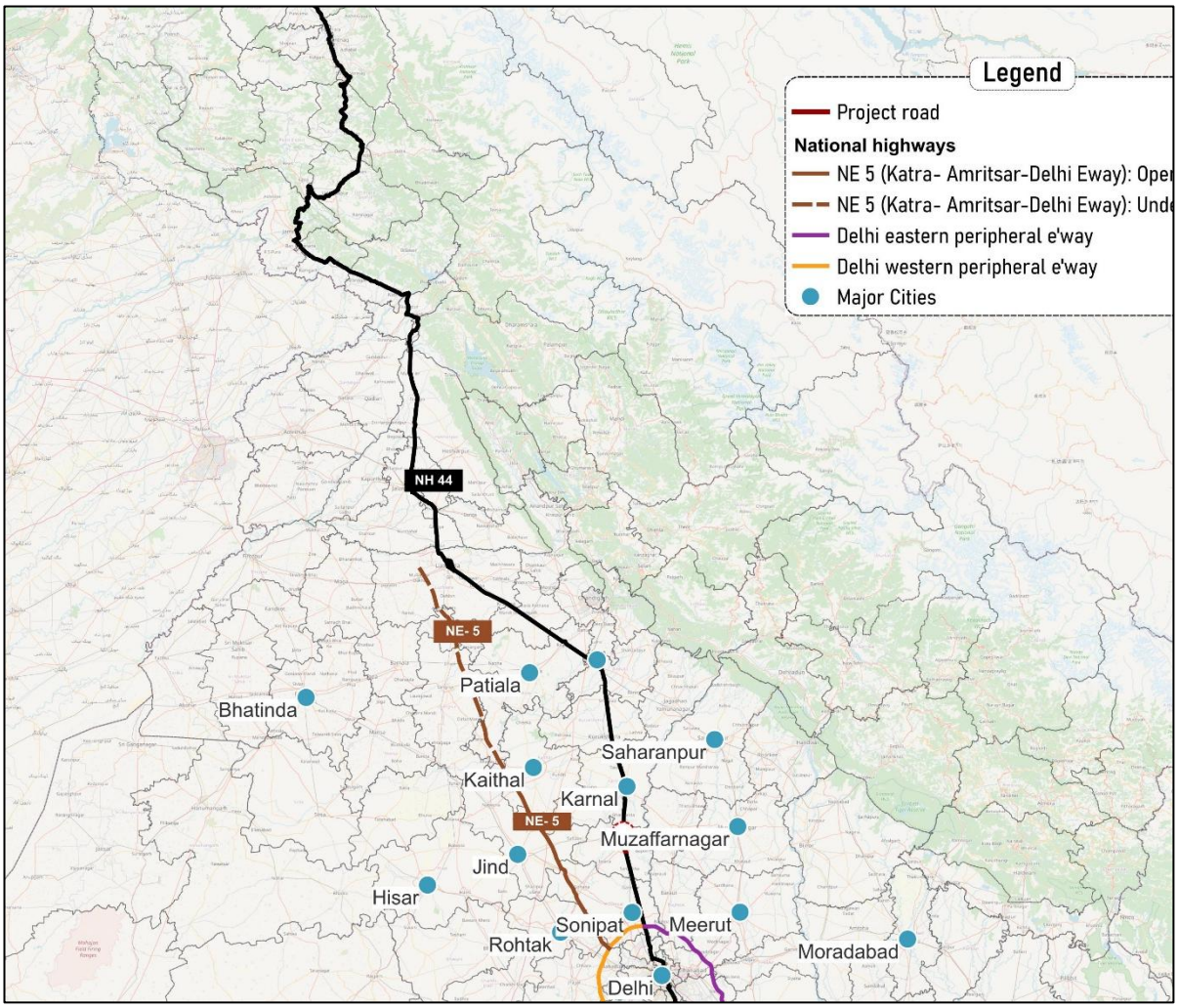
The expressway comprises two main sections: the 397.7 km Delhi–Katra segment, designated as National Expressway 5 (NE-5), and the 99 km Nakodar-Amritsar segment, designated as National Expressway 5A (NE-5A). Upon completion, the expressway will significantly reduce the travel distance between Delhi and Katra from 727 km to 588 km, and the travel time from 14 hours to 6 hours. Similarly, the distance between Delhi and Amritsar will be reduced to 405 km, with travel time decreasing from 8 hours to 4 hours.

This project integrates both greenfield and brownfield segments, passing through key regions in Haryana, Punjab, Jammu and Kashmir. It originates from the Kundli Manesar Palwal (KMP) Expressway near Nilauthi village in Jhajjar district and aims to alleviate traffic congestion on the Grand Trunk Road.

The National Highways Authority of India (NHAI) has divided the construction into two phases, comprising a total of 21 packages. Phase 1 involves the construction of a 397.7 km greenfield expressway from Delhi to Gurdaspur, including a 99 km spur to Amritsar. Phase 2 will extend from Gurdaspur to Katra, involving the brownfield expansion of the existing NH-54 and NH-44 highways.

The alignment of Project road via NH-44 and alternate route i.e., Delhi-Amritsar-Katra expressway (NE-5) is presented in **Figure 6-3**.

Figure 6-3: Alignment of the Project Road and Katra-Amritsar-Delhi Eway



Source: Open Street Maps, Crisil Intelligence

The assessment of traffic from/to Ambala/Ludhiana & Beyond to/from Gurgaon/Rajasthan & Beyond is presented in **Table 6-2**.

Table 6-2: Potential Traffic- Ambala/Ludhiana & Beyond to/from Gurgaon/Rajasthan & Beyond

Mode	Car	Bus	LCV	2A	3A	MAV	Total	PCU
Potential Traffic (% AADT)	20.4%	43.5%	23.4%	23.4%	26.5%	15.0%	21.3%	21.5%

Source: Crisil Intelligence

As per the information available in the public domain, the expressway might be operational by June 2026, however for some of the section land acquisition is under process. Due to delay in Land acquisition and construction of expressway, it is assumed that expressway will not be operational by the end of concession period, hence impact is not considered

7. Traffic Growth Estimation & Traffic Forecast

7.1 Approach and Methodology

Crisil Intelligence has used a traffic projection methodology to project traffic using regional industry growth assumptions, macroeconomic developments, infra development and consumption centre growth factors of the catchment area and adjacent regions.

Crisil, based on its coverage of 85+ sectors and the MSME industry, has developed a knowledge base to understand the growth of industries and demand across various regions and clusters.

The growth expectations for various industries are applied to each vehicle category, based on the commodity composition of the vehicle category.

For example, the share of LCVs carrying agricultural commodities is expected to grow as per agricultural output growth; the share of LCVs carrying consumer products is expected to grow as per the volume growth of durables; and the share of MAVs carrying steel commodities is expected to grow as per demand/supply volume of steel products, based on regional dynamics. This approach helps CRISIL provide a more accurate growth rate of commercial traffic in the region.

For passenger traffic, Crisil assesses the sale of passenger cars in the region, growth of vehicular population, purpose and frequency of passenger travel, population growth, expansion of the city, and infrastructure development in the catchment area.

Further, Crisil also examines the various factors that will impact traffic over the concession period, such as upcoming road routes, truck aggregation by logistics players, dedicated freight corridors and other transportation options.

Illustrative Example

Commodity	MAV (Vehicles) Year 1	YoY growth	MAV (Vehicles) Year 2
Construction materials	*300*	*9%*	*327*
Consumer products	*100*	*4%*	*104*
Agri Produce	*200*	*3%*	*206*
Iron & Steel products	*50*	*9%*	*55*
Chemical products	*200*	*5%*	*210*
Total vehicles	*XX*		*YY*

Commodity	LCV (Vehicles) Year 1	YoY growth	LCV (Vehicles) Year 2
Construction materials	*100*	*9%*	*109*
Consumer products	*200*	*4%*	*208*
Agri Produce	*50*	*3%*	*52*
Iron & Steel products	*300*	*9%*	*327*
Chemical products	*200*	*5%*	*210*
Total vehicles	*XX*		*YY*

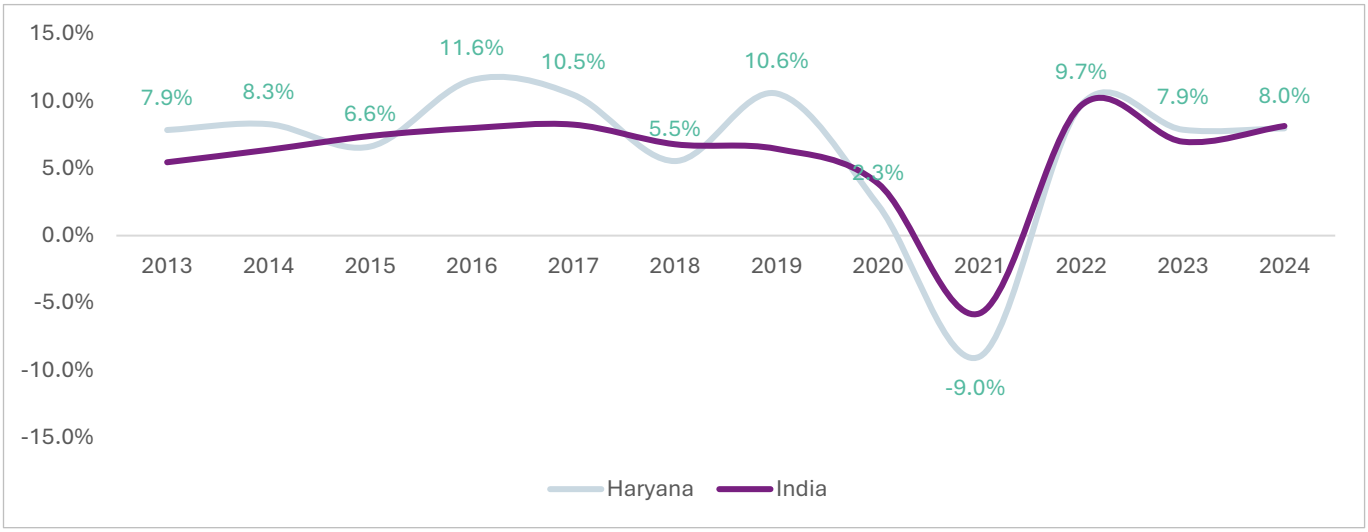
Growth rates for commodities are based on commodity specific demand/supply drivers and regional dynamics

7.2 Haryana State Profile

Project section falls entirely in the state of Haryana. A brief socio-economic profile of Haryana is presented in this sub section.

Haryana, with a GSDP of ₹13,263.2 billion in 2022-23, has consistently demonstrated robust economic growth, achieving a compounded annual growth rate (CAGR) of 7.5% from 2011-12 to 2022-23. After experiencing a 2.3% decline in FY21 due to the COVID-19 pandemic, the state's economy rebounded with a 9.7% growth in FY22, underscoring its resilience. The state's per capita income has also shown steady growth, with a CAGR of 6.6% from 2011-12 to 2022-23.

Figure 7-1: YoY Growth Rate of Haryana and India GSDP/GDP at constant price



Source: MoSPi, GoI, Crisil Intelligence

The tertiary sector dominates Haryana economy, contributing 44.8% to the GSDP in 2023-24, followed by the secondary sector at 29.2%, and agriculture and allied activities at 14.4%. Sectoral historical performance is presented in **Table 7-1**.

Table 7-1: Sectoral Growth-Haryana

Sector	2013-2019	2019-2023	2013-2023
Primary	4.8%	1.8%	3.4%
Secondary	8.7%	3.5%	6.3%
Tertiary	9.0%	4.5%	6.9%

Source: MoSPi, GoI, Crisil Intelligence

Primary sectors, which include agriculture, forestry and fishing, exhibited a steady growth of 4.8 percent during 2013-2019. This growth accelerates to 1.8 percent in the subsequent period of 2019-2024. Over the longer term from 2013-2024, the primary sector CAGR is 3.4 percent.

The secondary sector, comprising industries such as manufacturing, construction and utilities, experienced strong growth of 8.7 percent during 2013-2019. However, this saw a substantial slowdown, with growth dropping to 3.5 percent in the period 2019-2024 reflecting the effect due to covid-19 pandemic.

Haryana has emerged as a key contributor to India's economic growth, with strong performance across sectors such as automobile manufacturing, agricultural production, textiles, and IT services. The state has witnessed a significant rise in vehicle ownership, industrial output, and infrastructure development, reflecting improved income levels and economic resilience.

The districts of Gurugram, Faridabad, and Panipat are central to Haryana's industrial and economic framework. Gurugram has rapidly transformed into a major IT and financial services hub, hosting multinational corporations and fostering employment opportunities. Faridabad continues to be an important center for manufacturing, while Panipat is well known for its textile exports and petrochemical industries. Additionally, districts such as Hisar and Sonipat are key contributors to Haryana's growing steel, textile, and agricultural machinery exports, enhancing the state's export portfolio.

Tourism in Haryana has also grown steadily, supported by historic and cultural sites such as Kurukshetra, known for its mythological significance, and heritage locations in Pinjore and Panchkula. The state's wellness tourism, golf tourism, and religious circuits have contributed to rising domestic and international footfall, generating local employment and complementing the broader economy.

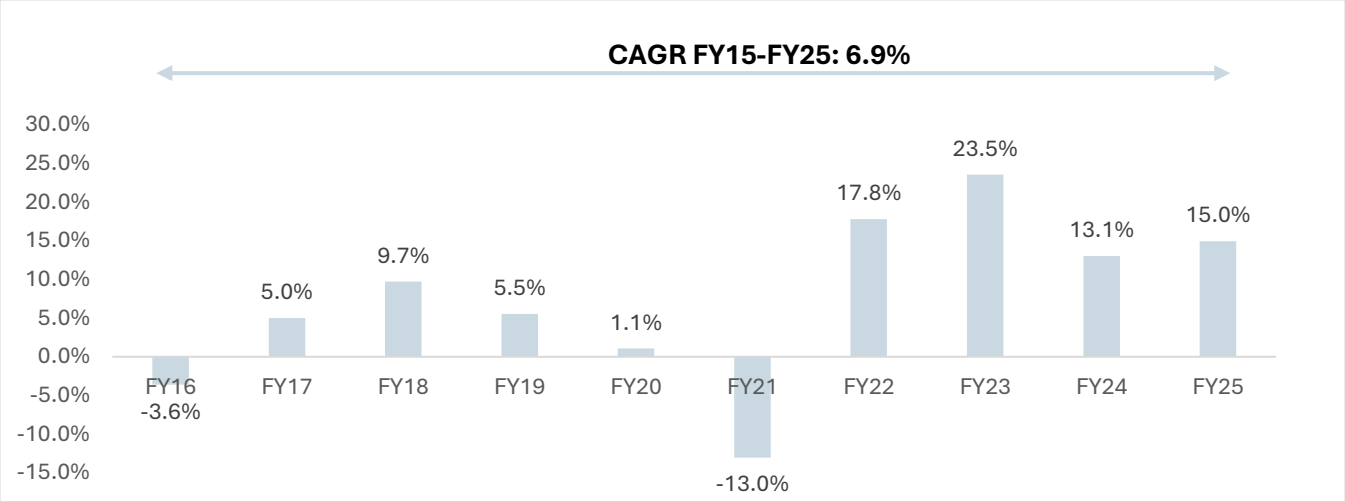
Haryana's economic landscape is further enriched by its strategic location and seamless connectivity through national highways and freight corridors, especially due to its proximity to the National Capital Region (NCR), which enhances trade and investment potential. The synergy between industrial, agricultural, and service sectors has bolstered inclusive growth across the state. In addition, Haryana attracted substantial foreign direct investment (FDI), further fueling economic expansion and positioning it as a preferred destination for global investors.

7.3 Outlook for Car Growth

The rate of car ownership in India has increased from 6.6 per 1,000 people in 2001 to 25 per 1,000 people in 2019. Despite India's car fleet growing at an annual rate of 10% for nearly 25 years, the rate of car ownership remains low compared to countries with similar economic status and significantly lower than developed countries, which have a rate of around 450 per 1,000 people. This low rate of car ownership indicates potential for continued growth in the coming years. With the ongoing increase in car ownership and improvements in the road network, the use of cars for inter-urban travel is showing a growing trend.

Vahan Dashboard by Ministry of Road Transport & Highways (MoRTH), shows good growth in motors cars for last decade (FY25-FY15) at 6.9% CAGR. Motor cars data for Haryana state from Vahan dashboard is compiled in the below chart.

Figure 7-2: Motor Car vehicle registration growth (on-year)



Source: Vahan Dashboard, Ministry of Road Transport & Highways (MoRTH)

7.4 Commodity Overview

As mentioned in section 3.4 The analysis of freight movement across the toll plaza reveals that the major commodities being transported include Agri produce, Courier parcel and Consumer Food & Consumer Products and Iron and steel products

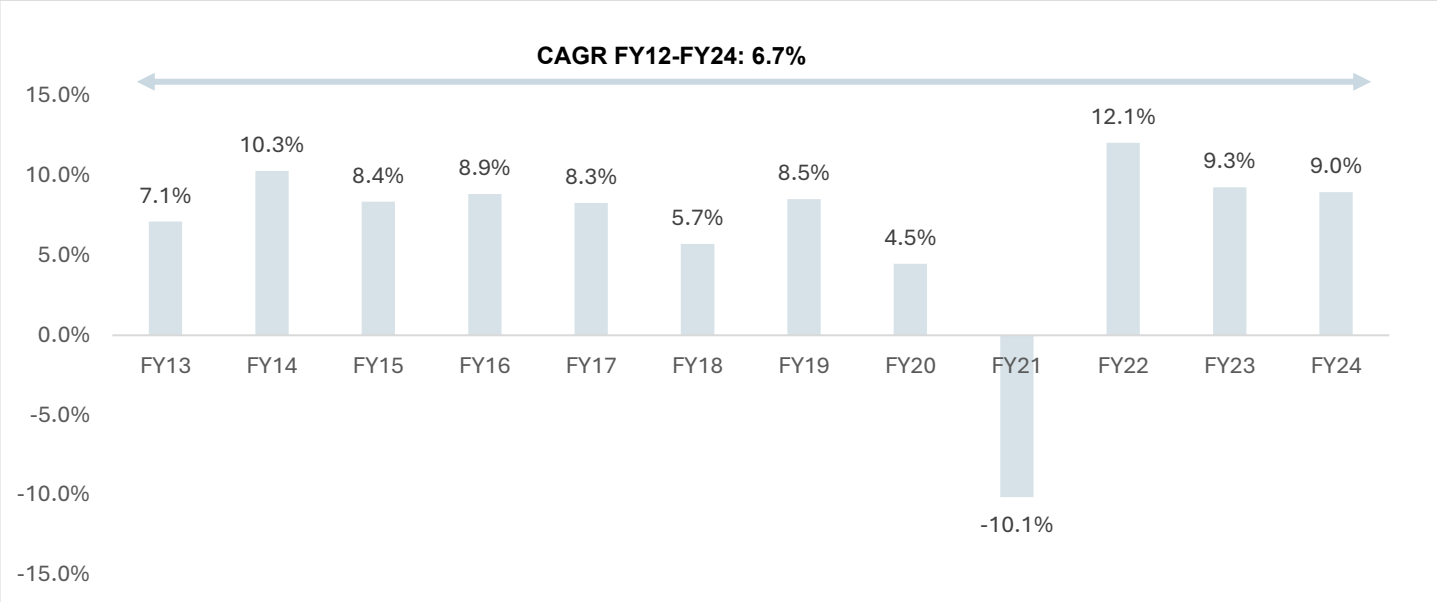
Courier and Parcels

Courier/Parcel traffic on the project section forms a significant proportion of the commercial traffic and is majorly for the purpose of consumption in domestic market in the urban and semi urban regions of Panipat, Ambala, Sonipat, Karnal, Chandigarh and nearby regions of the catchment.

As statewide developments are rapidly increasing, Tertiary sector growth is also in line with the same. Heavy proposed capex will increase in future growth of tertiary activities and hence the demand.

Tertiary sector growth for Haryana is shown in the image below.

Figure 7-3: Tertiary sector growth



Source: MOSPI, Crisil Intelligence

The e-commerce industry is on the rise with increasing consumption levels and moderating inflation and project corridor being an important link in connecting the important cities of Haryana, Delhi and NCR, Crisil expects growth of 8.5% from fiscal FY26-FY27 for courier & parcels related traffic on the project road.

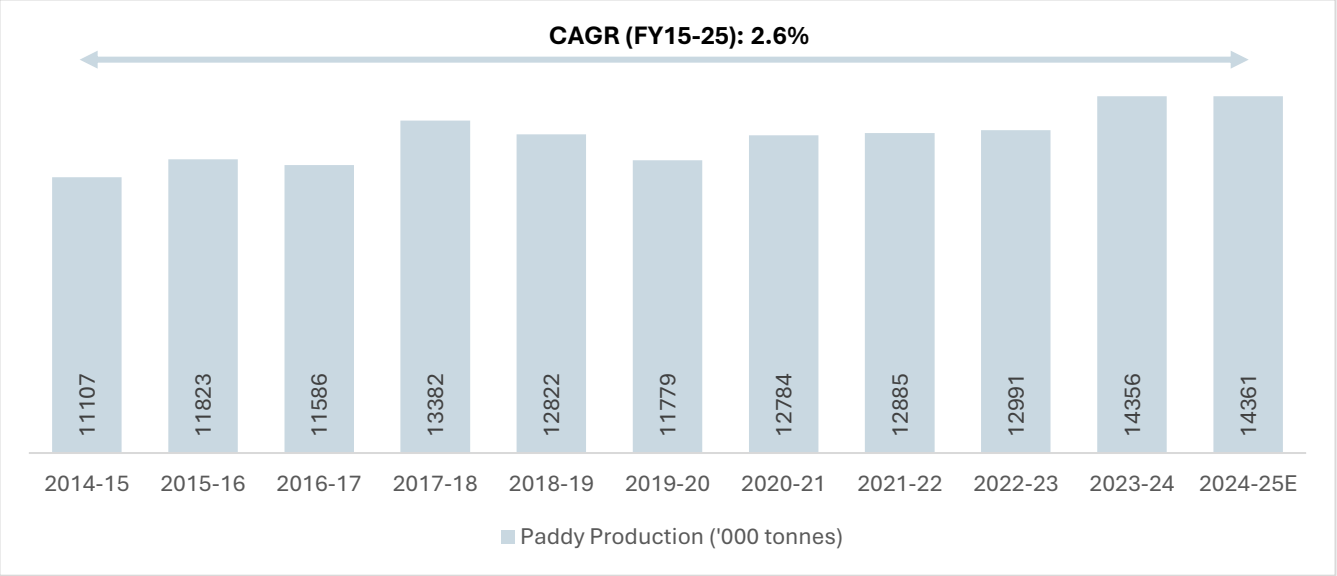
Agri Produce

Another major contributing commodity on the stretch is Agri produce, which largely consists of rice, wheat, fruits and vegetables. The key commodities in the region are grown in surrounding districts such as Karnal, Ambala, Ludhiana, Amritsar, etc.

Punjab and Haryana have established themselves as the leading states in India's paddy and wheat production, playing a pivotal role in ensuring national food security. Often referred to as the "granaries of India", these two states together contribute a significant share of rice and wheat to the Central Pool of Foodgrains, which supports the Public Distribution System (PDS) across the country.

Punjab and Haryana rank among the top contributors to India's paddy output. Punjab alone contributes more than 25-30% of rice to the central pool. Haryana, though smaller, consistently contributes around 10% to the pool. The extensive cultivation of high-yielding paddy varieties, supported by irrigation from canals and tubewells, has made both states vital to India's rice economy.

Figure 7-4: Paddy Production in Punjab



Source: UPAG, Crisil Intelligence

Given the predominantly agrarian landscape of Punjab and Haryana, agriculture produce will continue to remain one of the key contributors along the project stretch. Considering all these factors Crisil expects growth of 2.5% from fiscal FY 26-FY27 for agriproduce related traffic on the project road on a high base of previous years.

Consumer foods & products

The fast-moving consumer goods (FMCG) industry or consumer packaged goods (CPG) industry is mainly responsible for producing, distributing, and marketing fast-moving consumer goods. Fast-moving consumer goods (FMCG) sector is India's fourth-largest sector and has been expanding at a healthy rate over the years because of rising disposable income, a rising youth population, and rising brand awareness among consumers. Improved penetration of the organized snacks sector post the pandemic and new product offerings to drive growth of the industry in fiscal 2026.

Crisil expects growth of 3.5% from fiscal FY 26-FY27 for consumer food & products related traffic on the project road.

Iron and Steel Products

Iron and Steel Products contribute to 9.6% of MAV on the project stretch thus indicating Punjab and Haryana important supporting role in India's iron and steel sector, particularly through secondary steel production and downstream industries.

Punjab has a strong presence of secondary steel units in districts like Mandi Gobindgarh (in between Ambala and Ludhiana), often referred to as the "Steel Town of India." The cluster hosts hundreds of small and medium enterprises engaged in re-rolling, forging, and manufacturing steel products, supplying construction, auto parts, and machinery sectors.

On-going and up-coming infrastructure activities have been key driving factors to the growth of this sector. A healthy housing market and an increase in individual house construction across the country are supporting this segment. Government initiatives, such as the Pradhan Mantri Awas Yojana (PMAY), are further supporting this segment. Cold

storage, food processing units, warehouses, and irrigation structures also create consistent steel demand, linking back to the agrarian strength of both states.

Considering all these factors Crisil expects growth of 5.5% from fiscal FY26-FY27 for iron & steel products related traffic on the project road.

7.5 Commodity Outlook

Crisil Intelligence has forecasted the freight traffic growth till FY27 based on the growth in relevant sectors influencing traffic in the region. Industry growth has been analysed and forecasted based on our proprietary database of industries for the surrounding regions that impact traffic on project road as well as our internal assessment on a relevant set of sectors at the pan India level.

Package wise forecast incorporates the regional dynamics including, but not limited to, investments, commodity trends, district output (GDDP) profile (primary/secondary, construction/manufacturing) etc.

The traffic for the coming years is projected by factoring in the impact of these parameters on commodity wise growth rates and is presented in **Table 7-2**.

Table 7-2: Commodity Outlook for the Project Section

Commodity	FY27
Agri Produce	2.5%
Automobiles	6.0%
Chemical products	4.0%
Coal	2.5%
Construction materials	5.0%
Consumer Foods	3.5%
Consumer Products	3.5%
Container	4.0%
Courier & parcel	8.5%
Iron & Steel Products	5.5%
Machinery	4.0%
Milk & Animal Food	2.0%
Others	5.0%
Paper products	4.0%
Petroleum Products	3.0%
Pharmaceuticals	3.5%
Plastic products	3.5%
Plywood & Timber products	3.5%
Rubber products	3.5%
Textile & Footwear	4.0%
Tiles & Ceramic products	4.0%

Source: Industry, Crisil Intelligence

7.6 Implied Growth Rate for the Project Section

Mode wise implied growth rate adopted for the project road section is presented in **Table 7-3**.

Table 7-3: Implied Growth Rate for the PECL

Vehicle Type	FY27
Car/Jeep/Van	6.0%
LCV	3.5%
Bus	3.0%
2A	3.7%
3A	0.9%
MAV	3.9%
Total	5.3%
PCU	4.6%

Source: Crisil Intelligence

7.7 Traffic Projections

The total traffic projected in terms of PCUs based on the most likely growth rates is presented in **Table 7-4**.

The traffic (PCU) on the project stretch is expected to grow at 4.6% CAGR between fiscals 2026 and 2027.

Table 7-4: Traffic Projections in terms of PCUs

FY	PECL
FY26E	60,321
FY27P	63,541
Growth (FY26- FY27)	**4.6%**

Source: Crisil Intelligence

Also, mode wise projection at toll plaza is presented below.

Table 7-5: Projection by Mode: PECL

FY	Car/Jeep/Van	LCV	Bus	2A	3A	MAV	Total	PCU
FY26E	45,751	2,530	2,388	2,462	1,877	5,312	60,321	93,634
FY27P	48,497	2,618	2,460	2,554	1,894	5,520	63,541	97,984
Growth (FY26 – FY27)	**6.0%**	**3.5%**	**3.0%**	**3.7%**	**0.9%**	**3.9%**	**5.3%**	**4.6%**

Source: Crisil Intelligence

7.8 Modification in concession period

An extension of 350 days has been approved by the competent authority (NHAI) in view of the farmers' agitation from 25-Dec-2020 to 28-Jan-2021 (33 days) and from 29- Jan-2021 to 13-Dec-2021 (317 days), therefore revised date of concession period is 01-Feb-2027.

8. Revenue forecast

8.1 General

The project section is under “open tolling system” which enables the concessionaire to collect tolls from long distance as well as short distance traffic joining the project from adjoining highways.

8.2 User Fee Schedule

As per the user fee schedule of the Concession Agreement, the base toll rate for use of a section is applicable from COD. It is to be noted that all vehicles will be charged on a single category ticket and there will be no return tickets issued.

The concession of traffic has been provided under the categories/toll tickets is presented in

Ticket	Maximum number of one-way journeys allowed	Period of validity
Single/Normal	Single	-
Local Commercial	Single	-
Local Personal	Single	-
Local Monthly Personal	Multiple	One month from the date of payment

Source: Schedule-User Fee of Concession Agreement

As per the concession agreement in the case of the Local personal trip category, the user will pay 25% of the applicable fees for the special category of vehicles and the local commercial trip category will pay 50% of the applicable fees for the special category of vehicles.

The base toll rate is presented in **Table 8-1**.

Table 8-1: Base Toll Rate

Mode	Fee per Vehicle per one way trip (In rupees)
Car	20
LCV	30
Bus	60
Truck	60

Source: Schedule-User Fee of Concession Agreement

The above-mentioned rates shall be revised every year with effect from 17th July. The formula for the calculation of user fees is as follows:

$$Base\ Rate\ X \frac{WPI - B}{WPI - A}$$

WPI-B refers to Wholesale Price Index as on March 31 prior to the fee revision date

WPI-A refers to Wholesale Price Index as on March 31 prior to COD

8.3 Traffic Segmentation

As mentioned in section 4.4 historical toll data for the toll plaza was made available by client. FY25 is used in adopting the segmentation for the project road. The traffic tolling segmentation in % adopted for the present study for FY26 is presented in **Table 8-2**.

Table 8-2: Historical mode wise traffic segmentation in %

Ticket Type	Single	Local Commercial	Discount Local Monthly Pass Trips	Local Personal Traffic	Exempt	Violation	Total
			FY25				
Car	82.7%	0.5%	2.7%	6.9%	7.1%	0.1%	100.0%
LCV	95.0%	4.2%	0.0%	0.0%	0.9%	0.0%	100.0%
Bus	96.6%	3.1%	0.0%	0.0%	0.3%	0.0%	100.0%
Truck	97.7%	1.8%	0.0%	0.0%	0.5%	0.0%	100.0%

Source: PECL, Crisil Intelligence

8.3.1. Trip Rates

The trip rates are adopted based on the FY25 historic traffic data and trip rates for the present study for FY26 onwards is presented in **Table 8-3**.

Table 8-3: Trip Rates

Ticket Type	Single	Local Commercial	Discount Local Monthly Pass Trips	Local Personal Traffic
Car	1.00	1.00	54.76	1.00
LCV	1.00	1.00	1.00	1.00
Bus	1.00	1.00	1.00	1.00
Truck	1.00	1.00	1.00	1.00

Source: PECL, Crisil Intelligence

8.3.2. Tolling Length

The tollable length for the project section plaza is presented below

No	Toll Plaza	Length (Km)
1	PECL (Km 95.000)	10.000

Source: PECL, Crisil Intelligence

The final toll rates used for FY27 are presented in **Table 8-4**.

Table 8-4: Toll Rates at PECL for FY27

Ticket Type	Car	LCV	Bus	Truck	MAV>2A
Single Journey	45	65	130	130	130
Local Commercial	20	30	65	65	65
Local Personal	10	-	-	-	-
Local Monthly Personal	350	-	-	-	-

Source: Crisil Intelligence

8.4 Revenue Estimates

8.4.1. Review and Outlook of Whole-Sale Price Index (WPI)

The projected toll rates are dependent on Wholesale Price Index (WPI) assumptions for 2027. For WPI projection, Crisil Intelligence has relied on inputs from Client. Past and outlook WPI growth is presented in below table.

Table 8-5: WPI

FY	WPI	Expected YoY Growth
FY25	151.4	0.3%
FY26	154.8	2.2%
FY27P	162.6	3.0%

Source: Crisil Intelligence

8.4.2. Revenue Estimates

Revenue across the toll plaza is projected to grow at a CAGR of approximately 10.5% and for the forecast period (FY26-27).

The revenue projections mode wise for the project road have been presented till FY27 and is presented in **Table 8-6**.

Table 8-6: Revenue (Rs million) by Mode: PECL

Vehicle Type	Car/Jeep/Van	LCV	Bus	2A	3A	MAV	Total
FY26E	568.6	56.9	107.0	110.8	84.5	239.1	1,166.8
FY27P	654.6	60.2	113.3	118.2	87.6	255.4	1,289.3

Source: Crisil Intelligence

About Crisil Intelligence (formerly Market Intelligence & Analytics)

Crisil Intelligence is a leading provider of research, consulting, risk solutions and advanced data analytics, serving clients across government, private and public enterprises. We leverage our expertise in data-driven insights and strong benchmarking capabilities to help clients navigate complex external ecosystems, identify opportunities and mitigate risks. By combining cutting-edge analytics, machine learning and AI capabilities with deep industry knowledge, we empower our clients to make informed decisions, drive business growth and build resilient capacities.

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Traffic & Revenue Assessment of 4-Lane 131.650 km Rajkot-Jamnagar-Vadinar section of SH-25 and NH151A from Km 3.0 to Km 125.5 in Gujarat state

Final Report

November 2025



by S&P Global

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Abbreviations

Abbreviation	Meaning
AADT	Annual Average Daily Traffic
ADT	Average Daily Traffic
CA	Concession Agreement
CAGR	Compound annual growth rate
CFS	Container Load
DPR	Detailed Project Report
EXIM	Export Import
FMCG	Fast-moving consumer goods
FY	Fiscal Year
GDP	Gross Domestic Product
GIDC	Gujarat Industrial Development Corporation
GSDP	Gross State Domestic Product
GSR	General Statutory Rules
GSRDC	Gujarat State Road Development Corporation
HME	Heavy Motor Vehicle
ICD	Inland Container Depots
IHMCL	Indian Highways Management Company Limited
IRC	Indian Road Congress
JNPT	Jawaharlal Nehru Port Trust/Authority
LCV	Light Commercial Vehicle
LMT	lakh metric tonnes
LPG	Liquefied petroleum gas
MAV	Multi Axle Vehicle
MMLP	Multi-Modal Logistics Parks
MMT	million metric tons
MTPA	million tonnes per annum
NH	National Highways
NHAI	National Highways Authority of India
OD	Origin-Destination
OSV	Over Sized Vehicle
PCU	Passenger Car Unit
SBM	Single Buoy Mooring
SCF	Seasonal Correction Factors
SH	State Highway
SPV	Special Purpose Vehicle
TMS	Toll Management Systems
TP	Toll Plaza
TVC	Traffic Volume Count

1 Executive Summary

1.1 Project Details

We understand that EAAA TransInfra Managers Limited is the Investment Manager, M/s EPIC Transnet Project Management Private Limited is the proposed Project Manager and M/s EPIC Transnet Infrastructure Private Limited is the sponsor of the Citius TransNet Investment Trust ("Trust" or "InvIT") and M/s Rajkot-Vadinar Tollway Private Limited (RVTPL) in the state of Gujarat is proposed to be part of the initial portfolio assets of the Trust. The Trust is registered with Securities and Exchange Board of India ("SEBI") as an infrastructure investment trust under the SEBI InVIT Regulations.

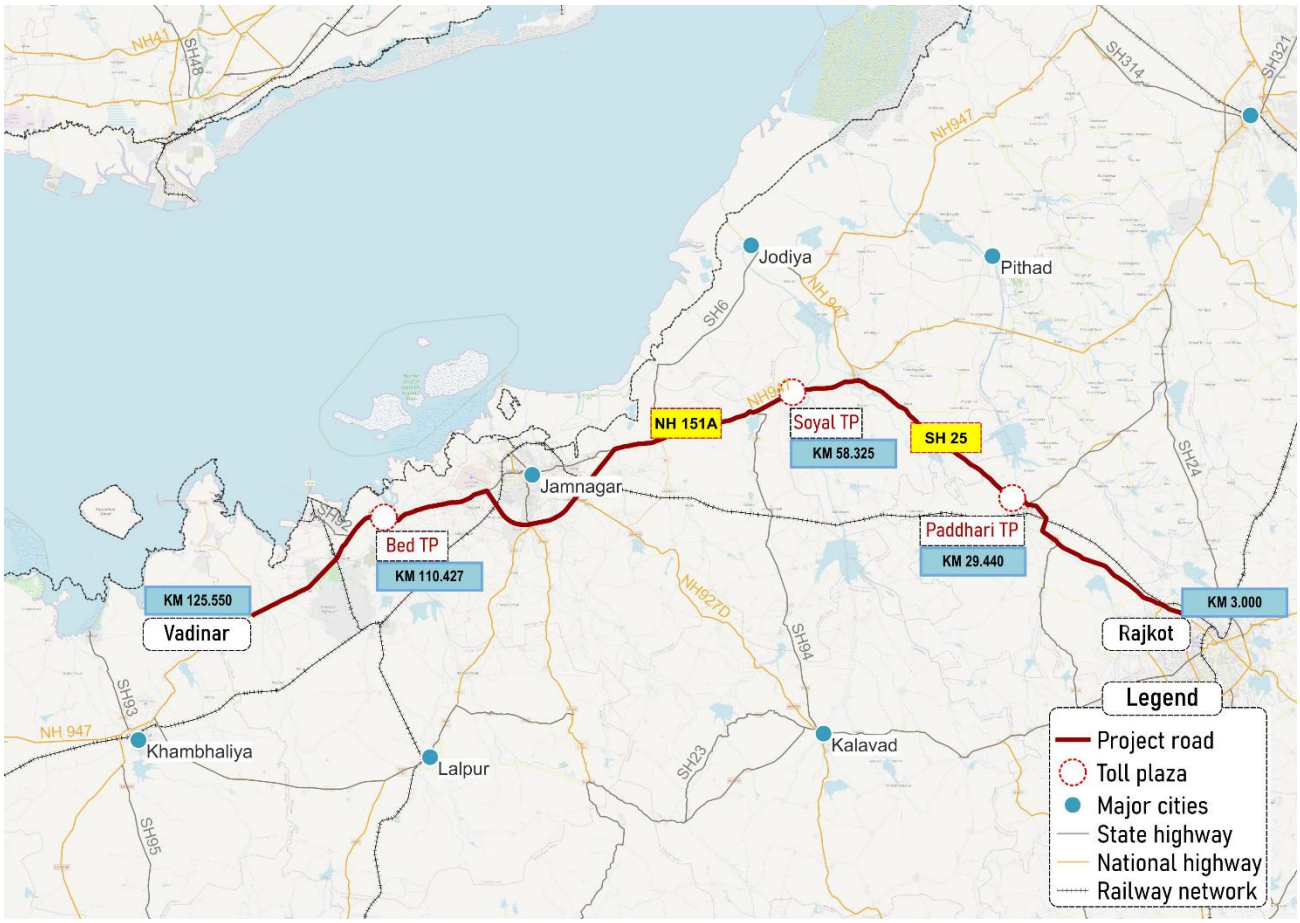
M/s EPIC Transnet Infrastructure Private Limited (hereinafter "the Client") as sponsor has appointed M/s CRISIL Limited (hereinafter referred as "Technical Consultant") to carry out Traffic and Revenue Due Diligence of operational asset of Four Laning of Rajkot-Vadinar road on BOT Toll Basis in the State of Gujarat (herein after refer as "the Project") which is being operated by "M/s Rajkot-Vadinar Tollway Private Limited (RVTPL)" (hereinafter refer as "the Concessionaire or Company or RVTPL").

1.2 Asset Overview

Project road Rajkot-Jamangar-Vadinar is a 4-lane, 131.650 kms long stretch, on national highways SH25 and NH151A in the state of Gujarat which connects Jamnagar and Dwarka region. Project road gives connectivity to industrial clusters of Jamnagar and Dwarka region with other parts of India. The project stretch has three toll plaza namely Padhhari Toll Plaza (TP1), Soyal (Dhrol) Toll Plaza (TP2), and Bed Toll Plaza (TP3) which lies at the chainage of km 29.440, km 58.325, and km 110.427 respectively spanning from Rajkot city to Vadinar region via Dhrol town. Most of the traffic is originating/destined to Jamnagar and Dwarka industrial area which houses Reliance industries, Nayara Refineries, Digvijay Cement, Jamnagar GIDC, Refractory Shapes Ltd (RSPL) Soda Ash factory, Tata Chemicals, Sikka Power Plant, non-major ports like Bedi port, Navlakhi port and other MSMEs. Project road also connects prominent tourism hub like Nageshwar Temple in Dwarka, Beyt in Dwarka, Somnath temple near Porbandar and beach side locations of Gujarat. The project stretches provide seamless connectivity to the important industrial towns of Rajkot, Jamangar and Dwarka to the hinterlands in Gujarat and up north - extending to Rajasthan, Haryana, Punjab and beyond and down south regions like Maharashtra, Tamil Nadu, and Karnataka etc. The project was awarded by the Gujarat State Road Development Corporation (GSRDC) with an original concession period of 20 years inclusive of construction period, with appointed date from 12th September 2009.

The Rajkot–Jamnagar–Vadinar asset is strategically positioned within India's largest petroleum refining zone, encompassing major players like Reliance and Nayara Energy in Jamnagar and Vadinar. This location makes it a crucial freight corridor for both domestic and export-oriented fuel movement. The corridor acts as a key link between the western refinery belt and various parts of India, facilitating the flow of energy products, industrial goods, and raw materials. The corridor also connects to mining areas in Khambhalia and links key settlements such as Rajkot, Paddhari, Jamnagar, Depaliya, and Motikhavadi. Close proximity to Jamnagar Airport enhances regional connectivity for business and logistics operations. Integrates with rail freight lines serving refinery sidings and port terminals, ensuring end-to-end transport efficiency.

Figure 1-1: Project Road



Source: Open Street Map, Crisil Intelligence

1.3 Salient growth features and traffic generators

The Rajkot-Jamnagar-Vadinar corridor serves as a critical transportation link connecting major industrial hubs in Gujarat, with distinct commodity profiles at each toll plaza reflecting regional economic activities. The 132 km highway handles diverse cargo ranging from petroleum products and chemicals to agricultural commodities and construction materials, with empty vehicle return trips constituting the largest single category across all locations.

Paddhari Toll Plaza is positioned at 29/440 km on the SH-25 corridor, Paddhari serves as the eastern gateway connecting Rajkot to the other regions of the corridor and towards Morbi, Mundra and Kandla regions as well. The taluka benefits from strategic positioning on major transportation networks linking Rajkot's industrial estates to downstream markets. Rajkot houses The Agricultural Produce Market Committee which facilitates trade of agricultural products of Horticulture crops like Cotton, Ground Nut, and Gram etc. In Rajkot, industries like furniture manufacturing, auto parts manufacturing, metal casting, manufacturing of agricultural and forest machinery, forging, pressing, stamping and roll-forming of metal, oil mills and food processing units, plastic product manufacturing etc. are existing in large numbers. Nearly 7.3% of all commodity vehicle movements are agricultural produce, supported by Rajkot's trade centre and agro-industrial enterprises. This plaza also features 14.8% petroleum products and 8.4% plastic products, which can be attributed to the flow of refined products outbound from Jamnagar and Vadinar refineries and the steady stream of manufactured plastic goods originating from Rajkot's robust manufacturing sector. Paddhari also stands out for having high courier and commercial (6.8%) and empty vehicle movements (28.3%), underscoring its role as a return cargo hub for commercial vehicles after

transferring cargo from regional industrial clusters.

Soyal (Dhrol) Toll Plaza is positioned at 58/325 km serves as a mid-corridor junction connecting agricultural hinterlands to industrial centres. The area spans 51 hectares of industrial development with established GIDC infrastructure. Dhrol is located in Jamnagar district, and it provides intermediate connectivity between Navlakhi port, Morbi region, Kutch district and other northern regions with Jamnagar and regions beyond. Dhrol is small town and also act as one of the consumption centres on project stretch. Nearest industrial hub to Dhrol is Jamnagar city which houses Ferrous and Non-Ferrous manufacturing units, weaving, spinning and traditional Bandhani texturing Textile industries, Refined petroleum production, and basic chemical manufacturing etc. Jamnagar also houses airport that facilitates passenger and cargo movement. Bedi port, which is used extensively for coal import is at the closest proximity to Jamnagar city. The plaza's commodity mix is led by petroleum products at 17.6%, closely followed by a high share of empty vehicles at 32.9%, reflecting pronounced directional traffic and return empties after extensive outbound traffic flows into the region's manufacturing and refining complexes. Dhrol also handles significant loads of construction materials (8.3%) and plastic products (6.8%), illustrating the area's active construction and manufacturing landscape. Courier and parcel traffic at 7.0% signals intraregional trade and service sector activity connecting secondary towns to larger markets and export centres.

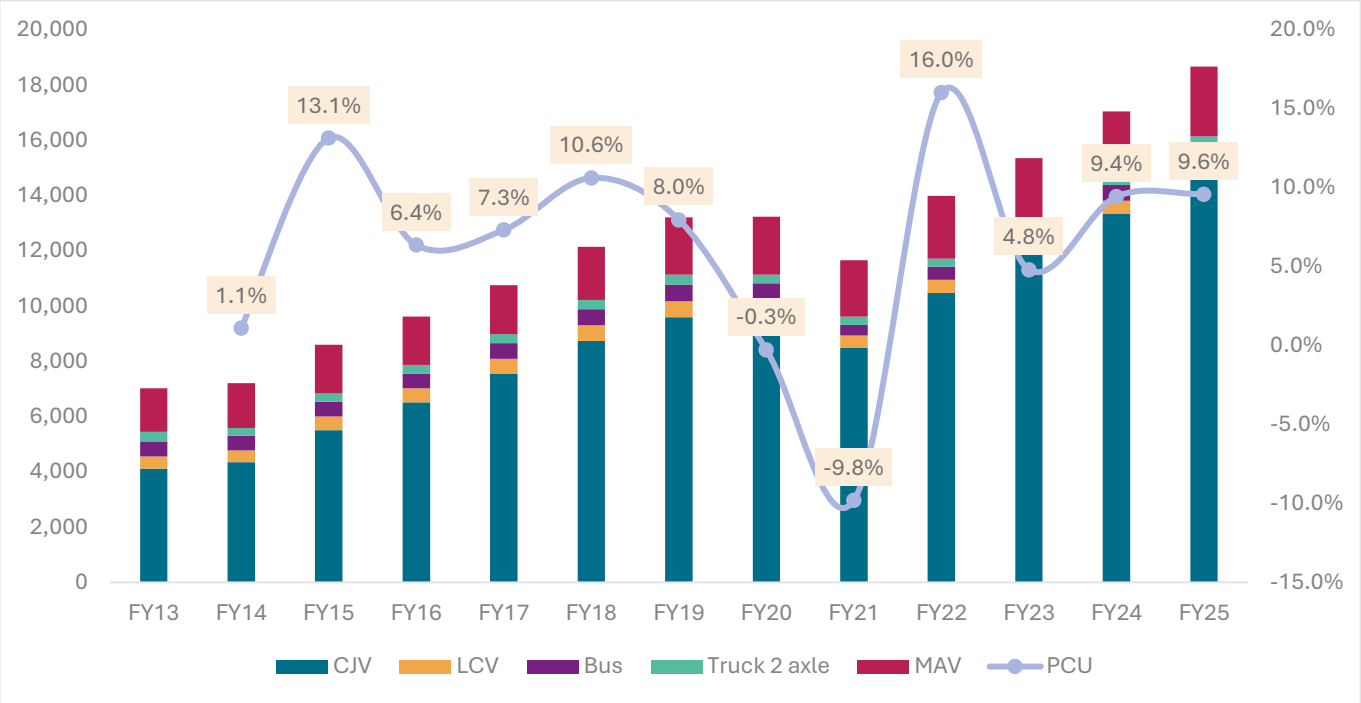
Bed Toll Plaza is positioned at 110/427 km and nearest to refineries in the Jamnagar-Vadinar region, the commodity profile pivots strongly toward petroleum products, which make up 18.5% of all movements, supported by coal at 7.3%, chemicals at 5.9%, and construction materials at 8.5%. This pattern is a direct result of Bed's TP geographical proximity to India's largest refinery complexes (Reliance, Nayara/Vadinar) and fertilizer plants at Sikka. The remarkable 31.7% share of empty vehicles at Bed TP reveals the high volume of outbound bulk load trips to the destinations from refineries and industries in the catchment with much of the return traffic being empty. Bed TP's unique industrial cluster attracts coal for captive power and raw material needs, chemicals and petroleum for onward distribution, and construction materials to sustain continuous infrastructure development tied to port and energy sector expansions. Bed TP acts as terminal to enter/exit the heavy industrial establishments like Reliance Industries, Nayara Refineries, Shree Digvijat Cement, Gujarat State Fertilizers and Chemicals Limited, Tata Chemicals in Mithapur, Refractory Shapes Ltd (RSPL) soda ash manufacturing, etc. Bed TP also facilitates traffic for thermal power plants like Nayara Energy captive power plant, Essar Power, Sikka Thermal Power Station, RSPL limited captive power plant etc. and few major coal consumers like Reliance industries and Shreeji coke and energy pvt. Ltd.

Project corridor has ~30% of empty trips, a common feature in industrial-port corridors dominated by outbound loaded trips and dependent on exports of refined, processed, or bulk goods. Seasonal agriculture and continuous manufacturing output anchor steady traffic, while ongoing investments in airport, ship repair, and container terminal infrastructure continue to stimulate further traffic growth. The commodity mix clearly reflects the combined influence of Rajkot's agro-industrial and engineering industries, Dhrol's manufacturing and agro-based cluster, and Bed's high-capacity petroleum, chemicals, and port infrastructure, creating a corridor with diversified, regionally distinctive and consistently high-volume traffic generators. All of these observations point to the corridor's critical function as Gujarat's backbone for both domestic distribution and global trade, providing a dynamic environment for future traffic growth, industrial expansion, and multimodal logistics integration. Project road also connects prominent tourism hub like Nageshwar Temple in Dwarka, Beyt in Dwarka, Somnath temple near Porbandar and beach side locations of Gujarat that leads to ~9% growth in passenger traffic on project stretch across all toll plaza. Project road provides key connectivity for Jamnagar airport and Rajkot (Hirasar) airport.

1.4 Historical traffic data

The chart below shows the average daily traffic on Rajkot-Jamnagar-Vadinar section of SH25 and NH151A from September 2010 to July 2025.

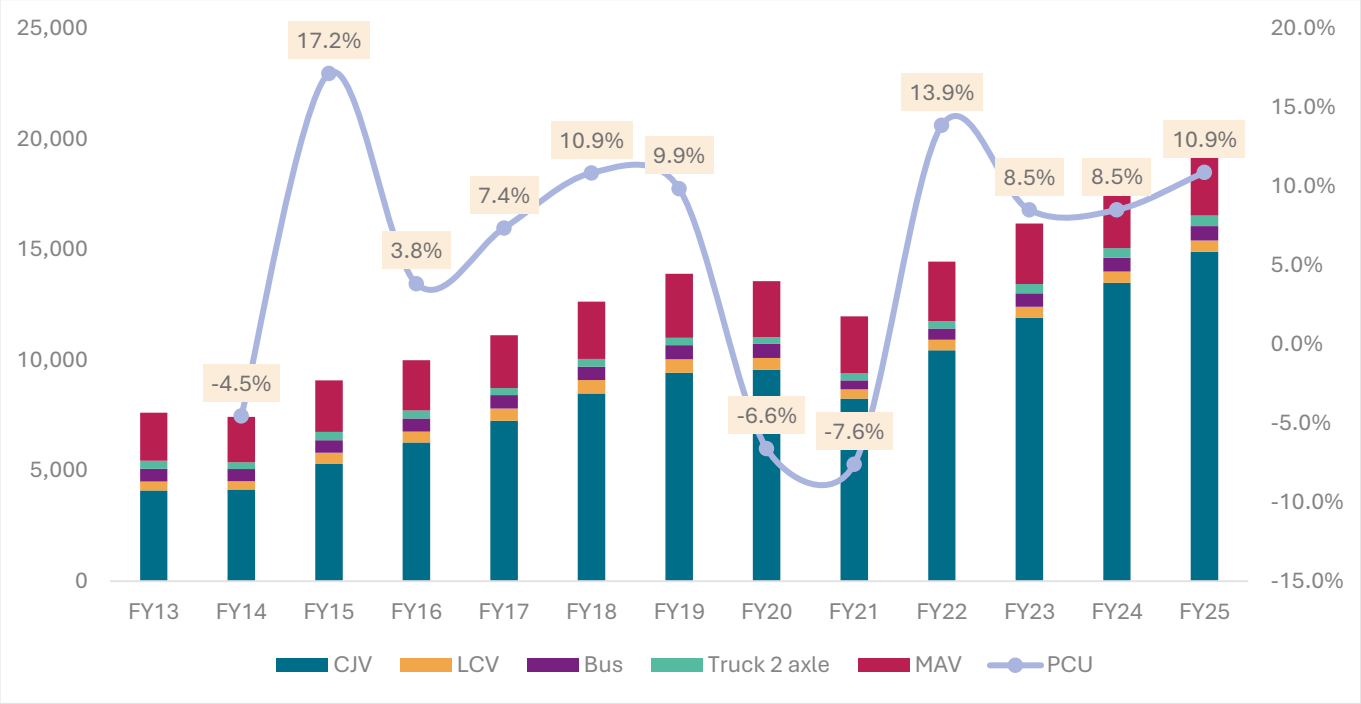
Figure 1-2: Historic Annual Average Daily Traffic (AADT) – TP1 Paddhari Toll Plaza



Source: Client Data, Crisil Intelligence

Note: MAV comprises MAV (vehicles with 3 axles up to 6 axles) and OSV (vehicles with more than 6 axles)

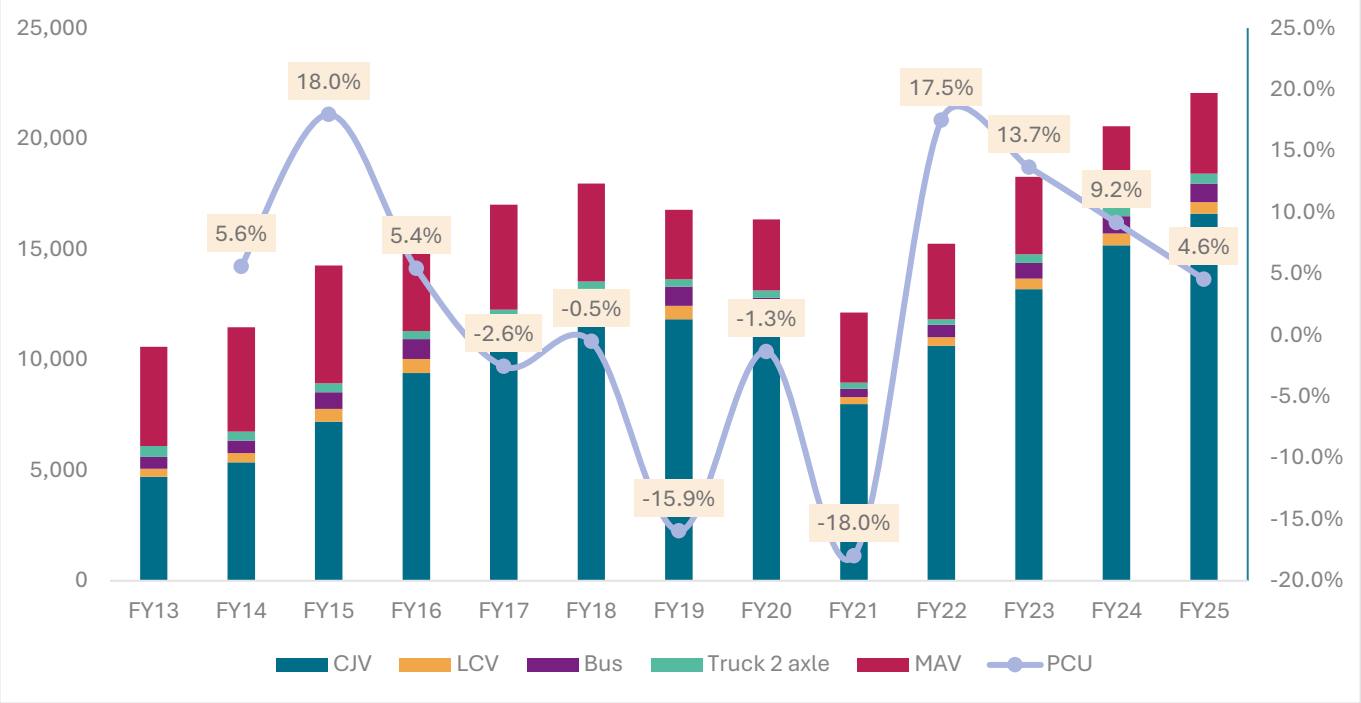
Figure 1-3: Historic Annual Average Daily Traffic (AADT) – TP2 Dhrol (Soyal) Toll Plaza



Source: Client Data, Crisil Intelligence

Note: MAV comprises MAV (vehicles with 3 axles up to 6 axles) and OSV (vehicles with more than 6 axles)

Figure 1-4: Historic Annual Average Daily Traffic (AADT) – TP3 Bed Toll Plaza



Source: Client Data, Crisil Intelligence

Note: MAV comprises MAV (vehicles with 3 axles up to 6 axles) and OSV (vehicles with more than 6 axles)

1.5 Base Traffic Estimates

For base traffic (annual average daily traffic) estimation of the present study, current fiscal 4-months (Apr-25 to July-25) of TMS traffic data were annualized using SCF factor of FY 25 traffic data (excluding the Bijparjoy cyclone impact in FY 24 & excluding impact of Cyclone Asna in FY 25) to arrive at the annual average daily traffic (AADT) for FY 26.

The AADT estimation for the base case for FY26 is presented table below

Table 1-1: Base Traffic Estimation for Paddhari TP: FY26 AADT

Particulars	CJV	LCV/MINIBUS	BUS	TRUCK 2 AXLE	TRUCK 3 AXLE	MAV+OSV	Total	PCU
ADT (4MFY26)	15,285	494	590	400	560	2,051	19,379	29,903
4-12 Month Factor (FY25)	1.052	1.043	1.030	1.082	1.057	1.057		
AADT FY26	**16,086**	**515**	**607**	**433**	**592**	**2,168**	**20,401**	**31,508**

**For August 2024 month data is considered till 26th august, rest of the days were affected by floods in Kutch region of Gujarat (Cyclone Asna)*
***June 2023 data is adjusted for the cyclone Bijparjoy Impact (Data till 23rd June).*
MAV comprises (vehicles with more than 3 axles up to 6 axles) and OSV (vehicles with more than 6 axles)

Source: Client TMS Data, Crisil Intelligence

Table 1-2: Base Traffic Estimation for Soyal (Dhrol) TP: FY26 AADT

Particulars	CJV	LCV/MINIBUS	BUS	TRUCK 2 AXLE	TRUCK 3 AXLE	MAV+OSV	Total	PCU
ADT (4MFY26)	15,643	544	652	477	692	2,919	20,927	35,058
4-12 Month Factor (FY25)	1.06	1.04	1.02	1.09	1.09	1.087		
AADT FY26	**16,542**	**567**	**669**	**519**	**753**	**3,175**	**22,224**	**37,499**

**For August 2024 month data is considered till 26th august, rest of the days were affected by floods in Kutch region of Gujarat (Cyclone Asna)*
***June 2023 data is adjusted for the cyclone Bijparjoy Impact (Data till 23rd June).*
MAV comprises (vehicles with more than 3 axles up to 6 axles) and OSV (vehicles with more than 6 axles)

Source: Client TMS Data, Crisil Intelligence

Table 1-3: Base Traffic Estimation for Bed TP: FY26 AADT

Particulars	CJV	LCV/MINIBUS	BUS	TRUCK 2 AXLE	TRUCK 3 AXLE	MAV+OSV	Total	PCU
ADT (4MFY26)	18,157	528	897	441	783	3,029	23,835	38,943
4-12 Month Factor (FY25)	1.06	1.02	1.08	1.05	1.01	1.01		
AADT FY26	**19,225**	**538**	**966**	**464**	**794**	**3,071**	**25,057**	**40,520**

**For August 2024 month data is considered till 26th august, rest of the days were affected by floods in Kutch region of Gujarat (Cyclone Asna)*
***June 2023 data is adjusted for the cyclone Bijparjoy Impact (Data till 23rd June).*
First 3 days of September-2024 were impacted at TP3 due to flood.
MAV comprises (vehicles with more than 3 axles up to 6 axles) and OSV (vehicles with more than 6 axles)

Source: Client TMS Data, Crisil Intelligence

1.6 Toll Segmentation

The table below presents a segmentation which is considered for the traffic based on the historic data (FY25).

Table 1-4: Toll segmentation: Paddhari

TP1	Single Journey	Return Journey	Monthly Pass	Exemptions & Violations	Total
Car/Jeep/Van	40.2%	41.0%	0.0%	18.9%	100.0%
Minibus	42.6%	55.3%	0.0%	2.1%	100.0%
2 Axle Bus	38.3%	61.2%	0.0%	0.5%	100.0%
LCV	42.6%	55.3%	0.0%	2.1%	100.0%
Truck	51.8%	45.4%	0.0%	2.8%	100.0%
3 Axle Truck	83.4%	15.6%	0.0%	1.0%	100.0%
MAV	83.4%	15.6%	0.0%	1.0%	100.0%
OSV	83.4%	15.6%	0.0%	1.0%	100.0%

Source: Crisil Intelligence

Table 1-5: Toll segmentation: Soyal

TP2	Single Journey	Return Journey	Monthly Pass	Exemptions & Violations	Total
Car/Jeep/Van	43.7%	43.3%	0.0%	13.0%	100.0%
Minibus	38.6%	59.4%	0.0%	2.0%	100.0%
2 Axle Bus	36.8%	62.6%	0.0%	0.6%	100.0%
3 Axle Bus	36.8%	62.6%	0.0%	0.6%	100.0%
LCV	38.6%	59.4%	0.0%	2.0%	100.0%
Truck	48.4%	47.7%	0.0%	3.9%	100.0%
3 Axle Truck	79.6%	19.5%	0.0%	0.8%	100.0%
MAV	79.6%	19.5%	0.0%	0.8%	100.0%
OSV	79.6%	19.5%	0.0%	0.8%	100.0%

Source: Crisil Intelligence

Table 1-6: Toll segmentation: Bed

TP3	Single Journey	Return Journey	Monthly Pass	Exemptions & Violations	Total
Car/Jeep/Van	20.4%	60.2%	2.4%	17.0%	100.0%
Minibus	22.5%	75.3%	0.0%	2.1%	100.0%
2 Axle Bus	14.0%	85.8%	0.0%	0.2%	100.0%
3 Axle Bus	14.0%	85.8%	0.0%	0.2%	100.0%
LCV	22.5%	75.3%	0.0%	2.1%	100.0%
Truck	29.7%	69.1%	0.0%	1.1%	100.0%
3 Axle Truck	60.4%	39.4%	0.0%	0.2%	100.0%
MAV	60.4%	39.4%	0.0%	0.2%	100.0%

TP3	Single Journey	Return Journey	Monthly Pass	Exemptions & Violations	Total
OSV	60.4%	39.4%	0.0%	0.2%	100.0%

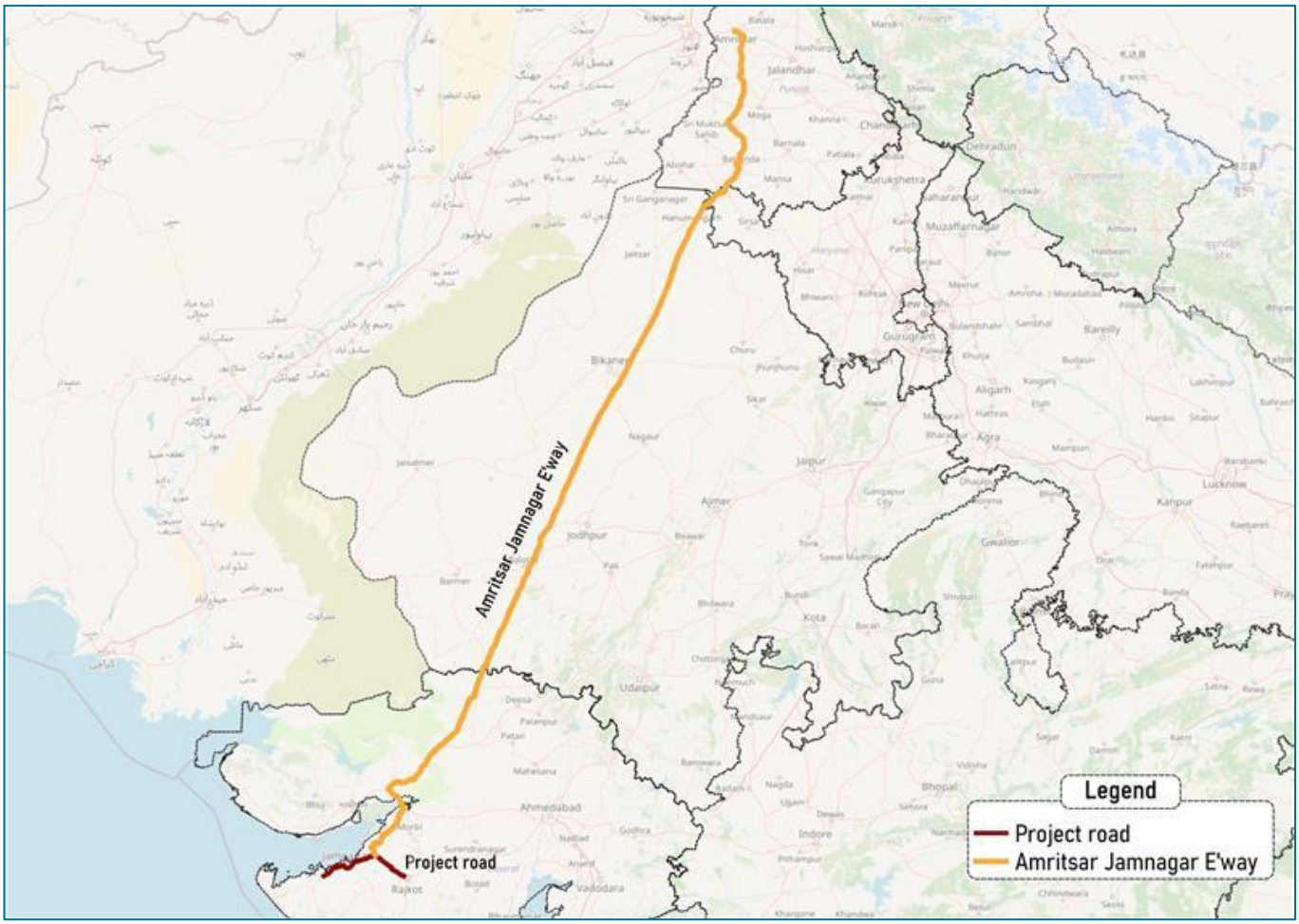
Source: Crisil Intelligence

1.7 Network Developments in the Region

In the case of the project road, Amritsar Jamnagar expressway is under construction, and it is likely to complete by December 2025. As the portion of Amritsar Jamnagar expressway that connects to project road is a brownfield section and is currently operational for traffic, Impact of the same has negligible likelihood

The alignment of the developments along with the project road is presented below figure.

Figure 1-5: Network Development around project road



Source: Open Street Map, Crisil Intelligence

1.8 Traffic Projections

The tables below provide the traffic growth rates for three project road's toll asset:

Table 1-7: Projected Traffic Growth Rates: Paddhari

Vehicle Type	2027	2028	2029	2030
Car/Jeep/Van	8.3%	7.8%	7.4%	7.1%

Vehicle Type	2027	2028	2029	2030
LCV/Minibus	0.8%	0.6%	0.5%	0.4%
2 Axle Bus	3.5%	3.4%	3.4%	3.3%
Truck	4.6%	4.4%	4.3%	4.1%
3 Axle Truck	1.2%	1.1%	0.9%	0.8%
MAV+OSV	5.1%	4.9%	4.8%	4.6%
Total Veh.	**7.3%**	**7.0%**	**6.7%**	**6.4%**
Total PCU	**6.3%**	**6.0%**	**5.8%**	**5.6%**
Revenue Growth	**11.4%**	**10.9%**	**10.3%**	**10.9%**

Source: Crisil Intelligence

Table 1-8: Projected Traffic Growth Rates: Soyal

Vehicle Type	2027	2028	2029	2030
Car/Jeep/Van	8.3%	7.8%	7.4%	7.1%
LCV/Minibus	2.2%	2.1%	2.0%	1.9%
2 Axle Bus	3.5%	3.4%	3.4%	3.3%
Truck	4.4%	4.3%	4.1%	4.0%
3 Axle Truck	3.0%	2.8%	2.7%	2.6%
MAV+OSV	5.1%	5.0%	4.8%	4.7%
Total Veh.	**7.2%**	**6.9%**	**6.6%**	**6.3%**
Total PCU	**6.2%**	**6.0%**	**5.7%**	**5.5%**
Revenue Growth	**13.5%**	**10.0%**	**12.2%**	**8.0%**

Source: Crisil Intelligence

Table 1-9: Projected Traffic Growth Rates: Bed

Vehicle Type	2027	2028	2029	2030
Car/Jeep/Van	8.3%	7.8%	7.4%	7.1%
LCV/Minibus	2.2%	2.1%	2.0%	1.9%
2 Axle Bus	3.5%	3.4%	3.4%	3.3%
Truck	4.0%	3.9%	3.7%	3.6%
3 Axle Truck	2.5%	2.4%	2.2%	2.1%
MAV+OSV	4.6%	4.5%	4.4%	4.2%
Total Veh.	**7.2%**	**6.9%**	**6.6%**	**6.3%**
Total PCU	**6.1%**	**5.9%**	**5.6%**	**5.4%**
Revenue Growth	**10.7%**	**9.9%**	**11.0%**	**10.0%**

Source: Crisil Intelligence

Table 1-10: Projected Traffic: Paddhari

Vehicle Type	2026	2027	2028	2029	2030	FY 26 - FY 30
Car/Jeep/Van	16,086	17,413	18,778	20,176	21,604	**7.7%**
LCV/Minibus	515	519	522	525	527	**0.6%**
2 Axle Bus	607	629	650	672	694	**3.4%**
Truck	433	453	473	493	513	**4.3%**
3 Axle Truck	592	598	605	611	615	**1.0%**
MAV+OSV	2,168	2,278	2,390	2,505	2,621	**4.9%**
Total Veh.	**20,401**	**21,890**	**23,418**	**24,982**	**26,574**	**6.8%**
Total PCU	**31,508**	**33,481**	**35,500**	**37,562**	**39,656**	**5.9%**
PCU Growth		**6.3%**	**6.0%**	**5.8%**	**5.6%**	

Source: Crisil Intelligence

Table 1-11: Projected Traffic: Soyal

Vehicle Type	2026	2027	2028	2029	2030	FY 26 - FY 30
Car/Jeep/Van	16,542	17,907	19,310	20,748	22,215	**7.7%**
LCV/Minibus	567	580	592	604	615	**2.1%**
2 Axle Bus	669	692	716	740	764	**3.4%**
Truck	519	542	565	588	612	**4.2%**
3 Axle Truck	753	775	797	819	840	**2.8%**
MAV+OSV	3,175	3,337	3,503	3,673	3,844	**4.9%**
Total Veh.	**22,224**	**23,833**	**25,483**	**27,171**	**28,890**	**6.8%**
Total PCU	**37,499**	**39,821**	**42,197**	**44,621**	**47,083**	**5.9%**
PCU Growth		**6.2%**	**6.0%**	**5.7%**	**5.5%**	

Source: Crisil Intelligence

Table 1-12: Projected Traffic: Bed

Vehicle Type	2026	2027	2028	2029	2030	FY 26 - FY 30
Car/Jeep/Van	19,225	20,811	22,442	24,113	25,819	**7.7%**
LCV/Minibus	538	550	561	572	583	**2.0%**
2 Axle Bus	966	999	1,034	1,068	1,104	**3.4%**
Truck	464	482	501	519	538	**3.8%**
3 Axle Truck	794	814	833	852	870	**2.3%**
MAV+OSV	3,071	3,213	3,357	3,504	3,652	**4.4%**
Total Veh.	**25,057**	**26,869**	**28,728**	**30,629**	**32,565**	**6.8%**
Total PCU	**40,520**	**42,978**	**45,493**	**48,057**	**50,662**	**5.7%**
PCU growth		**6.1%**	**5.9%**	**5.6%**	**5.4%**	

Source: Crisil Intelligence

1.9 Tollable Length and Toll Rates

Project road is a 131.650 kms long 4 lane divided highway in Saurashtra region under Gujarat State Road Development Authority (GSRDC). Tollable length of project road is divided between 6 sub-sections. Detailed list of each section of project road is mentioned below:

a. Rajkot to Dhrol (Ch. Km 3.000 to 50.000, 47.0 kms)

b. Dhrol to Falla (Ch. Km 50.000 to 63.000, 13.0 kms)

c. Falla to Jamnagar Bypass (Ch. Km. 63.000 to 78.600, 15.6 kms)

d. Jamnagar Bypass (Ch. Km. 78.600 to 97.800, 19.2 kms)

e. Jamnagar to Vadinar Junction (Ch. Km. 94.000 to 125.55, 31.55 kms (including Vasai bypass at Ch. Km. 104, length: 0.750 km))

f. Additional spur of Rajkot to Morbi bypass (Ch. Km. 0.000 to 5.300, 5.3 kms)

Government of Gujarat enacted the Gujarat Infrastructure Development Act, 1999 (Gujarat Act No. 11 of 1999) to provide a regulatory framework for the participation of the private sector in Financing, Construction, Maintenance and Operation of structure and other development projects undertaken on BOT basis in the State of Gujarat.

Actual amount of fee to be charged for the particular year at COD is computed as under: Capping rate of base fee escalated to 5% of inflation per year travel distance (in km) of journey. The aforesaid Fee is revised once in every year by escalating the toll rates at an inflation rate of 5% p.a. For estimation of corridor level toll rate, fee is rounded to nearest 5 Rupee. For revision of Annual toll fee, the base toll rate is the actual toll fee of preceding year, omitting the nearest rounding off to five Rupees.

Annual Revised Toll Rate: Base Toll Rate for given section in year 2007 (without rounding off “x” Kms. of the section for one-way journey “x”*(1+0.05)^n, "n" refers to the number of anniversaries from the January 1, 2007.

Toll rates at Toll Plaza of project stretch as applicable for current fiscal (FY26) is provided below:

Table 1-13: Toll Rates

FY2026	Car/Jeep/Van	Minibus/LCV	2 Axle Bus	3 Axle Bus	Truck	3Axle & MAV
TP1						
Single Journey	75	135	270	270	270	430
Return Journey	125	215	430	430	430	690
Monthly Pass	1,230	2,155	4,290	4,290	4,290	6,910
Local Commercial	385	675	1,340	1,340	1,340	2,160
TP2						
Single Journey	40	75	145	145	145	235
Return Journey	65	120	235	235	235	380
Monthly Pass	670	1,180	2,345	2,345	2,345	3,775
Local Commercial	210	370	735	735	735	1,180
TP3						
Single Journey	75	130	260	260	260	420
Return Journey	120	210	415	415	415	670
Monthly Pass	1,190	2,090	4,160	4,160	4,160	6,705
Local Commercial	375	655	1,300	1,300	1,300	2,095
Local pass (All 3)	345					

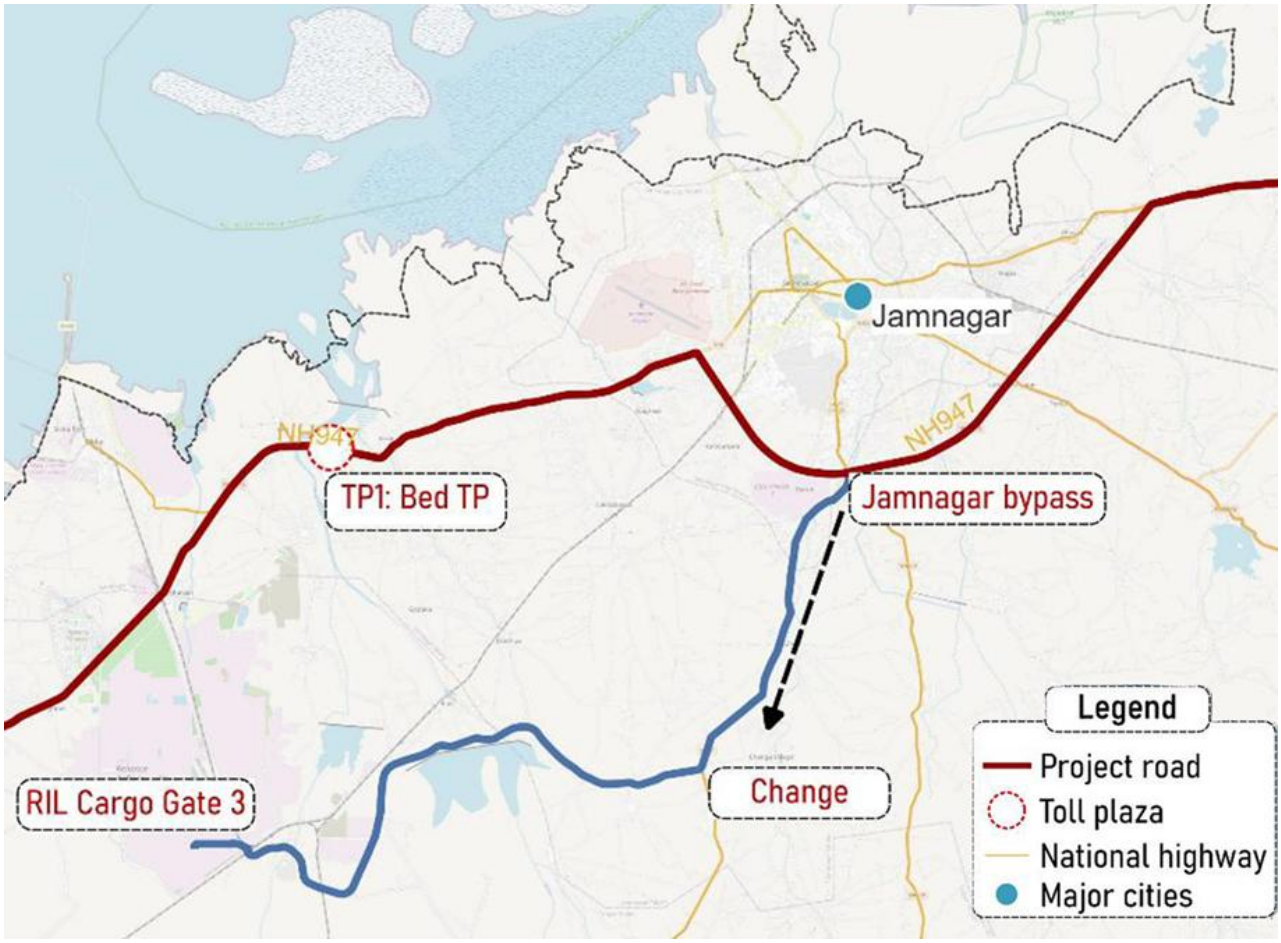
Source: Client’s data Crisil Intelligence

1.10 Revenue Projections

The revenue in ₹ million for the project road is projected to grow at a CAGR of about 10 percent (10%) for the forecast period from FY26 to FY30 and is presented in the below table. Revenue presented in table below is inclusive of GSRDC claim settlement of Car/Jeep/van category and government buses.

Pre-Covid, Reliance Jamnagar had access from Gates near Bed Toll Plaza (TP3) only. This causes long queue and wait time during peak hours. Both raw materials and refill trucks uses project road only to access Reliance complex. During November 2015, Reliance had opened new gate on Eastern side of the complex for vehicles carrying raw materials and other necessary goods. Traffic plying on project road diverts from Jamnagar bypass to Lalpur Junction toward Changa and finally Gate no. 3 of Reliance complex. This has led to drop in commercial vehicle traffic from TP3. Usually, front gate is used for Petroleum refill trucks and other passenger movements. Loss of traffic on TP3 is compensated by GSRDC.

Figure 1-6: Alignment of Lalpur-Changa-Reliance Cargo Gate 3 road



Source: Open Street Map, Crisil Intelligence

In addition to the revenue collection at project toll plaza, additional revenue reimbursement from the authority is also claimed for TP3 on account of loss of revenue due to commercial vehicle's movement shift from project road to Lalpur-Changa-Vantara Road post opening of new gate of Reliance Industries, Jamnagar. Estimates for the same is provided below.

Table 1-14: Projected Revenue in ₹ million

Year	2026	2027	2028	2029	2030	CAGR 26-30
TP1	854.1	951.3	1,055.3	1,163.7	1,290.5	**10.9%**
TP2	580.2	658.5	724.1	812.6	877.9	**10.9%**
TP3	1,043.0	1,154.6	1,269.1	1,408.6	1,550.0	**10.4%**
All TP	2,477.3	2,764.4	3,048.5	3,384.9	3,718.4	**10.7%**
TP3 – Reliance Road Claim	148.3	161.8	176.5	192.8	210.4	
Grand Total	2,625.6	2,926.2	3,225.0	3,577.7	3,928.8	**10.6%**

Source: Crisil Intelligence

2 Overview of project stretch

2.1. Project stretch

The Rajkot-Jamnagar-Vadinar project is a 131.65 km long, 4-lane road stretch located on national highways SH25 and NH151A in Gujarat, connecting Jamnagar and Dwarka. This project provides vital connectivity to the industrial clusters in Jamnagar and Dwarka, linking them to the rest of India. The road features three toll plazas: Padhhari (TP1) at km 29.440, Soyal (Dhrol) (TP2) at km 58.325, and Bed (TP3) at km 110.427, spanning from Rajkot to Vadinar via Dhrol. Most of the traffic on this road originates from or is destined for the industrial areas in Jamnagar and Dwarka, which are home to major companies such as Reliance Industries, Nayara Refineries, and Tata Chemicals, as well as several MSMEs and non-major ports. This project also connects key tourist destinations like Nageshwar Temple, Beyt, and Somnath Temple, as well as beachside locations in Gujarat. The project road provides seamless connectivity to important industrial towns like Rajkot, Jamnagar, and Dwarka, linking them to the hinterlands in Gujarat and beyond, including Rajasthan, Haryana, Punjab, Maharashtra, Tamil Nadu and Karnataka. On September 17, 2008, the GRSDC and Concessionaire signed the concession agreement for augmenting of the existing road from km 3.00 to km 125.55, including existing Jamnagar Bypass and Rajkot spur road (approximately 131.65 km) on the Rajkot-Jamnagar-Vadinar road, state highway no. 25 to make it a 4 lane divided carriageway facility under the Viability Gap Funding Scheme of the Government of India on a build, operate and transfer basis, for a concession period of 20 years with the appointed date being September 12, 2009.

Tollable length of project road is divided between 6 sub-sections. Detailed list of each section of project road is mentioned below:

a. Rajkot to Dhrol (Ch. Km 3.000 to 50.000, 47.0 kms)

b. Dhrol to Falla (Ch. Km 50.000 to 63.000, 13.0 kms)

c. Falla to Jamnagar Bypass (Ch. Km. 63.000 to 78.600, 15.6 kms)

d. Jamnagar Bypass (Ch. Km. 78.600 to 97.800, 19.2 kms)

e. Jamnagar to Vadinar Junction (Ch. Km. 94.000 to 125.55, 31.55 kms (including Vasai bypass at Ch. Km. 104, length: 0.750 km))

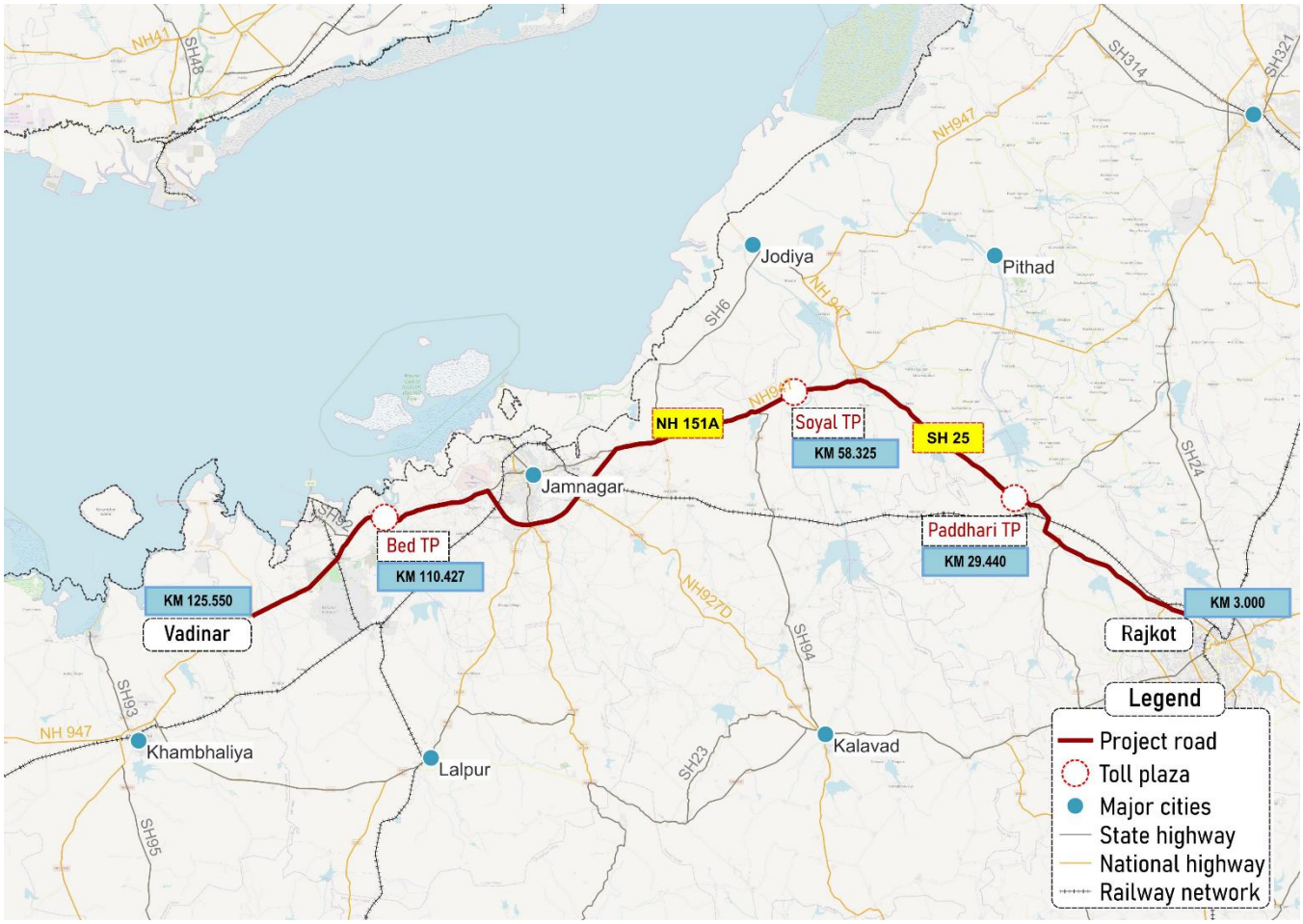
f. Additional spur of Rajkot to Morbi bypass (Ch. Km. 0.000 to 5.300, 5.3 kms)

Table 2-1: Details of the road stretch

Project Section	Toll Plaza Location (Kms)	Toll plaza Name	Length (km)
Rajkot-Dhrol	29.440	Paddhari	52.300
Dhrol Start to Jamnagar Bypass	58.325	Soyal (Dhrol)	28.600
Jamnagar Bypass to Vadinar Approach	110.427	Bed	50.750

Source: Crisil Intelligence

Figure 2-1: Project stretch alignment



Source: Open Street Map, Crisil Intelligence

Table 2-2: Key details of project stretch

Project Stretch	Rajkot-Jamnagar-Vadinar Road section of SH-25 from Km 3.0 to Km 125.55 in Gujarat state
Concessionaire	Rajkot-Vadinar Tollway Limited
Authority	Gujarat State Road Development Corporation (GSRDC)
Concession period	20 years
No. of lanes	4-lane configuration
Project type	Build - Operate - Transfer
Length of Project Stretch	131.65 km
No. of Toll Plazas	3
Toll Plaza 01	Paddhari - Chainage Km 29/440
Toll Plaza 02	Soyal (Dhrol) - Chainage Km 58/325
Toll Plaza 03	Bed - Chainage Km 110/427
CA Signed	17-Sep-08
Appointed Date	Sep-09
PCOD Issuance	Jan-12
Concession period	20 Years
Extension	162 Days
Concession End	Feb/20/2030 (FY30)

Source: Concession Agreement, Fee Notification, Crisil Intelligence

2.2. Scope

The scope of the traffic assessment for the project road is divided into following four sections.

1. Detailed Assessment of the project road
   Include review of the Historic TMS Data, past traffic growth, detailed network assessment.
2. Primary Data collection & Analysis
   Conducting preliminary traffic surveys like TVC and Origin-Destination (O-D) to understand the traffic patterns, commodity profiles.
3. Network Impact Assessment
   To Analyse the upcoming network developments which may impact the project road traffic
4. Traffic and Revenue Projections
   Traffic & Revenue projections considering relevant growth drivers and network developments

Approach & Methodology is detailed out in Traffic Growth Estimation & Traffic forecast chapter.

2.3. Network Profile

The Rajkot-Jamnagar-Vadinar corridor, is a critical multi-modal road network. This corridor predominantly follows State Highway 25 (SH-25) from Rajkot, progressing westward through Paddhari and Dhrol, and merging into the Rajkot-Jamnagar section of National Highway 151A closer to Jamnagar city, thereafter, providing spurs via State and Port Connectivity Roads to Bedi and further to the Vadinar port and refinery zone. Rajkot, the eastern anchor, is a major urban node and industrial centre known for its foundry, engineering, machine tools, auto component manufacturing, and plastic goods industries. The city's road network integrates directly with NH-27 for long-distance east-west movement and with SH-25 for access to regional towns and the west coast. Crucially, Rajkot is also supported by the Hirasar Greenfield International Airport, located near the highway, which boosts passenger and logistics connectivity for business and manufacturing sectors.

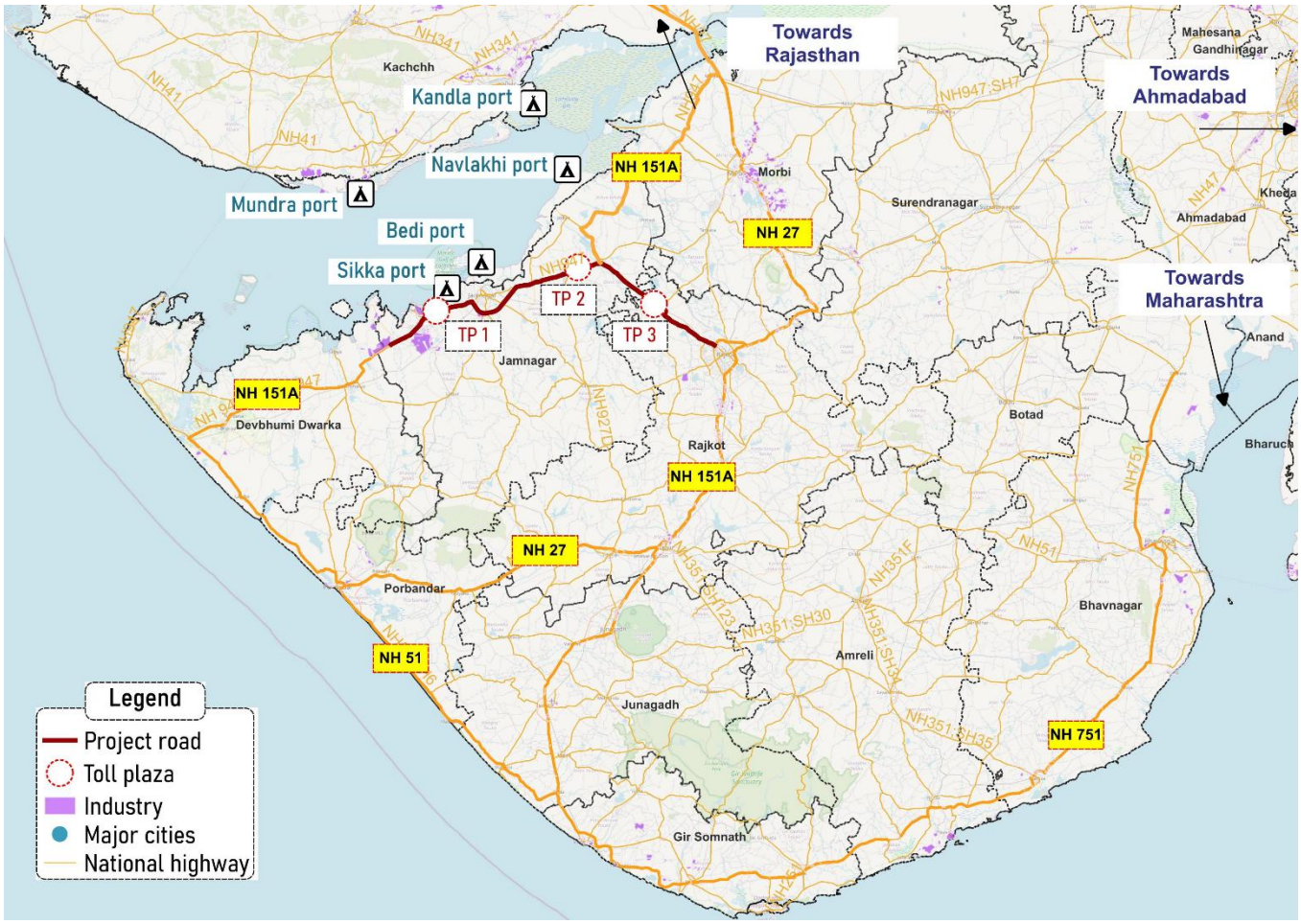
Traveling west, the road corridor passes through significant agro-industrial zones in Paddhari and Dhrol talukas, where road links branch off to rural hubs and agricultural mandis. These sub-centres serve extensive cotton, groundnut, oilseeds, and ginning industries and act as critical feeder routes bringing produce towards the main highway for further movement to export and processing centres. At Dhrol and adjacent industrial clusters, connections to GIDC estates and rail terminals support movement not only of agro-products but also of manufactured goods, brass components—given the proximity to Jamnagar's world-famous brass-parts industry—and leather and food processing units.

The corridor then approaches Jamnagar, a pivotal traffic attractor for both population and freight which connects Morbi (ceramic hub) and other interior Saurashtra towns via project stretch. Within the urban area, key logistics infrastructure includes HAPA, transport companies, and proximity to Jamnagar Airport, supporting both passenger and cargo movement. Jamnagar's petrochemical and engineering hub like Reliance Industries' and Nayara Energy's (formerly Essar) massive refinery complexes in the Special Economic Zone (SEZ) at Vadinar and Sikka.

The corridor is also notable for its residential and worker-population nodes along Rajkot, Jamnagar, and smaller towns like Dhrol and Paddhari. These towns, project road and secondary Road networks, experience daily and weekly movement of staff buses, and service vehicles serving both industry and agriculture.

Tourism, an emerging factor, is catered to by project road to coastal attractions such as Narara Marine National Park, Pirotan Island, Sikka beach, Beyt region, Dwarka coastal tourism locations and the Khijadiya Bird Sanctuary, etc. with designated access points for buses, taxis, and private vehicles.

Figure 2-2: Regional Connectivity



Source: Open Street Map, Crisil Intelligence

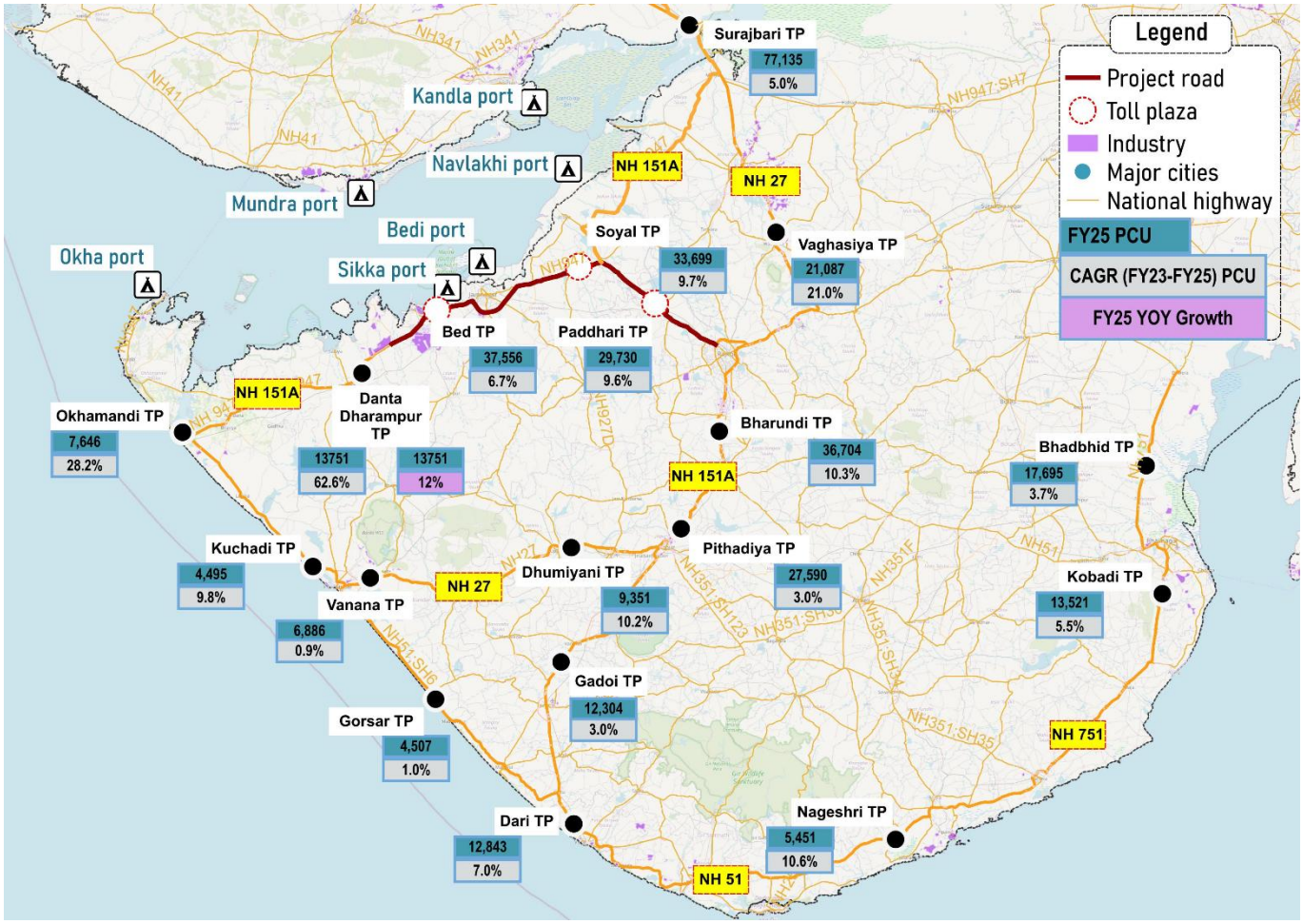
Neighbourhood project roads/assets have shown good traffic growth in the recent years

Indian Highways Management Company Limited (IHMCL) publishes toll plazas traffic data for the plazas on national highways and data is analysed for neighboring plazas to understand traffic growth patterns in the region, nearby plazas have shown good traffic growth in recent years. FY 25 traffic PCU and CAGR PCU growth for FY23-FY25 is presented in the below figure.

TP 1 and TP 2 of Project corridor has showcased ~10% growth in FY2023-2025, while TP 3 clocked ~7%. Toll plaza in catchment area have shown notable positive overall growth. To assess the key reasons behind the positivity of catchment area, Crisil has assessed the vehicle category wise breakup for each neighbouring plaza for FY2023 and FY2025. Passenger vehicle traffic including CJV category and buses category have clocked an average of ~18% CAGR across toll plaza of the catchment area barring Danta Dharmpur toll plaza, and Bus/Truck category have achieved an average of ~10% CAGR across toll plaza nearby to project stretch barring Danta Dharmpur toll plaza. Passenger vehicles are key growth drivers for the catchment area of project stretch.

Higher passenger movement is attributable to significant tourism traffic surge in catchment area along with growing economic activity linked growing traffic. Both Gujarat' Tourism and Gujarat's Economy has outpaced India's statistics in past years. Detailed assessment of tourism and economy will be discussed in subsequent sections of this report.

Figure 2-3: Neighbourhood plazas traffic & growth



Source: Open Street Map, Crisil Intelligence, IHMCL Data

Industrial clusters near project road cater to Petroleum, Plastic, Chemicals, Agro products, FMCG, Iron & Steel etc.

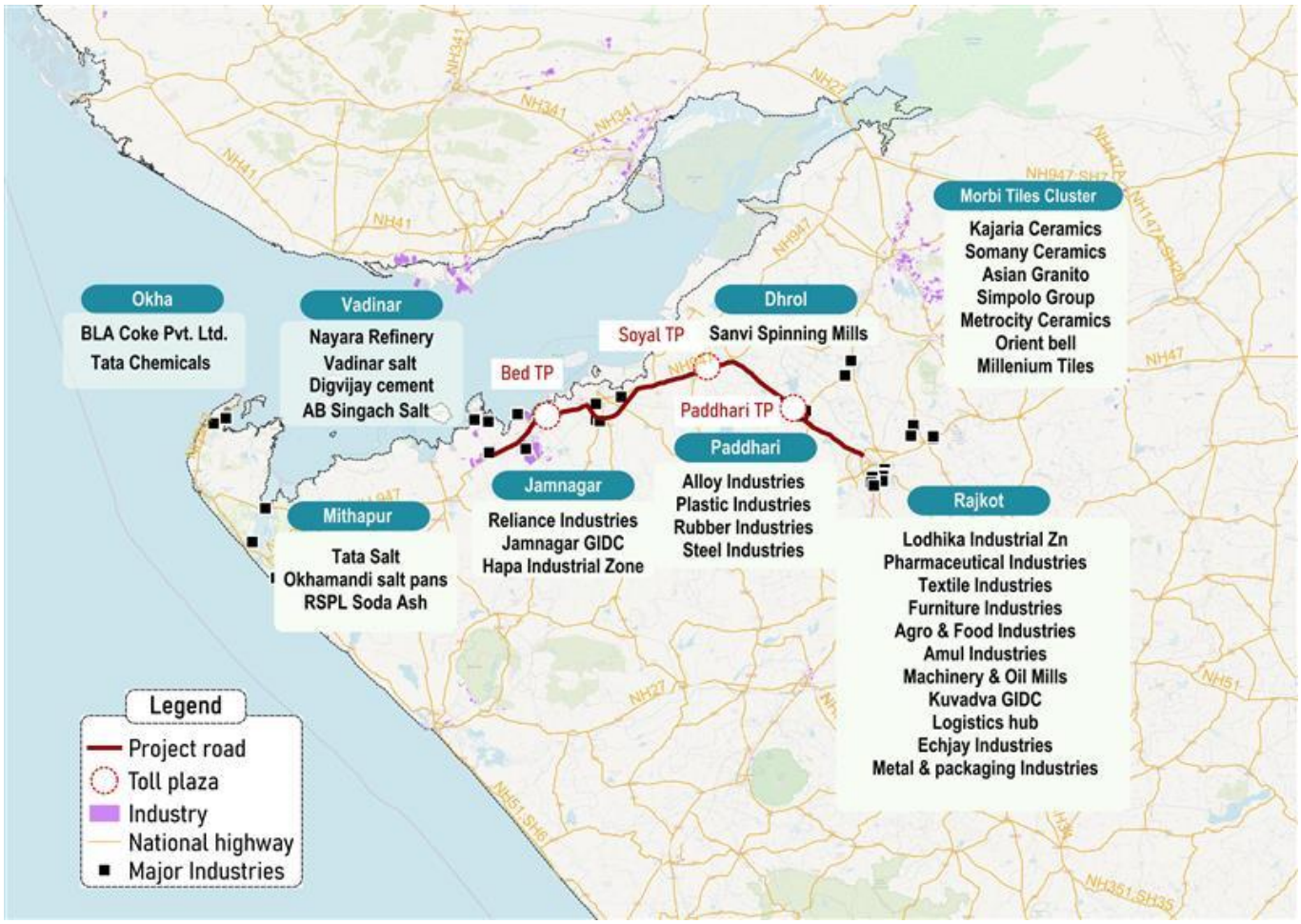
The Rajkot-Jamnagar-Vadinar project road serves as a critical industrial corridor connecting major manufacturing clusters, petrochemical complexes, and port facilities across Saurashtra. Rajkot located on eastern side housing industrial estates with over 5,000 industries specializing in engineering, foundry, machine tools, diesel engines, bearings, auto components, and plastic goods manufacturing. Major companies include Mahindra CIE Automotive, CNC Automation, and numerous foundries producing castings for automotive and agricultural sectors.

Jamnagar district has India's largest refinery complex featuring Reliance Industries which is also the world's largest single-location refinery—producing gasoline, diesel, jet fuel, petrochemicals, and polypropylene primarily for export to the US and Europe. Adjacent Nayara Energy's (formerly Essar Oil) Vadinar Refinery processes crude oil into refined products and chemicals.

The project corridor terminates near Vadinar. Gujarat State Fertilizers & Chemicals (GSFC) operates major facilities at Sikka, producing fertilizers, chemicals, and industrial gases with dedicated port jetties. The corridor also serves Morbi's ceramic industry cluster located 67 km north of Rajkot, producing 90% of India's ceramic tiles through 800+ manufacturing units generating Rs 50,000 crore annual turnover and substantial export volumes to global markets.

Few key industries of the catchment area are shown in the map below.

Figure 2-4: Industries & industrial clusters along project road



Source: Open Street Map, Crisil Intelligence

2.4. Overview of Key Influence Area

The project road entirely falls in the state of Gujarat. A brief description of key influencing district around the project section is presented below.

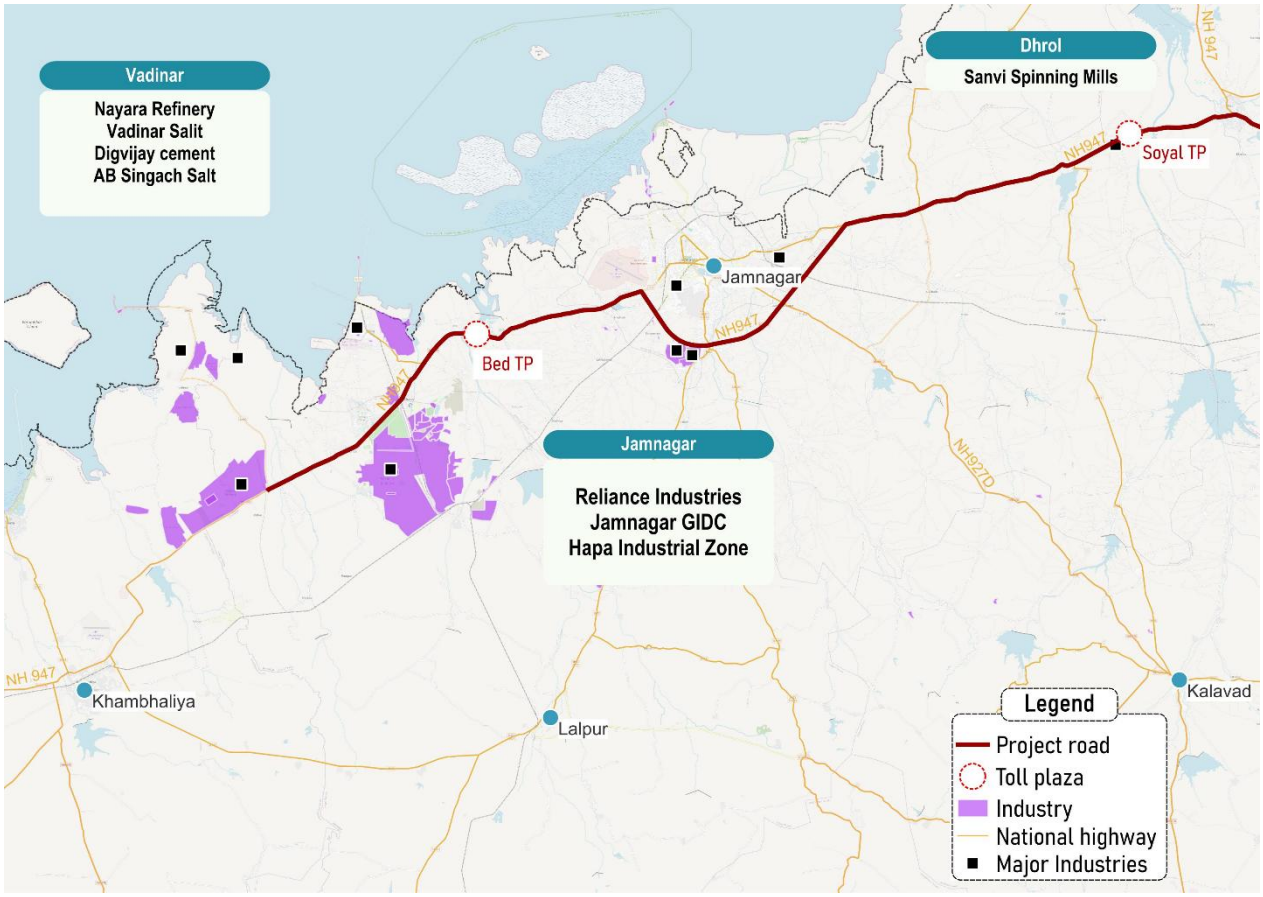
2.4.1 Jamnagar District Profile

Jamnagar district covers nearly 14,000 sq. km in northwestern Saurashtra with over 300 km Arabian Sea coastline. The district population reaches ~21 lakhs. Jamnagar is very well connected with Road, Rail, Air and Water transportation. The mineral resources include bauxite, limestone, and various minor minerals supporting regional industries. Jamnagar has world-class industrial infrastructure with over 2,500 registered industrial units including large-scale enterprises. The district anchors India's petroleum refining sector through Reliance Industries' 68.2 MMTPA facility (world's largest single-location refinery) and major chemical complexes including Gujarat State Fertilizers & Chemicals, Tata Chemicals, and Century Chemical Ltd. The renowned brass industry cluster encompasses over 3,000 units producing precision components, foundry products, and engineering goods, generating substantial employment.

Jamnagar ranks as India's premier export district, dominated by petroleum products, organic chemicals, plastics, and engineering goods, contributing significantly to national foreign exchange earnings. The district operates

comprehensive port infrastructure through Bedi port complex, GSFC jetties, and specialized petroleum product terminals facilitating crude imports and refined product exports globally. Agriculture supports nearly ~10 lakh hectares with crops including groundnuts, cotton, wheat, and cash crops. Major exportable commodities include refined petroleum products, petrochemicals, brass components, Jamnagari Bandhani textiles, salt, marine products, and agricultural commodities.

Figure 2-5: Industrial areas in Jamnagar district



Source: Open Street Map, Crisil Intelligence

2.4.2 Rajkot District Profile

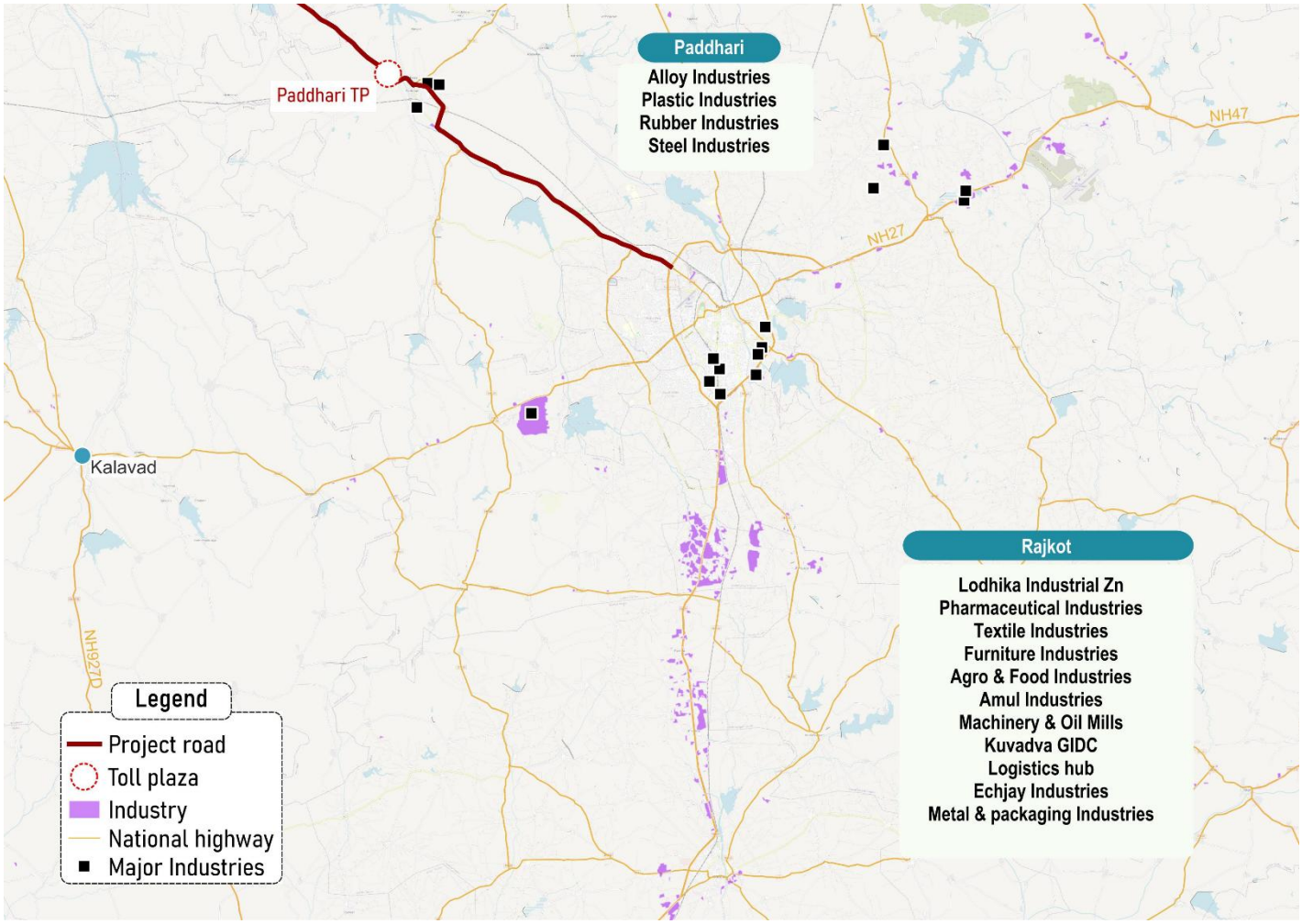
Rajkot district is situated on eastern end of the project corridor. It spans ~11,000 sq. km in central Saurashtra. Rajkot has a population of 38.04 lakh (2011 census). Rajkot has ~58% urban population, making it Gujarat's most urbanized region. Rajkot is very well connected with Road, Rail and Air transportation.

Rajkot serves as Saurashtra's industrial capital with over 22,000 registered MSME units. The district dominates India's foundry sector with over 700 grey iron foundry units producing ~1,500 tonnes daily. Major industrial clusters include Aji GIDC, Bhaktinagar, and Lodhika, specializing in engineering goods, diesel engines, machine tools, bearings, auto components, and plastic products. The district has renowned companies like Mahindra CIE Automotive, Atul Auto, and Jyoti CNC Automation, with over 19,000 micro enterprises, over 3,000 small enterprises, and over 150 medium enterprises contributing significantly to Gujarat's engineering output.

Agriculture covers over 500,000 hectares net sown area with major crops including groundnuts, cotton, bajri, and sesame, making Rajkot Gujarat's largest cotton producer and second-largest oilseed producer. Mineral resources

include fireclay, limestone, and silica sand, supporting ceramic and construction industries. Export commodities encompass engineering goods, auto components, bearings, foundry products, agricultural products, and processed foods. The district's strategic location with multi-modal connectivity to major ports (Kandla 206km, Mundra 251km) and robust banking network with commercial banks, cooperative institutions, and development finance support establishes Rajkot as Saurashtra's premier industrial and logistics hub.

Figure 2-6: Industrial areas in Rajkot district



Source: Open Street Map, Crisil Intelligence

2.4.3 Dev Bhumi Dwarka District Profile

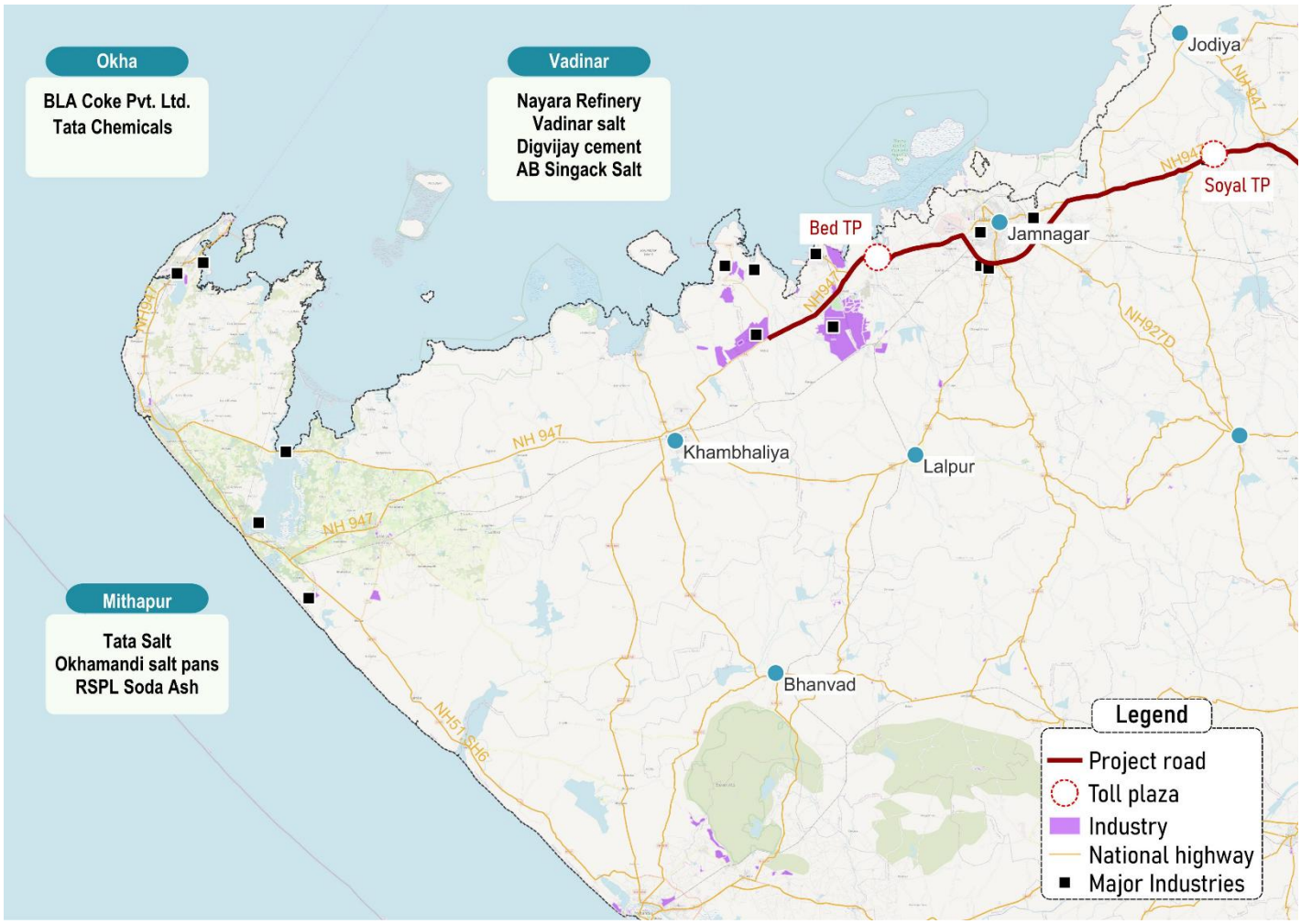
Dev Bhumi Dwarka district, carved from Jamnagar in 2013, spans 4,051 sq km. It has Arabian Sea coastline and tidal creek systems. Dwarka experiences semi-arid climate with exceptional average rainfall of 898mm annually, significantly higher than surrounding regions, supporting diverse agricultural activities. With population of 752,484 (2011 census), Dwarka comprises 4 talukas - Khambhalia, Kalyanpur, Bhanvad, and Okhamandal.and sacred city of Dwarka. Transportation infrastructure includes road, rail and waterways connectivity.

Project road provides direct connectivity to Devbhumi Dwarka. As per Commissioner of Tourism, Gujarat, Devbhumi Dwarka attracted ~20.6 lakhs tourists' footfall during April 2025. Dwarka Temple attracted ~9.5 lakh tourist during during April 2025 and stands at 4th ranking in religious tourism hub in Gujarat. Nearly ~83.54 lakh visitors were welcomed by Dwarka in the fiscal year 2023-24. Major tourism spots are the sacred Dwarkadhish Temple, the ancient Nageshwar Jyotirlinga, the scenic Bhadkeshwar Mahadev Temple, and the popular Shivrajpur

Blue Flag Beach. Other notable places are the Rukmini Devi Mandir, Gomti Ghat, Dwarka Beach, and the Sudama Setu suspension bridge and Dwarka Lighthouse.

Dev Bhumi Dwarka has agricultural economy with over 200,000 hectares (~58% of geographical area) under cultivation. Groundnut is major crop produced, followed by cotton, wheat, cumin, garlic, and horticultural crops including mango, coconut, and date palm. The district has more than 350 registered MSME units. Industrial infrastructure includes 5 GIDC estates at Jamkhambhalia, Arambhada-I & II, Bhatia, and Bhanvad, supporting manufacturing activities including soda ash production, oil processing, salt production, and marine-based industries. Mineral resources encompass bauxite, limestone, moulding sand, and clay.

Figure 2-7: Industrial areas in Dev Bhumi Dwarka district



Source: Open Street Map, Crisil Intelligence

3 Primary Data Collection & Analysis

3.1. General

Primary traffic surveys, i.e. Traffic volume count and Origin Destination surveys were collected on the project road to understand the traffic and travel pattern of vehicles plying on the project road.

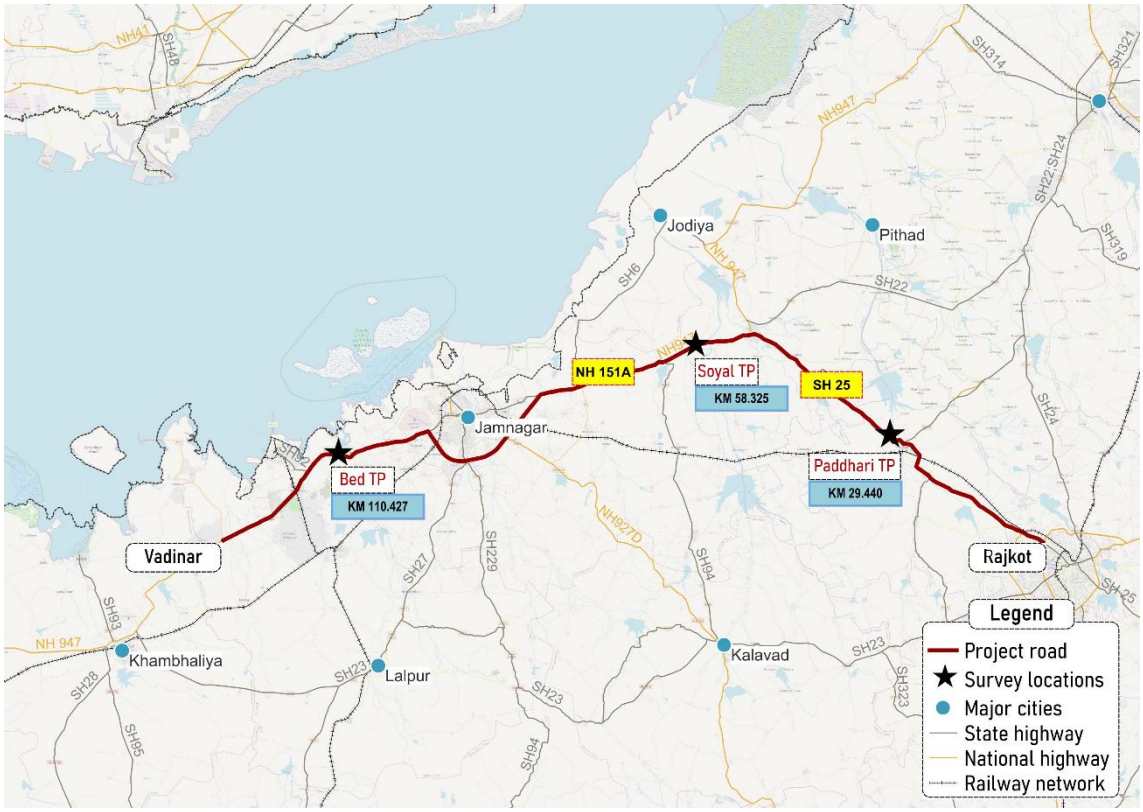
For the present study, seven days video-based traffic volume count and two days (48-Hours) origin destination survey conducted at the toll plaza location on the project road. The schedule of the traffic surveys carried out as part of the study on the project road are presented in the below table and figure.

Table 3-1: Type of Survey & Schedule

Location	Type of Survey	Survey Duration	Survey Date
Paddhari Toll Plaza	Traffic Volume Count (TVC) Survey	7 Days	26th May 2025 to 1st June 2025
	Origin-Destination (O-D) Survey	2 Days	26th May 2025 to 28th May 2025
Soyal (Dhrol) Toll Plaza	Traffic Volume Count (TVC) Survey	7 Days	26th May 2025 to 1st June 2025
	Origin-Destination (O-D) Survey	2 Days	26th May 2025 to 28th May 2025
Bed Toll Plaza	Traffic Volume Count (TVC) Survey	7 Days	26th May 2025 to 1st June 2025
	Origin-Destination (O-D) Survey	2 Days	29th May 2025 to 30th May 2025

Source: Crisil Intelligence

Figure 3-1: Survey Locations



Source: Open Street Map, Crisil Intelligence

3.2. Traffic Characteristics

The seven days traffic volume count was analysed to get existing traffic intensity, daily variations, and traffic composition.

The vehicle classification and there PCU values as suggested in IRC: 64-1990 are presented in below table.

Table 3-2: PCU Factors-IRC:64-1990

Mode	PCU
Car/Jeep	1.0
Two-Wheeler	0.5
Three-Wheeler	1.0
Minibus/School Bus	1.5
Bus (Govt/Pvt)	3.0
Mini LCV	1.0
LCV	1.5
2-Axle	3.0
3-Axle	3.0
MAV (4-6 Axles)	4.5
HME/OSV	4.5
Agricultural Tractor	1.5
Agricultural Tractor with Trailer	4.5
Cycle	0.5
Cycle Rickshaw	2.0
Animal Drawn Crat	6.0

Source: IRC:64-1990

The average daily tollable traffic volume at the toll plaza locations were analysed. The summary of ADT in terms of vehicles and PCUs is presented in table below.

Table 3-3: Average Daily Traffic (ADT) for the Paddhari TP

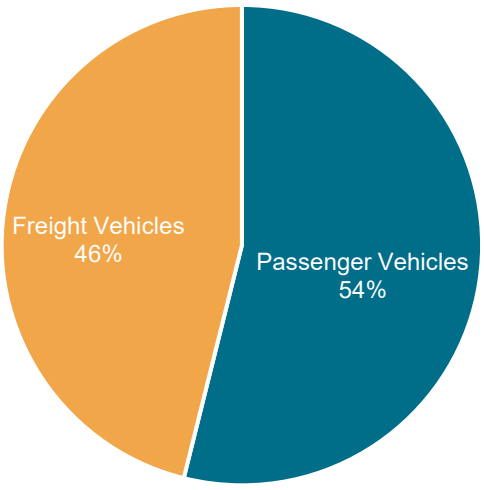
TP1	Rajkot To Dhrol	Dhrol To Rajkot	Both Direction	Traffic % Share	PCU % Share
Car	7,903	7,044	14,947	70.4%	46.5%
Minibus	72	53	125	0.6%	0.6%
Bus	384	342	726	3.4%	6.8%
Mini LCV	993	930	1,923	9.1%	6.0%
LCV	273	273	547	2.6%	2.6%
Truck-2 Axle	124	123	247	1.2%	2.3%
Truck-3Axle	313	268	581	2.7%	5.4%
MAV	1,083	1,039	2,122	10.0%	29.7%
OSV	3	4	8	0.0%	0.1%
WADT	11,149	10,077	21,226	100.0%	-
PCU	16,764	15,359	32,123	-	100.0%

Source: Crisil Intelligence

Paddhari TP clocks 32,123 PCU on an average daily basis. CJV and Mini LCV category together contributes to nearly 79% among total traffic plying at project stretch. However, in PCU terms the contribution of CJV is 52%. MAV is the 2nd largest category that contributes to the traffic at project stretch. MAV has 10% and 30% share contribution in total traffic and total PCU respectively. Higher share of CJV signifies heavy passenger traffic on Paddhari TP.

Share of Passenger and freight vehicle is shown below.

Figure 3-2: PCU share: Paddhari



Source: Survey Data, Crisil Intelligence

Table 3-4: Average Daily Traffic (ADT) for the Soyal (Dhrol) TP

TP2	Rajkot To Dhrol	Dhrol To Rajkot	Both Direction	Traffic % Share	PCU % Share
Car	7,422	7,923	15,345	67.4%	41.5%
Minibus	65	97	163	0.7%	0.7%

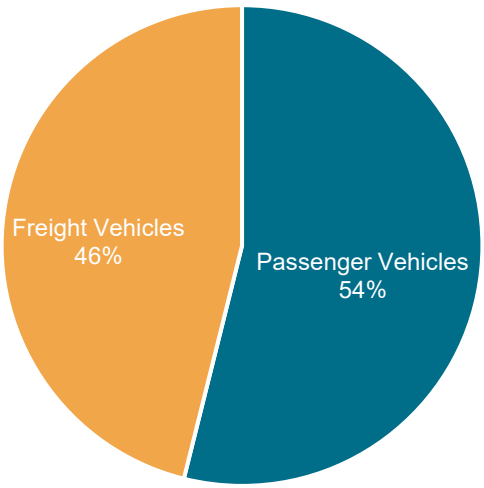
TP2	Rajkot To Dhrol	Dhrol To Rajkot	Both Direction	Traffic % Share	PCU % Share
Bus	407	448	855	3.8%	6.9%
Mini LCV	949	963	1,912	8.4%	5.2%
LCV	298	323	621	2.7%	2.5%
Truck-2 Axle	116	128	244	1.1%	2.0%
Truck-3Axle	345	348	693	3.0%	5.6%
MAV	1,410	1,510	2,920	12.8%	35.6%
OSV	0	1	2	0.0%	0.0%
WADT	11,013	11,741	22,754	100.0%	-
PCU	17,869	19,086	36,954	-	100.0%

Source: Crisil Intelligence

The total ADT for both directions is 22,754 vehicles, with cars being the most prevalent (15,345 or 67.4% of total traffic). In terms of PCU, the total is 36,954, with cars contributing 41.5% and MAVs contributing 35.6%. The data indicates that CJV and MAV categories together account for nearly 79% of total traffic. At Soyal TP also, Cars dominate the traffic with a significant share in both total traffic and PCU.

Share of Passenger and freight vehicle is shown below.

Figure 3-3: PCU share: Soyal (Dhrol)



Source: Survey Data, Crisil Intelligence

Table 3-5: Average Daily Traffic (ADT) for the Bed TP

TP3	Rajkot To Dhrol	Dhrol To Rajkot	Both Direction	Traffic % Share	PCU % Share
Car	8,982	8,383	17,365	68.7%	42.5%
Minibus	142	130	273	1.1%	1.0%
Bus	543	499	1,042	4.1%	7.6%
Mini LCV	1,035	1,007	2,042	8.1%	5.0%
LCV	162	157	319	1.3%	1.2%
Truck-2 Axle	134	135	269	1.1%	2.0%
Truck-3Axle	411	404	816	3.2%	6.0%
MAV	1,582	1,563	3,145	12.4%	34.6%
OSV	7	3	10	0.0%	0.1%

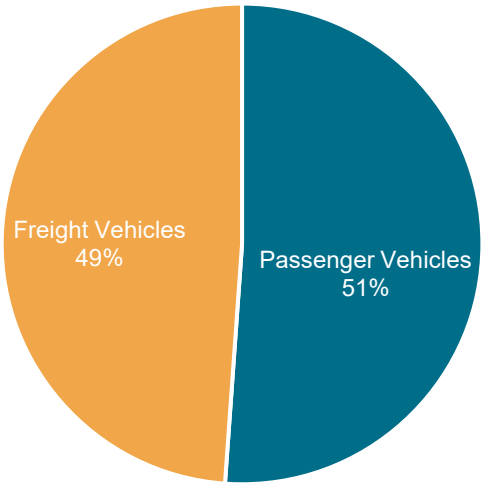
TP3	Rajkot To Dhrol	Dhrol To Rajkot	Both Direction	Traffic % Share	PCU % Share
WADT	12,998	12,282	25,280	100.0%	-
PCU	20,888	19,987	40,874	-	100.0%

Source: Crisil Intelligence

Cars account for the largest share of traffic, with an average daily traffic of 17,365 vehicles, representing 68.7% of the total traffic. MAVs are the second most common type of vehicle, with an average daily traffic of 3,145 vehicles, representing 12.4% of the total traffic. The total average daily traffic at the Bed toll plaza is 25,280 vehicles. The PCU share is also provided, with cars accounting for 42.5% of the total PCU, followed by MAVs at 34.6%. The data suggests that the Bed toll plaza is a significant transportation hub, with a high volume of traffic. The dominance of cars and MAVs in the traffic mix indicates that the toll plaza is likely to be used by a mix of personal and commercial vehicles.

Share of Passenger and freight vehicle is shown below.

Figure 3-4: PCU share: Bed



Source: Survey Data, Crisil Intelligence

Paddhari Toll Plaza TVC: The daily traffic volume at Paddhari Plaza based on the TVC survey for the seven-day period from Monday, May 26, 2025, to Sunday, June 1, 2025, shows that:

- Passenger vehicles constitute 79.5% of the tollable traffic and Goods vehicles (LCVs, Trucks, 3A vehicles, and OSVs) constitute 20.5% of the tollable traffic in vehicle terms.
- Cars are having the highest share with around 79.5%, followed by MAVs with 10% share.
- Average Daily traffic is about 21,226 and 32,123 in traffic vehicles and PCU terms respectively.

TVC survey data for the seven-day period is presented in the below table.

Table 3-6: Daily traffic volume at Paddhari Plaza based on TVC survey

TVC	Car	LCV	Bus	Truck	3A	MAV	OSV	Total	PCU	LCV+Truck
Monday, May 26, 2025	17,081	697	662	213	546	1,924	3	21,126	31,061	910

TVC	Car	LCV	Bus	Truck	3A	MAV	OSV	Total	PCU	LCV+Truck
Tuesday, May 27, 2025	15,628	744	704	205	625	2,205	10	20,121	31,314	949
Wednesday, May 28, 2025	15,704	655	742	210	623	2,178	8	20,120	31,249	865
Thursday, May 29, 2025	15,920	599	646	310	541	2,181	8	20,205	31,160	909
Friday, May 30, 2025	16,344	786	739	255	657	2,341	15	21,137	33,078	1,041
Saturday, May 31, 2025	17,215	612	750	310	706	2,208	3	21,804	33,381	922
Sunday, June 1, 2025	20,200	611	837	228	370	1,816	6	24,068	33,621	839
WADT	16,870	672	726	247	581	2,122	8	21,226	32,123	919
%Share-Nos	79.5%	3.2%	3.4%	1.2%	2.7%	10.0%	0.0%	100.0%	-	4.3%
%Share-PCU	52.5%	3.1%	6.8%	2.3%	5.4%	29.7%	0.1%	-	100.0%	5.4%

Source: Survey Data, Crisil Intelligence

Soyal (Dhrol) Toll Plaza TVC: The daily traffic volume at Soyal (Dhrol) Plaza from May 26 to June 1, 2025, shows a total vehicle count ranging from 21,366 (Tuesday, May 27) to 25,837 (Sunday, June 1).

- Passenger vehicles constitute 75.8% of the tollable traffic and Goods vehicles (LCVs, Trucks, etc.) constitute 24.2% of the tollable traffic in vehicle terms.
- Cars are having the highest share with around 75.8%, followed by MAVs with 12.8% share.
- Average Daily traffic is about 22,754 and 36,954 in traffic vehicles and PCU terms respectively.

TVC survey data for the seven-day period is presented in the below table.

Table 3-7: Daily traffic volume at Soyal (Dhrol) Plaza based on TVC survey

TVC	Car	LCV	Bus	Truck	3A	MAV	OSV	Total	PCU	LCV+Truck
Monday, May 26, 2025	17,599	729	711	211	621	2,710	0	22,581	35,517	940
Tuesday, May 27, 2025	15,699	822	928	235	691	2,989	2	21,366	35,954	1,057
Wednesday, May 28, 2025	15,948	764	833	284	744	2,997	0	21,570	36,164	1,048
Thursday, May 29, 2025	16,236	819	801	251	756	2,979	1	21,843	36,299	1,070
Friday, May 30, 2025	16,729	775	869	264	786	3,106	0	22,529	37,626	1,039
Saturday, May 31, 2025	17,561	818	957	272	796	3,145	2	23,551	39,025	1,090
Sunday, June 1, 2025	21,024	762	885	193	454	2,513	6	25,837	38,099	955
WADT	17,257	784	855	244	693	2,920	2	22,754	36,954	1,028
%Share-Nos	75.8%	3.4%	3.8%	1.1%	3.0%	12.8%	0.0%	100.0%	-	4.5%
%Share-PCU	46.7%	3.2%	6.9%	2.0%	5.6%	35.6%	0.0%	-	100.0%	5.2%

Source: Survey Data, Crisil Intelligence

Bed Toll Plaza TVC: The Bed toll plaza recorded an average daily traffic of 25,280 vehicles with a Passenger Car Unit (PCU) of 40,692. Here are the 3 key takeaways from the TVC survey analysis for Bed toll plaza:

- Passenger vehicles constitute 68.7% of the tollable traffic and Goods vehicles (MAVs, LCVs, Trucks, etc.) constitute 31.3% of the tollable traffic in vehicle terms.
- Cars are having the highest share with around 68.7%, followed by MAVs with 12.4% share.

- Average Daily traffic is about 25,280 and 40,692 in traffic vehicles and PCU terms respectively.

TVC survey data for the seven-day period is presented in the below table.

Table 3-8: Daily traffic volume at Bed Plaza based on TVC survey

TVC	Car	LCV	Bus	Truck	3A	MAV	OSV	Total	PCU	LCV+Truck
Monday, May 26, 2025	19,510	545	1,080	255	726	3,238	7	25,361	41,113	800
Tuesday, May 27, 2025	18,762	606	1,085	272	857	3,075	9	24,666	40,191	878
Wednesday, May 28, 2025	18,661	602	1,145	260	885	3,137	14	24,704	40,614	862
Thursday, May 29, 2025	18,713	602	1,094	265	851	3,163	4	24,692	40,498	867
Friday, May 30, 2025	19,361	617	1,091	287	963	3,391	11	25,721	42,619	904
Saturday, May 31, 2025	20,389	640	1,024	379	1,013	3,501	22	26,968	44,451	1,019
Sunday, June 1, 2025	20,449	529	775	165	414	2,513	5	24,850	36,636	694
WADT	19,406	592	1,042	269	816	3,145	10	25,280	40,874	861
%Share-Nos	76.8%	2.3%	4.1%	1.1%	3.2%	12.4%	0.0%	100.0%	-	3.4%
%Share-PCU	47.5%	2.2%	7.6%	2.0%	6.0%	34.6%	0.1%	-	100.0%	4.1%

Source: Survey Data, Crisil Intelligence

3.3. TVC vs. TMS data

Toll Management system (TMS) data was provided for survey days, and comparison is made with TVC (survey data). Overall variations of traffic are observed to be about 0.1%, -0.2 and -0.4% for TP1, TP2 and TP3 respectively and which is within tolerable limits. Table below shows the plaza wise daily variation trend comparison.

Table 3-9: TVC vs TMS Comparison

Daily Traffic (Total Nos.)	TP1				TP2				TP3		
	TVC	TMS	TVC vs TMS		TVC	TMS	TVC vs TMS		TVC	TMS	TVC vs TMS
26-May-25	21,126	21,147	-0.1%		22,581	22,556	0.1%		25,361	25,430	-0.3%
27-May-25	20,121	20,146	-0.1%		21,366	21,480	-0.5%		24,666	24,784	-0.5%
28-May-25	20,120	20,105	0.1%		21,570	21,628	-0.3%		24,704	24,773	-0.3%
29-May-25	20,205	20,269	-0.3%		21,843	21,878	-0.2%		24,692	24,893	-0.8%
30-May-25	21,137	21,246	-0.5%		22,529	22,575	-0.2%		25,721	25,889	-0.6%
31-May-25	21,804	21,769	0.2%		23,551	23,538	0.1%		26,968	27,088	-0.4%
01-Jun-25	24,068	23,830	1.0%		25,837	25,878	-0.2%		24,850	24,889	-0.2%
WADT	21,226	21,216	0.1%		22,754	22,790	-0.2%		25,280	25,392	-0.4%

Source: TMS Data, TVC Data, Crisil Intelligence

3.4. Origin-Destination (OD) and Commodity Analysis

3.4.1 Overview

Origin-Destination survey was carried out at Paddhari, Soyal and Bed toll plaza for 2 Days (48-hours), by roadside interview method as described in IRC: 102-1988. A random sampling approach was employed to interview both

passenger and freight vehicles traversing the project road at the toll plaza locations. The survey aimed to gather information on various aspects, including origin, destination, frequency of trips, purpose of travel and for freight vehicles, the type of commodity being transported.

The regional distribution of tollable vehicles at the toll plaza locations has been estimated based on OD matrices is presented in below table and figure.

The project influencing states will provide an overview of the factors likely to influence the pattern of economic development and hence the flows and volumes of traffic on the project road.

3.4.2 Regional Influence

The regional distribution of tollable vehicles at the toll plaza locations has been estimated based on OD. The project influencing states will provide an overview of the factors likely to influence, the pattern of economic development and hence the flows and volumes of traffic on the project road.

Regional Influence: Passenger Traffic

Across TP1, TP2, and TP3, Gujarat consistently has the highest influence (98.0%, 98.7%, 99.0%). Other regions like Maharashtra, South India, Rajasthan, Delhi NCR and Madhya Pradesh are also included in the list of contributors.

- Project road provides connectivity to Rajkot, Jamnagar and Devbhumi Dwarka districts of Gujarat, which are located at western side of peninsular border of India.
- Devbhumi Dwarka is one of the top tourism destinations of Gujarat and hence attracts heavy intrastate tourism footfall.
- Project corridor is also a heavy industrial connectivity corridor. Hence, workforce of all industrial as well as residential zones along project catchment is using project road itself.

Regional Influence for passenger traffic is given in the below table.

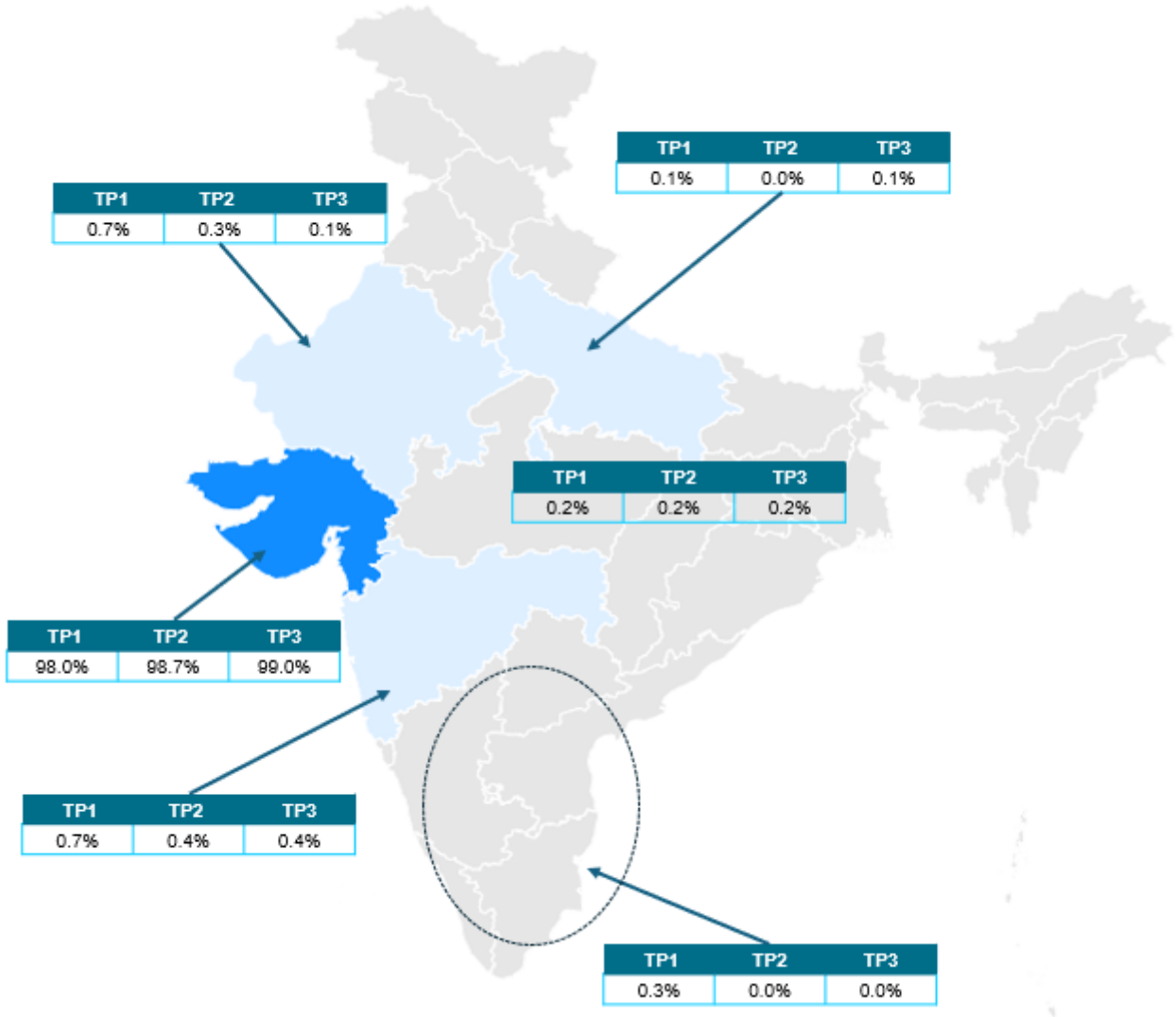
Table 3-10: Regional Influence in % for passenger traffic

State/Region	% Influence		State/Region	% Influence		State/Region	% Influence
TP1			TP2			TP3	
Gujarat	98.0%		Gujarat	98.7%		Gujarat	99.0%
Rajasthan	0.7%		Maharashtra	0.4%		Maharashtra	0.4%
Maharashtra	0.7%		Rajasthan	0.3%		Rajasthan	0.1%
South India	0.3%		Madhya Pradesh	0.2%		Uttar Pradesh	0.1%
Uttar Pradesh	0.1%		Delhi (NCR)	0.1%		Madhya Pradesh	0.1%
Rest of India	0.2%		Rest of India	0.2%		Rest of India	0.2%

Source: Survey data, Crisil Intelligence

Image below represents the Regional Influence for passenger movements.

Figure 3-5: Regional Influence map for Passenger Vehicle



Source: Survey data, Crisil Intelligence

Regional Influence: Freight Traffic

- In TP1, Gujarat has 91.5% influence on goods traffic, followed by Maharashtra (3.1%), Rajasthan (1.3%), Delhi (NCR) (1.3%), South India (1.0%), and Rest of India (1.7%).
- For TP2, Gujarat's influence is 92.1%, with other regions contributing: Maharashtra (2.6%), Rajasthan (1.7%), South India (1.0%), Delhi (NCR) (0.9%), and Rest of India (1.7%).
- In TP3, Gujarat dominates with 96.1% influence, and other regions have lesser influence: Maharashtra (1.4%), Rajasthan (1.1%), Madhya Pradesh (0.4%), South India (0.3%), and Rest of India (0.8%).

- Across TP1, TP2, and TP3, Gujarat consistently has the highest influence on goods traffic which is attributable to ~18% of petroleum traffic movement from Jamnagar and Vadinar refineries along with traffic movement induced by heavy industrial activities on project corridor.

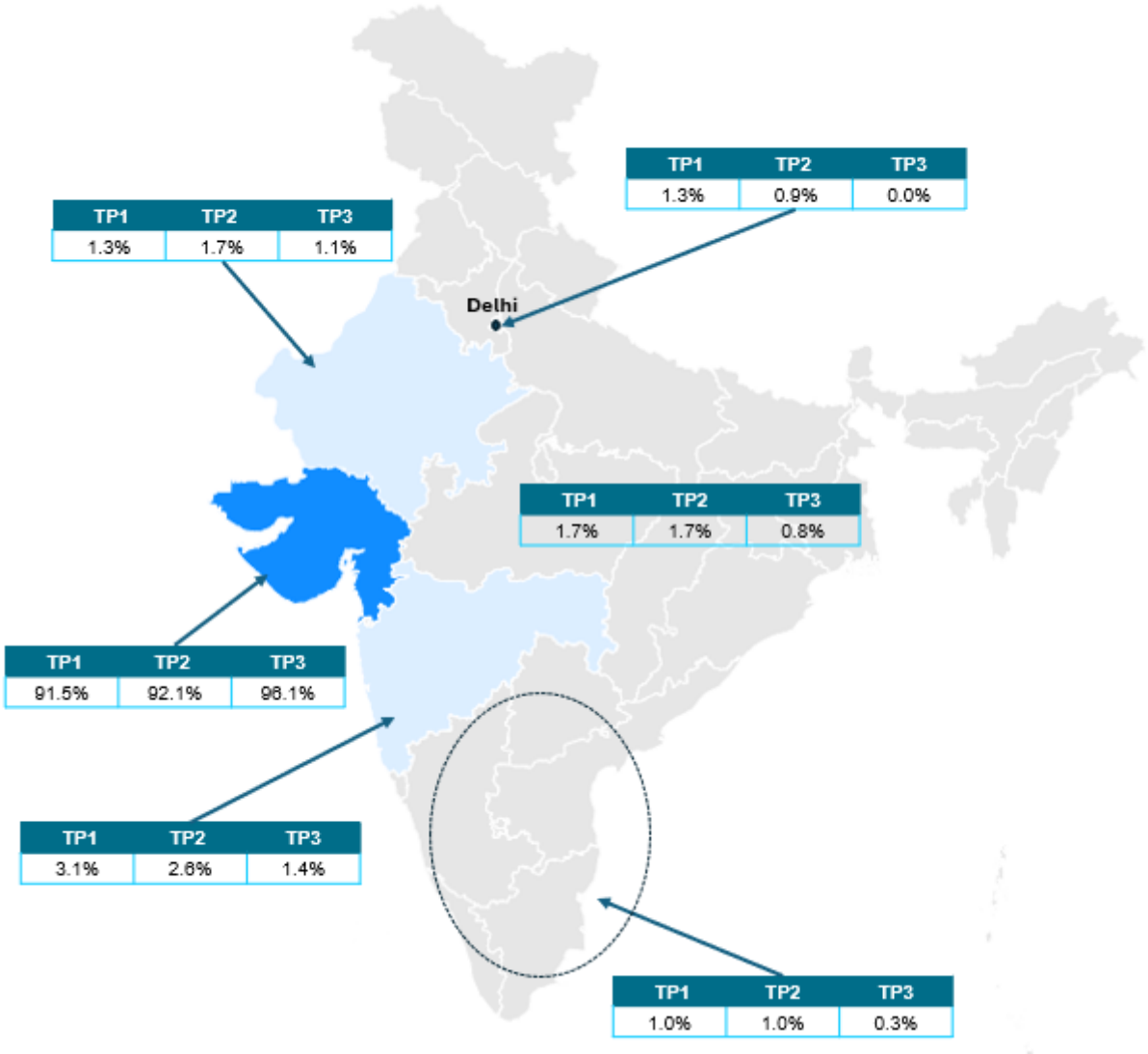
Table 3-11: Regional Influence in % for goods traffic

State/Region	% Influence		State/Region	% Influence		State/Region	% Influence
TP1			TP2			TP3	
Gujarat	91.5%		Gujarat	92.1%		Gujarat	96.1%
Maharashtra	3.1%		Maharashtra	2.6%		Maharashtra	1.4%
Rajasthan	1.3%		Rajasthan	1.7%		Rajasthan	1.1%
Delhi (NCR)	1.3%		South India	1.0%		Madhya Pradesh	0.4%
South India	1.0%		Delhi (NCR)	0.9%		South India	0.3%
Rest of India	1.7%		Rest of India	1.7%		Rest of India	0.8%

Source: Survey data, Crisil Intelligence

Image below represents the Regional Influence for freight movements.

Figure 3-6: Regional Influence map for Goods Vehicle



Source: Survey data, Crisil Intelligence

3.4.3 Zonal Influence

Zonal influence: Passenger Traffic

The zonal influence on passenger traffic is presented in Table below. Rajkot is the dominant influencer in TP1, accounting for 35.6% of passenger traffic, followed closely by Jamnagar at 27.5%. Jamnagar takes the lead in TP2 with a 24.5% influence, narrowly edging out Rajkot at 22.1%. For TP3, Jamnagar again tops the list with a significant 31.2% influence. Rest of India category also plays a substantial role, particularly in TP2, where it accounts for 24.5% of passenger traffic, indicating a broader geographic distribution of travel patterns.

- Rajkot and Jamnagar are the primary drivers of passenger traffic in the region, with each city dominating different toll plazas (TP1, TP2, and TP3).
- Additionally, significant influence from outside of the local area, with the "Rest of India" category in passenger traffic, particularly in TP2 is attributable to region's transportation network is connectivity to broader geographic area, with people traveling from outside the local area contributing to the traffic volume.

Table 3-12: Zonal influence in % for Passenger traffic

State/Region	% Influence		State/Region	% Influence		State/Region	% Influence
TP1			TP2			TP3	
Rajkot	35.6%		Jamnagar	24.5%		Jamnagar	31.2%
Jamnagar	27.5%		Rajkot	22.1%		Reliance	19.3%
Dwarka	9.2%		Dwarka	13.5%		Dwarka	13.1%
Dhrol	8.7%		Dhrol	9.4%		Rajkot	7.6%
Ahmedabad	4.5%		Reliance	5.9%		Khambhalia	7.4%
Rest of India	14.5%		Rest of India	24.5%		Rest of India	21.4%

Source: Survey data, Crisil Intelligence

Zonal influence: Goods Traffic

The zonal influence on goods traffic is presented in Table below. For goods traffic, Jamnagar has a significant influence in TP1 (24.2%), TP2 (19.3%), and TP3 (21.1%). Rajkot is also prominent in TP1 (23.3%) and TP2 has Reliance at 17.3% and Rajkot at 17.1%. Rest of India has a substantial influence ranging from 29.5% in TP1 to 35.2% in TP2.

- Higher local share is attributable to abundance of economic activities happening within project catchment.
- Jamnagar and Vadinar refineries and Industrial cluster of Rajkot is driving higher zonal influence.

Table 3-13: Zonal influence in % for Goods traffic

State/Region	% Influence		State/Region	% Influence		State/Region	% Influence
TP1			TP2			TP3	
Jamnagar	24.2%		Jamnagar	19.3%		Jamnagar	21.1%
Rajkot	23.3%		Reliance	17.3%		Reliance	18.3%
Reliance	11.8%		Rajkot	17.1%		Rajkot	9.6%
Dhrol	5.9%		Morbi	6.4%		Dwarka	9.4%
Ahmedabad	5.4%		Ahmedabad	4.8%		Nayara	8.3%
Rest of India	29.5%		Rest of India	35.2%		Rest of India	33.3%

Source: Survey data, Crisil Intelligence

3.4.4 Top OD Pairs

Passenger Vehicle

Rajkot to Jamnagar accounts for 42.8% of passenger traffic, making it the largest passenger flow in the corridor. Other notable OD pairs at TP1 include Rajkot to Dhrol (12.3%), Rajkot to Dwarka (10.1%), and Ahmedabad to Jamnagar (8.2%), which collectively account for over 70% of passenger traffic. A similar trend is observed at TP2, where Rajkot to Jamnagar leads with 21.7%, followed by Rajkot to Dwarka (13.0%) and Dhrol to Jamnagar (9.8%). At TP3, the major route is Jamnagar to Reliance (28.6%), followed by Jamnagar to Khambhalia (10.7%) and Jamnagar to Dwarka (9.4%), with these three pairs accounting for nearly half of all passenger movements.

Table 3-14: Top OD pairs for Passenger Vehicle

TP1			TP2			TP3	
OD Pairs	% Share		OD Pairs	% Share		OD Pairs	% Share
Rajkot To Jamnagar	42.8%		Rajkot To Jamnagar	21.7%		Jamnagar To Reliance	28.6%
Rajkot To Dhrol	12.3%		Rajkot To Dwarka	13.0%		Jamnagar To Khambhalia	10.7%
Rajkot To Dwarka	10.1%		Dhrol To Jamnagar	9.8%		Jamnagar To Dwarka	9.4%
Ahmedabad To Jamnagar	3.8%		Rajkot To Reliance	5.5%		Jamnagar To Sikka	9.1%
Ahmedabad To Dwarka	3.4%		Morbi To Jamnagar	4.9%		Rajkot To Dwarka	7.0%
Rajkot To Reliance	2.4%		Morbi To Dwarka	3.5%		Rajkot To Reliance	4.3%
Paddhari To Jamnagar	1.8%		Ahmedabad To Jamnagar	3.2%		Ahmedabad To Dwarka	3.3%
Paddhari To Dhrol	1.7%		Dhrol To Dwarka	2.8%		Jamnagar To Nayara	2.2%
Surat To Dwarka	1.4%		Ahmedabad To Dwarka	2.7%		Rajkot To Khambhalia	1.9%
Surat To Jamnagar	1.3%		Dhrol To Reliance	2.4%		Jamnagar To Vadinar	1.3%

Source: Survey data, Crisil Intelligence

Goods Vehicle

The top Origin-Destination (OD) pairs for Goods Vehicles reveal key freight routes in the corridor. At TP1, Rajkot to Jamnagar emerges as the leading pair, accounting for 24.7% of goods vehicle traffic. Other significant OD pairs at TP1 include Rajkot to Reliance (10.1%), Ahmedabad to Jamnagar (5.7%), Rajkot to Dhrol (5.5%), and Paddhari to Dhrol (5.0%). A similar pattern is observed at TP2, where Rajkot to Jamnagar captures 14.2% of goods vehicle traffic, followed by Rajkot to Reliance (10.3%) and Morbi to Reliance (5.3%). At TP3, Jamnagar to Reliance leads with 16.5%, followed by Jamnagar to Sikka (8.4%) and Jamnagar to Dwarka (6.2%). These OD pairs highlight the importance of industrial destinations, such as Reliance, Sikka, and Nayara, as well as traditional hubs like Rajkot and Jamnagar, in shaping goods movement in the region.

List of top OD pairs for project stretch is presented in tables below.

Table 3-15: Top OD pairs for Goods Vehicle

TP1			TP2			TP3	
OD Pairs	% Share		OD Pairs	% Share		OD Pairs	% Share
Rajkot To Jamnagar	24.7%		Rajkot To Jamnagar	14.2%		Jamnagar To Reliance	16.5%
Rajkot To Reliance	10.1%		Rajkot To Reliance	10.3%		Jamnagar To Sikka	8.4%
Ahmedabad To Jamnagar	5.7%		Morbi To Reliance	5.3%		Jamnagar To Dwarka	6.2%
Rajkot To Dhrol	5.5%		Morbi To Jamnagar	4.1%		Jamnagar To Nayara	5.9%
Paddhari To Dhrol	4.3%		Ahmedabad To Jamnagar	3.9%		Rajkot To Reliance	5.4%
Rajkot To Nayara	3.4%		Surat To Reliance	3.8%		Rajkot To Dwarka	4.9%

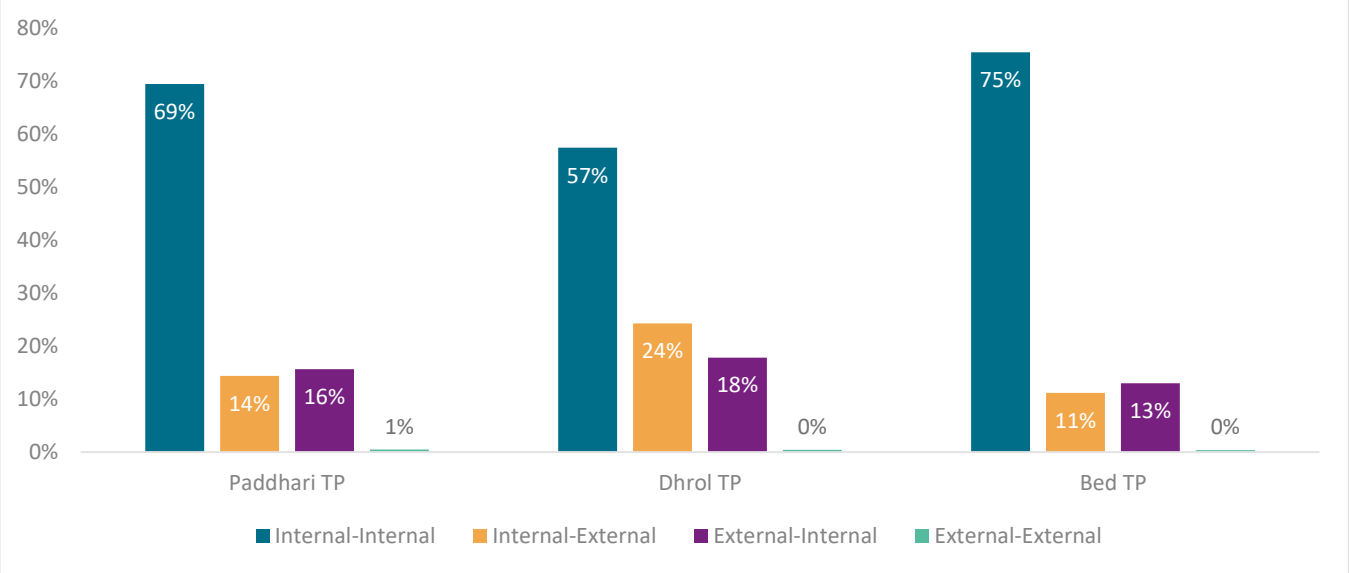
TP1			TP2			TP3	
OD Pairs	% Share		OD Pairs	% Share		OD Pairs	% Share
Ahmedabad To Reliance	2.8%		Dhrol To Jamnagar	3.5%		Jamnagar To Khambhalia	4.0%
Paddhari To Jamnagar	2.4%		Ahmedabad To Reliance	3.2%		Rajkot To Nayara	3.5%
Mumbai To Jamnagar	2.1%		Rajkot To Nayara	2.7%		Rajkot To Sikka	3.1%
Vadodara To Reliance	1.9%		Rajkot To Dwarka	2.6%		Ahmedabad To Reliance	2.2%

Source: Survey data, Crisil Intelligence

3.4.5 Internal - External Analysis

The zones which fall along the project road and very near project road are considered as internal zones and other zones are considered as external zones. If both end of the trips are internal, those trips are internal-internal trips. If one end of the trips is internal and other is external those trips are internal to external and external to internal trips. If both ends of the trips are external, those are external-external trips. Internal-External analysis is presented in the below figure.

Figure 3-7: Internal – External Influence



Source: Survey data, Crisil Intelligence

Internal-Internal trips, which are journeys both originating and terminating within the regional influence area, constitute the largest share at each toll plaza: 69% at Paddhari, 57% at Dhrol, and a notable 75% at Bed. This is further reflected in the overall project road value of 68%, highlighting that a significant majority of travel demand arises from local or intra-regional connectivity.

External-External trips, representing pure through-traffic bypassing the region, are negligible (1% at Paddhari and 0% elsewhere), indicating the project corridor's main role is to support local and regional movements rather than long-haul or non-regional freight and passenger flows.

Short Distance: Short-distance traffic for RVTPL is primarily observed between Rajkot and Jamnagar, including the GIDC units located in Jamnagar and various industrial establishments along the corridor. This movement is largely driven by the exchange of raw materials and finished goods between these closely linked industrial centers.

Medium Distance: Medium-distance traffic for RVTPL mainly flows from Jamnagar to Vadinar, encompassing the Reliance industrial units, and also extends towards Morbi. This corridor supports the movement of petroleum products, industrial goods, and raw materials, linking key production and processing centers within the region.

Long-distance: Long distance traffic for RVTPL originates primarily from the Reliance and Nayara facilities in Jamnagar, extending towards Porbandar, Rajasthan, Punjab, Ahmedabad, and other parts of India. This movement includes a mix of petroleum products and industrial cargo, highlighting the corridor's role in supporting nationwide distribution from major refining and industrial hubs in western Gujarat.

3.4.6 Commodity Distribution

OD analysis was carried out to understand the various freight vehicles being used to transport different commodities. Table below presents the commodity distribution across project stretch is presented in the table below.

Table 3-16: Commodity Distribution (in %) for TP1, TP2 & TP3

Commodity	Paddhari TP	Dhrol TP	Bed TP	Grand Total
Agri Produce	7.3%	3.3%	4.8%	5.1%
Automobiles	1.3%	0.7%	0.2%	0.7%
Chemical products	5.0%	3.7%	5.9%	4.8%
Coal	0.0%	1.0%	7.3%	2.9%
Construction materials	3.7%	8.3%	8.5%	6.9%
Consumer Foods	1.4%	1.9%	1.8%	1.7%
Consumer Products	6.2%	3.8%	3.0%	4.3%
Container	0.8%	0.4%	0.4%	0.5%
Courier & parcel	6.8%	7.0%	3.3%	5.7%
Empty	28.3%	32.9%	31.7%	31.1%
Iron & Steel Products	2.9%	2.2%	2.9%	2.7%
Machinery	1.7%	2.1%	1.4%	1.7%
Milk & Animal Food	3.8%	2.0%	2.9%	2.9%
Others	1.4%	0.7%	2.3%	1.5%
Paper products	0.2%	0.3%	0.4%	0.3%
Petroleum Products	14.8%	17.6%	18.5%	17.1%
Pharmaceuticals	0.2%	0.1%	0.1%	0.1%
Plastic products	8.4%	6.8%	1.6%	5.5%
Plywood & Timber products	2.6%	1.9%	1.4%	1.9%
Rubber products	0.2%	0.5%	0.2%	0.3%
Textile & Footwear	2.2%	2.1%	0.7%	1.6%
Tiles & Ceramic products	0.8%	0.7%	0.6%	0.7%
Grand Total	100.0%	100.0%	100.0%	100.0%

Source: OD Analysis, Crisil Intelligence

The OD survey data for the project road shows that the leading commodity share across the Paddhari, Dhrol, and Bed toll plazas is consistently held by **empty** vehicle movements, with a total of 31.1%. This high share reflects the strong directional nature of traffic on the corridor—freight vehicles predominantly arrive loaded at their destination and return empty, especially due to specialized cargo and point-to-point industrial distribution.

Petroleum products hold 17.1% overall share, and this is attributable to the proximity to major refineries and terminals at Jamnagar, Vadinar, and Sikka drives this category, with significant outbound shipments of refined products to various consumption and storage centres. Petrol, Diesel and Gas are major commodities travelling on project stretch. Reliance and Nayara refineries are major origin and destinations for empty tankers. TP3 provides connectivity to Reliance and Nayara, and all tanker uses project road to refill petroleum products. TP1 has slightly

lower share (~2-3%) of petroleum products which is attributable to additional trips from Morbi, Kutch, Rajasthan and beyond.

Construction materials have 6.9% overall share which is largely driven by TP2 and TP3 share as it is more than 8% on both TP2 and TP3. Higher share of construction material is attributable to ongoing industrial estate expansion and urbanization along the corridor which drive the demand for construction materials, including cement, sand, stones, aggregate, etc. Outbound movement from Sikka cement factory is largely driving construction material growth on project stretch. Construction material is largely destined to Jamnagar, Rajkot, Reliance, and Morbi etc. Major current ongoing construction activities near project corridor is provided in table below.

Table 3-17: Major ongoing construction activities

Project Name	Project Type	Expected Completion Date	Cost(Rs.Crore)	Location
Refinery (Vadinar) Project - Expansion	Capacity Expansion	NA	130000	Vadinar
Dhirubhai Ambani Green Energy Giga Complex (Jamnagar)	New Unit	December-27	60000	Jamnagar
Solar-Wind Hybrid Power (Dwarka) Project	New Unit	January-26	25000	Dwarka
Grid Connected Wind-Solar Hybrid Power (Bhogat) Project	New Unit	September-26	5500	Bhogat
Inter-State Transmission System (Jamnagar) [Phase-I]	New Unit	October-26	3815	Jamnagar
Smart City (Rajkot) Project	New Unit	NA	2623	Rajkot city

Source: Crisil Intelligence

Plastic products have overall 5.5% share on project road, where TP1 and TP2 have 8.4% and 6.8% share respectively. Rajkot's well-developed plastics and engineering cluster is the primary contributor to this category.

Plastic granules and pipes which form a large proportion of plastic products, of which plastic granules are used as raw materials at industries in Jamnagar and pipes is the final product transported for distribution.

Jamnagar houses multiple pipe manufacturing industries like Wingrip Plast Pvt. Ltd., Vigor Plast India Pvt. Ltd., Fitwell Polytechnik Private Limited, Bandhan Pipes, King Pipes and Fittings, and Fitline Pipes and Fittings etc.

Reliance industries use polypropylene and polyethylene as feedstock to produce polymer for industry like packaging, automotive, construction, appliance furniture, paint, closures, luggage and crates, etc. Thus, indicating the high contribution of plastic products on our project stretch.

Chemical products category, which accounts for 4.8% of the overall share, is relatively evenly distributed among TP1 (5.0%) and TP3 (5.9%), although it has a slightly lower presence on TP2 (3.7%). The existence of chemical parks, fertilizer plants, and the integrated petrochemical ecosystem in Jamnagar and nearby Sikka provides a supportive environment for this category. According to the Origin-Destination (OD) survey, key sub-commodities within the chemical products category include chemicals, sulphur, and chemical salts. The primary origins for these products are Maharashtra, Gujarat, Delhi, and Rajasthan

Sulphur, a crucial component in this category, is primarily utilized in soil enrichment, fertilizer production, sulphuric acid manufacturing, pesticide production, and the petroleum refining process.

Chemical salts, predominantly sodium carbonate, are also transported along the project stretch. Sodium carbonate is a key input in the production of chlorine, caustic soda, and textile dyeing, as well as in treatment processes such as water softening.

Coal: The movement of coal at TP3 is substantial, accounting for 7.3% of the overall commodity share. The proximity of Bedi and Navlakhi ports, which serve as key import points for coal along the project stretch, to TP3 and TP2 further underscores the significance of coal transportation in this region.

The thermal power plants operated by prominent organizations such as Nayara Energy, Sikka Thermal Power Plant, RSPL Limited, and Reliance Industries are primary consumers of coal transported along the project corridor. Additionally, other notable users of coal, including Shreeji Coke and Energy Limited and Digvijay Cement, rely on this essential fuel for their operations.

Notably, the combined import volume of coal at Bedi and Navlakhi ports reached approximately 10 million tonnes during FY2024, highlighting the critical role of these ports in supporting the regional energy and industrial sectors. Furthermore, recent developments in the cement industry are expected to drive increased demand for coal in the region. For instance, Shree Digvijay Cement has received environmental clearance for the expansion of its cement plant from 1.2 MTPA to 3.0 MTPA and its clinker plant from 1.1 MTPA to 2.21 MTPA, as of January 2024.

Agricultural produce is a significant commodity transported on the project road, with a notable share of 5.1% overall. However, at the Paddhari toll plaza, the share of agricultural produce increases to 7.3%, highlighting the importance of this corridor for the movement of farm products. The primary sub-commodities transported on the project road include a diverse range of items such as vegetables, fruits, rice, onions, wheat, seeds, groundnuts, and maize, among others.

The movement of agricultural produce on the project road is supported by the presence of key agricultural infrastructure, including the Rajkot Agriculture Produce Market Committee (APMC) and various agro-industrial enterprises. Additionally, the consumption needs of major urban centers such as Rajkot, Dhrol, Jamnagar, and Dwarka also drive the demand for agricultural produce on this route.

The Saurashtra-Kutch region, which encompasses districts including Jamnagar, Rajkot, Porbandar, Surendranagar, Junagadh, Amreli, Bhavnagar, Morbi, Botad, Gir Somnath, and Dwarka, has experienced a notable growth in horticulture production, with a compound annual growth rate (CAGR) of approximately 4.7% between fiscal years 2019 and 2025. This growth outpaces the overall horticulture production growth in Gujarat, which stood at 3.8% during the same period, underscoring the region's emerging importance as a hub for horticultural production and trade.

Other notable commodities include **Consumer products** (4.3%) and **Courier & Parcel** (5.7%), which reflect the growing importance of e-commerce and logistics in the region.

Vehicle category wise commodity shares in percentage for all 3-toll plaza of project road is provided in tables below.

Table 3-18: Commodity Distribution (in %) for Paddhari Toll Plaza

TP1	LCV	2 Axle Truck	3 Axle Truck	MAV	Grand Total
Agri Produce	13.0%	3.4%	2.3%	2.5%	7.3%
Automobiles	1.3%	3.4%	0.3%	1.3%	1.3%
Chemical products	1.1%	3.4%	6.1%	9.4%	5.0%
Coal	0.0%	0.0%	0.0%	0.1%	0.0%
Construction materials	3.3%	3.7%	3.4%	4.3%	3.7%
Consumer Foods	1.7%	0.6%	1.4%	1.2%	1.4%
Consumer Products	9.2%	8.3%	2.7%	3.3%	6.2%

TP1	LCV	2 Axle Truck	3 Axle Truck	MAV	Grand Total
Container	0.0%	1.1%	0.7%	1.7%	0.8%
Courier & parcel	8.0%	13.7%	4.7%	5.1%	6.8%
Empty	27.7%	29.2%	36.3%	26.8%	28.3%
Iron & Steel Products	3.1%	2.8%	2.1%	2.9%	2.9%
Machinery	2.1%	3.6%	0.9%	1.1%	1.7%
Milk & Animal Food	5.5%	3.0%	2.3%	2.2%	3.8%
Others	2.2%	1.5%	0.6%	0.8%	1.4%
Paper products	0.3%	0.6%	0.0%	0.1%	0.2%
Petroleum Products	2.0%	14.4%	30.5%	25.5%	14.8%
Pharmaceuticals	0.2%	0.8%	0.4%	0.1%	0.2%
Plastic products	10.3%	3.2%	2.0%	8.5%	8.4%
Plywood & Timber products	5.1%	0.9%	0.5%	0.5%	2.6%
Rubber products	0.4%	0.0%	0.3%	0.0%	0.2%
Textile & Footwear	3.0%	1.7%	1.2%	1.6%	2.2%
Tiles & Ceramic products	0.4%	0.6%	1.3%	1.1%	0.8%
Grand Total	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Crisil Intelligence

Paddhari Toll Plaza: On overall level, Petroleum Products have the highest share at 14.8%, following Empty at 28.3%. Consumer Products account for 6.2%, Agri Produce for 7.3%, and Plastic products for 8.4%. LCVs are predominantly used for Agri Produce (13.0%), Consumer Products (9.2%), and Plastic products (10.3%). 2 Axle Trucks show a notable percentage for Courier & parcel (13.7%) and Petroleum Products (14.4%). 3 Axle Trucks are significantly used for Petroleum Products (30.5%) and have a high percentage of Empty (36.3%). MAVs are used for Petroleum Products (25.5%) and have a considerable Empty percentage (26.8%).

Table 3-19: Commodity Distribution (in %) for Soyal (Dhrol) Toll Plaza

TP2	LCV	2 Axle Truck	3 Axle Truck	MAV	Grand Total
Agri Produce	4.7%	4.5%	2.9%	2.2%	3.3%
Automobiles	0.6%	3.2%	0.3%	0.7%	0.7%
Chemical products	2.4%	1.9%	4.2%	4.7%	3.7%
Coal	0.2%	0.6%	0.5%	1.7%	1.0%
Construction materials	5.2%	6.4%	10.5%	10.4%	8.3%
Consumer Foods	2.3%	1.1%	0.8%	1.9%	1.9%
Consumer Products	5.3%	4.5%	2.1%	3.0%	3.8%
Container	0.5%	0.9%	0.2%	0.3%	0.4%
Courier & parcel	9.8%	8.5%	6.0%	4.9%	7.0%
Empty	37.7%	33.7%	30.8%	29.6%	32.9%
Iron & Steel Products	2.2%	3.0%	3.1%	2.0%	2.2%
Machinery	2.7%	2.6%	3.4%	1.3%	2.1%
Milk & Animal Food	3.0%	1.3%	1.1%	1.5%	2.0%
Others	0.8%	1.5%	0.4%	0.5%	0.7%
Paper products	0.4%	0.4%	0.1%	0.3%	0.3%
Petroleum Products	12.4%	17.3%	26.4%	19.8%	17.6%
Pharmaceuticals	0.1%	0.0%	0.0%	0.1%	0.1%
Plastic products	2.7%	4.1%	3.6%	11.1%	6.8%
Plywood & Timber products	2.0%	1.3%	0.4%	2.1%	1.9%

TP2	LCV	2 Axle Truck	3 Axle Truck	MAV	Grand Total
Rubber products	1.1%	0.0%	0.1%	0.1%	0.5%
Textile & Footwear	3.2%	2.6%	2.1%	1.1%	2.1%
Tiles & Ceramic products	0.5%	0.6%	0.9%	0.8%	0.7%
Grand Total	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Crisil Intelligence

Soyal (Dhrol) Toll Plaza: The distribution of commodities transported by vehicle type reveals that "Empty" vehicles account for the largest percentage (32.9%) across all categories, with a notable presence in Light Commercial Vehicles (LCVs) (37.7%), 2 Axle Trucks (33.7%), 3 Axle Trucks (30.8%), and Multi-Axle Vehicles (MAVs) (29.6%). Petroleum Products are the second most commonly transported commodity (17.6%), primarily using 2 Axle Trucks (17.3%) and 3 Axle Trucks (26.4%). Construction materials make up 8.3% of the total, with significant usage in 3 Axle Trucks (10.5%) and MAVs (10.4%). Other commodities, such as Consumer Products (3.8%), Agri Produce (3.3%), and Chemical products (3.7%), have lower percentages, but still show notable usage in specific vehicle types, like LCVs and 2 Axle Trucks. The data also highlights the presence of other commodities like Automobiles, Coal, and Pharmaceuticals, albeit with smaller percentages.

Table 3-20: Commodity Distribution (in %) for Bed Toll Plaza

TP3	LCV	2 Axle Truck	3 Axle Truck	MAV	Grand Total
Agri Produce	11.1%	3.6%	1.1%	2.0%	4.8%
Automobiles	0.3%	0.3%	0.1%	0.2%	0.2%
Chemical products	1.7%	5.2%	8.4%	7.9%	5.9%
Coal	2.3%	7.7%	16.8%	8.0%	7.3%
Construction materials	4.8%	13.8%	9.1%	10.2%	8.5%
Consumer Foods	4.1%	1.0%	0.5%	0.8%	1.8%
Consumer Products	5.2%	4.9%	1.8%	1.8%	3.0%
Container	0.2%	0.3%	0.1%	0.6%	0.4%
Courier & parcel	6.4%	2.7%	0.8%	2.1%	3.3%
Empty	35.8%	28.3%	25.6%	31.0%	31.7%
Iron & Steel Products	2.0%	1.4%	1.1%	4.0%	2.9%
Machinery	1.6%	0.5%	1.0%	1.5%	1.4%
Milk & Animal Food	6.5%	1.7%	0.9%	1.2%	2.9%
Others	4.8%	2.3%	1.3%	0.9%	2.3%
Paper products	0.6%	0.0%	0.4%	0.3%	0.4%
Petroleum Products	5.6%	20.5%	26.7%	24.3%	18.5%
Pharmaceuticals	0.4%	0.3%	0.1%	0.0%	0.1%
Plastic products	2.8%	2.4%	1.1%	0.8%	1.6%
Plywood & Timber products	2.1%	1.6%	1.1%	1.0%	1.4%
Rubber products	0.6%	0.2%	0.1%	0.0%	0.2%
Textile & Footwear	0.5%	1.2%	1.7%	0.6%	0.7%
Tiles & Ceramic products	0.6%	0.2%	0.2%	0.6%	0.6%
Grand Total	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Crisil Intelligence

Bed Toll Plaza: Agri Produce is mainly transported by Light Commercial Vehicles (LCVs) at 11.1%, with smaller shares in 2 Axle Trucks (3.6%), 3 Axle Trucks (1.1%), and Multi-Axle Vehicles (MAVs) (2.0%), contributing to a total of 4.8%. Automobiles have a negligible presence across all vehicle types, with a total share of only 0.2%. Chemical products are transported primarily by 3 Axle Trucks (8.4%), 2 Axle Trucks (5.2%), and MAVs (7.9%),

totalling 5.9%. Coal is heavily reliant on 3 Axle Trucks (16.8%) and 2 Axle Trucks (7.7%), with a total share of 7.3%. Construction materials are significantly transported by 2 Axle Trucks (13.8%), 3 Axle Trucks (9.1%), and MAVs (10.2%), totalling 8.5%. The "Empty" category dominates across all vehicle types, with LCVs (35.8%), 2 Axle Trucks (28.3%), 3 Axle Trucks (25.6%), and MAVs (31.0%) contributing to a total of 31.7%. Petroleum Products are majorly transported by 2 Axle Trucks (20.5%), 3 Axle Trucks (26.7%), and MAVs (24.3%), totalling 18.5%.

3.4.7 Trip Length Distribution

Trip Length Distribution analysis gives distance-based patterns for project road traffic. Trip length is categorized into nine trip length groups. Trip length distribution table for different vehicle types is presented below.

Table 3-21: Trip Length Distribution

	Cars	Bus	LCV	2 Axle Truck	3 Axle Truck	MAV
0 to 20	1.02%	0.88%	1.27%	0.58%	0.03%	0.21%
21 to 40	17.88%	19.11%	16.52%	10.67%	14.12%	11.32%
41 to 100	41.17%	30.40%	39.93%	36.65%	23.76%	26.36%
101 to 200	20.88%	18.05%	16.39%	16.30%	19.98%	15.87%
201 to 350	11.01%	13.14%	14.59%	18.15%	25.61%	24.72%
351 to 500	5.43%	13.52%	5.20%	6.20%	6.92%	7.44%
501 to 750	1.25%	3.05%	1.72%	3.93%	4.04%	5.89%
751 to 100	0.56%	0.93%	1.94%	3.80%	1.65%	2.89%
Beyond 1000 Km	0.80%	0.92%	2.44%	3.72%	3.89%	5.30%

Source: Crisil Intelligence

Cars are mostly short distance trip, about 58% of trip travel within 100 kms. In MAV about 52% trips are short, distanced trip indicating goods are potentially transported to nearby destinations or transportation/distribution centres.

4 Traffic Assessment of Project Stretch

4.1 General

This section summarizes the historical performance of the project section in order to understand baseline traffic patterns comprising of historical tollable traffic and revenue growth, traffic and revenue composition, trip distribution, trip factors, seasonality and trend of traffic over the available data set.

The historical tollable traffic and revenue data mode wise was made available by client from April 2012 to July 2025 and is presented in below tables for all three-toll plaza on project corridor.

Table 4-1: Historical Traffic Data Availability

Data Source	Type of Data	Period
TMS Data	Traffic & Revenue Data Vehicle Wise	April 2012 - July 2025

Source: Client, Crisil Intelligence

4.4.1 Historical traffic analysis of Paddhari Toll Plaza

Since fiscal 2013, traffic at the Paddhari Toll Plaza has consistently increased, with the total number of vehicles rise from 7,029 in 2013 to 18,669 by 2025. CJV has the highest contribution of ~78% which has increased at a robust pace of 11% CAGR from 4,116 in fiscal 2013 to 14,675 in fiscal 2025. Additionally, multi-axle vehicles have shown significant growth, increasing from 1,577 in 2013 to 2,534 in 2025. The total PCU have also risen, from 14,542 in 2013 to 29,757 in 2025. The growth rates of different vehicle types vary, with CJV clocked a 11.2% annual growth rate from 2013 to 2025, and multi-axle vehicles showing a 4.0% growth rate over the same period. Steady growth in traffic is likely driven by increasing transportation needs and economic activity in the region.

- The high volume of CJV indicates a strong demand for personal and small-scale transportation linked to business and tourism growth in the catchment zone. Paddhari TP acts as entry point to project road for the traffic travelling between Rajkot and beyond to Dhrol, Jamnagar and beyond. Project road also connects prominent tourism hub like Nageshwar Temple in Dwarka, Beyt in Dwarka, Somnath temple near Porbandar and beach side locations of Gujarat that leads to ~11% growth in passenger traffic on project stretch across all toll plaza. Project road provides key connectivity for Jamnagar airport and Rajkot (Hirasar) airport

- LCV growth has remained subdue (~3.2%) in Post Covid levels when compared to Pre-Covid growth (6.0%). This is attributable to modal shift from small commercial vehicle to large sized commercial vehicle.

- 2 Axle Trucks and MAVs both have clocked exceptional 10% and 9% CAGR post covid which is attributable to growing economic activities along project corridor.

The summary of historic tollable TMS traffic data is presented in below table.

Table 4-2: Historic Traffic: Paddhari Toll Plaza

Actual Traffic-TP1	CJV	LCV	Bus	2Axle Truck	MAV	Vehicles	PCU
FY2012	4,164	496	525	470	1,756	7,410	15,793
FY2013	4,116	446	541	350	1,577	7,029	14,552
FY2014	4,346	427	535	277	1,621	7,204	14,713

Actual Traffic-TP1	CJV	LCV	Bus	2Axle Truck	MAV	Vehicles	PCU
FY2015	5,511	499	526	300	1,757	8,594	16,645
FY2016	6,519	503	539	311	1,752	9,623	17,704
FY2017	7,557	529	566	335	1,766	10,753	19,000
FY2018	8,738	564	578	337	1,930	12,148	21,016
FY2019	9,598	571	608	360	2,074	13,210	22,689
FY2020	9,708	528	585	319	2,092	13,232	22,626
FY2021	8,485	449	381	299	2,046	11,661	20,408
FY2022	10,472	480	477	291	2,263	13,982	23,678
FY2023	11,890	440	560	335	2,128	15,354	24,815
FY2024	13,353	458	566	372	2,289	17,038	27,154
FY2025	14,675	469	590	402	2,534	18,669	29,757
FY2025* (Apr-July)	13,986	452	575	374	2,409		
FY2026* (Apr-July)	15,285	494	590	400	2,610	19,379	30,742
CAGR (25-13)	**11.2%**	**0.4%**	**0.7%**	**1.1%**	**4.0%**	**8.5%**	**6.1%**
CAGR (25-15)	**10.3%**	**-0.6%**	**1.2%**	**3.0%**	**3.7%**	**8.1%**	**6.0%**
CAGR (19-14)	**17.2%**	**6.0%**	**2.6%**	**5.4%**	**5.1%**	**12.9%**	**9.1%**
CAGR (25-23)	**11.1%**	**3.2%**	**2.6%**	**9.5%**	**9.1%**	**10.3%**	**9.5%**
CAGR (25-20)	**8.6%**	**-2.4%**	**0.2%**	**4.7%**	**3.9%**	**7.1%**	**5.6%**

Source: Client TMS Data, Crisil Intelligence
Note: MAV comprises MAV (vehicles with 3 axles up to 6 axles) and OSV (vehicles with more than 6 axles)

4.4.2 Historical traffic analysis of Soyal (Dhrol) Toll Plaza

Since fiscal 2013, traffic at the Soyal Toll Plaza has consistently increased, with the total number of vehicles rising from 7,622 in 2013 to 19,806 in 2025. Cars, jeeps, and vans (CJV) have grown from 4,105 in 2013 to 14,897 in 2025, with a highest year-on-year growth of ~18% in 2016. Multi-axle vehicles (MAV) have shown significant growth, increasing from 2,178 in 2013 to 3,260 in 2025. The total Passenger Car Units (PCU) have also risen, from 17,313 in 2013 to 33,733 in 2025.

- The high volume of CJV indicates a strong demand for personal and small-scale transportation linked to business and tourism growth in the catchment zone, with a CAGR of 17.8% pre-pandemic and 11.8% post-pandemic.
- LCV growth has clocked a CAGR of 2.1% since FY2013, with a 10.1% pre-Covid growth and it has clocked moderate 3% post Covid CAGR.
- 2 Axle trucks have recorded a moderate 2.5% CAGR during FY2013 to FY2025.
- The growth in traffic is likely driven by increasing construction activities, surge in petroleum demand, and overall growth of Gujarat across sectors, leading to a 10% overall growth in traffic at Soyal TP post-Covid.

The summary of historic tollable TMS traffic data is presented in below table.

Table 4-3: Historic Traffic: Soyal (Dhrol) Toll Plaza

Actual Traffic-TP2	CJV	LCV	Bus	2Axle Truck	MAV	Vehicles	PCU
FY2012	3,775	368	556	330	1,881	6,909	15,447
FY2013	4,105	405	578	356	2,178	7,622	17,313

Actual Traffic-TP2	CJV	LCV	Bus	2Axle Truck	MAV	Vehicles	PCU
FY2014	4,150	371	549	311	2,054	7,435	16,528
FY2015	5,327	483	574	367	2,331	9,081	19,364
FY2016	6,278	491	586	374	2,269	9,997	20,106
FY2017	7,260	546	609	328	2,377	11,120	21,586
FY2018	8,489	607	615	345	2,589	12,645	23,929
FY2019	9,433	599	648	333	2,892	13,905	26,289
FY2020	9,568	534	629	308	2,527	13,566	24,551
FY2021	8,253	423	412	312	2,584	11,984	22,689
FY2022	10,443	477	513	325	2,703	14,460	25,835
FY2023	11,924	492	611	415	2,732	16,175	28,035
FY2024	13,502	507	624	428	2,890	17,951	30,422
FY2025	14,897	520	650	479	3,260	19,806	33,733
FY2025* (Apr-July)	14,141	502	636	443	3,012		
FY2026* (Apr-July)	15,643	544	652	477	3,611	20,927	36,096
CAGR (25-13)	**11.3%**	**2.1%**	**1.0%**	**2.5%**	**3.4%**	**8.3%**	**5.7%**
CAGR (25-15)	**10.8%**	**0.7%**	**1.3%**	**2.7%**	**3.4%**	**8.1%**	**5.7%**
CAGR (19-14)	**17.8%**	**10.1%**	**3.4%**	**1.4%**	**7.1%**	**13.3%**	**9.7%**
CAGR (25-23)	**11.8%**	**2.8%**	**3.1%**	**7.3%**	**9.2%**	**10.7%**	**9.7%**
CAGR (25-20)	**9.3%**	**-0.5%**	**0.6%**	**9.2%**	**5.2%**	**7.9%**	**6.6%**

Source: Client TMS Data, Crisil Intelligence
Note: MAV comprises MAV (vehicles with 3 axles up to 6 axles) and OSV (vehicles with more than 6 axles)

4.4.3 Historical traffic analysis of Bed Toll Plaza

Bed toll plaza acts as entry gate to massive Jamnagar refinery complexes of Reliance and Nayara along with industrial estates and tourism hubs of Dev Bhumi Dwarka. Actual Traffic has generally been increasing over the years, with some fluctuations, notably a significant drop in 2020 likely due to the COVID-19 pandemic.

- CJV shows a mix of growth and decline with a pre-COVID CAGR of 17.2% (2019-2014). In terms of Year-on-Year growth, CJV had high growth in early years (like 34.2% in 2015).
- Surge in MAV post Covid period is attributable to growing economic activities and construction activities near project catchment.
- The Compound Annual Growth Rate (CAGR) for Actual Traffic from 2015 to 2025 is 8.7% pre-COVID, 12.0% post-COVID (from 2025-2023), and 7.7% from 2025-2020. Slow post covid CJV growth is resisting overall traffic growth.
- PCU growth pre-Covid has been subdued and has clocked 0.3% CAGR but PCU growth has clocked 6.8% CAGR post Covid.

The summary of historic tollable TMS traffic data is presented in below table.

Table 4-4: Historic Traffic: Bed Toll Plaza

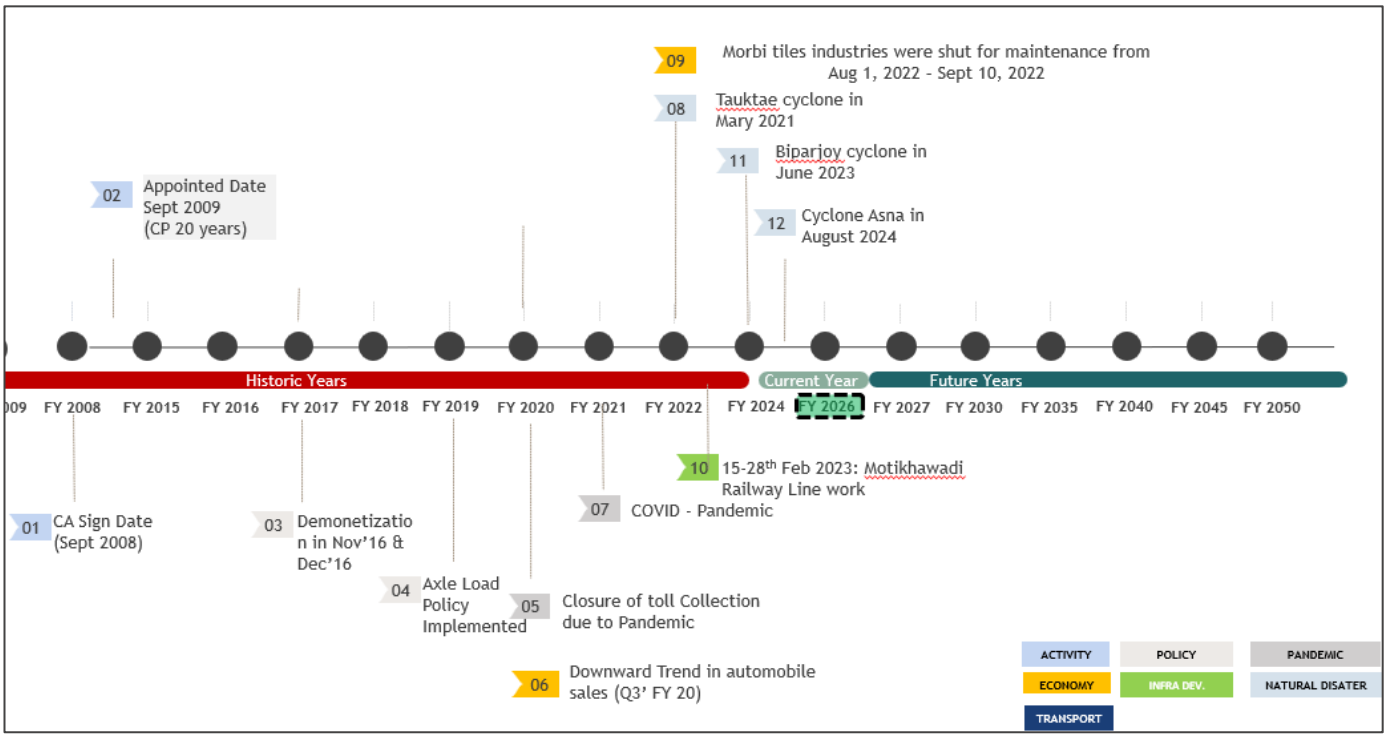
Actual Traffic-TP3	CJV	LCV	Bus	2Axle Truck	MAV	Vehicles	PCU
FY2012	5,207	387	577	545	2,994	9,710	22,625
FY2013	4,704	358	544	494	4,478	10,578	28,504

Actual Traffic-TP3	CJV	LCV	Bus	2Axle Truck	MAV	Vehicles	PCU
FY2014	5,361	420	560	403	4,715	11,460	30,101
FY2015	7,195	575	762	406	5,323	14,260	35,511
FY2016	9,394	640	896	366	5,177	16,473	37,436
FY2017	10,374	628	914	349	4,750	17,015	36,481
FY2018	11,634	637	938	330	4,422	17,961	36,292
FY2019	11,831	607	865	337	3,147	16,786	30,506
FY2020	11,484	534	782	325	3,221	16,346	30,101
FY2021	7,986	330	373	269	3,174	12,133	24,691
FY2022	10,627	397	555	254	3,414	15,248	29,015
FY2023	13,190	478	710	393	3,503	18,274	32,979
FY2024	15,178	533	779	428	3,644	20,562	35,997
FY2025	16,608	525	840	447	3,640	22,060	37,636
FY2025* (Apr-July)	15,948	520	785	431	3,628		
FY2026* (Apr-July)	18,157	528	897	441	3,812	23,835	40,118
CAGR (25-13)	**11.0%**	**3.3%**	**3.7%**	**-0.8%**	**-1.7%**	**6.3%**	**2.3%**
CAGR (25-15)	**8.7%**	**-0.9%**	**1.0%**	**1.0%**	**-3.7%**	**4.5%**	**0.6%**
CAGR (19-14)	**17.2%**	**7.6%**	**9.1%**	**-3.6%**	**-7.8%**	**7.9%**	**0.3%**
CAGR (25-23)	**12.2%**	**4.9%**	**8.8%**	**6.6%**	**1.9%**	**9.9%**	**6.8%**
CAGR (25-20)	**7.7%**	**-0.3%**	**1.4%**	**6.6%**	**2.5%**	**6.2%**	**4.6%**

Source: Client TMS Data, Crisil Intelligence

Note: MAV comprises MAV (vehicles with 3 axles up to 6 axles) and OSV (vehicles with more than 6 axles)

Figure 4-1: Historic calendar of events



Source: Crisil Intelligence

Historic traffic has seen some changes in trend due to some events which has occurred during this period. Over the years Kutch region has witnessed cyclones, in June 2023 witnessed cyclone Bijparjoy and in last week of

august 2024 Kutch region witnessed cyclone Asna. Traffic also depends on the ceramic cluster of Morbi region. Tiles & ceramics export has been fluctuating over the years due to various factors like antidumping, industry shutdowns, employee strikes. During 15th to 28th February 2023 (FY23), heavy vehicle movement was diverted via Lalpur-Changa-Reliance Gate No. 3 (Reliance Road) amid ongoing construction work of railway line at Motikhawadi Junction. Bed toll plaza traffic was impacted for 6 days (26th August to 3rd September 2023) due to flood. In January 2024, Shree Digvijay Cement got environmental clearance for capacity expansion of its 1.2 MTPA capacity of Cement plant to 3.0 MTPA and 1.1 MTPA clinker plant to 2.21 MTPA. During September 2024, maintenance work on Maliya bridge led to diversion of heavy vehicle traffic via Tankara – Latipur road resulting in surge in MAVs at Soyal (TP2) TP. While construction of massive Giga factory in Reliance industries is still under progress, during Q4 of fiscal 2025, trial of Phase 1 started along with completion of 2 trial units of Biogas plants at Reliance Jamnagar complex.

Pre-Covid, Reliance Jamnagar had access from Gates near Bed Toll Plaza (TP3) only. This causes long queue and wait time during peak hours. Both raw materials and refill trucks uses project road only to access Reliance complex. During November 2015, Reliance has opened new gate on Eastern side of the complex for vehicles carrying raw materials and other necessary goods. Traffic plying on project road diverts from Jamnagar bypass to Lalpur Junction toward Changa and finally Gate no. 3 of Reliance complex. This has led to drop in commercial vehicle traffic from TP3. Usually, front gate is used for Petroleum refill trucks and other passenger movements. Loss of traffic on TP3 is compensated by GSRDC.

During May 2024, Sandhiya Pul (ROB) of Jamangar bypass went under demolition as new 4 lane ROB is under construction (ROB in LIEU of LC No.20B Lalpur to Mota Khadba Road) to cater the traffic.

Reliance Industries has shut down a crude unit and secondary units at its 660,000-bpd refinery in Jamnagar, Gujarat, for 21 days of maintenance during April 2025 as per media sources. The shutdown, which includes a diesel hydrotreater, is a routine measure to ensure optimal operation. The refinery is part of the world's largest refining complex, with a total capacity of ~1.3 million bpd. Pre plant closure activities are reflecting traffic surge in heavy commercial vehicles in 4th quarter of FY2025.

Nayara Energy successfully commissioned its 450,000 tonnes per annum polypropylene plant in July 2024.

Vehicle registration of cars in Gujarat state has shown CAGR growth of around 7% in the recent five years and project has shown decadal growth of around 7.3%, the growth in cars with core reasons including rapid urbanization, poor public transport, economic growth in the region and raising tourism infrastructure and rising affluence in the state.

4.2. Historic Toll Segmentation

Recent years toll segmentation has been analysed from vehicle wise and toll segmentation toll data provide by client. As the variations the recent years has been minimal, we have adopted latest FY25 and 4-Month-FY26 toll segmentation for future projections.

Table 4-5: Historic toll segmentation: Paddhari

FY2024	Single Journey	Return Journey	Monthly Pass	Local Comm	Exemptions	Total
Car/Jeep/Van	40.1%	41.0%	0.0%	0.0%	18.9%	100.0%
Minibus	41.1%	56.1%	0.0%	0.0%	2.8%	100.0%
2 Axle Bus	38.4%	61.1%	0.0%	0.0%	0.5%	100.0%
LCV	41.1%	56.1%	0.0%	0.0%	2.8%	100.0%

FY2024	Single Journey	Return Journey	Monthly Pass	Local Comm	Exemptions	Total
Truck	50.2%	46.2%	0.0%	0.0%	3.6%	100.0%
3 Axle Truck	82.4%	14.7%	0.0%	0.0%	2.9%	100.0%
MAV	82.4%	14.7%	0.0%	0.0%	2.9%	100.0%

Source: TMS Data, Crisil Intelligence

Table 4-6: Historic toll segmentation: Soyal

FY2024	Single Journey	Return Journey	Monthly Pass	Local Comm	Exemptions	Total
Car/Jeep/Van	43.8%	43.2%	0.0%	0.0%	13.0%	100.0%
Minibus	38.1%	59.3%	0.0%	0.0%	2.7%	100.0%
2 Axle Bus	36.8%	62.6%	0.0%	0.0%	0.6%	100.0%
LCV	38.1%	59.3%	0.0%	0.0%	2.7%	100.0%
Truck	48.9%	47.6%	0.0%	0.0%	3.5%	100.0%
3 Axle Truck	80.1%	18.7%	0.0%	0.0%	1.2%	100.0%
MAV	80.1%	18.7%	0.0%	0.0%	1.2%	100.0%

Source: TMS Data, Crisil Intelligence

Table 4-7: Historic toll segmentation: Bed

FY2024	Single Journey	Return Journey	Monthly Pass	Local Comm	Exemptions	Total
Car/Jeep/Van	20.5%	60.0%	2.4%	0.0%	17.0%	100.0%
Minibus	22.4%	75.1%	0.0%	0.0%	2.5%	100.0%
2 Axle Bus	15.3%	84.5%	0.0%	0.0%	0.2%	100.0%
LCV	22.4%	75.1%	0.0%	0.0%	2.5%	100.0%
Truck	30.1%	68.9%	0.0%	0.0%	1.1%	100.0%
3 Axle Truck	59.1%	40.7%	0.0%	0.0%	0.2%	100.0%
MAV	59.1%	40.7%	0.0%	0.0%	0.2%	100.0%

Source: TMS Data, Crisil Intelligence

The above trip segmentation is adjusted for GSRDC exemption claim for CJV and Government Buses based on data received from The Client.

5 Base Traffic Estimation

5.1 Seasonality Factors

Traffic volumes on roads varies throughout the year, influenced by socio-economic activities in the surrounding regions. To accurately estimate the Annual Average Daily Traffic (AADT) for the road, it is crucial to account for these seasonal variations.

To achieve this, a seasonal correction factor is applied, which is derived from secondary data sources such as historical traffic data, fuel sales and similar indicators. In this assessment as long historic traffic data is available, consultants have the traffic data for seasonality

5.4.1 Seasonal correction Factors (SCF)

Seasonal correction factors for the latest years of FY 24 & FY 25 are tabulated below.

Table 5-1: Seasonal correction factors for FY 24 and FY 25 – Paddhari Toll Plaza

FY	Month	Cars	LCV	Bus	2-Axle	MAV
2024	Apr	1.1	1.0	1.0	1.0	1.0
	May	0.9	1.0	0.9	1.0	1.0
	Jun*	1.1	1.0	1.0	1.1	1.0
	Jul	1.2	1.1	1.1	1.1	1.0
	Aug	1.1	1.0	1.1	1.1	1.0
	Sep	1.1	1.1	1.0	1.1	1.1
	Oct	1.1	1.1	1.1	1.0	1.2
	Nov	0.9	1.0	1.0	1.0	1.2
	Dec	0.9	0.9	1.0	0.8	0.9
	Jan	1.0	1.0	1.0	0.9	0.9
	Feb	0.9	0.8	0.9	0.8	0.9
	Mar	0.9	0.9	1.0	1.0	0.9
2025	Apr	1.1	1.0	1.0	1.0	1.1
	May	1.0	1.0	1.0	1.0	1.0
	Jun	1.0	1.0	1.0	1.1	1.0
	Jul	1.2	1.2	1.1	1.2	1.1
	Aug*	1.1	1.2	1.0	1.2	1.1
	Sep	1.1	1.1	1.1	1.1	1.0
	Oct	1.1	1.1	1.1	1.1	1.0
	Nov	0.9	1.0	0.9	1.0	1.0
	Dec	0.9	0.9	0.9	0.8	0.9
	Jan	0.9	0.9	0.9	0.8	0.9
	Feb	0.9	0.9	1.0	0.9	0.9
	Mar	0.9	0.9	1.0	0.9	1.0

June 2023 data is adjusted for the cyclone Bijparjoy Impact (Data till 23rd June).
For August month data is considered till 26th august, rest of the days were affected by floods in Kutch region of Gujarat (Cyclone Asna).
Source: Client TMS Data, Crisil Intelligence

Table 5-2: Seasonal correction factors for FY 24 and FY 25 – Soyal (Dhrol) Toll Plaza

FY	Month	Cars	LCV	Bus	2-Axle	MAV
2024	Apr	1.1	1.1	1.0	1.0	1.0
	May	0.9	1.1	0.9	1.1	0.9
	Jun*	1.1	1.0	1.0	1.1	0.9
	Jul	1.2	1.1	1.1	1.2	1.0
	Aug	1.1	1.0	1.1	1.1	1.0
	Sep	1.0	1.1	1.0	1.2	1.1

FY	Month	Cars	LCV	Bus	2-Axle	MAV
	Oct	1.1	1.0	1.1	1.1	1.2
	Nov	0.9	1.0	1.0	1.1	1.2
	Dec	0.9	0.9	0.9	0.9	1.0
	Jan	1.0	1.0	1.0	0.9	0.9
	Feb	0.9	0.8	0.9	0.8	0.9
	Mar	0.9	0.9	1.0	0.9	1.0
2025	Apr	1.1	1.0	1.0	1.0	1.1
	May	1.0	1.0	1.0	1.0	1.1
	Jun	1.0	1.0	1.0	1.1	1.0
	Jul	1.2	1.2	1.1	1.3	1.1
	Aug*	1.1	1.1	1.0	1.3	1.2
	Sep	1.1	1.1	1.1	1.1	0.9
	Oct	1.2	1.1	1.1	1.2	1.0
	Nov	0.8	1.0	0.9	1.1	1.0
	Dec	0.9	0.9	0.9	0.8	0.9
	Jan	0.9	0.9	0.9	0.8	0.9
	Feb	0.9	0.9	1.0	0.8	0.9
	Mar	0.9	0.9	1.0	0.9	1.0

June 2023 data is adjusted for the cyclone Bijparjoy Impact (Data till 23rd June).
For August month data is considered till 26th august, rest of the days were affected by floods in Kutch region of Gujarat (Cyclone Asna).
Source: Client TMS Data, Crisil Intelligence

Table 5-3: Seasonal correction factors for FY 24 and FY 25 – Bed Toll Plaza

FY	Month	Cars	LCV	Bus	2-Axle	MAV
2024	Apr	1.1	1.0	1.1	1.0	0.9
	May	1.0	1.0	1.1	1.1	0.9
	Jun*	1.1	1.0	1.2	1.1	0.9
	Jul	1.2	1.1	1.2	1.3	1.0
	Aug	1.1	1.1	1.0	1.1	0.9
	Sep	1.0	1.1	1.0	1.2	1.0
	Oct	1.0	1.1	0.9	1.0	1.1
	Nov	0.9	1.0	1.0	1.0	1.1
	Dec	1.0	1.0	1.0	0.9	1.0
	Jan	1.0	1.0	0.9	0.9	1.0
	Feb	0.9	0.8	0.9	0.8	1.0
	Mar	0.8	0.9	0.9	0.9	1.1
2025	Apr	1.1	1.0	1.1	1.0	1.0
	May	1.0	1.0	1.1	0.9	0.9
	Jun	1.0	1.0	1.1	1.1	1.0
	Jul	1.1	1.1	1.1	1.3	1.1
	Aug*	1.1	1.1	1.1	1.3	1.0
	Sep*	1.1	1.0	1.0	1.1	1.1
	Oct	1.1	1.1	1.0	1.1	1.0
	Nov	0.9	1.1	1.0	1.0	1.0
	Dec	0.9	0.9	0.9	0.9	0.9
	Jan	0.9	0.9	0.9	0.9	1.0
	Feb	0.9	1.0	0.9	0.9	0.9
	Mar	0.9	0.9	1.0	0.9	1.0

June 2023 data is adjusted for the cyclone Bijparjoy Impact (Data till 23rd June).
For August month data is considered till 26th august, rest of the days were affected by floods in Kutch region of Gujarat (Cyclone Asna).
First 3 days of September are impacted at TP3 due to flood.
Source: Client TMS Data, Crisil Intelligence

5.2 Base Traffic Estimation

For base traffic (annual average daily traffic) estimation of the present study, current fiscal 4-months (Apr-25 to July-25) of TMS traffic data were annualized using SCF factor of FY 25 traffic data excluding impact of Cyclone

Asna in FY 25, to arrive at the annual average daily traffic (AADT) for FY 26.

The AADT estimation for the base case for FY26 is presented table below

Table 5-4: Base Traffic Estimation for Paddhari TP: FY26 AADT

Particulars	CJV	LCV/MINIBUS	BUS	TRUCK 2 AXLE	TRUCK 3 AXLE	MAV+OSV	Total	PCU
ADT (4MFY26)	15,285	494	590	400	560	2,051	19,379	29,903
4-12 Month Factor (FY25)	1.05	1.04	1.03	1.08	1.06	1.06		
AADT FY26	**16,086**	**515**	**607**	**433**	**592**	**2,168**	**20,401**	**31,508**

**For August 2024 month data is considered till 26th august, rest of the days were affected by floods in Kutch region of Gujarat (Cyclone Asna)*
***June 2023 data is adjusted for the cyclone Bijparjoy Impact (Data till 23rd June).*
Source: Client TMS Data, Crisil Intelligence

Table 5-5: Base Traffic Estimation for Soyal TP: FY26 AADT

Particulars	CJV	LCV/MINIBUS	BUS	TRUCK 2 AXLE	TRUCK 3 AXLE	MAV+OSV	Total	PCU
ADT (4MFY26)	15,643	544	652	477	692	2,919	20,927	35,058
4-12 Month Factor (FY25)	1.06	1.04	1.02	1.09	1.09	1.087		
AADT FY26	**16,542**	**567**	**669**	**519**	**753**	**3,175**	**22,224**	**37,499**

**For August 2024 month data is considered till 26th august, rest of the days were affected by floods in Kutch region of Gujarat (Cyclone Asna)*
***June 2023 data is adjusted for the cyclone Bijparjoy Impact (Data till 23rd June).*
Source: Client TMS Data, Crisil Intelligence

Table 5-6: Base Traffic Estimation for Bed TP: FY26 AADT

Particulars	CJV	LCV/MINIBUS	BUS	TRUCK 2 AXLE	TRUCK 3 AXLE	MAV+OSV	Total	PCU
ADT (4MFY26)	18,157	528	897	441	783	3,029	23,835	38,943
4-12 Month Factor (FY25)	1.06	1.02	1.08	1.05	1.01	1.01		
AADT FY26	**19,225**	**538**	**966**	**464**	**794**	**3,071**	**25,057**	**40,520**

**For August 2024 month data is considered till 26th august, rest of the days were affected by floods in Kutch region of Gujarat (Cyclone Asna)*
***June 2023 data is adjusted for the cyclone Bijparjoy Impact (Data till 23rd June).*
First 3 days of September-2024 were impacted at TP3 due to flood.
Source: Client TMS Data, Crisil Intelligence

For estimating the base revenue, the toll rates applicable for FY 26 is multiplied with base year FY 26 ADDT traffic numbers by adopting the trip segmentation which is mentioned section 8 and Table 8-2.

Table 5-7: Base Revenue -FY26

Revenue in INR Millions	FY	Car/Jeep/Van	Minibus	2 Axle Bus	LCV	Truck	3 Axle Truck	MAV	OSV	Total
TP1	2026	327.2	4.1	52.1	17.9	37.5	89.0	326.2	0.0	854.1
TP2	2026	190.5	2.8	31.0	10.6	23.9	61.6	259.9	0.0	580.2
TP3	2026	364.7	9.8	75.6	11.5	37.4	111.7	432.3	0.0	1,043.0
All TP	2026	882.5	16.7	158.6	39.9	98.8	262.4	1,018.4	0.0	2,477.3
Reliance Road Revenue	2026	0.0	1.0	1.4	1.1	1.8	29.4	113.6	0.0	148.3
Grand Total	2026	882.5	17.6	160.0	41.1	100.6	291.7	1,132.1	0.0	2,625.6

Source: Crisil Intelligence

6 Network developments in the Region

6.1 Major Leakage Points

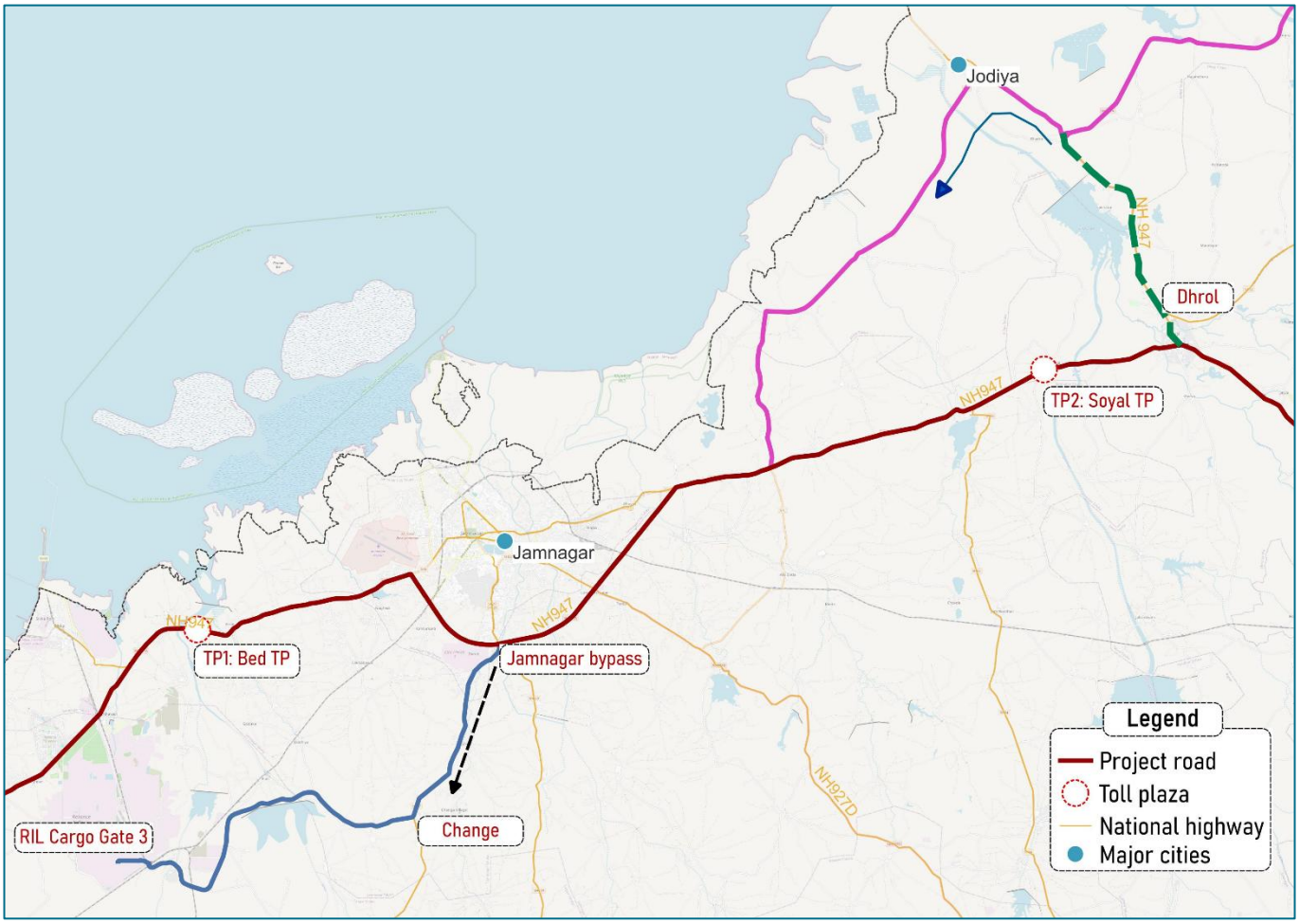
In the case of the project road, there are no short distance alternate routes available that will impact the traffic on the project road. However, traffic leakage is observed at TP2 using 2 lane Jodiya - Jambuda road and TP3 using 2 lane Jamnagar Bypass-Lalpur-Changa-Reliance Gate No.3 road.

Due to heavy vehicle's traffic restriction in Dhrol town during 07:00 AM to 05:00 PM, truck traffic coming from Maliya prefers Jodiya – Jambuda route during restricted hours. Jodiya – Jambuda road is ~4 kms shorter.

Traffic carrying raw material for Reliance Jamnagar prefers entry from Gate no. 3 and hence, TP3 traffic loses its share of commercial traffic. Although, GSDRC provides reimbursement for loss of revenue due to Reliance Road. Lalpur chowk – Changa – Reliance Industries route is ~8kms longer than project road.

Map below represents the road being used alternatively.

Figure 6-1: Network Development around project road



Source: Open Street Map, Crisil Intelligence

Since the leakage is already existing, no further impact is expected.

6.2 Amritsar Jamnagar Expressway

The Amritsar Jamnagar Economic Corridor, a 1,400 km long, 6-lane wide corridor, is set to revolutionize the transportation landscape in India. This ambitious project, part of the Bharatmala initiative, will significantly reduce travel time between Amritsar and Jamnagar from 26 hours to just 13 hours, passing through four states: Punjab, Haryana, Rajasthan, and Gujarat.

The corridor comprises three main sections:

- Upgraded NH54: A 215 km long stretch that will be upgraded to a 6-lane highway.
- Amritsar-Jamnagar Expressway (EC3) NH754A: A 915.85 km long greenfield expressway that will be built from scratch.
- Upgraded NH27 and NH151A: A 245 km long stretch that will be upgraded to a 6-lane highway.

The Amritsar Jamnagar Economic Corridor is of immense strategic importance, as it will connect: 3 major oil refineries: HMEL Bathinda, HPCL Barmer, and RIL Jamnagar. 7 seaports: Kandla Port, Mandvi, Navlakhi, Bedi, Sikka, Jodia, and Okha. 8 airports: Amritsar, Bathinda, Sirsa AFS, Bikaner, Bhuj, Kandla, Mundra, and Jamnagar.

While the construction activities at Amritsar Jamnagar Expressway is currently underway, movement of traffic at multiple section including 4 lane brownfield section of NH151A is also ongoing. Tolling at multiple sections of AJE is already in progress.

Section wise details of current status of AJE are provided in the table below.

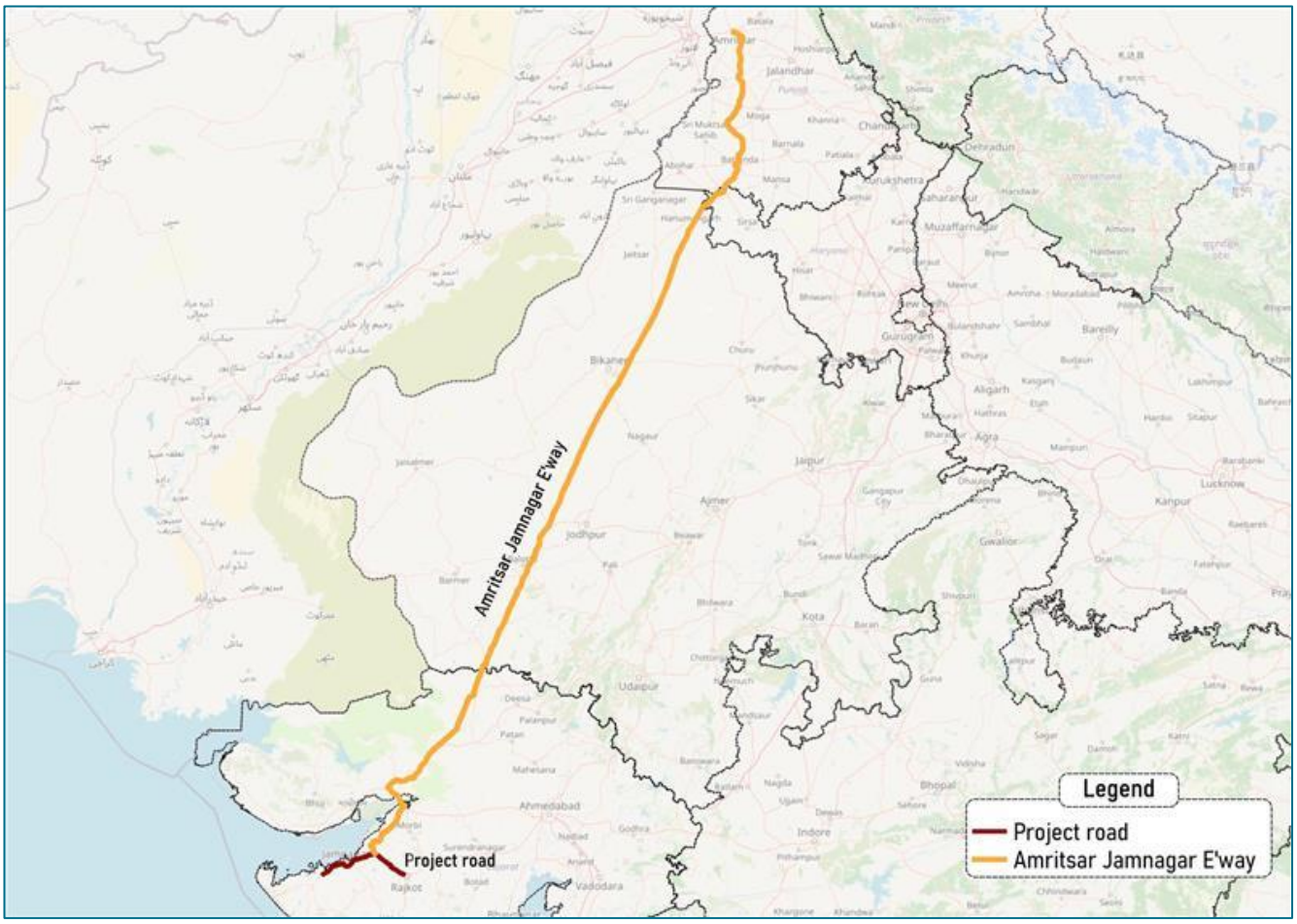
Table 6-1: Status of AJE

AJE			
Section	Distance	Status	Completion/Tentative Date
Amritsar – Bathinda Expressway	154.866	Operational (under development)	Dec-25
Bathinda – Sangariya / Chautala Section	85.1	Operational (under development)	
Sangariya / Chautala – Rasisar Expressway	252.8	Partially Operational	
Rasisar – Deogarh Expressway	175.758	Operational (under development)	
Deogarh – Sanchore Expressway	208.242	Operational (under development)	
Sanchore – Santalpur Expressway	125.185	Operational (under development)	
Santalpur-Malia-Jamnagar Expressway	255	Operational (under development)	
Total	1,506		

Source: Crisil Intelligence

The details along with alignment of the AJE, NH27 and the project section is presented in below figure.

Figure 6-2: Alignment of AJE



Source: Open Street Map, Crisil Intelligence

7 Traffic Growth Estimation & Traffic Forecast

7.1 Approach for traffic growth rates estimation

Crisil, based on its coverage of 80+ sectors and the MSME industry, has developed a knowledge base to understand the growth of industries and demand across various regions and clusters. The growth expectations for various industries are applied to each vehicle category based on the commodity composition of the vehicle category. For example, the share of light commercial vehicles (LCVs) carrying agricultural commodities is expected to grow as per agricultural output growth; the share of LCVs carrying consumer products is expected to grow as per the volume growth of durables; and the share of Multi axle vehicles (MAVs) carrying steel commodities is expected to grow as per demand/supply volume of steel products based on regional dynamics. This approach helps Crisil provide a more accurate growth rate of commercial traffic in the region.

For passenger traffic, Crisil assesses the sale of passenger cars in the region, growth of vehicular population, purpose and frequency of passenger travel, population growth, expansion of the city, and infrastructure development in the catchment area.

Further, Crisil also examines the various factors that will impact traffic over the concession period, such as upcoming alternative road routes, truck aggregation by logistics players, dedicated freight corridors and other transportation options. Thus, the analysis considers the impact of central and state policies, growth in production and consumption centres along the stretch, and infrastructure in the adjoining regions. The report covers both growth drivers and restraints for the traffic along the stretch. CRISIL has enumerated and detailed the parameters that will positively/negatively impact the traffic on the stretch in the future.

Crisil has used its proprietary traffic projection methodology to project traffic using regional industry growth assumptions, macroeconomic developments, infra development and consumption centre growth factors of the catchment area and adjacent regions.

Figure 7-1: Commodity based approach: Illustrative example for Commercial vehicles

Commodity	MAV (Vehicles) Year 1	YoY growth	MAV (Vehicles) Year 2
Construction materials	300	9%	327
Consumer products	100	4%	104
Agri Produce	200	3%	206
Iron & Steel products	50	9%	55
Chemical products	200	5%	210
Total vehicles	XX		YY

Commodity	LCV (Vehicles) Year 1	YoY growth	LCV (Vehicles) Year 2
Construction materials	100	9%	109
Consumer products	200	4%	208
Agri Produce	50	3%	52
Iron & Steel products	300	9%	327
Chemical products	200	5%	210
Total vehicles	XX		YY

Growth rates for commodities are based on commodity specific demand/supply drivers and regional dynamics

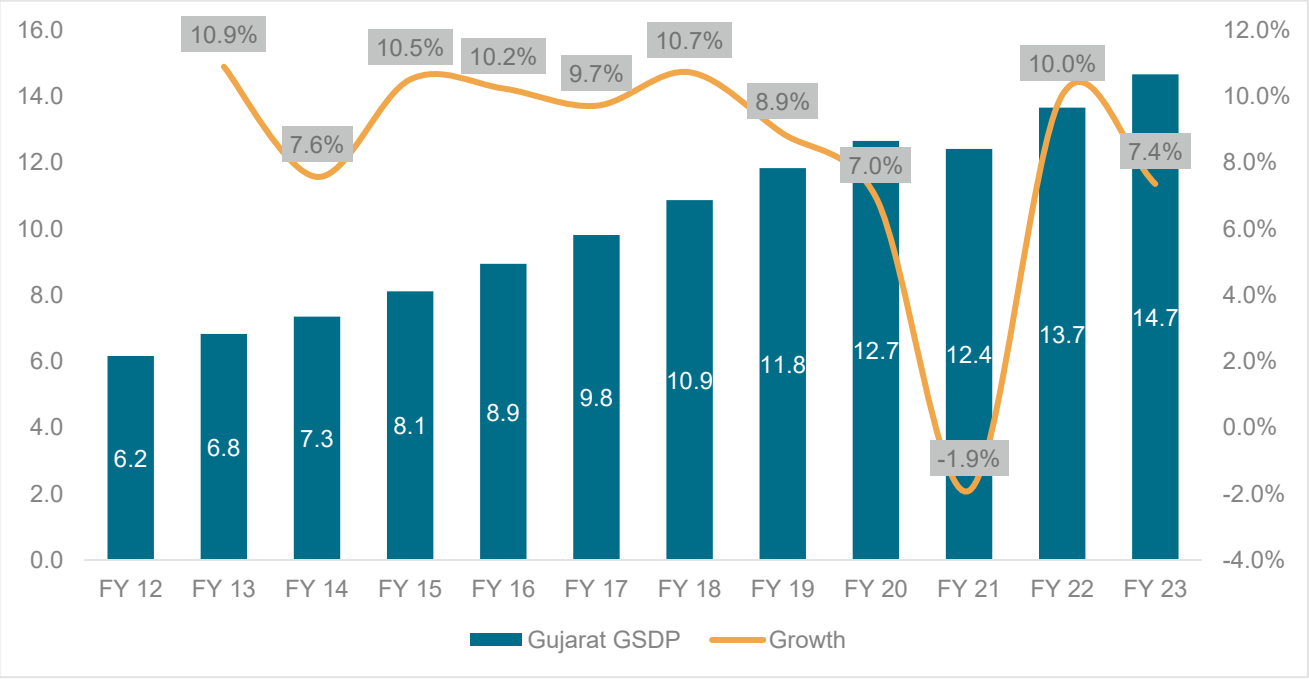
7.2 Gujarat State profile

Gujarat is one of the most economically developed states in India, with a strong and diversified industrial base. The state has a high GDP growth rate, with an average annual growth rate of **7.9%** from fiscal year 2013 to fiscal year 23. The state's economy is driven by a range of industries, including textiles, pharmaceuticals, petrochemicals, and automotive manufacturing. The state is also a major hub for small and medium-sized enterprises (SMEs), with a large number of units operating in the state. The state's strategic location on the western coast of India, with a long coastline and several major ports, including the Port of Kandla and the Port of Mundra, makes it an important centre for international trade.

Gujarat is also a major producer of agricultural products, including cotton, groundnuts, and tobacco. The state is home to a number of major agricultural processing industries, including textile mills, oilseed processing plants, and tobacco manufacturing units. The state government has also implemented a number of initiatives to promote agriculture and allied activities, including the development of irrigation infrastructure and the provision of subsidies and other support to farmers. In addition to its industrial and agricultural sectors, Gujarat is also a popular tourist destination, with a number of major attractions, including the Gir Forest National Park, the Somnath Temple, and the city of Ahmedabad, which is a UNESCO World Heritage City.

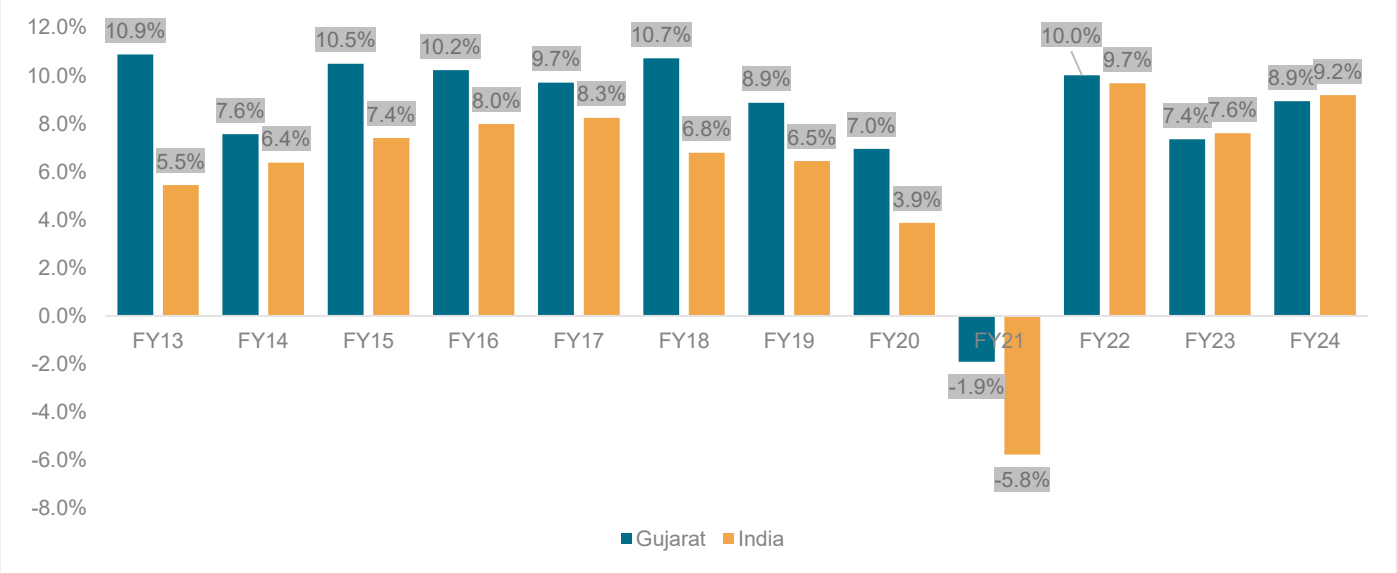
The state government has implemented a number of policies and initiatives to promote economic growth and development in Gujarat, including the development of special economic zones (SEZs), industrial estates, and infrastructure projects such as roads, ports, and airports. The state has also established a number of institutions and organizations to support entrepreneurship and innovation, including the Gujarat Industrial Development Corporation (GIDC) and the Gujarat Venture Finance Limited (GVFL). Overall, Gujarat's strong economy, favourable business environment, and high standard of living make it an attractive destination for investors, entrepreneurs, and tourists alike. The state's economic profile is characterized by a high level of economic activity, a diverse range of industries, and a strong focus on innovation and entrepreneurship.

Figure 7-2: Gujarat GSDP at constant price



Source: MOSPI, Crisil Intelligence

Figure 7-3: Gujarat GSDP vs India GDP



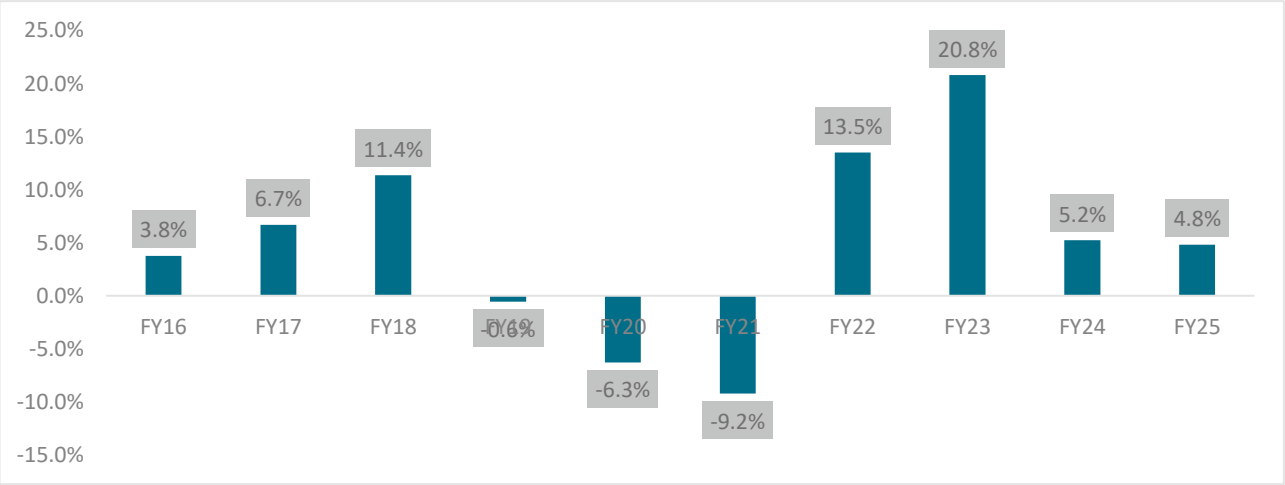
Source: MOSPI, Crisil Intelligence

7.3 Outlook for Car growth

The rate of car ownership in India has increased from 6.6 per 1,000 people in 2001 to 25 per 1,000 people in 2019. Despite India's car fleet growing at an annual rate of 10% for nearly 25 years, the rate of car ownership remains low compared to countries with similar economic status and significantly lower than developed countries, which have a rate of around 450 per 1,000 people. This low rate of car ownership indicates potential for continued growth in the coming years. With the ongoing increase in car ownership and improvements in the road network, the use of cars for inter-urban travel is showing a growing trend.

Vahan Dashboard by Ministry of Road Transport & Highways (MoRTH), shows good growth in motors cars for last decade has shown 4.7% registered vehicle growth. Motor cars data for Gujarat state from Vahan dashboard is compiled in the below chart.

Figure 7-4: Motor Car vehicle registration growth



Source: Vahan Dashboard, Ministry of Road Transport & Highways (MoRTH)

7.4 Tourism Overview

Gujarat has emerged as India's fastest-growing tourism destination, with a remarkable 31.88% CAGR in tourist arrivals from CY 2019 to 2023. The state's tourist arrivals surged from 59 million in 2019 to 178 million in 2023, representing a three-fold increase in just four years. This phenomenal growth significantly outpaces the national average of 1.96% CAGR. Table below shows the tourist arrival in millions for few states and India.

Table 7-1: Tourist arrival statistics (Million)

Year	2023	2022	2021	2020	2019	CAGR (19-23)
India	2,510	1,731	678	610	2,322	1.96%
Gujarat	178	136	25	19	59	31.88%
Uttar Pradesh	479	318	110	86	536	-2.79%
Tamil Nadu	286	219	115	141	495	-12.81%
Andhra Pradesh	255	193	93	71	237	1.81%

Source: Ministry of Tourism, Crisil Intelligence

India's total tourist arrivals increased from 2,322 million in 2019 to 2,510 million in 2023, showing recovery and growth. However, other major states demonstrated varying performance, with Uttar Pradesh recording negative growth at -2.79% CAGR and Tamil Nadu experiencing a -12.81% CAGR decline. Andhra Pradesh maintained modest positive growth at 1.81% CAGR.

Gujarat's religious tourism has demonstrated unprecedented scale and growth, with over 25% of the state's 18.59 crore annual tourists visiting spiritual destinations in FY2023-24. The state recorded 24.07% year-over-year growth in total tourist arrivals, establishing itself as India's premier religious tourism hub. Ambaji Temple leads with 1.65 crore devotees annually, followed by Somnath Temple at 97.93 lakh visitors and Dwarka Temple at 83.54 lakh visitors representing substantial growth from previous years. Infrastructure developments, such as the Sudarshan Setu bridge and the planned Dwarka airport, will further catalyse tourism growth.

Government initiatives, such as PRASAD, Char Dham Yatra infrastructure enhancement, and Swadesh Darshan Yojana, significantly boost religious tourism development.

Project road provides direct connectivity to Devbhumi Dwarka. CJV traffic has grown with more than 11% CAGR post Covid across all three-toll plaza of project stretch. Considering higher base of CJVs, a modest ~7.7% of CAGR is expected till the end of Concession period.

7.5 Expansion plans of major industries

Reliance Industries: Reliance is constructing the Dhirubhai Ambani Green Energy Giga Complex, a ₹75,000 crore ($10 billion) investment in renewable energy manufacturing. The Dhirubhai Ambani Green Energy Giga Complex will increase exports of solar panels, batteries, and green hydrogen, while the crude-to-chemicals expansion will boost petrochemical exports. Freight traffic is expected to rise with the import of equipment and materials for the gigafactories, and Jamnagar will see a surge in exports of renewable energy products, petrochemicals, and green hydrogen derivatives, with an estimated increase in container and bulk cargo volumes.

The expansion will also drive demand for logistics and transportation services, including shipping, trucking, and warehousing. As a result, Jamnagar is expected to emerge as a major hub for global energy trade, with significant opportunities for commodity traders, logistics providers, and shipping companies.

Nayara (Vadinar) Refineries: Nayara Energy has committed $8 billion (₹68,000 crore) investment for Phase-II petrochemical expansion, featuring a 1.5 MMTPA ethane cracker facility at the Vadinar complex which will increase transportation of petrochemicals, such as polyethylene and polypropylene. The expansion will also drive demand for logistics and transportation services, including trucking and warehousing.

With the proposed expansion, Nayara Energy's facilities will see an increase in bulk and liquid cargo volumes, including crude oil, petrochemicals, and fuels.

7.6 Commodity Overview

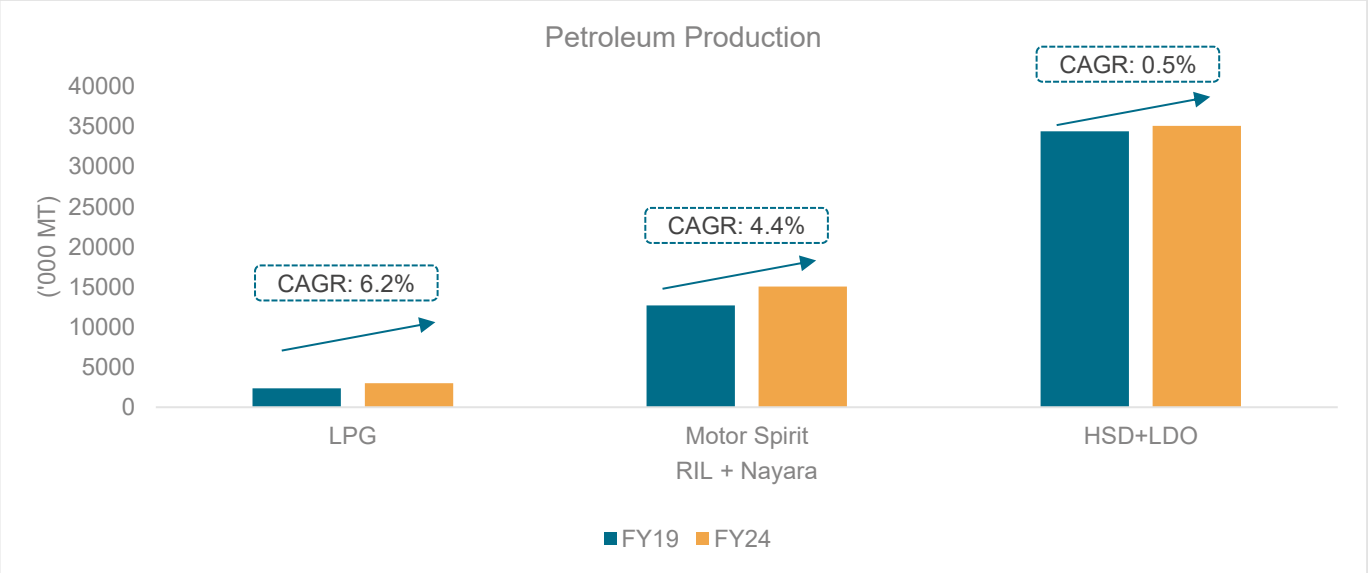
As mentioned in section primary data collection & analysis, the analysis of freight movement across the toll plaza reveals that the major commodities being transported include Petroleum Products, Construction Materials, Plastic products, Chemical products and Consumer goods, etc.

Petroleum Products

Petroleum product has 17.1% overall share, and this is attributable to the proximity to major refineries and terminals at Jamnagar, Vadinar, and Sikka drives this category, with significant outbound shipments of refined products to various consumption and storage centres. Petrol, Diesel and Gas are major commodities travelling on project stretch.

Overall production of Petrol, Diesel and LPG from Reliance and Nyara refinery are shown in the image below.

Figure 7-5: Petroleum production of Jamnagar refineries



Source: PPAC, Crisil Intelligence

Overall Crude processing at Jamnagar refineries have not outgrown pre-pandemic levels, attributable to increase in EV penetration. ~90% of POL produce in Jamnagar travels via road transport.

Notably, the crude processing activities in the region yield a diverse range of by-products, with petroleum products constituting the largest share. Origin-destination (OD) data reveals that the petroleum products are primarily comprised of Diesel, Petrol, and Gas.

Furthermore, a review of the 5-year compound annual growth rate (CAGR) from 2019 to 2024 indicates that

production of LPG, Motor Spirit, and High-Speed Diesel (HSD) have exhibited a growth rate exceeding 3%.

The anticipated surge in petrochemical demand is expected to drive growth along the project corridor, thereby underscoring a positive outlook for the future. Based on these trends, it is inferred that the projected growth from 2026 to 2030 is expected to be ~3.3%, driven primarily by the increasing demand for petroleum products and petrochemicals.

Construction Materials

Construction materials account for 6.9% of the overall freight traffic, with a higher share of 8% on both Soyal (Dhrol) TP (TP2) and Bed TP (TP3). This is largely driven by the ongoing expansion of industrial estates and urbanization along the corridor, which has led to an increased demand for construction materials such as cement, sand, stones, and aggregates.

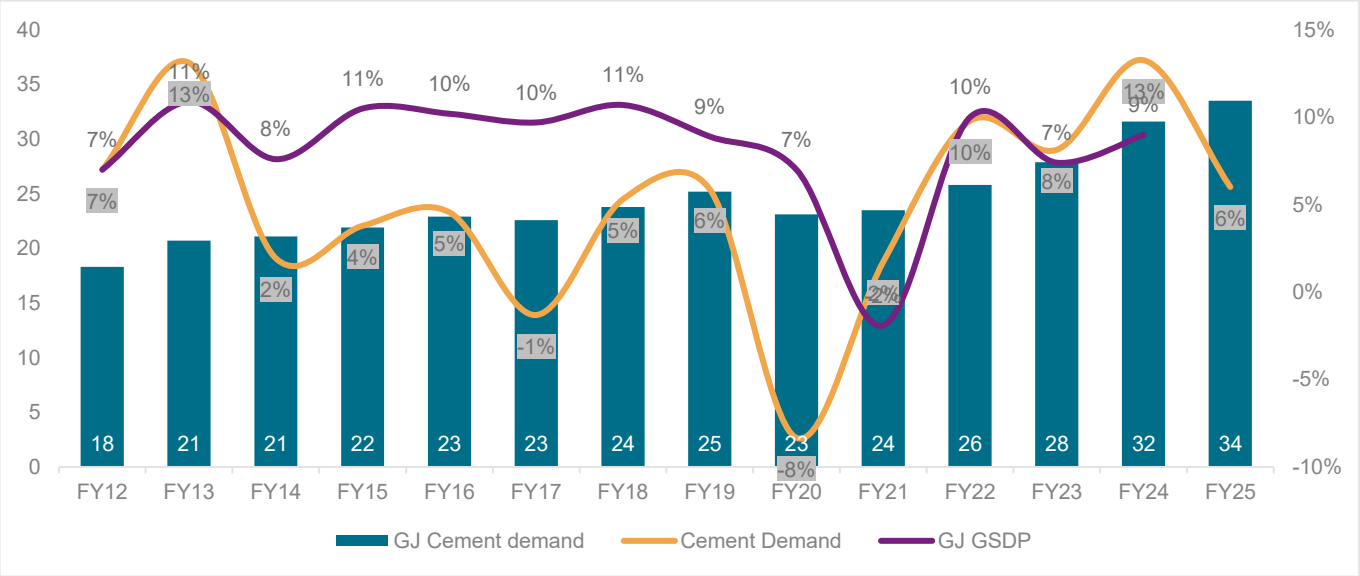
The growth in construction materials is primarily driven by the outbound movement from the Sikka cement factory, which is a major supplier of cement to the region and in addition to it, cities such as Rajkot, Morbi, Jamnagar, and Ahmedabad are significant origin zones for sand, which is a key component of construction materials.

The construction materials are largely destined for major industrial and urban centres such as Jamnagar, Rajkot, Reliance, and Morbi, among others. These destinations are experiencing rapid growth and development, driving the demand for construction materials and contributing to the overall growth of the freight traffic in the region.

Gujarat has witnessed ~8% CAGR growth in the past decade driven by factors such as rapid infrastructure development, industrialization, and urbanization. It is expected to grow on similar pace in future years driven by factors such as ongoing infrastructure projects, renewed focus on industrial capex, and growth in the housing segment.

Cement demand is expected to grow by 5.5-6.5% between fiscal 2026-30 majorly led by infra segment despite healthy base driven by factors such as increasing demand from the industrial and commercial segments on project corridor and catchment areas.

Figure 7-6: Cement Demand growth in Gujarat



Source: CMA, Industry, Crisil Research Estimates

Plastic Products

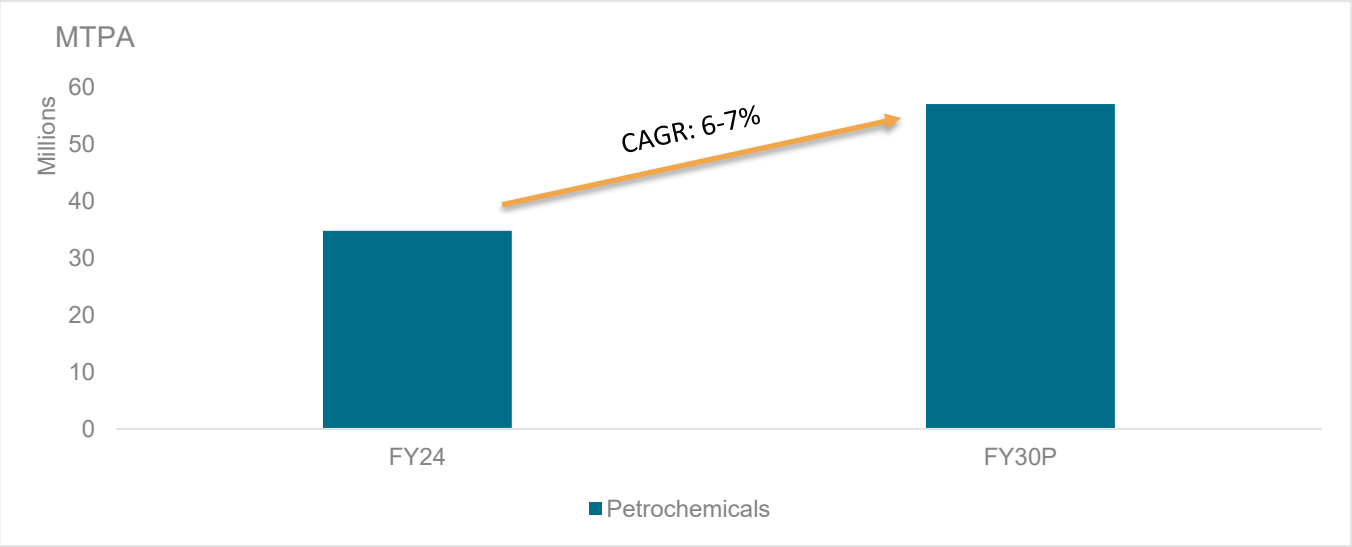
Plastic products account for 5.5% of the overall freight traffic on the project road, with a higher share of 8.4% and 6.8% on Paddhari TP (TP1) and Soyal (Dhrol) TP (TP2) respectively. The well-developed plastics and engineering cluster in Rajkot is the primary driver of this category, with plastic granules and pipes being the major sub-commodities.

Rising Urbanization & Industrialization, rising investment in the building and construction sector, expansion in the automobiles and electrical appliances sector, Capacity additions owing to rising demand from end-use sectors, and population growth of the country are major drivers of petrochemicals and will be key drivers of plastic products on project stretch.

- Polymer and Olefilms to lead demand growth over medium term
- Infra investments to drive demand for PVC over medium term
- Investments are planned for capacity expansion aiming to reduce reliance on imports

Petrochemical demand outlook is shown in the chart below.

Figure 7-7: Petrochemical Demand Outlook



Source: MOPNG, Crisil Intelligence

Gujarat being one of the key hubs of petrochemicals in India is expected to mirror the India growth rate shown above. Plastic products is expected to grow at a similar pace of 6-7% CAGR between fiscal 2026-30 as petrochemicals is a key raw material for plastic products thus making it a key driver for plastic products industry.

Courier and Parcel

Rajkot, Jamnagar, Reliance, Ahmedabad, Surat, Dhrol, Delhi, Sikka and Dwarka are key origins for courier and

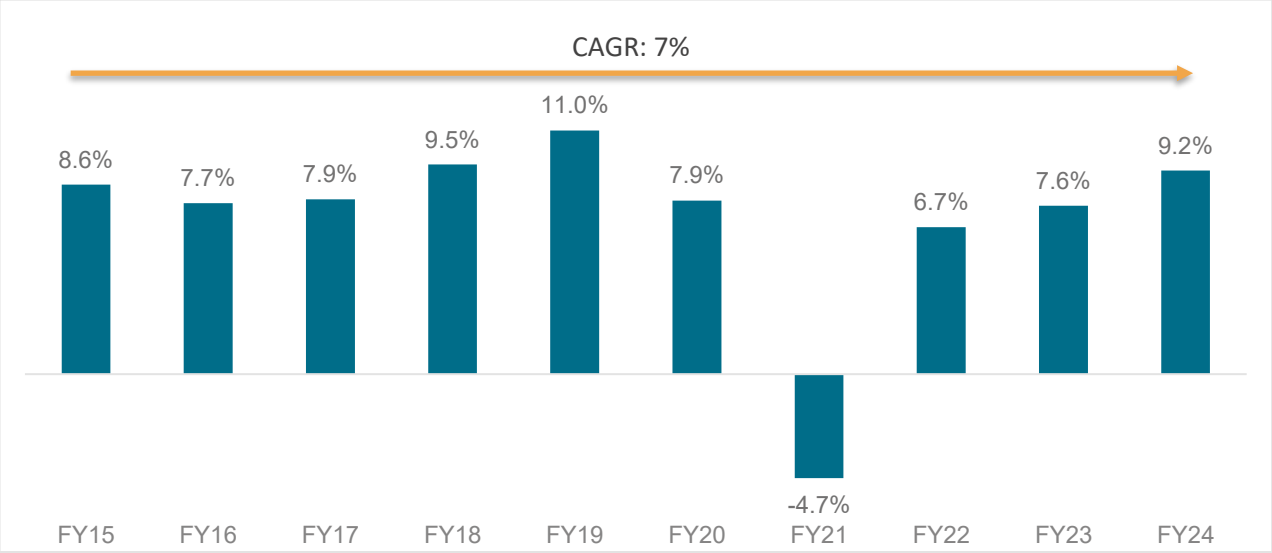
parcel category. Jamnagar, Rajkot, Paddhari, Ahmedabad, Reliance and Mumbai are key destinations across toll plaza.

As statewide developments are rapidly increasing, Tertiary sector growth is also in line with the same. Heavy proposed capex will increase in future growth of tertiary activities and hence the demand.

- Low online penetration, rising internet penetration and increasing online shoppers to drive growth in online retail

Tertiary sector growth for Gujarat is shown in the image below.

Figure 7-8: Tertiary sector growth in Gujarat



Source: MOSPI, Crisil Intelligence

With governments focus on infrastructure scaling and streamlining freight movements, the sector is expected to support growth for the sector. Tertiary growth will continue to have a strong correlation with courier and parcel growth, thus Crisil anticipates a 6-8% CAGR from fiscal FY 26-FY30.

Coal

Coal movement at TP3 is significant and attains 7.3% of overall commodity share. Bedi and Navnlakhi port, which is used to import coal on project stretch, are in close proximity to TP3 and TP2.

- Thermal power plants belonging to organisations like Nayara Energy, Sikka Thermal Power Plant, RSPL limited, and Reliance Industries are key consumers of coal travelling on project stretch.
- Other users like Shreeji coke and Energy limited and Digvijay cement are also key users of coal. ~10 million tonnes of coal were imported on Bed and Navlakhi Port combined during FY2024.

India's policy to reduce coal imports by boosting domestic production and promoting energy transition has caused recent overall coal imports to dip over the years in the future, However, ongoing power sector mandates to operate imported coal plants at full capacity, especially during demand peaks, sustain import volumes at major ports and India expects domestic non-coking coal production to grow at healthy growth, on account of increased production

by Coal India Ltd.

Non-coking coal imports are expected to decline as rise in domestic coal production will increasingly substitute the demand for imported coal. Coking coal imports to remain main source as demand sustains though stabilizes over the next five years. As the construction activity has started to revive, we have observed revival of output from brick mills, the rolling mills faced some issues in the form availability of raw material in the initial period but are expected to revive back in the last quarter. Some portion of demand for imported coal both in brick mills and captive power plants could be substituted by domestic coal. Non-coking coal imports are expected to decline as rise in domestic coal production will increasingly substitute demand for imported coal. Considering all these factors Crisil expects CAGR of 2.2% from fiscal FY 26-FY30.

7.7 Commodity Outlook

Crisil Intelligence has forecasted the freight traffic growth based on the growth in relevant sectors influencing traffic in the region. Industry growth has been analysed and forecasted based on our proprietary database of industries for the surrounding regions that impact traffic on project road as well as our internal assessment on a relevant set of sectors at the pan India level.

Package wise forecast incorporates the regional dynamics including, but not limited to, investments, commodity trends, district output (GDDP) profile (primary/secondary, construction/manufacturing) etc.

The traffic for the coming years is projected by factoring in the impact of these parameters on commodity wise growth rates and is presented in below table.

Table 7-2: Commodity Outlook for the Project Section

Commodity	TP1 Share	TP2 Share	TP3 Share	FY26-30
Agri Produce	7.3%	3.3%	4.8%	2.5%
Automobiles	1.3%	0.7%	0.2%	5.2%
Chemical products	5.0%	3.7%	5.9%	6.5%
Coal	0.0%	1.0%	7.3%	2.7%
Construction materials	3.7%	8.3%	8.5%	5.8%
Consumer Foods	1.4%	1.9%	1.8%	4.3%
Consumer Products	6.2%	3.8%	3.0%	4.3%
Container	0.8%	0.4%	0.4%	4.7%
Courier & parcel	6.8%	7.0%	3.3%	7.0%
Iron & Steel Products	2.9%	2.2%	2.9%	5.3%
Machinery	1.7%	2.1%	1.4%	5.1%
Milk & Animal Food	3.8%	2.0%	2.9%	4.3%
Others	1.4%	0.7%	2.3%	4.3%
Paper products	0.2%	0.3%	0.4%	4.3%
Petroleum Products	14.8%	17.6%	18.5%	3.3%

Commodity	TP1 Share	TP2 Share	TP3 Share	FY26-30
Pharmaceuticals	0.2%	0.1%	0.1%	3.7%
Plastic products	8.4%	6.8%	1.6%	6.5%
Plywood & Timber products	2.6%	1.9%	1.4%	4.7%
Rubber products	0.2%	0.5%	0.2%	4.7%
Textile & Footwear	2.2%	2.1%	0.7%	3.3%
Tiles & Ceramic products	0.8%	0.7%	0.6%	4.5%

Source: Industry, Crisil Intelligence

7.8 Traffic Projections

The total traffic projected in terms of PCUs based on most likely growth rates and after impacts is presented in below table.

Table 7-3: Traffic projections – Paddhari TP

Vehicle Type	Car/Jeep/Van	LCV/Minibus	2 Axle Bus	Truck	3 Axle Truck	MAV+OSV	Total Veh.	Total PCU
2026	16,086	515	607	433	592	2,168	20,401	31,508
2027	17,413	519	629	453	598	2,278	21,890	33,481
2028	18,778	522	650	473	605	2,390	23,418	35,500
2029	20,176	525	672	493	611	2,505	24,982	37,562
2030	21,604	527	694	513	615	2,621	26,574	39,656
FY 26 - FY 30	**7.7%**	**0.6%**	**3.4%**	**4.3%**	**1.0%**	**4.9%**	**6.8%**	**5.9%**

Source: Crisil Intelligence

Table 7-4: Traffic projections – Soyal (Dhrol) TP

Vehicle Type	Car/Jeep/Van	LCV/Minibus	2 Axle Bus	Truck	3 Axle Truck	MAV+OSV	Total Veh.	Total PCU
2026	16,542	567	669	519	753	3,175	22,224	37,499
2027	17,907	580	692	542	775	3,337	23,833	39,821
2028	19,310	592	716	565	797	3,503	25,483	42,197
2029	20,748	604	740	588	819	3,673	27,171	44,621
2030	22,215	615	764	612	840	3,844	28,890	47,083
FY 26 - FY 30	**7.7%**	**2.1%**	**3.4%**	**4.2%**	**2.8%**	**4.9%**	**6.8%**	**5.9%**

Source: Crisil Intelligence

Table 7-5: Traffic projections – Bed TP

Vehicle Type	Car/Jeep/Van	LCV/Minibus	2 Axle Bus	Truck	3 Axle Truck	MAV+OSV	Total Veh.	Total PCU
2026	19,225	538	966	464	794	3,071	25,057	40,520
2027	20,811	550	999	482	814	3,213	26,869	42,978
2028	22,442	561	1,034	501	833	3,357	28,728	45,493
2029	24,113	572	1,068	519	852	3,504	30,629	48,057
2030	25,819	583	1,104	538	870	3,652	32,565	50,662
FY 26 - FY 30	**7.7%**	**2.0%**	**3.4%**	**3.8%**	**2.3%**	**4.4%**	**6.8%**	**5.7%**

Source: Crisil Intelligence

7.9 Modification in Concession Period

As per article 3, Clause 3.1.1 of The Concession Agreement, Concessionaire has been granted concession period of 20 years.

As per supplementary agreement The Concessionaire has requested an extension of the construction period and concession period through its letters dated February 23, 2011, May 8, 2013, and July 17, 2013. In response, the Gujarat State Road Development Corporation (GSRDC) has agreed to grant an extension of the construction period by 47 days and an extension of the concession period by 47 days, which the Concessionaire has accepted.

Due to toll suspension Demonetisation and loss of revenue due to trucker's strike in year 2015 and year 2018, Concessionaire has received additional 77 days of extension of concession period.

The Concessionaire has been granted an additional 38-day extension of the concession period, as per a letter from the Gujarat State Road Development Corporation (GSRDC) dated October 27, 2021. This extension is a result of the nationwide lockdown imposed due to the COVID-19 pandemic, which was deemed a force majeure event.

A total of 162 days of extension of concession period have been granted to the concessionaire resulting in 20 years and 162 days (Last day: 21st Feb 2030 (FY30)) of total concession period from appointed date of 9th Sept 2009 as per supplementary and settlement agreements.

8 Revenue forecast

8.1 General

The project section is under “open tolling system” which enables the concessionaire to collect tolls from long distance as well as short distance traffic joining the project from adjoining highways.

8.4.1 User Fee Schedule

Government of Gujarat enacted the Gujarat Infrastructure Development Act, 1999 (Gujarat Act No. 11 of 1999) to provide a regulatory framework for the participation of the private sector in Financing, Construction, Maintenance and Operation of structure and other development projects undertaken on BOT basis in the State of Gujarat.

Actual amount of fee to be charged for the particular year at COD will be computed as under: Capping rate of base fee escalated to 5% of inflation per year travel distance (in km) of journey. The aforesaid Fee will be revised once in every year by escalating the toll rates at an inflation rate of 5% p.a. For estimation of corridor level toll rate, this has to be rounded to nearest 5 Rupee. For revision of Annual toll fee the base toll rate will be actual toll fee of preceding year, omitting the nearest rounding off to five Rupees.

Annual Revised Toll Rate: Base Toll Rate for given section in year 2007 (without rounding off “x” Kms. of the section for one-way journey “x”*(1+0.05)^n, "n" refers to the number of anniversaries from the January 1, 2007.

Table 8-1: Tolling Tickets

Ticket	Maximum number of one-way journeys allowed	Period of validity
Single/Normal	Single	-
Daily Pass	Two	24 hours
Monthly Pass	Fifty	One month from the date of payment
Local Personal	Multiple	One month from the date of payment
Local Commercial	Single	-

8.4.2 Toll Segmentation

Segmented traffic data of FY25 and 4 Month FY26 data have been used to estimate the toll segmentation and the traffic tolling segmentation in (%) adopted for the present study for FY26 onwards is presented in below table.

Table 8-2: Toll segmentation in % - Paddhari TP (FY25 & 4MFY26)

TP1	Single Journey	Return Journey	Monthly Pass	Special Trip	Local Pass	Exemptions	Total
Car/Jeep/Van	40.2%	41.0%	0.0%	0.0%	0.0%	18.9%	100.0%
Minibus	42.6%	55.3%	0.0%	0.0%	0.0%	2.1%	100.0%
2 Axle Bus	38.3%	61.2%	0.0%	0.0%	0.0%	0.5%	100.0%
LCV	42.6%	55.3%	0.0%	0.0%	0.0%	2.1%	100.0%
Truck	51.8%	45.4%	0.0%	0.0%	0.0%	2.8%	100.0%
3 Axle Truck	83.4%	15.6%	0.0%	0.0%	0.0%	1.0%	100.0%
MAV	83.4%	15.6%	0.0%	0.0%	0.0%	1.0%	100.0%

TP1	Single Journey	Return Journey	Monthly Pass	Special Trip	Local Pass	Exemptions	Total
OSV	83.4%	15.6%	0.0%	0.0%		1.0%	100.0%

Source: Historical toll data, Crisil Intelligence

Note: The above trip segmentation is adjusted for GSRDC exemption claim for CJV and Government Buses based on June 2025 month compensation claim data

Table 8-3: Toll segmentation in % - Soyal TP (FY25 & 4MFY26)

TP2	Single Journey	Return Journey	Monthly Pass	Special Trip	Local Pass	Exemptions	Total
Car/Jeep/Van	43.7%	43.3%	0.0%	0.0%	0.0%	13.0%	100.0%
Minibus	38.6%	59.4%	0.0%	0.0%	0.0%	2.0%	100.0%
2 Axle Bus	36.8%	62.6%	0.0%	0.0%	0.0%	0.6%	100.0%
LCV	38.6%	59.4%	0.0%	0.0%	0.0%	2.0%	100.0%
Truck	48.4%	47.7%	0.0%	0.0%	0.0%	3.9%	100.0%
3 Axle Truck	79.6%	19.5%	0.0%	0.0%	0.0%	0.8%	100.0%
MAV	79.6%	19.5%	0.0%	0.0%	0.0%	0.8%	100.0%
OSV	79.6%	19.5%	0.0%	0.0%		0.8%	100.0%

Source: Historical toll data, Crisil Intelligence

Note: The above trip segmentation is adjusted for GSRDC exemption claim for CJV and Government Buses based on June 2025 month compensation claim data

Table 8-4: Toll segmentation in % - Bed TP (FY25 & 4MFY26)

TP3	Single Journey	Return Journey	Monthly Pass	Special Trip	Local Pass	Exemptions	Total
Car/Jeep/Van	20.4%	60.2%	2.4%	0.0%	0.0%	17.0%	100.0%
Minibus	22.5%	75.3%	0.0%	0.0%	0.0%	2.1%	100.0%
2 Axle Bus	14.0%	85.8%	0.0%	0.0%	0.0%	0.2%	100.0%
LCV	22.5%	75.3%	0.0%	0.0%	0.0%	2.1%	100.0%
Truck	29.7%	69.1%	0.0%	0.0%	0.0%	1.1%	100.0%
3 Axle Truck	60.4%	39.4%	0.0%	0.0%	0.0%	0.2%	100.0%
MAV	60.4%	39.4%	0.0%	0.0%	0.0%	0.2%	100.0%
OSV	60.4%	39.4%	0.0%	0.0%	0.0%	0.2%	100.0%

Source: Historical toll data, Crisil Intelligence

Note: The above trip segmentation is adjusted for GSRDC exemption claim for CJV and Government Buses based on June 2025 month compensation claim data

Reliance road claim for commercial vehicles is estimated separately based on compensation claim data provided by client

8.4.3 Trip Rates

The trip rates are adopted based on the FY25 and 4 Month FY26 historic traffic data and trip rates for the present study for FY26 onwards is presented in below table.

Table 8-5: Toll segmentation in % - FY25

Vehicle category	Single journey	Return journey	Monthly Pass	Special Trip	Local Pass
Car/Jeep/Van	1.00	2.00	50.00	1.00	50
Minibus	1.00	2.00	50.00	1.00	
2 Axle Bus	1.00	2.00	50.00	1.00	
LCV	1.00	2.00	50.00	1.00	
2 Axle Truck	1.00	2.00	50.00	1.00	
3 Axle Truck	1.00	2.00	50.00	1.00	

Vehicle category	Single journey	Return journey	Monthly Pass	Special Trip	Local Pass
MAV	1.00	2.00	50.00	1.00	
OSV	1.00	2.00	50.00	1.00	

Source: Historical toll data, Crisil Intelligence

8.4.4 Tolling lengths

Project road is a 131.650 kms long 4 lane divided highway in Saurashtra region under Gujarat State Road Development Authority (GSRDC). Tollable length of project road is divided between 6 sub-sections. Detailed list of each section of project road is mentioned below:

a. Rajkot to Dhrol (Ch. Km 3.000 to 50.000, 47.0 kms)

b. Dhrol to Falla (Ch. Km 50.000 to 63.000, 13.0 kms)

c. Falla to Jamnagar Bypass (Ch. Km. 63.000 to 78.600, 15.6 kms)

d. Jamnagar Bypass (Ch. Km. 78.600 to 97.800, 19.2 kms)

e. Jamnagar to Vadinar Junction (Ch. Km. 94.000 to 125.55, 31.55 kms (including Vasai bypass at Ch. Km. 104, length: 0.750 km))

f. Additional spur of Rajkot to Morbi bypass (Ch. Km. 0.000 to 5.300, 5.3 kms)

The Tollable lengths for the project section for plaza is presented in below table.

Table 8-6: Tolling Lengths

Project Section	Toll Plaza Location (Kms)	Toll plaza Name	Length (km)
Rajkot-Dhrol	29.440	Paddhari	52.300
Dhrol Start to Jamnagar Bypass	58.325	Soyal (Dhrol)	28.600
Jamnagar Bypass to Vadinar Approach	110.427	Bed	50.750

Source: Concession Agreement, Crisil Intelligence

8.4.5 Toll Rates Estimation

The toll rates (Rs/km) for the base year 2007 for different vehicle categories are as per fee rule/concession agreement mentioned above and are presented in the below table.

Table 8-7: Base Rate in Rs/km

Vehicle Type	Base rate of fee per km for the per km length
Car, Jeep, Van, or Light Motor Vehicle	0.61
Light Commercial Vehicle, Light Goods Vehicle or Minibus	1.07
Bus or Truck (Two Axles)	2.13
Three-axle commercial vehicles	3.43

Vehicle Type	Base rate of fee per km for the per km length
Heavy Construction Machinery (HCM) or Earth Moving Equipment (EME) or Multi Axle Vehicle (MAV) (four to six axles)	3.43
Oversized Vehicles (seven or more axles)	3.43

Source: Client's documents

Table 8-8: Toll fee for FY26

FY2026	Car/Jeep/Van	Minibus/LCV	2 Axle Bus	3 Axle Bus	Truck	3Axle & MAV
TP1						
Single Journey	75	135	270	270	270	430
Return Journey	125	215	430	430	430	690
Monthly Pass	1,230	2,155	4,290	4,290	4,290	6,910
Local Commercial	385	675	1,340	1,340	1,340	2,160
TP2						
Single Journey	40	75	145	145	145	235
Return Journey	65	120	235	235	235	380
Monthly Pass	670	1,180	2,345	2,345	2,345	3,775
Local Commercial	210	370	735	735	735	1,180
TP3						
Single Journey	75	130	260	260	260	420
Return Journey	120	210	415	415	415	670
Monthly Pass	1,190	2,090	4,160	4,160	4,160	6,705
Local Commercial	375	655	1,300	1,300	1,300	2,095
Local pass (All 3)	345					

Source: Fee notification, Crisil Intelligence

8.2 Revenue Estimates

Toll segmentation for all 3 toll plazas of project stretch is adjusted for GSRDC compensation claim for CJV, Government Minibus and Government Bus category based on data received for the month of June-2025. The revenue projections for the project road are presented in the below table. Revenue projections are inclusive of GSDRC compensation claim.

Table 8-9: Revenue in ₹ Million for the Project Section: Paddhari TP

TP 1	Car/Jeep/Van	Minibus	2 Axle Bus	LCV	Truck	3 Axle Truck	MAV	OSV	Total
2026	327.2	4.1	52.1	17.9	37.5	89.0	326.2	0.0	854.1
2027	373.5	4.4	56.2	18.7	40.8	95.2	362.4	0.0	951.3
2028	424.7	4.8	61.5	20.1	45.1	100.8	398.4	0.0	1055.3
2029	477.4	5.1	66.3	20.8	49.1	106.8	438.2	0.0	1163.7
2030	543.2	5.5	71.8	21.9	53.7	113.1	481.4	0.0	1290.5
CAGR 26-30	13.5%	7.6%	8.4%	5.2%	9.4%	6.2%	10.2%	0.0%	10.9%

Source: Crisil Intelligence

Table 8-10: Revenue in ₹ Million for the Project Section: Soyal TP

TP 2	Car/Jeep/Van	Minibus	2 Axle Bus	LCV	Truck	3 Axle Truck	MAV	OSV	Total
2026	190.5	2.8	31.0	10.6	23.9	61.6	259.9	0.0	580.2
2027	227.6	2.9	33.8	11.1	26.4	67.2	289.5	0.0	658.5
2028	253.8	3.1	36.7	11.9	28.9	72.2	317.5	0.0	724.1
2029	296.7	3.4	39.7	12.7	31.5	78.2	350.5	0.0	812.6
2030	317.6	3.7	43.3	13.8	34.7	83.4	381.4	0.0	877.9
CAGR 26-30	13.6%	7.3%	8.8%	6.8%	9.7%	7.9%	10.1%	0.0%	10.9%

Source: Crisil Intelligence

TP3 is impacted by Reliance Road for which concessionaire gets additional claim. Compensation claim from GSRDC for Reliance Road for TP3 is shown exclusively in table below. Revenue projection shown below is inclusive of GSRDC compensation claim for CJV, Government Minibus and Bus but excludes Reliance Road claim.

Table 8-11: Revenue in ₹ Million for the Project Section: Bed TP

TP 3	Car/Jeep/Van	Minibus	2 Axle Bus	LCV	Truck	3 Axle Truck	MAV	OSV	Total
2026	364.7	9.8	75.6	11.5	37.4	111.7	432.3	0.0	1043.0
2027	414.2	10.5	82.1	12.2	40.8	120.2	474.6	0.0	1154.6
2028	460.5	11.4	89.7	13.1	44.7	129.2	520.6	0.0	1269.1
2029	529.1	12.1	96.6	13.9	48.4	138.5	570.0	0.0	1408.6
2030	590.7	13.2	105.0	15.0	52.7	148.8	624.7	0.0	1550.0
CAGR 26-30	12.8%	7.6%	8.6%	6.9%	9.0%	7.4%	9.6%	0.0%	10.4%
RIL Road	**Car/Jeep/Van**	**Minibus**	**2 Axle Bus**	**LCV**	**Truck**	**3 Axle Truck**	**MAV**	**OSV**	**Total**
2026	0.0	1.0	1.4	1.1	1.8	29.4	113.6	0.0	148.3
2027	0.0	1.0	1.5	1.2	2.0	31.5	124.5	0.0	161.8
2028	0.0	1.1	1.7	1.3	2.2	33.8	136.4	0.0	176.5
2029	0.0	1.2	1.8	1.4	2.4	36.4	149.7	0.0	192.8
2030	0.0	1.3	2.0	1.5	2.6	39.1	164.1	0.0	210.4

Source: Crisil Intelligence

Table 8-12: Revenue in ₹ Million for the Project Section: All TP

All TP+RIL	Car/Jeep/Van	Minibus	2 Axle Bus	LCV	Truck	3 Axle Truck	MAV	OSV	Total
2026	882.5	17.6	160.0	41.1	100.6	291.7	1132.1	0.0	2625.6
2027	1015.3	18.8	173.6	43.2	110.1	314.2	1251.1	0.0	2926.2
2028	1139.0	20.4	189.6	46.4	120.8	336.0	1372.8	0.0	3225.0
2029	1303.2	21.7	204.4	48.7	131.4	359.9	1508.4	0.0	3577.7
2030	1451.5	23.6	222.1	52.1	143.6	384.3	1651.6	0.0	3928.8
CAGR 26-30	13.2%	7.6%	8.5%	6.1%	9.3%	7.1%	9.9%	0.0%	10.6%

Source: Crisil Intelligence

Tables representing GSRDC compensation claim are shown below.

Table 8-13: Revenue in ₹ Million (GSRDC Compensation): Paddhari TP

TP 1	Car/Jeep/Van	Minibus	2 Axle Bus	LCV	Truck	3 Axle Truck	MAV	OSV	Total
2026	321.2	0.5	28.7	2.0	0.0	0.0	0.0	0.0	352.4
2027	366.6	0.5	30.9	2.1	0.0	0.0	0.0	0.0	400.2

TP 1	Car/Jeep/Van	Minibus	2 Axle Bus	LCV	Truck	3 Axle Truck	MAV	OSV	Total
2028	416.8	0.5	33.8	2.3	0.0	0.0	0.0	0.0	453.5
2029	468.5	0.6	36.5	2.4	0.0	0.0	0.0	0.0	507.9
2030	533.1	0.6	39.6	2.5	0.0	0.0	0.0	0.0	575.7

Source: Crisil Intelligence

Table 8-14: Revenue in ₹ Million (GSRDC Compensation): Soyal TP

TP 2	Car/Jeep/Van	Minibus	2 Axle Bus	LCV	Truck	3 Axle Truck	MAV	OSV	Total
2026	188.1	0.3	17.0	1.2	0.0	0.0	0.0	0.0	206.6
2027	224.7	0.3	18.5	1.3	0.0	0.0	0.0	0.0	244.8
2028	250.5	0.4	20.1	1.4	0.0	0.0	0.0	0.0	272.4
2029	292.9	0.4	21.7	1.5	0.0	0.0	0.0	0.0	316.5
2030	313.6	0.4	23.7	1.6	0.0	0.0	0.0	0.0	339.3

Source: Crisil Intelligence

Table 8-15: Revenue in ₹ Million (GSRDC Compensation): Bed TP

TP 3	Car/Jeep/Van	Minibus	2 Axle Bus	LCV	Truck	3 Axle Truck	MAV	OSV	Total
2026	358.1	0.5	19.7	0.6	0.0	0.0	0.0	0.0	378.9
2027	406.6	0.6	21.4	0.7	0.0	0.0	0.0	0.0	429.3
2028	452.1	0.6	23.3	0.7	0.0	0.0	0.0	0.0	476.7
2029	519.6	0.7	25.1	0.8	0.0	0.0	0.0	0.0	546.2
2030	579.9	0.7	27.3	0.8	0.0	0.0	0.0	0.0	608.8

Source: Crisil Intelligence

Table 8-16: Revenue in ₹ Million (GSRDC Compensation): All TP

TP 3	Car/Jeep/Van	Minibus	2 Axle Bus	LCV	Truck	3 Axle Truck	MAV	OSV	Total
2026	867.4	1.3	65.3	3.9	0.0	0.0	0.0	0.0	937.9
2027	997.9	1.4	70.8	4.1	0.0	0.0	0.0	0.0	1074.2
2028	1119.4	1.5	77.3	4.4	0.0	0.0	0.0	0.0	1202.7
2029	1281.0	1.6	83.4	4.6	0.0	0.0	0.0	0.0	1370.6
2030	1426.6	1.8	90.6	4.9	0.0	0.0	0.0	0.0	1523.9

Source: Crisil Intelligence



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Traffic & Revenue Assessment for Sambalpur-Rourkela section of SH-10 from Km 4.900 to Km 167.900 (length 163 km) in the state of Odisha

Final Report

November 2025



by S&P Global

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Acronyms

Acronyms	Meaning
AADT	Annual Average Daily Traffic
ADT	Average Daily Traffic
APEDA	Agricultural and Processed Food Products Export Development Authority
APSEZ	Adani Ports and Special Economic Zone
CA	Concession Agreement
CAGR	Compound annual growth rate
CFS	Container Load
CONCOR	Container Corporation of India
CT	Container Terminal
DBFOT	Design Build Finance Operate and Transfer
DGCIS	Directorate General of Commercial Intelligence and Statistics
DPR	Detailed Project Report
DWT	Deadweight Tonnage
EAC	Expert Appraisal Committee
EXIM	Export Import
FMCG	Fast-moving consumer goods
FY	Fiscal Year
GDP	Gross Domestic Product
GIDC	Gujarat Industrial Development Corporation
GSDP	Gross State Domestic Product
GSR	General Statutory Rules
GVFL	Gujarat Venture Finance Limited
HME	Heavy Motor Vehicle
ICD	Inland Container Depots
IHMCL	Indian Highways Management Company Limited
IRC	Indian Road Congress
JNPT	Jawaharlal Nehru Port Trust/Authority
KASEZ	Kandla Special Economic Zone
KRCL	Kutch Railway Company Limited
LCL	Container Freight Station
LCV	Light Commercial Vehicle

LMT	lakh metric tonnes
LPG	Liquefied petroleum gas
MAV	Multi Axle Vehicle (vehicles with more than 3 axles up to 6 axles)
MMLP	Multi-Modal Logistics Parks
MMT	million metric tons
MTPA	million tonnes per annum
NH	National Highways
NHAI	National Highways Authority of India
OD	Origin-Destination
OSV	Over Sized Vehicle (vehicles with more than 6 axles)
PCU	Passenger Car Unit
SBM	Single Buoy Mooring
SCF	Seasonal Correction Factors
SPV	Special Purpose Vehicle
TEU	Twenty-foot Equivalent Units
TMS	Toll Management Systems
TVC	Traffic Volume Count
UAE	United Arab Emirates
UNESCO	United Nations Educational, Scientific and Cultural Organization
US	United State of America
WDFC	Western Dedicated Freight Corridor
WPI	Wholesale price index
2A-MM	2 axle trucks carrying major minerals
3A-MM	3 axle trucks carrying major minerals
MAV-MM	MAV trucks carrying major minerals

1 Executive Summary

1.1 Project Details

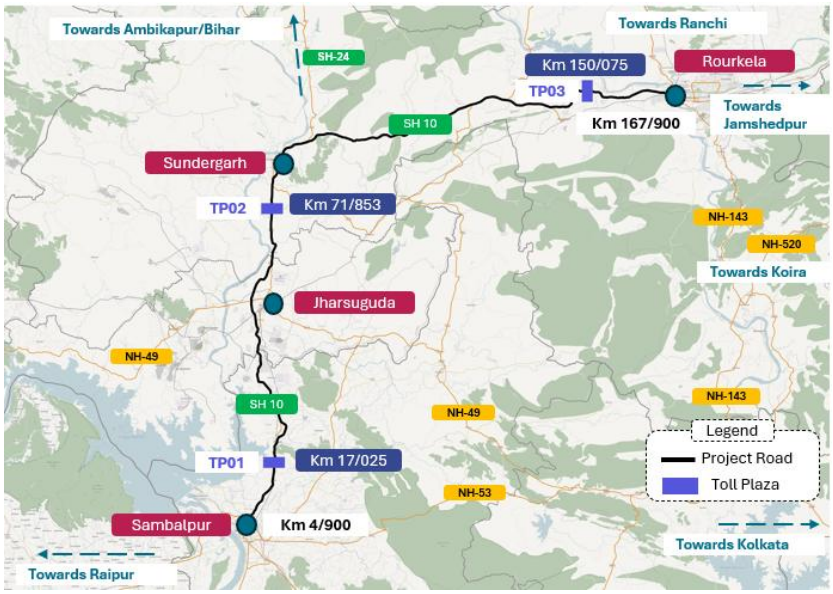
We understand that EAAA TransInfra Managers Limited is the Investment Manager, M/s EPIC Transnet Project Management Private Limited is the proposed Project Manager and M/s EPIC Transnet Infrastructure Private Limited is the sponsor of the Citius TransNet Investment Trust ("Trust" or "InvIT") and M/s Sambalpur-Rourkela Tollway Private Limited (“SRTL”) is proposed to be part of the initial portfolio assets of the Trust. The Trust is registered with Securities and Exchange Board of India (“SEBI”) as an infrastructure investment trust under the SEBI InVIT Regulations.

M/s EPIC Transnet Infrastructure Private Limited (hereinafter “the Client”) as sponsor has appointed M/s CRISIL Limited (hereinafter referred as “Traffic Consultant”) to carry out Traffic and Revenue Due Diligence of operational asset of Four Laning of Sambalpur-Rourkela Road on BOT Toll Basis in the State of Odisha (herein after refer as “the Project”) which is being operated by “M/s Sambalpur-Rourkela Tollway Private Limited" (hereinafter refer as “the Concessionaire or Company or SRTL”).

1.2 Asset Overview

On November 8, 2013, the Governor of Odisha, represented by the Odisha Works Department and SRTL entered into a concession agreement in relation to a 4 lane project with paved shoulders of the Sambalpur – Rourkela Section of state highway no. 10 from km 4.90 to km 167.90 (approximately 162.50 km) in the state of Odisha on a design, finance, build, operate and transfer basis for a concession period of 22 years with the appointed date being July 15, 2014. Key cities and villages along the route include Sambalpur, Rengali, and Khinda in Sambalpur district; Jharsuguda and Badmal in Jharsuguda district; as well as Sundargarh, Rajgangpur, and Rourkela in Sundargarh district. The project section has three toll plazas: TP1 – Nuakhurigaon, Rengali (km 17/025), TP2 – Bhedabahal, Masanikani (km 71/853) and TP3 – Laing, Rajgangpur (km 150/075)

Figure 1-1: Project Road

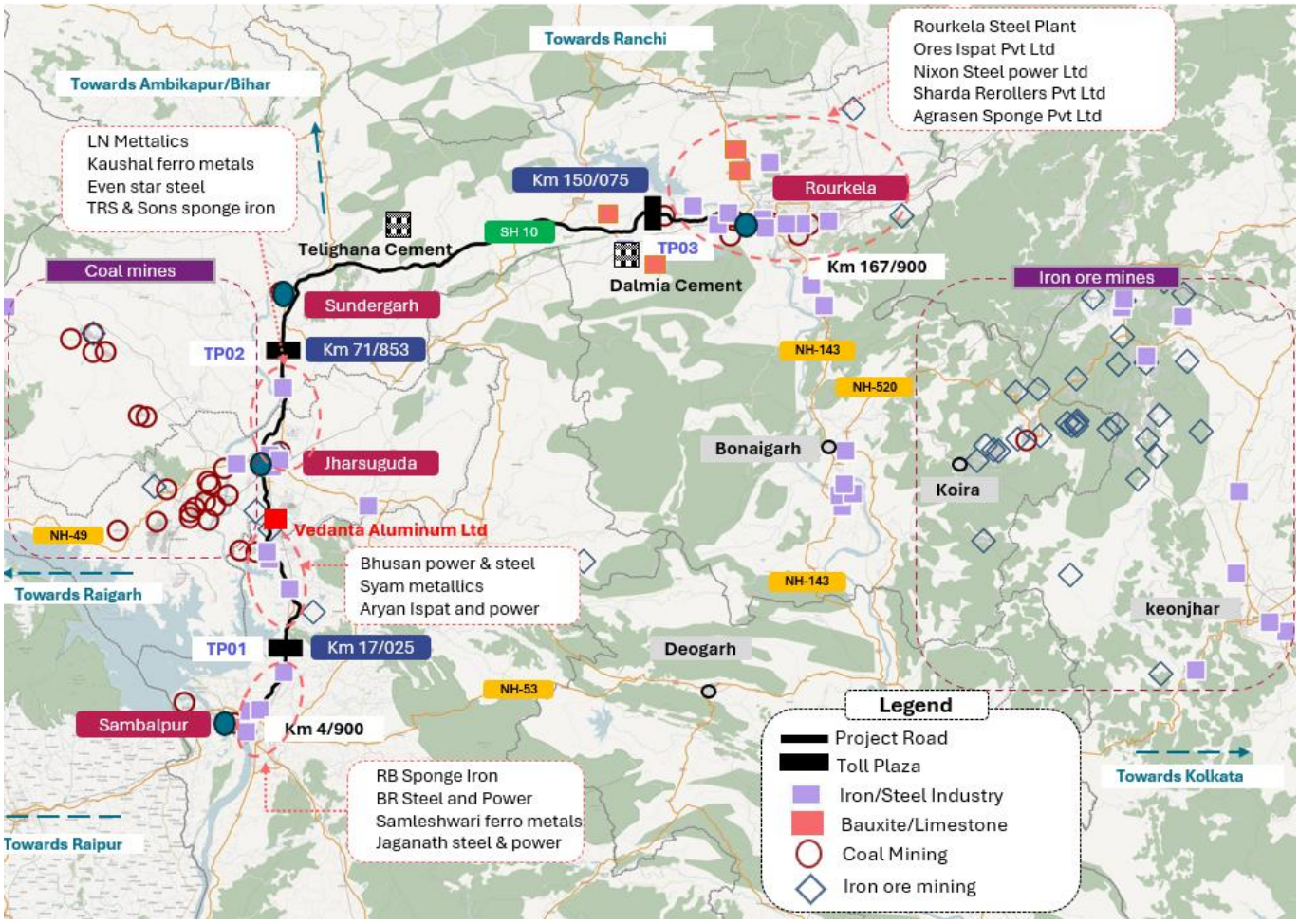


Source: Open Street Map, Crisil Intelligence

Salient growth features and traffic generators

The SH-10 belt is among Odisha's most resource-rich and industrially active regions, hosting major public and private sector enterprises. Mining and mineral-based industries in Mahanadi Coalfields Limited (MCL), Rourkela Steel Plant (SAIL), Vedanta Aluminium, Ultratech Cement, OCL India, and power utilities. Numerous thermal power plants and industrial townships are located along or near the corridor. The region contributes substantially to Odisha's industrial output and export capacity, driven by minerals, metal, and energy production. The asset serves neighbouring industrial clusters of iron, steel, aluminium, and cement. The road provides connectivity to the domestic airport in Jharsuguda. Neighbouring districts of Angul and Raigarh are also growing industrial cities that contribute to both passenger and goods traffic. Notable nearby industries include the Rourkela Steel Plant, one of India's largest, which provides substantial employment and diverse steel products. UltraTech's cement plant and Vedanta's aluminium are also located in project vicinity, besides Bhushan Power and Steel's steel making operations. Additionally, Coal India Limited manages significant coal mines situated in Sundargarh district, which support multiple industrial units in the region. The asset also provides direct connectivity to iron ore mines situated at Koira/Barbil. The industrial units, which includes numerous SMEs, in the region and mines are major contributor of the traffic on the project road. The location of mines and industries around the project corridor is presented below

Figure 1-2: Project Road



Source: Open Street Map, Crisil Intelligence

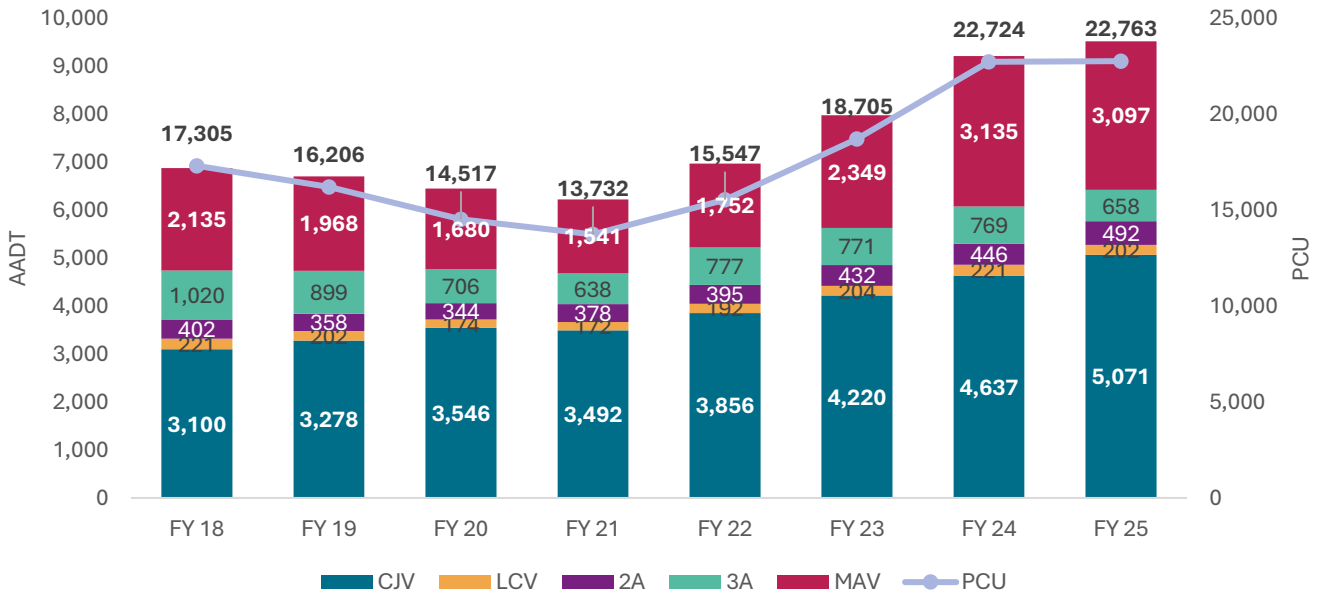
Asset interlinks with key transport corridors, including NH 53 (Kolkata–Mumbai Corridor) at Sambalpur and NH 143 near Rourkela, connecting to Keonjhar and Jamshedpur. Proximity to Jharsuguda Airport and Rourkela Airport enhances regional accessibility. Integration with major rail freight routes of East Coast Railway and Southeastern Railway, enabling multimodal logistics. Micro alternate routes were closed during the implementation stage and even passenger vehicles are not preferring to use the alternate route because of poor road condition and long distance while compared to the project road

Notable nearby industries include the Rourkela Steel Plant, one of India's largest, which provides substantial employment and diverse steel products. The L&T Kansbahal Works, operated by Larsen & Toubro, manufactures heavy engineering equipment for various sectors. UltraTech Cement runs a cement plant nearby, supporting construction, while Vedanta Aluminium produces aluminium for multiple industries. Bhushan Power and Steel also operate a steel plant in the region. Additionally, Coal India Limited manages significant coal mines that supply various industries.

1.3 Historical traffic data

Mode wise traffic from COD till July-2025 was made available by client. Historical AADT for the toll plazas is presented below

Figure 1-3: Historic Annual Average Daily Traffic (AADT) -TP01

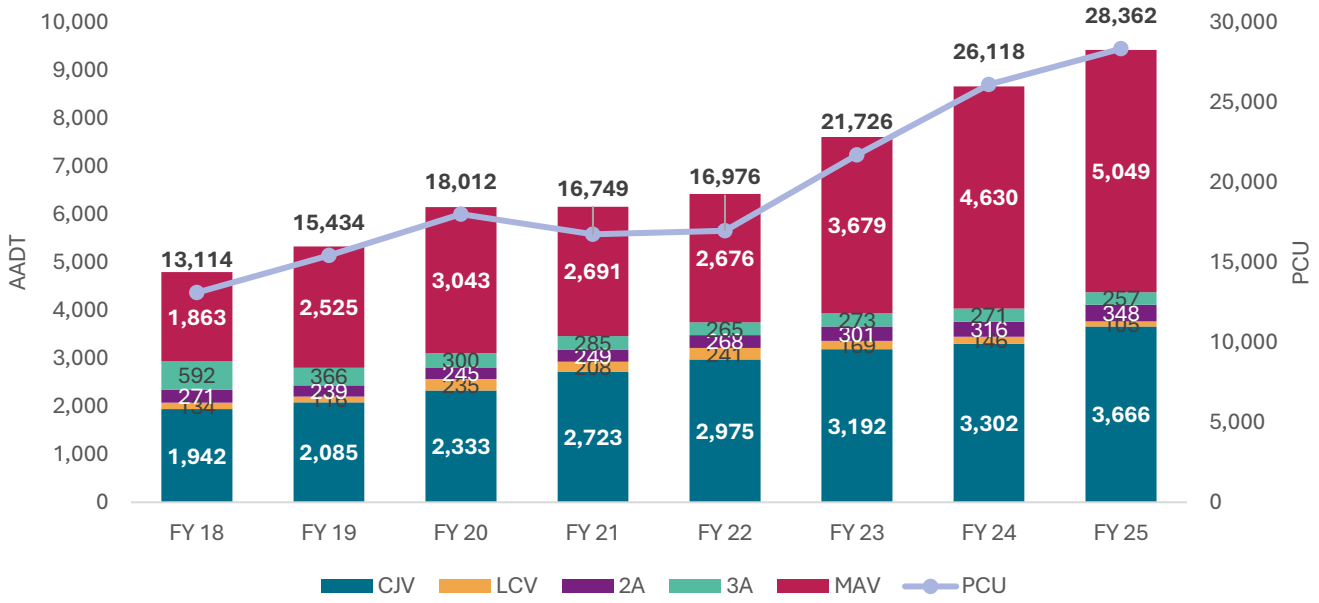


Source: Client Data, Crisil Intelligence

- TP01 is largely influenced by CJV traffic, which is plying mostly between Sambalpur and Jharsuguda, it accounts to about 53 percent followed by MAV which accounts to about 26 percent of the total tollable traffic in FY25.
- In addition, MAV carrying major minerals accounts to about 7 percent of the total tollable traffic in FY25.
- The plaza in terms of PCUs has observed to be grown at 3.2 percents for the period FY25 vs FY18.

- The CJV traffic has grown at 6.6 percent for the period FY25 vs FY18.

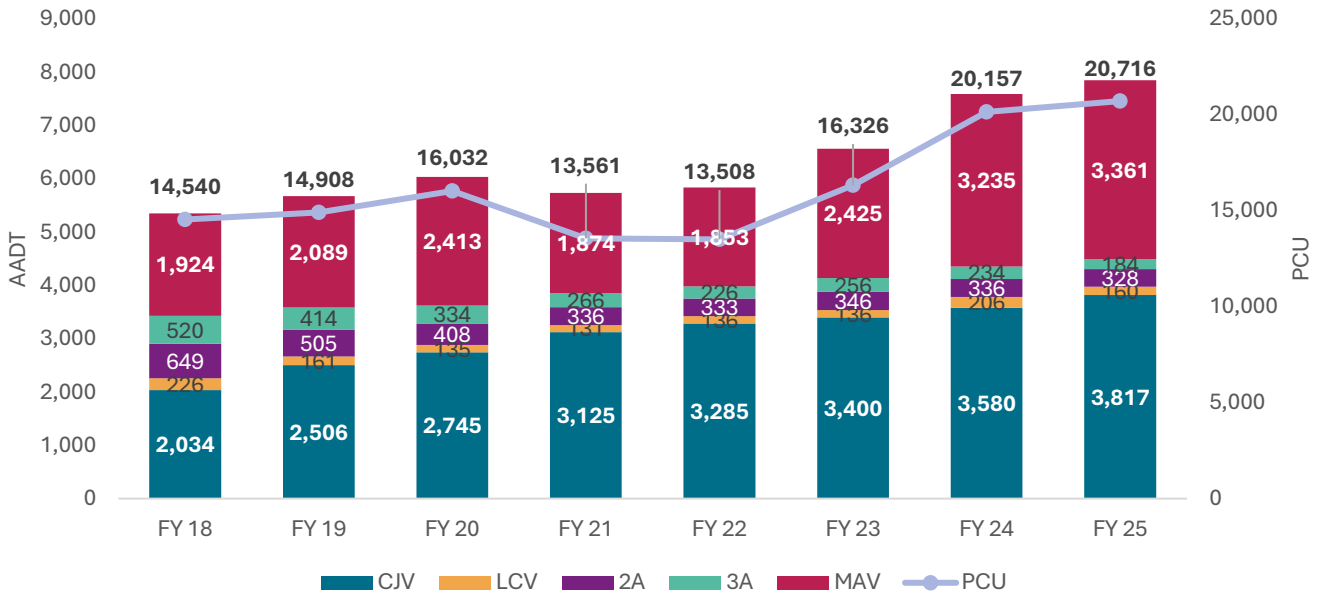
Figure 1-4: Historic Annual Average Daily Traffic (AADT)-TP02



Source: Client Data, Crisil Intelligence

- At TP02, CJV accounts to about 39 percent followed by MAV which accounts to about 32 percent of the total tollable traffic in FY25
- In addition, MAV carrying major minerals accounts to about 21 percent of the total tollable traffic which has a notable movement from coal mining area in Sundergarh and iron ore movement from Koira mines to plants located around the influence area.
- The plaza in terms of PCUs has observed to be grown at 9.6 percents for the period FY25 vs FY18.

Figure 1-5: Historic Annual Average Daily Traffic (AADT)-TP03



Source: Client Data, Crisil Intelligence

- At TP03, CJV accounts to about 49 percent followed by MAV which accounts to about 25 percent of the total tollable traffic in FY25
- In addition, MAV carrying major minerals accounts to about 18 percent of the total tollable traffic which has a notable movement from iron ore movement from Koira mines to plants located around the influence area along with iron and steel movement from the plants located in the influence area.
- The plaza in terms of PCUs has observed to be grown at 4.3 percents for the period FY25 vs FY18.

1.4 Traffic Characteristics & Commodity profile

This corridor, a strategic segment of state highway no.10 in Odisha, connects important districts of Sambalpur, Jharsuguda, and Sundargarh. The SRTL asset is strategically located in a region where industrial activity and mineral resources converge, making it a critical freight corridor. The region includes prominent industrial zones and mineral-rich belts, particularly known for coal and iron ore deposits. The asset serves as a vital link between mining areas, industrial plants, and consumption centres, enabling efficient supply chain movements across Odisha and neighbouring states. Asset has seen 8 years of operation and much controlled in violations and exemptions.

Short Distance: Short-distance traffic for SRTL flows primarily between Sambalpur and nearby industrial areas, including the industries in Jharsuguda and the industrial plants in Rourkela. This corridor supports local movement of raw materials and finished goods within these key industrial centres.

Medium Distance: Medium-distance traffic involves the movement of coal from MCL mines to industries located in Sambalpur, Jharsuguda, and Rourkela, along with the transport of finished byproducts. This corridor supports the supply chain between mining and industrial processing centers in the region.

Long Distance: Long-distance traffic primarily consists of iron ore transported from Keonjhar (Koida) to industries within the region, with finished products then moving onward to Andhra Pradesh and other parts of India. This route plays a crucial role in connecting mineral extraction centres with manufacturing hubs and broader markets across the country.

Commodity Composition – Heavy Industrial and Mineral Focus:

a) **Manufacturing Goods:** A dominant category, reflecting movement of finished and semi-finished goods from local industries, steel plants, and fabrication units. The high range indicates variation across toll plazas and periods based on industrial output and demand.
b) **Minerals:** Mainly include coal and iron ore, transported from mining sites to industrial consumers such as power plants, steel units, and smelters. Highlights the asset's role as a key corridor for raw material movement.
c) **Empty Vehicles:**
    a) A significant portion of vehicles return empty after delivery, typical in regions with unidirectional bulk commodity flow, especially from mines and plants to end-users.
    b) Indicates logistical imbalances common in freight corridors linked to extractive industries.

1.5 Base traffic estimation

For base traffic estimation for the present study, the 4-months (Apr-25-July-25) of traffic data for all the three toll plazas were annualized using SCF factor of 4-12 months were derived from the year FY24 for TP02 and TP03 and average of FY24 & FY25 for TP01 used for estimating FY26 AADT.

The AADT estimation for the base case for FY26 is presented below

Table 1-1: Base traffic-FY26

TP	Car	LCV	2A	3A	MAV	2A-MM	3A-MM	MAV-MM	PCU
ADT (April-25 to July-25)									
TP01	5,197	198	499	386	2,634	1	80	513	22,552
TP02	3,961	110	333	195	3,133	0	11	1,827	28,063
TP03	4,081	145	313	171	1,935	0	10	1,358	20,599
AADT-FY26									
TP01	5,430	201	512	360	2,645	1	84	461	22,581
TP02	4,090	107	352	184	3,448	0	8	2,041	30,583
TP03	4,250	169	304	155	1,865	0	8	1,355	20,397

Source: Client Data, Crisil Intelligence
Note: "MAV comprises (vehicles with more than 3 axles up to 6 axles) and OSV (vehicles with more than 6 axles)"

1.6 Tolling lengths

The tolling lengths for the project section as per concession agreement is presented below

Table 1-2: Tolling Lengths for the project section

Toll Plaza	Chainage	Tolling Length
TP01	Km 17.025	45.690
TP02	Km 71.853	71.350
TP03	Km 150.075	44.690

Source: Concession Agreement, Crisil Intelligence

1.7 Traffic Projections

The total traffic projected in terms of PCUs based on most likely growth rates is presented below:

Table 1-3: Traffic projection in terms of PCU for the project section

FY Year	TP01	TP02	TP03
2025	22,738	28,335	20,694
2026	23,813	30,583	20,397
2027	24,992	32,112	21,461
2028	26,201	33,676	22,558
2029	27,424	35,261	23,674
2030	28,637	36,849	24,792
2031	29,899	38,495	25,978
2032	31,223	40,223	27,223
2033	32,612	42,036	28,532
2034	34,070	43,940	29,907
2035	35,571	45,902	31,325
2036	37,093	47,906	32,770
2037	38,656	49,968	34,256
2038	40,259	52,086	35,783
2039	41,902	54,259	37,350
2040	43,584	56,488	38,957
2041	45,304	58,770	40,603
CAGR (FY26-FY41)	**4.40%**	**4.45%**	**4.70%**

Source: Crisil Intelligence

TP01, TP02 and TP03 traffic in terms of PCUs is projected grow at 4.40 percent, 4.45 percent and 4.70 percent respectively.

1.8 Revenue Projections

The revenue in ₹ million for the project road is projected to grow at a CAGR of about 8.9 percent for the forecast period from FY26 to FY41 and is presented in the below table.

Table 1-4: Projected Revenue in ₹ million

FY Year	TP01	TP02	TP03	Total
2025	682.3	1,525.3	682.7	2,890.3
2026	708.3	1,677.7	683.4	3,069.4
2027	765.0	1,822.3	744.9	3,332.2
2028	837.9	1,996.6	819.6	3,654.1
2029	918.0	2,168.0	889.6	3,975.6
2030	992.7	2,367.0	972.2	4,331.9
2031	1,084.1	2,569.1	1,065.6	4,718.9
2032	1,187.7	2,807.8	1,169.3	5,164.8
2033	1,275.9	3,052.3	1,269.1	5,597.3
2034	1,399.5	3,328.4	1,400.4	6,128.2
2035	1,520.6	3,628.7	1,523.2	6,672.5
2036	1,658.6	3,956.7	1,665.6	7,280.9
2037	1,800.9	4,287.2	1,813.4	7,901.4
2038	1,956.3	4,664.1	1,983.1	8,603.6
2039	2,125.0	5,064.7	2,158.1	9,347.8
2040	2,317.5	5,511.5	2,350.0	10,179.0
2041	2,500.7	5,961.5	2,548.1	11,010.3
CAGR (FY26-FY41)	**8.8%**	**8.8%**	**9.2%**	**8.9%**

Source: Crisil Intelligence

The share of revenue from TP01 and TP03 is about 22 percent each and TP02 contributes to about 55.4 percent of the total revenue from the project section.

2 Introduction

2.1 Asset Overview

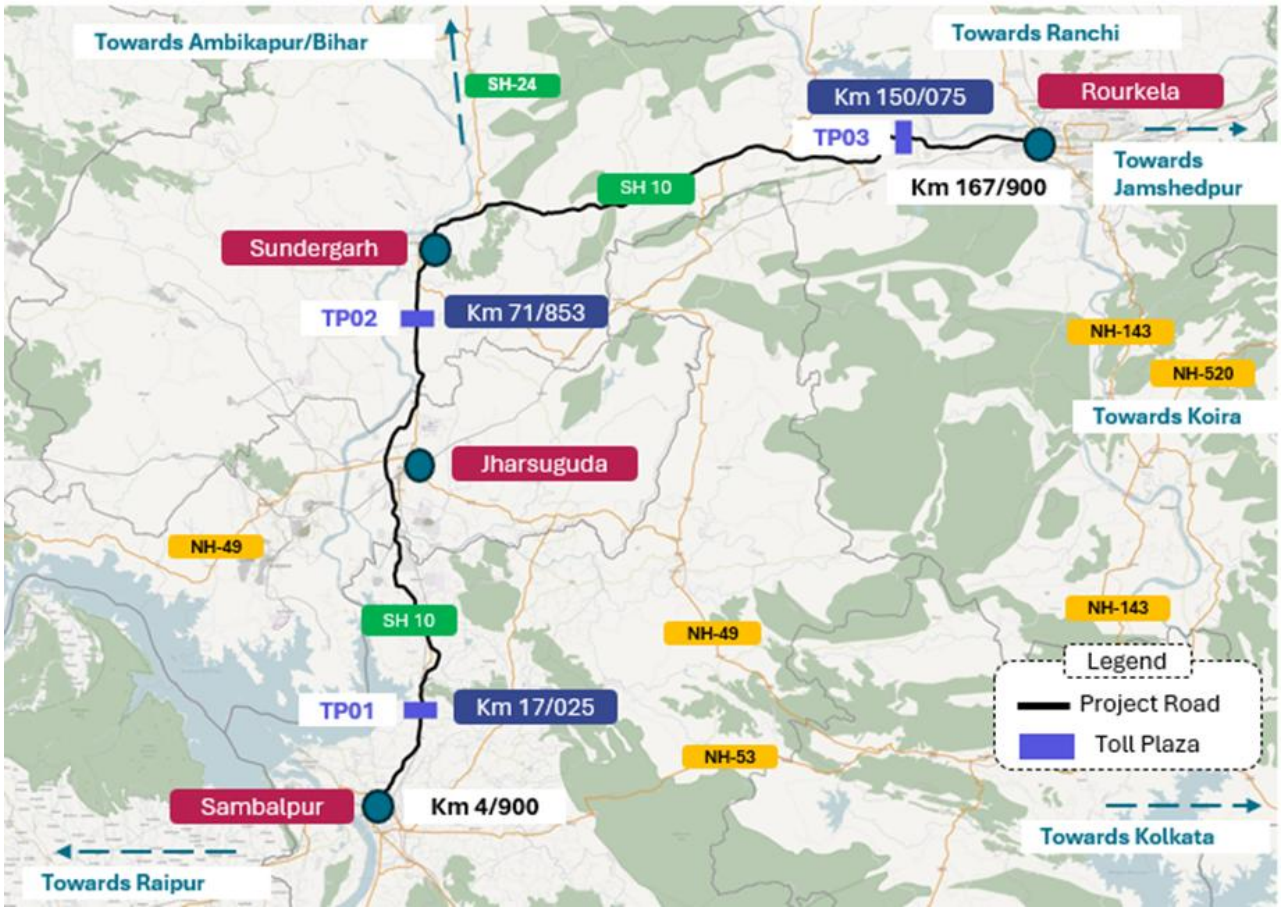
Project road Sambalpur to Rourkela is a four lane, 163 kms long stretch, on SH-10 which connects Sambalpur to Rourkela. The project stretch has three toll plazas located at Km 17.025 near Sambalpur, Km 71.853 near Sundergarh and Km 150.075 near Rourkela. Key cities and villages along the route include Sambalpur, Rengali, and Khinda in Sambalpur district; Jharsuguda and Badmal in Jharsuguda district; as well as Sundargarh, Rajgangpur, and Rourkela in Sundargarh district.

Table 2-1: Details of the road stretch

Project stretch	TP	Km	Tolling length
Sambalpur-Rourkela section of SH-10 in the state of Odisha	TP01	17.025	45.690
	TP02	71.853	71.350
	TP03	150.075	44.690

Source: Crisil Intelligence

Figure 2-1: Project stretch alignment



Source: Open Street Map, Crisil Intelligence

Table 2-2: Key details of project stretch

Project stretch	Sambalpur-Rourkela via Jharsuguda (Km 4/900 to Km 167/900 of SH-10)
Authority	Works Department, Government of Odisha
Concessionaire	M/s Sambalpur-Rourkela Tollway Private Limited
Concession period	22 years
No. of lanes	4-lane configuration with paved shoulders
Project type	Design, Build, Finance, Operate & Transfer
Project Length	163 km
No. of Toll Plazas	3
Toll Plaza 01	Nuakhurigaon, Rengali (km 17/025)
Toll Plaza 02	Bhedabahal, Masanikani (km 71/853)
Toll Plaza 03	Laing, Rajgangpur (km 150/075)
Concession agreement date	8th November 2013
Appointment date	15th July 2014
Construction period	3 years
PCOD-I	13th March 2018
PCOD-II	12th August 2019
COD	30th March 2021
Estimated Target Traffic Extension period	4.4 years
TP01 (PCU & Revenue)-FY25	PCU-22,713 & Revenue – 68.2 Cr
TP01 (PCU & Revenue)-FY25	PCU-28,299 & Revenue – 152.6 Cr
TP01 (PCU & Revenue)-FY25	PCU-20,672 & Revenue – 68.2 Cr

Source: Concession Agreement, Crisil Intelligence

2.2 Scope

The scope of the traffic assessment for the project road is divided into following four sections.

1. Detailed Assessment of the project road
   Include review of the Historic TMS Data, past traffic growth, detailed network assessment.
2. Primary Data collection & Analysis
   Conducting preliminary traffic surveys like TVC and Origin-Destination (O-D) to understand the traffic patterns, commodity profiles.
3. Network Impact Assessment
   To Analyse the upcoming network developments which may impact the project road traffic

4. Traffic and Revenue Projections

Traffic & Revenue projections considering relevant growth drivers and network developments

Approach & Methodology is detailed out in Traffic Growth Estimation & Traffic forecast chapter.

2.3 Overview of Key Influence Area

The project road entirely falls in the state of Odisha. A brief description of state profile and key influencing district around the project section is presented below.

Overview of Odisha State profile

Odisha is located in the eastern region of India, bordered by West Bengal to the northeast, Jharkhand to the north, Andhra Pradesh to the south, Chhattisgarh to the west, and the Bay of Bengal to the east. Key highways such as NH-16 (formerly NH-5) and NH-49 link Odisha with West Bengal, Andhra Pradesh, and Chhattisgarh. The state boasts a comprehensive railway system, featuring numerous stations that connect it to various other states. The East Coast Railway (ECoR) zone is vital for linking Odisha to major urban centres like Kolkata, Chennai, Mumbai, Delhi, and Bangalore via different railway routes. Moreover, Biju Patnaik International Airport in Bhubaneswar and Jharsuguda Airport act as significant air hubs, offering both domestic and international flight services. These airports facilitate connections between Odisha and major Indian cities, as well as select international locations.

Odisha's Gross State Domestic Product (GSDP) was recorded at Rs 5,209.1 billion for the fiscal year 2023-24, experiencing a compounded annual growth rate of 7.0 percent since 2013-14. The tertiary sector is the predominant contributor to the GSDP, accounting for 32.0 percent, followed by the primary sector at 26 percent, and the secondary sector at 34.9 percent of the GSDP for 2023-24. Odisha is rich in natural resources and boasts a significant coastline, holding one-fifth of India's coal reserves, a quarter of its iron ore, and one-third of its bauxite reserves.

Major resources in Odisha

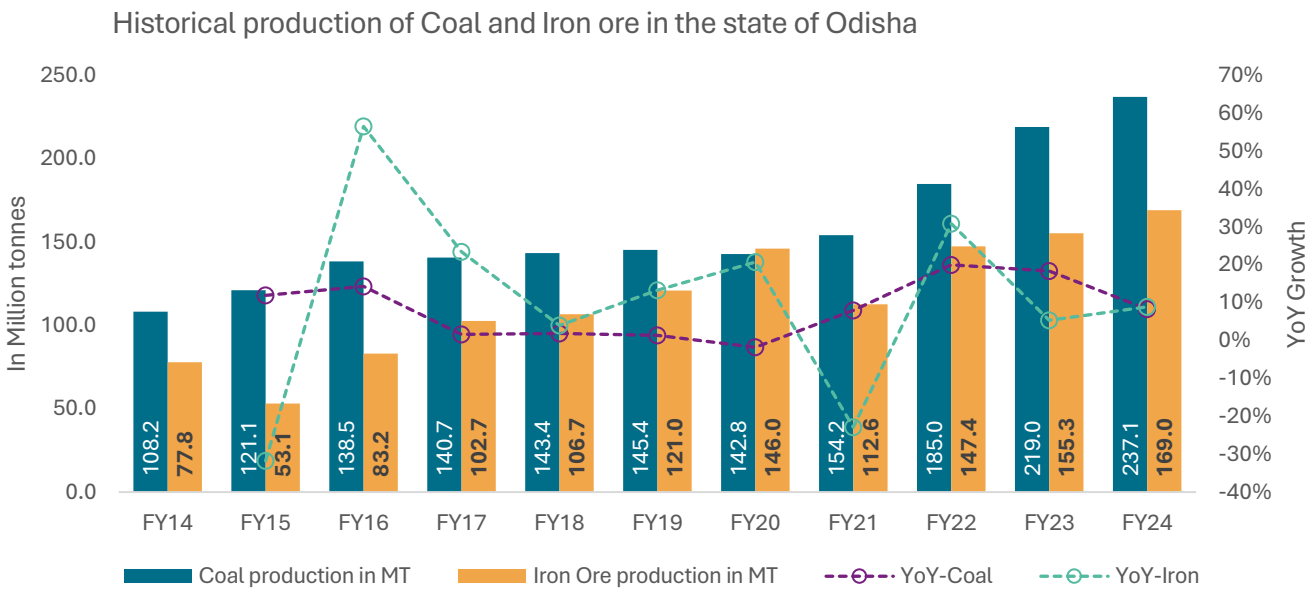
Odisha is recognized as a mineral-rich state in India. It has extensive reserves of high-quality minerals such as iron ore, bauxite, chromite, manganese ore, coal, limestone, dolomite, platinum group metals (PGM), nickel, vanadium, graphite, gemstones, diamonds, dimension stones, and decorative stones. Importantly, the Adash block in the Deogarh district has been noted for its reserves of gold and silver, according to a survey by the Geological Survey of India (GSI). As per the most recent report from the Indian Bureau of Mines, Odisha contributes 100% of India's chromite production, 73% of bauxite, 24% of coal, 53% of iron ore, and 20% of manganese. The mineral resources of the state are primarily located in the southern and western districts. Iron ore deposits can be found in districts such as Keonjhar, Sundargarh, Mayurbhanj, and Jajpur, while coal, another key mineral, is mainly found in Jharsuguda, Angul, Dhenkanal, Gajapati, and Sundargarh districts. The chromite mines are situated in Keonjhar, Jajpur, Dhenkanal, and Balasore districts, whereas bauxite mines are primarily located in Kalahandi, Koraput, and Bolangir districts.

- Coal and iron ore account for approximately 90% of Odisha's overall mineral production.

- The state's mineral output has generally trended upwards from 2013-14 to 2023-24, with the exception of a minor drop in 2014-15 and during the COVID-19 pandemic year of 2020-21.
- Bauxite ore constitutes roughly 4.0% of the mineral production in Odisha, with Koraput and Rayagada districts being the main contributors.
- Odisha is a key producer of various minerals including iron ore, chromite, coal, bauxite, limestone, graphite, and manganese ore.
- The minor minerals found in Odisha include materials such as building stones, gravel, ordinary clay, ordinary sand (excluding specific uses), and other minerals recognized by the Government of India. The Odisha Minor Mineral Concession Rules 2016 were enacted by the State Government and took effect on December 15, 2016.
- The minor minerals officially acknowledged in Odisha comprise Quartzite, Pyrophyllite, China clay, Dolomite, Soapstone, Fire clay, Silica sand, and Sandstone.

The historical production of coal and iron ore from the state of Odisha is presented below.

Figure 2-2: Coal and Iron ore production in the state of Odisha



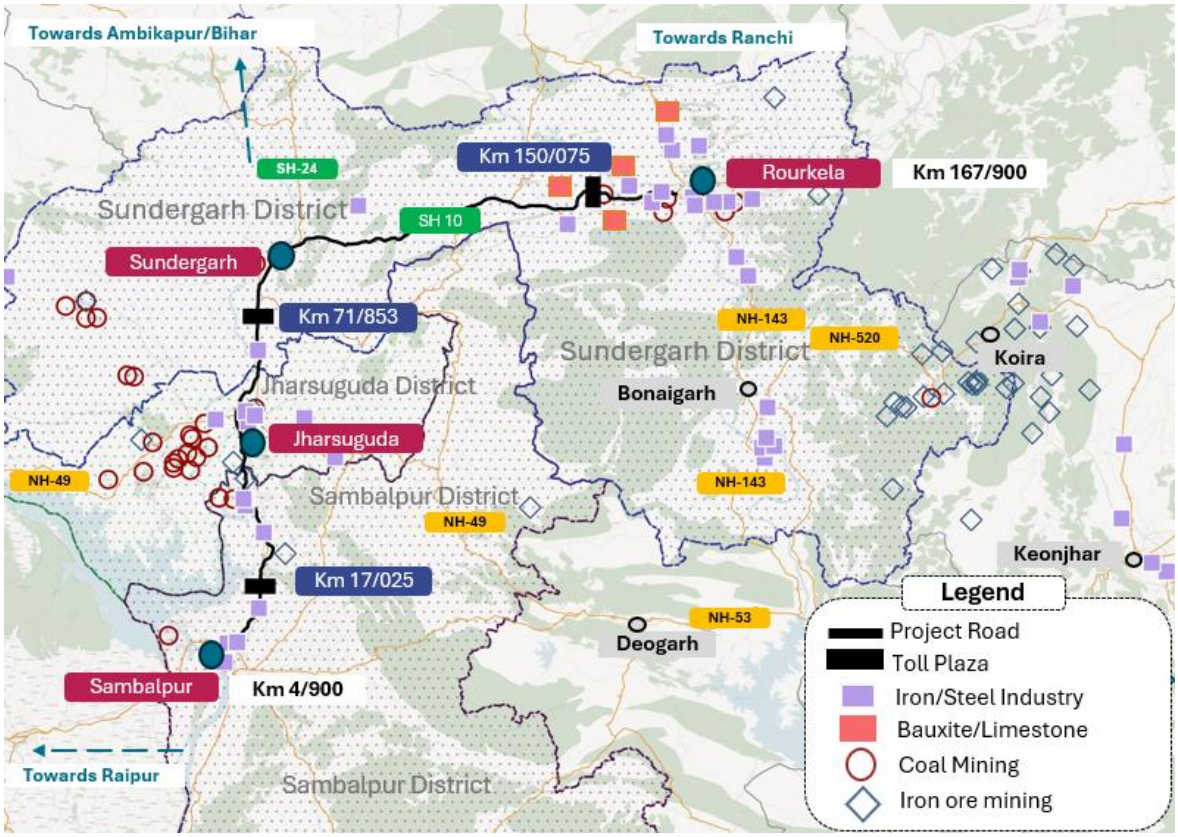
Source: Ministry of Steel and mines, Govt of Odisha, Crisil Intelligence

- Iron ore extraction makes up about 39% of the total mineral output, with Keonjhar district being the leading contributor, followed by Sundargarh, Jajpur, and Mayurbhanj. Production grows at a rate of 8.1 percent for the period FY24 vs FY14 and about 6.9 percent for the period FY19 vs FY24.
- Coal extraction makes up about 54% of the total mineral output, with Sundergarh district being the leading contributor, followed by Angul. Production grows at a rate of 8.2 percent for the period FY24 vs FY14.

In summary, coal and iron ore are pivotal in Odisha's mineral production, and despite some variations, the state has seen growth in its mineral output over the years. Furthermore, the Odisha Minor Mineral Concession Rules 2016 regulate the extraction and management of minor minerals within the state. Mineral sand and dolomite are crucial to the overall value of mineral production in Odisha during the specified timeframe.

Project road falls under three districts, i.e. Sambalpur, Jharsuguda and Sundergarh district. TP01 falls under Sambalpur district and TP02 and TP03 falls under Sundergarh district. The influence region of district around the project section is presented below

Figure 2-3: Project Influence district



Source: Open Street Map, Crisil Intelligence

Sambalpur District profile

Sambalpur district is situated in the western part of Odisha state, bordered by Deogarh district to the east, Bargarh district to the west, Jharsuguda district to the north, and Sonepur and Angul districts to the south.

The primary crops cultivated in the district include sugarcane, rice, gram, tuar, arhar, sesame, groundnut, mustard, castor, and linseed. Major minerals extracted in Sambalpur district consist of bauxite, coal, base metals (such as lead and copper), china clay, fireclay, dolomite, graphite, and coarse crystal quartz.

There are two industrial zones located in the district, specifically in Sambalpur and Rengali. Key industries in the area include HINDALCO Hirakud Smelter, Hirakud Industrial Works, and Mahanadi Coal Field, all situated near Hirakud town in Sambalpur district.

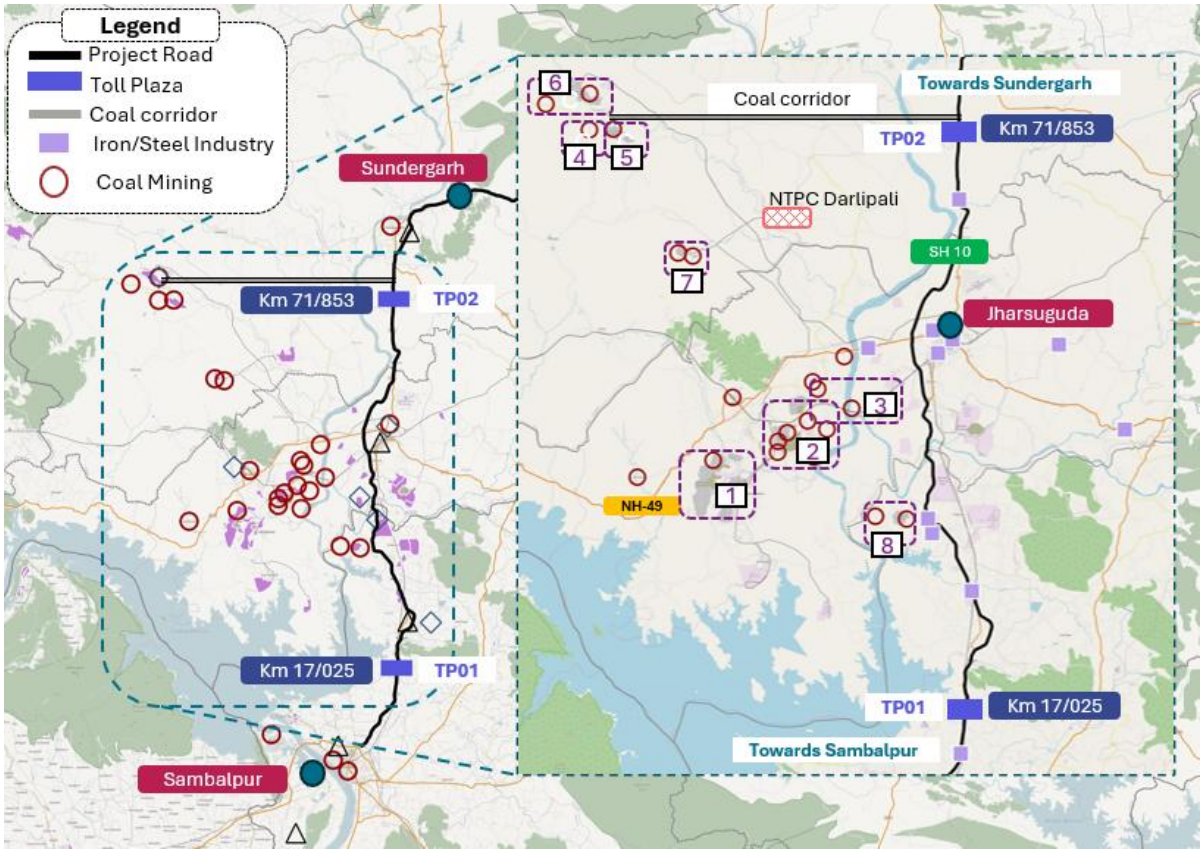
Jharsuguda District profile

Jharsuguda district is situated in the western part of Odisha state, bordered by Sundergarh district to the north, Bargarh district to the south, Sambalpur district to the east, and Chhattisgarh state to the west. Jharsuguda is recognized as a developing industrial centre due to the presence of metallurgical industries. It is often referred to as the powerhouse of Odisha because of the numerous thermal power plants located in its vicinity due to abundance of coal.

Some major industries located in the industries include like The Jharsuguda Cement works located in the village of Arda along the Jharsuguda-Laikera Road, approximately 12 km from Jharsuguda city by road. M/s Ultratech Cement Limited, Vedanta Aluminium Limited (VAL), also known as Bedanta Aluminium Ltd, is situated in the Bhurka Munda area of Jharsuguda district. Other significant industrial units in the area include Utkal Alumina International Ltd, SMC Power Generation Ltd., Action Ispat Ltd., Eastern Steel & Power Ltd., TRL Krosaki Refractories Limited, and SPS Steel & Power Ltd.

The location of mines and its connection (via newly developed coal road) to project road is presented below.

Figure 2-4: Location of coal mines and its connection to the project section



Source: Open Street Map, Crisil Intelligence

District has presence of several coal mines under Mahanadi coal fields and is well connected to the project road. Majority of the coal transported via project road originates from the mines present along the project road and is presented below

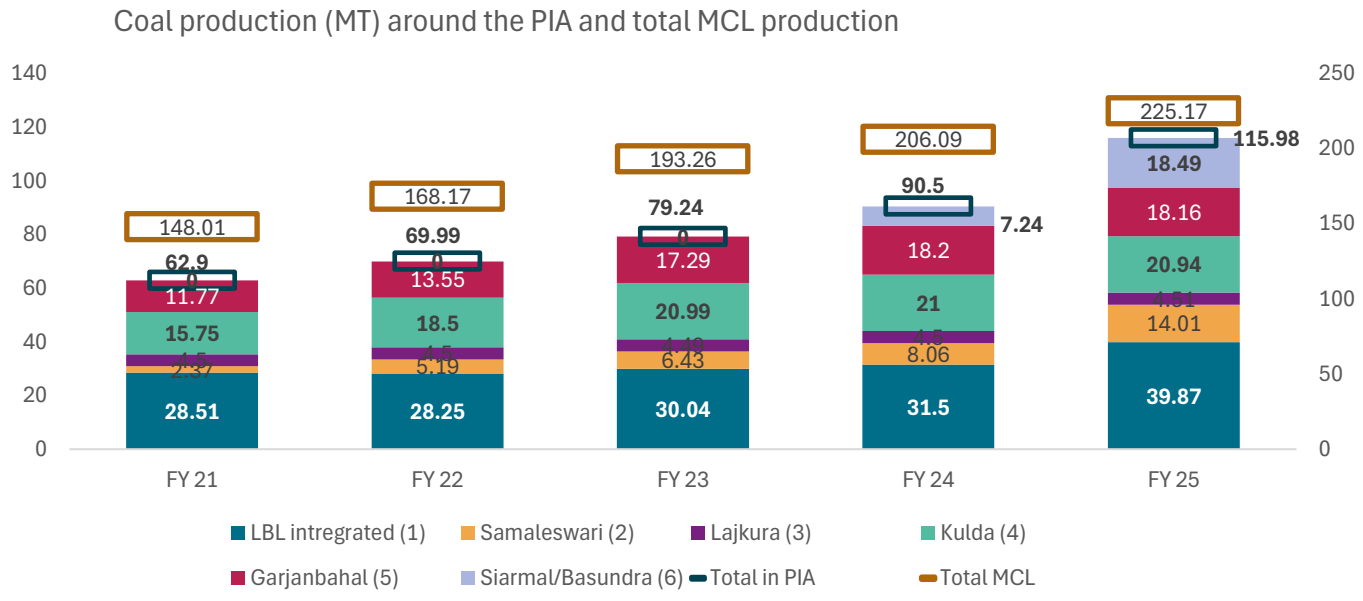
Table 2-3: Coal mines located around the project section

Map Notation	Coal Mines
1	LBL (Lakhanpur and Belapahar) Integrated coal mine
2	Samleshwari coal mines
3	Lajkura coal mines
4	Kulda coal mines
5	Garjanbahal coal mines
6	Basundra and Siarmal coal mines
7	Dulanga coal mine; captive to NTPC Darlipali
8	Talabira coal mine

Source: Open Street Map, Crisil Intelligence

Mahanadi Coalfields Limited is a major coal-producing company in India and one of the eight subsidiaries of Coal India Limited and accounts to 84% of total coal production in the state of Odisha. Also, the mines located around the project influence area account to about 44 percent of the total coal production in Odisha. LBL integrated (Lakhanpur & Belapahar), Kulda, Siarmal/Basundra accounts to major share of coal production, together it accounts to 68 percent of the total coal production. The historical coal production of the above-mentioned mines is presented below

Figure 2-5: Coal production around the project influence area and total MCL production



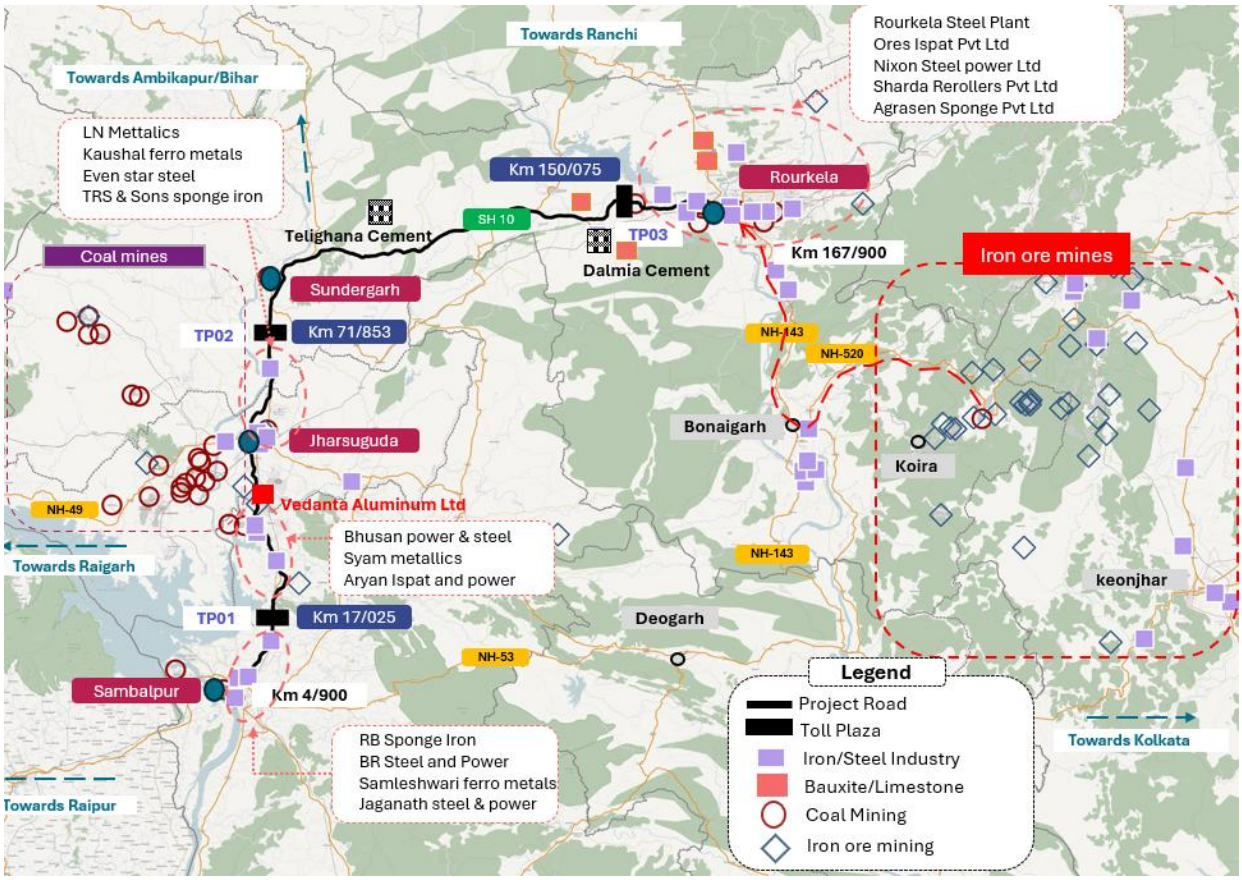
Source: Coal.nic.in, Crisil Intelligence

Coal production saw an increase during the periods of FY22 compared to FY21 and FY23 compared to FY22. This rise can be linked to heightened demand and the expansion of significant plants situated in the project influence area during the same timeframe. Additionally, it is important to highlight that the Siarmal/Basundra mines recorded a production increase in FY25 (18.5 mt) compared to FY24 (7.24 mt).

Sundergarh District profile

Sundargarh district, situated in the northern part of Odisha, shares its borders with the states of Chhattisgarh and Jharkhand. It is one of the larger districts in Odisha. The district is rich in economically valuable minerals such as iron ore, manganese ore, coal, lead ore, limestone, dolomite, and quartz, which are extracted and exported. The primary industries in Sundargarh are concentrated in Rourkela, Rajgangpur, and Kansbahal. Rourkela stands as the third largest city in Sundargarh, housing the NIT institution and a significant Software Technology Park of India. Additionally, it is home to the Rourkela Steel Plant of SAIL, a captive power plant, and a fertilizer township within its premises. The city also features a domestic airport. Sundargarh encompasses the Koira region, which boasts over 33 iron ore mines. The Basundhara coal mines are directly linked to the project stretch via a coal corridor, which is also located in Sundargarh. The region hosts several cement plants due to the presence of limestone deposits across more than 21 mines. Furthermore, it contains reserves of manganese (13 mines) and dolomite. Numerous sponge iron plants, along with Scan Steels and the Dalmia-OCL cement plant, are established in the Sundargarh area. The Project Road is linked directly to the Koira Iron Mines in the Sundargarh district through NH 143 and NH 520. Odisha is responsible for one-third of the total iron ore production in the country, with Sundargarh district contributing over 14% of Odisha's output. The Koira area comprises 33 operational iron mines and is rich in bauxite reserves. Essel Mining, part of the Aditya Birla Group, plays a significant role in this region. A substantial amount of traffic at TP-03 near Rourkela is made up of iron ore transported from the Koira area. Iron ore mines connection to the project section is presented below

Figure 2-6: Iron ore mines connection to the project section

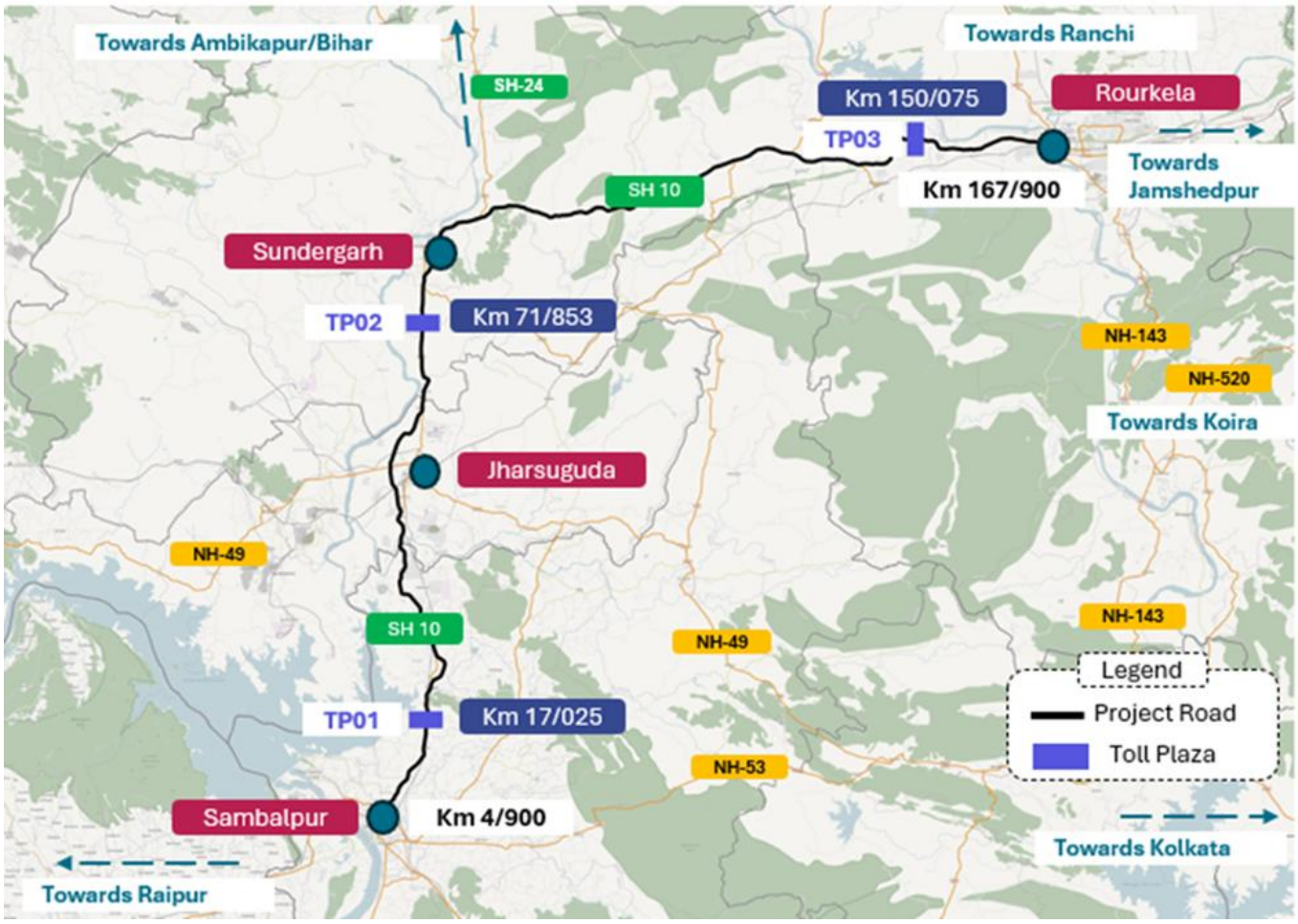


Source: Open Street Map, Crisil Intelligence

2.4 Network Profile

The Project Road located on of SH-10 that links Sambalpur to Rourkela. This section of the project traverses through the industrial areas of Sambalpur, Jharsuguda, Sundergarh, and Rourkela. Furthermore, it ensures smooth connectivity to the iron and coal mining regions within the project's influence area. The section intersects with the major national highway corridor, NH-6 (NH-53), near Sambalpur, which runs from west to east, connecting Mumbai to Kolkata. Additionally, this project section offers access to the northern part of Chhattisgarh, specifically towards Ambikapur via SH-24. It also provides direct access to Raigarh through NH-49, which merges and diverges from the project section close to Jharsuguda. Moreover, NH-143 serves as a feeder road to the project section, leading to Koira, Barbil, and Tensa, which further connected to the iron ore mining areas in the region via NH-520.

Figure 2-7: Project connectivity

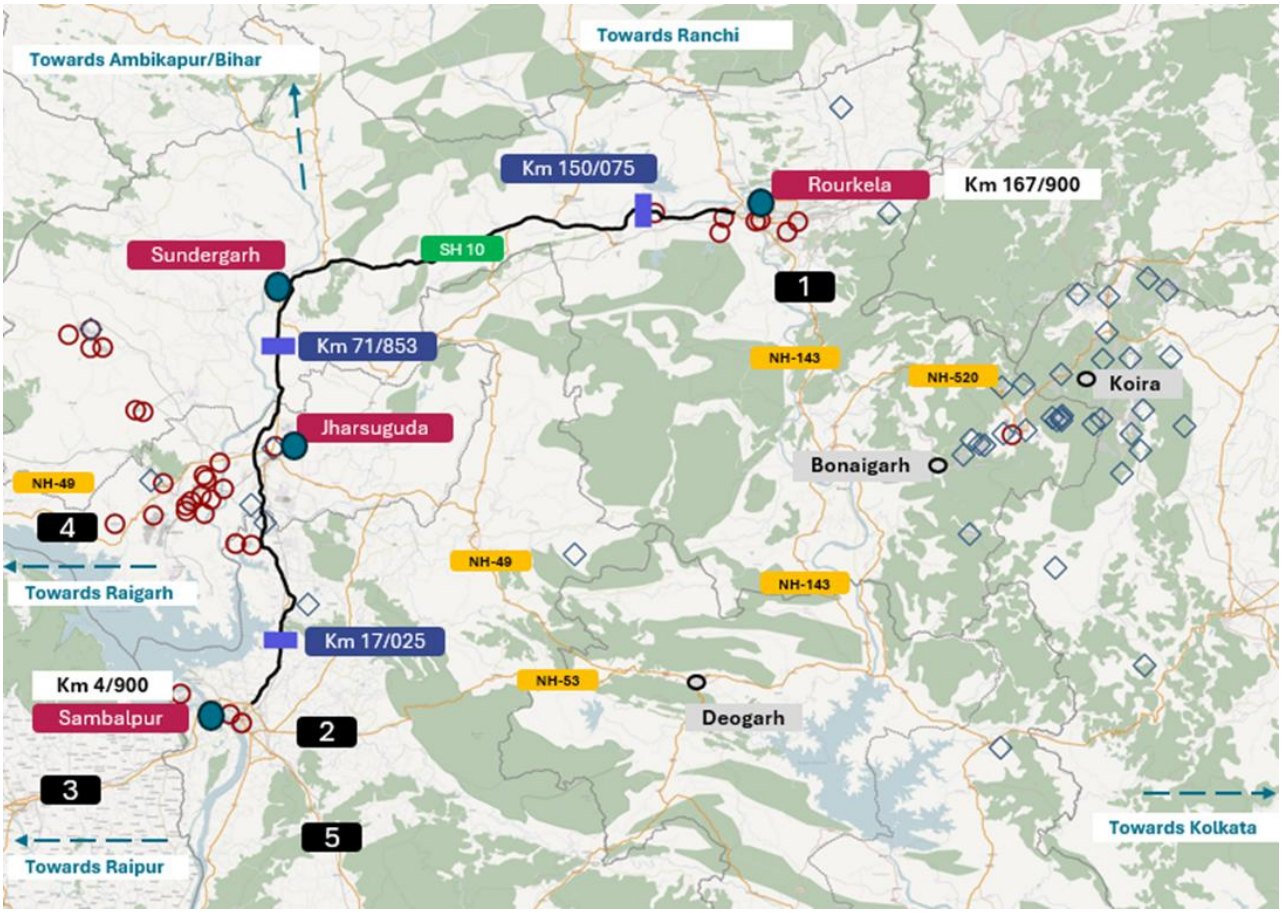


Source: Open Street Map, Crisil Intelligence

Neighbourhood project roads/assets have shown good traffic growth in the recent years

Indian Highways Management Company Limited (IHMCL) publishes toll plazas traffic data for the plazas on national highways and data is analysed for neighboring plazas to understand traffic growth patterns in the region, nearby plazas have shown good traffic growth in recent years. FY 25 traffic PCU and CAGR PCU growth for FY23-FY25 is presented in the below figure.

Figure 2-8: Neighbourhood plazas traffic & growth



Source: Open Street Map, Crisil Intelligence

As stated in the previous section, the project is located on SH-10, linking Sambalpur to Rourkela. To understand the traffic specially MAV pattern at the nearby plazas, were examined since the movement across the selected sections has around majority of the share in traffic from MAV vehicles. It is important to note, however, that the traffic flow from the project section has a distinct nature due to the movement from industries and mining, which will differ from that of other plazas. The section/toll plaza studied is presented below.

Table 2-4: Historical mode wise traffic-TP01

S. No	Toll Plaza	NH/SH	Section Name	FY25 Vs FY24
1	Darjing TP	NH-143	Brahmani Bypass to Rajamunda Section	6.4%
2	Pudapada TP	NH-53	Teleibani to Sambalpur Section	2.4%
3	Bargarh TP	NH-53	Sambalpur- Baragarh -Orisha	4.2%
4	Jhalmala TP	NH-49	Kanaktora to Jharsuguda	-7.2%
5	Bideibadkudar	NH-53	Binjabahal - Teliebani	-4.5%

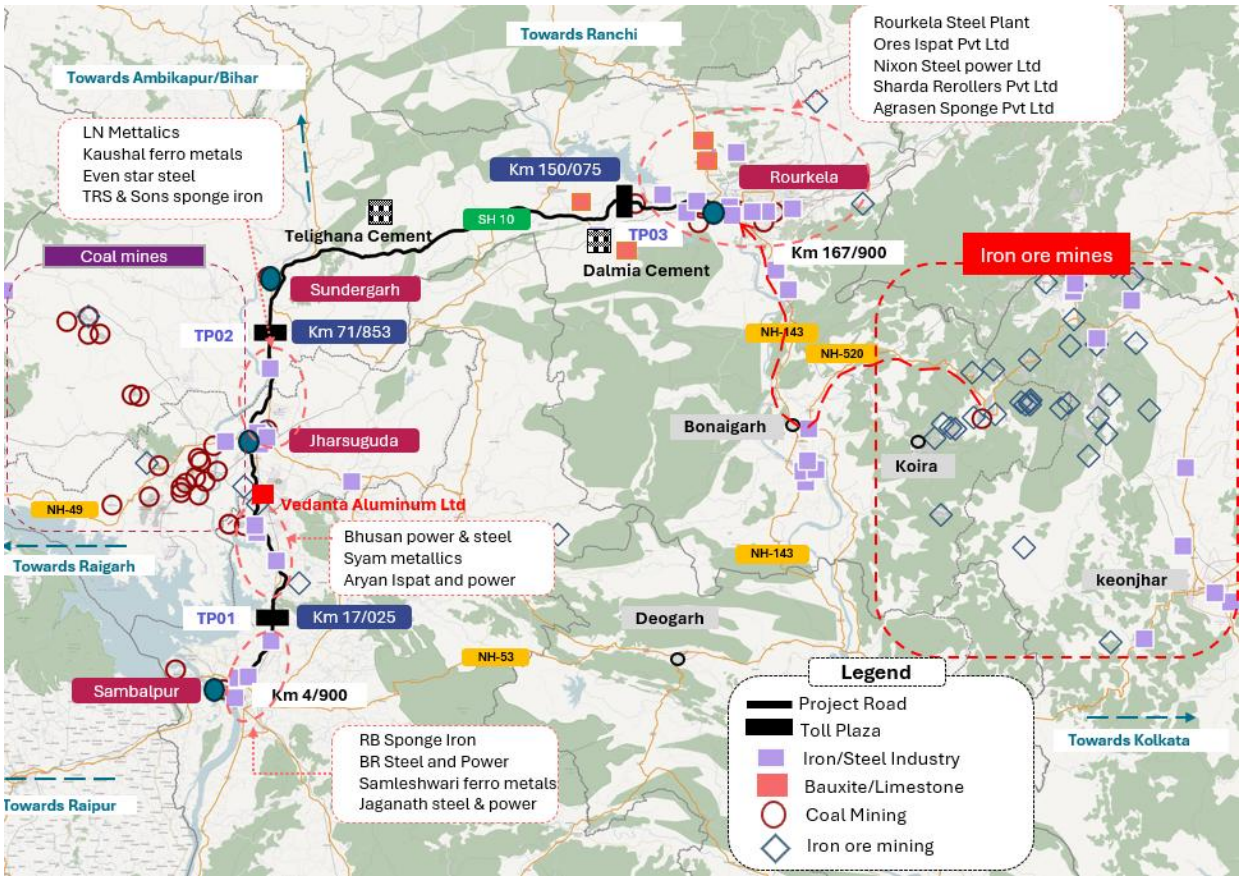
Source: IHMCL, Crisil Intelligence

2.5 Industries near project stretch

The Sambalpur-Rourkela Tollway Limited in Odisha, India, is situated in an area that hosts several prominent industries. These industries play a crucial role in the economic development of the region and contribute significantly to the state's industrial landscape. One of the notable industries near the Sambalpur-Rourkela Tollway is the Rourkela Steel Plant, operated by Steel Authority of India Limited (SAIL). It is one of the largest steel plants in India and a major employer in the region. The plant produces a wide range of steel products and has contributed significantly to the and international.

Additionally, the region is known for its significant coal mines operated by Coal India Limited. These coal mines supply coal to various industries, including power plants, steel plants, and cement factories. The presence of these industries near the Sambalpur-Rourkela Tollway highlights the strategic importance of the region in terms of industrial development and economic growth. These industries not only generate employment opportunities but also contribute to the overall development of the state of Odisha.

Figure 2-9: Industries and Mining near the project section



Source: Open Street Map, Crisil Intelligence

Industrial cluster near the project influence area:

Sector-wise disaggregation indicates that repairing services account for majority share in MSMEs, with almost 62% share of total MSMEs setup in the State and generating 49% of the total employment opportunities created through MSME units.

Focus Sectors for Odisha Government highlighted during the Make in Odisha Conclave of 2018

- Agro Food Processing including Seafood
- Textiles including technical textiles
- Ancillary and Downstream Industries in Metal Sector
- Chemicals, Plastics and Petrochemicals
- Electronics Manufacturing

Vedanta Aluminum has partnered with Odisha Industrial Infrastructure Development Corporation (IDCO) to set up Vedanta Aluminium Park near its aluminium smelter in Jharsuguda. The park will offer facilities such as water, power, hot metal supply, dross processing plant, as well as other benefits to companies that set up their manufacturing units in the park. The project is expected to attract investments of over Rs 2,000 crores to Odisha and engage thousands of MSMEs in the ecosystem.

Major SMEs clusters near the stretch is presented below

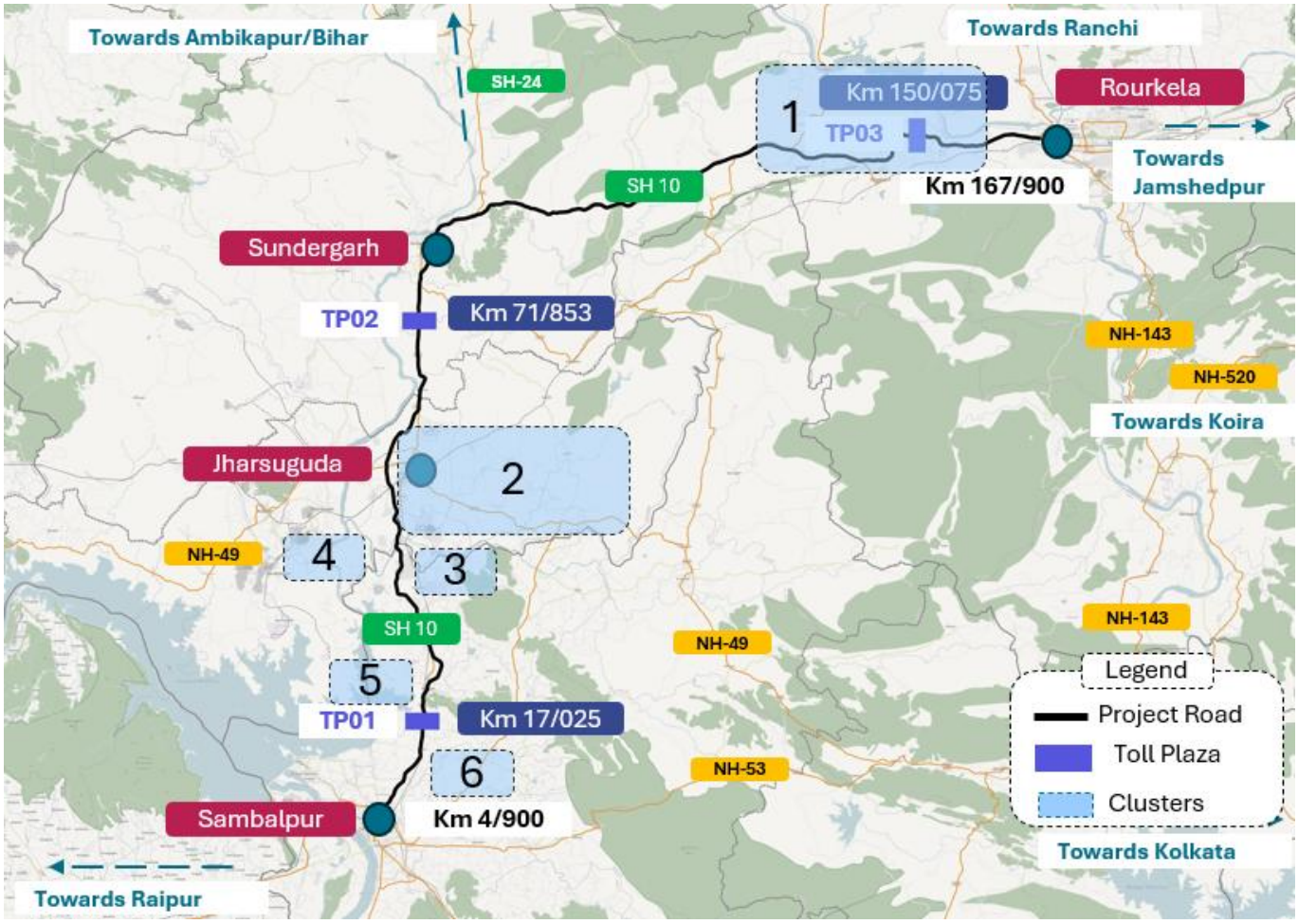
Table 2-5: Major SMEs Cluster near the stretch

Cluster	Major SMEs
Cluster-1	L&T Ltd, Weltech engineers Structural Fabrication & Engg Works, Sural Products, Agrasen Sponge Pvt Ltd.
Cluster-2	Maa Enterprises, D&F Foundry and Revolving Mills Pvt Ltd., Orissa Development Corporation Ltd
Cluster-3	Allwyn Chemicals & Industries, RB Sponge, Hitech Bottling Pvt Ltd.
Cluster-4	Bhagabati Steel Pvt Ltd, SPS Power and Steel, Indian Carbon Ltd, Bitumen Pvt Ltd, Singhal Enterprises
Cluster-5	Shyam Metallics, Viraj Steel, Gotal Coal Ta
Cluster-6	Agarwal Graphite, Samleshwari Ferro, Visaka Industries

Source: Crisil Intelligence

The clusters mentioned above has been traced to map and presented below

Figure 2-10: Major SMEs Cluster near the stretch



Source: Open Street Map, Crisil Intelligence

3 Primary Data Collection & Analysis

3.1 General

Primary traffic surveys, i.e. Traffic volume count and Origin Destination surveys were collected on the project road to understand the traffic and travel pattern of vehicles plying on the project road.

For the present study, seven days video-based traffic volume count and two days (48-Hours) origin destination survey conducted at the toll plaza location on the project road. The schedule of the traffic surveys carried out as part of the study on the project road are presented in the below table and figure.

Table 3-1: Type of Survey & Schedule

Location	Type of Survey	Survey Duration	Survey Date
Traffic Volume Count	TP01 (Km17/025)	7 Days	26th May-2025 to 1st June-2025
	TP02 (Km71/853)		
	TP03 (Km150/075)		
OD Survey	TP01 (Km17/025)	2 Days	27th & 28th May -2025
	TP02 (Km71/853)		28th & 29th May-2025
	TP03 (Km150/075)		29th & 30th May-2025

Source: Crisil Intelligence

Figure 3-1: Project Section Alignment



Source: Open Street Map, Crisil Intelligence

3.2 Traffic Characteristics

The seven days traffic volume count was analysed to get existing traffic intensity, daily variations, and traffic composition.

The vehicle classification and there PCU values as suggested in IRC: 64-1990 are presented in below table.

Table 3-2: PCU Factors-IRC:64-1990

Mode	PCU
Car/Jeep	1.0
Two-Wheeler	0.5
Three-Wheeler	1.0
Minibus/School Bus	1.5
Bus (Govt/Pvt)	3.0
Mini LCV	1.0
LCV	1.5
2-Axle	3.0
3-Axle	3.0
MAV (4-6 Axles)	4.5
HME/OSV	4.5
Agricultural Tractor	1.5
Agricultural Tractor with Trailer	4.5
Cycle	0.5
Cycle Rickshaw	2.0
Animal Drawn Crat	6.0

Source: IRC:64-1990

The average daily tollable traffic volume at the toll plaza locations were analysed. The summary of ADT in terms of vehicles and PCUs is presented in table.

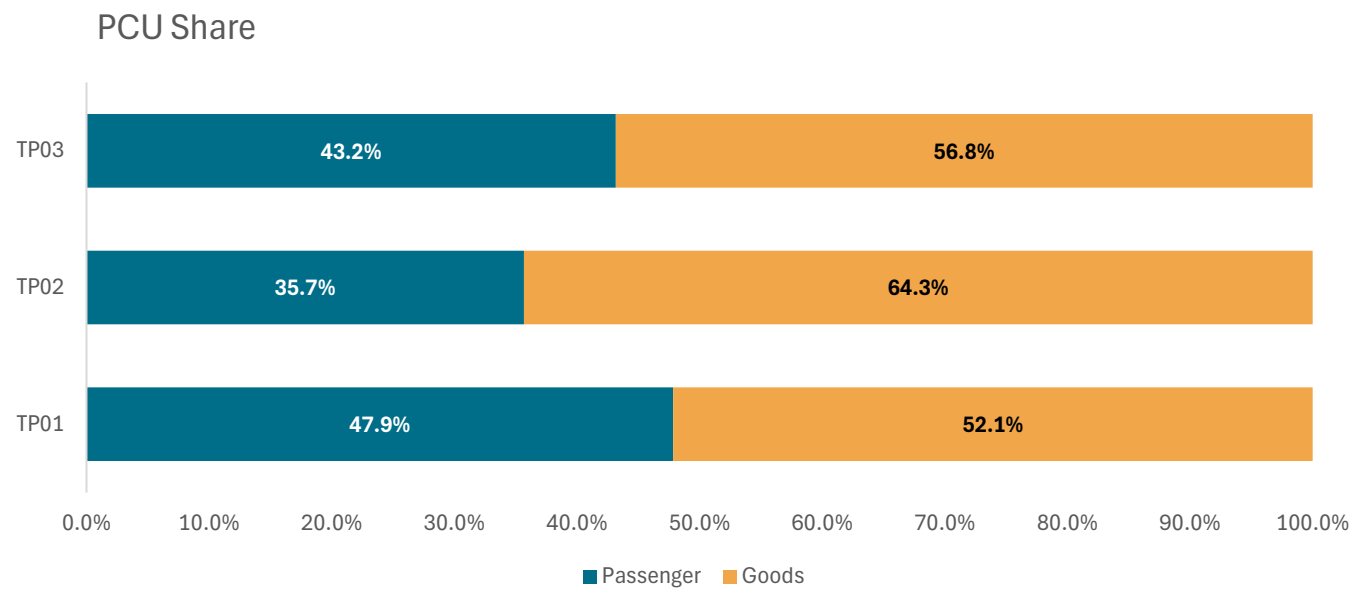
Table 3-3: Average Daily Traffic (ADT) for the Project Section

Mode	Rourkela-Sambalpur	Sambalpur-Rourkela	ADT
TP01			
Car	1,331	1,552	2,883
Minibus	26	36	62
Bus	234	218	452
3-Ax Bus	2	1	3
Mini LCV	332	340	672
LCV	96	81	177
Truck-2 Axle	227	221	448
Truck-3Axle	263	327	590
MAV	1,360	1,584	2,944
OSV	0	1	1
Vehicles	4,361	3,871	8,232
PCU	**11,502**	**10,144**	**21,646**
TP02			
Car	2,174	2,149	4,324
Minibus	25	28	53
Bus	251	239	490
3-Ax Bus	3	1	4
Mini LCV	373	414	787
LCV	92	92	184
Truck-2 Axle	258	249	507
Truck-3Axle	289	268	557
MAV	1,622	1,643	3,265
OSV	3	5	7
Vehicles	5,091	5,088	10,179
PCU	**12,442**	**12,432**	**24,874**
TP03			
Car	1,770	1,804	3,574
Minibus	7	8	16
Bus	195	217	412
3-Ax Bus	2	3	5
Mini LCV	289	294	583
LCV	74	67	141
Truck-2 Axle	188	192	380
Truck-3Axle	122	118	240

Mode	Rourkela-Sambalpur	Sambalpur-Rourkela	ADT
MAV	2,081	1,844	3,924
OSV	3	3	7
Vehicles	4,731	4,550	9,281
PCU	13,082	12,116	25,198

Source: Crisil Intelligence

Figure 3-2: PCU share



An analysis of TVC traffic at all the toll plazas on the project road is presented below.

- Passenger vehicles contribute highest at TP01 at ~48% and about 36% at TP02 and 44% at TP03 plaza locations in terms of PCU. As for Goods, highest share of 64 percent is observed at TP02.
- CJV traffic has a share of about 42.5 percent (4,324 vehicles) at TP01, 32.5 percent (3,317 vehicles) at TP02 and 38.5 percent (3,574 vehicles) at TP03.
- Two-axle traffic accounts to a about 5.0 percent (507 vehicles) at TP01, 3.5 percent (352 vehicles) at TP02 and 4.1 percent (380 vehicles) at TP03
- MAV (4-6 axle) traffic has a share of about 32.1 percent (3,265 vehicles) at TP01, 51.0 percent (5,203 vehicles) at TP02 and 42.3 percent (3,924 vehicles) at TP03
- Average Daily traffic is about 24,874 at TP01,30,823 at TP02, 31,968 and about 25,198 at TP03 in terms of PCUs
- In terms of vehicles, ADT is about 10,179 at TP01, 10,195 at TP02, 41,157 and 9,281 at TP03.

TVC survey data for the seven-day period is presented in the below table.

Table 3-4: Daily traffic volume at all toll plaza locations

Date	CJV	LCV/Minibus	Bus	Truck 2A	Truck 3A	MAV/OSV	Total
TP01							
26-May-25	3,555	239	452	448	593	2,945	8,232
27-May-25	5,011	207	493	580	615	3,252	10,158
28-May-25	5,560	266	528	522	625	3,560	11,061
29-May-25	5,222	253	520	522	565	3,328	10,410
30-May-25	5,455	253	505	528	614	3,439	10,794
31-May-25	5,443	253	465	572	528	3,457	10,718
01-Jun-25	5,532	181	467	374	382	2,926	9,862
WADT	**5,111**	**236**	**490**	**507**	**560**	**3,272**	**10,176**
TP02							
26-May-25	3,312	124	288	285	244	5,465	9,718
27-May-25	3,873	139	287	355	289	5,460	10,403
28-May-25	4,157	175	276	418	238	5,414	10,678
29-May-25	4,015	159	261	383	259	4,943	10,020
30-May-25	4,031	148	276	368	288	5,162	10,273
31-May-25	3,933	148	269	364	263	4,733	9,710
01-Jun-25	4,333	138	291	293	298	5,297	10,650
WADT	**3,951**	**147**	**278**	**352**	**268**	**5,211**	**10,207**
TP03							
26-May-25	3,431	155	374	344	179	4,053	8,536
27-May-25	3,985	172	424	375	243	4,259	9,458
28-May-25	4,459	159	420	412	258	4,388	10,096
29-May-25	4,208	157	425	403	270	3,942	9,405
30-May-25	4,191	143	382	395	271	4,150	9,532
31-May-25	4,151	143	443	401	258	3,269	8,665
01-Jun-25	4,673	114	417	330	336	3,456	9,326
WADT	**4,157**	**149**	**412**	**380**	**259**	**3,931**	**9,288**

Source: Survey Data, Crisil Intelligence

Toll Management system (TMS) data was provided survey days, and comparison is made with TVC (survey data). Overall variations of traffic are about **-0.4%** and which is within tolerable limits. However, variations in LCV and Bus

can be observed that could be on account of Minibus and Buses are toll free at the project section and which is not reflected fully in TMS data. In addition, cross classification error could be observed between LCV/Minibus, Bus and 2A in TVC data.

Table 3-5: TMS vs TVC comparison

Particulars	CJV	LCV/Minibus	Bus	Truck 2A	Truck 3A	MAV/OSV	Total
TP01							
WADT (TVC)	5,111	236	490	507	560	3,272	10,176
WADT (TMS)	5 136	196	452	491	577	3 286	10 138
% Variation	-0.5%	20.3%	8.5%	3.2%	-2.9%	-0.4%	0.4%
TP02							
WADT (TVC)	3,951	147	278	352	268	5,211	10,207
WADT (TMS)	3 970	112	258	326	239	5 215	10 121
% Variation	-0.5%	31.8%	7.7%	8.2%	12.2%	-0.1%	0.9%
TP03							
WADT (TVC)	4,157	149	412	380	259	3,931	9,288
WADT (TMS)	4 109	144	354	350	199	3 914	9 069
% Variation	1.2%	3.7%	16.5%	8.6%	30.1%	0.4%	2.4%

Source: Survey Data, Client data, Crisil Intelligence

3.3 Origin-Destination (OD) and Commodity Analysis

Origin-Destination survey was carried out at Samakhiali Plaza for 2 Days (48-hours), by roadside interview method as described in IRC: 102-1988. A random sampling approach was employed to interview both passenger and freight vehicles traversing the project road at the toll plaza locations. The survey aimed to gather information on various aspects, including origin, destination, frequency of trips, purpose of travel and for freight vehicles, the type of commodity being transported.

The regional distribution of tollable vehicles at the toll plaza locations has been estimated based on OD matrices is presented in below table and figure.

The project influencing states will provide an overview of the factors likely to influence the pattern of economic development and hence the flows and volumes of traffic on the project road.

Regional Influence

The key influencing regions from the origin destination survey are Odisha, Jharkhand, and Chattishargh. Regional distribution for passenger traffic and goods traffic is given in the below table.

Table 3-6: Regional Distribution in % for passenger traffic

State/Region	TP01-% Influence	TP02-% Influence	TP03-% Influence
Odisha	87.8%	93.3%	79.6%
Jharkhand	4.3%	2.9%	9.2%
Bihar	0.3%	0.3%	0.0%
Andhra Pradesh	3.3%	0.4%	0.0%
Chhattisgarh	4.3%	3.1%	7.3%
Uttar Pradesh	0.0%	0.0%	0.0%
Maharashtra	0.0%	0.0%	0.0%
South India State	0.0%	0.0%	0.0%
Rest of India	0.0%	0.0%	3.8%
Total	**100.0%**	**100.0%**	**100.0%**

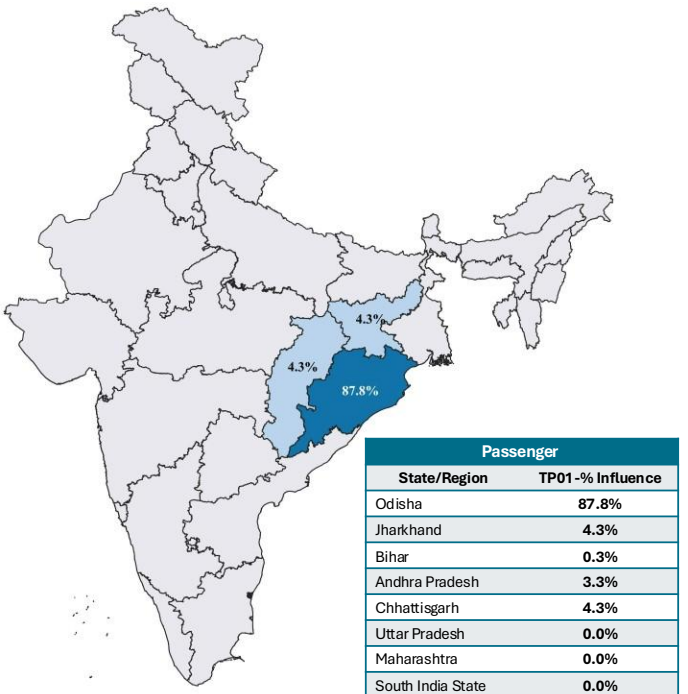
Source: Primary survey, Crisil Intelligence

Table 3-7: Regional Distribution in % for goods traffic

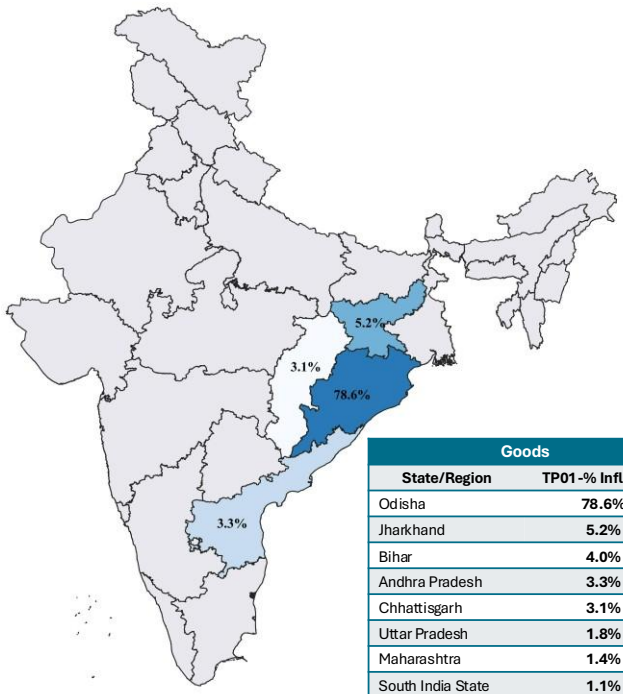
State/Region	TP01-% Influence	TP02-% Influence	TP03-% Influence
Odisha	78.6%	71.8%	66.6%
Jharkhand	5.2%	7.4%	9.0%
Bihar	4.0%	3.3%	1.7%
Andhra Pradesh	3.3%	3.5%	0.9%
Chhattisgarh	3.1%	4.3%	7.5%
Uttar Pradesh	1.8%	3.6%	1.3%
Maharashtra	1.4%	1.2%	2.0%
South India State	1.1%	1.0%	1.4%
Rest of India	1.4%	3.8%	9.6%
Total	**100.0%**	**100.0%**	**100.0%**

Source: Primary survey, Crisil Intelligence

Figure 3-3: State influence for Passenger and goods-TP01



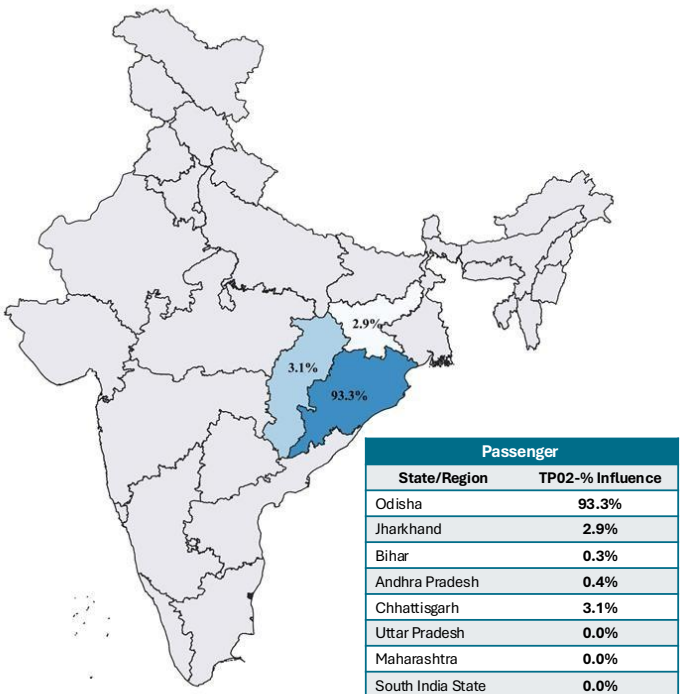
Passenger	
State/Region	TP01 -% Influence
Odisha	87.8%
Jharkhand	4.3%
Bihar	0.3%
Andhra Pradesh	3.3%
Chhattisgarh	4.3%
Uttar Pradesh	0.0%
Maharashtra	0.0%
South India State	0.0%
Rest of India	0.0%



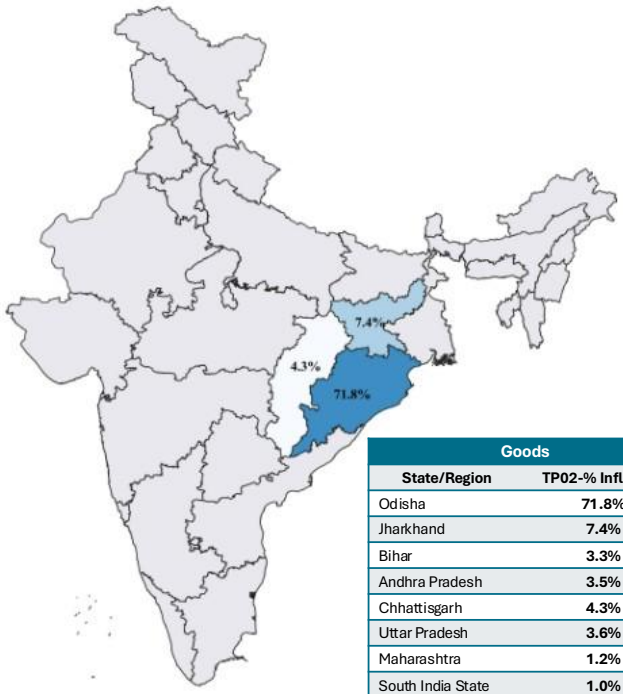
Goods	
State/Region	TP01 -% Influence
Odisha	78.6%
Jharkhand	5.2%
Bihar	4.0%
Andhra Pradesh	3.3%
Chhattisgarh	3.1%
Uttar Pradesh	1.8%
Maharashtra	1.4%
South India State	1.1%
Rest of India	1.4%

Source: Crisil Intelligence

Figure 3-4: State influence for Passenger and goods-TP02



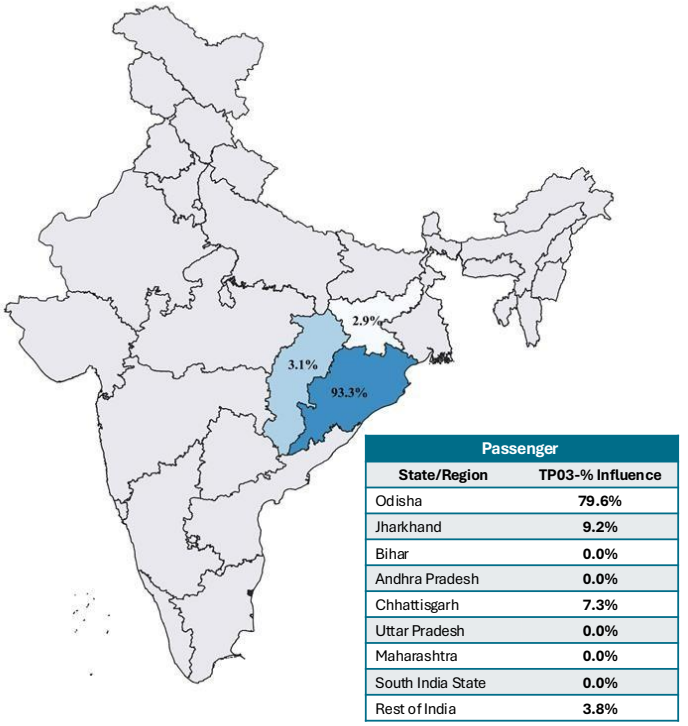
Passenger	
State/Region	TP02-% Influence
Odisha	93.3%
Jharkhand	2.9%
Bihar	0.3%
Andhra Pradesh	0.4%
Chhattisgarh	3.1%
Uttar Pradesh	0.0%
Maharashtra	0.0%
South India State	0.0%
Rest of India	0.0%



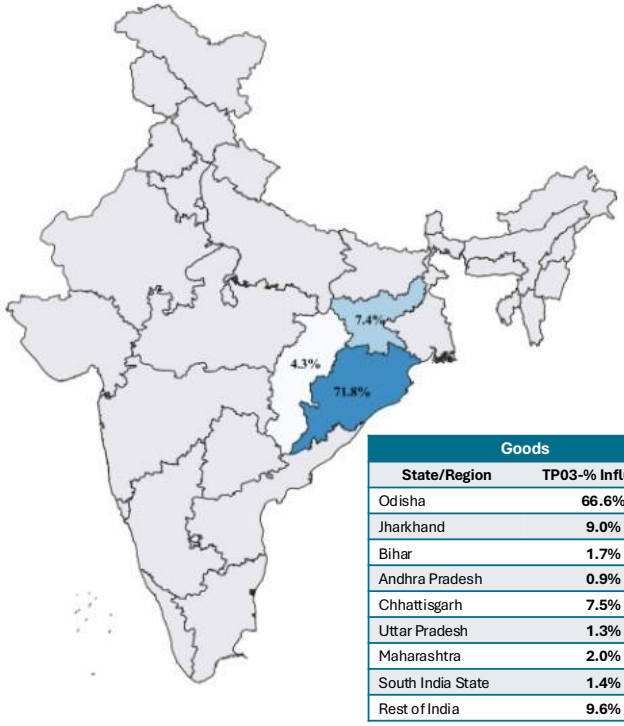
Goods	
State/Region	TP02-% Influence
Odisha	71.8%
Jharkhand	7.4%
Bihar	3.3%
Andhra Pradesh	3.5%
Chhattisgarh	4.3%
Uttar Pradesh	3.6%
Maharashtra	1.2%
South India State	1.0%
Rest of India	3.8%

Source: Crisil Intelligence

Figure 3-5: State influence for Passenger and goods-TP03



Passenger	
State/Region	TP03-% Influence
Odisha	79.6%
Jharkhand	9.2%
Bihar	0.0%
Andhra Pradesh	0.0%
Chhattisgarh	7.3%
Uttar Pradesh	0.0%
Maharashtra	0.0%
South India State	0.0%
Rest of India	3.8%



Goods	
State/Region	TP03-% Influence
Odisha	66.6%
Jharkhand	9.0%
Bihar	1.7%
Andhra Pradesh	0.9%
Chhattisgarh	7.5%
Uttar Pradesh	1.3%
Maharashtra	2.0%
South India State	1.4%
Rest of India	9.6%

Source: Crisil Intelligence

TP01:

Passenger Traffic

- Odisha contribute to 88 percent passenger traffic and followed by Jharkhand and Chattishargh with 4 percent each respectively.
- Sambalpur to Jharsuguda and Sambalpur to Sundergarh and vice versa are the major OD pairs in car traffic. This is due to the presence of industrial estates in and around Sambalpur, Jharsuguda, Sundergarh and Rourkela etc and daily commute trips to work attributing to car.

Freight Traffic

- Odisha contribute to 79 percent of freight traffic followed by Jharkhand contributing to 5 percent.
- The Plaza and the project section has a greater influence of industrial areas located at Sambalpur, Jharsuguda, Sundergarh and Rourkela, these industries are mostly iron and steel industry along with cement-based industry also. The interaction of goods vehicles from industries largely influences the project commercial traffic.

TP02:

Passenger Traffic

- Odisha contribute to 93 percent passenger traffic and followed by Jharkhand and Chattishargh with 3 percent each respectively.

- Jharsuguda to Sundergarh and Jharsuguda to Rourkela and vice versa are the major OD pairs in car traffic. This is due to the presence of industrial estates in and around Sambalpur, Jharsuguda, Sundergarh and Rourkela etc and daily commute trips to work attributing to car.

Freight Traffic

- Odisha contribute to 80 percent of freight traffic followed by Jharkhand contributing to 9 percent.
- The Plaza and the project section has a greater influence of industrial areas located at Jharsuguda, Sundergarh and Rourkela. Also, the toll plaza is also influenced by the presence of coal mines in the vicinity which connected directly via coal corridor to Basundra mines. These movements are observed from the mines towards the Jharsuguda specially to the plants such as Aryan Steel and BSPL. In addition, iron ore movement from Rourkela to Jharsuguda direction can also be observed which feeds to the iron and steel industries located around the project influence areas.

TP03:

Passenger Traffic

- Odisha contribute to 80 percent passenger traffic and followed by Jharkhand and Chattishargh with 9 percent and 7 percent respectively.
- Sundergarh to Rourkela and Jharsuguda to Rourkela and vice versa are the major OD pairs in car traffic. This is due to the presence of industrial estates in and around, Sundergarh and Rourkela etc and daily commute trips to work attributing to car.

Freight Traffic

- Odisha contribute to 67 percent of freight traffic followed by Jharkhand contributing to 9 percent and followed by Chhattisgarh accounting to about 7 percent
- The Plaza and the project section has a greater influence of industrial areas located at Sundergarh and Rourkela, these industries are mostly iron and steel industry along with sponge iron based. Industrial area located at Rajgangpur. The traffic has significant movement of iron ore movement from Koira/Baril to Sundergarh and Jharsuguda. These ores feeds to the sponge iron and steel industries located at the project influence area. In addition, finished goods are transported to Jharsuguda and West Bengal. The Rourkela steel plant also significantly influences the project road traffic. Also, Limestone mines are located near the plazas which feeds to the cement located at Sundergarh and Rourkela. The byproduct i.e. fly ash from these cement industries further transported to destinations to Rourkela, Jharkhand, Jharsuguda and beyond. Chhattisgarh also contributes a significant share in the commercial movement which crosses TP03 and TP02 only which is mostly interaction from Korba/Ambikapur to Rourkela for both finished goods and raw materials. The movement of coal at TP03 is significantly lower than the other two plazas.

3.4 Zonal Influence

The key influencing zones/regions at TP01 from the origin destination survey are Sambalpur, Jharsuguda, Sundergarh and Bargarh for Passenger traffic, indicating more local movements and for goods traffic key influencing zones/regions are Sambalpur, Jharsuguda, Sundergarh and Kendujhar districts.

Table 3-8: TP01- Zonal influence in % for passenger traffic and goods traffic

State/Region	% Influence	State/Region	% Influence
Passenger		**Goods**	
Sambalpur District	39.7%	Sambalpur District	24.4%
Jharsuguda District	14.9%	Jharsuguda District	15.2%
Sundargarh District	13.5%	Sundargarh District	15.1%
Bargarh District	5.4%	Kendujhar District	6.7%
Rest of Odisha	4.8%	Rest of Odisha	6.5%

Source: Client, Crisil Intelligence

The key influencing zones/regions at TP02 from the origin destination survey are Sundergarh, Jharsuguda and Sambalpur district for Passenger traffic, indicating more local movements and for goods traffic key influencing zones/regions are Jharsuguda, Sundargarh, Sambalpur and Jharkhand.

Table 3-9: TP02- Zonal influence in % for passenger traffic and goods traffic

State/Region	% Influence	State/Region	% Influence
Passenger		**Goods**	
Sundargarh District	40.6%	Jharsuguda District	28.0%
Jharsuguda District	30.8%	Sundargarh District	20.4%
Sambalpur District	12.6%	Sambalpur District	11.9%
Rest of Odisha	4.1%	Jharkhand	7.4%
Jharkhand	2.6%	Rest of Odisha	4.4%

Source: Client, Crisil Intelligence

The key influencing zones/regions at TP03 from the origin destination survey are Sundergarh, Jharsuguda and Sambalpur district for Passenger traffic, indicating more local movements and for goods traffic key influencing zones/regions are Jharsuguda, Sundargarh, Sambalpur and Jharkhand.

Table 3-10: TP02- Zonal influence in % for passenger traffic and goods traffic

State/Region	% Influence	State/Region	% Influence
Passenger		**Goods**	
Sundargarh District	40.3%	Sundargarh District	35.3%
Sambalpur District	14.8%	Sambalpur District	10.1%
Jharsuguda	12.6%	Jharkhand	9.0%
Jharkhand	9.6%	Jharsuguda District	7.5%
Chhattisgarh	5.7%	Chhattisgarh	5.8%

Source: Client, Crisil Intelligence

3.5 Top OD Pairs

Key OD pairs-Car traffic and MAV traffic

TP01:

Passenger vehicle movement is largely limited to Odisha state itself. Sambalpur to Jharsuguda, Sambalpur to Sundergarh and Sambalpur to Rengali are major no. of trips at the Toll Plaza. Sambalpur to Sundergarh, Sambalpur to Jharsuguda and Sambalpur to Rourkela are found in MAV top pairs.

Top 5 OD pairs contribute nearly 33% in car traffic and 20% of the traffic in MAV. The top 5 OD pairs are presented in the table below.

Table 3-11: Top OD pairs for car traffic

S. No	OD Pair	% Influence	OD Pair	% Influence
	Cars		MAV	
1	Sambalpur to Jharsuguda	12.11%	Sambalpur to Sundergarh	4.47%
2	Sambalpur to Rest of Sundargarh District	6.50%	Sambalpur to Jharsuguda	3.96%
3	Sambalpur to Rengali	4.85%	Sambalpur to Rourkela	3.65%
4	Sambalpur to Rourkela	4.70%	Sambalpur to Belpahar	3.30%
5	Sambalpur to Sundargarh	4.10%	Sambalpur to Koida	2.99%

Source: Client, Crisil Intelligence

TP02:

Passenger vehicle movement is largely limited to Odisha state itself. Jharsuguda to Sundergarh, Jharsuguda to Rourkela and Sambalpur to Rourkela are major no. of trips at the Toll Plaza. Jharsuguda to Basundra, Jharsuguda to Jharkhand and Jharsuguda to Sundergarh are found in MAV top pairs.

Top 5 OD pairs contribute nearly 54% in car traffic and 25% of the traffic in MAV. The top 5 OD pairs are presented in the table below.

Table 3-12: Top OD pairs for car traffic

S. No	OD Pair	% Influence	OD Pair	% Influence
	Cars		MAV	
1	Jharsuguda to Sundargarh	23.75%	Jharsuguda to Basundra/Tikilipara	5.85%
2	Jharsuguda to Rourkela	10.14%	Jharsuguda to Jharkhand	5.23%
3	Sambalpur to Sundargarh	8.92%	Jharsuguda to Sundargarh	4.32%
4	Jharsuguda to Rest of Sundargarh District	6.13%	Jharsuguda to Rest of UP	3.89%
5	Sambalpur to Rourkela	4.35%	Jharsuguda to Rourkela	3.49%

Source: Client, Crisil Intelligence

TP03:

Passenger vehicle movement is largely limited to Odisha state itself. Sambalpur to Jharsuguda, Sambalpur to Sundergarh and Sambalpur to Rengali are major no. of trips at the Toll Plaza. Sambalpur to Sundergarh, Sambalpur to Jharsuguda and Sambalpur to Rourkela are found in MAV top pairs.

Top 5 OD pairs contribute nearly 27% in car traffic and 18% of the traffic in MAV. The top 5 OD pairs are presented in the table below.

Table 3-13: Top OD pairs for car traffic

S. No	OD Pair	% Influence	OD Pair	% Influence
	Cars		MAV	
1	Sambalpur to Rourkela	8.59%	Sundargarh to Rourkela	5.41%
2	Sambalpur to Jharkhand (Dhanbad)	4.71%	Chhattisgarh (Raigarh, Ambikapur, Korba) to Rourkela	4.38%
3	Sundargarh to Rourkela	4.59%	Sambalpur to Kendujhar	2.60%
4	Jharsuguda to Rourkela	4.59%	Sambalpur to Jharkhand (Dhanbad)	2.25%
5	Rest of Sundargarh District to Rourkela	3.76%	Chhattisgarh (Raigarh, Ambikapur, Korba) to Jharkhand (Dhanbad)	2.01%

Source: Client, Crisil Intelligence

3.5.1 Commodity Distribution

Analysis was carried out to understand the various freight vehicles being used to transport different commodities. Table below presents the commodity distribution for all the toll plazas in project road.

Table 3-14: Commodity distribution of the project section

Date	LCV	2A	3A	MAV	Total
			TP01		
Agri Produce	4.0%	4.0%	1.4%	1.6%	2.1%
Automobiles	0.3%	0.7%	0.3%	0.2%	0.2%
Chemical products	0.4%	2.2%	1.4%	1.8%	1.6%
Coal	6.3%	6.9%	8.4%	8.9%	8.3%
Iron Ore	0.0%	8.6%	23.5%	23.6%	19.6%
Construction materials	3.4%	6.9%	7.2%	6.5%	6.3%
Consumer Foods	11.4%	9.7%	1.1%	2.2%	3.7%
Consumer Products	0.0%	0.0%	0.0%	0.0%	0.0%
Container	0.0%	0.0%	0.0%	0.1%	0.0%
Courier & parcel	17.5%	6.6%	1.7%	2.1%	4.2%
Iron & Steel Products	0.6%	5.5%	3.7%	8.2%	6.3%
Machinery	1.1%	1.8%	0.5%	1.1%	1.0%

Date	LCV	2A	3A	MAV	Total
Milk & Animal Food	2.4%	0.0%	0.0%	0.0%	0.3%
Others	0.3%	0.7%	0.7%	0.6%	0.6%
Paper products	0.3%	0.4%	0.0%	0.1%	0.1%
Petroleum Products	0.0%	4.9%	2.3%	0.9%	1.3%
Pharmaceuticals	0.0%	0.0%	0.0%	0.0%	0.0%
Plastic products	0.6%	0.4%	0.5%	0.6%	0.6%
Plywood & Timber products	0.0%	0.2%	0.0%	0.1%	0.1%
Rubber products	0.1%	0.0%	0.0%	0.0%	0.0%
Textile & Footwear	0.1%	0.0%	0.1%	0.1%	0.1%
Tiles & Ceramic products	5.6%	4.0%	3.6%	3.0%	3.5%
Empty	45.6%	36.5%	43.6%	38.2%	39.9%
Total	**100%**	**100%**	**100%**	**100%**	**100%**
		TP02			
Agri Produce	4.5%	2.6%	2.6%	4.3%	4.2%
Automobiles	0.8%	0.9%	2.3%	1.1%	1.2%
Chemical products	0.0%	1.7%	4.6%	2.4%	2.4%
Coal	2.1%	13.9%	7.2%	15.4%	14.1%
Iron Ore	2.7%	16.5%	17.9%	12.8%	12.4%
Construction materials	0.0%	1.7%	3.2%	0.9%	1.0%
Consumer Foods	0.8%	1.3%	0.0%	1.6%	1.4%
Consumer Products	0.0%	1.3%	6.3%	5.0%	4.6%
Container	0.0%	0.0%	0.0%	0.0%	0.0%
Courier & parcel	55.4%	4.3%	7.5%	9.4%	12.3%
Iron & Steel Products	5.4%	8.2%	19.3%	13.5%	13.0%
Machinery	3.9%	1.7%	2.0%	2.2%	2.3%
Milk & Animal Food	0.0%	0.0%	0.0%	0.2%	0.2%
Others	2.3%	4.3%	3.5%	1.4%	1.7%
Paper products	0.0%	0.0%	0.0%	0.0%	0.0%
Petroleum Products	0.0%	1.3%	0.3%	0.5%	0.5%
Pharmaceuticals	3.1%	0.0%	2.9%	0.2%	0.5%
Plastic products	1.9%	0.0%	2.0%	1.3%	1.4%
Plywood & Timber products	0.0%	1.3%	0.0%	0.8%	0.7%
Rubber products	0.0%	0.0%	0.0%	0.0%	0.0%
Textile & Footwear	5.6%	0.4%	0.6%	0.6%	0.9%
Tiles & Ceramic products	0.4%	1.3%	0.9%	1.0%	1.0%
Empty	11.0%	37.2%	17.0%	25.5%	24.5%
Total	**100%**	**100%**	**100%**	**100%**	**100%**
		TP03			
Agri Produce	5.8%	0.7%	1.4%	2.8%	2.8%

Date	LCV	2A	3A	MAV	Total
Automobiles	0.0%	0.2%	0.0%	0.3%	0.3%
Chemical products	0.0%	0.0%	0.6%	0.8%	0.7%
Coal	2.3%	4.5%	3.1%	2.8%	2.8%
Iron Ore	0.0%	9.0%	24.6%	13.2%	12.8%
Construction materials	6.2%	10.4%	6.1%	6.5%	6.7%
Consumer Foods	1.9%	1.5%	0.0%	0.4%	0.5%
Consumer Products	3.1%	0.7%	1.2%	1.6%	1.7%
Container	0.0%	0.0%	0.0%	0.0%	0.0%
Courier & parcel	15.7%	4.0%	2.6%	2.7%	3.7%
Iron & Steel Products	14.1%	17.7%	13.4%	23.6%	21.8%
Machinery	0.0%	2.5%	0.6%	1.2%	1.2%
Milk & Animal Food	1.4%	0.0%	0.2%	0.2%	0.3%
Others	4.1%	3.2%	2.4%	1.8%	2.1%
Paper products	0.4%	0.0%	0.0%	0.0%	0.0%
Petroleum Products	1.2%	1.2%	2.0%	0.5%	0.7%
Pharmaceuticals	0.0%	0.2%	0.0%	0.0%	0.0%
Plastic products	1.0%	0.2%	0.6%	0.7%	0.7%
Plywood & Timber products	0.2%	0.0%	0.2%	0.4%	0.3%
Rubber products	0.6%	0.0%	0.0%	0.1%	0.1%
Textile & Footwear	0.0%	0.0%	0.0%	0.2%	0.1%
Tiles & Ceramic products	1.2%	1.0%	1.0%	1.1%	1.1%
Empty	40.6%	42.8%	39.7%	39.2%	39.5%
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Source: Primary Survey, Crisil Intelligence

- The analysis of freight movement across the toll plaza reveals that the major commodities being transported include iron ore, iron and steel products, coal and construction materials.
- Iron ore is transported from Koria, Barbi, Joda and Keonjhar region. And it is found that about 19 percent at TP01, around 13 percent from TP02 and about 12 percent at TP03 MAV vehicles carrying iron ore. These iron ores are being fed to iron and steel plants located in and around the project section.
- In case of MAV, about 8 percent at TP01, about 15 percent at TP02 and about 3 percent at TP03 were found to be carrying the coal. Coal mining area are located at Jharsuguda and Sundergarh district. The IB alley and Basundra coal mines are well connected to project road via a coal corridor. These coals are transported to plants located at the project influence area for thermal, cement as well as iron and steel industries.
- About 8 percent at TP01, 20 percent at TP02 and about 28 percent of MAV trucks were found to be carrying iron and steel products, there are sponge-based industries along the Jharsuguda, Sundergarh and Rourkela region which influences the traffic on the project section.

Direction wise commodity distribution is presented in the below tables.

Table 3-15: Direction wise commodity distribution- TP01

Date	LCV	2A	3A	MAV	Total	LCV	2A	3A	MAV	Total
	Sambalpur- Rourkela					Rourkela-Sambalpur				
Agri Produce	5.3%	3.9%	2.3%	2.4%	2.8%	2.9%	4.1%	0.5%	0.9%	1.3%
Automobiles	0.6%	1.2%	0.0%	0.3%	0.3%	0.0%	0.0%	0.5%	0.1%	0.1%
Chemical products	0.9%	2.3%	1.4%	2.2%	1.9%	0.0%	2.1%	1.5%	1.5%	1.3%
Coal	0.6%	1.2%	0.7%	0.9%	0.8%	10.9%	14.4%	16.2%	16.9%	15.9%
Iron Ore	0.0%	8.9%	33.1%	34.2%	28.2%	0.0%	8.2%	13.7%	12.8%	11.0%
Construction materials	1.6%	5.4%	4.5%	4.0%	4.0%	4.9%	8.8%	10.0%	8.9%	8.6%
Consumer Foods	24.2%	14.0%	0.5%	2.4%	5.4%	0.8%	4.1%	1.6%	2.1%	2.0%
Consumer Products	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Container	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
Courier & parcel	4.4%	4.7%	2.1%	2.7%	2.9%	28.4%	9.3%	1.3%	1.5%	5.5%
Iron & Steel Products	0.6%	7.0%	3.2%	5.3%	4.6%	0.5%	3.6%	4.2%	11.2%	8.0%
Machinery	2.5%	3.1%	0.7%	2.1%	1.9%	0.0%	0.0%	0.2%	0.2%	0.1%
Milk & Animal Food	5.3%	0.0%	0.0%	0.0%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%
Others	0.0%	0.4%	1.4%	0.8%	0.8%	0.5%	1.0%	0.0%	0.4%	0.4%
Paper products	0.3%	0.0%	0.0%	0.2%	0.2%	0.3%	1.0%	0.0%	0.0%	0.1%
Petroleum Products	0.0%	6.6%	3.0%	1.1%	1.8%	0.0%	2.6%	1.5%	0.7%	0.8%
Pharmaceuticals	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Plastic products	0.6%	0.4%	0.4%	0.8%	0.7%	0.5%	0.5%	0.5%	0.4%	0.5%
Plywood & Timber products	0.0%	0.4%	0.0%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
Rubber products	0.3%	0.0%	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
Textile & Footwear	0.3%	0.0%	0.0%	0.2%	0.1%	0.0%	0.0%	0.2%	0.1%	0.1%
Tiles & Ceramic products	10.7%	4.7%	5.5%	5.1%	5.7%	1.3%	3.1%	1.6%	0.9%	1.2%
Empty	41.5%	36.0%	41.0%	35.1%	37.0%	2.9%	4.1%	0.5%	0.9%	1.3%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Source: Primary Survey, Crisil Intelligence

Table 3-16: Direction wise commodity distribution- TP02

Date	LCV	2A	3A	MAV	Total	LCV	2A	3A	MAV	Total
	Sambalpur- Rourkela					Rourkela-Sambalpur				
Agri Produce	4.6%	4.5%	4.3%	4.3%	4.3%	4.3%	0.8%	1.1%	4.4%	4.1%
Automobiles	0.8%	0.0%	2.5%	1.1%	1.1%	0.8%	1.7%	2.2%	1.2%	1.2%

Date	LCV	2A	3A	MAV	Total	LCV	2A	3A	MAV	Total
Chemical products	0.0%	1.8%	6.2%	2.6%	2.5%	0.0%	1.7%	3.2%	2.3%	2.2%
Coal	0.0%	0.9%	0.0%	1.4%	1.2%	4.3%	25.8%	13.5%	28.6%	26.2%
Iron Ore	2.3%	17.1%	18.5%	12.8%	12.4%	3.1%	15.8%	17.3%	12.7%	12.4%
Construction materials	0.0%	1.8%	3.7%	0.9%	0.9%	0.0%	1.7%	2.7%	1.0%	1.0%
Consumer Foods	1.1%	1.8%	0.0%	1.8%	1.7%	0.4%	0.8%	0.0%	1.4%	1.2%
Consumer Products	0.0%	1.8%	5.6%	4.7%	4.3%	0.0%	0.8%	7.0%	5.2%	4.8%
Container	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Courier & parcel	59.9%	4.5%	6.8%	8.0%	11.5%	50.8%	4.2%	8.1%	10.9%	13.1%
Iron & Steel Products	5.0%	9.9%	16.7%	15.6%	14.7%	5.9%	6.7%	21.6%	11.4%	11.4%
Machinery	5.0%	0.0%	1.9%	2.7%	2.8%	2.8%	3.3%	2.2%	1.6%	1.8%
Milk & Animal Food	0.0%	0.0%	0.0%	0.4%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%
Others	2.3%	3.6%	3.7%	1.6%	1.8%	2.4%	5.0%	3.2%	1.2%	1.5%
Paper products	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Petroleum Products	0.0%	1.8%	0.0%	0.8%	0.7%	0.0%	0.8%	0.5%	0.2%	0.2%
Pharmaceuticals	3.4%	0.0%	2.5%	0.2%	0.5%	2.8%	0.0%	3.2%	0.2%	0.5%
Plastic products	1.9%	0.0%	2.5%	1.4%	1.4%	2.0%	0.0%	1.6%	1.3%	1.3%
Plywood & Timber products	0.0%	2.7%	0.0%	0.8%	0.8%	0.0%	0.0%	0.0%	0.7%	0.6%
Rubber products	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Textile & Footwear	5.7%	0.0%	0.0%	0.7%	1.0%	5.5%	0.8%	1.1%	0.4%	0.8%
Tiles & Ceramic products	0.4%	0.9%	1.9%	1.2%	1.2%	0.4%	1.7%	0.0%	0.8%	0.7%
Empty	7.6%	46.8%	23.5%	37.1%	34.7%	14.6%	28.3%	11.4%	14.5%	14.8%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Source: Primary Survey, Crisil Intelligence

Table 3-17: Direction wise commodity distribution- TP03

Date	LCV	2A	3A	MAV	Total	LCV	2A	3A	MAV	Total
	Sambalpur- Rourkela					Rourkela-Sambalpur				
Agri Produce	5.2%	1.5%	2.9%	5.0%	4.7%	6.8%	0.0%	0.3%	0.7%	0.9%
Automobiles	0.0%	0.5%	0.0%	0.4%	0.3%	0.0%	0.0%	0.0%	0.2%	0.2%
Chemical products	0.0%	0.0%	1.5%	1.3%	1.1%	0.0%	0.0%	0.0%	0.3%	0.3%
Coal	0.0%	0.0%	0.5%	0.5%	0.4%	6.3%	8.7%	4.9%	4.9%	5.2%
Iron Ore	0.0%	7.2%	5.9%	4.5%	4.3%	0.0%	10.6%	38.1%	21.4%	21.0%
Construction materials	8.1%	12.9%	11.2%	9.9%	10.0%	2.8%	8.2%	2.4%	3.2%	3.4%

Date	LCV	2A	3A	MAV	Total	LCV	2A	3A	MAV	Total
Consumer Foods	1.0%	3.1%	0.0%	0.6%	0.8%	3.4%	0.0%	0.0%	0.2%	0.3%
Consumer Products	2.0%	1.0%	2.4%	3.0%	2.7%	5.1%	0.5%	0.3%	0.4%	0.6%
Container	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
Courier & parcel	20.5%	5.2%	4.9%	4.3%	5.9%	7.4%	2.9%	1.0%	1.1%	1.5%
Iron & Steel Products	5.5%	6.7%	3.4%	8.8%	8.0%	29.0%	27.9%	20.6%	37.7%	35.3%
Machinery	0.0%	1.5%	1.5%	2.1%	1.8%	0.0%	3.4%	0.0%	0.4%	0.6%
Milk & Animal Food	2.3%	0.0%	0.5%	0.3%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%
Others	3.6%	5.2%	1.5%	2.0%	2.3%	5.1%	1.4%	3.1%	1.6%	1.9%
Paper products	0.3%	0.0%	0.0%	0.0%	0.0%	0.6%	0.0%	0.0%	0.0%	0.0%
Petroleum Products	2.0%	1.5%	4.4%	0.7%	1.1%	0.0%	1.0%	0.3%	0.2%	0.3%
Pharmaceuticals	0.0%	0.5%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
Plastic products	0.3%	0.5%	0.0%	0.8%	0.7%	2.3%	0.0%	1.0%	0.5%	0.6%
Plywood & Timber products	0.0%	0.0%	0.0%	0.5%	0.4%	0.6%	0.0%	0.3%	0.2%	0.2%
Rubber products	0.7%	0.0%	0.0%	0.3%	0.3%	0.6%	0.0%	0.0%	0.0%	0.0%
Textile & Footwear	0.0%	0.0%	0.0%	0.3%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%
Tiles & Ceramic products	1.6%	2.1%	0.0%	0.8%	0.9%	0.6%	0.0%	1.7%	1.5%	1.3%
Empty	46.9%	50.5%	59.5%	53.8%	53.3%	29.5%	35.6%	25.5%	25.3%	26.2%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Source: Primary Survey, Crisil Intelligence

- The iron movement at TP01 is predominantly observed in the direction from Sambalpur to Rourkela. This is due to the raw materials being transported through Keonjhar, which follows the NH-6 route, crosses the toll plaza, and is destined for the Jharsuguda industrial area, including Bhushan power and steel (now owned by JSW), Aryan Steel, and various other sponge iron industries situated along the corridor.
- Conversely, at TP02 and TP03, the movement of iron ore is primarily directed from Rourkela to Sambalpur direction. This trend is linked to the iron ore mines located in the Koira/Barbil/Joda region, which utilize NH-143 to connect to the project road section. It is important to highlight that Koira, Barbil, and Joda represent the largest iron ore producing areas, possessing sufficient resources for the next 50 years.
- Additionally, coal is another significant commodity being transported in the project section area from Rourkela to Sambalpur direction at TP02 and TP01. It should be noted that the coal mining areas are situated close to the project section, as previously mentioned. These coal mining regions are linked via a coal corridor that merges or diverges from the project section just near TP02. The coal transported is used in sponge iron production, steel industries, cement manufacturing, and other related activities.

  The remaining commodities exhibit a relatively balanced directional distribution, driven by demand and supply needs.

Iron and Steel products is the topmost commodity on the stretch

Iron and Steel products commodity on the stretch largely includes iron rods, wire, coils iron pipes, iron sheets and wire coil. These commodities travel short as well as long distance based on the demand from regional and other states. Strong growth prospects related to infrastructure boost, construction activities and infrastructure projects such as roads, highways, in addition housing and construction demands will drive the growth of the commodity. There are many iron and steel products manufacturing industries along the project corridor some of the prominent being ones Bhushan power and steel (now owned by JSW) at Jharsuguda, Aryan steel, Rourkela steel plant which is the largest in region, other sponge related industries located at Sundergarh and Rourkela. Majority of the plants have increased there capacity in recent years and will likely to grow as the demand for the sector increases.

Minerals such as Coal and iron ore is the second most commodity on the stretch

Coal constitutes a significant commodity, representing 8 percent at TP01 and approximately 15 percent at TP02 along the project corridor. It is extracted from the Sundergarh and Jharsuguda districts. These mines are efficiently linked to the project road through a coal corridor, as previously discussed. The coal mined is transported along the road towards thermal, cement, and iron and steel plants. However, most of this commodity is transported by rail over longer distances, while a substantial amount also moves by road to industries situated near the project road section, owing to operational and logistical benefits, a trend that is expected to continue in the foreseeable future. It is important to note that coal transported by road is typically intended for small and medium enterprises (SMEs) in the iron and steel sector, which involve smaller volumes and shorter transport distances. In contrast, larger industrial entities utilize dedicated railway sidings to manage and transport significantly larger quantities of coal for their operational needs. Meanwhile, regional mines have increased production in response to sustained demand during FY24 and FY25, backed by ample coal reserves, which guarantees a consistent supply for ongoing industrial activities.

Iron is also transported through the project section to plants located within the project influence areas, such as BPSDL, Aryan Steel, and other sponge and steel industries, which are supplied from mining areas close to the project influence zone of Koira, Barbil, Joda, and Keonjhar. The demand for iron ore is expected to rise as the iron and steel industries expand. Additionally, it is noteworthy that the iron ore reserves in the aforementioned areas are substantial and are likely to be key minerals transported to industries throughout the region.

Construction materials

Construction materials represent a significant commodity transported throughout the area, particularly at TP01 and TP03 accounting to about 6.5 percent each. The primary sub-commodity within construction materials is cement, followed by fly ash, a byproduct from thermal plants that is also utilized as a raw material in the production of pozzolana cement. As noted in earlier sections, there are two major cement plants situated near the project area: Ultra Tech Cement near Jharsuguda and Dalmia Cement near Rourkela. The demand for this commodity is expected to continue increasing, driven by the growing needs of the infrastructure, housing, and other related sectors.

4 Review of Historical Traffic & Revenue

4.1 General

This section summarizes the historical performance of the project section in order to understand baseline traffic patterns comprising of historical traffic and revenue growth, traffic and revenue composition, trip distribution, trip factors, seasonality and trend of traffic over the available data set.

The historical tollable traffic and revenue data mode wise was made available by client from April-2018 to July 2025 and is presented in below table.

Table 4-1: Historical Traffic and Revenue Data Availability

Toll Plaza	Toll Plaza chainage	Period
TP01	Km 17.025	April-2018 – July-2025
TP02	Km 71.853	April-2018 – July-2025
TP03	Km 150.075	April-2018 – July-2025

Source: Client, Crisil Intelligence

The summary of historic traffic data in terms of PCUs and revenue in million is presented below

Table 4-2: Past traffic in PCU

FY	TP01	TP02	TP03
2018	17,305	13,114	14,540
2019	16,206	15,434	14,908
2020	14,517	18,012	16,032
2021	13,732	16,749	13,561
2022	15,547	16,976	13,508
2023	18,705	21,726	16,326
2024	22,724	26,118	20,157
2025	22,763	28,362	20,716

Source: Client, Crisil Intelligence

Traffic in terms of PCUs at TP01, TP02 and TP03 has grown at 3.2 percent, 9.6 percent and 4.3 percent respectively. Higher growth observed at TP02 and TP03 on account of movement from mines both iron and coal as well as increased production of iron and steels products through the project influence area, which plays a significant role in traffic increase in the above-mentioned toll plazas.

4.2 Historical traffic and composition-TP01

Overall traffic growth in terms of PCU for the period FY25 vs FY19 is about 5.8 percent. However external factors mentioned below had impacted mode wise and overall traffic while comparing year on year.

- Covid-19 pandemic for three different waves has significantly impacted traffic across India and on to the project section. First wave (March-April-2020), Second wave (September-Nover-2020) and Third wave during (January-Feburary-2021)
- Post three strong waves of covid-19 i.e. from FY21 onwards traffic specially in cars has seen significant growth across all India across all toll plaza owing to increased use of private mode of transport
- Post ETC/Fastag implementation; LCV and 2A corrections have also been observed across the project corridor which is in line with benchmark across the country
- Growth rate of LCV traffic is subdued at toll plaza owing to conversion of LCV to higher load carrying capacity vehicles from 4-wheel LCV to 6 -wheel LCV made which categorized based on its GVW to 2-axle category
- Also, shift of vehicles from Three axle trucks to higher category vehicles such as 5-axle and 6-axle trucks observed across the country and at the project section for its economic advantage. It is worth noting that within MAV category 5 Axle trucks are gaining importance as compared to 4 axle trucks
- In the case of MAV, significant growth was noted during FY23 compared to FY22 and FY24 compared to FY23, which can be linked to the rise in sponge iron production within the project's influence area during that timeframe.
- However, in the period from FY25 to FY24, MAV mining traffic experienced a decline of -9.6 percent, which can be attributed to a structural change in the sourcing of iron ore by Bhushan power and steel (now owned by JSW). Previously, the plant sourced iron ore from the open market and was largely transported via Sambalpur direction; however, after acquiring their own iron ore mine in Koira, this led to a change in movement patterns.

The mode wise historical traffic for TP01 is presented below

Table 4-3: Historical mode wise traffic-TP01

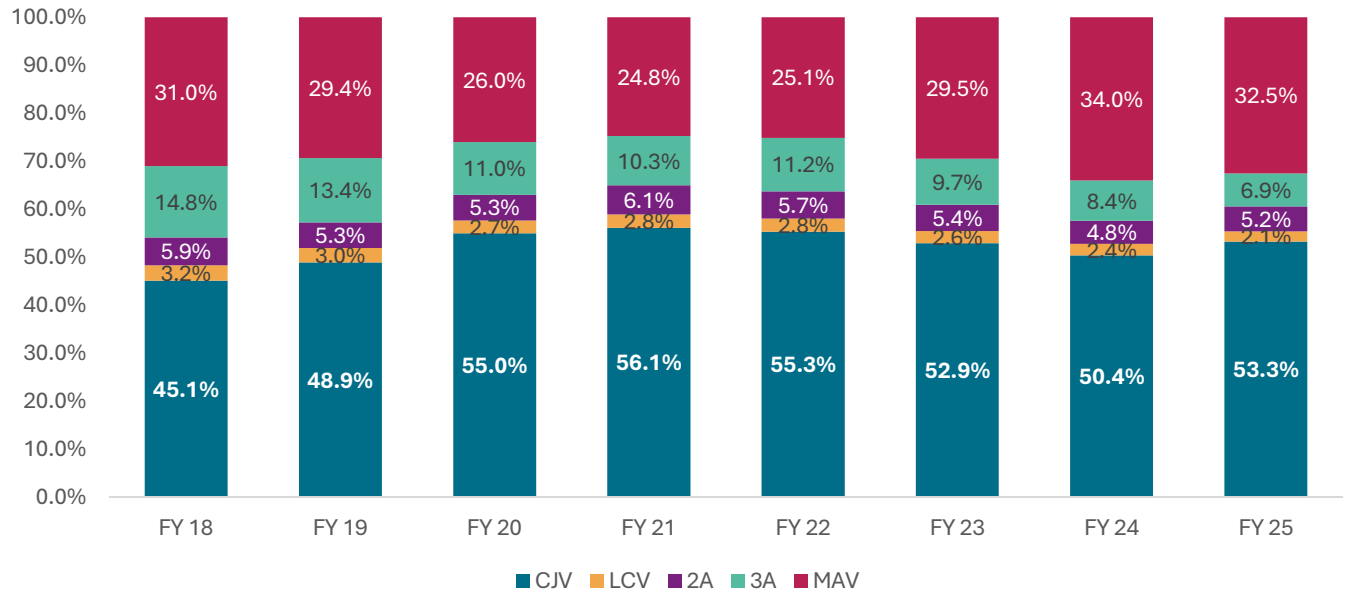
FY Year	Car	LCV	2A	3A	MAV	PCU
2018	3,100	221	402	1,020	2,135	17,305
2019	3,278	202	358	899	1,968	16,206
2020	3,546	174	344	706	1,680	14,517
2021	3,492	172	378	638	1,541	13,732
2022	3,856	192	395	777	1,752	15,547
2023	4,220	204	432	771	2,349	18,705
2024	4,637	221	446	769	3,135	22,724
2025	5,071	202	492	658	3,097	22,763
CAGR (25-19)	**7.5%**	**0.1%**	**5.7%**	**-5.0%**	**7.8%**	**5.8%**
CAGR (25-23)	**9.6%**	**-0.2%**	**7.0%**	**-11.6%**	**15.6%**	**10.4%**

Source: Client, Crisil Intelligence

Traffic composition:

CJV traffic accounts to about 54 percent of the total traffic, followed by MAV which accounts to 33 percent in FY25. The major minerals traffic mostly carries iron ore and coal from the project influence areas.

Figure 4-1: Tollable Traffic composition shares at TP01

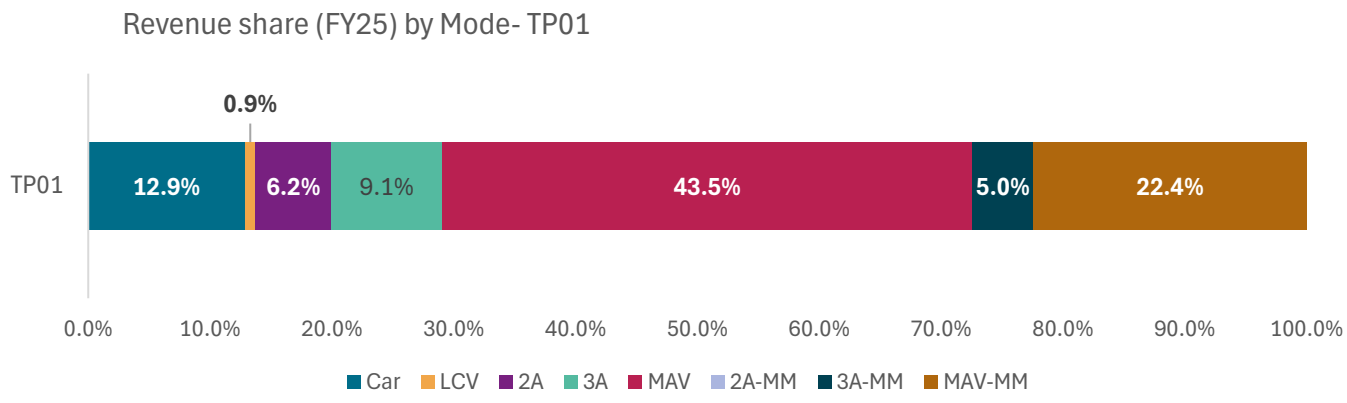


Source: Client, Crisil Intelligence

Revenue composition:

The highest revenue is generated from MAV trucks accounting to about 44 percent, followed by MAV carrying major minerals which accounts to about 23 percent. Also, the revenue share for 3-Axle trucks is about 9 percent and about 13 percent from CJV. It may be noted that vehicles (2A+3A+MAV) carrying major minerals accounts to about 28 percent of the total revenue generated.

Figure 4-2: Revenue share (FY25) by mode-TP01



Source: Client, Crisil Intelligence

4.3 Historical traffic and composition-TP02

Overall traffic growth in terms of PCU for the period FY25 vs FY19 is about 10.7 percent. However external factors mentioned for TP01 follows for TP02 as well. Other factors impacted traffic listed below

- TP02 lies between Jharsuguda and Sundergarh, thus the car traffic is local in nature owing to work trips. In addition to the influence of Jharsuguda airport has also led to increase IN CJV traffic
- The passenger vehicle segment demonstrated robust growth, achieving a compound annual growth rate (CAGR) of 7.1% for the period from FY2023 to FY2025.
- Post three strong waves of covid-19 i.e. from FY21 onwards traffic specially in cars has seen significant growth across all India across all toll plaza owing to increased use of private mode of transport
- In the case of MAV, significant growth was noted during FY23 compared to FY22 and FY24 compared to FY23, which can be linked to the rise in sponge iron production within the project's influence area during that timeframe.
- However, in the period from FY25 to FY24, MAV mining traffic experienced a growth of 1.9 percent, which can be attributed to an increased local coal rail movement across the influence area over road, specifically to the Vedanta plant located near Jharsuguda.
- The project section is influenced by coal movement. Majority of mines are located around the project influence area and are sourced from Samleshwari, Siarmal/Basundra and Lankhanpur/Belapahar coal mines, which are transported to plants located at Jharsuguda and beyond. Basundra mines are connected by coal corridor to the project section has increased their production in FY24 and FY25
- Post ETC/Fastag implementation; LCV and 2A corrections have also been observed across the project corridor which is in line with benchmark across the country.

The mode wise historical traffic for TP02 is presented below

Table 4-4: Historical mode wise traffic-TP02

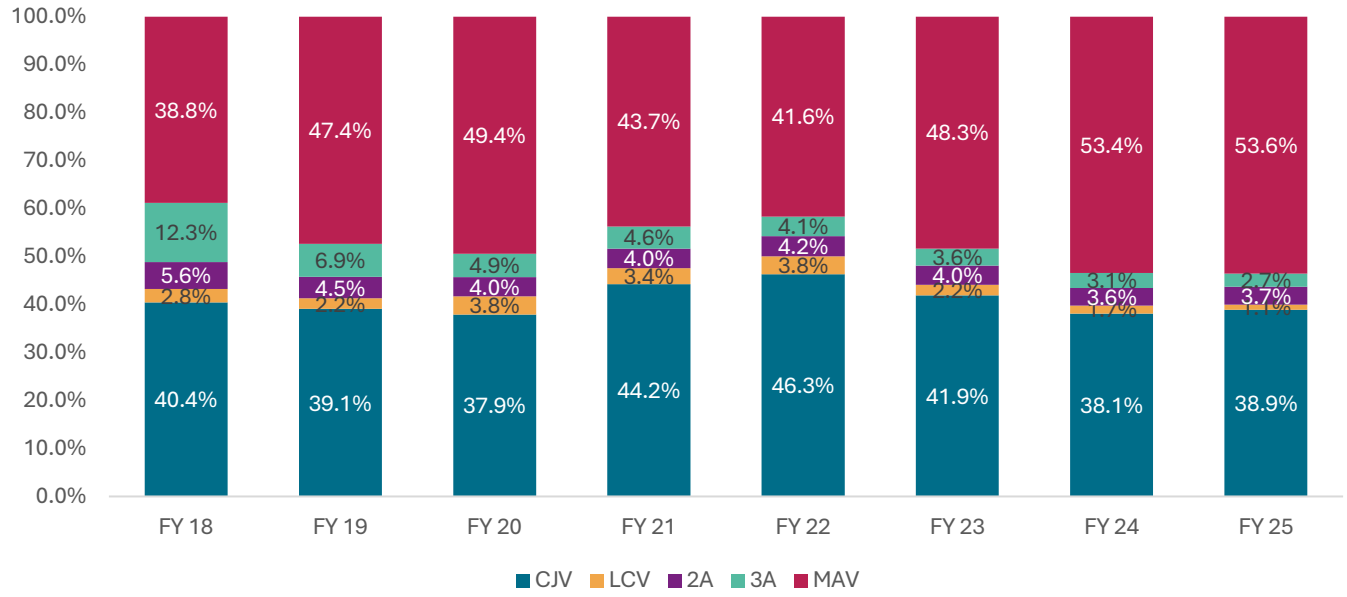
FY Year	Car	LCV	2A	3A	MAV	PCU
2018	1,942	134	271	592	1,863	13,114
2019	2,085	116	239	366	2,525	15,434
2020	2,333	235	245	300	3,043	18,012
2021	2,723	208	249	285	2,691	16,749
2022	2,975	241	268	265	2,676	16,976
2023	3,192	169	301	273	3,679	21,726
2024	3,302	146	316	271	4,630	26,118
2025	3,666	105	348	257	5,049	28,362
CAGR (25-19)	**7.5%**	**0.1%**	**5.7%**	**-5.0%**	**7.8%**	**5.8%**
CAGR (25-23)	**9.6%**	**-0.2%**	**7.0%**	**-11.6%**	**15.6%**	**10.4%**

Source: Client, Crisil Intelligence

Traffic composition:

CJV traffic accounts to about 39 percent of the total traffic, followed by MAV which accounts to 54 percent in FY25. The major minerals traffic mostly carries coal from the Siarmal/Basundra, IB integrated coal mines.

Figure 4-3: Tollable Traffic composition shares at TP02

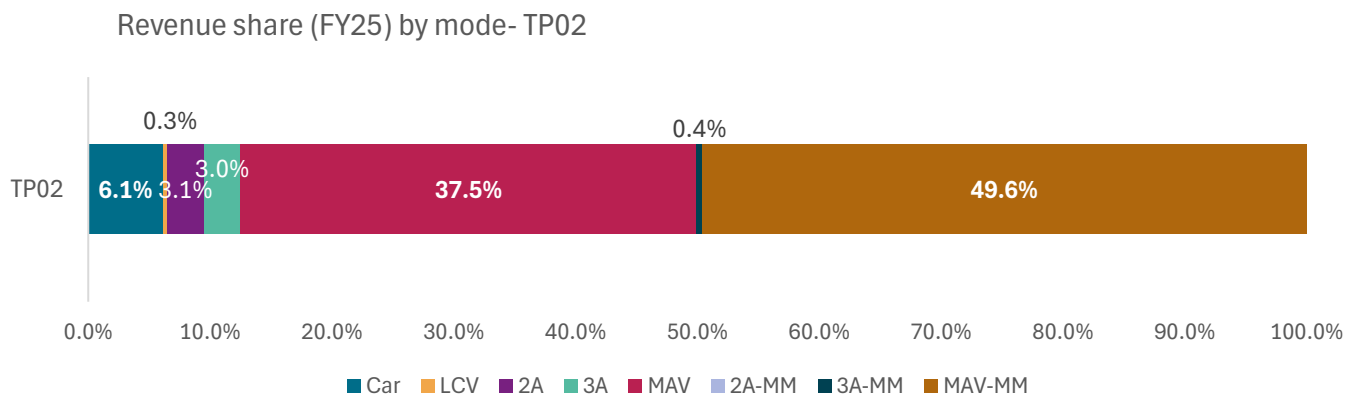


Source: Client, Crisil Intelligence

Revenue composition:

The highest revenue is generated from MAV carrying major minerals trucks accounting to about 50 percent, followed by MAV which accounts to about 38 percent. Also, the revenue share for 2-Axle trucks is about 3 percent and about 6 percent from CJV. It may be noted that vehicles (2A+3A+MAV) carrying major minerals accounts to about 50 percent of the total revenue generated.

Figure 4-4: Revenue share (FY25) by mode-TP02



Source: Client, Crisil Intelligence

4.4 Historical traffic and composition-TP03

Overall traffic growth in terms of PCU for the period FY25 vs FY19 is about 5.7 percent. However external factors mentioned for TP01 & TP02 follows for TP03 as well. Other factors impacted traffic listed below

- TP03 lies between Sundergarh and Rourkela, thus the car traffic is local in nature owing to work trips
- The passenger vehicle segment demonstrated robust growth, achieving a compound annual growth rate (CAGR) of 5.9% for the period from FY2023 to FY2025.
- Post three strong waves of covid-19 i.e. from FY21 onwards traffic specially in cars has seen significant growth across all India across all toll plaza owing to increased use of private mode of transport
- In the case of MAV, a significant growth was noted during FY23 compared to FY22 this increase can be attributed to completion and operation of section i.e. Brahmani bypass to Rajamunda of NH-143 in January 2023. Increase in traffic can be observed from Jan -2023 onwards specially for mining trucks.
- Also increase of MAV traffic can be observed FY24 compared to FY23, which can be linked to the rise in sponge iron production within the project's influence area during that timeframe.
- The project section is influenced by iron ore movement. Majority of mines are located around the project influence area and are sourced from Joda/Barbil/Koira which are the largest iron ore producing area in the state of Odisha. The completion of NH-143 section has provided seamless connectivity to the industries located around the project section.
- Post ETC/Fastag implementation; LCV and 2A corrections have also been observed across the project corridor which is in line with benchmark across the country.

The mode wise historical traffic for TP03 is presented below

Table 4-5: Historical mode wise traffic-TP03

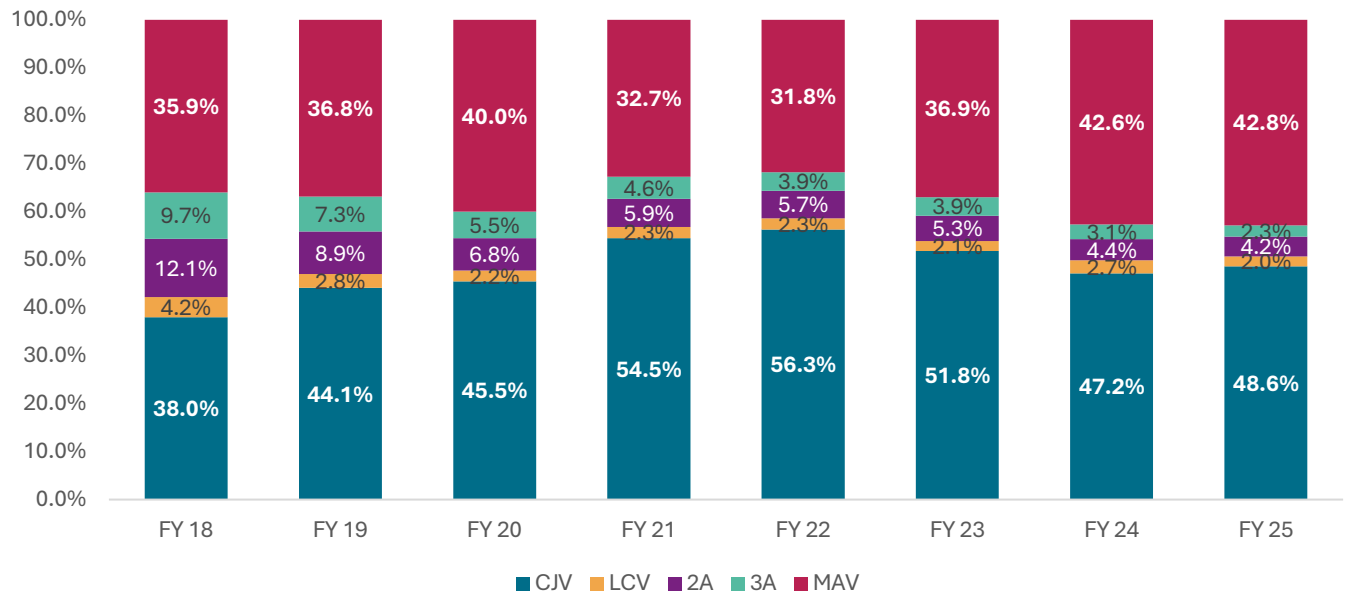
FY Year	Car	LCV	2A	3A	MAV	PCU
2018	2,034	226	649	520	1,924	14,540
2019	2,506	161	505	414	2,089	14,908
2020	2,745	135	408	334	2,413	16,032
2021	3,125	131	336	266	1,874	13,561
2022	3,285	136	333	226	1,853	13,508
2023	3,400	136	346	256	2,425	16,326
2024	3,580	206	336	234	3,235	20,157
2025	3,817	160	328	184	3,361	20,716
CAGR (25-19)	**7.5%**	**0.1%**	**5.7%**	**-5.0%**	**7.8%**	**5.8%**
CAGR (25-23)	**9.6%**	**-0.2%**	**7.0%**	**-11.6%**	**15.6%**	**10.4%**

Source: Client, Crisil Intelligence

Traffic composition:

CJV traffic accounts to about 49 percent of the total traffic, followed by MAV which accounts to 43 percent in FY25. The major minerals traffic mostly carries iron ore from the Joda/Barbil/Koira region.

Figure 4-5: Tollable Traffic composition shares at TP03

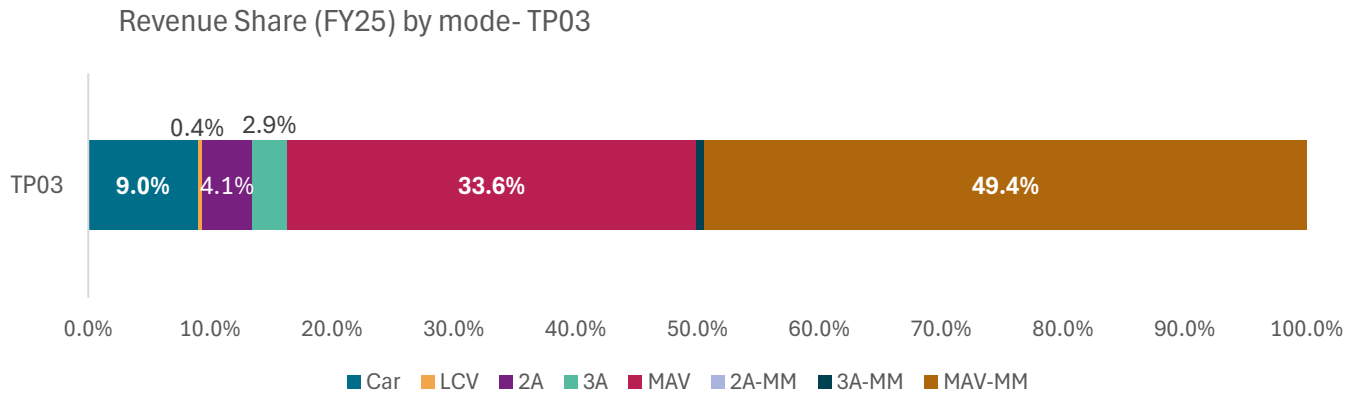


Source: Client, Crisil Intelligence

Revenue composition:

The highest revenue is generated from MAV carrying major minerals trucks accounting to about 50 percent, followed by MAV which accounts to about 34 percent. Also, the revenue share for 2-Axle trucks is about 4.1 percent and about 9 percent from CJV. It may be noted that vehicles (2A+3A+MAV) carrying major minerals accounts to about 50 percent of the total revenue generated.

Figure 4-6: Revenue share (FY25) by mode-TP02



Source: Client, Crisil Intelligence

4.5 Traffic segmentation in %

Mode wise traffic ticket segmentation in % for full FY23, FY24 and FY25 as provided by client is presented below

Table 4-6: Historical Traffic segmentation in %

FY Year	TP01			TP02			TP03		
	FY23	FY24	FY25	FY23	FY24	FY25	FY23	FY24	FY25
Single									
CJV	41.6%	41.4%	43.4%	42.4%	40.5%	42.5%	35.2%	33.7%	33.4%
LCV	78.8%	87.8%	80.2%	69.3%	90.2%	83.0%	71.7%	53.0%	45.2%
2A	99.1%	99.0%	98.9%	98.2%	98.6%	98.5%	98.8%	98.7%	99.1%
3A	99.8%	99.7%	99.9%	99.4%	99.4%	99.8%	99.4%	99.3%	99.8%
MAV	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	100.0%	100.0%
2A-MM	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
3A-MM	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
MAV-MM	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Return									
CJV	43.8%	42.5%	41.3%	38.5%	37.8%	37.1%	48.7%	48.8%	49.5%
Monthly									
CJV	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%
Local Personal									
CJV	9.0%	9.5%	9.6%	12.1%	13.4%	12.8%	9.7%	10.5%	10.4%
Exemption									
CJV	5.1%	6.0%	5.2%	6.1%	7.2%	6.5%	5.9%	6.3%	5.9%
LCV	21.2%	12.2%	19.8%	30.7%	9.6%	17.0%	28.3%	46.9%	54.8%
2A	0.9%	1.0%	1.1%	1.8%	1.4%	1.5%	1.2%	1.3%	0.9%
3A	0.2%	0.3%	0.1%	0.6%	0.6%	0.2%	0.6%	0.7%	0.2%
MAV	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
Violation									
CJV	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
LCV	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.1%	0.0%
2A	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
3A	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
MAV	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Source: Client, Crisil Intelligence

5 Base Traffic Estimation

5.1 Seasonality Factors

Traffic volumes on roads varies throughout the year, influenced by socio-economic activities in the surrounding regions. To accurately estimate the Annual Average Daily Traffic (AADT) for the road, it is crucial to account for these seasonal variations.

To achieve this, a seasonal correction factor is applied, which is derived from secondary data sources such as historical traffic data, fuel sales and similar indicators. In this assessment as long historic traffic data is available, consultants have the traffic data for seasonality

Seasonal correction Factors (SCF)

Seasonal correction factors for the latest years of FY 24 & FY 25 are tabulated below.

Table 5-1: Seasonal correction factors for FY 24 and FY 25- TP01

TP	Car	LCV	2A	3A	MAV	2A-MM	3A-MM	MAV-MM
FY24								
Apr-23	1.12	0.98	0.91	1.10	1.07	1.04	2.21	0.86
May-23	1.01	1.04	1.07	1.11	1.10	0.78	2.52	0.91
Jun-23	0.97	1.01	1.13	0.89	1.10	2.45	1.12	1.05
Jul-23	1.09	1.09	1.11	1.08	1.06	1.01	0.92	0.90
Aug-23	1.12	1.11	1.13	1.01	1.06	0.94	0.99	0.99
Sep-23	1.09	1.08	1.10	1.04	1.04	0.77	0.83	1.14
Oct-23	1.00	1.01	1.04	0.94	1.04	0.63	0.84	1.43
Nov-23	1.03	1.03	1.06	0.94	1.03	0.80	0.85	1.30
Dec-23	0.90	0.97	0.96	1.01	1.02	5.06	0.82	1.22
Jan-24	0.93	0.96	0.99	0.97	0.95	1.99	0.77	0.84
Feb-24	0.89	0.87	0.85	0.91	0.81	0.75	0.78	0.78
Mar-24	0.92	0.91	0.80	1.06	0.83	0.86	1.23	0.96
FY25								
Apr-24	1.06	0.98	0.93	0.81	0.85	1.44	0.69	0.69
May-24	1.04	0.97	0.97	0.80	0.88	1.22	0.82	0.71
Jun-24	1.03	1.02	1.07	0.79	0.96	0.70	0.92	0.87
Jul-24	1.05	1.05	1.09	0.93	1.11	5.03	0.85	1.66
Aug-24	1.12	1.11	1.15	1.33	1.20	0.56	1.35	1.66
Sep-24	1.09	1.06	1.13	1.32	1.15	0.40	1.37	1.31
Oct-24	1.00	1.04	1.02	1.19	1.04	0.62	1.48	0.99
Nov-24	1.01	1.08	1.03	1.08	1.01	1.86	0.90	0.69
Dec-24	0.94	0.96	0.99	1.03	1.00	2.01	1.25	1.24

TP	Car	LCV	2A	3A	MAV	2A-MM	3A-MM	MAV-MM
Jan-25	0.92	0.94	1.02	0.99	1.03	1.55	1.19	1.13
Feb-25	0.84	0.88	0.89	0.97	0.92	1.82	0.92	1.00
Mar-25	0.96	0.95	0.82	1.13	0.96	1.39	0.91	1.11

Source: Client TMS Data, Crisil Intelligence

Table 5-2: Seasonal correction factors for FY 24 and FY 25- TP02

TP	Car	LCV	2A	3A	MAV	2A-MM	3A-MM	MAV-MM
FY24								
Apr-23	1.08	0.84	0.81	0.96	1.05	0.52	0.48	1.00
May-23	0.95	0.96	1.10	0.91	1.11	0.44	0.67	1.03
Jun-23	0.98	1.06	1.23	1.08	1.09	#DIV/0!	2.97	1.16
Jul-23	1.14	1.07	1.19	0.86	1.16	2.67	0.61	1.33
Aug-23	1.14	1.07	1.14	1.06	1.09	1.78	0.84	1.08
Sep-23	1.13	1.08	1.09	1.21	1.02	5.16	0.95	1.04
Oct-23	0.99	1.08	1.01	1.07	0.96	0.67	0.80	0.98
Nov-23	1.03	1.07	1.10	1.16	1.05	1.72	5.04	0.96
Dec-23	0.87	0.99	1.00	1.11	1.00	1.07	4.58	0.96
Jan-24	0.93	0.98	1.05	1.12	1.00	5.34	4.30	0.98
Feb-24	0.91	0.94	0.81	0.86	0.81	0.45	1.36	0.80
Mar-24	0.94	0.94	0.75	0.80	0.81	0.76	0.64	0.86
FY25								
Apr-24	1.11	0.81	0.89	0.89	1.00	0.90	1.96	1.04
May-24	1.02	1.07	0.97	0.84	0.94	0.47	2.54	0.87
Jun-24	1.04	1.18	1.07	0.91	0.95	0.57	2.67	0.89
Jul-24	1.08	1.07	1.08	1.11	1.22	0.78	3.26	1.19
Aug-24	1.12	1.16	1.12	1.19	1.32	2.34	3.85	1.13
Sep-24	1.13	1.16	1.07	1.26	1.29	1.51	0.63	1.24
Oct-24	1.00	1.09	1.01	1.01	1.09	1.56	0.32	0.97
Nov-24	1.01	1.14	1.07	0.99	1.04	1.13	0.95	0.95
Dec-24	0.94	1.12	1.05	0.84	0.86	4.67	0.48	0.99
Jan-25	0.91	0.91	1.09	1.04	0.85	1.17	1.33	1.01
Feb-25	0.78	0.71	0.88	1.06	0.82	0.84	1.46	0.93
Mar-25	0.96	0.88	0.80	1.05	0.89	1.17	1.24	0.91

Source: Client TMS Data, Crisil Intelligence

Table 5-3: Seasonal correction factors for FY 24 and FY 25- TP03

TP	Car	LCV	2A	3A	MAV	2A-MM	3A-MM	MAV-MM
FY24								
Apr-23	1.06	1.34	1.05	0.82	0.90	0.76	0.47	0.84
May-23	0.99	1.43	0.94	0.88	0.90	0.70	0.80	0.86
Jun-23	1.02	0.99	0.94	1.00	1.01	6.48	3.20	1.10

TP	Car	LCV	2A	3A	MAV	2A-MM	3A-MM	MAV-MM
Jul-23	1.10	1.03	0.96	0.94	1.05	1.34	0.87	1.33
Aug-23	1.10	1.05	1.04	1.06	1.13	1.22	0.69	1.15
Sep-23	1.08	1.03	1.06	1.00	1.14	0.59	0.59	1.02
Oct-23	1.00	0.96	1.03	1.00	1.08	1.12	0.91	1.08
Nov-23	1.05	0.92	1.09	1.10	1.14	1.62	1.54	1.15
Dec-23	0.90	0.88	1.00	1.09	1.02	0.96	2.23	0.99
Jan-24	0.89	0.90	1.10	1.20	0.99	1.12	18.41	1.06
Feb-24	0.91	0.85	0.94	0.98	0.85	0.78	1.95	0.79
Mar-24	0.98	0.91	0.89	1.03	0.90	0.89	0.79	0.87
FY25								
Apr-24	1.03	0.79	0.92	0.88	0.84	1.57	0.99	0.94
May-24	0.99	0.82	0.95	1.02	0.90	3.05	2.83	0.75
Jun-24	1.06	0.92	0.97	1.05	1.00	1.47	1.76	0.83
Jul-24	1.09	0.98	1.02	1.11	1.24	3.05	1.59	1.47
Aug-24	1.07	1.10	1.13	1.28	1.16	2.22	3.74	1.42
Sep-24	1.08	1.14	1.08	1.18	1.14	0.81	2.17	1.60
Oct-24	1.00	1.19	1.02	0.99	1.08	4.88	0.67	1.05
Nov-24	1.01	1.12	1.05	1.05	1.16	0.21	0.96	0.97
Dec-24	0.92	1.06	1.04	1.02	1.16	0.87	0.70	1.12
Jan-25	0.90	1.07	1.05	1.03	0.94	1.11	1.52	0.95
Feb-25	0.92	0.94	0.91	0.91	0.83	1.69	2.21	0.86
Mar-25	0.98	1.04	0.91	0.72	0.80	1.11	0.28	0.77

Source: Client TMS Data, Crisil Intelligence

5.2 Base Traffic Estimation

For base traffic estimation for the present study, the 4-months (Apr-25-July-25) of traffic data for all the three toll plazas were annualized using SCF factor of 4-12 months were derived from the year FY24 for TP02 and TP03 and average of FY24 & FY25 for TP01 used for estimating FY26 AADT.

The AADT estimation for the base case for FY26 is presented below

Table 5-4: Base traffic-FY26

TP	Car	LCV	2A	3A	MAV	2A-MM	3A-MM	MAV-MM	PCU
ADT (April-25 to July-25)									
TP01	5,197	198	499	386	2,634	1	80	513	22,552
TP02	3,961	110	333	195	3,133	0	11	1,827	28,063
TP03	4,081	145	313	171	1,935	0	10	1,358	20,599
SCF (April-July)									
TP01	1.04	1.02	1.03	0.93	1.00	1.17	1.05	0.90	
TP02	1.03	0.97	1.06	0.95	1.10	0.88	0.72	1.12	
TP03	1.04	1.17	0.97	0.91	0.96	1.10	0.83	1.00	
AADT-FY26									
TP01	5,430	201	512	360	2,645	1	84	461	22,581
TP02	4,090	107	352	184	3,448	0	8	2,041	30,583
TP03	4,250	169	304	155	1,865	0	8	1,355	20,397

Source: Client Data, Crisil Intelligence

Note: "MAV comprises (vehicles with more than 3 axles up to 6 axles) and OSV (vehicles with more than 6 axles)"

6 Network developments in the Region

In the case of the project road, there is one short distance alternate routes available that will impact the traffic on the project road. However ongoing and upcoming rail link that could impact the project road

- Short distance alternate route to avoid TP01 & TP02
- Bimlagarh-Angul new rail line

The details of the development in term of milestone, expected completion date and possible impact to project road traffic is presented in below table.

Table 6-1: Details of Network Development and Possible impact

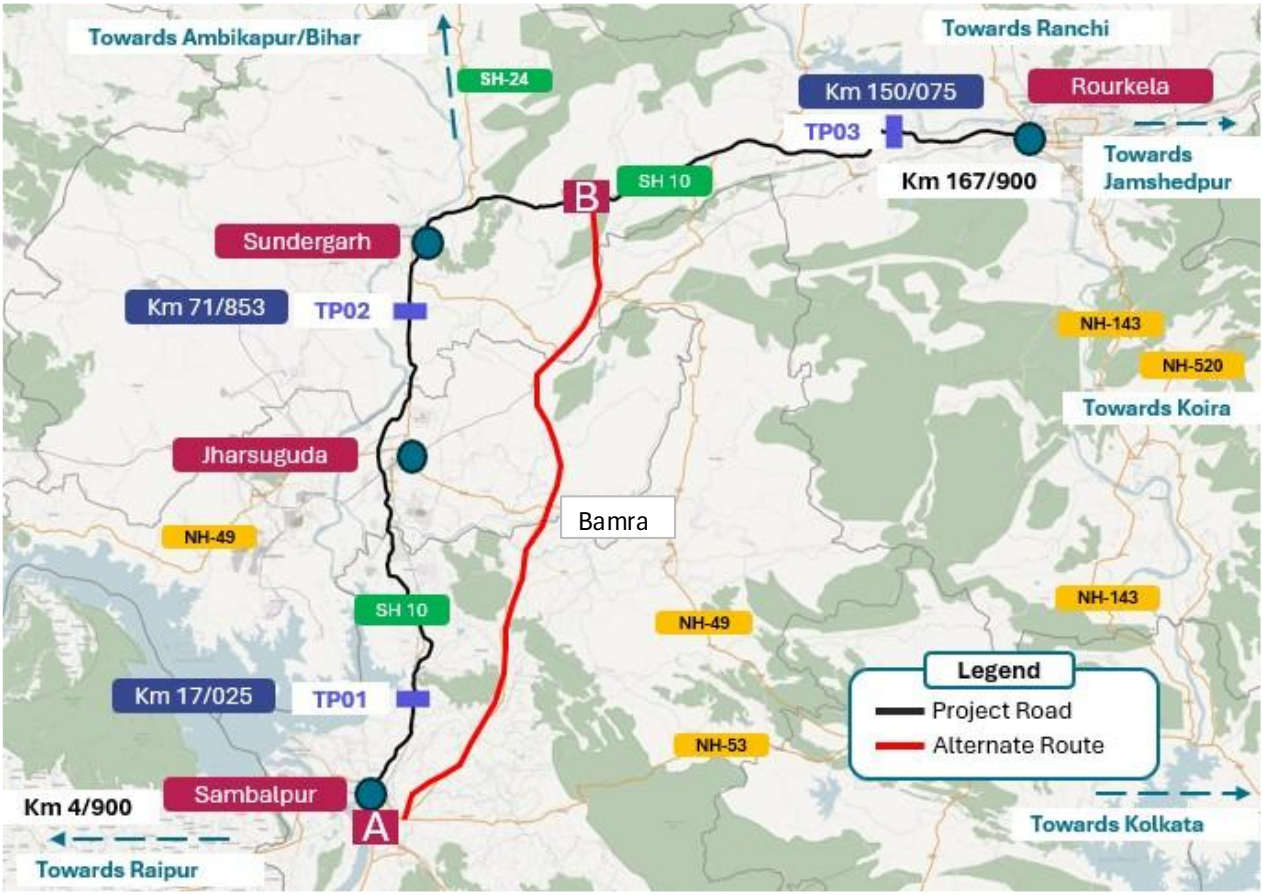
S. No	Details of Development	Milestone/Completion	Possible Impact
1	**Short distance alternate route** • Bypassing TP01 & TP02 • Passes through forest area, villages and towns • Single lane configuration with sharp bends and turns over the forest area	No update on upgradation or improvement plan from the site visit and in public domain	No Impact • Since the travel is well established between the two routes. There is and will be no impact from this route • No Impact
2	**Bimlagarh-Angul New Rail link** • New link to connect Bimlagarh to Angul which directly connects to Rourkela to Angul directly • Year of Sanction 2004 • Length: 149.78 km	• Talcher- Sunakhani (17.62 Km): Commissioned on 06.01.2020. • Sunakhani-Samal (9.928 Km): Commissioned on 31.03.2024. • Khamar-Shrirampur (19.30Km): Major bridges & Road Over Bridge (ROB) works in progress. • Land acquisition in progress between Shrirampur – Bimlagarh	No Impact • SMEs prefers road transport and their primary source on account of quantity constraints and faster mobility via road • The SMEs in Sundergarh, Jharsuguda and Sambalpur primarily procure coal, iron ore, limestone and other raw materials from within these districts which are well connected via roads and with the project influence area • Hence No impact on account of new line.

Source: Crisil Intelligence

6.1.1.1 Impact of Short distance alternate route

This alternate route starts from Sambalpur (A), passes through Kolabira and Bamra and meets PR near Gariamal (B). The alignment of the alternate route is presented below

Figure 6-1: Short distance alternate route



Source: Open Street Map, Crisil Intelligence

This route has a Single /intermediate carriageway (MDR) from Sambalpur (A) to Bamra with average road condition while remaining section from Bamra to Gariamal (B) is a State Highway with good road condition.

Key feature of the alternate route:

- The alternate route includes sharp and narrower turns that add complexity for both commercial and passenger vehicles.
- Passage through villages and extensive forest areas further restricts convenient commercial movement, raising safety concerns for passenger vehicles as well.
- During the site visit and information gathered, no commercial vehicles were observed utilizing this route for project-related road movement due to the outlined limitations.

The operationalisation of the project road since March 2018 has led to an established and localized travel pattern on both routes. The travel on the alternate route remains minimal and predominantly local; hence, no significant

impact is identified when benchmarking the alternate route against the project road. The project road continues to serve both commercial and passenger transport needs efficiently, and route substitution is unwarranted.

Conclusion

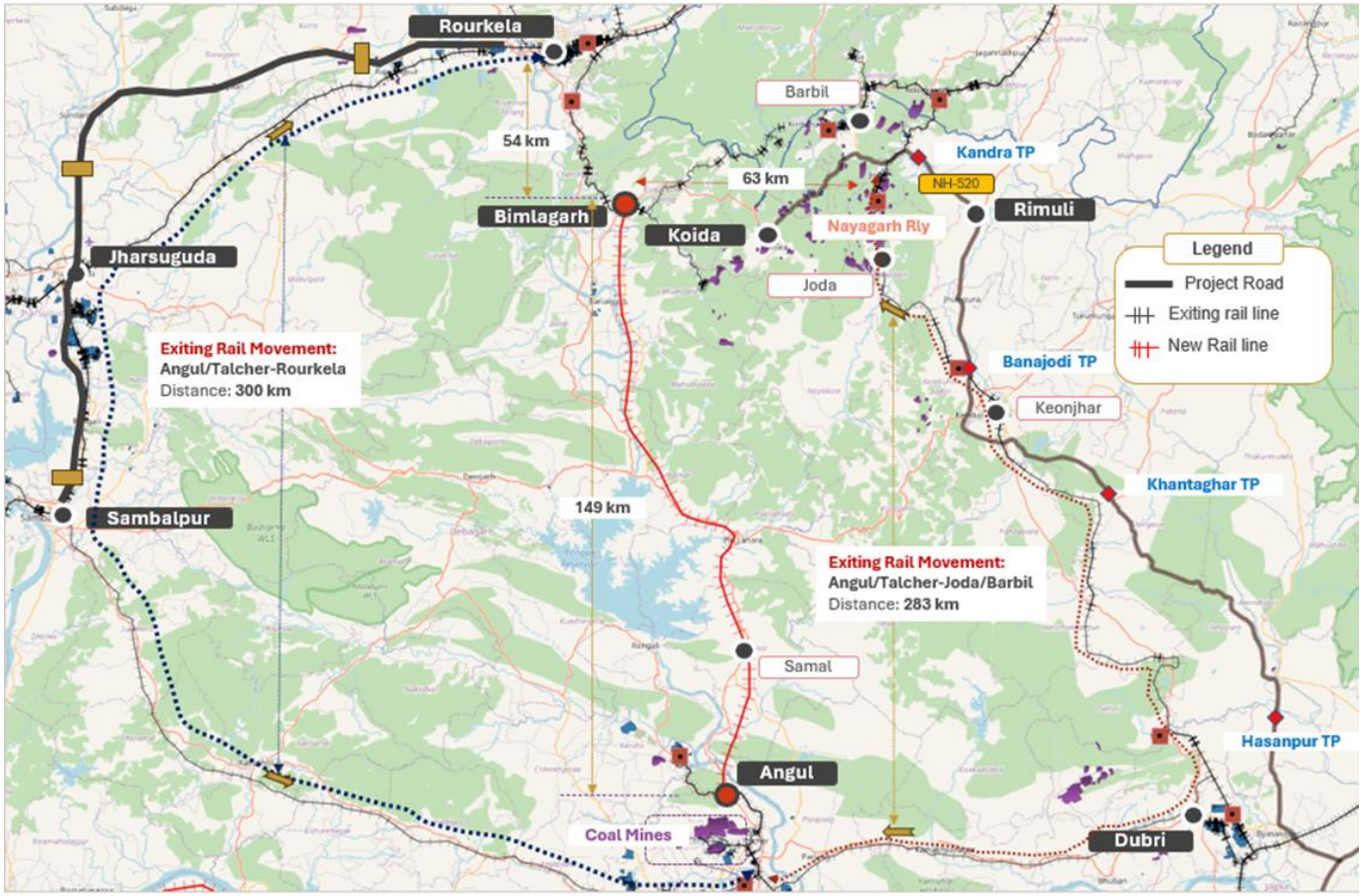
The assessment clearly indicates that the alternate route lacks the infrastructural and safety features required for commercial and broader passenger vehicle use in comparison to the established project road. Consequently, the project road remains the preferred and practical corridor, with the alternate route exerting negligible impact on existing transportation patterns and regional connectivity.

6.1.1.2 Impact of Bimlagarh-Angul New Rail link

The Bimlagarh–Angul (Talcher–Bimlagarh) new rail line is a strategically important railway project in Odisha, intended to boost rail connectivity, reduce travel distances, and spur regional economic development in mineral-rich belts of the state.

The new rail link covers approximately 150 km of new broad-gauge track, traversing Angul, Deogarh, and Sundargarh districts. The corridor is designed to enhance freight capacity, serving large industries and mining regions, and features multi-point centralized loading stations. The alignment of the new Bimlagarh-Angul Rail line is presented below

Figure 6-2: Bimlagarh-Angul New Rail Link



Source: Open Street Map, Crisil Intelligence

Key feature of the new rail link is presented below

Table 6-2: Key information on new Bimlagarh- Angul New rail line

Feature	Details
Route length	~ 150 Km
District Covered	Angul, Deogarh & Sundergarh
Cost	Rs 1,928 crore
Key economic impact	Connectivity to Iron ore mining. Reduce travel distance from Rourkela to Angul and to Bhubaneswar. Decreasing exiting loan on the existing infrastructure for Rourkela to Angul segment
Current Status	26% as on September 2025, with land availability issue considering crossing forest areas.
Likely completion	As per information available in public domain, FY30

Source: Open Street Map, Crisil Intelligence

The sanctioned railway link, under construction since 2003-2004, is designed to provide the direct and shortest route for freight and passenger connectivity between Angul/Talcher and Rourkela. The corridor passes through resource-intensive zones, especially Angul, which is renowned for its reserves of iron ore, limestone, coal, and hosts extensive aluminium and thermal power assets. The alignment spans approximately 149.78 km and strategically traverses the iron ore mining areas of Koida and Barbil, enhancing logistical access to Angul/Talcher.

Present Status

Commissioning milestones include:

- Talcher–Sunakhani (17.62 km), operational from 06.01.2020
- Sunakhani–Samal (9.928 km), commissioned on 31.03.2024
- Khamar–Shrirampur (19.30 km), with major bridges and ROBs under construction
- Ongoing land acquisition between Shrirampur and Bimlagarh.

Conclusion

The new link is expected to have minimum impact on the project road as traffic in the project section comprises of goods to be consumed or produced by SMEs in the region, particularly iron and steel and cement. The predominant commodities produced in Angul, such as iron and steel, are largely transported by SMEs using road networks, which remain the primary mode due to quantity constraints and demand for flexible logistics. Additionally, local mineral flows—such as limestone, coal, and iron ore from Sambalpur/Jharsuguda/Sundergarh—are already efficiently managed via well-connected roadways within affected districts.

The robust pre-existing road infrastructure ensures that the addition of the Bimlagarh–Angul railway line will not materially alter traffic volumes or patterns within the project's influence area.

7 Traffic Growth Estimation & Traffic Forecast

7.1 Approach for traffic growth rates estimation

Crisil, based on its coverage of 80+ sectors and the MSME industry, has developed a knowledge base to understand the growth of industries and demand across various regions and clusters. The growth expectations for various industries are applied to each vehicle category based on the commodity composition of the vehicle category. For example, the share of light commercial vehicles (LCVs) carrying agricultural commodities is expected to grow as per agricultural output growth; the share of LCVs carrying consumer products is expected to grow as per the volume growth of durables; and the share of Multi axle vehicles (MAVs) carrying steel commodities is expected to grow as per demand/supply volume of steel products based on regional dynamics. This approach helps Crisil provide a more accurate growth rate of commercial traffic in the region.

For passenger traffic, Crisil assesses the sale of passenger cars in the region, growth of vehicular population, purpose and frequency of passenger travel, population growth, expansion of the city, and infrastructure development in the catchment area.

Further, Crisil also examines the various factors that will impact traffic over the concession period, such as upcoming alternative road routes, truck aggregation by logistics players, dedicated freight corridors and other transportation options. Thus, the analysis considers the impact of central and state policies, growth in production and consumption centres along the stretch, and infrastructure in the adjoining regions. The report covers both growth drivers and restraints for the traffic along the stretch. Crisil has enumerated and detailed the parameters that will positively/negatively impact the traffic on the stretch in the future.

Crisil has used its proprietary traffic projection methodology to project traffic using regional industry growth assumptions, macroeconomic developments, infra development and consumption centre growth factors of the catchment area and adjacent regions.

Figure 7-1: Commodity based approach: Illustrative example for Commercial vehicles

Commodity	MAV (Vehicles) Year 1	YoY growth	MAV (Vehicles) Year 2
Construction materials	300	9%	327
Consumer products	100	4%	104
Agri Produce	200	3%	206
Iron & Steel products	50	9%	55
Chemical products	200	5%	210
Total vehicles	XX		YY

Commodity	LCV (Vehicles) Year 1	YoY growth	LCV (Vehicles) Year 2
Construction materials	100	9%	109
Consumer products	200	4%	208
Agri Produce	50	3%	52
Iron & Steel products	300	9%	327
Chemical products	200	5%	210
Total vehicles	XX		YY

Growth rates for commodities are based on commodity specific demand/supply drivers and regional dynamics

Source: Crisil Intelligence

7.2 Odisha State profile

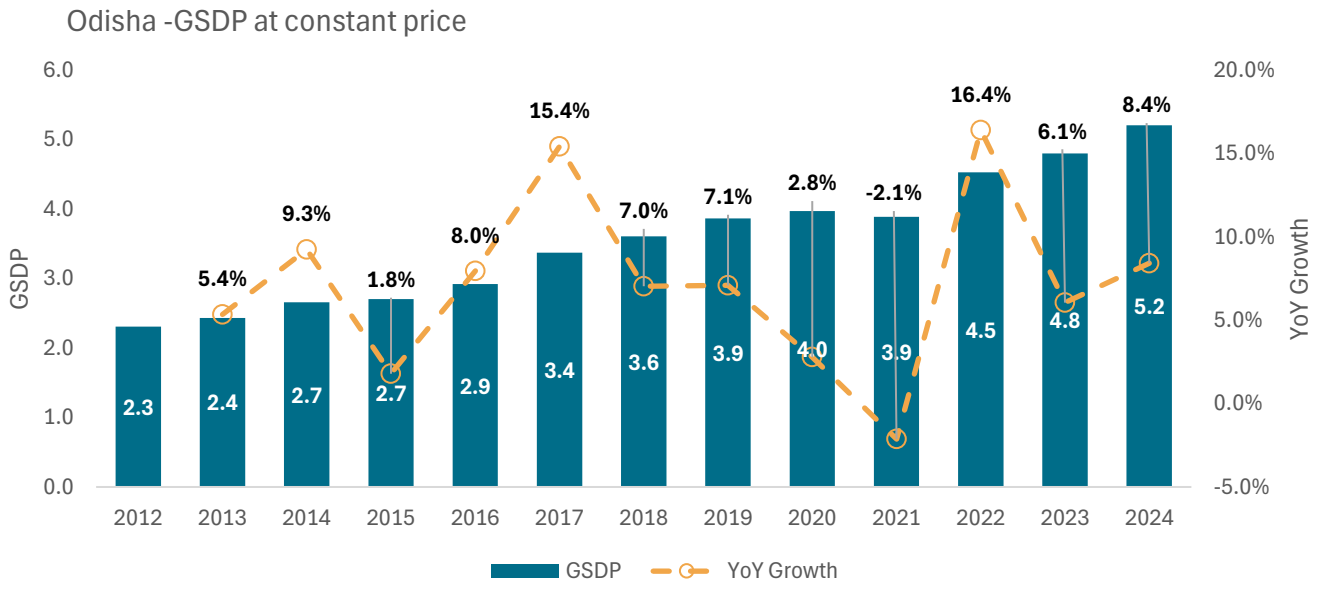
Odisha is one of India's most economically and resource-rich states, showing robust growth driven by its minerals, industry, and diverse policy initiatives. The state's Gross State Domestic Product (GSDP) has consistently registered high growth rates, with the economy projected to expand by 7–8% annually in recent years. Odisha's per capita income is rising rapidly, narrowing the gap with the national average. Its economic profile is defined by a strong emphasis on industrialization, mineral exploitation, and growing service activities.

The industrial sector is Odisha's primary growth engine, contributing nearly 44% to the GSDP at constant prices. This sector thrives on the state's vast mineral reserves, which include significant shares of India's iron ore, bauxite, coal, and chromite. Odisha holds the largest iron ore reserve in the country, fuelling a thriving steel manufacturing ecosystem with major integrated plants clustered in Rourkela, Kalinga Nagar, and Angul. The state also leads in aluminium production through major plants operated by public sector enterprises, notably in Angul and Damanjodi. Coal reserves in Talcher and Ib Valley support large-scale power generation and energy-intensive industries, while other minerals like manganese, graphite, and limestone provide raw materials for diverse mineral-based enterprises.

Beyond minerals and heavy industry, Odisha's manufacturing sector comprises cement, fertilisers, chemicals, paper, and an expanding MSME base. Strategic initiatives have driven the development of special economic zones, industrial corridors, and modern infrastructure to facilitate investment and innovation. The government's focus on promoting MSMEs has positioned Odisha among India's top ten states for enterprise count.

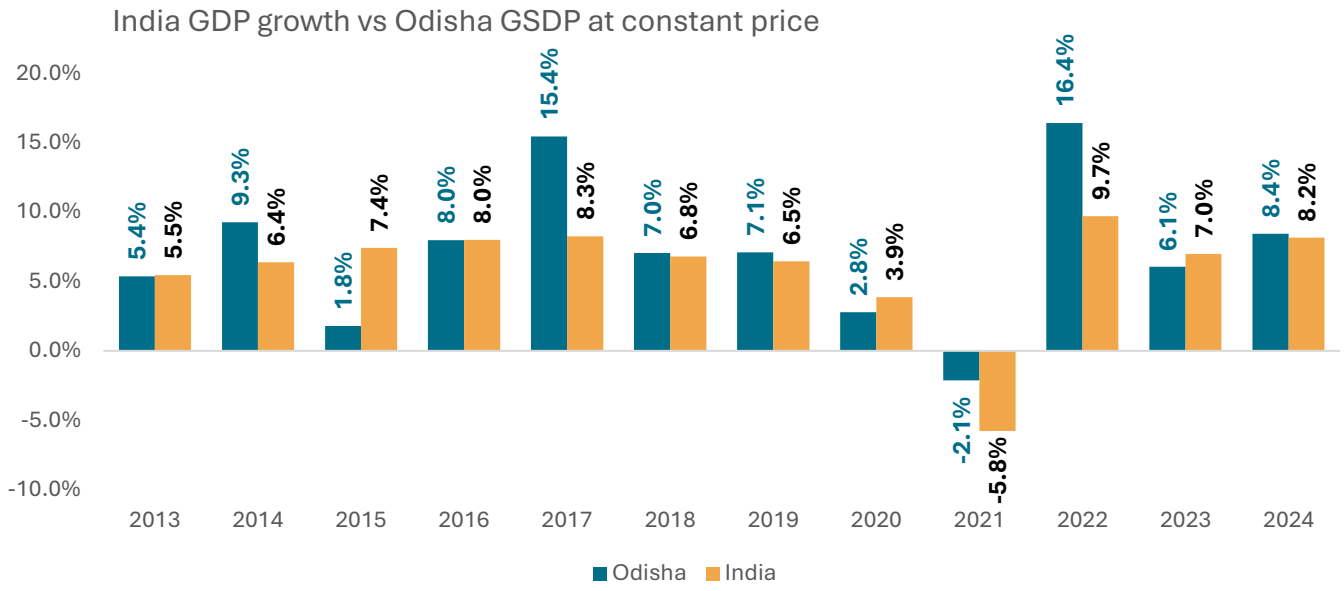
The services sector is Odisha's fastest-growing segment, contributing about 37% to the GSDP and registering double-digit growth in recent years. Banking, insurance, trade, transport, and tourism are central to this expansion. Agriculture and allied activities, including horticulture, livestock, and fishing, account for roughly 19–20% of GSDP, with state programs improving irrigation and farmer incomes.

Figure 7-2: Odisha GSDP



Source: MOSPI, Crisil Intelligence

Figure 7-3: Odisha GSDP vs India GDP

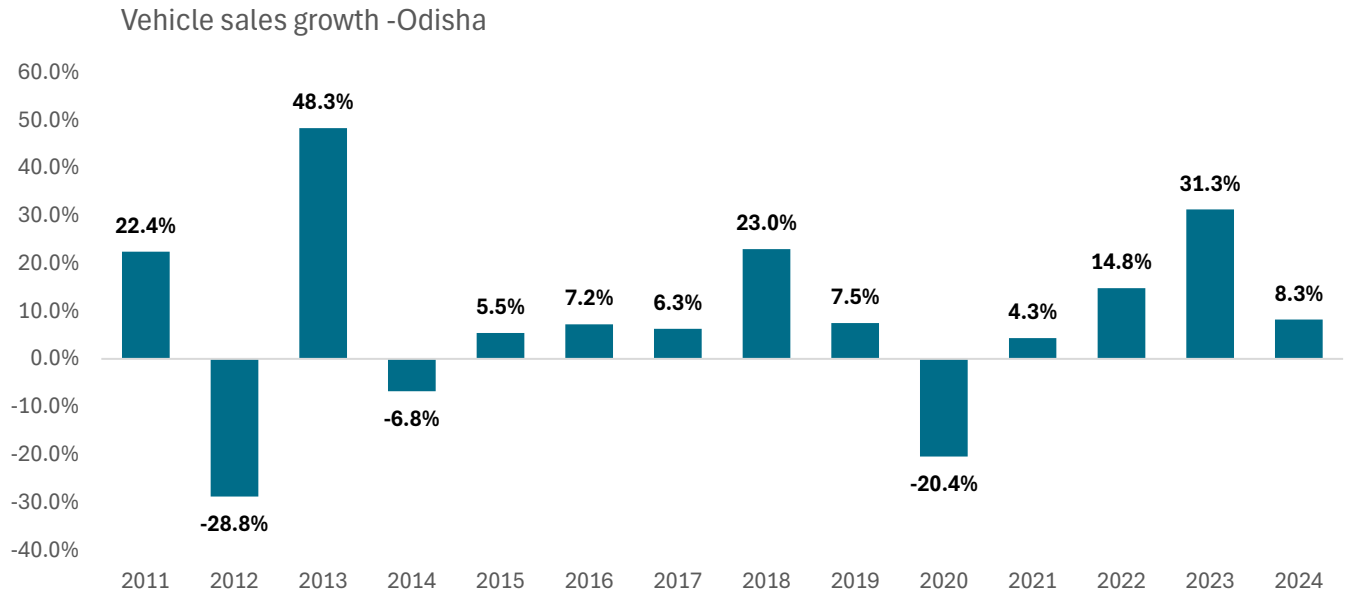


Source: MOSPI, Crisil Intelligence

7.3 Outlook for car growth

The rate of car ownership in India has increased from 6.6 per 1,000 people in 2001 to 25 per 1,000 people in 2019. Despite India's car fleet growing at an annual rate of 10% for nearly 25 years, the rate of car ownership remains low compared to countries with similar economic status and significantly lower than developed countries, which have a rate of around 450 per 1,000 people. This low rate of car ownership indicates potential for continued growth in the coming years. With the ongoing increase in car ownership and improvements in the road network, the use of cars for inter-urban travel is showing a growing trend.

Vehicles sales in Odisha have grown to about 6.3 percent for the period FY19 vs FY24 also about 8 percent during the period FY24 vs FY14. The project road CJV traffic have grown to about 7-8 percent for the period FY24 vs FY19. The YoY passenger vehicles sales growth is presented below.



Source: SIAM, Crisil Intelligence

7.4 Commodity Overview

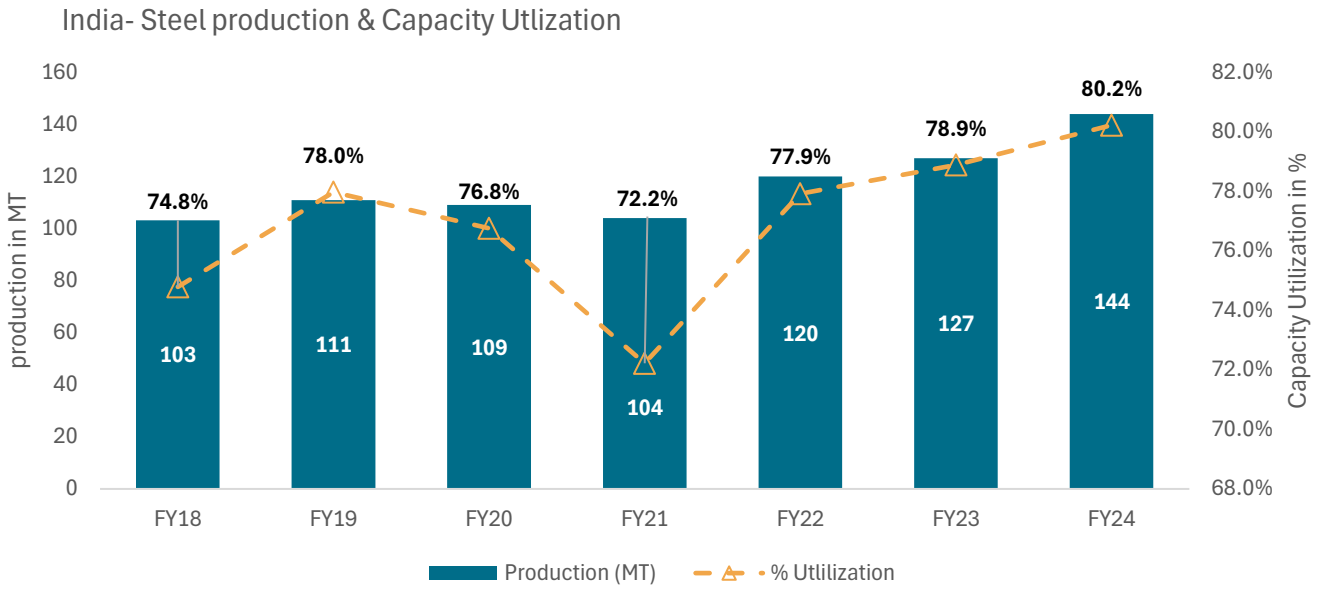
As mentioned in section primary data collection & analysis, the analysis of freight movement across the toll plaza reveals that the major commodities being transported include iron and steel products, Coal, construction material (Cement and fly ash) and courier and parcels.

Iron and Steel products

Iron and steel products accounts to about 14% in the overall traffic. Project section has presence of several iron and steel industries located the project influence areas which influences the traffic on the project section. Some of the major iron and steel producing plants are Rourkela Steel Plant, Ores Ispat Pvt Ltd, Nixon Steel power Ltd, Sharda Rerollers Pvt Ltd, Agrasen Sponge Pvt Ltd towers Rourkela. Similarly, LN Mettalics, Kaushal ferro metals, even star steel, TRS & Sons sponge iron near Sundergarh and Bhushan power & steel, Syam metallics, Aryan Ispat and power towards Jharsuguda. The location of the industries is explained in earlier sections. It is to be noted that Rourkela steel plant, Bhushan power and steel (now owned by JSW) and Aryan Ispat and power has significant contribution of traffic on the project section. Sambalpur and Jharsuguda attracted sponge iron units and auxiliary manufacturing operations. As infrastructure improved, these districts saw increased investment. The project road section became critical for enabling this growth.

The overall India steel production and capacity has grown to about 5.4 percent and 4.8 percent respectively for the period FY18-FY24. Construction and infrastructure remain the largest contributors, accounting for 65–72% of apparent steel demand, with building & construction and infrastructure each maintaining significant market share. Steel demand from transportation and engineering sectors adds further momentum, while long steel products continue to outpace flats in growth rates. The historical India production and capacity utilization is presented below.

Figure 7-4: India-Steel production and capacity utilization.



Source: Crisil Intelligence

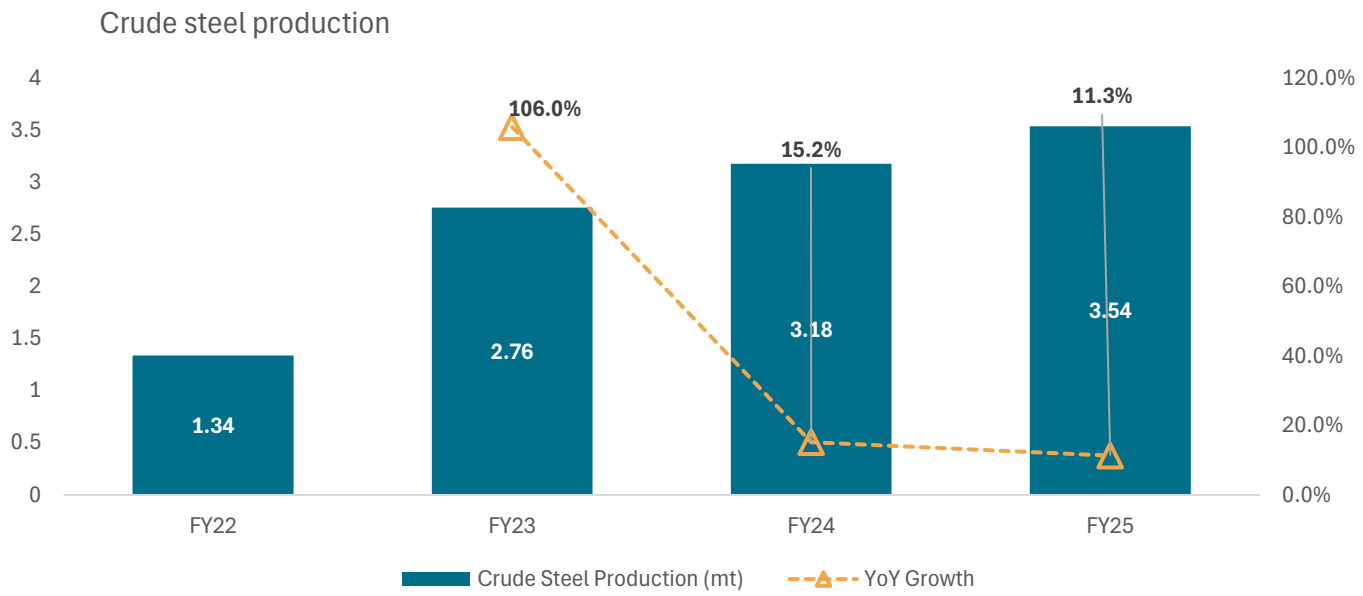
Also, the Odisha steel production and capacity has grown to about 5.4 percent and 4.8 percent respectively. The historical production and capacity utilization is presented below.

Odisha's steel production and capacity from FY18 to FY24 show significant growth. The crude steel production in Odisha rose from around 16.5 million tons in FY18 to 26 million tons in FY24. The state's steel production capacity increased as well, reported to be about 30.01 million tons per annum (MTPA) around FY24. The sector has seen a compound annual growth rate (CAGR) of approximately 7.8% over the last 6 years. Odisha currently holds about 20% of India's total steel production capacity, The state government initiatives and private investments from major companies like Tata Steel, JSW, and Jindal Steel are major contributors to this growth trajectory.

In addition, project road and Odisha has presence of large number of sponge iron units which also significantly contributes to the project road traffic. The production of sponge iron stood for Odisha stood at 12.8 million tonnes with 15.3 million tonnes capacity at FY24.

In addition, Bhushan power and steel (now owned by JSW) plant which is located at project section near Jharsuguda also significantly influences the project section traffic. The YoY crude steel production and its growth is presented below

Figure 7-5: Bhushan power and steel (Now owned by JSW)-Crude steel production and its growth



Source: Crisil Intelligence

Outlook for Iron & Steel products

Sectoral expansion amid supportive domestic and global dynamics is anchored by resilient infrastructure development, continued investments in capacity, and effective supply chain management. With demand for steel products remaining on a firm trajectory, the sector is poised to capitalize on policy support, technological upgrades, and favourable end-user demand, ensuring sustained momentum through the period. Crisil expects a growth of 5.7% from fiscal FY 27-31 considering historical and the above-mentioned factors for iron & steel products related traffic on the project road.

Coal

Coal is another major commodity, which travels on the road stretch and accounts to about 10 percent of the total volume.

The coal mines located in Sundargarh and Jharsuguda and closer to project road and is well connected to the industries located around the project influence area and these mines play a pivotal role in supporting the industrial growth of project influence area and Odisha as a whole as well, these mines serves as essential sources of thermal coal for a wide range of plants throughout the districts in the influence area and the state. These mines supply a steady flow of coal to power plants, cement factories, steel manufacturing units, and several small and medium enterprises, ensuring that the operational needs of these industries are consistently met. The strategic placement of these mines allows for efficient transportation, with coal often delivered to end-users through roadways for smaller volumes and by rail for larger industrial players who require substantial quantities. Their ample reserves and ongoing production have become vital for the uninterrupted functioning of Odisha's major manufacturing

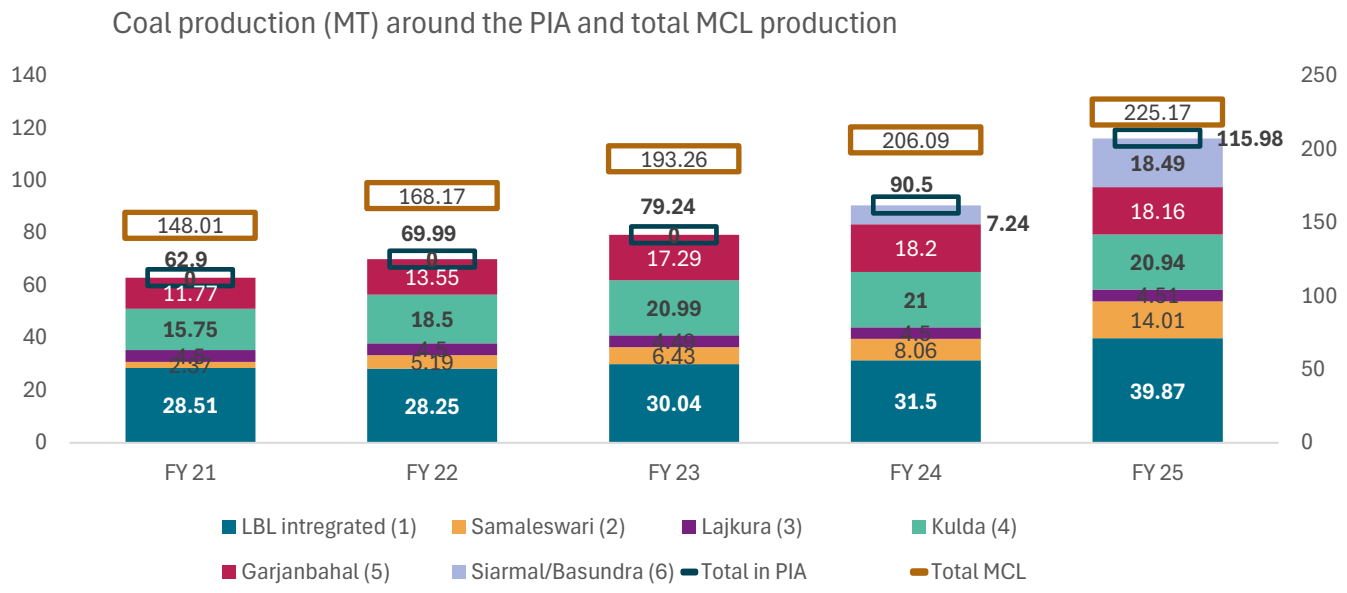
sectors, helping maintain steady output and industrial expansion.

Notably, coal that travels via road is generally destined for SMEs in the iron and steel sector, involving modest volumes and shorter transport distances. Larger industrial players, by contrast, utilize dedicated railway sidings to handle and transport far greater volumes of coal for their operational requirements. Meanwhile, regional mines have responded to sustained demand by ramping up production during FY24 &FY25 and are supported by substantial coal reserves, ensuring a stable supply for ongoing industrial activity.

Mahanadi Coalfields Limited is a major coal-producing company in India and one of the eight subsidiaries of Coal India Limited and accounts to 84% of total coal production in the state of Odisha. Also, the mines located around the project influence area account to about 44 percent of the total coal production in Odisha. LBL integrated (Lakhanpur & Belapahar), Kulda, Siarmal/Basundra accounts to major share of coal production, together it accounts to 68 percent of the total coal production.

Coal production saw an increase during the periods of FY22 compared to FY21 and FY23 compared to FY22. This rise can be linked to heightened demand and the expansion of significant plants situated in the project influence area during the same timeframe. Additionally, it is important to highlight that the Siarmal/Basundra mines recorded a production increase in FY25 (18.5 mt) compared to FY24 (7.24 mt). The production of coal mines over the years located around the project influence area is presented below.

Figure 7-6: Coal production trend in project influence area



Source: Coal.nic.in, Crisil Intelligence

India's policy to reduce coal imports by boosting domestic production and promoting energy transition has caused recent overall coal imports to dip over the years in the future, However, ongoing power sector mandates to operate imported coal plants at full capacity, especially during demand peaks, sustain import volumes at major ports and India expects domestic non-coking coal production to grow at healthy growth, on account of increased production by Coal India Ltd. Non-coking coal imports are expected to decline as rise in domestic coal production will

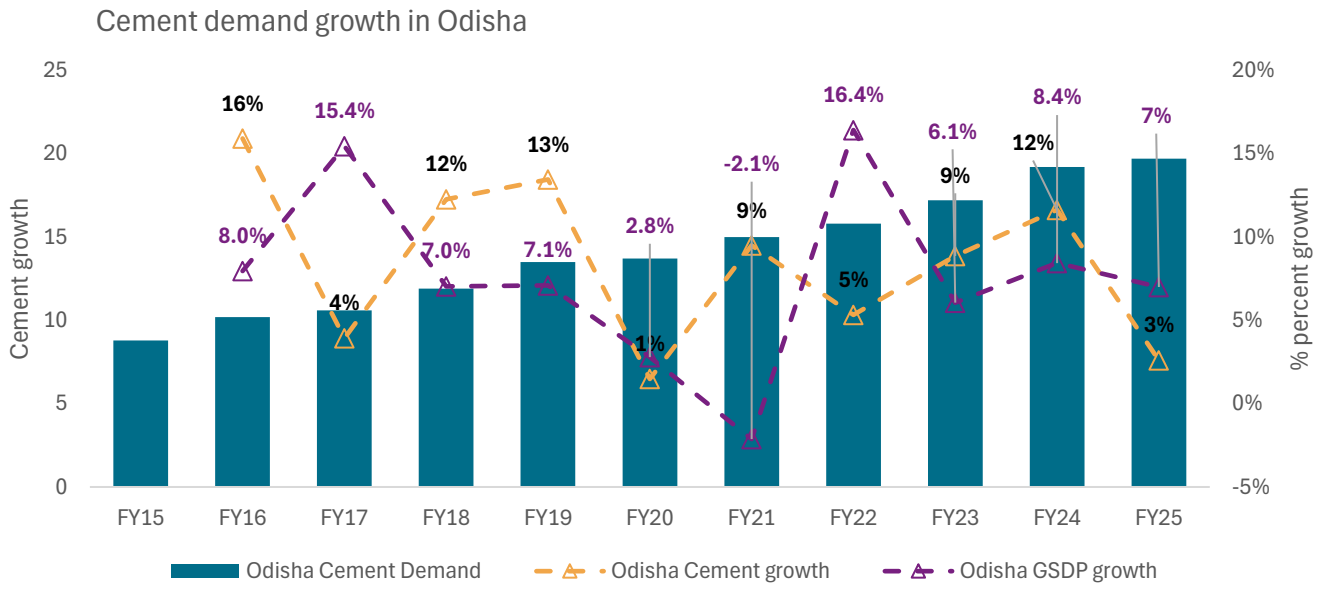
increasingly substitute the demand for imported coal. Coking coal imports to remain main source as demand sustains though stabilizes over the next five years. Non-coking coal imports are expected to decline as rise in domestic coal production will increasingly substitute demand for imported coal. Considering all these factors Crisil expects CAGR of 2.9% from fiscal FY 27-FY 31 related traffic on the project road.

Construction materials

Construction materials account for 4 percent of the overall freight traffic at all the toll plazas. This has the component of cement and by products from the plants located in the project influence area. The limestone/bauxite mines are located near Jharsuguda and Rourkela region I.e. Ultratech cement and Dalmia cement.

Sundargarh and Jharsuguda stand out as pivotal regions for cement production in their area, serving as vital industrial hubs with both manufacturing and logistical significance. Their position is enhanced by a network of major cement plants, including some run by leading industry players such as Ultra tech cement and Dalmia cement, which supports a steady flow of raw materials from the limestone/Bauxite mines and finished goods throughout the nearby districts and beyond.
These clusters are not just key contributors to production; they are also central to regional cement traffic, with a large share of this movement attributed to Sundargarh and Sambalpur. The internal and outward movement is fuelled by their proximity to raw material sources and the dynamic interplay between neighbouring districts, making the region naturally suited to large-scale cement operations.

Cement demand in India is primarily driven by infrastructure projects, which account for a broad range of 29–31% of total demand, supported by significant investments and government initiatives. Rural housing follows closely, contributing 32–34%, while urban housing maintains a steady share of 22–24%, reflecting ongoing urbanization trends. The industrial and commercial sector, although smaller, still holds a notable 13–15% share, showing the diverse yet fluctuating sources of cement consumption across the country.



Source: Coal.nic.in, Crisil Intelligence

Cement demand is expected to grow by 4.5-5% in upcoming 5 years, majorly led by infra segment despite healthy base. Growth on our project stretch is expected to grow by 4-5% driven by factors such as increasing demand from the industrial and commercial segments on project corridors and catchment areas.

7.5 Commodity Outlook

Crisil Intelligence has forecasted the freight traffic growth based on the growth in relevant sectors influencing traffic in the region. Industry growth has been analysed and forecasted based on our proprietary database of industries for the surrounding regions that impact traffic on project road as well as our internal assessment on a relevant set of sectors at the pan India level. Package wise forecast incorporates the regional dynamics including, but not limited to, investments, commodity trends, district output (GDDP) profile (primary/secondary, construction/manufacturing) etc.

The traffic for the coming years is projected by factoring in the impact of these parameters on commodity wise growth rates and is presented in below table.

Table 7-1: Commodity Outlook for the Project Section

Commodity Type	FY 27-31	FY 31-35	FY 35-39	FY27-FY41
Agri Produce	1.8%	1.6%	1.5%	1.6%
Automobiles	4.8%	4.5%	4.2%	4.4%
Chemical products	4.4%	4.1%	3.8%	4.0%
Coal	2.9%	2.8%	2.6%	2.7%
Iron Ore	4.8%	4.8%	4.6%	4.7%
Construction materials	4.8%	4.8%	4.6%	4.7%
Consumer Foods	3.5%	3.2%	3.1%	3.2%
Consumer Products	3.5%	3.2%	3.1%	3.2%
Container	4.4%	4.1%	3.8%	4.0%
Courier & parcel	7.0%	6.5%	6.1%	6.4%
Iron & Steel Products	5.7%	5.8%	5.5%	5.6%
Machinery	4.4%	4.1%	3.8%	4.0%
Milk & Animal Food	1.8%	1.6%	1.5%	1.6%
Others	5.3%	4.9%	4.6%	4.8%
Paper products	4.8%	4.5%	4.2%	4.4%
Petroleum Products	2.6%	2.4%	2.3%	2.4%
Pharmaceuticals	4.4%	4.1%	3.8%	4.0%
Plastic products	4.8%	4.5%	4.2%	4.4%
Plywood & Timber products	3.5%	3.2%	3.1%	3.2%

Commodity Type	FY 27-31	FY 31-35	FY 35-39	FY27-FY41
Rubber products	4.4%	4.1%	3.8%	4.0%
Textile & Footwear	6.2%	5.7%	5.4%	5.6%
Tiles & Ceramic products	4.0%	3.6%	3.4%	3.6%

Source: Industry, Crisil Intelligence

7.6 Implied Growth Rate for the Project Section

Mode wise implied growth rates adopted for the project road is presented in the below table.

Table 7-2: Mode wise Traffic projections

Vehicle category	FY 26 - FY 30	FY30-35	FY35-40	FY26-41
TP01				
Car	6.1%	5.2%	4.6%	5.2%
LCV	4.4%	4.0%	3.8%	4.0%
2A	3.2%	3.0%	2.8%	3.0%
3A	1.1%	0.9%	0.7%	0.9%
MAV	4.7%	4.6%	4.3%	4.5%
2A-MM	2.9%	2.9%	2.6%	2.8%
3A-MM	1.4%	1.4%	1.1%	1.3%
MAV-MM	4.6%	4.6%	4.4%	4.5%
Total Veh.	5.2%	4.7%	4.3%	4.7%
Total PCU	4.7%	4.4%	4.1%	4.4%
TP02				
Car	6.1%	5.2%	4.6%	5.2%
LCV	6.2%	5.5%	5.1%	5.5%
2A	3.6%	3.3%	3.1%	3.3%
3A	2.2%	1.9%	1.6%	1.9%
MAV	5.1%	4.8%	4.6%	4.8%
2A-MM	2.8%	2.8%	2.6%	2.7%
3A-MM	1.3%	1.3%	1.1%	1.2%
MAV-MM	3.8%	3.8%	3.6%	3.7%
Total Veh.	5.2%	4.7%	4.3%	4.7%
Total PCU	4.8%	4.5%	4.2%	4.5%

Vehicle category	FY 26 - FY 30	FY30-35	FY35-40	FY26-41
TP03				
Car	6.1%	5.2%	4.6%	5.2%
LCV	4.7%	4.4%	4.2%	4.4%
2A	3.9%	3.8%	3.5%	3.7%
3A	1.8%	1.6%	1.4%	1.6%
MAV	5.1%	5.0%	4.7%	4.9%
2A-MM	3.1%	3.1%	2.8%	3.0%
3A-MM	1.6%	1.7%	1.4%	1.5%
MAV-MM	4.5%	4.5%	4.3%	4.4%
Total Veh.	5.4%	4.9%	4.5%	4.9%
Total PCU	5.0%	4.8%	4.5%	4.7%

Source: Crisil Intelligence

7.7 Traffic Projections

The total traffic projected in terms of PCUs based on most likely growth rates and after impacts is presented in below table.

Table 7-3: Traffic projections

FY	Car	LCV	2A	3A	MAV	2A-MM	3A-MM	MAV-MM	Total Veh.	Total PCU	YoY Growth (%)
TP01											
2026	5,425	204	522	401	2,853	1	113	475	9,992	23,813	
2027	5,771	213	540	406	2,995	1	115	498	10,538	24,992	5.0%
2028	6,139	223	558	411	3,139	1	116	521	11,108	26,201	4.8%
2029	6,513	232	576	415	3,286	1	118	544	11,684	27,424	4.7%
2030	6,872	242	593	419	3,433	1	119	569	12,247	28,637	4.4%
2031	7,231	252	610	422	3,589	1	121	595	12,821	29,899	4.4%
2032	7,609	262	628	426	3,753	1	123	622	13,424	31,223	4.4%
2033	8,007	272	647	430	3,924	1	124	651	14,057	32,612	4.4%
2034	8,426	283	666	435	4,104	1	126	682	14,722	34,070	4.5%
2035	8,859	294	686	439	4,290	1	128	713	15,409	35,571	4.4%
2036	9,284	306	706	442	4,481	1	129	745	16,094	37,093	4.3%
2037	9,721	318	726	446	4,677	1	131	778	16,797	38,656	4.2%
2038	10,170	330	746	449	4,879	1	132	812	17,519	40,259	4.1%

FY	Car	LCV	2A	3A	MAV	2A-MM	3A-MM	MAV-MM	Total Veh.	Total PCU	YoY Growth (%)
2039	10,631	342	766	452	5,086	1	134	847	18,259	41,902	4.1%
2040	11,104	355	787	455	5,299	1	135	883	19,017	43,584	4.0%
2041	11,588	368	807	457	5,516	1	136	919	19,793	45,304	3.9%
CAGR (27-41)	5.6%	4.3%	3.2%	1.0%	4.8%	3.0%	1.4%	4.8%	5.0%	4.7%	
TP02											
2026	4,090	107	352	184	3,448	0	8	2,041	10,230	30,583	
2027	4,351	114	365	189	3,636	0	8	2,121	10,783	32,112	5.0%
2028	4,628	121	379	193	3,826	0	8	2,202	11,357	33,676	4.9%
2029	4,910	128	392	197	4,019	0	8	2,285	11,939	35,261	4.7%
2030	5,180	136	405	201	4,214	0	8	2,369	12,513	36,849	4.5%
2031	5,451	143	418	204	4,417	0	8	2,458	13,100	38,495	4.5%
2032	5,736	151	432	208	4,630	0	8	2,551	13,717	40,223	4.5%
2033	6,036	159	447	212	4,854	0	9	2,647	14,365	42,036	4.5%
2034	6,352	168	462	216	5,091	0	9	2,748	15,046	43,940	4.5%
2035	6,678	177	477	221	5,336	0	9	2,850	15,748	45,902	4.5%
2036	6,999	187	492	224	5,589	0	9	2,955	16,456	47,906	4.4%
2037	7,328	196	508	228	5,850	0	9	3,063	17,183	49,968	4.3%
2038	7,667	206	524	232	6,120	0	9	3,172	17,930	52,086	4.2%
2039	8,014	217	540	236	6,398	0	9	3,283	18,697	54,259	4.2%
2040	8,371	228	556	239	6,684	0	9	3,397	19,483	56,488	4.1%
2041	8,735	239	572	243	6,978	0	9	3,512	20,288	58,770	4.0%
CAGR (27-41)	5.6%	5.9%	3.5%	2.0%	5.2%	2.9%	1.3%	4.0%	5.0%	4.8%	
TP03											
2026	4,250	169	304	155	1,865	0	8	1,355	8,107	20,397	
2027	4,521	178	316	158	1,965	0	9	1,418	8,565	21,461	5.2%
2028	4,810	187	329	161	2,066	0	9	1,483	9,044	22,558	5.1%
2029	5,102	195	342	164	2,170	0	9	1,549	9,531	23,674	4.9%
2030	5,383	204	354	166	2,276	0	9	1,616	10,009	24,792	4.7%
2031	5,665	213	368	169	2,390	0	9	1,689	10,503	25,978	4.8%
2032	5,961	222	381	172	2,510	0	9	1,766	11,022	27,223	4.8%
2033	6,273	232	396	174	2,636	0	10	1,846	11,568	28,532	4.8%

FY	Car	LCV	2A	3A	MAV	2A-MM	3A-MM	MAV-MM	Total Veh.	Total PCU	YoY Growth (%)
2034	6,601	243	411	177	2,769	0	10	1,930	12,141	29,907	4.8%
2035	6,940	253	426	180	2,907	0	10	2,017	12,734	31,325	4.7%
2036	7,273	264	442	183	3,049	0	10	2,106	13,327	32,770	4.6%
2037	7,615	276	458	186	3,196	0	10	2,197	13,937	34,256	4.5%
2038	7,967	287	474	188	3,347	0	10	2,290	14,564	35,783	4.5%
2039	8,329	299	490	191	3,503	0	10	2,386	15,208	37,350	4.4%
2040	8,699	311	506	193	3,663	0	11	2,484	15,867	38,957	4.3%
2041	9,078	324	523	195	3,828	0	11	2,584	16,543	40,603	4.2%
CAGR (27-41)	5.6%	4.7%	4.0%	1.7%	5.3%	3.2%	1.7%	4.7%	5.2%	5.0%	

Source: Crisil Intelligence

7.8 Modification in concession period

As per the clause 29.2.1 Subject to the provisions of Clause 29.1.2, in the event Actual Average Traffic shall have fallen short of the Target Traffic, then for every 1% (one per cent) shortfall as compared to the Target Traffic, the Concession Period shall, subject to payment of Concession Fee in accordance with this Agreement, be increased by 1.5% (one point five per cent) thereof; provided that such increase in Concession Period shall not in any case exceed 20% (twenty per cent) of the Concession Period.

As per the information provided by client, following extension period to the concession period is considered:

- Target traffic extension: 1,606 days
- IE letter dated 2nd feb 2023. which includes COVID extension of 102.82 days, 190 days for MAE and 7.14 days for trucker's strike. (Approval pending by OWD)

The concession end date including approved extension is 6th December 2040. Hence the projection is provided till FY41.

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8 Revenue forecast

8.1 General

At present the project section is under “open tolling system” which enables the concessionaire to collect tolls from long distance as well as short distance traffic joining the project from adjoining highways.

8.1.1.1 User Fee Schedule

In the Schedule of User Fee (Schedule R) outlined in the Concession Agreement for the project, the toll rates per kilometre that have been applicable since 2010/11 for standard tolling lengths are detailed. According to the concession agreement, freight vehicles (2A/3A/MAV/Oversized) transporting minerals other than minor minerals are subject to a higher toll rate, which is also specified in Schedule R. Furthermore, the Orissa Gazette notification dated 23rd June 2011 indicates that discounts for daily and monthly passes are exclusively available for non-commercial vehicles, specifically for cars. The three categories of concessions available for non-commercial traffic (cars) are outlined in the following rates:

Local traffic Car / Jeep / Vans (CJV) - This category includes local users who own a vehicle registered for non-commercial use, living within 20 km of the toll plaza and crossing it for commuting. The reduced fee for these users is a monthly pass priced at Rs. 150.00.

Daily Pass If a vehicle needs to cross the tolled area more than once in a single day, the user can choose to pay one and a half times (1.5 times) the fee for a single entry; this pass is valid for 2 entries within 24 hours of purchase.

Monthly Pass Users who frequently utilize the project road throughout the month may opt to buy a monthly pass by paying a fee equivalent to two-thirds of the cost for 50 single journeys; this pass allows for a maximum of 50 one-way trips during its month of validity

The concessions of traffic have been provided under the categories/ toll tickets as presented in below table.

Table 8-1: Tolling Tickets

Ticket	Maximum number of one-way journeys allowed	Period of validity
Single/Normal	Single	-
Daily Pass	Multiple	24 hours
Monthly Pass	Multiple	One month from the date of payment
Local Personal	Multiple	One month from the date of payment

8.1.1.2 Toll Segmentation

As mentioned in section historical toll data of FY 25 is used in adopting the segmentation for the project road. The traffic tolling segmentation in (%) adopted for the present study for FY26 onwards is presented in below table.

Table 8-2: Toll segmentation in % - FY25

Mode	Single journey	Return journey	Monthly Pass	Local Pass	Exempt	Violation
TP01						
Car	43.4%	41.3%	0.003%	10.0%	5.2%	0.1%
LCV	80.2%				19.8%	0.0%
2A	98.9%				1.1%	0.0%
3A	99.9%				0.1%	0.0%
MAV	100.0%				0.0%	0.0%
2A-MM	100.0%					
3A-MM	100.0%					
MAV-MM	100.0%					
TP02						
Car	42.5%	37.1%	0.143%	13.8%	6.5%	0.0%
LCV	83.0%				17.0%	
2A	98.5%				1.5%	
3A	99.8%				0.2%	
MAV	100.0%				0.0%	
2A-MM	100.0%					
3A-MM	100.0%					
MAV-MM	100.0%					
TP03						
Car	33.4%	49.5%	0.101%	11.0%	5.9%	0.1%
LCV	45.2%				54.8%	0.0%
2A	99.1%				0.9%	
3A	99.8%				0.2%	0.0%
MAV	100.0%				0.0%	
2A-MM	100.0%					
3A-MM	100.0%					
MAV-MM	100.0%					

Source: Historical toll data, Crisil Intelligence

The normal toll paying traffic for Cars is about 44 percent at TP01, 42 percent at TP02 and about 34 percent at TP03 respectively. In case of MAV vehicle normal toll paying is 100 percent across all toll plazas. Also, it is to be noted that the higher exempt observed for LCV is on account of Minibuses which are recorded under this category.

8.1.1.3 Trip Rates

The trip rates for CJV are adopted based on the FY 25 historic traffic data and trip rates for the present study for FY26 onwards is presented in below table. It may be noted that for other vehicles trip rates of 1.0 is adopted as per schedule of user fee.

Table 8-3: Trip rates for CJV

Mode	Single journey	Return journey	Monthly Pass	Local Pass
TP01	1.00	1.96	0.07	0.66
TP02	1.00	1.97	1.49	0.44
TP03	1.00	1.98	1.59	0.62

Source: Historical toll data, Crisil Intelligence

8.1.1.4 Tolling lengths

The tolling lengths for the project section as per concession agreement is presented below

Table 8-4: Tolling Lengths for the project section

Toll Plaza	Chainage	Tolling Length
TP01	Km 17.025	45.690
TP02	Km 71.853	71.350
TP03	Km 150.075	44.690

Source: Concession Agreement, Crisil Intelligence

8.1.1.5 Toll Rates Estimation

The toll rates (Rs/km) for the base year 2010-2011 for different vehicle category as per concession agreement is presented below.

Also, it may be noted that as per concession agreement it specifies that the toll rates for 2010-11 will rise by three percent each year, starting from April 1, without compounding. This increased rate will serve as the base rate for the following years. The base rates will be adjusted annually from April 1 to account for the rise in the wholesale price index for December of the previous year when the revision occurs. However, this adjustment will be limited to 40 percent of the increase in the wholesale price index

Table 8-5: Base Rate in Rs/km

Vehicle Type	Base rate (Rs/km)	Base rate (Rs/km) for vehicles carrying major minerals
Car, Jeep, LMV (CJV)	0.71	
LCV/Minibus	1.15	
2- Axle	2.75	5.50
3-Axle	3.79	7.60
MAV	3.79	7.60
Tractor Trailer	2.42	

Source: Concession agreement, Schedule of user fee

8.1.1.6 Review and Outlook of Whole-Sale price index (WPI)

The projected toll rates are dependent on Wholesale Price Index (WPI) assumptions for 2024 to 2045. For WPI projection, Crisil Intelligence has relied on inputs from Client. Past and outlook WPI growth is presented in below table.

Table 8-6: WPI

Year	WPI	Expected Year-on-year growth
2025	478.6	
2026	492.9	3.00%
2027	513.9	4.25%
2028	535.7	4.25%
2029	558.5	4.25%
2030	581.9	4.20%
2031	606.4	4.20%
2032	631.8	4.20%
2033	658.1	4.15%
2034	685.4	4.15%
2035	713.8	4.15%
2036	743.1	4.10%
2037	773.5	4.10%
2038	805.3	4.10%
2039	837.9	4.05%
2040	871.8	4.05%
2041	907.1	4.05%

Source: Projected WPI (P): IHS: Markit (Client Data)

8.2 Revenue Estimates

According to the concession agreement, the duration of the concession for the project section is set at 22 years. The appointment date was in July 2014, and toll collection commenced in March 2018. The concession period is scheduled to conclude at the end of FY37; however, based on the information provided by the client regarding target traffic, the concession period is expected to be extended by 4.4 years. Additionally, an extension of 102.82 days will be granted due to the COVID-19 pandemic. The revenue estimates have been presented till FY41 and is presented below

Table 8-7: Revenue in ₹ Million for the Project Section

FY Year	TP01	TP02	TP03	Total
2025	682.3	1,525.3	682.7	2,890.3
2026	708.3	1,677.7	683.4	3,069.4
2027	765.0	1,822.3	744.9	3,332.2
2028	837.9	1,996.6	819.6	3,654.1
2029	918.0	2,168.0	889.6	3,975.6
2030	992.7	2,367.0	972.2	4,331.9
2031	1,084.1	2,569.1	1,065.6	4,718.9
2032	1,187.7	2,807.8	1,169.3	5,164.8
2033	1,275.9	3,052.3	1,269.1	5,597.3
2034	1,399.5	3,328.4	1,400.4	6,128.2
2035	1,520.6	3,628.7	1,523.2	6,672.5
2036	1,658.6	3,956.7	1,665.6	7,280.9
2037	1,800.9	4,287.2	1,813.4	7,901.4
2038	1,956.3	4,664.1	1,983.1	8,603.6
2039	2,125.0	5,064.7	2,158.1	9,347.8
2040	2,317.5	5,511.5	2,350.0	10,179.0
2041	2,500.7	5,961.5	2,548.1	11,010.3
CAGR (FY26-FY41)	**8.8%**	**8.8%**	**9.2%**	**8.9%**

Source: Crisil Intelligence

The share of revenue from TP01 and TP03 is about 22 percent each and TP02 contributes to about 55.4 percent of the total revenue from the project section.

At TP01, MAV is major contributor in total revenue accounting to about 44 percent, followed by MAV carrying major minerals accounting to about 23 percent. CJV accounts to about 13 percent of the total revenue

At TP02, MAV carrying major accounts to about 50 percent of the total revenue followed by MAV which account to about 38 percent. CJV accounts to about 6.1 percent of the total revenue.

Similarly, At TP03, MAV carrying major accounts to about 50 percent of the total revenue followed by MAV which account to about 34 percent. CJV accounts to about 9.0 percent of the total revenue. Revenue by mode for TP01, TP02 and TP03 is presented below

Table 8-8: TP01 Revenue by Mode in ₹ Million

FY Year	Car	LCV	2A	3A	MAV	2A-MM	3A-MM	MAV-MM	Total
2025	87.8	5.9	42.5	62.1	296.6	0.2	34.1	153.0	682.3
2026	98.4	6.3	47.1	50.4	359.1	0.1	28.2	118.8	708.3
2027	107.1	6.9	50.7	52.5	387.9	0.1	29.9	129.9	765.0
2028	121.5	7.5	54.5	55.5	425.0	0.1	31.7	142.0	837.9
2029	136.4	8.2	58.2	59.0	467.5	0.1	33.5	155.0	918.0
2030	146.8	8.9	63.1	61.8	507.3	0.1	35.5	169.2	992.7
2031	163.1	9.6	67.2	65.4	556.6	0.1	37.5	184.6	1,084.1
2032	181.4	10.4	72.7	69.4	611.0	0.2	39.9	202.8	1,187.7
2033	193.7	11.2	78.2	72.2	658.6	0.2	42.0	219.9	1,275.9
2034	214.0	12.0	84.2	76.8	726.3	0.2	44.6	241.3	1,399.5
2035	235.7	13.4	90.3	80.7	790.5	0.2	47.1	262.8	1,520.6
2036	262.5	14.4	98.3	84.9	860.7	0.2	50.0	287.6	1,658.6
2037	285.9	15.3	104.8	89.4	938.7	0.2	52.8	313.8	1,800.9
2038	311.6	16.9	111.7	94.1	1,023.7	0.2	55.8	342.3	1,956.3
2039	342.7	18.0	120.3	98.9	1,113.5	0.3	58.9	372.4	2,125.0
2040	372.5	19.8	129.5	104.8	1,221.4	0.3	62.4	407.0	2,317.5
2041	406.3	21.5	138.4	109.2	1,318.3	0.3	65.5	441.2	2,500.7

Source: Crisil Intelligence

Table 8-9: TP02 Revenue by Mode in ₹ Million

FY Year	Car	LCV	2A	3A	MAV	2A-MM	3A-MM	MAV-MM	Total
2025	93.6	4.9	46.8	45.2	571.6	0.0	6.3	756.9	1,525.3
2026	110.2	5.2	49.3	35.9	673.3	0.0	3.1	800.9	1,677.7
2027	122.3	5.9	53.2	38.1	736.4	0.0	3.2	863.2	1,822.3
2028	137.4	6.4	57.3	40.9	812.1	0.0	3.4	939.0	1,996.6
2029	151.2	7.2	62.0	43.4	887.3	0.0	3.6	1,013.3	2,168.0
2030	167.4	7.8	67.0	46.4	976.5	0.0	3.8	1,098.1	2,367.0

FY Year	Car	LCV	2A	3A	MAV	2A-MM	3A-MM	MAV-MM	Total
2031	182.5	8.7	72.2	49.2	1,063.8	0.0	4.0	1,188.7	2,569.1
2032	201.4	9.6	77.9	52.5	1,169.0	0.0	4.3	1,293.0	2,807.8
2033	220.6	10.6	84.3	55.7	1,275.5	0.0	4.5	1,401.1	3,052.3
2034	239.7	11.7	90.5	59.5	1,402.7	0.0	4.8	1,519.4	3,328.4
2035	267.3	12.9	97.7	63.5	1,538.3	0.0	5.1	1,643.9	3,628.7
2036	291.7	14.2	105.6	67.6	1,687.3	0.0	5.4	1,784.8	3,956.7
2037	315.9	15.5	114.1	71.5	1,836.1	0.1	5.7	1,928.3	4,287.2
2038	348.4	17.2	122.4	76.1	2,010.1	0.1	6.0	2,083.9	4,664.1
2039	379.3	18.7	131.9	80.7	2,194.7	0.1	6.3	2,252.9	5,064.7
2040	416.8	20.4	142.3	85.6	2,396.9	0.1	6.7	2,442.8	5,511.5
2041	450.4	22.4	153.3	90.6	2,610.1	0.1	7.0	2,627.7	5,961.5

Source: Crisil Intelligence

Table 8-10: TP03 Revenue by Mode in ₹ Million

FY Year	Car	LCV	2A	3A	MAV	2A-MM	3A-MM	MAV-MM	Total
2025	61.3	2.6	27.8	19.6	229.4	0.1	4.4	337.3	682.7
2026	73.3	2.8	26.9	18.9	228.0	0.1	2.1	331.4	683.4
2027	80.2	3.1	28.6	20.1	250.9	0.1	2.2	359.7	744.9
2028	88.6	3.4	31.6	21.4	276.0	0.1	2.3	396.2	819.6
2029	96.2	3.7	34.0	22.6	301.0	0.1	2.5	429.6	889.6
2030	107.4	4.0	37.1	23.9	328.1	0.1	2.6	468.9	972.2
2031	119.2	4.4	39.9	25.5	361.9	0.1	2.8	511.8	1,065.6
2032	128.8	4.8	43.6	27.3	399.5	0.1	3.0	562.3	1,169.3
2033	142.1	5.2	47.2	28.6	432.9	0.1	3.1	609.9	1,269.1
2034	159.9	5.8	51.3	30.7	480.0	0.1	3.4	669.3	1,400.4
2035	171.5	6.3	55.5	32.5	525.0	0.1	3.6	728.8	1,523.2
2036	188.3	6.8	60.1	34.4	574.6	0.1	3.8	797.6	1,665.6
2037	205.0	7.5	64.5	36.5	629.7	0.1	4.0	865.9	1,813.4
2038	227.1	8.1	70.2	38.7	690.1	0.1	4.2	944.6	1,983.1
2039	246.6	8.9	75.3	41.0	754.2	0.1	4.5	1,027.6	2,158.1
2040	268.1	9.5	81.7	43.4	824.4	0.2	4.7	1,118.1	2,350.0
2041	293.3	10.4	87.9	45.5	894.0	0.2	5.0	1,211.8	2,548.1

Source: Crisil Intelligence



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Crisil Intelligence is a leading provider of research, consulting, risk solutions and advanced data analytics, serving clients across government, private and public enterprises. We leverage our expertise in data-driven insights and strong benchmarking capabilities to help clients navigate complex external ecosystems, identify opportunities and mitigate risks. By combining cutting-edge analytics, machine learning and AI capabilities with deep industry knowledge, we empower our clients to make informed decisions, drive business growth and build resilient capacities.

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Traffic & Revenue Assessment for Samakhiali-Gandhidham section of NH-41 (old NH-8A) from Km 306.00 to Km 362.16 (length 56.16 km) in the state of Gujarat

Final Report

November 2025



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Acronyms

Acronyms	Meaning
AADT	Annual Average Daily Traffic
ADT	Average Daily Traffic
APEDA	Agricultural and Processed Food Products Export Development Authority
APSEZ	Adani Ports and Special Economic Zone
BOT	Bulit Operate & Transfer
CA	Concession Agreement
CAGR	Compound annual growth rate
CFS	Container Load
CONCOR	Container Corporation of India
CT	Container Terminal
DBFOT	Design Build Finance Operate and Transfer
DGCIS	Directorate General of Commercial Intelligence and Statistics
DPR	Detailed Project Report
DWT	Deadweight Tonnage
EAC	Expert Appraisal Committee
EXIM	Export Import
FMCG	Fast-moving consumer goods
FY	Fiscal Year
GDP	Gross Domestic Product
GIDC	Gujarat Industrial Development Corporation
GSDP	Gross State Domestic Product
GSR	General Statutory Rules
GVFL	Gujarat Venture Finance Limited
HME	Heavy Motor Vehicle
ICD	Inland Container Depots
IHMCL	Indian Highways Management Company Limited
IRC	Indian Road Congress
JNPT	Jawaharlal Nehru Port Trust/Authority
KASEZ	Kandla Special Economic Zone
KRCL	Kutch Railway Company Limited
LCL	Container Freight Station

Acronyms	Meaning
LCV	Light Commercial Vehicle
LMT	lakh metric tonnes
LPG	Liquefied petroleum gas
MAV	Multi Axle Vehicle
MMLP	Multi-Modal Logistics Parks
MMT	million metric tons
MTPA	million tonnes per annum
NH	National Highways
NHAI	National Highways Authority of India
OD	Origin-Destination
OSV	Over Sized Vehicle
PCU	Passenger Car Unit
SBGTPL	Samkhiali Bhachau Gandhidham Tollway Private Limited
SBM	Single Buoy Mooring
SCF	Seasonal Correction Factors
SEBI	Securities and Exchange Board of India
SPV	Special Purpose Vehicle
TEU	Twenty-foot Equivalent Units
TMS	Toll Management Systems
TVC	Traffic Volume Count
UAE	United Arab Emirates
UNESCO	United Nations Educational, Scientific and Cultural Organization
US	United State of America
WDFC	Western Dedicated Freight Corridor
WPI	Wholesale price index

1 Executive Summary

1.1 Project Details

We understand that EAAA TransInfra Managers Limited is the Investment Manager, M/s EPIC Transnet Project Management Private Limited is the proposed Project Manager and M/s EPIC Transnet Infrastructure Private Limited is the sponsor of the Citius TransNet Investment Trust ("Trust" or "InvIT") and M/s Samkhiali Bhachau Gandhidham Tollway Private Limited (“SBGTPL”) is proposed to be part of the initial portfolio assets of the Trust. The Trust is registered with Securities and Exchange Board of India (“SEBI”) as an infrastructure investment trust under the SEBI InVIT Regulations.

M/s EPIC Transnet Infrastructure Private Limited (hereinafter “the Client”) as sponsor has appointed M/s Crisil Limited (hereinafter referred as “Traffic Consultant”) to carry out Traffic Due Diligence of operational asset of Six Laning of Samakhiali-Gandhidham section of NH 8A from Km 306.00o to 362.160 in the state of Gujarat on Built Operate & Transfer (BOT) (Toll) on DBFOT pattern (herein after refer as “the Project”) which is being operated by “M/s Samkhiali Bhachau Gandhidham Tollway Private Limited " (hereinafter refer as “the Concessionaire or Company or SBGTPL”).

1.2 Asset overview

Project road Samakhiali Gandhidham is a 6-lane, 56.160 kms long stretch, on national highways (NH) 8A/41 in the state of Gujarat which connects Gandhidham. Project road gives connectivity to Mundra port & Kandla Ports in the western region of India. The project stretch has one toll plaza by the name of Samakhiali which lies at the chainage of km 308.800 near Samakhiali village. Most of the traffic is originating/destined to Gandhidham, Kandla port & Mundra port. Around 26% of the truck traffic is container trucks. The project stretches provide seamless connectivity to the important Port towns of Kandla and Mundra to the hinterlands in Gujarat and up north - extending to Rajasthan, Haryana, Punjab and beyond.

The project road section falls entirely under the jurisdiction of Kutch district in the state of Gujarat. It serves a cluster of small industrial areas developed along the stretch of the road. Over and above this, NH 8A is the main traffic feeding arterial route for Kandla and Mundra Ports, connecting to the hinterlands spread out in the interiors of Gujarat and extending to Rajasthan, Haryana, Punjab and beyond. Mundra port is the largest commercial port in the country and a critical hub for container traffic. It handles a significant volume of cargo, including containers, dry bulk, liquid bulk, and automobiles. This unique location makes the corridor an essential route for the import and export movement of goods, ensuring consistent and high-volume freight flow. Since most of the cargo entering or leaving through these ports needs to be transported inland, the project corridor plays a vital role in the national logistics chain, especially for both containerized and bulk cargo.

NH 41 plays a crucial role in India’s port-led development and export–import logistics, acting as the primary surface transport artery connecting some of the country’s largest ports to the hinterland. Facilitating port connectivity: Direct link between Kandla Port (Major Port) and the national freight grid via NH 27 and NH 48. Supporting multimodal logistics, linking to railheads, ICDs (Inland Container Depots), and logistics parks around Gandhidham and Anjar. Project does not have any alternate route.

On March 17, 2010 the NHAI and SBGTPL entered into a concession agreement for a 6 lane project of the Samakhiali - Gandhidham section of NH-8A from km 306.00 to km 362.16 (approximately 56.16 km) in the state of Gujarat on design, build, finance, operate and transfer on toll basis for a concession period of 24 years from the

by S&P Global

appointed date of September 11, 2010.

Figure 1-1: Project Road



Source: Open Street Map, Crisil Intelligence

Salient growth features and traffic generators

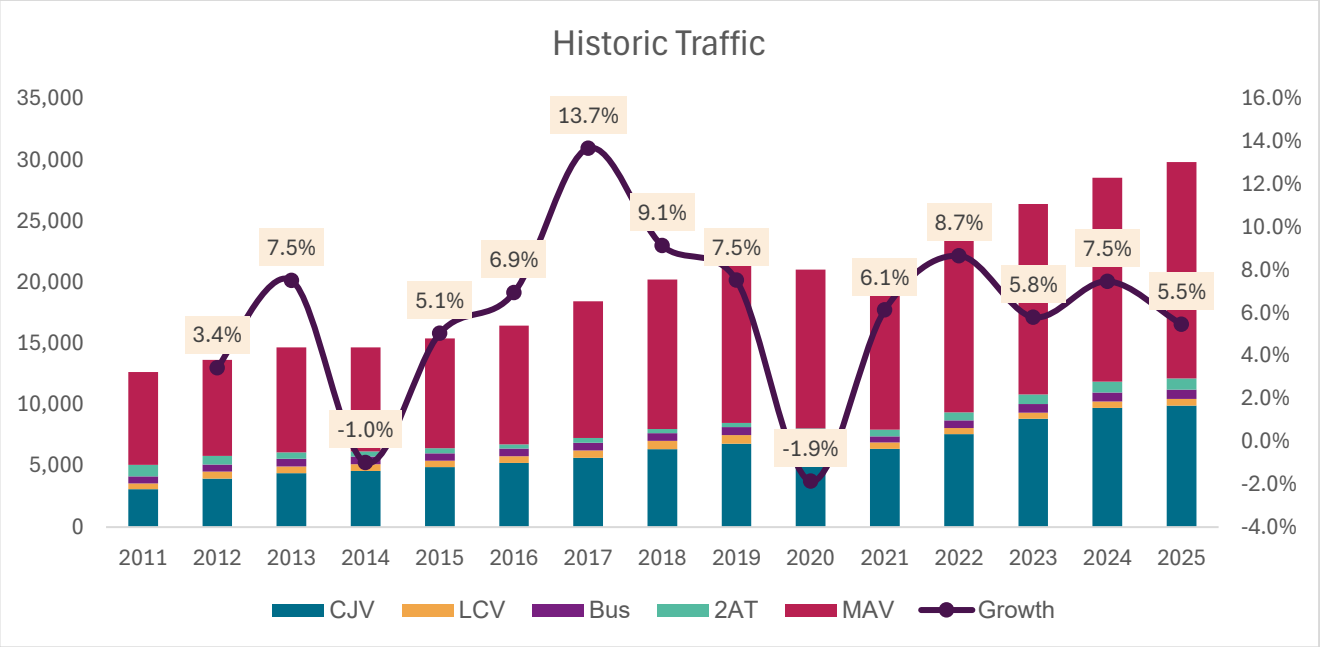
Container traffic holds major share around 26% in the overall traffic. Project road gives connectivity to two important seaports in the region which are Mundra Port and Kandla Port. Mundra Port, located in Gujarat, India, Mundra port is the largest commercial port in the country and a critical hub for container traffic. It handles a significant volume of cargo, including containers, dry bulk, liquid bulk, and automobiles. The port's strategic location on the western coast of India allows it to serve the vast hinterland regions, including the National Capital Region, Gujarat, Punjab, Rajasthan, and Madhya Pradesh. Mundra Port operates five container terminals across 12 berths, with a combined capacity of 9.5 million TEUs (twenty-foot equivalent units). India's container traffic decadal growth (FY14-FY24) is around 7.7% and Mundra port's container traffic decadal growth (FY14-FY24) is around 12.0%. Project road connects Kandla port, which is one of the major ports in the western region. Kandla port cargo handled decadal growth (FY15- FY25) is about 4.98%.

Second most carried commodity is agriculture produce, which is around 6.6% and it mostly comprises of rice (Basmati Rice). One of the most carried commodities is tiles and ceramics, which is around 3.1%. The Morbi Ceramic Cluster, located in Gujarat, India, is one of the largest and most significant ceramic industry clusters in the world. It is situated about 250 km from Ahmedabad and is renowned for its extensive production of ceramic products. The cluster comprises over 600 units, producing a wide range of items including wall tiles, floor tiles, vitrified tiles, polished glazed vitrified tiles, and sanitary ware.

1.3 Historical traffic data

The chart below shows the average daily traffic on Gandhidham-Mundra stretch from September 2010 to July 2025.

Figure 1-2: Historic Annual Average Daily Traffic (AADT)



Source: Client Data, Crisil Intelligence

Project road has seen healthy traffic CAGR growth of 6.8% in PCU terms from FY 2015 to FY 2025. In the last two years the traffic shown steady growth of 6.5% in PCU terms. The summary of historic tollable TMS traffic data is presented in below table.

Table 1-1: Historic Annual Average Daily Traffic (AADT)

FY	Cars	LCV	Bus	2-Axle	MAV	Vehicles	PCU
2011	3,091	487	558	950	7,597	**12,684**	**42,534**
2012	3,971	556	597	694	7,849	**13,666**	**43,996**
2013	4,405	557	613	527	8,588	**14,690**	**47,306**
2014	4,582	563	615	439	8,501	**14,700**	**46,841**
2015	4,894	535	609	401	8,996	**15,434**	**49,207**
2016	5,255	551	609	359	9,698	**16,472**	**52,626**
2017	5,657	616	630	395	11,150	**18,448**	**59,832**
2018	6,375	667	645	331	12,222	**20,240**	**65,302**
2019	6,819	713	649	342	13,191	**21,713**	**70,219**
2020	6,369	624	661	412	12,976	**21,042**	**68,915**
2021	6,398	510	496	551	13,965	**21,921**	**73,148**
2022	7,606	503	609	673	14,953	**24,344**	**79,494**
2023	8,843	505	723	774	15,560	**26,404**	**84,110**
2024	9,748	519	742	872	16,674	**28,554**	**90,400**
2025	9,940	540	745	924	17,687	**29,836**	**95,349**
2026*	10,490	594	741	985	17,856	**30,666**	**97,076**
CAGR (25-15)	**7.3%**	**0.1%**	**2.0%**	**8.7%**	**7.0%**	**6.8%**	**6.8%**
CAGR (25-12)	**7.3%**	**-0.2%**	**1.7%**	**2.2%**	**6.4%**	**6.2%**	**6.1%**

FY	Cars	LCV	Bus	2-Axle	MAV	Vehicles	PCU
CAGR (19-12)	**8.0%**	**3.6%**	**1.2%**	**-9.6%**	**7.7%**	**6.8%**	**6.9%**
CAGR (25-23)	**6.0%**	**3.5%**	**1.5%**	**9.3%**	**6.6%**	**6.3%**	**6.5%**

FY 2026 Data is till July 2025

Note: MAV comprises MAV (vehicles with more than 3 axles up to 6 axles) and OSV (vehicles with more than 6 axles).

Source: Client TMS Data, Crisil Intelligence

1.4 Base Traffic Estimation

For base traffic (annual average daily traffic) estimation of the present study, current fiscal 4-months (Apr-25 to July-25) of TMS traffic data were annualized using SCF factor of FY 24 & FY 25 ETC traffic data (excluding the Bijparjoy cyclone impact in FY 24 & excluding impact of Cyclone Asna in FY 25) to arrive at the annual average daily traffic (AADT) for FY 26.

The AADT estimation for the base case for FY26 is presented table below

Table 1-2: Base Traffic Estimation -FY26 AADT

Particulars	FY Year	Cars	LCV	Bus	2-Axle	3-Axle	MAV	OSV	Vehicles	PCU
ADT (Apr-July) *	FY 26	10,490	594	741	985	1,155	16,701	37	30,702	95,895
SCF	FY 24 & FY 25	1.01	1.01	1.02	1.01	1.04	1.04	1.16		
AADT	**FY 26**	**10,573**	**599**	**759**	**992**	**1,199**	**17,339**	**42**	**31,503**	**99,110**

**For August 2024 month data is considered till 25th august, rest of the days were affected by floods in Kutch region of Gujarat (Cyclone Asna)*
***June 2023 data is adjusted for the cyclone Bijparjoy Impact (Data till 23rd June).*

Source: Client TMS Data, Crisil Intelligence

1.4.1 Toll Segmentation

The table below presents a segmentation which is considered for the traffic based on the historic data (FY25).

Table 1-3: Toll segmentation

Vehicle category	Single Journey	Return Journey	Monthly Pass	Special Trip	Local Pass	Exemptions
Car/Jeep/Van	*36.9%*	*38.5%*	*0.0%*	*7.4%*	*1.5%*	*15.9%*
Minibus	*41.2%*	*52.2%*	*0.8%*	*0.0%*	*0.0%*	*5.8%*
2 Axle Bus	*9.5%*	*86.7%*	*0.0%*	*0.0%*	*0.0%*	*3.7%*
LCV	*58.1%*	*40.6%*	*0.0%*	*0.0%*	*0.0%*	*1.3%*
2 Axle Truck	*41.2%*	*52.2%*	*0.8%*	*0.0%*	*0.0%*	*5.8%*
3 Axle Truck	*58.1%*	*40.6%*	*0.0%*	*0.0%*	*0.0%*	*1.3%*
MAV	*55.5%*	*41.9%*	*0.0%*	*1.9%*	*0.0%*	*0.8%*
OSV	*55.5%*	*41.9%*	*0.0%*	*1.9%*	*0.0%*	*0.8%*

Source: Crisil Intelligence

1.5 Traffic Characteristics & Commodity Profile

The key influencing regions from the origin destination survey are Mundra, Gandhidham, Ahmedabad and Morbi for passenger traffic and for goods traffic Mundra, Gandhidham, Morbi and Rajasthan.This Project is under operation for almost 15 years hence, it has stabilised and consistent traffic pattern.

Short distance: Short-distance traffic flows between Samakhiyali and Gandhidham–Bhuj, serving the industries located along this corridor. This route supports the local movement of raw materials and finished goods within the

industrial and trading hubs in the region.

Medium Distance: Medium-distance traffic involves the movement of goods from industrial units in Morbi and Ahmedabad to major ports like Kandla and Mundra. This corridor handles a diverse mix of commodities, facilitating the transport of raw materials and finished products for export and import activities.

Long Distance: Long-distance traffic from Mundra and Kandla ports extends to Rajasthan, Punjab, Haryana, and other northern regions, as well as to southern and western parts of India. This flow supports the nationwide distribution of import-export cargo and industrial goods, making these ports critical gateways for trade across multiple regions.

The assets support different types of commodities, reflecting in both industrial supply chains and port-based logistics.

Construction/Building Materials: Represents the largest share of commodity traffic on the corridor. This includes cement, aggregates, and related construction inputs—likely driven by regional infrastructure development and real estate growth, as well as port infrastructure expansion.

Courier & Parcel Goods: Indicates strong movement of general merchandise and packaged goods, including courier shipments and less-than-truckload cargo. Reflects the corridor's importance in logistics and e-commerce supply chains.

Empty Return Vehicles: A high percentage of empty truck movement suggests directional cargo patterns, especially after deliveries to inland locations. Common in port corridors where outbound loads are heavier than return shipments.

Manufacturing Goods: Includes transport of processed goods and machinery, highlighting the corridor’s connectivity to manufacturing hubs across Gujarat and beyond.

Petroleum Products: A significant volume of POL (petroleum, oil, and lubricants) movement reflects supply operations linked to refineries and port-based fuel distribution.

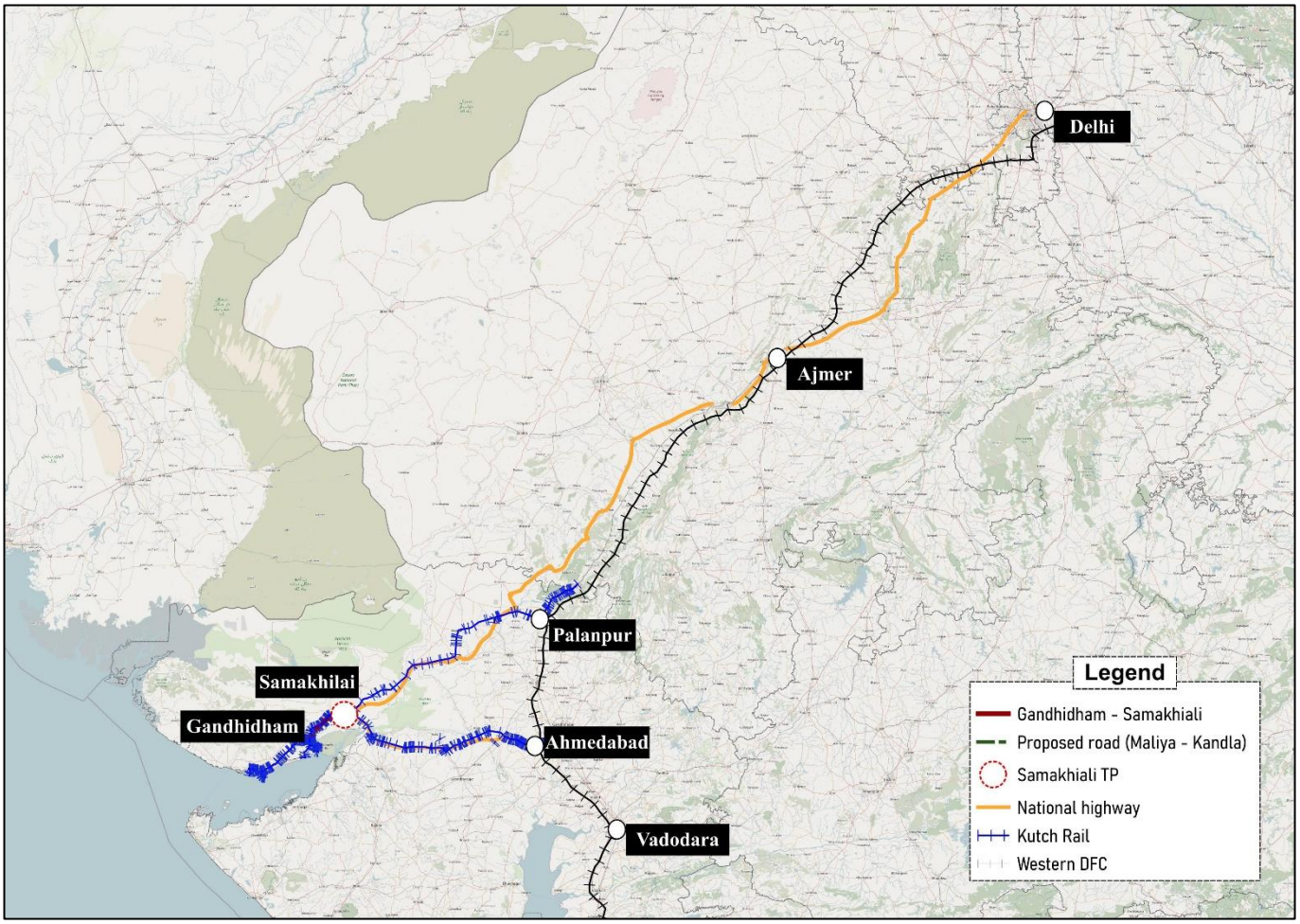
1.6 Network Developments in the Region

In the case of the project road, there are no short distance alternate routes available that will impact the traffic on the project road. However ongoing and upcoming short distance & long-distance networks that could impact the project road are:

- Western Dedicated Freight Corridor (WDFC) (Operational)
- 4/6 Lane Road from Kandla port to Maliya (DPR is in progress)

The alignment of the developments along with the project road is presented below figure.

Figure 1-3: Network Development around project road



Source: Open Street Map, Crisil Intelligence

1.7 Traffic Projections

The table below provides the traffic growth rates considering various diversion/impacts, as provided by the Traffic Consultant:

Table 1-4: Projected Traffic Growth Rates

Vehicle Type	FY 27	FY 28	FY 29	FY 30	FY 31	FY 32	FY 33	FY 34	FY 35
Car/Jeep/Van	6.0%	5.8%	5.5%	5.3%	5.1%	4.9%	4.7%	4.5%	4.3%
Minibus	3.0%	2.9%	2.8%	2.7%	2.5%	2.4%	2.3%	2.3%	2.2%
2 Axle Bus	3.0%	2.9%	2.8%	2.7%	2.5%	2.4%	2.3%	2.3%	2.2%
LCV	4.0%	3.8%	3.6%	3.3%	3.2%	3.1%	3.0%	3.0%	2.8%
Truck	4.5%	4.3%	4.0%	3.8%	3.7%	3.6%	3.6%	3.5%	3.4%
3 Axle Truck	2.5%	2.3%	2.0%	1.7%	1.7%	1.6%	1.6%	1.6%	1.5%
MAV	6.0%	5.6%	5.4%	5.2%	5.1%	5.1%	5.0%	5.0%	4.8%
OSV	6.0%	5.6%	5.4%	5.2%	5.1%	5.1%	5.0%	5.0%	4.8%
Vehicles	**5.8%**	**5.5%**	**5.2%**	**5.0%**	**4.9%**	**4.8%**	**4.7%**	**4.6%**	**4.5%**
PCU's	**5.8%**	**5.5%**	**5.2%**	**5.0%**	**4.9%**	**4.9%**	**4.8%**	**4.7%**	**4.6%**
Revenue Growth	**9.5%**	**10.3%**	**9.8%**	**9.4%**	**9.9%**	**9.7%**	**9.6%**	**9.3%**	**9.6%**

Source: Crisil Intelligence

Table 1-5: Projected Traffic

FY Year	Cars	Minibus	2 Axle Bus	LCV	Truck	3 Axle Truck	MAV	OSV	Total Veh.	Total PCU	YoY Growth (%)
FY-2026	10,573	50	759	548	991	815	17,658	42	31,436	98,816	
FY-2027	11,207	52	781	570	1,035	836	18,719	45	33,246	104,534	5.8%
FY-2028	11,853	53	804	592	1,079	855	19,774	47	35,058	110,233	5.5%
FY-2029	12,508	55	826	613	1,123	873	20,840	50	36,888	115,979	5.2%
FY-2030	13,172	56	848	634	1,166	888	21,921	52	38,737	121,793	5.0%
FY-2031	13,844	57	870	654	1,209	902	23,041	55	40,632	127,787	4.9%
FY-2032	14,521	59	891	675	1,253	917	24,207	58	42,580	133,997	4.9%
FY-2033	15,203	60	912	695	1,298	932	25,421	61	44,582	140,429	4.8%
FY-2034	15,888	62	932	716	1,343	947	26,685	64	46,637	147,090	4.7%
FY-2035	16,576	63	953	736	1,389	961	27,977	67	48,721	153,880	4.6%
CAGR (26-35)	**5.1%**	**2.6%**	**2.6%**	**3.3%**	**3.8%**	**1.8%**	**5.2%**	**5.2%**	**5.0%**	**5.0%**	

Source: Crisil Intelligence

1.7.1 Tollable Length and Toll Rates

In terms of tollable length for the project road is about 56.160 kms. In India, toll rates are as per notification by the Ministry of Road Transport and Highways in the National Gazette. The present toll rates are determined with reference to the published base toll rates and are adjusted annually at the beginning of each fiscal year equal to 40% of the movement in the wholesale price index in December of the preceding year plus a fixed 3%.

As per Gazette notification dated 05.12.2008, under National Highways Fee (Determination of Rates and Collection) Rules 2008 [GSR 838 (E)], Toll rates at Samakhiali Toll Plaza applicable for current fiscal (FY26) is provided below:

Table 1-6: Toll Rates

Type of vehicle	Single Journey	Return Journey	Monthly Pass
Car/Jeep/Van	85	130	2,845
LCV	140	205	4,595
Bus/Truck	290	435	9,625
3 Axle Truck	455	680	15,090
MAV	455	680	15,090
OSV	550	825	18,370

Source: Crisil Intelligence
Note: Special concession is allowed for cars with Toll Rate of ₹1 per trip.
Special concessions are allowed for MAV (Local Transporters) with Toll Rate of ₹100 for per trip

1.8 Revenue Projections

The revenue in ₹ crores for the project road is projected to grow at a CAGR of about 9.6 percent (10.1%) for the forecast period from FY26 to FY35 and is presented in the below table.

Table 1-7: Projected Revenue in ₹ Millions

FY Year	Revenue
FY-2026	3,078

FY Year	Revenue
FY-2027	3,371
FY-2028	3,717
FY-2029	4,081
FY-2030	4,464
FY-2031	4,907
FY-2032	5,382
FY-2033	5,900
FY-2034	6,448
FY-2035	7,049
CAGR (26-35)	**9.6%**

Source: Crisil Intelligence

2 Introduction

2.1 Asset Overview

The project road of Samakhiali - Gandhidham section of NH-8A (New NH 41) with a length of 56.160 km. The project road section falls entirely under the jurisdiction of Kutch district in the state of Gujarat. It serves a cluster of small industrial areas developed along the stretch of the road. Over and above this, NH 8A is the main traffic feeding arterial route for Kandla and Mundra Ports, connecting to the hinterlands spread out in the interiors of Gujarat and extending to Rajasthan, Haryana, Punjab and beyond. Mundra port is the largest commercial port in the country and a critical hub for container traffic. It handles a significant volume of cargo, including containers, dry bulk, liquid bulk, and automobiles. This unique location makes the corridor an essential route for the import and export movement of goods, ensuring consistent and high-volume freight flow. Since most of the cargo entering or leaving through these ports needs to be transported inland, the project corridor plays a vital role in the national logistics chain, especially for both containerized and bulk cargo.

NH 41 plays a crucial role in India's port-led development and export–import logistics, acting as the primary surface transport artery connecting some of the country's largest ports to the hinterland. Facilitating port connectivity: Direct link between Kandla Port (Major Port) and the national freight grid via NH 27 and NH 48. Supporting multimodal logistics, linking to railheads, ICDs (Inland Container Depots), and logistics parks around Gandhidham and Anjar. Project does not have any alternate route.

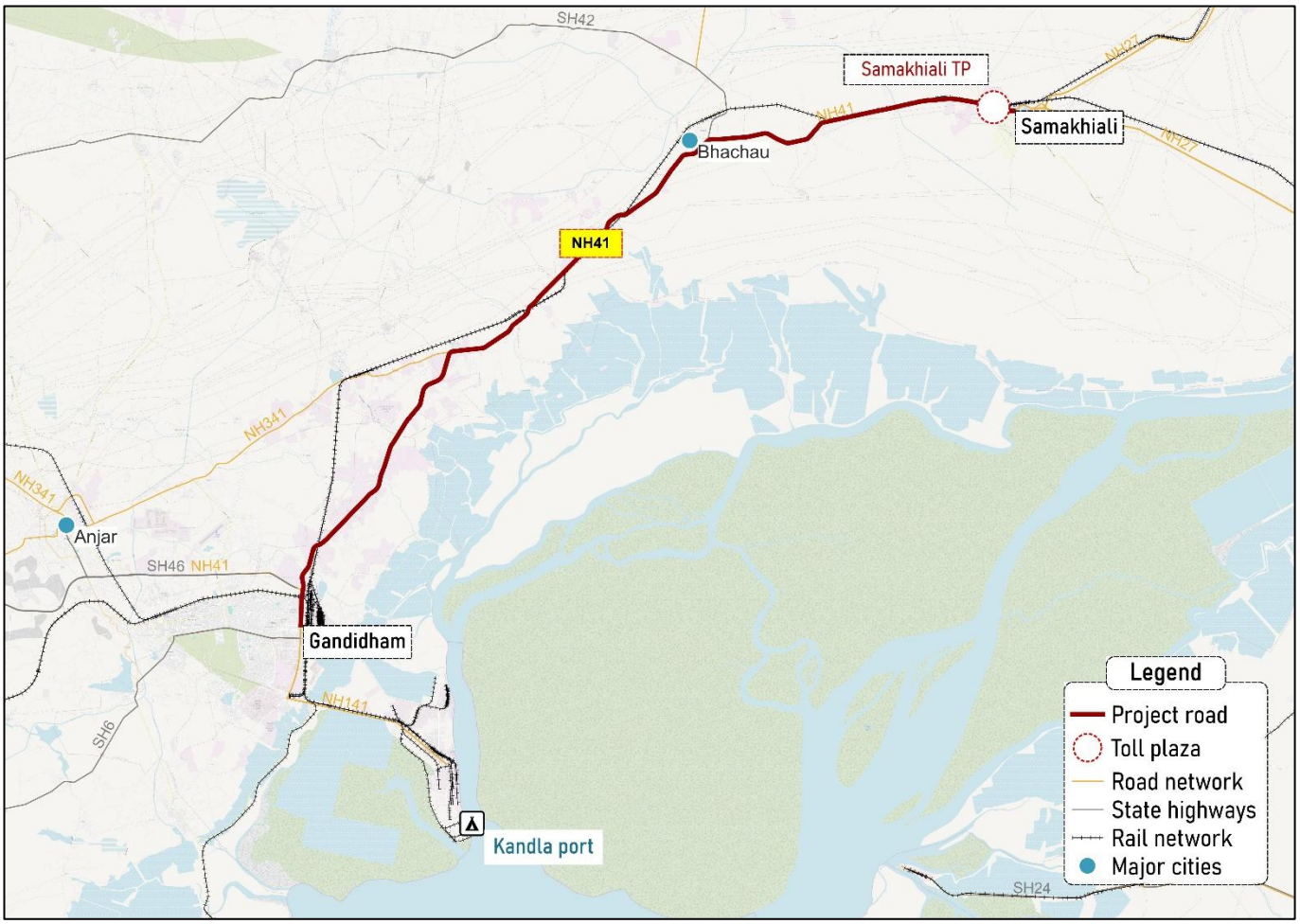
On March 17, 2010 the NHAI and SBGTPL entered into a concession agreement for a 6 lane project of the Samakhiali - Gandhidham section of NH-8A from km 306.00 to km 362.16 (approximately 56.16 km) in the state of Gujarat on design, build, finance, operate and transfer on toll basis for a concession period of 24 years from the appointed date of September 11, 2010.

Table 2-1: Details of the road stretch

Project stretch	State	Toll plaza	Length (km)
Samakhiali - Gandhidham section of NH-41 (old NH-8A) from Km 306.00 to Km 362.16 (length 56.16 km) in the state of Gujarat	Gujarat	Samakhiali	56.160

Source: Crisil Intelligence

Figure 2-1: Project stretch alignment



Source: Open Street Map, Crisil Intelligence

Table 2-2: Key details of project stretch

Project stretch	Samakhiali - Gandhidham section of NH-41 (old NH-8A)
Authority	National Highway Authority of India
Concessionaire	Samkhiali Bhachau Gandhidham Tollway Private Limited (SBGTPL)
Project type	Design, build, finance, operate, and transfer (DBFOT)
No. of lanes	6-lane configuration
Length of Project Stretch	56.160 Km
No. of Toll Plaza(s)	01
Name of Toll Plaza(s)	Samakhiali Plaza (Km 44.500)
Concession Period	24 Years
CA Signed	17-Mar-2010
Appointed Date	11-Sep-2010

Source: Concession Agreement, Crisil Intelligence

2.2 Scope

The scope of the traffic assessment for the project road is divided into following four sections.

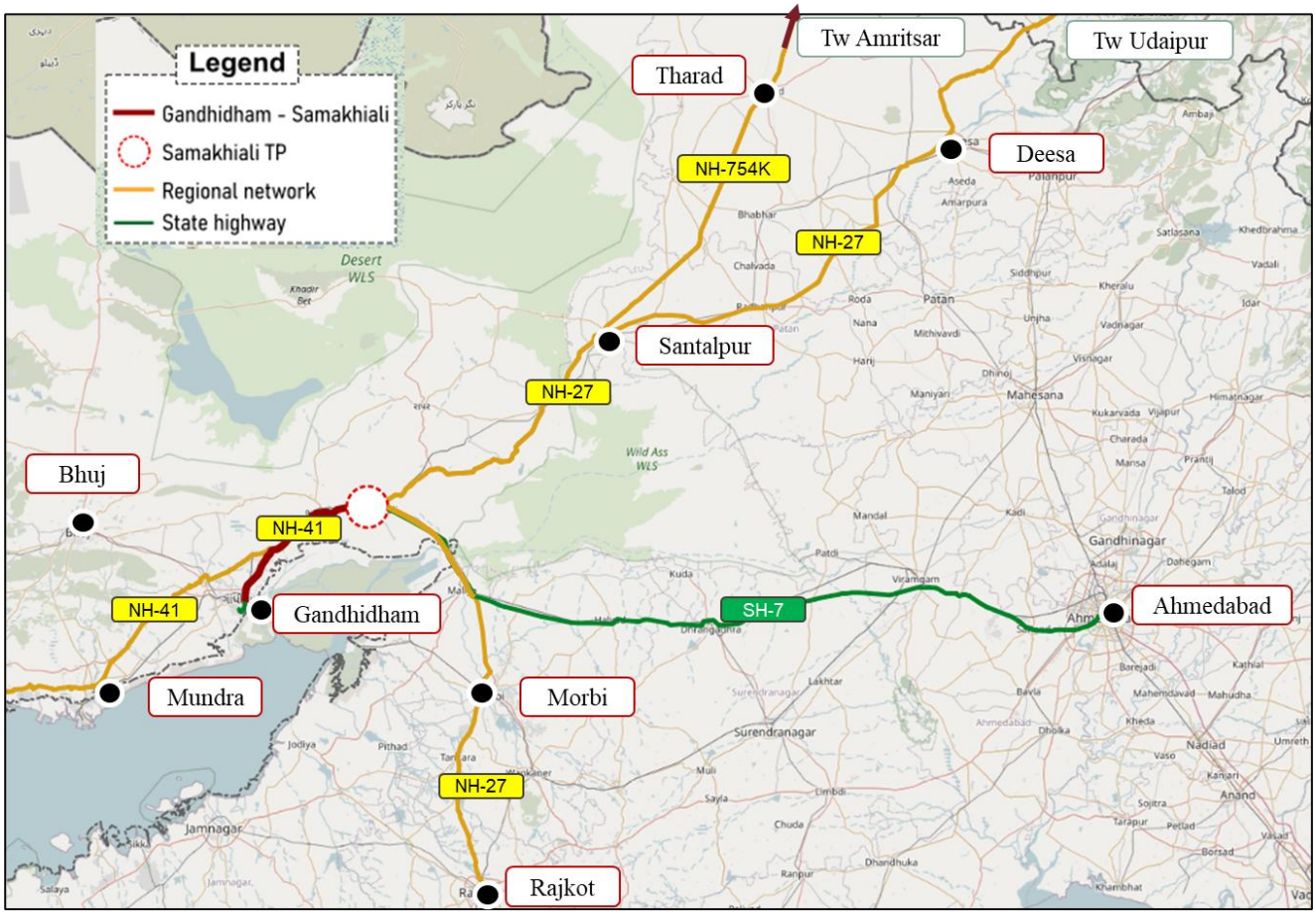
1. Detailed Assessment of the project road
   Include review of the Historic TMS Data, past traffic growth, detailed network assessment.
2. Primary Data collection & Analysis
   Conducting preliminary traffic surveys like TVC and Origin-Destination (O-D) to understand the traffic patterns, commodity profiles.
3. Network Impact Assessment
   To Analyse the upcoming network developments which may impact the project road traffic
4. Traffic and Revenue Projections
   Traffic & Revenue projections considering relevant growth drivers and network developments

Approach & Methodology is detailed out in Traffic Growth Estimation & Traffic forecast chapter.

2.3 Network Profile

Project road Samakhiali-Gandhidham is a six lane, 56.160 kms long stretch, on national highways (NH) 41(old NH 8A) which connects Gandhidham. Project road connects to states like Rajasthan, Madhya Pradesh, Uttar Pradesh, Bihar, West Bengal, and Assam and is part of the East-West Corridor project of the National Highways Authority of India (NHAI) through NH 27. Project road connects to states like Punjab, Haryana and Rajasthan through Amritsar–Jamnagar Expressway (EC3) NH754A. A regional connectivity map is presented in the figure below.

Figure 2-2: Regional Connectivity

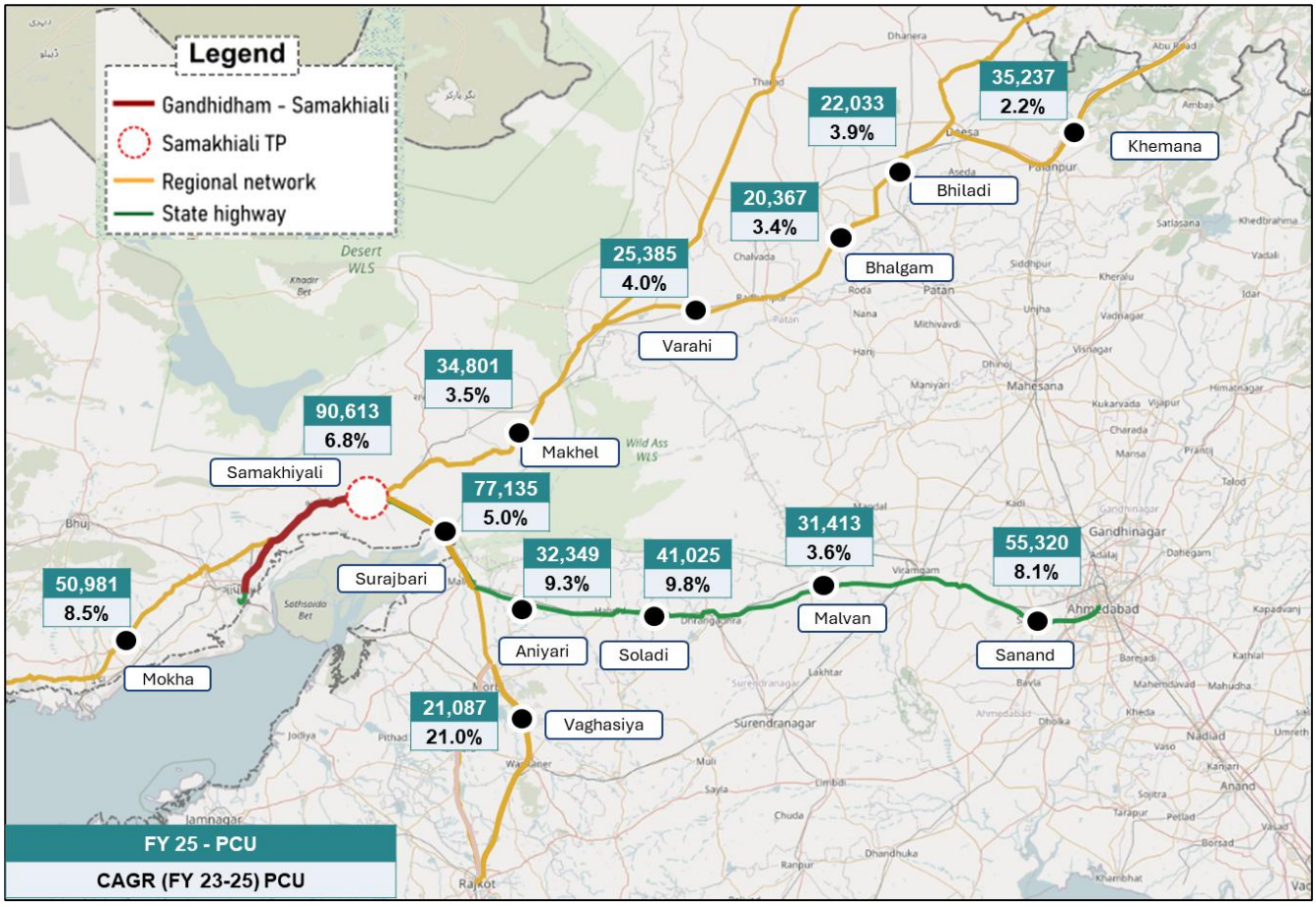


Source: Open Street Map, Crisil Intelligence

Neighbourhood project roads/assets have shown good traffic growth in the recent years

Indian Highways Management Company Limited (IHMCL) publishes toll plazas traffic data for the plazas on national highways and data is analysed for neighboring plazas to understand traffic growth patterns in the region, nearby plazas have shown good traffic growth in recent years. FY 25 traffic PCU and CAGR PCU growth for FY23-FY25 is presented in the below figure. Project road has shown one of the highest traffic growths in region, driven majorly by growth in Kandla and Mundra port traffic growth (cargo handling growth).

Figure 2-3: Neighbourhood plazas traffic & growth

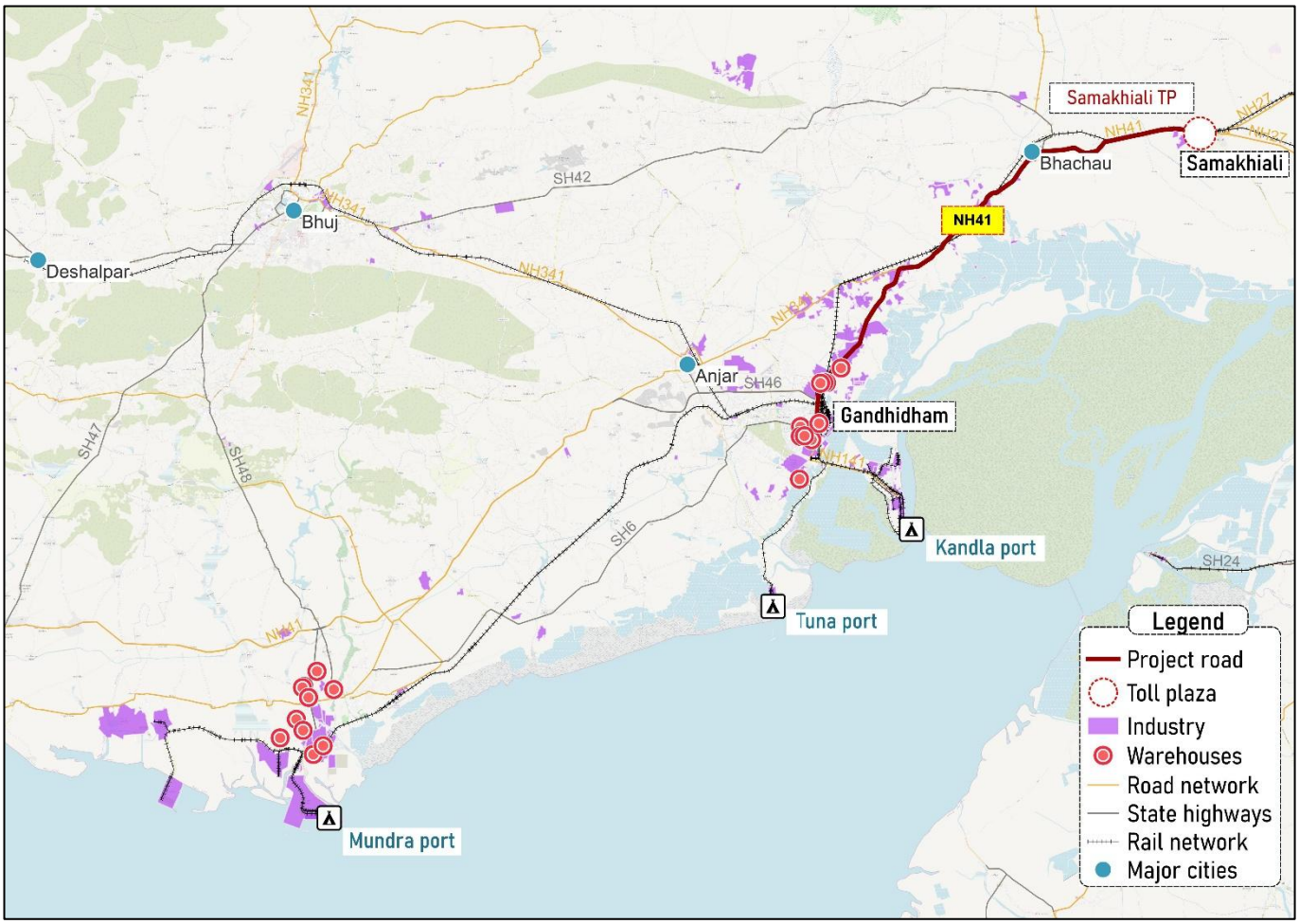


Source: Open Street Map, Crisil Intelligence, IHMCL Data

Warehouses near project road cater to Agro products, Plywood, FMCG, Iron & Steel etc.

Plenty of Warehouses are in the project influence are especially near Mundra port, Gandhidham, Anjar region. These warehouses cater to store Agro products, Plywood, FMCG, Iron & Steel, Pharmaceuticals commodities. Warehouses along the project road is presented in below figure.

Figure 2-4: Warehouses along project road



Source: Open Street Map, Crisil Intelligence

Container Infrastructure

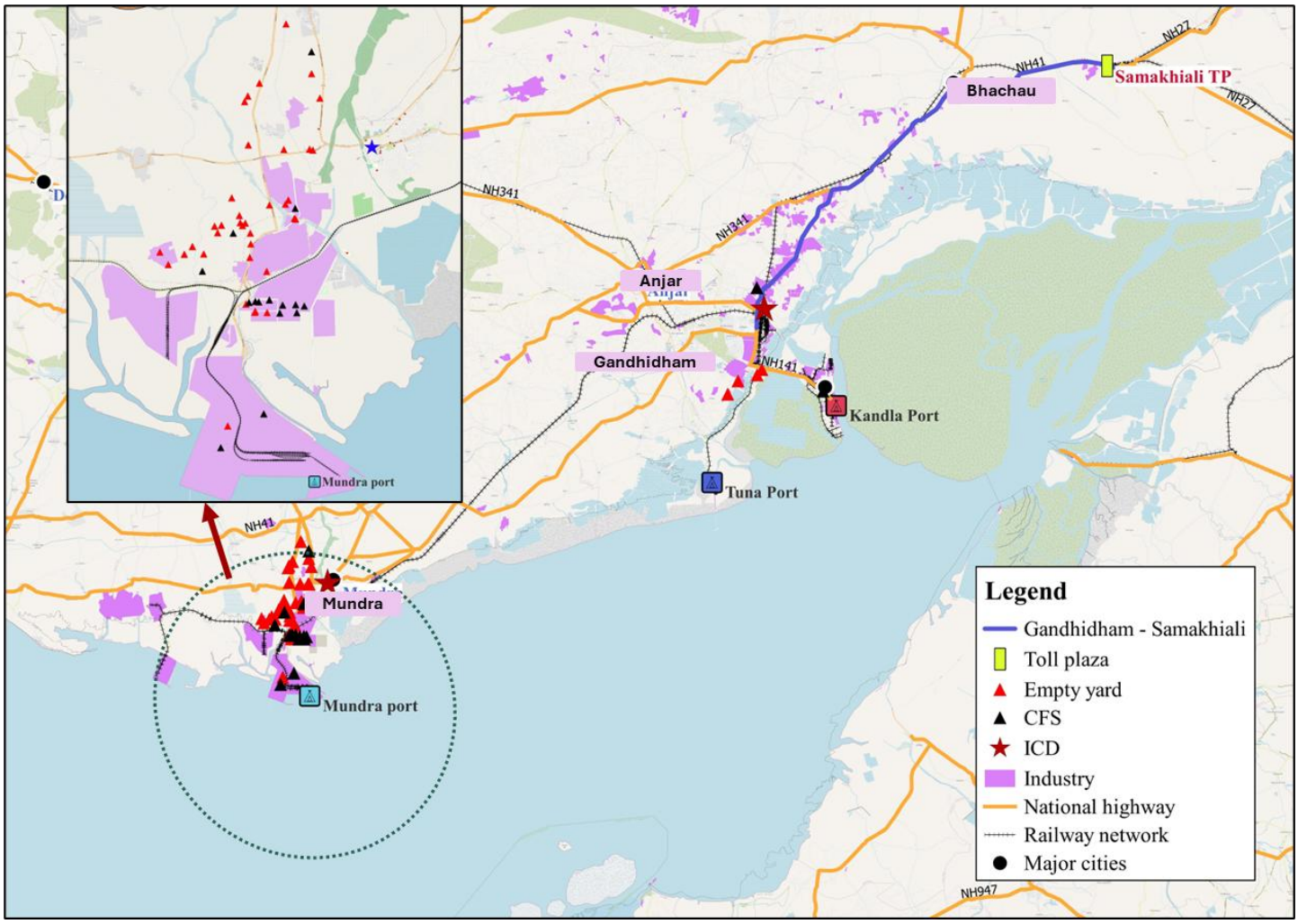
Container Infrastructure which is part of logistics infrastructure for seamless movements of good traffic near project road includes,

Container Freight Stations (CFS) about 17 in numbers, a warehouse facility, usually located near ports or transportation hubs, that handles the consolidation and de-consolidation of cargo, especially for Less-than-Container Load (LCL) shipments.

Empty Yards about 50, a facility that stores and manages empty shipping containers for the logistics industry. These yards provide storage, cleaning, and repair services for containers and play a crucial role in ensuring the smooth flow of goods by making containers available for the next export shipment are mainly located near Mundra and Kandla ports.

Two **Inland Container Depots (ICD),** namely MMLP Mundra and CONCOR, Gandhidham, that serves as a customs-supervised facility for handling and clearing international cargo, acting as an extension of a seaport.

Figure 2-5: Container Infrastructure



Source: Open Street Map, Crisil Intelligence

2.4 Overview of Key Influence Area & Industrial profile

The project road entirely falls in the state of Gujarat. A brief description of key influencing district around the project section is presented below.

Kutch District Profile

Kutch is the largest district in India, located in the state of Gujarat. It covers an area of approximately 45,652 square kilometres and accounts for about 23% of Gujarat's total geographical area. The district is bounded by the Arabian Sea to the west and southwest, the Rann of Kutch to the north, and the districts of Banaskantha and Patan to the east. Kutch is known for its diverse geography, which includes the Rann of Kutch, a vast salt desert, and the Banni grasslands, a unique ecosystem.

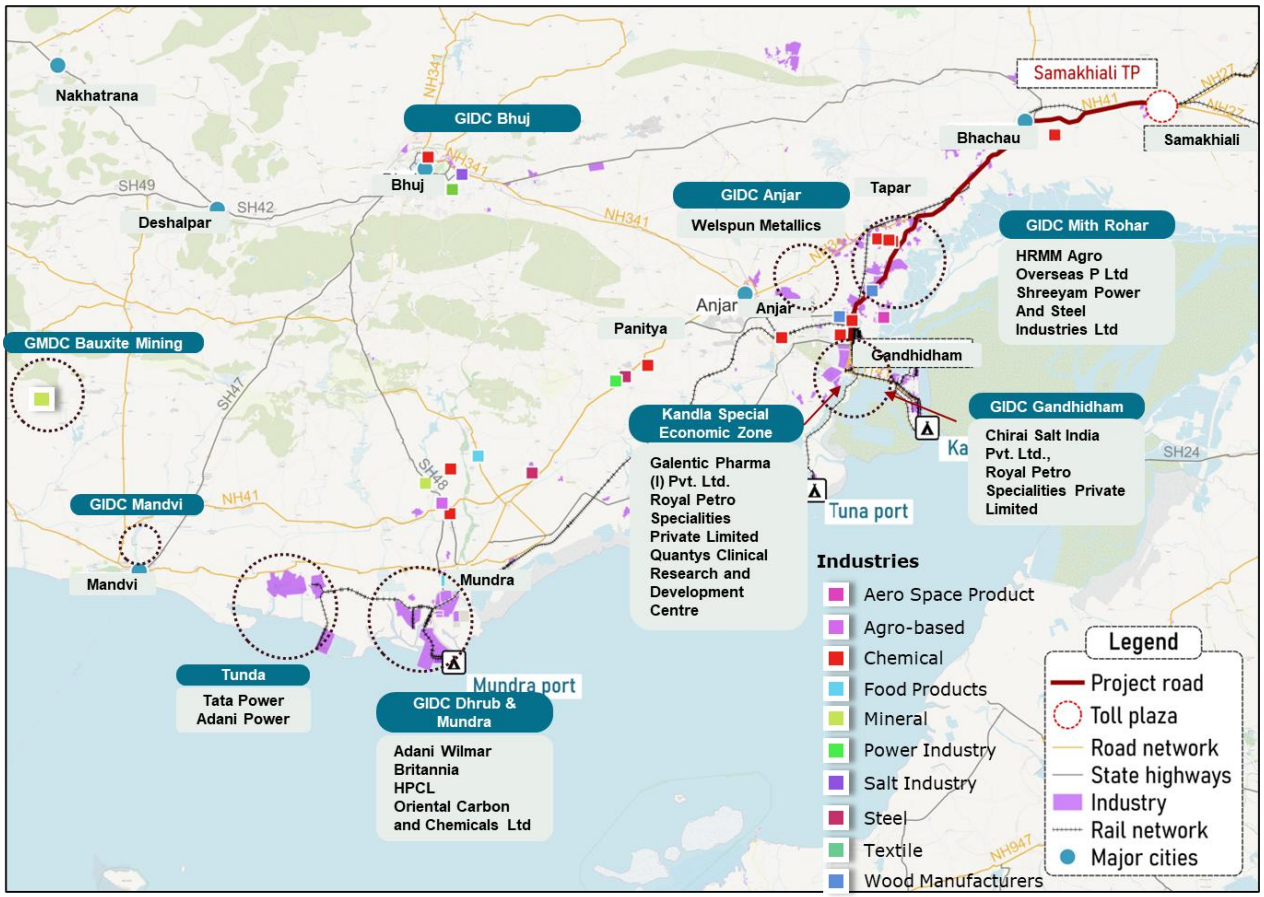
Kutch is one of the most economically developed districts in Gujarat, driven by its strategic location, infrastructure, and natural resources. The district has a strong industrial base, with major industries including cement, textiles, and chemicals. The Mundra Port, one of India's largest private ports, is in Kutch and has transformed the region into a major logistics and trade hub. The district is also rich in minerals, including lignite, bauxite, and limestone, which has led to the growth of mining and quarrying activities. Additionally, Kutch has a thriving agriculture sector, with major crops including cotton, groundnut, and wheat. Kutch contributes over 60% of India's total salt production

Kutch district has several key industrial areas that contribute significantly to its economy. Major industrial areas are developed by Gujarat Industrial Development Corporation (GIDC), which are in Gandhidham, Mundra, Bhuj, Mith Rohar and Anjar. Kutch district is home to a diverse range of industries such are cement industry, agro based, chemical, salt production, power industry, textile, etc. The Kandla Special Economic Zone (KASEZ), located in the Kutch district of Gujarat, is one of India's most prominent SEZs. with area about 1000 acres with 318 operational units. Hosts a variety of industries, including textiles, chemicals, engineering goods, etc.

Kutch produces nearly 75% of Gujarat's minerals, including bauxite, China clay, lignite, and limestone. Industrial areas along the project road and major industries in the region is presented in the below figure.

Kandla Special Economic Zone (KASEZ) is the first and largest multi-product Special Economic Zone in Asia, located in the Kutch district of Gujarat, India. Established in 1965, it spans over 1,000 acres with more than 140 operational units. Industries in Kandla SEZ include Gems & jewellery, electronics, textile & garments, engineering good and agriculture & food processing.

Figure 2-6: Industrial areas in Kutch district



Source: Open Street Map, Crisil Intelligence

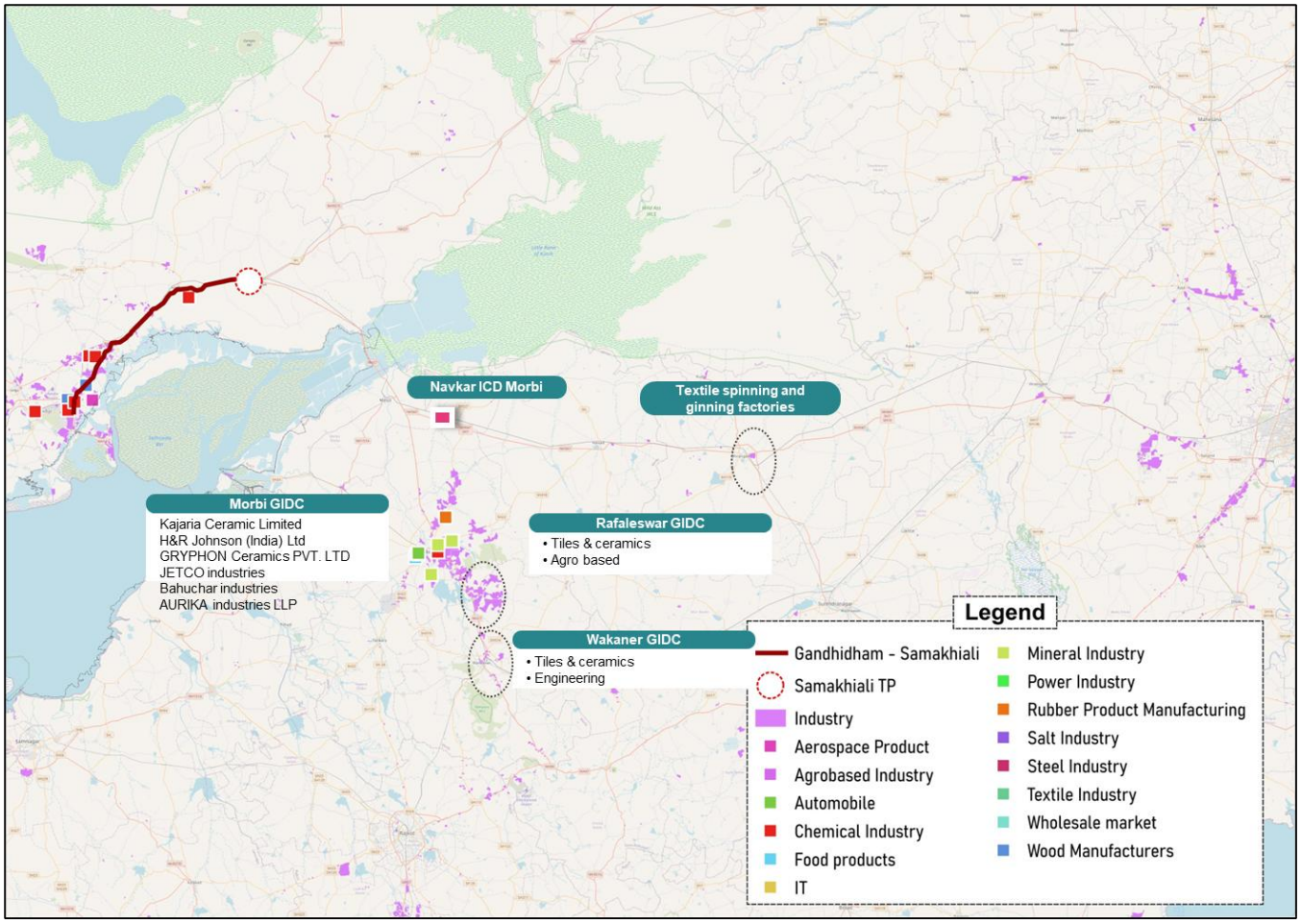
Morbi District Profile

Morbi district is located in the state of Gujarat, western India, and has a population of approximately 0.9 million as of 2021, with a growth rate of 10% from 2011. The district is a major producer of agricultural products such as cotton, tobacco, and vegetables. Morbi is known for its production of high-quality cotton and is often referred to as the "Cotton City" of India

The economy of Morbi district is primarily driven by industries such as ceramics, textiles, and chemicals. The

district is home to several industrial estates, including the Morbi Industrial Estate and the Wankaner Industrial Estate. Morbi is known for its ceramic production and is often referred to as the "Ceramic City" of India. The district has a diverse economy with a strong presence of small and medium-scale industries. The Indian ceramic tiles industry, which is a significant sector in the district. Despite the current challenges, Morbi district has immense potential for future development. The margins of organized players in the ceramic tiles industry are expected to increase in fiscal 2026, with the revival of retail demand and improvement in volumes and realizations. Additionally, the district is expected to benefit from several infrastructure projects, such as the development of the Morbi-Wankaner industrial area and the construction of the Morbi-Rajkot highway, which will drive economic growth and create new opportunities for investment and employment. With its strategic location, diverse economy, and rich cultural heritage, Morbi district is poised to become a major hub for economic activity and tourism in the region.

Figure 2-7: Industrial areas in Morbi district



Source: Open Street Map, Crisil Intelligence

3 Primary Data Collection & Analysis

3.1 General

Primary traffic surveys, i.e. Traffic volume count and Origin Destination surveys were collected on the project road to understand the traffic and travel pattern of vehicles plying on the project road.

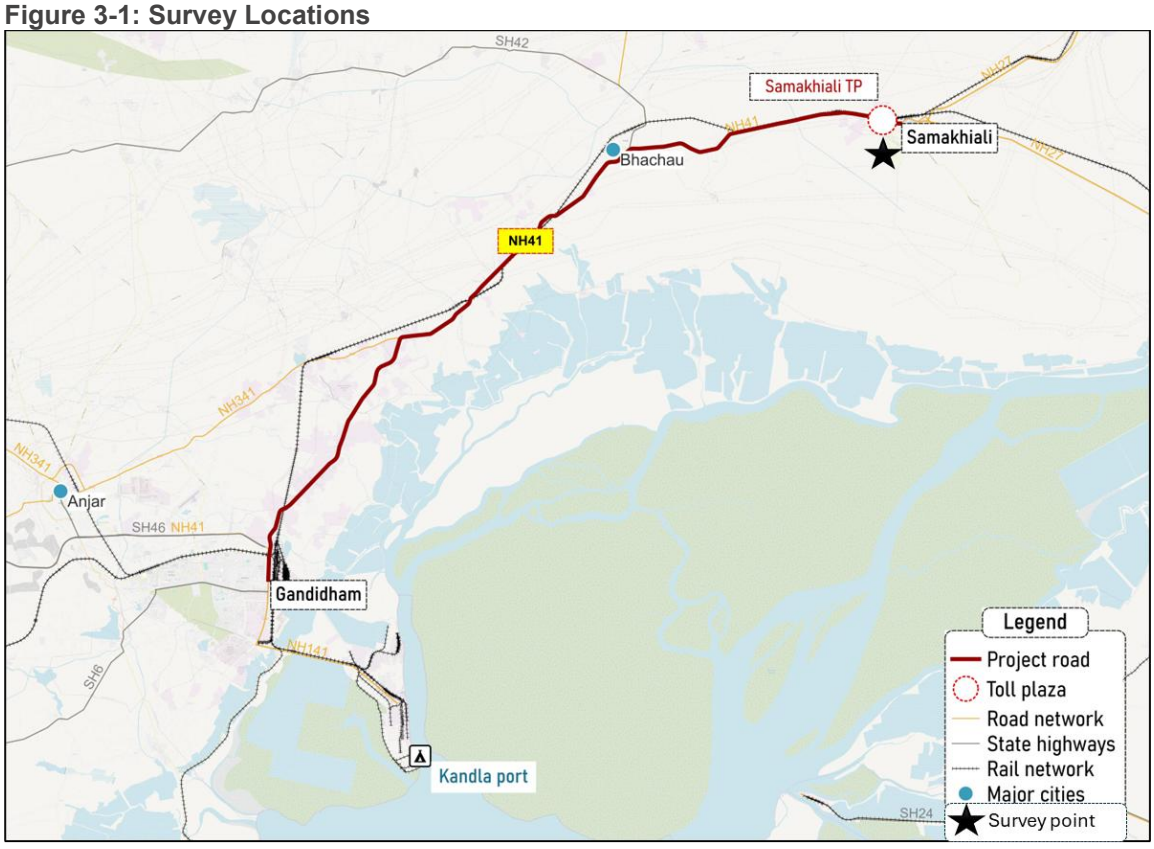
For the present study, seven days video-based traffic volume count and two days (48-Hours) origin destination survey conducted at the toll plaza location on the project road. The schedule of the traffic surveys carried out as part of the study on the project road are presented in the below table and figure.

Table 3-1: Type of Survey & Schedule

Location	Type of Survey	Survey Duration	Survey Date
Samakhiali Toll Plaza	Traffic Volume Count (TVC) Survey	7 Days	29th May 2025 to 4th June 2025
	Origin-Destination (O-D) Survey	2 Days	2nd June 2025 to 3rd June 2025

Source: Crisil Intelligence

Figure 3-1: Survey Locations



Source: Open Street Map, Crisil Intelligence

3.2 TVC Analysis and key findings

The seven days traffic volume count was analysed to get existing traffic intensity, daily variations, and traffic composition.

The vehicle classification and there PCU values as suggested in IRC: 64-1990 are presented in below table.

Table 3-2: PCU Factors-IRC:64-1990

Mode	PCU
Car/Jeep	1.0
Two-Wheeler	0.5
Three-Wheeler	1.0
Minibus/School Bus	1.5
Bus (Govt/Pvt)	3.0
Mini LCV	1.0
LCV	1.5
2-Axle	3.0
3-Axle	3.0
MAV (4-6 Axles)	4.5
HME/OSV	4.5
Agricultural Tractor	1.5
Agricultural Tractor with Trailer	4.5
Cycle	0.5
Cycle Rickshaw	2.0
Animal Drawn Crat	6.0

Source: IRC:64-1990

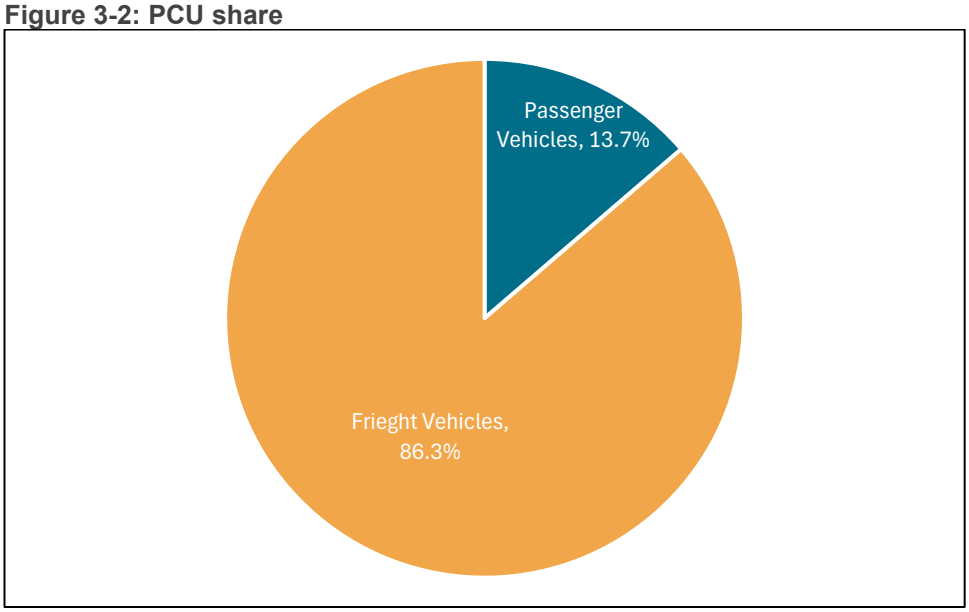
The average daily tollable traffic volume at the toll plaza locations were analysed. The summary of ADT in terms of vehicles and PCUs is presented in table.

Table 3-3: Average Daily Traffic (ADT) for the Project Section

Mode	Gandhidham to Samakhiali	Samakhiali to Gandhidham	ADT
Car	4,540	4,731	9,271
Minibus	997	1,024	2,021
Bus	36	38	74
3-Ax Bus	357	363	720
Mini LCV	7	8	15
LCV	340	469	810
Truck-2 Axle	440	367	807
Truck-3Axle	579	610	1,189
MAV	8,482	8,711	17,193
OSV	6	6	12
Vehicles	**15,785**	**16,326**	**32,112**
PCU	**48,448**	**49,783**	**98,232**

Source: Crisil Intelligence

Figure 3-2: PCU share



Source: Survey Data, Crisil Intelligence

An analysis of TVC traffic at Samakhiali Plaza is presented below.

- Passenger vehicles constitute 14% of the tollable traffic and Goods 86% of the tollable traffic in vehicle terms.
- MAV is having highest share with around 79%, followed by cars with 12% share.
- Average Daily traffic is about 32,212 and 98,232 in traffic vehicles and PCU terms respectively.

TVC survey data for the seven-day period is presented in the below table.

Table 3-4: Daily traffic volume at Samakhiali Plaza based on TVC survey

Date	CAR/Jeep/ Van	LCV + 2 Axle Truck	Bus	3-Axle	MAV	OSV	Total	PCU
5/29/2025	10,748	1,754	726	1,415	18,217	26	32,886	102,992
5/30/2025	10,812	1,847	722	1,405	18,676	12	33,474	105,269
5/31/2025	11,559	1,750	735	1,393	18,714	7	34,158	106,322
6/1/2025	11,893	1,422	789	1,127	16,331	3	31,565	94,204
6/2/2025	11,164	1,548	677	818	14,399	7	28,613	83,841
6/3/2025	11,700	1,791	712	1,125	16,683	19	32,030	96,468
6/4/2025	11,168	1,721	681	1,148	17,328	9	32,055	98,528
ADT	**11,292**	**1,690**	**720**	**1,204**	**17,193**	**12**	**32,112**	**98,232**

Source: Survey Data, Crisil Intelligence

Toll Management system (TMS) data was provided survey days, and comparison is made with TVC (survey data). Overall variations of traffic are about **-0.3%** and which is within tolerable limits.

Date	CAR/Jeep/Van	LCV + 2 Axle Truck	Bus	MAV + OSV	Total
WADT (TVC)	11,292	1,690	720	18,409	**32,112**
WADT (TMS)	11,372	1,612	756	18,459	**32,198**
Variations	**-0.7%**	**4.9%**	**-4.7%**	**-0.3%**	**-0.3%**

3.3 Origin-Destination (OD) and Commodity Analysis

Origin-Destination survey was carried out at Samakhiali Plaza for 2 Days (48-hours), by roadside interview method as described in IRC: 102-1988. A random sampling approach was employed to interview both passenger and freight vehicles traversing the project road at the toll plaza locations. The survey aimed to gather information on various aspects, including origin, destination, frequency of trips, purpose of travel and for freight vehicles, the type of commodity being transported.

The regional distribution of tollable vehicles at the toll plaza locations has been estimated based on OD matrices is presented in below table and figure.

The project influencing states will provide an overview of the factors likely to influence the pattern of economic development and hence the flows and volumes of traffic on the project road.

3.3.1 Regional Influence

The key influencing regions from the origin destination survey are Mundra, Gandhidham, Ahmedabad and Morbi for passenger traffic and for goods traffic Mundra, Gandhidham, Morbi and Rajasthan. Regional distribution for passenger traffic and goods traffic is given in the below table.

Table 3-5: Regional Distribution in % for passenger traffic

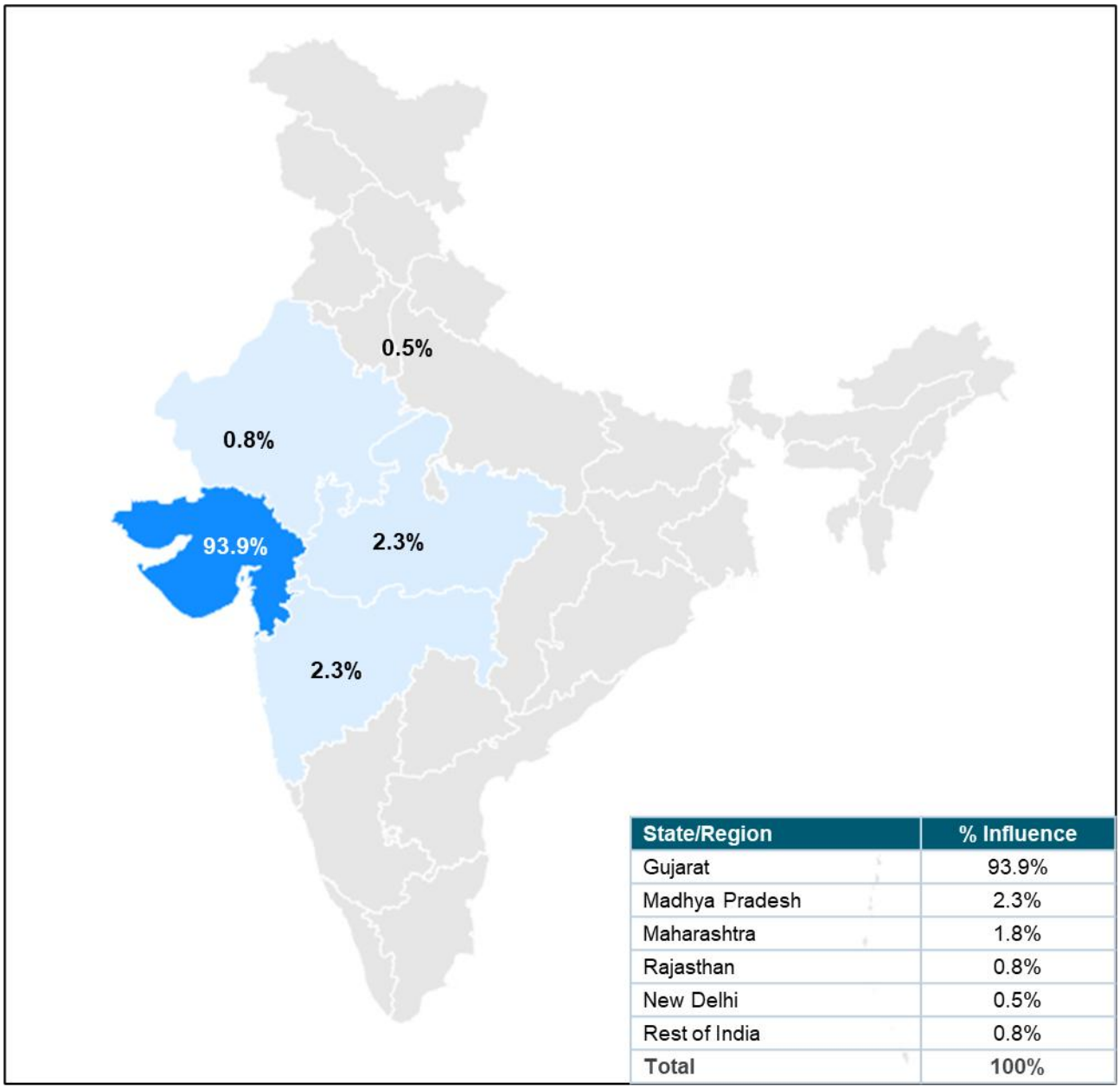
State/Region	% Influence
Gujarat	93.9%
Madhya Pradesh	2.3%
Maharashtra	1.8%
Rajasthan	0.8%
New Delhi	0.5%
Rest of India	0.8%
Total	**100%**

Table 3-6: Regional Distribution in % for goods traffic

State/Region	% Influence
Gujarat	83.1%
Rajasthan	4.9%
Maharashtra	4.0%
New Delhi	2.6%
Madhya Pradesh	1.5%
Haryana	1.1%
Uttar Pradesh	0.8%
Punjab	0.5%
Rest of India	1.6%
Total	**100%**

Source: Crisil Intelligence

Figure 3-3: State influence for Passenger



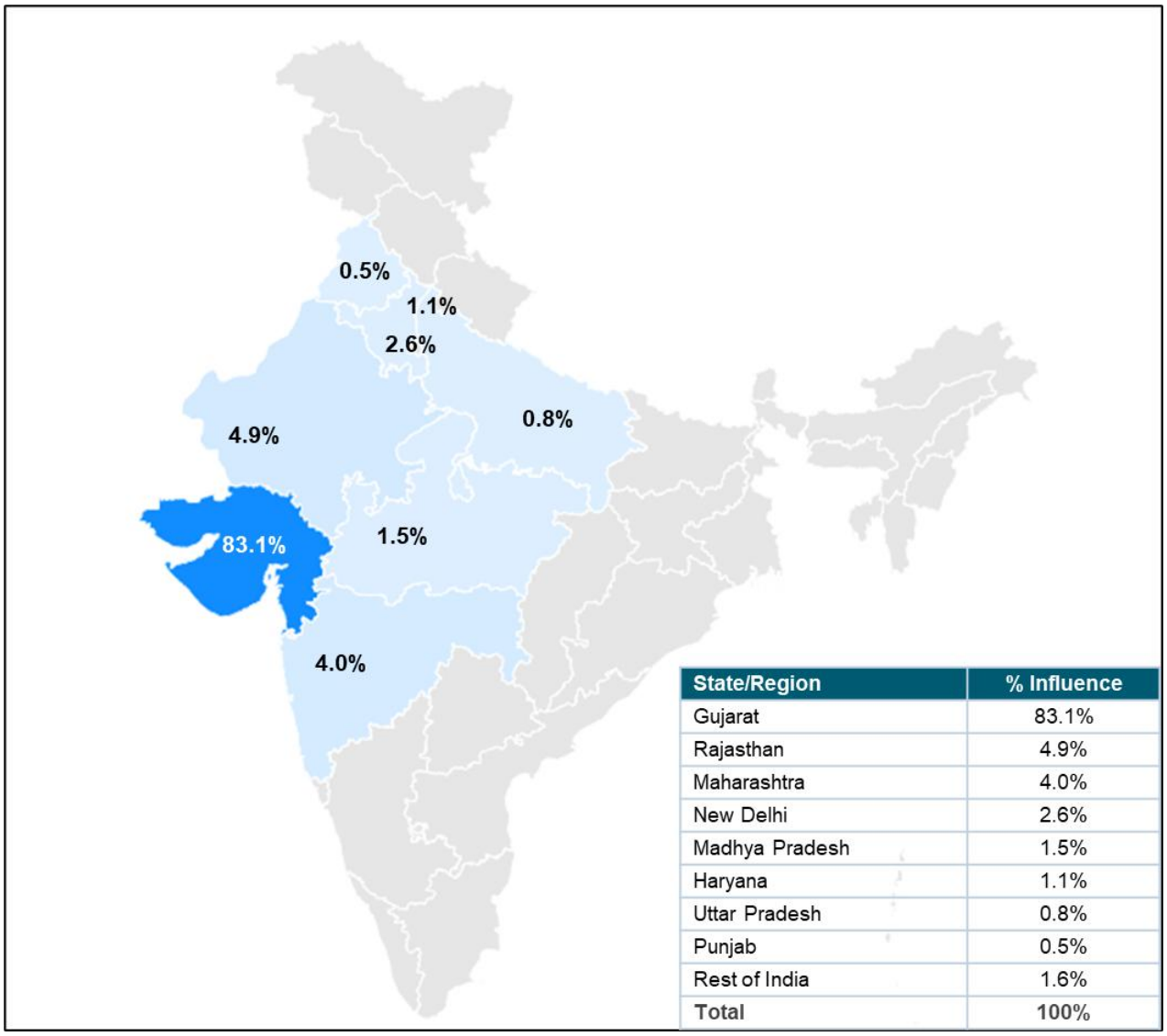
State/Region	% Influence
Gujarat	93.9%
Madhya Pradesh	2.3%
Maharashtra	1.8%
Rajasthan	0.8%
New Delhi	0.5%
Rest of India	0.8%
Total	100%

Source: Crisil Intelligence

Passenger Traffic

- **Gandhidham** contribute to 14.5% car traffic and followed by **Samakhiali** with 14.3% region, indicating the more local movement.
- **Samakhiali-Gandhidham and Samakhiali-Bhuj** and vice versa are the major OD pairs in car traffic.

Figure 3-4: State influence for Goods



State/Region	% Influence
Gujarat	83.1%
Rajasthan	4.9%
Maharashtra	4.0%
New Delhi	2.6%
Madhya Pradesh	1.5%
Haryana	1.1%
Uttar Pradesh	0.8%
Punjab	0.5%
Rest of India	1.6%
Total	100%

Source: Crisil Intelligence

Freight Traffic

- **Mundra** contribute to 18.8% MAV traffic and followed by **Gandhidham** with 12.4% region of MAV traffic. Morbi region contribute to 9.4% traffic and **Kandla** region contribute to 7.2% traffic.
- **For Container traffic, Mundra, Gandhidham and Morbi** region contribute to 49% of MAV traffic.
- **For Agricultural produce (Majorly Rice) commodity traffic apart from top regions like Mundra, Gandhidham, Kandla and Morbi region, North India** region contributes 7.2% of traffic.

3.3.2 Zonal Influence

The key influencing zones/regions from the origin destination survey are Samakhiali, Gandhidham, Bhuj, Ahmedabad and Bhachau for passenger traffic, indicating more local movements and for goods traffic key influencing zones/regions are Mundra, Gandhidham, Morbi, Samakhiali, Bhuj & Kandla.

Table 3-7: Zonal influence in % for passenger traffic

State/Region	% Influence
Samakhiali	14.4%
Gandhidham	14.4%
Bhuj	10.0%
Ahmedabad	6.8%
Bhachau	6.5%

Table 3-8: Zonal influence in % for goods traffic

State/Region	% Influence
Mundra port	17.5%
Gandhidham	12.1%
Morbi	9.2%
Samakhiali	8.1%
Bhuj	7.3%
Kandla	7.1%

Source: Crisil Intelligence

3.3.3 Top OD Pairs

Key OD pairs-Car traffic

Samakhiali to Gandhidham is top od pair accounting for 8.7% of the car traffic, followed by Samakhiali to Bhuj, Ahmedabad to Gandhidham, etc. (OD pairs includes both direction movements). Top 10 OD pairs contribute to nearly 38% of the traffic in cars and top 10 od pair traffic is presented in the below table.

Table 3-9: Top OD pairs for car traffic

OD Pair	% Influence
Samakhiali to Gandhidham	8.7%
Samakhiali to Bhuj	5.4%
Ahmedabad to Gandhidham	5.4%
Samakhiali to Bhachau	4.5%
Ahmedabad to Bhuj	3.7%
Dwarka to Gandhidham	2.4%
Samakhiali to Mundra port	2.3%
Surat to Gandhidham	2.0%
Morbi to Mundra port	1.7%
Samakhiali to Kandla	1.4%

Key OD pairs-MAV traffic

Morbi to Mundra port is top od pair accounting for 9.1% of the MAV traffic, followed by Samakhiali to Mundra port, Ahmedabad to Mundra port, etc. (OD pairs includes both direction movements). Top 10 OD pairs contribute to

nearly 39% of the traffic in MAV and top 10 od pair traffic is presented in the below table.

Table 3-10: Top OD pairs for MAV traffic

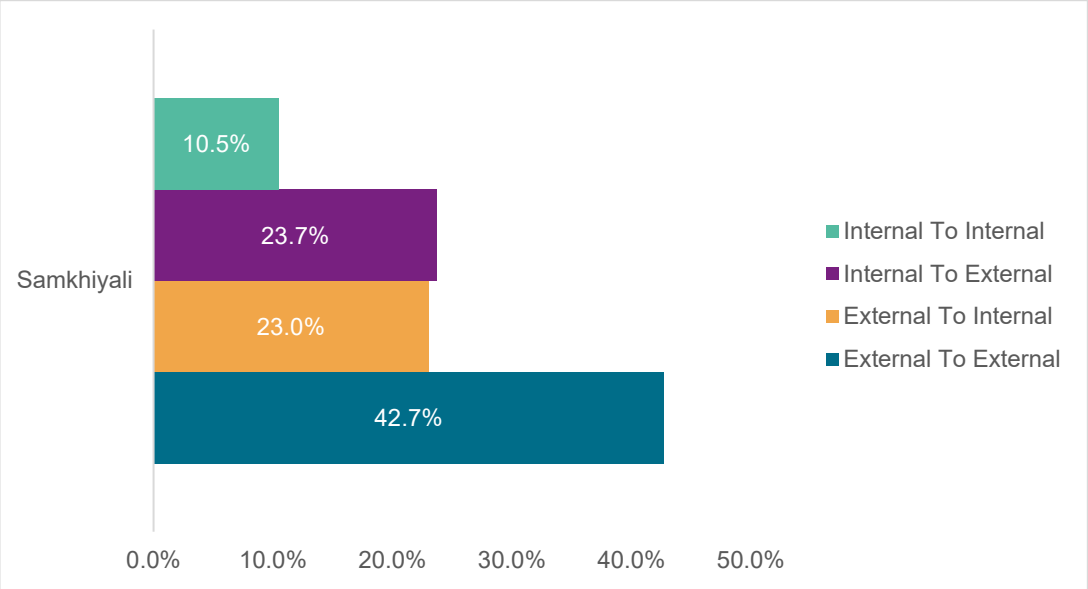
OD Pair	% Influence
Morbi to Mundra port	9.1%
Samakhiali to Mundra port	5.4%
Ahmedabad to Mundra port	4.1%
Samakhiali to Gandhidham	3.4%
Ahmedabad to Gandhidham	3.3%
Morbi to Gandhidham	3.3%
Morbi to Kandla	2.8%
Morbi to Bhuj	2.5%
New Delhi to Mundra port	2.5%
Samakhiali to Bhuj	2.3%

Source: Crisil Intelligence

3.3.4 Internal External Analysis

The zones which fall along the project road and very near project road are considered as internal zones and other zones are considered as external zones. If both end of the trips are internal, those trips are internal-internal trips. If one end of the trips is internal and other is external those trips are internal to external and external to internal trips. If both ends of the trips are external, those are external-external trips. Internal-External analysis is presented in the below figure, its shows about 10.5% trips move within the project road and about 43% of trips have their origin and destination are outside the project road.

Figure 3 3: Internal-External Influence



3.4 Commodity Distribution

Analysis was carried out to understand the various freight vehicles being used to transport different commodities. Table below presents the commodity distribution for Samakhiali Plaza.

Table 3-11: Commodity Distribution (in %) for Samakhiali Plaza

Commodity	LCV	2 Axle Truck	3 Axle Truck	MAV	Total
Container	4.9%	15.9%	38.8%	26.9%	26.2%
Empty	21.2%	26.3%	18.3%	14.9%	15.8%
Agri Produce	9.8%	9.8%	5.5%	6.3%	6.6%
Coal	4.0%	3.4%	3.6%	6.9%	6.5%
Tiles & Ceramic products	3.0%	7.9%	4.6%	6.3%	6.3%
Petroleum Products	3.7%	5.8%	5.5%	4.9%	5.0%
Courier & parcel	15.1%	7.5%	2.5%	4.3%	4.7%
Iron & Steel Products	4.3%	2.9%	3.7%	4.5%	4.4%
Plastic products	4.0%	2.8%	2.5%	3.4%	3.4%
Consumer Foods	2.5%	2.2%	2.9%	3.4%	3.3%
Chemical products	2.3%	2.0%	1.2%	3.1%	2.9%
Construction materials	1.7%	2.5%	2.5%	2.9%	2.8%
Textile & Footwear	2.1%	2.1%	1.1%	2.5%	2.4%
Plywood & Timber products	5.0%	1.9%	2.3%	2.2%	2.3%
Others	5.3%	1.4%	1.0%	2.1%	2.1%
Consumer Products	4.9%	1.3%	1.2%	1.5%	1.6%
Machinery	1.0%	1.9%	1.1%	1.0%	1.0%
Automobiles	1.0%	0.8%	0.7%	1.0%	0.9%
Paper products	2.0%	0.6%	0.5%	0.9%	0.9%
Rubber products	0.5%	0.3%	0.3%	0.7%	0.6%
Milk & Animal Food	1.5%	0.7%	0.2%	0.4%	0.4%
Pharmaceuticals	0.0%	0.0%	0.0%	0.0%	0.0%
Grand Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: Crisil Intelligence

- The analysis of freight movement across the toll plaza reveals that the major commodities being transported include container, Agri produce, coal and construction materials.
- Reason for higher container traffic is due to the project road connects the Mundra port, which is the largest commercial port in India, which has handled 8.5[1] million TEUs of container traffic in FY 25.
- In 3 Axle Trucks, traffic is largely contributed by containers and agricultural produce at 26% and 6.6%, respectively.
- In MAV, traffic is largely contributed by containers and coal at 26% and 6.9%, respectively.

Source: 1. Integrated Annual Report 2024-25, Adani Ports and Special Economic Zone Limited (APSEZ)

Direction wise commodity distribution is presented in the below tables.

Table 3-12: Commodity Distribution (in %) for Gandhidham-Samakhiali direction

Commodity	LCV	2 Axle Truck	3 Axle Truck	MAV	Total
Container	4.0%	16.7%	36.0%	25.2%	24.6%
Coal	6.0%	5.7%	6.8%	13.0%	12.2%
Empty	20.1%	21.2%	16.2%	10.0%	11.0%
Petroleum Products	4.6%	8.9%	8.3%	6.4%	6.5%
Iron & Steel Products	4.3%	3.7%	3.5%	4.8%	4.7%
Plastic products	4.7%	4.7%	2.8%	4.7%	4.6%
Consumer Foods	3.3%	3.8%	3.5%	4.7%	4.6%

Commodity	LCV	2 Axle Truck	3 Axle Truck	MAV	Total
Chemical products	3.0%	1.7%	1.0%	4.9%	4.5%
Tiles & Ceramic products	2.6%	4.2%	3.8%	4.0%	3.9%
Courier & parcel	14.5%	6.5%	1.0%	3.6%	3.9%
Plywood & Timber products	5.5%	2.8%	3.9%	3.7%	3.7%
Construction materials	1.7%	3.6%	3.5%	3.7%	3.6%
Agri Produce	10.2%	6.8%	5.0%	2.7%	3.2%
Others	4.3%	2.1%	0.9%	1.9%	2.0%
Consumer Products	4.8%	1.4%	1.1%	1.5%	1.6%
Paper products	3.0%	0.4%	0.8%	1.4%	1.4%
Textile & Footwear	0.4%	1.9%	0.5%	1.3%	1.3%
Rubber products	0.4%	0.7%	0.3%	1.2%	1.1%
Machinery	0.9%	1.8%	0.6%	0.5%	0.5%
Automobiles	0.4%	0.4%	0.4%	0.5%	0.5%
Milk & Animal Food	1.3%	1.0%	0.1%	0.4%	0.5%
Pharmaceuticals	0.0%	0.0%	0.0%	0.0%	0.0%
Grand Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: Crisil Intelligence

Table 3-13: Commodity Distribution (in %) for Samakhiali-Gandhidham direction

Commodity	LCV	2 Axle Truck	3 Axle Truck	MAV	Total
Container	6.1%	15.3%	41.6%	28.5%	27.8%
Empty	22.7%	30.5%	20.6%	19.9%	20.6%
Agri Produce	9.3%	12.2%	6.1%	10.0%	10.0%
Tiles & Ceramic products	3.7%	11.0%	5.5%	8.7%	8.6%
Courier & parcel	16.1%	8.3%	4.1%	5.0%	5.4%
Iron & Steel Products	4.3%	2.1%	3.9%	4.3%	4.2%
Textile & Footwear	4.4%	2.4%	1.7%	3.7%	3.5%
Petroleum Products	2.5%	3.3%	2.5%	3.5%	3.4%
Others	6.7%	0.8%	1.1%	2.2%	2.2%
Plastic products	3.1%	1.2%	2.3%	2.1%	2.1%
Construction materials	1.8%	1.6%	1.5%	2.1%	2.0%
Consumer Foods	1.3%	0.9%	2.1%	2.0%	1.9%
Consumer Products	5.1%	1.2%	1.3%	1.5%	1.5%
Machinery	1.2%	2.1%	1.7%	1.5%	1.5%
Automobiles	1.9%	1.1%	1.1%	1.5%	1.4%
Chemical products	1.2%	2.1%	1.5%	1.2%	1.2%
Plywood & Timber products	4.3%	1.2%	0.5%	0.7%	0.8%
Coal	1.2%	1.4%	0.2%	0.7%	0.7%
Paper products	0.6%	0.8%	0.2%	0.5%	0.5%
Milk & Animal Food	1.9%	0.5%	0.2%	0.4%	0.4%
Rubber products	0.6%	0.0%	0.3%	0.1%	0.1%
Pharmaceuticals	0.0%	0.0%	0.0%	0.0%	0.0%
Grand Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100%**

Source: Crisil Intelligence

- For Gandhidham-Samakhiali direction, coal traffic is slighter higher than the Samakhiali-Gandhidham direction, indicating more imports. Petroleum products, followed by construction materials among the top commodities.

- For Samakhiali-Gandhidham direction, container traffic is slighter higher than Gandhidham-Samakhiali direction followed by agriculture produce among the top commodities.

Based on the O-D survey analysis insights, it was observed the in goods most of the traffic movement was towards/starting from Gandhidham region, it was observed through site visit and interactions with various stakeholders like transporters, warehouse establishments, the commodities movements which are travelling from states Rajasthan, Delhi, Haryana and Punjab and beyond are getting containerised at Gandhidham region (Gandhidham has plenty of warehouse's), potentially transported through a hub and spoke.

Container is the topmost commodity on the stretch

Container traffic is the largest commodity plying on the project road. Container traffic holds major share around 26.2% in the overall traffic. Major container traffic is originating/destined to Morbi tiles & ceramic cluster, Ahmedabad, Surat within Gujarat State. Longest distance traffic from Rajasthan carrying marbles, stones etc. and basmati rice from states Punjab & Haryana. Project road gives connectivity to two important seaports in the region which are Mundra Port and Kandla Port. Mundra Port, located in Gujarat, India, is the largest commercial port in the country and a critical hub for container traffic. It handles a significant volume of cargo, including containers, dry bulk, liquid bulk, and automobiles. The port's strategic location on the western coast of India allows it to serve the vast hinterland regions, including the National Capital Region, Gujarat, Punjab, Rajasthan, and Madhya Pradesh. Mundra Port operates five container terminals across 12 berths, with a combined capacity of 9.5 million TEUs (twenty-foot equivalent units). India's container traffic decadal growth (FY14-FY24) is around 7.7% and Mundra port's container traffic decadal growth (FY14-FY24) is around 12.0%.

Agriculture porduce is the second most commodity on the stretch

Agri produce commodity is the second most carried commodity in the project road, and it accounts for 6.6% total traffic on the project stretch. This category comprises of rice, wheat, vegetables, and fruits.

Basmati Rice is major contributor among agricultural produce. Basmati rice belt in India primarily spans the northern regions, particularly in the states of Punjab, Haryana, Himachal Pradesh, Uttarakhand, and parts of Uttar Pradesh and Jammu & Kashmir. These areas are known for their ideal climatic conditions and fertile soil, which are perfect for cultivating high-quality Basmati rice. Rice gets exported from Mundra port.

Tiles & Ceramics commodity is one of the major commodities

Majority of this tiles traffic originates from Morbi which is the largest hub ceramic tiles manufacturing in the country. Marble and stone commodity majorly travels from Rajasthan onto the project stretch towards the ports. There is also proportion of feldspar as well. The Morbi Ceramic Cluster, located in Gujarat, India, is one of the largest and most significant ceramic industry clusters in the world. It is situated about 250 km from Ahmedabad and is renowned for its extensive production of ceramic products. The cluster comprises over 600 units, producing a wide range of items including wall tiles, floor tiles, vitrified tiles, polished glazed vitrified tiles, and sanitary ware.

Coal is one the major commodity

Coal is another major commodity, which is imported and travels on the road stretch. However, a huge portion of this commodity travels via railways, a meaningful portion also travels via road. In Gujarat, it originates/destined to Morbi, Ahmedabad etc. These are smaller packets of coal, travelling towards brick mills or some captive power plant in Rajasthan, Delhi or North India.

Iron and Steel products

Iron and Steel products commodity on the stretch largely includes iron products, metal scrap and some proportion of steel products. Iron commodity on the stretch is primarily importing driven and steel pipe manufacturing in the region, which travels to the various parts of the country. These commodities are also used for the purpose of construction in the region. Scrap and pig iron are primary inputs for small steel manufacturers. Strong growth prospects and upcoming manufacturing capacities in the Kachchh will drive the growth of the commodity.

Consumer Foods

The commodities travelling the project stretch in consumer food category are sugar, salt, edible oil and other FMCG goods. Largely the purpose of these commodities is for export purpose, and some portion is for consumption purpose in the Kutch region. India is very much dependent on edible oil imports, and this import demand is expected to continue. Salt production is strong in the vicinity regions and overall Gujarat. Salt travels for exports and consumption purpose on the stretch. Gujarat account for nearly 75% of India's salt production.

3.4.1 Trip Length Distribution

Trip Length Distribution analysis gives distance-based patterns for project road traffic. Trip length is categorized into nine trip length groups. Trip length distribution table for different vehicle types is presented below.

Table 3-14: Trip Length Distribution

Trip Length Group (Kms)	Cars	Minibus	Bus	LCV	2-Axle	3-Axle	MAV
0 to 20	5.1%	4.8%	5.3%	0.3%	1.0%	0.3%	0.3%
21 to 40	1.8%	0.4%	2.2%	0.3%	0.1%	0.2%	0.1%
41 to 100	24.2%	33.8%	23.4%	30.3%	15.7%	11.5%	14.2%
101 to 200	26.6%	24.8%	24.6%	18.5%	17.4%	15.3%	22.9%
201 to 350	24.1%	22.6%	27.3%	18.2%	21.3%	13.8%	18.0%
351 to 500	7.8%	8.0%	10.1%	10.9%	16.8%	9.1%	11.2%
501 to 750	3.6%	1.6%	2.8%	10.1%	11.9%	9.2%	12.1%
751 to 1000	3.7%	3.2%	3.2%	5.4%	6.6%	7.4%	9.8%
Beyond 1000 Km	3.1%	0.8%	1.1%	6.1%	9.2%	33.2%	11.4%
Grand Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: Crisil Intelligence

Cars are mostly short distance trip, about 31% of trip travel within 100 kms. In MAV about 39% trips are short distance with trip length within 100 kms, distanced trip indicating goods are potentially transported through a hub and spoke.

4 Review of Historic Traffic & Revenue

4.1 General

This section summarizes the historical performance of the project section in order to understand baseline traffic patterns comprising of historical tollable traffic and revenue growth, traffic and revenue composition, trip distribution, trip factors, seasonality and trend of traffic over the available data set.

The historical tollable traffic and revenue data mode wise was made available by client from September 2010 to July 2025 and is presented in below table.

Table 4-1: Historical Traffic and Revenue Data Availability

Data Source	Type of Data	Period
TMS Data	Traffic & Revenue Data Vehicle Wise	September 2010 – November 2024

Source: Client, Crisil Intelligence

MAVs contribute 83% of the Plaza traffic in terms of PCUs

Project road has seen healthy traffic CAGR growth of 6.8% in PCU terms from FY 2015 to FY 2025. In the last two years the traffic shown steady growth of 6.5% in PCU terms. The summary of historic tollable TMS traffic data is presented in below table.

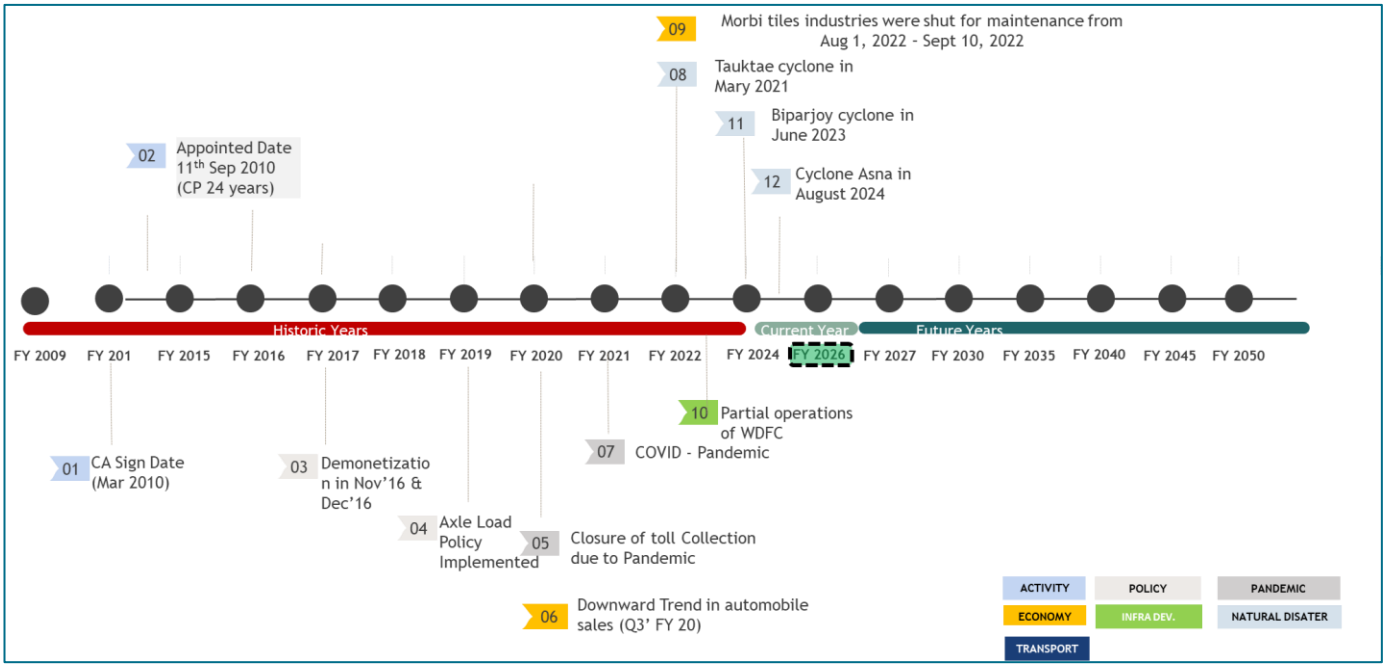
Table 4-2: Historic Traffic

FY	Cars	LCV	Bus	2-Axle	MAV	Vehicles	PCU
2011	3,091	487	558	950	7,597	**12,684**	**42,534**
2012	3,971	556	597	694	7,849	**13,666**	**43,996**
2013	4,405	557	613	527	8,588	**14,690**	**47,306**
2014	4,582	563	615	439	8,501	**14,700**	**46,841**
2015	4,894	535	609	401	8,996	**15,434**	**49,207**
2016	5,255	551	609	359	9,698	**16,472**	**52,626**
2017	5,657	616	630	395	11,150	**18,448**	**59,832**
2018	6,375	667	645	331	12,222	**20,240**	**65,302**
2019	6,819	713	649	342	13,191	**21,713**	**70,219**
2020	6,369	624	661	412	12,976	**21,042**	**68,915**
2021	6,398	510	496	551	13,965	**21,921**	**73,148**
2022	7,606	503	609	673	14,953	**24,344**	**79,494**
2023	8,843	505	723	774	15,560	**26,404**	**84,110**
2024	9,748	519	742	872	16,674	**28,554**	**90,400**
2025	9,940	540	745	924	17,687	**29,836**	**95,349**
2026*	10,490	594	741	985	17,856	**30,666**	**97,076**
CAGR (25-15)	**7.3%**	**0.1%**	**2.0%**	**8.7%**	**7.0%**	**6.8%**	**6.8%**
CAGR (25-12)	**7.3%**	**-0.2%**	**1.7%**	**2.2%**	**6.4%**	**6.2%**	**6.1%**
CAGR (19-12)	**8.0%**	**3.6%**	**1.2%**	**-9.6%**	**7.7%**	**6.8%**	**6.9%**
CAGR (25-23)	**6.0%**	**3.5%**	**1.5%**	**9.3%**	**6.6%**	**6.3%**	**6.5%**

FY 2026 Data is till July 2025

Source: Client TMS Data, Crisil Intelligence

Figure 4-1: Historic calendar of events



Source: Crisil Intelligence

Historic traffic has seen some changes in trend due to some events which has occurred during this period. Over the years Kutch region has witnessed cyclones, in June 2023 witnessed cyclone Bijparjoy and in last week of august 2024 Kutch region witnessed cyclone Asna. Traffic also depends on the ceramic cluster of Morbi region. Tiles & ceramics export has been fluctuating over the years due to various factors like antidumping, industry shutdowns, employee strikes. Mundra port also witnessed red sea crisis impact in October 2023. Operations of the WDFC and recent upgradation (doubling & electrification) by Kutch Rail Company limited for the railway line between Gandhidham and Palanpur has impacted project road traffic.

Vehicle registration of cars in Gujarat state has shown CAGR growth of around 7% in the recent five years and project has shown decadal growth of around 7.3%, the growth in cars with core reasons including rapid urbanization, poor public transport, economic growth in the region and raising tourism infrastructure and rising affluence in the state.

Growth in Goods traffic is mainly due to rapid cargo growth in Mundra port and Kandla port in the region which is primarily due to capacity expansion of the ports, project road has shown around 6.8% CAGR (FY15-FY25) in the last decade.

4.2 Historic Toll Segmentation

Recent years toll segmentation has been analysed from vehicle wise and toll segmentation toll data provide by client. As the variations the recent years has been minimal, we have adopted latest FY 25 toll segmentation for future projections.

Table 4-3: Historic Toll Segmentation

FY	Vehicle Type	Single	Return	Monthly	Local	Sp. Pass	Discount	Exemption	Total
2023	Cars	38.2%	36.6%	0.0%	1.1%	7.3%	0.0%	16.9%	100.0%
	LCV	38.6%	54.0%	1.2%	0.0%	0.0%	0.0%	6.2%	100.0%
	Bus	12.6%	83.5%	0.0%	0.0%	0.0%	0.0%	3.9%	100.0%

FY	Vehicle Type	Single	Return	Monthly	Local	Sp. Pass	Discount	Exemption	Total
	2 Axle Truck	54.2%	44.3%	0.0%	0.0%	0.0%	0.0%	1.5%	100.0%
	MAV	57.4%	39.6%	0.0%	0.0%	0.0%	2.1%	0.8%	100.0%
	OSV	84.2%	15.5%	0.0%	0.0%	0.0%	0.0%	0.3%	100.0%
2024	Cars	37.7%	38.6%	0.0%	1.0%	6.7%	0.0%	16.0%	100.0%
	LCV	39.9%	52.9%	0.9%	0.0%	0.0%	0.0%	6.4%	100.0%
	Bus	11.3%	85.0%	0.0%	0.0%	0.0%	0.0%	3.6%	100.0%
	2 Axle Truck	57.1%	41.5%	0.0%	0.0%	0.0%	0.0%	1.3%	100.0%
	MAV	55.3%	41.9%	0.0%	0.0%	0.0%	2.0%	0.8%	100.0%
	OSV	82.2%	17.6%	0.0%	0.0%	0.0%	0.0%	0.2%	100.0%
2025	Cars	36.9%	38.5%	0.0%	1.3%	7.4%	0.0%	15.9%	100.0%
	LCV	41.2%	52.2%	0.7%	0.0%	0.0%	0.0%	5.8%	100.0%
	Bus	9.5%	86.7%	0.0%	0.0%	0.0%	0.0%	3.7%	100.0%
	2 Axle Truck	58.1%	40.6%	0.0%	0.0%	0.0%	0.0%	1.3%	100.0%
	MAV	55.5%	41.9%	0.0%	0.0%	0.0%	1.9%	0.8%	100.0%
	OSV	88.3%	11.5%	0.0%	0.0%	0.0%	0.0%	0.2%	100.0%

Source: Client TMS Data, Crisil Intelligence

5 Base traffic estimation

5.1 Seasonality Factors

Traffic volumes on roads varies throughout the year, influenced by socio-economic activities in the surrounding regions. To accurately estimate the Annual Average Daily Traffic (AADT) for the road, it is crucial to account for these seasonal variations.

To achieve this, a seasonal correction factor is applied, which is derived from secondary data sources such as historical traffic data, fuel sales and similar indicators. In this assessment as long historic traffic data is available, consultants have the traffic data for seasonality

Seasonal correction Factors (SCF)

Seasonal correction factors for the latest years of FY 24 & FY 25 are tabulated below.

Table 5-1: Seasonal correction factors for FY 24 and FY 25

FY	Month	Cars	LCV	Bus	2-Axle	MAV	OSV
2024	Apr	1.1	1.0	1.0	1.1	1.0	1.0
	May	1.1	1.0	1.0	1.0	1.0	0.8
	Jun*	1.0	1.0	1.0	1.0	1.0	1.0
	Jul	0.8	0.9	0.9	0.9	1.0	0.8
	Aug	0.9	1.0	1.0	0.9	1.0	0.8
	Sep	1.0	0.9	1.0	0.9	0.9	1.0
	Oct	0.9	1.0	1.0	1.0	1.0	1.1
	Nov	1.2	1.0	1.0	0.9	0.9	1.0
	Dec	1.0	1.0	1.1	1.0	1.1	1.1
	Jan	1.0	1.0	1.1	1.0	1.0	1.0
	Feb	1.0	1.1	1.0	1.1	1.1	1.2
	Mar	1.0	1.0	1.0	1.2	1.1	1.1
2025	Apr	1.0	1.0	1.0	1.0	1.0	0.7
	May	1.1	1.0	1.0	1.0	1.0	0.8
	Jun	1.0	1.0	1.0	1.0	1.0	0.9
	Jul	0.9	0.9	0.9	0.9	0.9	0.9
	Aug*	0.9	0.9	1.0	0.9	0.9	0.8
	Sep	0.9	0.9	0.9	1.0	1.0	1.0
	Oct	0.9	1.0	1.0	1.0	1.0	1.2
	Nov	1.3	1.0	1.0	0.9	1.0	1.0
	Dec	1.0	1.1	1.1	1.0	1.1	1.2
	Jan	1.0	1.0	1.1	1.0	1.0	1.0
	Feb	1.1	1.1	1.0	1.1	1.1	1.2
	Mar	1.0	1.0	1.0	1.1	1.0	1.3

June 2023 data is adjusted for the cyclone Bijparjoy Impact (Data till 23rd June).
For August month data is considered till 25th august, rest of the days were affected by floods in Kutch region of Gujarat (Cyclone Asna).
Source: Client TMS Data, Crisil Intelligence

5.2 Base Traffic Estimation

For base traffic (annual average daily traffic) estimation of the present study, current fiscal 4-months (Apr-25 to July-25) of TMS traffic data were annualized using SCF factor of FY 24 & FY 25 ETC traffic data (excluding the Bijparjoy cyclone impact in FY 24 & excluding impact of Cyclone Asna in FY 25) to arrive at the annual average daily traffic (AADT) for FY 26.

The AADT estimation for the base case for FY26 is presented table below

Table 5-2: Base Traffic Estimation -FY26 AADT

Particulars	FY Year	Cars	LCV	Bus	2-Axle	3-Axle	MAV	OSV	Vehicles	PCU
ADT (Apr-July) *	FY 26	10,490	594	741	985	1,155	16,701	37	30,702	95,895
SCF	FY 24 & FY 25	1.01	1.01	1.02	1.01	1.04	1.04	1.16		
AADT	**FY 26**	**10,573**	**599**	**759**	**992**	**1,199**	**17,339**	**42**	**31,503**	**99,110**

**For August 2024 month data is considered till 25th august, rest of the days were affected by floods in Kutch region of Gujarat (Cyclone Asna)*
***June 2023 data is adjusted for the cyclone Bijparjoy Impact (Data till 23rd June).*
Source: Client TMS Data, Crisil Intelligence

For estimating the base revenue, the toll rates applicable for FY 26 is multiplied with base year FY 26 ADDT traffic numbers by adopting the trip segmentation which is mentioned section 9 and Table 9-2.

Table 5-3: Base Revenue -FY26

Particulars	FY Year	Cars	LCV	Bus	2-Axle	3-Axle	MAV	OSV	Total
Revenue in ₹ Millions	**FY 26**	218	24	60	93	118	2,556	8	**3,078**

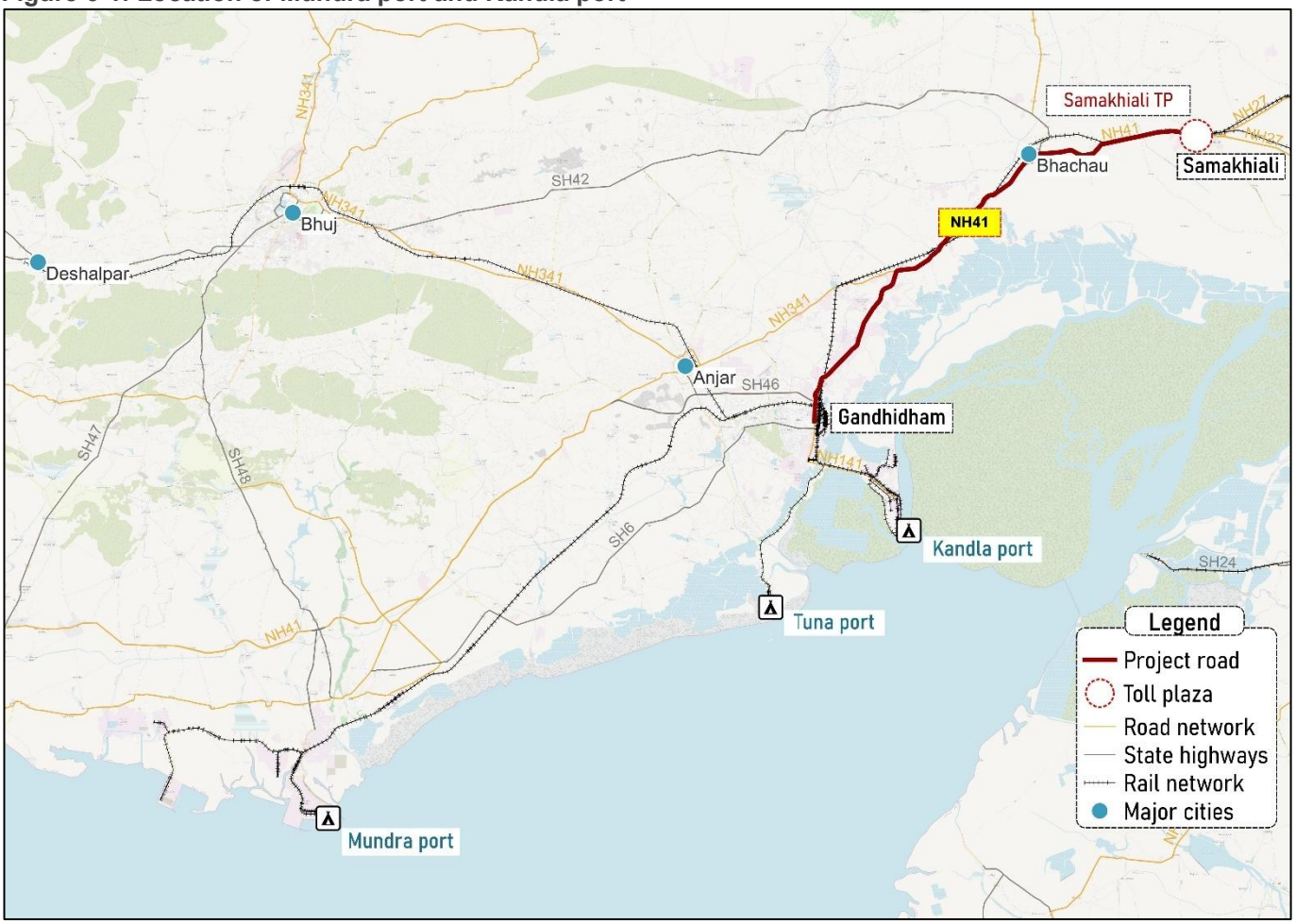
Source: Crisil Intelligence

6 Key Influencing factors

6.1 Ports in vicinity

Mundra port and Kandla port are located on either side of the project road. Mundra port container traffic directly influences project road traffic.

Figure 6-1: Location of Mundra port and Kandla port

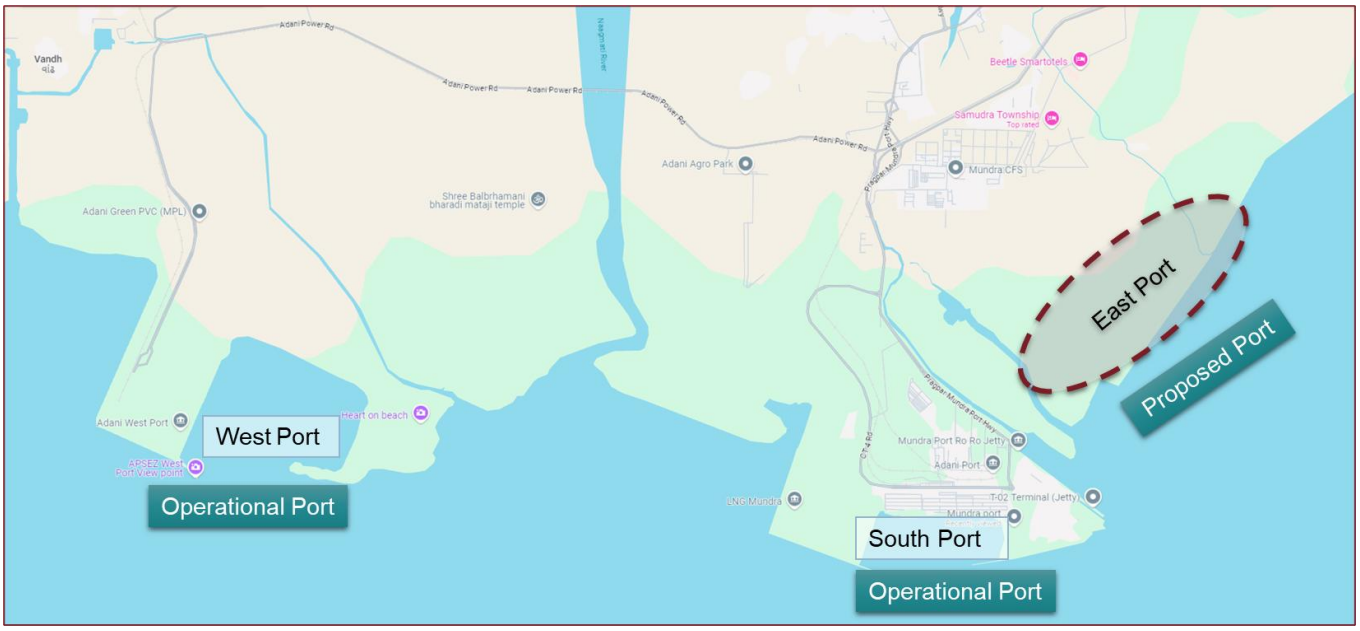


Source: Open Street Map, Crisil Intelligence

6.1.1 Mundra Port

Mundra Port, located in Gujarat, is India's largest commercial port and handles a significant amount of container traffic. It is an all-weather port with state-of-the-art facilities for handling various types of cargo, including containers, crude oil, dry bulk, breakbulk, automobiles, and liquid cargo.

Figure 6-2: Layout Plan for Mundra port



Source: Google Maps, Crisil Intelligence

Mundra Port has cargo capacity of 264 MMT (million metric tons). It has total of 5 container terminals, 12 container berths with combined capacity of 9.5 million TEU's (Twenty Foot Equivalent Units).

Mundra port made history in FY 2025 by becoming India's first port to exceed 200 MMT in annual cargo handling, reaching 200.5 MMT. This represents 11.8% year-on-year growth and establishes Mundra as India's largest commercial port in India.

Container terminal 1 (CT 1) commenced operation in 2003, operated by Mundra International Container Terminal Pvt Ltd (a unit of DP World), CT1 has a capacity of 1.3 million TEUs (Twenty-foot Equivalent Units) annually. The container terminal 2 or CT2 – Adani Mundra Container Terminal – with a city to handle 1.8 million TEUs is run by APSEZ itself. This terminal was originally designed to handle 1.3 million TEUs, but as demand grew, APSEZ converted an adjacent dry and break-bulk cargo handling terminal into a container handling facility some four years ago, adding 0.5 million TEUs of capacity. It began operation in 2007.

An equal joint venture between APSEZ and Terminal Investment Ltd, a unit of Mediterranean Shipping Co S A, the world's top container carrier by capacity, runs the container terminal 3 (CT3) – Adani International Container Terminal Pvt with a capacity to handle 3.1 million TEUs. It began operations in 2013. The 1.3 million TEU capacity container terminal 4 (CT4) – Adani CMA Mundra Terminal Pvt Ltd - is operated by an equal joint venture between APSEZ and CMA CGM S A. IT began operation in 2017. A new berth - T3 - with a capacity of 0.8 million TEUs is being commissioned to cater to the rising volumes at Mundra Port.

Figure 6-3: Container terminals at Mundra's south port



Source: Google Maps, Crisil Intelligence

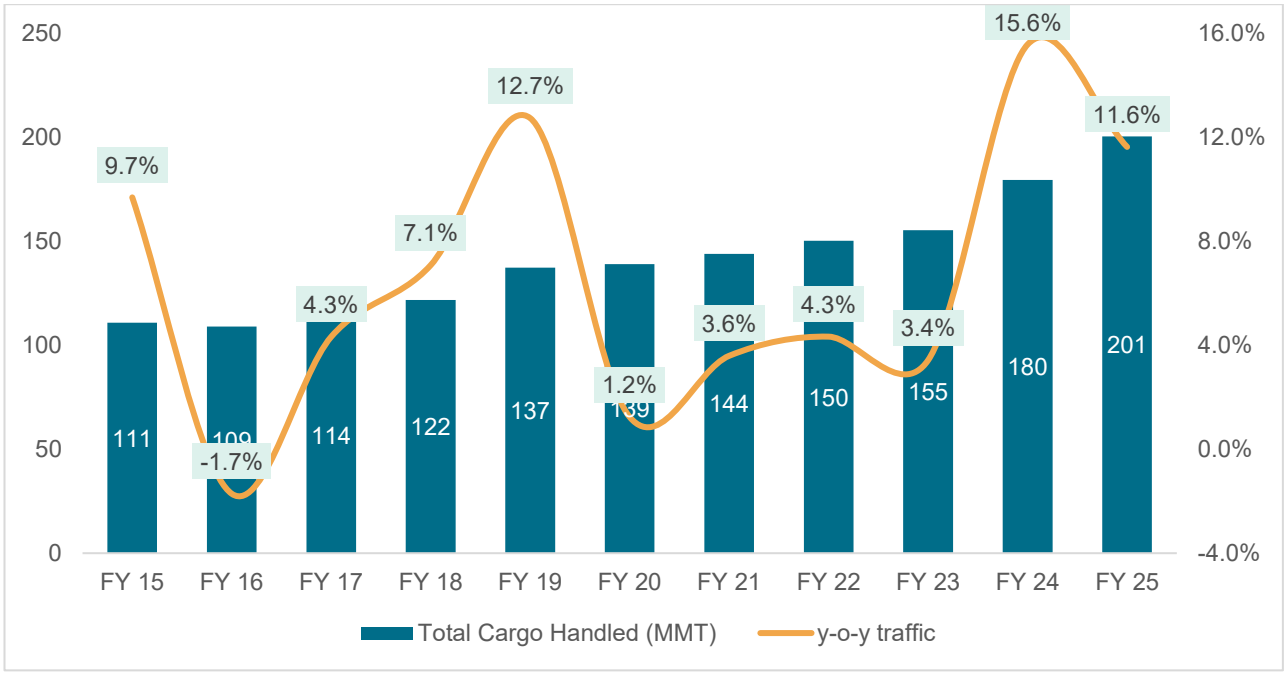
Table 6-1: Commodity Distribution (in %) for Samakhiali Plaza

Terminal	Player	Commissioned Year
CT1	Mundra International Container (MICT)	2003
CT2	Adani Mundra Container Terminal (AMCT 2)	2007
CT3	Adani International Container (AICTPL)	2013
CT4	JV of APSEZ and CMA CGM SA (ACMT)	2017
T2 Extn	Adani Mundra Container Terminal (AMCT 2 Ext)	2022
T3	Adani Mundra Container Terminal (AMCT T3)	2023

Trend in traffic at Mundra port

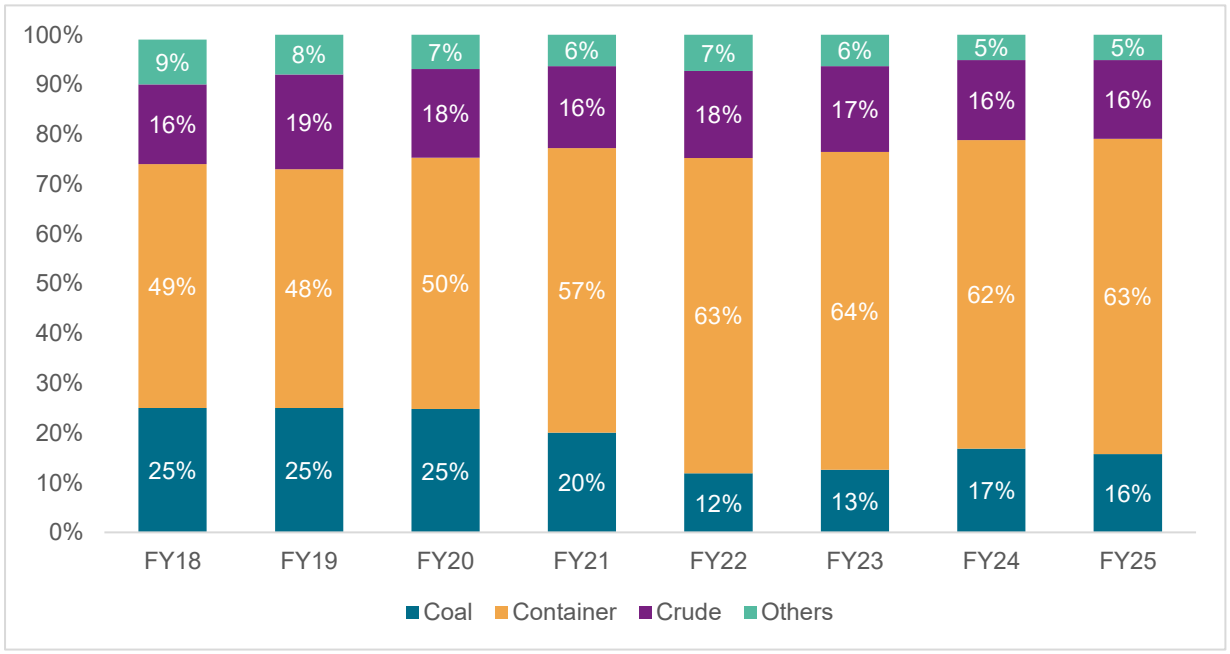
Mundra port made history in FY 25 by becoming India's first port to exceed 200 MMT in annual cargo handling, reaching 200.7 MMT. This represents 11.6% year-on-year growth (FY 25 vs FY24) and establishes Mundra as India's largest commercial port. Key advantages of services availed at Mundra is access to major mother line ships and huge efficiency gains as compared to major public ports of the country. Mundra is well connected to the railway network of the country and is currently facing capacity & scheduled delivery issues from railways, pertaining to container traffic. Mundra port has achieved a 5-year CAGR of 7.6% from FY 20-FY25. Growth is fuelled by expansions at Mundra port.

Figure 6-4: Trend in cargo handled in million metric tonnes (MMT) at Mundra port



Source: Adani ports and special economic zone limited (APSEZ), Crisil Intelligence

Figure 6-5: Segmental share in overall cargo

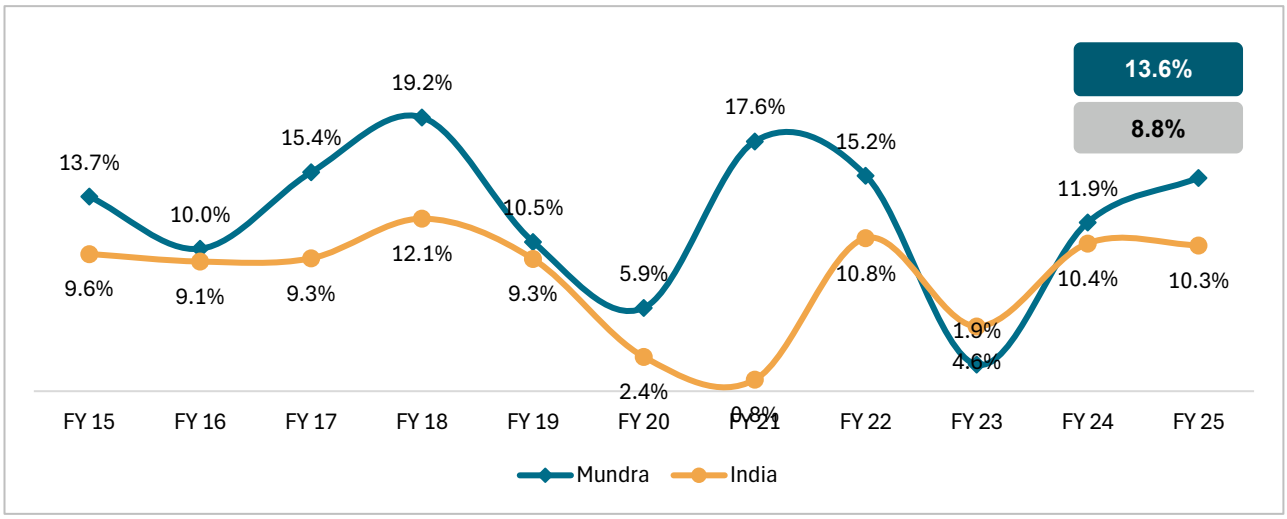


Source: Adani ports and special economic zone limited (APSEZ), Crisil Intelligence

Historic container traffic in India and Mundra port

Decadal growth of container traffic in India has shown CAGR (FY15-FY25) of 8.8% with expansion across various major ports across India and western region. Mundra port has shown grown faster than India's container growth with CAGR (FY15-FY25) of 13.6% fuelled by capacity additions at Mundra port.

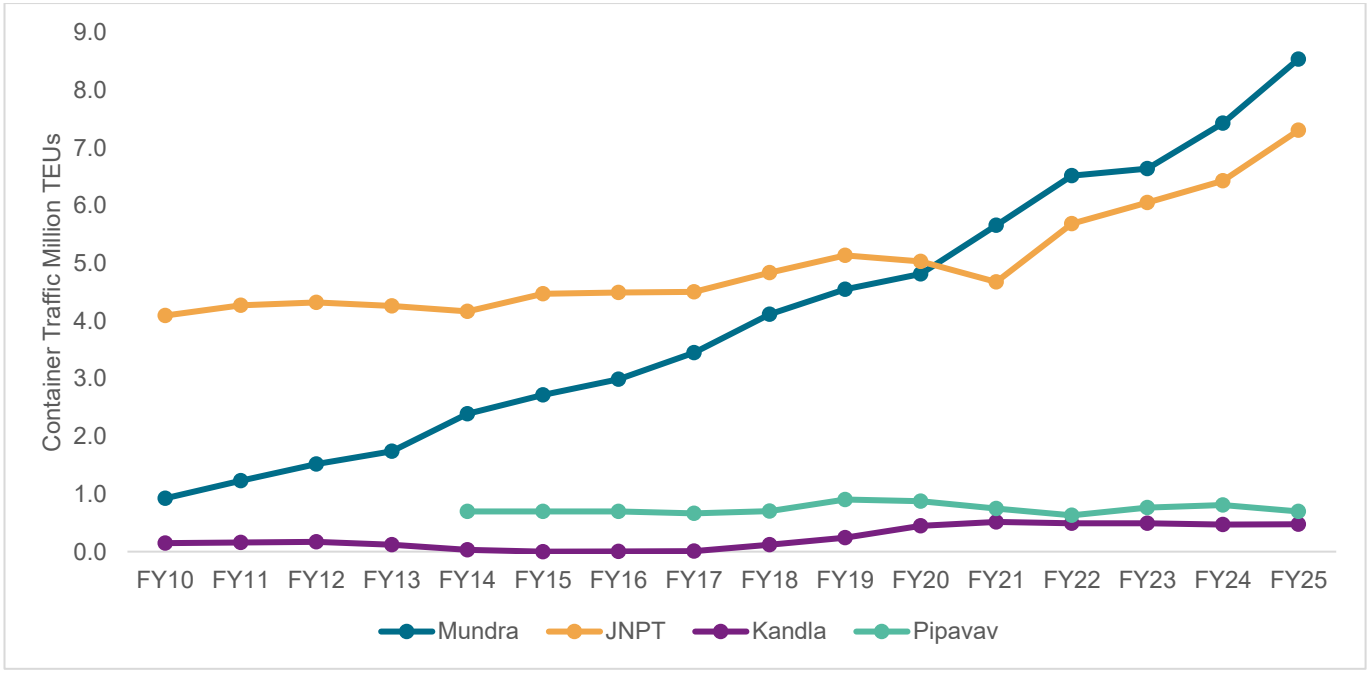
Figure 6-6: Mundra's container traffic vis-à-vis India's container traffic for last decade



Source: Indian Ports Association, Port websites, Industry, Crisil Intelligence

Mundra Port's container traffic has grown significantly more than other competitive ports like JNPT due to factors like its high operational efficiency, which includes quick turnaround times and effective container evacuation strategies, added capacity whenever the utilization has crossed 70% levels, invested heavily in modern infrastructure, including deep draft berths that can handle large vessels. In contrast, while JNPT (Jawaharlal Nehru Port Trust) remains a major container handling port in India, it has faced challenges such as congestion and limited expansion capacity.

Figure 6-7: Container traffic at competing ports



Source: Crisil Intelligence

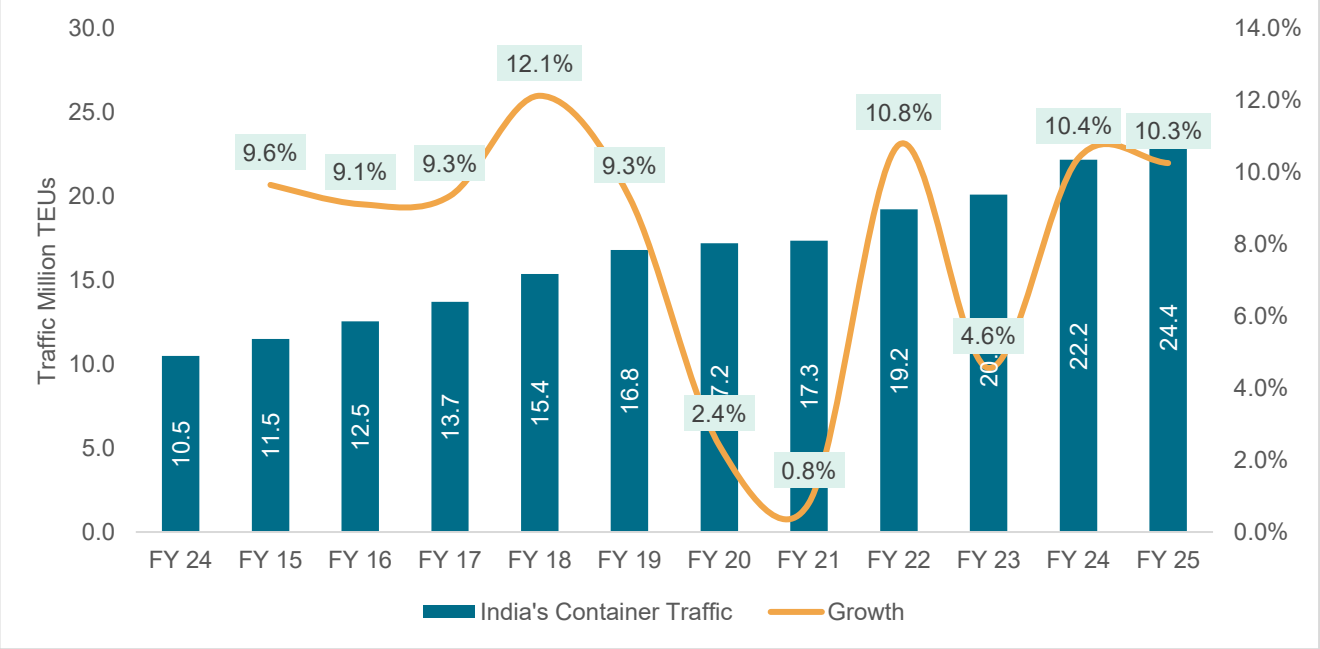
India container traffic growth trends

Consultants have investigated the India's container traffic from FY 2014 to FY 2025. Consultants have looked at the decadal growth of container traffic in India has shown CAGR (FY14-FY25) of 8.8%. India's container growth has been notable in recent years, driven by several key factors like

- India's expanding role in global supply chains has led to a rise in both exports and imports. This growth necessitates efficient logistics solutions, particularly containerized shipping.
- Programs like the Sagarmala Project and the Maritime India Vision 2030 aim to enhance port infrastructure and logistics capabilities.
- The rapid growth of e-commerce in India has transformed logistics and distribution channels.
- Investments in port infrastructure, such as the development of dedicated freight corridors and inland container depots, have improved the efficiency of cargo movement.
- India's strategic partnerships and trade agreements with countries like the UAE and the US have enhanced access to global markets, boosting containerized trade.

The overall economic growth in India has led to increased demand for goods, further driving the need for containerized transport.

Figure 6-8: India's Container traffic

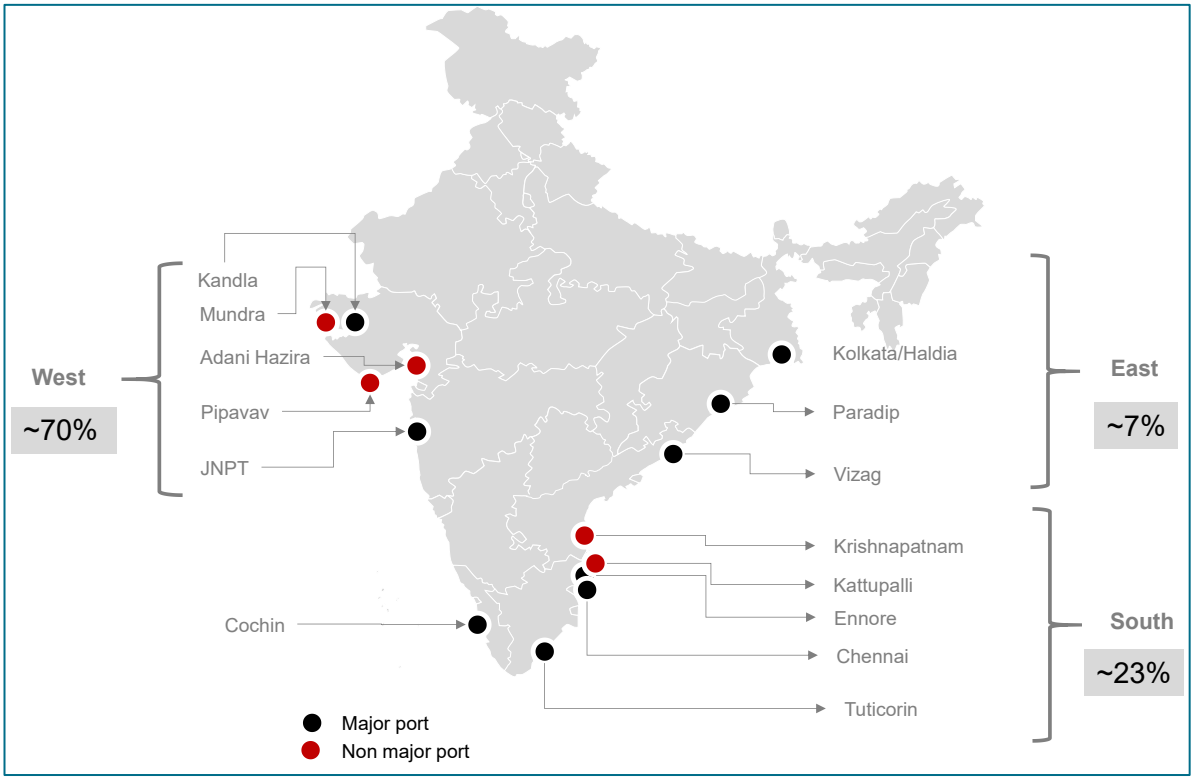


Source: Crisil Intelligence

Share of Western Ports

The container traffic share of the western ports over the years has remained the same, which is around ~70% of the overall India's container traffic share.

Figure 6-9: Western port share in India's Container traffic



Boxes represent share of region's ports in container traffic of India

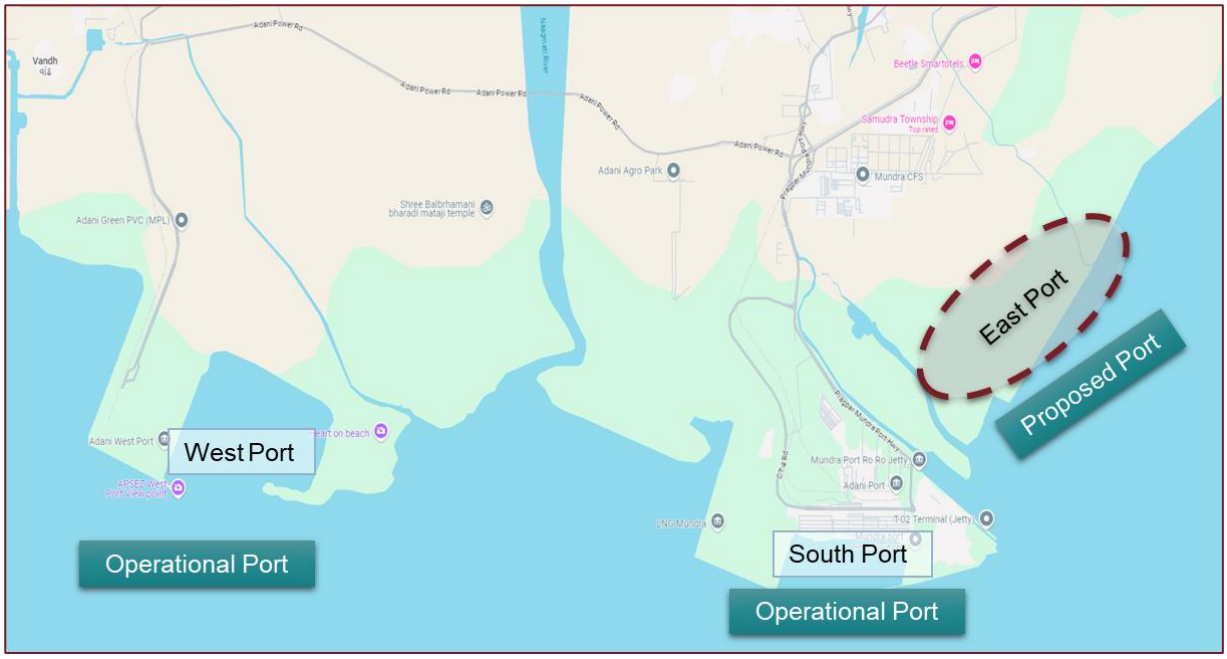
Source: Indian Ports Association, Port websites, Industry, Crisil Intelligence

Mundra port got environmental and coastal regulation zone clearance for Expansion

Adani Ports & Special Economic Zone Ltd (APSEZ) has received environmental and coastal regulation zone clearance from the Centre to double the capacity of Mundra port at a cost of Rs 45,000 crore.

APSEZ applied to the Expert Appraisal Committee (EAC) of the Ministry of Environment, Forest, and Climate Change to increase the Mundra Port's capacity by 289 million tonnes to 514 million tonnes as part of an expansion plan covering 3,335 hectares. The details of the proposed expansion are given below. The proposed expansion will be carried out in east port of Mundra. The likely expansion will be carried out in phased manner (when capacity utilisation reaches optimum level) and capacity expansion is already underway.

Figure 6-10: Proposed expansion of Mundra Port



Source: Google maps, Crisil Intelligence

Table 6-2: Proposed expansion of Mundra Port

Description	Approved till 2009	Already developed	Proposed Expansion	Cumulative after Expansion	Remarks
Quay Length (m)	22000	7870	8890	16760	The proposed quay length is envisaged due to optimization of layout for multi-purpose cargo handling. (Existing 7870m quay length will also be optimized for multipurpose cargo handling)

Source: Adani ports and special economic zone limited (APSEZ), Crisil Intelligence

Table 6-3: Details of Cargo handling after expansion of Waterfront Development Plan (Proposed)

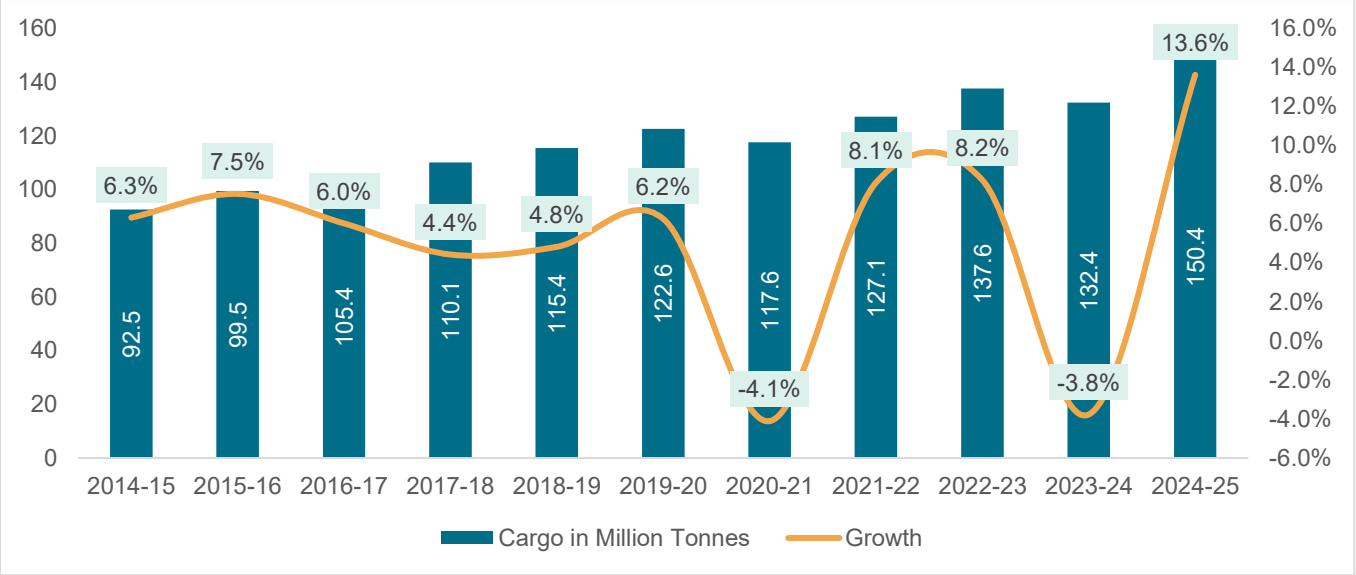
Cargo Type	Cargo Handling Capacity (MMTPA)
Dry Bulk & Break Bulk Cargo	140
Containers	250 (25 million TEUs)
Liquid Cargo	84
Gas/Cryogenics/Liquid	40
Total	**514**

Source: Adani ports and special economic zone limited (APSEZ), Crisil Intelligence

6.1.2 Kandla Port

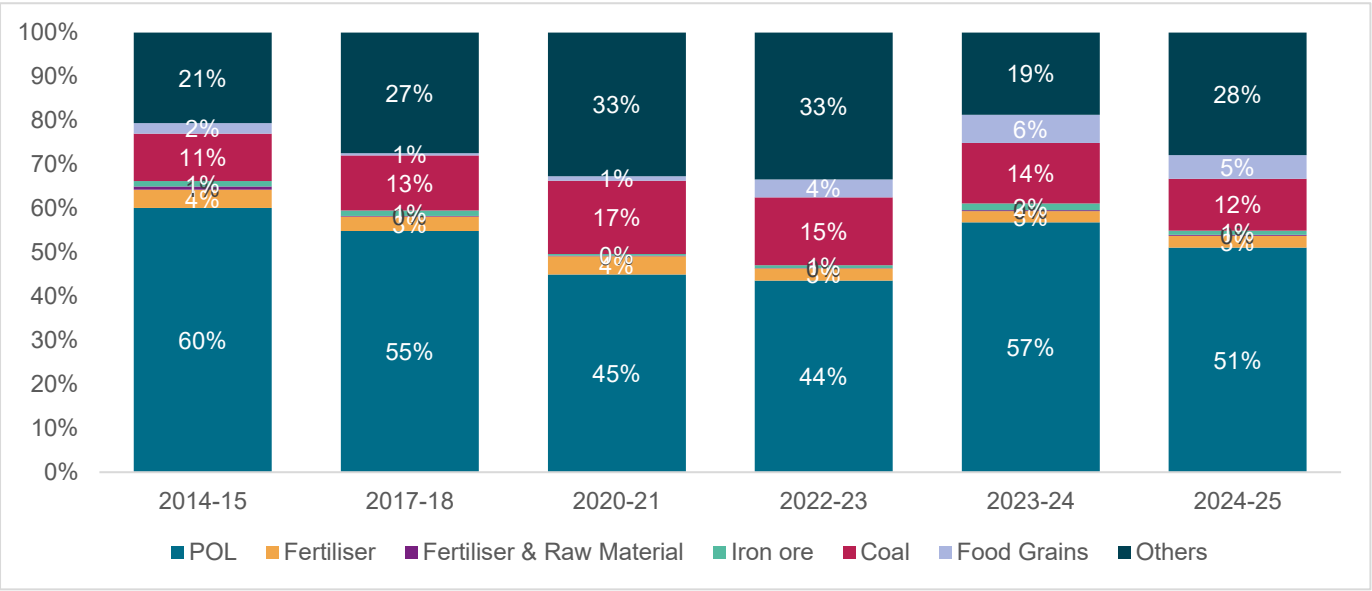
Kandla is one of the major ports of the country located on the west coast. Overall traffic has been growing at a good pace about 5.0% decadal growth, and it is supported by the super normal growth in the container segment. Coal is another major commodity on the port travelling via road, almost ~80-85% of the coal at Kandla port travels via road. Of the total throughput, ~60% of the coal traffic is directed towards Rajasthan & North region for end uses such as cement plants, steel rolling mills and brick mills. The usage of railways at Kandla, in containers as well as coal division is minimal, but could increase as they expand their EXIM business over the coming years.

Figure 6-11: Cargo Handled at Kandla Port



Source: Crisil Intelligence, Indian port association, Basic port statistics report

Figure 6-12: Commodity wise share (%) of cargo handled at Kandla Port



Source: Crisil Intelligence, Indian port association, Basic port statistics report

Expansion Plans for Kandla Port

The Kandla Port expansion plan involves a massive investment of ₹57,000 crore to enhance its capacity and efficiency. The project includes two major initiatives: a mega shipbuilding project worth ₹30,000 crore and a new cargo terminal outside Kandla Creek valued at ₹27,000 crore. The shipbuilding facility will be spread over 8,000 acres and will have the capability to manufacture 32 new ships and repair 50 vessels annually, including Very Large Crude Carriers (VLCCs) with capacities up to 3,20,000 tonnes DWT.

The new cargo terminal will add 135 million tonnes per annum (MTPA) to Kandla Port's existing capacity and handle dry bulk cargo with advanced equipment and efficient evacuation systems. This development aims to significantly improve waiting times and turnaround times for liquid tanker vessels, enhancing the overall efficiency of Kandla Port. Additionally, the existing port will be repurposed to handle liquid cargo, improving turnaround times

and reducing waiting periods for liquid tankers.

The expansion plan also includes other projects such as:

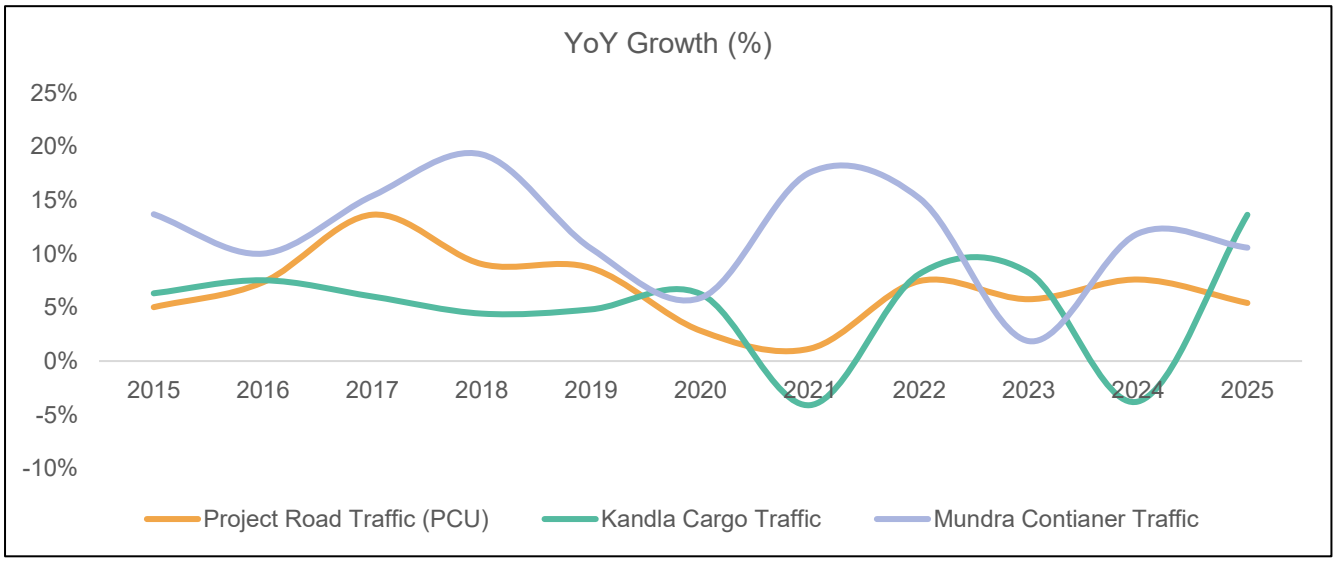
- Mega Cargo Terminal at Tuna Tekra: A new terminal being developed under Public-Private Partnership (PPP) mode with a capacity of 2.19 million Twenty-foot Equivalent Units (TEU).
- Multi Cargo Terminal at Tuna Tekra*: Adding 18.33 MTPA capacity to Kandla Port.
- New Oil Jetties: Enhancing liquid cargo handling capacity by 10 MTPA.
- Single Buoy Mooring (SBM) and Product Jetties at Vadinar: Boosting liquid cargo capacity by 24.5 MTPA.
- Ship Repair Facility at Vadinar: Capable of servicing 32 vessels annually.

Strong long-term correlation observed between stretch's AADT & Kandla port traffic and Mundra Container Traffic

The project road provides seamless connectivity to the important Port towns of Kandla and Mundra to the hinterlands in Gujarat and up north - extending to Rajasthan, Haryana, Punjab and beyond. Traffic at Samakhiali plaza has shown strong long-term correlation with respect port traffic at both Mundra and Kandla over the years.

For last decade, the correlation co-efficient (R^2) for project road traffic with respect to Kandla port traffic is around 0.96 and for Mundra port container traffic it is around 0.98.

Figure 6-13: YoY Growth Comparison of project road traffic, Kandla port Cargo traffic & Mundra port container traffic



Source: Crisil Intelligence, Indian port association, Basic port statistics report, Client Data

Table 6-4: Corelation coefficient

Parameters	Period	Correlation Co-efficient (R^2)
Project Road Traffic – Kandla Port Cargo Traffic	FY 15-25	0.96
Project Road Traffic – Mundra Port Container Traffic	FY 15-25	0.98

Tuna Tekra

Tuna Tekra Port is a modern, all-weather working port located about 15 km southwest of Kandla Port in Gujarat, India, with current dry bulk cargo capabilities and an ambitious ongoing project to make it a major container terminal.

Tuna Tekra currently handles dry bulk cargo like coal, fertilizers, minerals, salt, and agricultural products, with a mechanized berth and deep drafts, enabling cape-size vessels up to 130,000 DWT to berth.

In FY 25, Tuna Terminal has handled 9.4 MMT (million metric Tonnes) of cargo with installed capacity of 14 MMT.

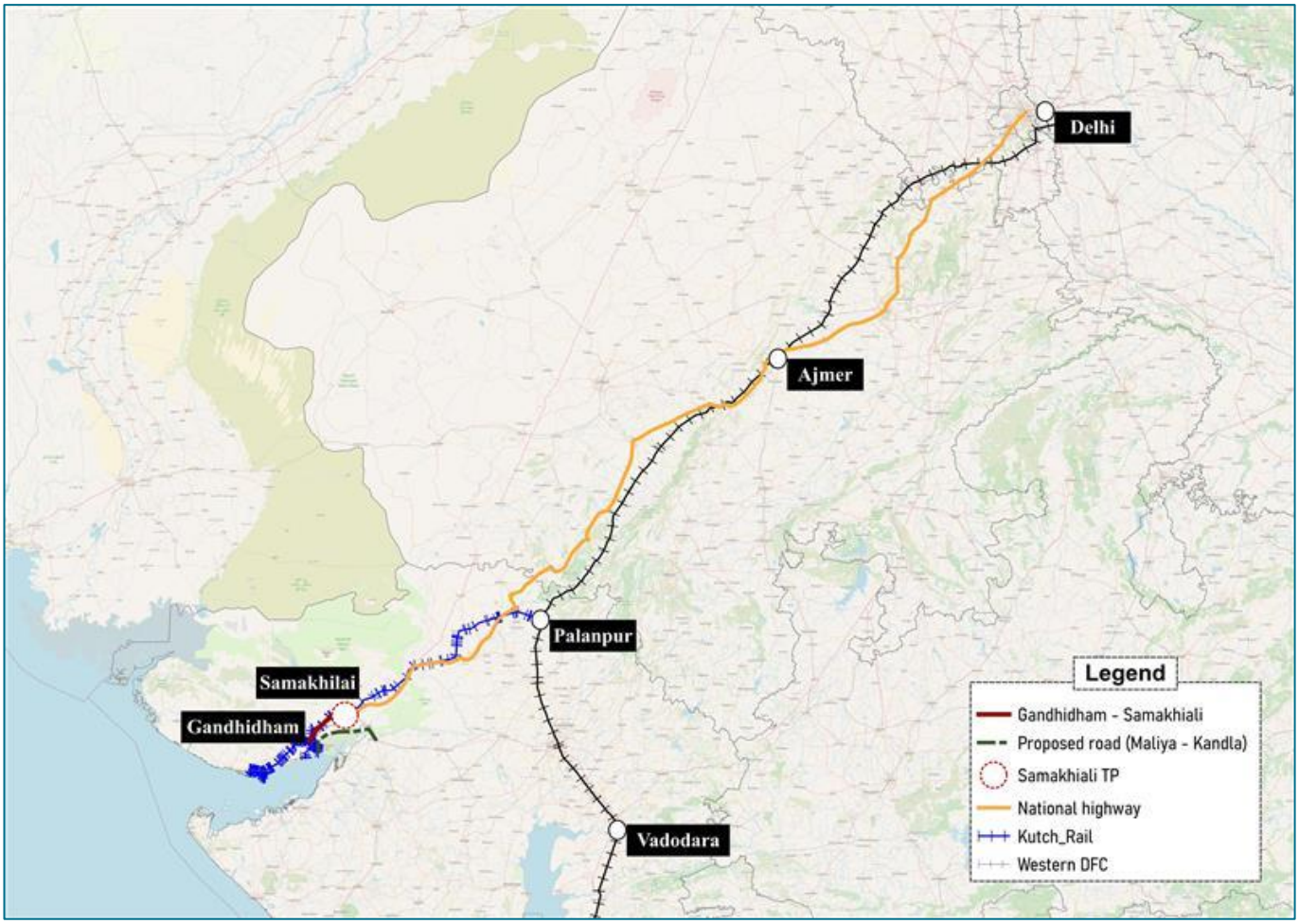
As part of future expansion plans, DP World container terminal, DP World is constructing container terminal with capacity of 2.19 million TEUs at Tuna Tekra Port with investment of approximately ₹4,200 crores.

7 Network and Industrial developments in the Region

In the case of the project road, there are no short distance alternate routes available that will impact the traffic on the project road. However ongoing and upcoming long-distance networks that could impact the project road are:

- Western Dedicated Freight Corridor (WDFC)
- 4/6 Lane Road from Kandla port to Maliya

Figure 7-1: Network Development around project road



Source: Open Street Map, Crisil Intelligence

The details of the development in term of milestone, expected completion date and possible impact to project road traffic is presented in below table.

Table 7-1: Details of Network Development and Possible impact

S. No	Details of Development	Milestone/Completion	Possible Impact
1	**WDFC** • 1,506 km long • The freight corridor will pass through the state of Delhi, Uttar Pradesh, Haryana,	93.2% section is commissioned and rest of section between Sachin – JNPT is under construction.	WDFC and KRCL Railway which connects the North India region to Mundra Region is operational since June 2023, currently the Impact of WDFC is partially and

S. No	Details of Development	Milestone/Completion	Possible Impact
	Rajasthan, Gujarat and Maharashtra **KRCL Line connecting Mundra to Palanpur** • Kutch Railway Company Limited which connects Mundra to Palanpur station of WDFC	Doubling of the existing railway line completing electrification of the same and these works were completed in February 2023 and May 2023, respectively	the balance residual impact of the WDFC is assessed in the current study. It will impact the traffic Palanpur & north. WDFC will impact from FY 26 onwards.
2	**4/6 Lane Road from Kandla port to Maliya**	**Current Status** is consultancy service for DPR preparation had been called in August 2024 by Deendayal Port Authority.	No Impact. Consultants have not considered this impact as alignment likely to pass some wetlands and land acquisition issues. It will impact Eastern part of Gujarat & beyond traffic from Morbi, Ahmedabad, Mumbai and beyond etc.

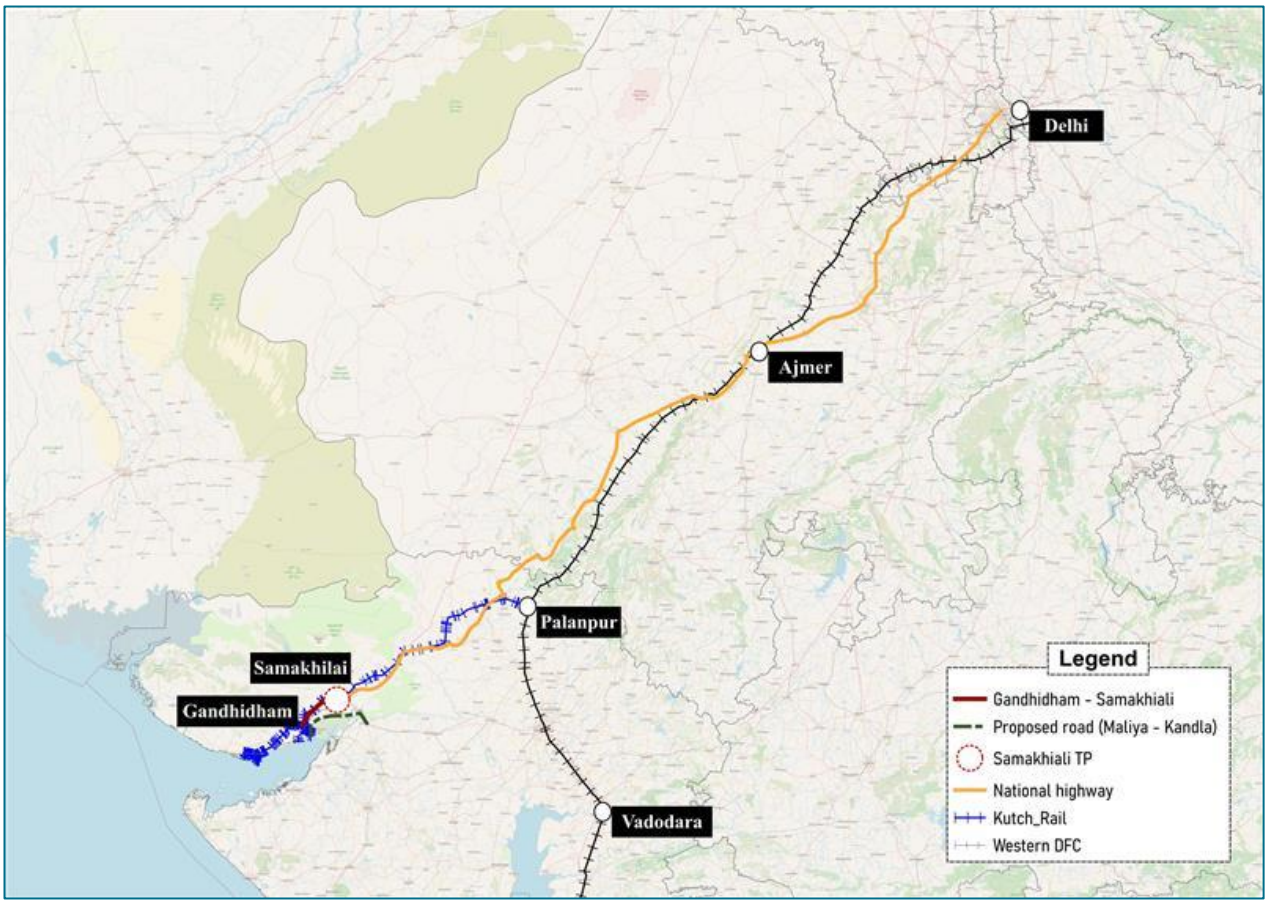
Source: Crisil Intelligence

7.1 Impact of Western Dedicated Freight Corridor (WDFC)

The Western Dedicated Freight Corridor (Western DFC) is an ambitious under-construction project spanning 1,506 km in India. It aims to connect Dadri, near Delhi in Uttar Pradesh, to Jawaharlal Nehru Port in Navi Mumbai, Maharashtra. Being developed by the Dedicated Freight Corridor Corporation of India Limited (DFCCIL), a public-sector unit under the Ministry of Railways, the Western DFC will feature electrified double-line operation. *Western Dedicated Freight Corridor (DFC) will have a negative impact on traffic.*

The alignment of the WDFC and the project section is presented in below figure.

Figure 7-2: Alignment of WDFC



Source: Open Street Map, Crisil Intelligence

KRCL was incorporated in January 2004 as an SPV for converting the existing meter gauge to broad gauge on the existing 301-km railway line between Gandhidham and Palanpur in Gujarat. KRCL took up the project for doubling the existing railway line and completing electrification of the same and these works were completed in February 2023 and May 2023, respectively. KRCL railway line which provides connectivity to two major seaports [Adani Port (erstwhile Mundra Port) and Deen-Dayal Port (erstwhile Kandla Port) with the northern mainland. It will also be a feeder route to the Western Dedicated Freight Corridor (WDFC).

The WDFC, may take away some of the traffic which is currently using the project road. The assessment of WDFC diversion from the project road is presented in below table.

Table 7-2: Status of WDFC

Section	Distance (Km)	Status	Completion Date
Dadri – Rewari	127	Operational	2024 January
Rewari - Madar	306	Operational	2021 January
Madar -Palanpur	353	Operational	2022 June
Palanpur - Makarpura	290	Operational	2023 October
Makarpura - Sachin	135	Operational	2023 June
Sachin - Vaitarna	193	Operational	2024 December
Vaitarna - JNPT	102	Under construction	2025 December*
Total	1,504		

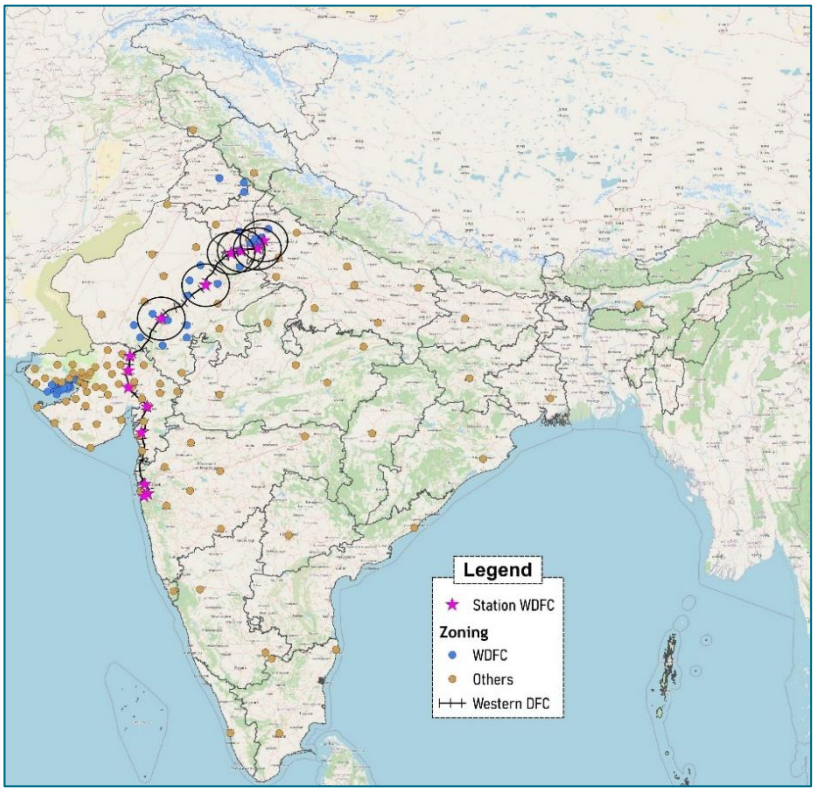
Source: Dedicated Freight Corridor Corporation of India Limited, Crisil Intelligence

7.1.1 Approach & Methodology for Diversion Analysis

Binary Logit Mode (Mode Choice Model) is used to analyse the impact of the WDFC Impact. Following assumptions are made in assessing the impact of WDFC.

- Zones/traffic falling within the 100km radius of the WDFC stations is considered.
- Binary logit analysis to estimate the diversions.
- Impact year is considered from FY26
- Inscope traffic is considered for more than 500 Km. (Binary logit model suggest shift from rail to road for the trip lengths with more than 500km due to the savings from travel time and travel cost). Zones above Palanpur were considered for Inscope traffic.
- The mode choice model has been used (National Rail Plan) based on the most evident factors of any goods transfer, i.e. Travel Time and Travel Cost.
- Commodities considered are Agri produce, Automobiles, Coal, Iron & steel, POL and Containers.
- Impact is considered in step wise approach with 25% for FY 26 to 100% in FY 2029

Figure 7-3: Inscope Zones considered for WDFC Impact



Source: Open Street Map, Crisil Intelligence

Table 7-3: Diverted Traffic

Vehicle Type	Inscope Traffic	% Diversion
2 Axle Truck	1.9%	0.5%
3 Axle Truck	3.7%	1.0%
MAV	5.6%	1.4%
Vehicle	**3.3%**	**0.8%**
PCU	**4.7%**	**1.2%**

Source: Crisil Intelligence

7.2 Impact of 4/6 Lane Road from Kandla port to Maliya

Deendayal Port Authority is planning to construct road four to six lane road from Kandla port to Maliya Road. Recent status for the project is as follows, consultancy service for DPR preparation had been called in August 2024 by Deendayal Port Authority. It will impact Eastern part of Gujarat & beyond traffic from Morbi, Ahmedabad, Mumbai and beyond etc. Consultants have not considered this impact as alignment likely to pass some wetlands and land acquisition issues. Consultants deem the proposed road will not impact the project road traffic during remainder of concession period. Inscope traffic estimated for the proposed road from project road is presented in the below table and alignment of the proposed road and the project section is presented in below figure.

Figure 7-4: Alignment (Tentative) of proposed road from Kandla port to Maliya



Source: Open Street Map, Crisil Intelligence

Table 7-4: Inscope Traffic

Vehicle Type	Inscope Traffic
Cars	17%
Minibus	26%
BUS	18%
LCV	22%
2 Axle Truck	24%
3 Axle Truck	24%
MAV	24%
Vehicle	**22%**
PCU	**23%**

Source: Crisil Intelligence

8 Traffic Growth Estimation & Traffic Forecast

8.1 Approach and Methodology

Crisil, based on its coverage of 80+ sectors and the MSME industry, has developed a knowledge base to understand the growth of industries and demand across various regions and clusters. The growth expectations for various industries are applied to each vehicle category based on the commodity composition of the vehicle category. For example, the share of light commercial vehicles (LCVs) carrying agricultural commodities is expected to grow as per agricultural output growth; the share of LCVs carrying consumer products is expected to grow as per the volume growth of durables; and the share of Multi axle vehicles (MAVs) carrying steel commodities is expected to grow as per demand/supply volume of steel products based on regional dynamics. This approach helps Crisil provide a more accurate growth rate of commercial traffic in the region.

For passenger traffic, Crisil assesses the sale of passenger cars in the region, growth of vehicular population, purpose and frequency of passenger travel, population growth, expansion of the city, and infrastructure development in the catchment area.

Further, Crisil also examines the various factors that will impact traffic over the concession period, such as upcoming alternative road routes, truck aggregation by logistics players, dedicated freight corridors and other transportation options. Thus, the analysis considers the impact of central and state policies, growth in production and consumption centres along the stretch, and infrastructure in the adjoining regions. The report covers both growth drivers and restraints for the traffic along the stretch. Crisil has enumerated and detailed the parameters that will positively/negatively impact the traffic on the stretch in the future.

Crisil has used its proprietary traffic projection methodology to project traffic using regional industry growth assumptions, macroeconomic developments, infra development and consumption centre growth factors of the catchment area and adjacent regions.

Figure 8-1: Commodity based approach: Illustrative example for Commercial vehicles

Commodity	MAV (Vehicles) Year 1	YoY growth	MAV (Vehicles) Year 2
Construction materials	300	9%	327
Consumer products	100	4%	104
Agri Produce	200	3%	206
Iron & Steel products	50	9%	55
Chemical products	200	5%	210
Total vehicles	XX		YY

Commodity	LCV (Vehicles) Year 1	YoY growth	LCV (Vehicles) Year 2
Construction materials	100	9%	109
Consumer products	200	4%	208
Agri Produce	50	3%	52
Iron & Steel products	300	9%	327
Chemical products	200	5%	210
Total vehicles	XX		YY

Growth rates for commodities are based on commodity specific demand/supply drivers and regional dynamics

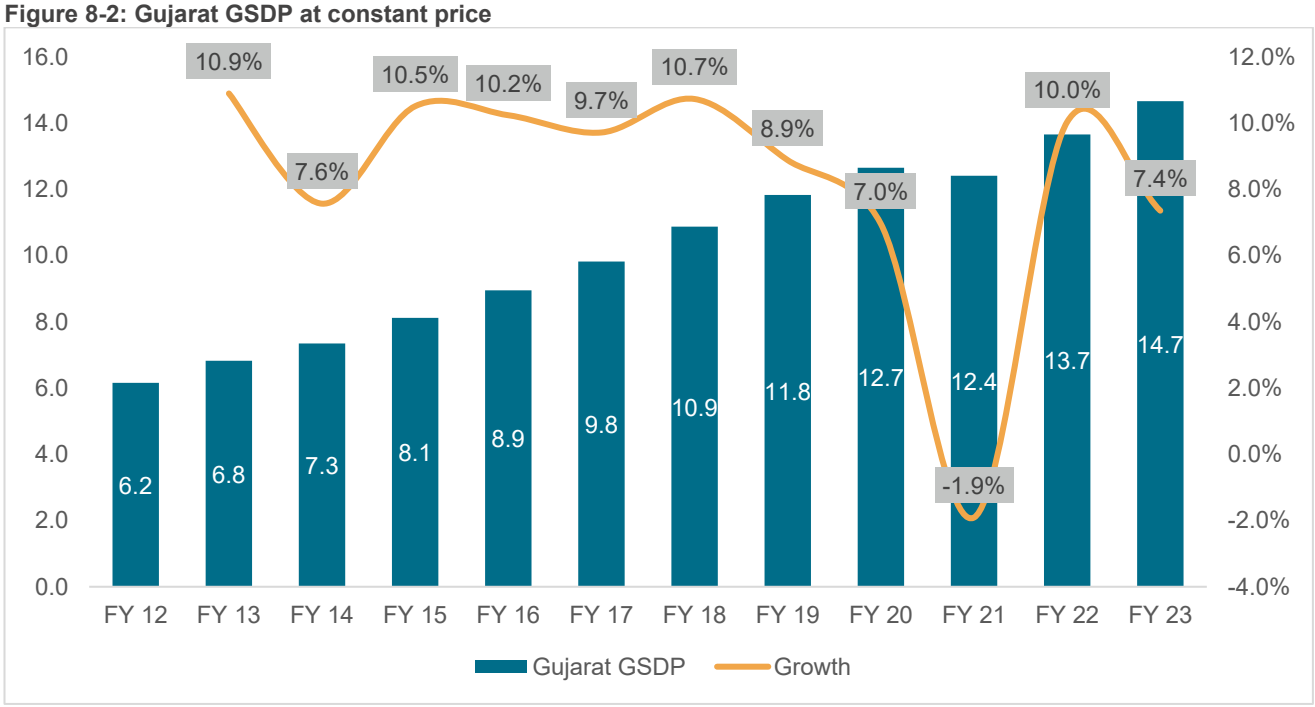
8.2 Gujarat State profile

Gujarat is one of the most economically developed states in India, with a strong and diversified industrial base. The state has a high GDP growth rate, with an average annual growth rate of **7.9%** from fiscal year 2013 to fiscal year 23. The state's economy is driven by a range of industries, including textiles, pharmaceuticals, petrochemicals, and automotive manufacturing. The state is also a major hub for small and medium-sized enterprises (SMEs), with a large number of units operating in the state. The state's strategic location on the western coast of India, with a long coastline and several major ports, including the Port of Kandla and the Port of Mundra, makes it an important centre for international trade.

Gujarat is also a major producer of agricultural products, including cotton, groundnuts, and tobacco. The state is home to a number of major agricultural processing industries, including textile mills, oilseed processing plants, and tobacco manufacturing units. The state government has also implemented a number of initiatives to promote agriculture and allied activities, including the development of irrigation infrastructure and the provision of subsidies and other support to farmers. In addition to its industrial and agricultural sectors, Gujarat is also a popular tourist destination, with a number of major attractions, including the Gir Forest National Park, the Somnath Temple, and the city of Ahmedabad, which is a UNESCO World Heritage City.

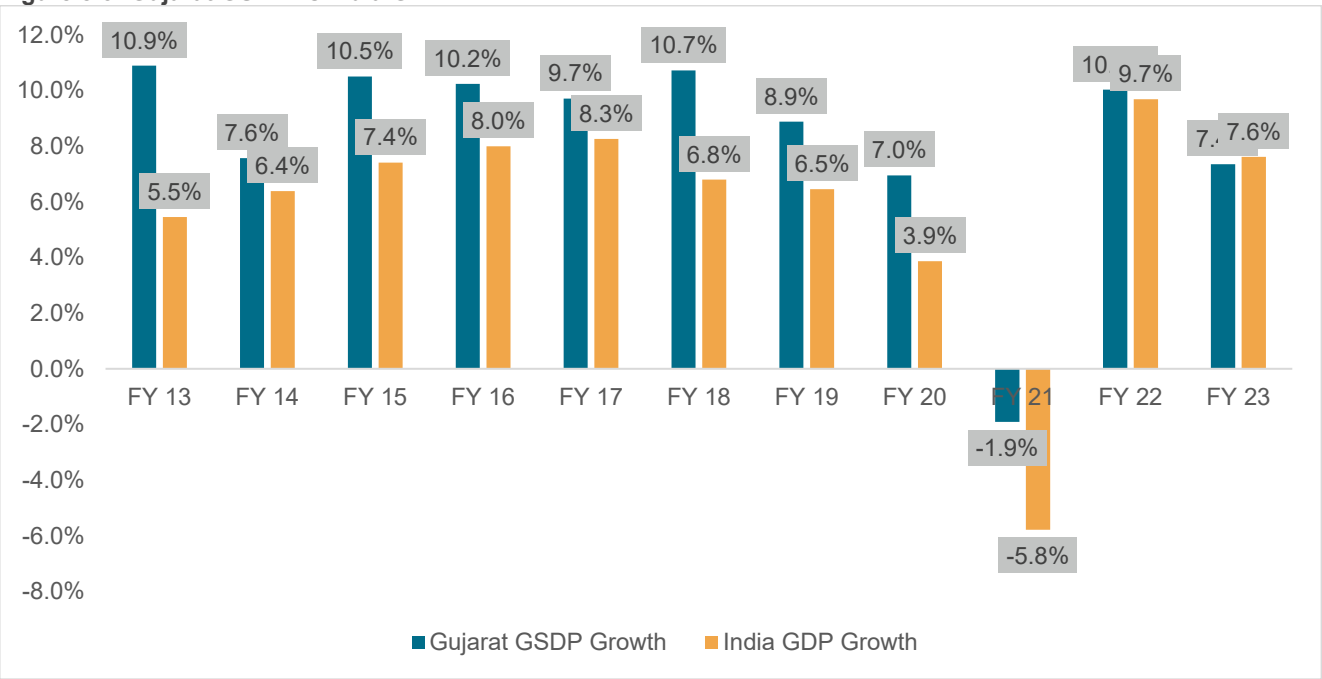
The state government has implemented a number of policies and initiatives to promote economic growth and development in Gujarat, including the development of special economic zones (SEZs), industrial estates, and infrastructure projects such as roads, ports, and airports. The state has also established a number of institutions and organizations to support entrepreneurship and innovation, including the Gujarat Industrial Development Corporation (GIDC) and the Gujarat Venture Finance Limited (GVFL). Overall, Gujarat's strong economy, favourable business environment, and high standard of living make it an attractive destination for investors, entrepreneurs, and tourists alike. The state's economic profile is characterized by a high level of economic activity, a diverse range of industries, and a strong focus on innovation and entrepreneurship.

Figure 8-2: Gujarat GSDP at constant price



Source: MOSPI, Crisil Intelligence

Figure 8-3: Gujarat GSDP vs India GDP



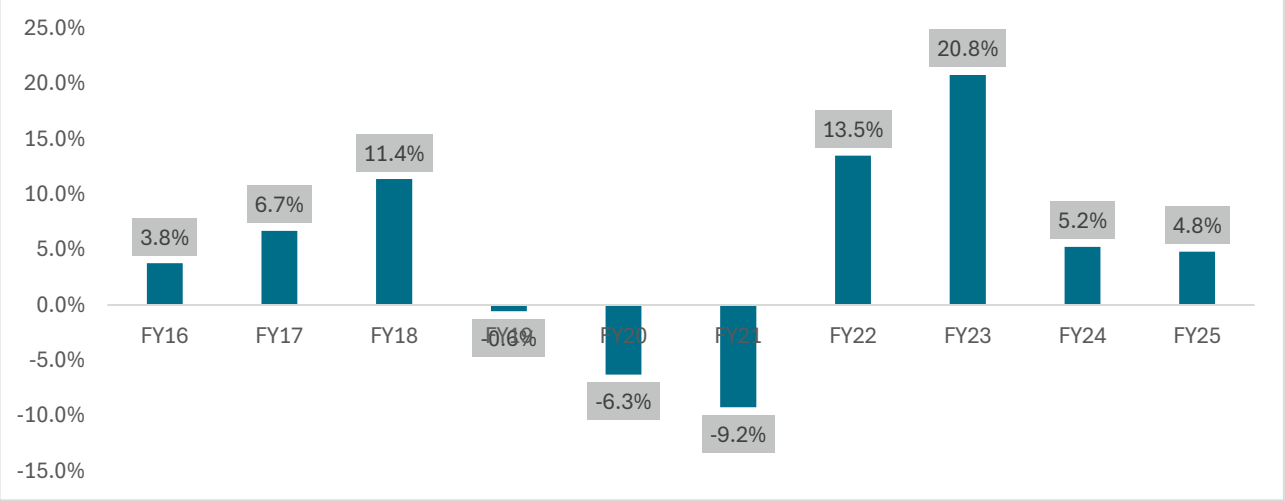
Source: MOSPI, Crisil Intelligence

8.3 Outlook for Car growth

The rate of car ownership in India has increased from 6.6 per 1,000 people in 2001 to 25 per 1,000 people in 2019. Despite India's car fleet growing at an annual rate of 10% for nearly 25 years, the rate of car ownership remains low compared to countries with similar economic status and significantly lower than developed countries, which have a rate of around 450 per 1,000 people. This low rate of car ownership indicates potential for continued growth in the coming years. With the ongoing increase in car ownership and improvements in the road network, the use of cars for inter-urban travel is showing a growing trend.

Vahan Dashboard by Ministry of Road Transport & Highways (MoRTH), shows good growth in motors cars for last decade has shown 4.7% registered vehicle growth. Motor cars data for Gujarat state from Vahan dashboard is compiled in the below chart.

Figure 8-4: Motor Car vehicle registration growth



Source: Vahan Dashboard, Ministry of Road Transport & Highways (MoRTH)

8.4 Commodity Overview

As mentioned in section primary data collection & analysis, the analysis of freight movement across the toll plaza reveals that the major commodities being transported include containers, tiles & ceramics, agri produce and consumer foods.

Containers

Container traffic holds major share around 26% in the overall traffic. Project road gives connectivity to two important seaports in the region which are Mundra Port and Kandla Port. Mundra Port, located in Gujarat, India, is the largest commercial port in the country and a critical hub for container traffic. It handles a significant volume of cargo, including containers, dry bulk, liquid bulk, and automobiles. The port's strategic location on the western coast of India allows it to serve the vast hinterland regions, including the National Capital Region, Gujarat, Punjab, Rajasthan, and Madhya Pradesh. Mundra Port operates five container terminals across 12 berths, with a combined capacity of 9.5 million TEUs (twenty-foot equivalent units). India's container traffic decadal growth (FY14-FY24) is around 7.7% and Mundra port's container traffic decadal growth (FY14-FY24) is around 12.0%.

As detailed out in the chapter of key influencing factors for the asset, the following future expansion planned in the region.

- Mundra port got the environmental clearance for the port expansion with investment of ₹45,000 crores to more than double the overall capacity to handle 514 MTPA and container cargo handling capacity of 25 million TEUs.
- DP World container terminal, DP World is constructing container terminal with capacity of 2.19 million TEUs at Tuna Tekra Port with investment of approximately ₹4,200 crores.

Considering above expansion plans of the ports in the regions, Crisil expects CAGR of 7.1% from fiscal FY 26-FY 34 for container traffic.

Agri Produce

Agri produce commodity is the second most carried commodity in the project road, and it accounts for 6.6% total traffic on the project stretch.

According to DGCIS data and Agricultural and Processed Food Products Export Development Authority (APEDA), India's basmati rice exports saw a significant boost in the FY 25, with a total of 60.65 lakh metric tonnes (LMT) exported, valued at Rs 50,312.01 crore (approximately $5.87 billion). This represents a 3.97% increase in value and a 15.7% rise in quantity compared to FY 25.

The country exported about 60.65 lakh metric tonnes (LMT) of basmati rice in 2024-25, about 8.23 LMT (15.7%) more than in FY 24. India exported basmati rice to 154 countries in FY 25, while in the FY 24, it had sold the commodity to 150 countries.

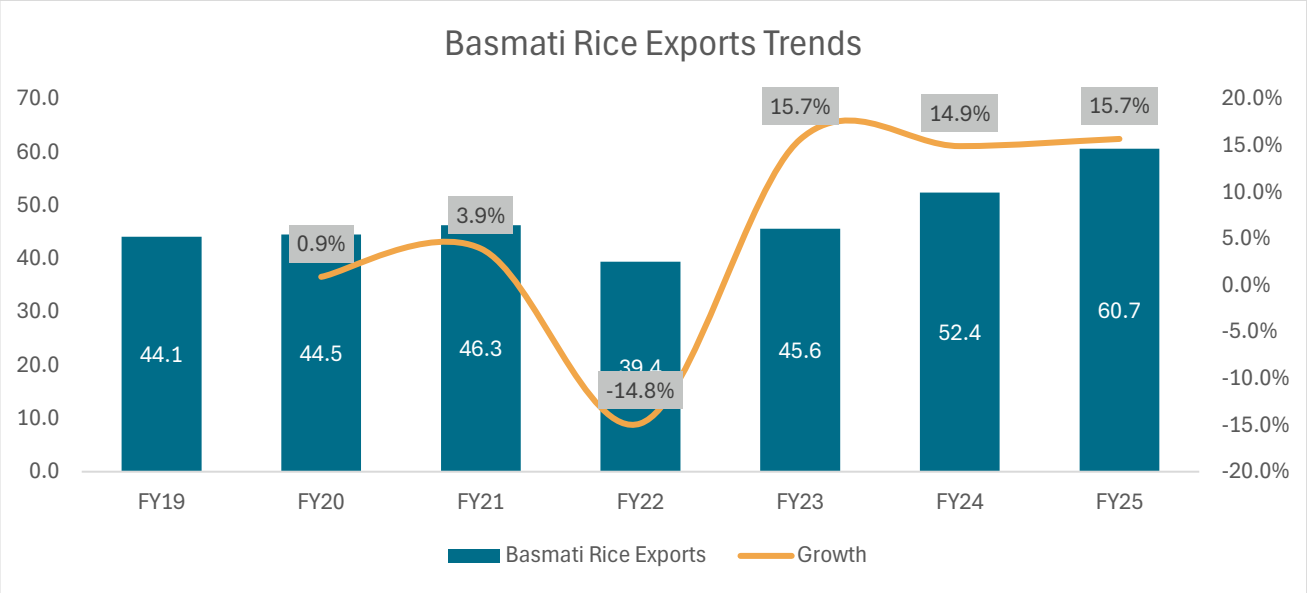
Saudi Arabia was the biggest importer of Indian basmati rice in quantity at about 11.73 LMT, followed by Iraq and Iran at 9.05 LMT and 8.55 LMT, respectively. The top export destinations for Indian Basmati rice include Iran, Saudi Arabia, Iraq, the United Arab Emirates, and Kuwait.

Basmati Rice is major contributor among agricultural produce. Basmati rice belt in India primarily spans the northern regions, particularly in the states of Punjab, Haryana, Himachal Pradesh, Uttarakhand, and parts of Uttar

Pradesh and Jammu & Kashmir. These areas are known for their ideal climatic conditions and fertile soil, which are perfect for cultivating high-quality Basmati rice. Rice gets exported from Mundra port.

India's foodgrain production is at a record high of 353.959 million tonnes in 2024-25, with rice and wheat production estimated to be 149.074 million tonnes and 117.507 million tonnes, respectively.

Figure 8-5: Basmati Rice Export Trends



Source: DGCIS, Crisil Intelligence

Outlook for agri produce

India’s agriculture sector is expected to grow by around 3% in FY 2026, with key support from robust monsoon and government interventions. Recent trends indicate steady rises in cereals, vegetables, fruit, milk, and other animal products output, with acceleration in area under vegetables and improvements in yield for several commodities

Tiles & Ceramics

The Morbi Ceramic Cluster, located in Gujarat, India, is one of the largest and most significant ceramic industry clusters in the world. It is situated about 250 km from Ahmedabad and is renowned for its extensive production of ceramic products. The cluster comprises over 600 units, producing a wide range of items including wall tiles, floor tiles, vitrified tiles, polished glazed vitrified tiles, and sanitary ware.

Morbi's ceramic industry is known for its advanced technology and high-quality products, with many units utilizing state-of-the-art equipment imported from around the globe.

The Morbi Ceramic Cluster provides direct employment to about 68,000 people and indirectly supports many more through related businesses and professions. The industry is a major contributor to the local economy, fostering growth and development in the region. The cluster's products are not only supplied domestically but also exported to various international markets, enhancing its global footprint.

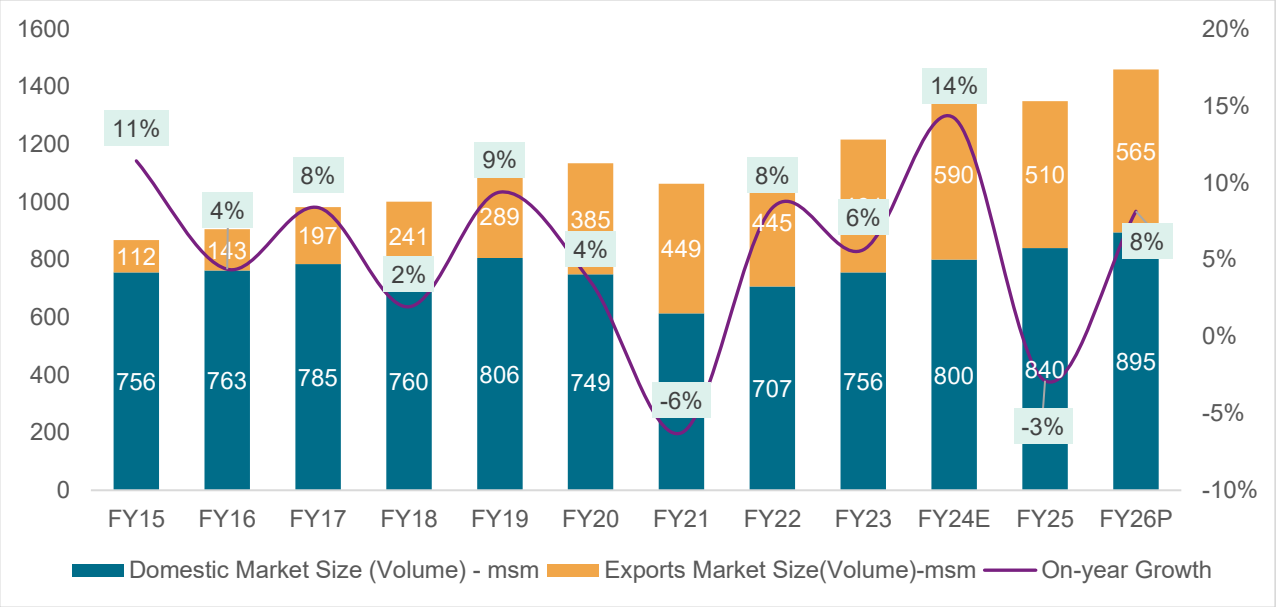
Overall, the Morbi Ceramic Cluster is a vital industrial hub that significantly contributes to India's ceramic production and export capabilities. Its continuous growth and adoption of new technologies ensure that it remains a key player in the global ceramic industry.

FY25 is estimated to have witnessed a decline of 10-13% in the exports volume compared to the previous year. The decline is majorly on account of high freight rates and subdued demand in European nations and the USA. Meanwhile, despite the European Union announcing anti-dumping duty on ceramic tiles from India in 2023, the same is lesser for ceramic tiles from India as compared to tiles from competitors like Turkey and China giving India an added advantage with regards to expansion in exports to European nations. This is majorly on the back of superior quality tiles being produced in India at comparatively affordable prices. Globally, ceramic tiles import from India are well preferred due to these factors.

Going forward as well, we expect growth momentum to continue owing to continued cost competitiveness of Indian manufacturers as well as major global importers wanting to reduce their dependence on sole supplier i.e. China.

Domestic demand remains moderate; however, oversupply in the industry is exerting significant pricing pressure. With issues in the export market in FY25, 10-13% of export volumes from Morbi have shifted to the domestic market. This diversion has resulted in dumping of excess inventory in the domestic market, leading to intense competition and additional stress on pricing. Crisil expects CAGR of 5.7% from fiscal FY 26-FY 34 for tiles & ceramics related traffic on the project road.

Figure 8-6: Ceramic industry volumes growth (domestic and exports)



Source: Crisil Intelligence, Directorate General of Foreign Trade (DGFT)

Coal

Coal is another major commodity, which is imported and travels on the road stretch. A huge portion of this commodity travels via railways, however a meaningful portion also travels via road as well. These are smaller packets of coal, travelling towards brick mills or some captive power plant in Rajasthan, Delhi, or North India. Some proportion of this traffic can shift on to DFC over long term. On the ports of Gujarat, Coal is majorly imported from the US, Indonesia, Australia and South Africa. Majority of the coal on the Kandla & Mundra port is consumed by power plants located closer to the port itself. A portion of coal which is transported via road is primarily for the end use in brick kilns, captive power plants and rolling mills. Coal traffic transported through the project stretch is typically for consumption in small volumes and travels towards the Ahmedabad and Morbi within Gujarat state and outside of project road state it travels to Rajasthan & northern hinterlands.

India's policy to reduce coal imports by boosting domestic production and promoting energy transition has caused recent overall coal imports to dip over the years in the future, However, ongoing power sector mandates to operate

imported coal plants at full capacity, especially during demand peaks, sustain import volumes at major ports and India expects domestic non-coking coal production to grow at healthy growth, on account of increased production by Coal India Ltd.

Non-coking coal imports are expected to decline as rise in domestic coal production will increasingly substitute the demand for imported coal. Coking coal imports to remain main source as demand sustains though stabilizes over the next five years. As the construction activity has started to revive, we have observed revival of output from brick mills, the rolling mills faced some issues in the form availability of raw material in the initial period but are expected to revive back in the last quarter. Some portion of demand for imported coal both in brick mills and captive power plants could be substituted by domestic coal. Non-coking coal imports are expected to decline as rise in domestic coal production will increasingly substitute demand for imported coal. Considering all these factors Crisil expects CAGR of 2.2% from fiscal FY 26-FY 34 for tiles & ceramics related traffic on the project road.

Petroleum products

Petroleum products are another major commodity, which travels on the project road stretch. Petroleum products both imports and exports through Kandla and Mundra ports are showing moderate growth, leveraged by expanding infrastructure and stable domestic demand, although global market volatility has led to some contraction in exports. Mundra port continues to be a major hub for crude oil and petroleum product imports, with its world-class infrastructure supporting VLCCs and large tankers.

Kandla (Deendayal Port) is slated for significant growth, with crude oil import capacity projected to rise in coming years, driven by refinery expansions and increased LPG imports. Overall imports of crude oil and related petroleum products are expected to grow in FY 2025-26, mainly due to expanding refining capacity and stable domestic consumption despite periodic dips in volume due to price effects. Kandla (Deendayal) Port is embarking on a large-scale oil jetty capacity expansion, with three new oil jetties being constructed and supporting liquid cargo infrastructure to boost overall throughput by 10 million tonnes per annum (MTPA) for petroleum and liquid bulk cargo.

Iron & Steel Products

Metals commodity on the stretch largely includes iron products, metal scrap and some proportion of steel products. Iron commodity on the stretch is primarily importing driven and steel pipe manufacturing in the region, which travels to the various parts of the country. These commodities are also used for the purpose of construction in the region. Scrap and pig iron are primary inputs for small steel manufacturers. Strong growth prospects and upcoming manufacturing capacities in the Kachchh will drive the growth of the commodity. Transport of raw material such as scrap and finished products from the production capacities located in the Kachchh region will lead to the incremental growth.

India was a net exporter of total finished steel from 2020-21 to 2022-23, but the country became net importer of finished steel in 2023-24 and 2024-25. Similar trend is observed on the project road iron & steel products traffic. Import and exports trends is presented in the below table.

Table 8-1: Exports & Imports rend of Total Finished Steel ('000 Tonnes)

Item	FY 21	FY 22	FY 23	FY 24	FY 25
Export	10784	13494	6716	7487	4858
Imports	4752	4669	6021	8320	9551
Net Exports/Imports	6031	8824	695	833	4693

Source: Joint Plant Committee, Crisil Intelligence

Despite a muted global environment, domestic demand has remained strong. Steel demand increased as a result of the infrastructure push, strong housing projects, and pent-up demand from auto sector. Considering all these factors Crisil expects CAGR of 5.1% from fiscal FY 26-FY 34 for Iron & Steel products related traffic.

8.5 Commodity Outlook

Crisil Intelligence has forecasted the freight traffic growth based on the growth in relevant sectors influencing traffic in the region. Industry growth has been analysed and forecasted based on our proprietary database of industries for the surrounding regions that impact traffic on project road as well as our internal assessment on a relevant set of sectors at the pan India level.

Package wise forecast incorporates the regional dynamics including, but not limited to, investments, commodity trends, district output (GDDP) profile (primary/secondary, construction/manufacturing) etc.

The traffic for the coming years is projected by factoring in the impact of these parameters on commodity wise growth rates and is presented in below table.

Table 8-2: Commodity outlook for the Project section

Commodity Type	Share	FY 26 - FY 30	FY30-34	FY26-34
Agri Produce	6.6%	2.6%	1.9%	2.1%
Automobiles	0.9%	5.2%	4.5%	4.8%
Chemical products	2.9%	6.1%	5.3%	5.6%
Coal	6.5%	2.6%	1.9%	2.2%
Construction materials	2.8%	6.1%	5.3%	5.6%
Consumer Foods	3.3%	4.2%	3.5%	3.8%
Consumer Products	1.6%	4.2%	3.5%	3.8%
Container	26.2%	7.6%	6.8%	7.1%
Courier & parcel	4.7%	7.0%	6.2%	6.5%
Iron & Steel Products	4.4%	5.5%	4.9%	5.1%
Machinery	1.0%	5.1%	4.4%	4.7%
Milk & Animal Food	0.4%	4.2%	3.5%	3.8%
Others	2.1%	4.2%	3.5%	3.8%
Paper products	0.9%	4.2%	3.5%	3.8%
Petroleum Products	5.0%	3.2%	2.9%	3.0%
Pharmaceuticals	0.0%	3.7%	3.1%	3.3%
Plastic products	3.4%	6.5%	5.7%	6.0%
Plywood & Timber products	2.3%	4.7%	4.0%	4.3%
Rubber products	0.6%	4.7%	4.0%	4.3%
Textile & Footwear	2.4%	3.2%	2.6%	2.8%
Tiles & Ceramic products	6.3%	6.1%	5.5%	5.7%

Source: Industry, Crisil Intelligence

8.6 Implied growth rate for the project section

Mode wise implied growth rates adopted for the project road is presented in the below table.

Table 8-3: Pre-Impact Traffic projections

Vehicle category	FY 26- FY 30	FY30-34	FY26-34
Car/Jeep/Van	5.6%	4.7%	5.1%
Minibus	2.8%	2.4%	2.6%
2 Axle Bus	2.8%	2.4%	2.6%
LCV	3.7%	3.0%	3.3%
2 Axle Truck	4.1%	3.6%	3.8%
3 Axle Truck	2.2%	1.6%	1.8%
MAV	5.6%	5.0%	5.2%
OSV	5.6%	5.0%	5.2%
Vehicles	**5.4%**	**4.7%**	**5.0%**
PCU	**5.4%**	**4.8%**	**5.0%**

Source: Crisil Intelligence

8.7 Traffic Projections

The total traffic projected in terms of PCUs based on most likely growth rates and after impacts is presented in below table.

Table 8-4: Pre-Impact Traffic projections

FY Year	Cars	Minibus	2 Axle Bus	LCV	Truck	3 Axle Truck	MAV	OSV	Total Veh.	Total PCU	YoY Growth (%)
FY-2026	10,573	50	759	548	992	817	17,721	42	31,503	99,110	
FY-2027	11,207	52	781	570	1,037	838	18,772	45	33,302	104,783	5.7%
FY-2028	11,853	53	804	592	1,081	858	19,859	48	35,147	110,628	5.6%
FY-2029	12,508	55	826	613	1,126	876	20,959	50	37,013	116,534	5.3%
FY-2030	13,172	56	848	634	1,168	891	22,046	53	38,869	122,375	5.0%
FY-2031	13,844	57	870	654	1,212	906	23,173	55	40,771	128,399	4.9%
FY-2032	14,521	59	891	675	1,256	921	24,345	58	42,725	134,639	4.9%
FY-2033	15,203	60	912	695	1,301	936	25,566	61	44,734	141,103	4.8%
FY-2034	15,888	62	932	716	1,347	950	26,837	64	46,796	147,797	4.7%
FY-2035	16,576	63	953	736	1,392	964	28,137	67	48,888	154,621	4.6%
CAGR (26-35)	**5.2%**	**2.6%**	**2.6%**	**3.4%**	**3.9%**	**1.9%**	**5.3%**	**5.3%**	**5.1%**	**5.1%**	

Source: Crisil Intelligence

Table 8-5: Post-Impact Traffic projections

FY Year	Cars	Minibus	2 Axle Bus	LCV	Truck	3 Axle Truck	MAV	OSV	Total Veh.	Total PCU	YoY Growth (%)
FY-2026	10,573	50	759	548	991	815	17,658	42	31,436	98,816	
FY-2027	11,207	52	781	570	1,035	836	18,719	45	33,246	104,534	5.8%
FY-2028	11,853	53	804	592	1,079	855	19,774	47	35,058	110,233	5.5%
FY-2029	12,508	55	826	613	1,123	873	20,840	50	36,888	115,979	5.2%
FY-2030	13,172	56	848	634	1,166	888	21,921	52	38,737	121,793	5.0%
FY-2031	13,844	57	870	654	1,209	902	23,041	55	40,632	127,787	4.9%
FY-2032	14,521	59	891	675	1,253	917	24,207	58	42,580	133,997	4.9%
FY-2033	15,203	60	912	695	1,298	932	25,421	61	44,582	140,429	4.8%
FY-2034	15,888	62	932	716	1,343	947	26,685	64	46,637	147,090	4.7%

FY Year	Cars	Minibus	2 Axle Bus	LCV	Truck	3 Axle Truck	MAV	OSV	Total Veh.	Total PCU	YoY Growth (%)
FY-2035	16,576	63	953	736	1,389	961	27,977	67	48,721	153,880	4.6%
CAGR (26-35)	**5.1%**	**2.6%**	**2.6%**	**3.3%**	**3.8%**	**1.8%**	**5.2%**	**5.2%**	**5.0%**	**5.0%**	

Source: Crisil Intelligence

Post impact traffic includes the impact of WDFC (Goods traffic is impacted). The concession agreement for the project specifies the design capacity to be 1,20,000 PCUs for a six-lane project highway. The CA also mentions that if the average daily traffic of PCUs in any accounting year shall exceed the design capacity of the project highway, the Authority at its option may cause preparation of Detailed Project Report (DPR). In context of this, the total projected traffic for the project road exceeds 1,20,000 PCUs in FY31 as per the projections based on the traffic growth rates.

8.8 Modification in concession period

As per the communications/letters (settlement agreement letter) of authority provided by client it shall be noted that the concession period is extended by 63 days in concession period, with the concession end date is 12th November 2034.

9 Revenue forecast

9.1 General

The project section is under “open tolling system” which enables the concessionaire to collect tolls from long distance as well as short distance traffic joining the project from adjoining highways.

9.2 User Fee Schedule

As per the revised toll gazette notification in July 2023 for the project road, National Highways Fee (Determination of Rates and Collection) Rules, 2008 is being followed for estimating the user fee.

The concessions of traffic have been provided under the categories/ toll tickets as presented in below table.

Table 9-1: Tolling Tickets

Ticket	Maximum number of one-way journeys allowed	Period of validity
Single/Normal	Single	-
Daily Pass	Two	24 hours
Monthly Pass	50	One month from the date of payment
Local Personal	Multiple	One month from the date of payment

9.3 Toll Segmentation

As mentioned in traffic assessment of the project stretch section, historical toll data of FY 25 is used in adopting the segmentation for the project road. The traffic tolling segmentation in (%) adopted for the present study for FY26 onwards is presented in below table.

Table 9-2: Toll segmentation in % - FY25

Vehicle category	Single journey	Return journey	Monthly Pass	Special Trip	Local Pass	Exemptions
Car/Jeep/Van	*36.9%*	*38.5%*	*0.0%*	*7.4%*	*1.5%*	*15.9%*
Minibus	*41.2%*	*52.2%*	*0.8%*	*0.0%*	*0.0%*	*5.8%*
2 Axle Bus	*9.5%*	*86.7%*	*0.0%*	*0.0%*	*0.0%*	*3.7%*
LCV	*41.2%*	*52.2%*	*0.8%*	*0.0%*	*0.0%*	*5.8%*
2 Axle Truck	*58.1%*	*40.6%*	*0.0%*	*0.0%*	*0.0%*	*1.3%*
3 Axle Truck	*55.5%*	*41.9%*	*0.0%*	*1.9%*	*0.0%*	*0.8%*
MAV	*55.5%*	*41.9%*	*0.0%*	*1.9%*	*0.0%*	*0.8%*
OSV	*88.3%*	*11.5%*	*0.0%*	*0.0%*	*0.0%*	*0.2%*

Source: Historical toll data, Crisil Intelligence

Note: Special concessions are allowed for cars with Toll Rate of ₹1 per trip.

Special concessions are allowed for MAV (Local Transporters) with Toll Rate of ₹100 for per trip

9.4 Trip Rates

The trip rates are adopted based on the FY 25 historic traffic data and trip rates for the present study for FY26 onwards is presented in below table.

Table 9-3: Toll segmentation in % - FY25

Vehicle category	Single journey	Return journey	Monthly Pass	Special Trip	Local Pass
Car/Jeep/Van	1.00	2.00	50.00	1.00	26.68
Minibus	1.00	2.00	50.00	1.00	
2 Axle Bus	1.00	2.00	50.00	1.00	
LCV	1.00	2.00	50.00	1.00	
2 Axle Truck	1.00	2.00	50.00	1.00	
3 Axle Truck	1.00	2.00	50.00	1.00	
MAV	1.00	2.00	50.00	1.00	
OSV	1.00	2.00	50.00	1.00	

Source: Historical toll data, Crisil Intelligence

9.4.1 Tolling lengths

The tollable lengths for the project section for plaza is presented in below table.

Table 9-4: Tolling Lengths

No.	Location of Toll Plaza (Existing chainage [km])	Length (kms) for which Fee is Payable
1.	Samakhiali toll plaza (km 308.60)	**56.160**

Source: Concession Agreement, Crisil Intelligence

9.4.2 Toll Rates Estimation

The toll rates (Rs/km) for the base year 2007-08 for different vehicle categories are as per fee rule/concession agreement mentioned above and are presented in the below table.

Table 9-5: Base Rate in Rs/km

Vehicle Type	Base rate of fee per km for the Base Year 2007-08 (in Rupees)
Car, Jeep, Van, or Light Motor Vehicle	0.65
Light Commercial Vehicle, Light Goods Vehicle or Minibus	1.05
Bus or Truck (Two Axles)	2.20
Three-axle commercial vehicles	3.45
Heavy Construction Machinery (HCM) or Earth Moving Equipment (EME) or Multi Axle Vehicle (MAV) (four to six axles)	3.45
Oversized Vehicles (seven or more axles)	4.20

Source: NHAI-Determination of Rates and Collection Rule 2008

As per Gazette notification dated 05.12.2008, under National Highways Fee (Determination of Rates and Collection) Rules 2008 [GSR 838 (E)], Toll rates at Samakhiali Toll Plaza applicable for current fiscal (FY26) is provided below:

Table 9-6: Toll Rates

Type of vehicle	Single Journey	Return Journey	Monthly Pass
Car/Jeep/Van	85	130	2,845
LCV	140	205	4,595
Bus/Truck	290	435	9,625
3 Axle Truck	455	680	15,090
MAV	455	680	15,090
OSV	550	825	18,370

Source: Crisil Intelligence

Note: Special concession is allowed for cars with Toll Rate of ₹1 per trip.

Special concessions are allowed for MAV (Local Transporters) with Toll Rate of ₹100 for per trip

9.4.3 Review and Outlook of Whole-Sale price index (WPI)

The projected toll rates are dependent on Wholesale Price Index (WPI) assumptions for 2024 to 2045. For WPI projection, Crisil Intelligence has relied on inputs from Client. Past and outlook WPI growth is presented in below table.

Table 9-7: WPI

Year	WPI	Expected Year-on-year growth
2025	478.6	
2026	492.9	3.0%
2027	513.9	4.3%
2028	535.7	4.3%
2029	558.5	4.3%
2030	581.9	4.2%
2031	606.4	4.2%
2032	631.8	4.2%
2033	658.1	4.2%
2034	685.4	4.2%

Source: Projected WPI (P): IHS: Markit (Client Data)

9.5 Revenue Estimates

The revenue projections for the project road are presented in the below table.

Table 9-8: Revenue in ₹ Millions for the Project Section

FY Year	Cars	Minibus	2 Axle Bus	LCV	Truck	3 Axle Truck	MAV	OSV	Total	YoY Growth (%)
FY-2026	218	2	60	22	93	118	2,556	8	3,078	
FY-2027	243	2	64	24	100	125	2,803	9	3,371	9.5%
FY-2028	270	2	69	26	110	134	3,096	10	3,717	10.3%
FY-2029	288	3	74	28	119	143	3,415	11	4,081	9.8%
FY-2030	317	3	79	31	130	151	3,741	12	4,464	9.4%
FY-2031	352	3	85	33	140	161	4,120	13	4,907	9.9%
FY-2032	385	3	91	36	152	172	4,529	15	5,382	9.7%
FY-2033	423	3	97	38	164	182	4,976	16	5,900	9.6%
FY-2034	459	4	104	41	178	193	5,451	18	6,448	9.3%
FY-2035	502	4	111	44	193	205	5,971	19	7,049	9.3%
CAGR (26-35)	**9.7%**	**7.1%**	**7.1%**	**7.9%**	**8.4%**	**6.3%**	**9.9%**	**9.9%**	**9.6%**	

Source: Crisil Intelligence

Table 9-9: Projected Revenue in ₹ Millions

FY Year	Revenue
FY-2026	3,078
FY-2027	3,371
FY-2028	3,717
FY-2029	4,081
FY-2030	4,464
FY-2031	4,907
FY-2032	5,382
FY-2033	5,900
FY-2034	6,448
FY-2035	7,049
CAGR (26-35)	**9.6%**

Source: Crisil Intelligence



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Traffic & Revenue Assessment of 6-Laning from Vadakkenchery (Km 236.135) to Thrissur (Km 264.490) section of NH-544 in Kerala state

Final Report

November 2025



by S&P Global

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Abbreviations

Abbreviation	Meaning
AADT	Annual Average Daily Traffic
ADT	Average Daily Traffic
CA	Concession Agreement
CAGR	Compound annual growth rate
CFS	Container Load
DPR	Detailed Project Report
EXIM	Export Import
FMCG	Fast-moving consumer goods
FY	Fiscal Year
GDP	Gross Domestic Product
GIDC	Gujarat Industrial Development Corporation
GSDP	Gross State Domestic Product
GSR	General Statutory Rules
GSRDC	Gujarat State Road Development Corporation
HME	Heavy Motor Vehicle
ICD	Inland Container Depots
IHMCL	Indian Highways Management Company Limited
IRC	Indian Road Congress
JNPT	Jawaharlal Nehru Port Trust/Authority
LCV	Light Commercial Vehicle
LMT	lakh metric tonnes
LPG	Liquefied petroleum gas
MAV	Multi Axle Vehicle
MMLP	Multi-Modal Logistics Parks
MMT	million metric tons
MTPA	million tonnes per annum
NH	National Highways
NHAI	National Highways Authority of India
OD	Origin-Destination
OSV	Over Sized Vehicle
PCU	Passenger Car Unit
SBM	Single Buoy Mooring
SCF	Seasonal Correction Factors
SH	State Highway
SPV	Special Purpose Vehicle
TMS	Toll Management Systems
TP	Toll Plaza
TVC	Traffic Volume Count

1 Executive Summary

1.1 Project Details

We understand that EAAA TransInfra Managers Limited is the Investment Manager, M/s EPIC Transnet Project Management Private Limited is the proposed Project Manager and M/s EPIC Transnet Infrastructure Private Limited is the sponsor of the Citius TransNet Investment Trust ("Trust" or "InvIT") and M/s Thrissur Expressway Limited ("TEL") is proposed to be part of the initial portfolio assets of the Trust. The Trust is registered with Securities and Exchange Board of India ("SEBI") as an infrastructure investment trust under the SEBI InVIT Regulations.

M/s EPIC Transnet Infrastructure Private Limited (hereinafter "the Client") as sponsor has appointed M/s CRISIL Limited (hereinafter referred as "Technical Consultant") to carry out Traffic and Revenue Due Diligence of operational asset of Six Laning of Vadakkencherry-Thrissur Road on DBFOT Toll Basis in the State of Kerala (herein after refer as "the Project") which is being operated by "M/s Thrissur Expressway Limited" (hereinafter refer as "the Concessionaire or Company or TEL").

1.2 Asset Overview

Project road, Vadakkenchery (Km 236.135) to Thrissur (Km 264.490) section of NH-544 in Kerala state is a 6-lane, 28.355 kms long stretch, on NH544 which serves as a vital link between Kerala and Tamil Nadu, forming an integral part of the Salem-Kochi Highway that connects major South Indian cities, including Salem, Erode, Coimbatore, Palakkad, Thrissur, and Kochi. Palakkad, Thrissur, Kochi, Coimbatore, Vadakkencherry, Banglore, Chennai and Salem. Project road also connects prominent tourism hub like Kochi, Munnar, Kodaikanal, and Ooty etc. The project stretches provide seamless connectivity to the important industrial and mining clusters of Palakkad, Thrissur and Coimbatore, etc. Project road acts as Eastern entrance to Kerala state from other regions of India. The project was awarded by the National Highway Authority of India with an original concession period of 20 years inclusive of construction period, with appointed date from September 2012.

The asset is a six-lane stretch of NH-544, a critical corridor connecting Salem in Tamil Nadu to Kochi in Kerala. This highway serves as a major arterial route linking Kerala with Tamil Nadu and the rest of India. A key feature of this asset is the 1.6 km Kuthiran Tunnel — Kerala's first twin-tube tunnel with three lanes in each direction — which passes through the Peechi-Vazhani Wildlife Sanctuary. The tunnel significantly enhances traffic flow and safety by bypassing a previously congested and accident-prone ghat section. The route traverses several key cities including Thrissur, Palakkad, Coimbatore, and Erode.



Figure 1-1: Project Road



Source: Open Street Map, Crisil Intelligence

1.3 Salient growth features and traffic generators

The Thrissur Expressway Limited (TEL) project along National Highway 544, spanning 28.355 kilometers from Vadakanchery (Km 236.135) to Thrissur (Km 264.490) is a critical transportation corridor serves as a vital link between Kerala and Tamil Nadu, forming an integral part of the Salem-Kochi Highway that connects major South Indian cities, including Salem, Erode, Coimbatore, Palakkad, Thrissur, and Kochi featuring a six-lane configuration. The project includes the Kuthiran Twin-Tube Tunnel, Kerala's first road tunnel, featuring two tubes of 944m and 955m respectively, designed as a six-lane facility.

The TEL project connects key transportation hubs and corridors, including NH 544 (Salem-Kochi Highway), the North-South Corridor, and providing direct interstate connectivity between Kerala's industrial centers and Tamil Nadu's manufacturing hubs. The project corridor is nearly 80 km from Cochin International Airport, connected via NH 544, and is also linked to Cochin Port, major railway stations at Thrissur and Palakkad, and integrates with Kerala State Road Transport Corporation (KSRTC) bus services.

The TEL project is situated near several major cities and towns, including Thrissur, Kerala's cultural capital and major commercial hub, known for its gold jewellery manufacturing. Palakkad, a strategic gateway to Kerala, serves as the second-largest industrial hub in the state, while Vadakanchery is an important intermediate town connecting the Palakkad and Thrissur regions. Chalakudy is notable for its proximity to Athirappilly waterfalls and industrial establishments.

Kerala has limited access points to neighbouring states due to its terrain. Major entry routes include NH-66 from

Mangalore (Karnataka) along the coast, NH-544 via this asset from the east, NH-85 from Madurai via Munnar, and NH-766 from Kollegal (Karnataka) through Mysuru to Kozhikode. Other routes, such as NH-183 through Kottayam and the southern corridor from Tirunelveli to Kochi, have difficult terrain and are unsuitable for heavy vehicles. This makes NH-544 crucial logistics and transport lifeline into Kerala. The asset serves as a critical connectivity link between Tamil Nadu and Kerala, facilitating seamless movement of goods across state borders. This corridor plays a major role in regional logistics, supporting trade and supply chains between the industrial hubs of Tamil Nadu and the consumption-driven markets of Kerala. Kerala has a 590 km long coastline and is home to 18 ports, including the major port at Kochi. Asset location is approximately 110.00 km from Kochi port, which is especially important for port-related traffic and commercial activity moving inland from the coast. Kochi port handled 37.75 million metric tonnes of cargo in the Financial Year 2025. Moreover, this asset does not have strong alternate route since alternative routes, such as NH-183 through Kottayam or the Southern Corridor from Tirunelveli to Kochi, are poor geometric condition and long detour due to hilly terrain.

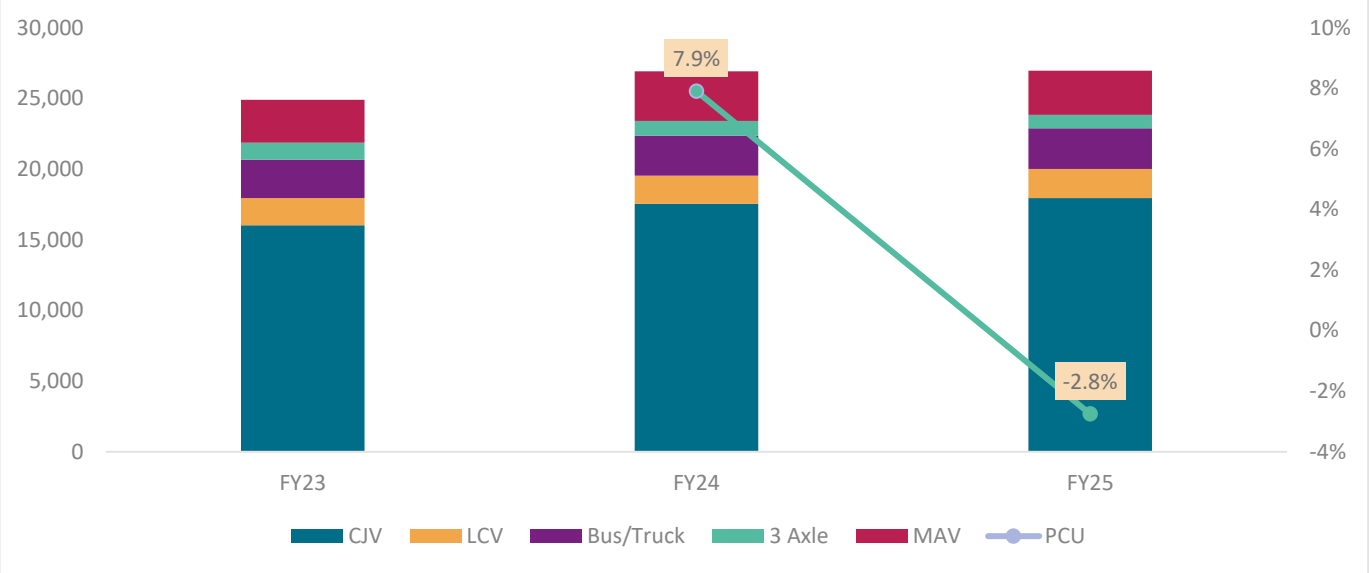
Panniyankara Toll Plaza is positioned at 239/030 km on the NH544 corridor. Palakkad has a diverse industrial base, with a mix of traditional and modern industries. The district is home to a significant textile industry, with a large number of textile mills producing cotton, silk, and synthetic fabrics. Palakkad is also a major producer of rice, coconut, and other agricultural products, with several food processing units. The district has a growing engineering sector, with manufacturing units for pumps, motors, and other machinery. Additionally, Palakkad has a thriving rubber industry, with several rubber processing units. The district's industrial landscape is also complemented by a growing IT sector, making it an attractive destination for investors and industries. Thrissur has a rich industrial heritage, with a diverse industrial base. The district is renowned for its gold and jewellery industry, with a large number of gold smiths and jewellery manufacturers. Thrissur is also a significant producer of textiles, agricultural products, and chemicals. The district has a growing automotive sector, with manufacturing units for vehicles and auto components. Additionally, Thrissur has a growing IT sector, making it an attractive destination for investors and industries seeking to leverage its strategic location and skilled workforce.

Nearly 17.35% of all commodity vehicle movements are agricultural produce, supported by Kerala’s consumption centres and agro-industrial enterprises. This plaza also features ~9.7% of construction materials and 8.6% of courier and parcels, which can be attributed to the flow of Cemenet, Soil and Sand. Panniyankkara also has higher share of empty vehicle movements (24.1%), underscoring its role as a return cargo hub for commercial vehicles after transferring cargo.

1.4 Historical traffic data

The chart below shows the average daily traffic on Vadakkenchery-Thrissur section of NH544 from April 2022 to Mar 2025.

Figure 1-2: Historic Annual Average Daily Traffic (AADT) – Panniyankara Toll Plaza



Source: Client Data, Crisil Intelligence
Note: MAV comprises MAV (vehicles with more than 3 axles up to 6 axles) and OSV (vehicles with more than 6 axles)

The project corridor plays a vital role in connecting several key locations in Kerala, including prominent tourist destinations such as Kochi, Cochin International Airport, Munnar, and the scenic beaches along the western coast, as well as the strategic Vizhinjam port. As a result, the project stretches experiences a significant influx of tourism-related traffic during peak travel months, specifically January, April, May, June, and December. Notably, the MAV traffic reached its highest point in May 2023, driven by a combination of factors, including an increase in mining min, a surge in tourism traffic, and a delayed onset of the monsoon season by approximately one week.

1.5 Base Traffic Estimates

For base traffic (annual average daily traffic) estimation of the present study, current fiscal 4-months (Apr-25 to July-25) of TMS traffic data were annualized using SCF factor of FY23 traffic data to arrive at the annual average daily traffic (AADT) for FY 26.

The AADT estimation for the base case for FY26 is presented table below

Table 1-1:2 Base Traffic Estimation - FY26 AADT

	CJV	LCV/MINIBUS	BUS	TRUCK 2 AXLE	TRUCK 3 AXLE	MAV+OSV	Total	PCU
AADT (FY25)	**17,946**	**2,065**	**1,358**	**1,528**	**939**	**3,129**	**26,965**	**46,600**
FY23(3-12 Month Factor)	1.02	1.01	1.01	1.01	0.90	1.07	0.85	
AADT FY26	**18,631**	**2,083**	**1,376**	**1,548**	**753**	**3,038**	**27,430**	**46,461**

Source: Client TMS Data, Crisil Intelligence

1.6 Toll Segmentation

The table below presents a segmentation which is considered for the traffic based on the historic data of April-July month of FY26 (4MFY26).

Table 1-3: Toll segmentation: Panniyankara

Vehicle	Single Journey	Return Journey	Monthlty Pass	Local Pass	Exempt	Total

Car/Jeep/Van	36.5%	54.1%	0.1%	0.7%	8.6%	100.0%
Minibus	31.6%	63.9%	4.4%	0.0%	0.1%	100.0%
2 Axle Bus	16.1%	66.9%	16.8%	0.0%	0.2%	100.0%
LCV	32.9%	64.4%	0.4%	0.0%	2.2%	100.0%
Truck	50.6%	48.3%	0.9%	0.0%	0.2%	100.0%
3 Axle Truck	49.3%	50.5%	0.0%	0.0%	0.1%	100.0%
MAV	50.3%	49.6%	0.0%	0.0%	0.1%	100.0%
OSV	71.0%	29.0%	0.0%	0.0%	0.0%	100.0%

Source: Crisil Intelligence

1.7 Traffic Projections

The tables below provide the traffic growth rates for the project road's toll asset:

Table 1-4: Projected Traffic Growth Rates: Panniyankara

Vehicle Type	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Car/Jeep/Van	6.5%	6.3%	6.2%	6.0%	5.9%	5.7%	5.4%	5.2%	4.9%	4.7%	4.4%
LCV/Minibus	3.6%	3.7%	3.4%	3.2%	3.2%	3.1%	3.0%	2.9%	2.8%	2.7%	2.6%
2 Axle Bus/truck	3.5%	3.5%	3.4%	3.2%	3.1%	3.1%	3.0%	2.9%	2.8%	2.7%	2.6%
3 Axle Truck	-0.7%	-0.3%	-0.5%	-0.7%	-0.8%	-0.9%	-1.0%	-1.1%	-1.2%	-1.4%	-1.5%
MAV	4.8%	5.3%	5.1%	4.8%	4.8%	4.7%	4.6%	4.5%	4.3%	4.2%	4.0%
OSV	4.8%	5.3%	5.1%	4.8%	4.8%	4.7%	4.6%	4.5%	4.3%	4.2%	4.0%
Total Veh.	**5.6%**	**5.6%**	**5.4%**	**5.3%**	**5.1%**	**5.0%**	**4.8%**	**4.6%**	**4.4%**	**4.2%**	**4.0%**
Total PCU	**4.9%**	**5.0%**	**4.9%**	**4.7%**	**4.6%**	**4.5%**	**4.4%**	**4.2%**	**4.1%**	**3.9%**	**3.7%**

Source: Crisil Intelligence

Table 1-5: Projected Traffic: Panniyankara

Financial Year	Car/Jeep/Van	LCV/Minibus	2 Axle Bus/truck	3 Axle Truck	MAV	OSV	Total Veh.	Total PCU
2026	18,631	2,083	2,924	753	3,036	2	27,430	46,461
2027	19,842	2,159	3,026	748	3,181	2	28,958	48,725
2028	21,100	2,238	3,133	746	3,351	2	30,570	51,183
2029	22,404	2,315	3,239	742	3,522	2	32,223	53,675
2030	23,753	2,390	3,343	737	3,692	2	33,917	56,202
2031	25,149	2,466	3,448	731	3,868	2	35,663	58,801
2032	26,589	2,542	3,554	724	4,049	2	37,460	61,467
2033	28,035	2,618	3,660	717	4,235	2	39,268	64,161
2034	29,485	2,695	3,767	709	4,425	3	41,083	66,878
2035	30,932	2,771	3,872	701	4,616	3	42,895	69,593
2036	32,375	2,845	3,977	691	4,809	3	44,700	72,301
2037	33,810	2,918	4,079	681	5,004	3	46,495	74,997
FY 26 - FY 37	**5.6%**	**3.1%**	**3.1%**	**-0.9%**	**4.6%**	**4.6%**	**4.9%**	**4.4%**

Source: Crisil Intelligence

1.8 Tollable Length and Toll Rates

In terms of tollable length for the project road is about 26.755 kms and 1.6 kms of tunnel section. In India, toll rates are as per notification by the Ministry of Road Transport and Highways in the National Gazette. The present toll

rates are determined with reference to the published base toll rates and are adjusted annually at the beginning of each fiscal year equal to 40% of the movement in the wholesale price index in December of the preceding year plus a fixed 3%.

As per Gazette notification dated 05.12.2008, under National Highways Fee (Determination of Rates and Collection) Rules 2008 [GSR 838 (E)], Toll rates at Panniyankara Toll Plaza applicable for current fiscal (FY26) is provided below:

Table 1-6: Toll Rates

Panniyankara (FY26)	Single Journey	Return Journey	Monthly Pass	Local Pass
Car/Jeep/Van	115	170	3,825	350
Minibus	180	265	5,925	0
2 Axle Bus	360	540	12,005	0
LCV	180	265	5,925	0
Truck	360	540	12,005	0
3 Axle Truck	550	825	18,305	0
MAV	550	825	18,305	0
OSV	710	1,060	23,590	0

Source: Client's data Crisil Intelligence

1.9 Revenue Projections

The revenue in ₹ million for the project road is projected to grow at a CAGR of about ~9 percent (8.7%) for the forecast period from FY26 to FY37 and is presented in the below table.

Table 1-7: Projected Revenue in ₹ million

Fiscal Year	Car/Jeep /Van	Minibus	2 Axle Bus	LCV	Truck	3 Axle Truck	MAV	OSV	Total	YOY
2026	599.3	17.5	121.3	93.0	198.9	132.0	533.5	0.4	1,696.0	**0.0%**
2027	671.2	18.8	130.3	99.7	214.0	135.8	579.3	0.5	1,849.4	**9.0%**
2028	740.2	20.5	141.1	109.3	231.7	141.9	639.5	0.5	2,024.7	**9.5%**
2029	820.9	21.8	152.8	116.2	251.1	147.6	702.4	0.6	2,213.3	**9.3%**
2030	909.8	23.7	164.2	125.9	268.9	152.5	766.7	0.6	2,412.4	**9.0%**
2031	1,004.9	25.6	177.4	136.1	290.3	158.3	840.4	0.7	2,633.6	**9.2%**
2032	1,127.3	27.7	191.8	147.1	313.3	164.6	922.8	0.7	2,895.2	**9.9%**
2033	1,231.8	29.7	207.1	157.6	338.3	170.0	1,006.9	0.8	3,142.2	**8.5%**
2034	1,364.0	32.1	222.3	170.3	362.1	176.2	1,102.6	0.9	3,430.4	**9.2%**
2035	1,482.2	34.6	239.5	183.4	389.5	181.7	1,200.9	0.9	3,712.8	**8.2%**
2036	1,631.1	37.4	258.2	197.3	418.7	187.6	1,309.6	1.0	4,040.9	**8.8%**
2037	1,771.4	40.0	277.0	210.5	447.3	193.0	1,422.8	1.1	4,363.2	**8.0%**
CAGR (26-37)	**10.4%**	**7.8%**	**7.8%**	**7.7%**	**7.6%**	**3.5%**	**9.3%**	**9.3%**	**9.0%**	**0.0%**

Source: Crisil Intelligence

2 Overview of project stretch

2.1. Project stretch

The Thrissur Expressway Limited (TEL) project, spanning 28.355 kilometers along National Highway 544 from Vadakanchery (Km 236.135) to Thrissur (Km 264.490), constitutes a vital transportation artery, facilitating seamless connectivity between Kerala and Tamil Nadu. As an integral component of the Salem-Kochi Highway, this six-lane corridor plays a pivotal role in linking major South Indian cities, including Salem, Erode, Coimbatore, Palakkad, Thrissur, and Kochi. A notable feature of the project is the Kuthiran Twin-Tube Tunnel, Kerala's inaugural road tunnel, comprising two tubes of 944m and 955m, respectively, designed to accommodate six lanes of traffic.

The TEL project boasts strategic connectivity to key transportation hubs and corridors, including NH 544 (Salem-Kochi Highway) and the North-South Corridor, thereby enabling direct interstate connectivity between Kerala's industrial centers and Tamil Nadu's manufacturing hubs. The project's proximity to Cochin International Airport, approximately 80 km away via NH 544, as well as its links to Cochin Port, major railway stations at Thrissur and Palakkad, and integration with Kerala State Road Transport Corporation (KSRTC) bus services, underscores its significance as a critical transportation node. The project's location near major cities and towns, including Thrissur, Palakkad, Vadakanchery, and Chalakudy, further enhances its importance, given the presence of thriving industrial hubs, commercial centers, and tourist attractions, such as the Athirappilly waterfalls, in the region.

In terms of tollable length for the project road is about 26.755 kms and 1.6 kms of tunnel section. On August 24, 2009, the NHAI and TEL entered into a concession agreement. TEL was engaged for the construction of a 6 lane project of the Vadakanchery-Thrissur section of NH-47 from km 240.00 to km 270.00 (approximately 28.35 km) in the state of Kerala on Design, Build, Finance, Operate and Transfer (DBFOT)basis, for a concession period of 20 years with the appointed date being September 15, 2012.

Table 2-1: Details of the road stretch

Project Section	Toll Plaza Location (Kms)	Toll plaza Name	Length (km)
Vadakanchery (Km 236.135) to Thrissur (Km 264.490) section of NH544 a total length of 28.355 (26.755 km road + 1.6 km tunnel) in the state of Kerala	239.030	Panniyankara Toll Plaza	28.355

Source: Crisil Intelligence

Figure 2-1: Project stretch alignment



Source: Open Street Map, Crisil Intelligence

Table 2-2: Key details of project stretch

Particulars	Details
Project SPV	Thrissur Expressway Private Limited
Authority	National Highway Authority of India
Concessioner	Thrissur Expressway Private Limited
Concession period	20 years
Project length (km)	28.355
Project type	Design, Build, Finance, Operate and transfer (DBFOT) – Toll)
Toll plaza	Panniyankara Toll Plaza
Date of concession agreement	24th August 2009
Appointed Date	Sep-12
COD	Mar-22
Concession end date	14-Sep-2036

Source: Concession Agreement, Fee Notification, Crisil Intelligence

2.2. Scope

The scope of the traffic assessment for the project road is divided into following four sections.

1. Detailed Assessment of the project road
   Include review of the Historic TMS Data, past traffic growth, detailed network assessment.

2. Primary Data collection & Analysis
   Conducting preliminary traffic surveys like TVC and Origin-Destination (O-D) to understand the traffic patterns, commodity profiles.
3. Network Impact Assessment
   To Analyse the upcoming network developments which may impact the project road traffic
4. Traffic and Revenue Projections
   Traffic & Revenue projections considering relevant growth drivers and network developments

Approach & Methodology is detailed out in Traffic Growth Estimation & Traffic forecast chapter.

2.3. Network Profile

The NH544 corridor is a critical transportation artery that spans 28.355 kilometres from Vadakanchery to Thrissur, forming an integral part of the Salem-Kochi Highway. This six-lane corridor serves as a vital link between Kerala and Tamil Nadu, connecting major South Indian cities, including Salem, Erode, Coimbatore, Palakkad, Thrissur, and Kochi. The corridor boasts strategic connectivity to key transportation hubs and corridors, including NH544 (Salem-Kochi Highway) and the North-South Corridor, enabling direct interstate connectivity between Kerala's industrial centres and Tamil Nadu's manufacturing hubs. The project's proximity to Cochin International Airport, approximately 80 km away via NH544, as well as its links to Cochin Port, major railway stations at Thrissur and Palakkad, and integration with Kerala State Road Transport Corporation (KSRTC) bus services, underscores its significance as a critical transportation node. The corridor's network profile is characterized by its multi-modal connectivity, with access to major industrial centres, ports, airports, and logistics hubs, making it a vital conduit for the movement of goods, services, and people in the region.

The corridor then approaches Thrissur, a pivotal traffic attractor for both population and freight, which connects Palakkad and other interior Kerala towns via project stretch. Within the urban area, key logistics infrastructure includes transport companies, and proximity to Cochin International Airport, supporting both passenger and cargo movement. Thrissur's industrial hub features gold and jewellery manufacturing, textile industry, tile industry, Ayurvedic and pharmaceutical units, and an expanding IT sector. The corridor is also notable for its residential and worker-population nodes along Thrissur, Palakkad, and smaller towns like Vadakkenchery and Chalakudy. Tourism, an emerging factor, is catered to by project road to coastal attractions such as Athirappilly waterfalls, Munnar, Kochi Fort, Kerala beaches, and other tourist destinations in the region.

The project's proximity to Cochin International Airport, approximately 85-95 km away via NH544, as well as its links to Cochin Port, major railway stations at Thrissur and Palakkad, and integration with Kerala State Road Transport Corporation (KSRTC) bus services, underscores its significance as a critical transportation node. The corridor's network profile is characterized by its multi-modal connectivity, with access to major industrial centres, ports, airports, and logistics hubs, making it a vital conduit for the movement of goods, services, and people in the region.

Figure 2-2: Regional Connectivity



Source: Open Street Map, Crisil Intelligence

Neighbourhood project roads/assets have shown dissimilar traffic growth in the recent years

Indian Highways Management Company Limited (IHMCL) publishes toll plazas traffic data for the plazas on national highways and data is analysed for neighboring plazas to understand traffic growth patterns in the region, nearby plazas have shown good traffic growth in recent years. FY 25 traffic PCU and CAGR PCU growth for FY23-FY25 is presented in the below figure.

Pampampallam Toll Plaza has approximately ~2500 vehicles and ~5500 PCUs lesser than Panniyankara TP and Panniyankara TP is situated near Vadakkenchery connecying mining/quarrying areas of Palakkad to rest of Kerala. Project stretch is key connecting road for trips within Kerala. Palakkad is also a major town that houses educational institutions, government offices, crusher units, iron & steel industries and marketplaces, etc. Pampampallam is situated near Kerala-Tamil Nadu border, and it connects northern part of Palakkad and Malappuram district via 2 lane NH966 Pampampallam toll plaza largely caters to traffic entering Kerala from Tamil Nadu and vice-versa.

Paliyekkara TP provides connectivity to populated regions of Thrissur. It also caters the traffic coming from northern parts of Kerala with NH544. Paliyekkara TP caters nearly ~63,000 PCUs daily, out of which nearly ~30,000 comprised by CJV category only. On a daily basis, Paliyekkara TP observes nearly ~5500 trucks (2A, 3A and MAV) which is nearly similar to Panniyankara TP. Strategically located Paliyekkara TP acts as key connector between traffic plying between South of Kerala to/from zones located in North and East of Kerala and beyond.

A notable decline in average daily traffic has been observed at the Kumbalam Toll Plaza, primarily attributed to

several factors. The traffic congestion on NH66, coupled with ongoing construction activities and the poor condition of the road, has significantly impacted traffic mobility. Furthermore, the recent surge in toll rates has also contributed to the decrease in traffic volume. Additionally, the availability of an alternative route, namely the Main Eastern Highway, has proven to be a more attractive option for commuters, offering a shorter distance of approximately 10 kilometers, a reduced travel time of 45 minutes, and relatively lower toll costs. This combination of factors has resulted in a substantial shift in traffic patterns, with many commuters opting for the alternative route, thereby contributing to the observed decline in average daily traffic at the Kumbalam Toll Plaza.

Figure 2-3: Neighbourhood plazas traffic & growth



Source: Open Street Map, Crisil Intelligence, IHMCL Data

Project stretch acts as key connecting hub for Quarries, Crushers, Irorn & Steel industries along with other medium and small-scale enterprises

The Thrissur Expressway Limited project road serves as a vital industrial and logistics corridor, connecting the manufacturing and mining clusters of few major districts in southern India, including Palakkad, Thrissur, Coimbatore, Salem, Ernakulam, Bangalore, Kollam, and Tiruchirapalli. The mining landscape in the region is dominated by large granite quarrying belts, with Thrissur, Palakkad, and Salem contributing significant output, which fuels the construction sector regionally.

Kerala State is endowed with a number of occurrences/deposits of minerals such as heavy mineral sands (ilmenite, rutile, zircon, monazite, sillimanite), gold, iron ore, bauxite, graphite, China clay (Kaolin), fire clay, tile, brick clay, silica sand, lignite, limestone, limeshell, dimension stone (granite), gemstones, magnesite, steatite etc. Mining activities on large scale are confined mainly to a few minerals-Heavy Mineral Sands, China Clay and to a lesser

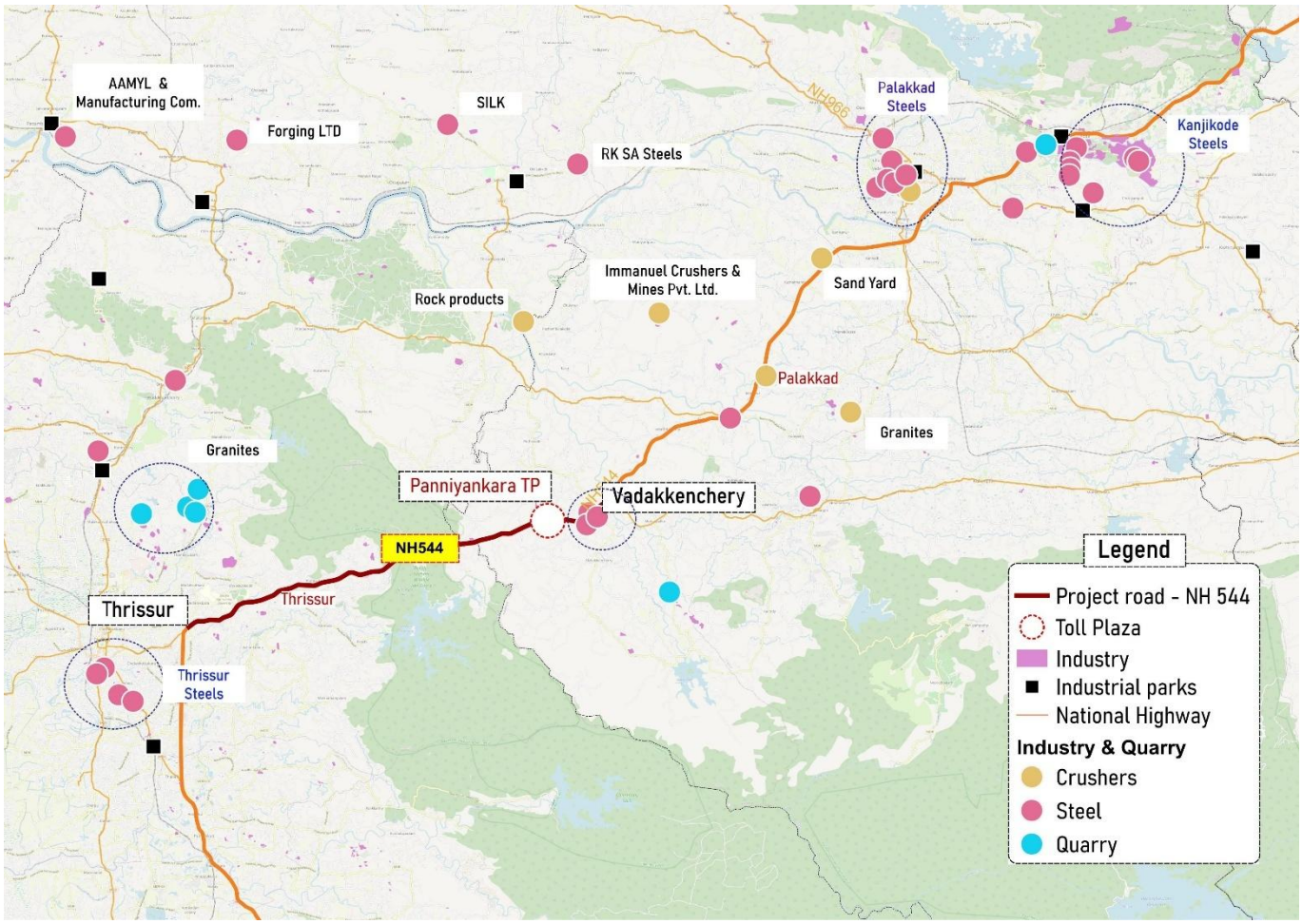
extent limestone/limeshell, silica sand and granite. Heavy mineral sand and China clay contribute more than 90% of the total value of mineral production in the State. Stones from quarries and mineral sand have various usage, like construction activities, cement industry, glass industry, manufacturing of Titanium Dioxide, and ceramic industry, etc. Palakkad district is the major contributor of construction material traffic at project stretch.

In Kerala, the Palakkad corridor is anchored by Kanjikode, one of the state's largest industrial areas, which is home to prominent facilities such as BEML, Malabar Cements, and United Breweries, as well as clusters for steel processing, cotton spinning, and agricultural implements.

Thrissur, a major manufacturing hub, boasts a diverse range of industries, including gold jewellery, ayurvedic pharmaceuticals, textiles, tiles, and tile machinery, supported by significant SIDCO and KINFRA estates.

Few key industries of the catchment area are shown in the map below.

Figure 2-4: Industries & industrial clusters along project road



Source: Open Street Map, Crisil Intelligence

2.4. Overview of Key Influence Area

The project road entirely falls in the state of Kerala and connects Tamil Nadu and rest of India with Kerala state. A brief description of key influencing district around the project section is presented below.

2.4.1 Palakkad District Profile

Palakkad district serves as a vital economic and cultural conduit between Kerala and Tamil Nadu, earning its

reputation as the "Gateway to Kerala" and spanning 4,482 square kilometres, with a significant share of its area under forest cover, the district is home to a population of ~2.81 million residents, as per the 2011 Census, distributed across six taluks, 13 blocks, and 157 villages. The Pudussery-Kanjikode industrial belt is a major hub for industrial activity, hosting prominent establishments such as BEML, Premier Breweries, and Instrumentation Limited, among others. Additionally, the KINFRA Industrial and Textile Park and the Mega Food Park provide comprehensive manufacturing support, while the proposed 2,000-acre industrial corridor under the Salem-Kochi development initiative promises significant economic expansion.

Palakkad's tourism sector is characterized by iconic destinations such as the Silent Valley National Park, a UNESCO World Heritage site, the Malampuzha Dam and Gardens, known as the "Vrindavan of Kerala", the historic Palakkad Fort, and scenic locations like Nelliyampathy hills and Attappady tribal settlements. The district's institutions such as the new IIT Palakkad campus and Government Medical College enhance its human resource development capacity, ensuring Palakkad's emergence as a hub for economic growth, cultural heritage, and educational excellence.

Figure 2-5: Industrial areas in Palakkad district



Source: Open Street Map, Crisil Intelligence

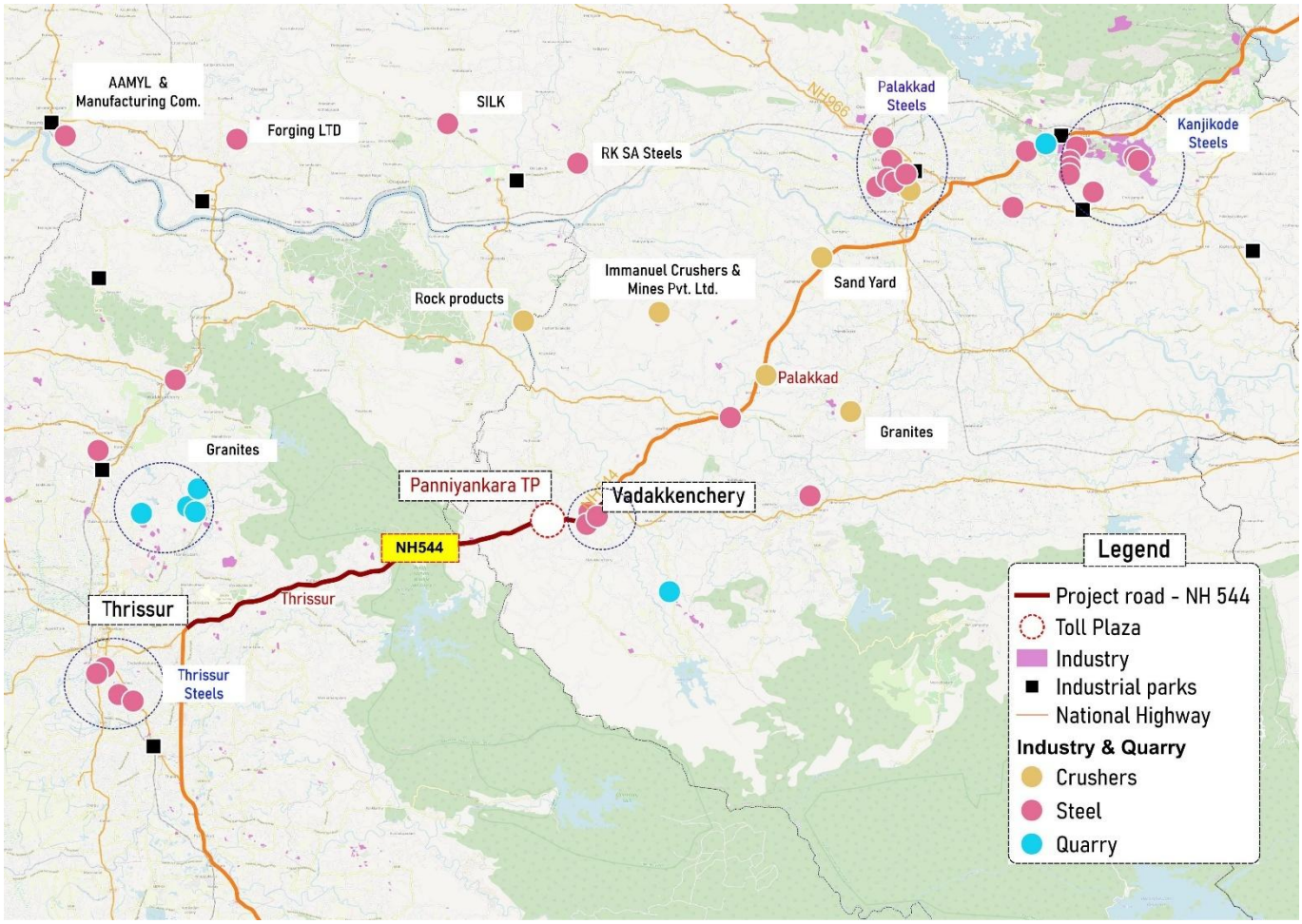
2.4.2 Thrissur District Profile

Thrissur district, aptly recognized as the "Cultural Capital of Kerala", is a pivotal economic and commercial hub situated in central Kerala, spanning 3,032 square kilometres. With a population of 3.11 million, as per the 2011 Census. Thrissur is renowned for manufacturing 70% of Kerala's plain gold jewellery with a significant contribution of ~10% to Kerala's state GDP. The district's strategic location, bordered by major districts and the Arabian Sea,

establishes it as a critical transportation and commercial corridor connecting northern and southern Kerala. Thrissur's economy is characterized by remarkable diversification across various sectors, including gold jewellery manufacturing, banking and finance, retail, textiles, tiles, timber, and tourism. Key industrial establishments, including Apollo Tyres, Kerala Lakshmi Mills, and Steel & Industries Forgings Limited. The tourism sector is driven by globally renowned attractions, such as the Guruvayur Temple, Thrissur Pooram festival, Athirapally Waterfalls, and Vadakkunnathan Temple, supported by excellent transportation connectivity through major railway stations and comprehensive road networks.

Educational institutions, including the Government Medical College, Kerala Agricultural University, and multiple engineering colleges, enhance the district's human capital development. Industrial parks operated by SIDCO, KINFRA facilities, and the emerging IT sector through Infopark Thrissur provide comprehensive manufacturing support, while the robust retail sector, featuring major jewellery groups and textile businesses, establishes Thrissur as a premier commercial destination in South India. With its rich cultural heritage, diversified economy, and excellent infrastructure, Thrissur district is poised for continued growth and development, solidifying its position as a leading economic and commercial hub in Kerala.

Figure 2-6: Industrial areas in Thrissur district



Source: Open Street Map, Crisil Intelligence

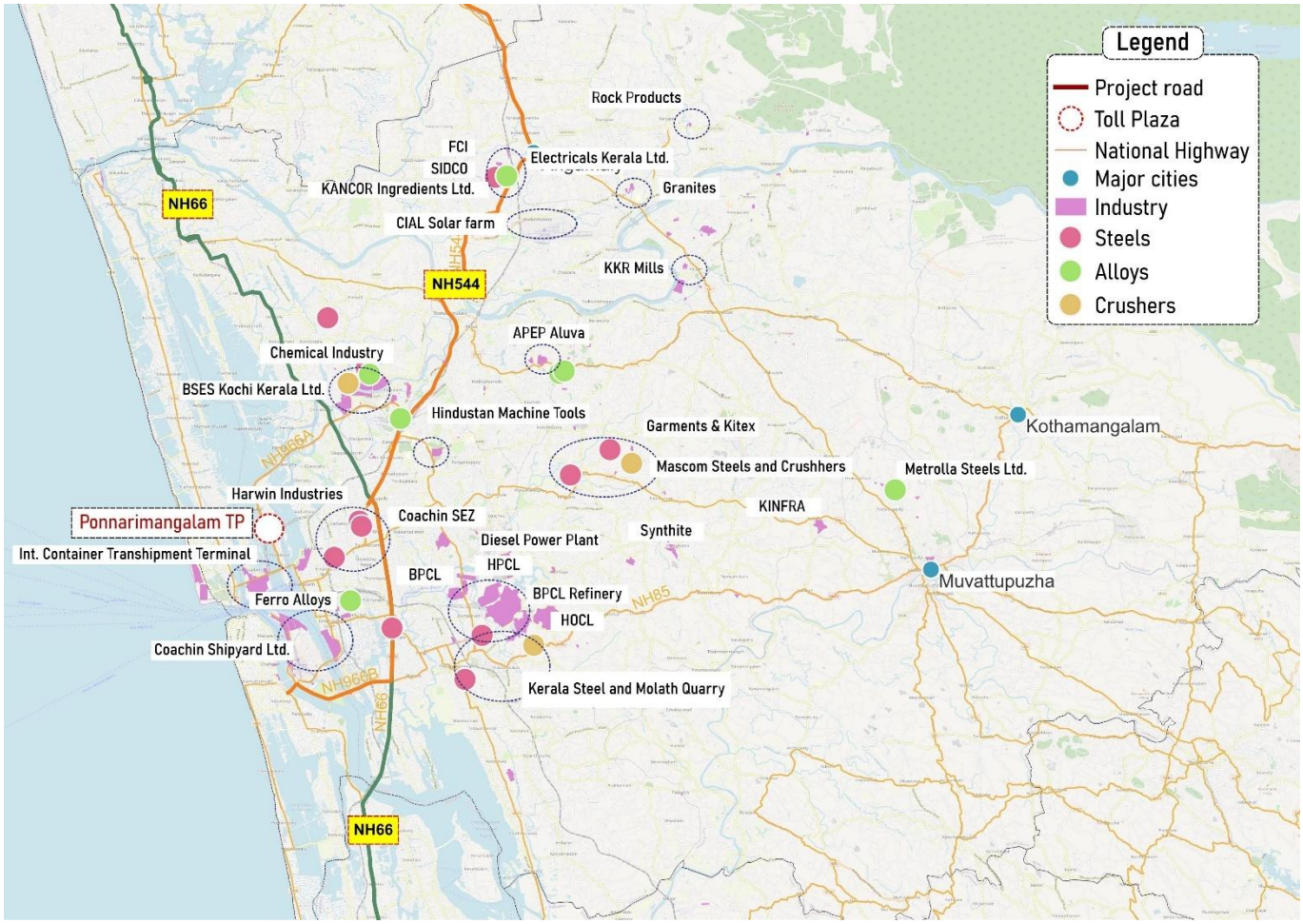
2.4.3 Ernakulam District Profile

Ernakulam district, widely regarded as Kerala's "Commercial Capital" and "IT Hub", is the state's most economically advanced region, covering an area of 2,408 square kilometres with a population of 32.82 lakh, of which 50.7% are

female, and boasting an exceptional literacy rate of 95.9%. The district's unique geographical advantage, which includes a seaport, international airport, and comprehensive rail networks, creates an unparalleled multimodal transportation hub that facilitates both domestic and international connectivity. The district's administrative structure, comprising two revenue divisions, seven taluks, 117 villages, 14 blocks, and 84 gram panchayats, in addition to the Kochi Corporation and 11 municipalities, demonstrates exceptional urban planning and governance infrastructure. The district is home to a thriving industrial sector, with over 21,000 registered MSME units, alongside ~89 medium-scale enterprises and numerous large-scale public and private sector establishments.

Major industrial complexes, such as the Kakkanad IT Park (InfoTech Park), Kalamassery Development Area, and Edayar Development Area, support diverse sectors ranging from petrochemicals to precision engineering. Key manufacturing establishments, including FACT (Fertilizers and Chemicals Travancore), Cochin Refinery, Cochin Shipyard, HMT Kalamassery, Apollo Tyres, and Hindustan Organic Chemicals, contribute to the district's economic growth. The transportation infrastructure is characterized by the Cochin International Airport, the world's first fully solar-powered airport, the Kochi Metro, and the Kochi Water Metro, the world's largest electric boat transportation system, in addition to major railway stations and comprehensive road networks, including NH-544 and NH-66. The district's tourism assets, including Fort Kochi's colonial architecture, the Jewish Synagogue, Chinese Fishing Nets, Marine Drive, Mattancherry Palace, and extensive backwater networks, are supported by integrated transport systems via jetties, water metro and comprehensive urban mobility solutions. Ernakulam's commitment to sustainable transportation has earned Kochi the "Most Sustainable Transport System" award in 2021, further solidifying its position as a premier commercial and tourist destination in Kerala.

Figure 2-7: Industrial areas in Ernakulam district



Source: Open Street Map, Crisil Intelligence

3 Primary Data Collection & Analysis

3.1. General

Primary traffic surveys, i.e. Traffic volume count and Origin Destination surveys were collected on the project road to understand the traffic and travel pattern of vehicles plying on the project road.

For the present study, seven days video-based traffic volume count and two days (48-Hours) origin destination survey conducted at the toll plaza location on the project road. The schedule of the traffic surveys carried out as part of the study on the project road are presented in the below table and figure.

Table 3-1: Type of Survey & Schedule

Location	Type of Survey	Survey Duration	Survey Date
Panniyankara Toll Plaza	Traffic Volume Count (TVC) Survey	7 Days	07th Apr 2025 to 13st Apr 2025
	Origin-Destination (O-D) Survey	2 Days	07th Apr 2025 to 8th Apr 2025

Source: Crisil Intelligence

Figure 3-1: Survey Locations

Source: Open Street Map, Crisil Intelligence

3.2. Traffic Characteristics

The seven days traffic volume count was analysed to get existing traffic intensity, daily variations, and traffic composition.

The vehicle classification and there PCU values as suggested in IRC: 64-1990 are presented in below table.

Table 3-2: PCU Factors-IRC:64-1990

Mode	PCU
Car/Jeep	1.0
Two-Wheeler	0.5
Three-Wheeler	1.0
Minibus/School Bus	1.5
Bus (Govt/Pvt)	3.0
Mini LCV	1.0
LCV	1.5
2-Axle	3.0
3-Axle	3.0
MAV (4-6 Axles)	4.5
HME/OSV	4.5
Agricultural Tractor	1.5
Agricultural Tractor with Trailer	4.5
Cycle	0.5
Cycle Rickshaw	2.0
Animal Drawn Crat	6.0

Source: IRC:64-1990

The average daily tollable traffic volume at the toll plaza locations were analysed. The summary of ADT in terms of vehicles and PCUs is presented in table below.

Table 3-3: Average Daily Traffic (ADT) for the Panniyankara TP

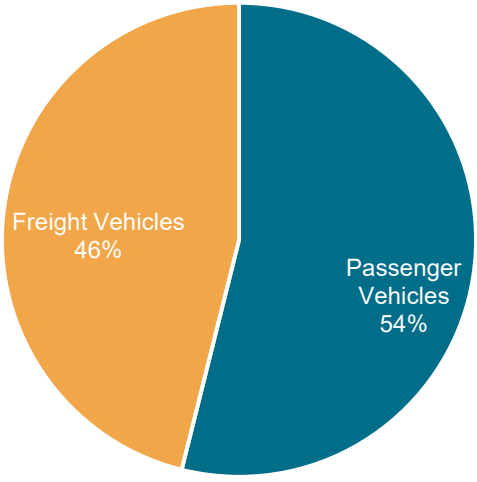
	Palakkad to Thrissur	Thrissur to Palakkad	Both Direction	Traffic % Share	PCU % Share
Car	8,339	7,889	16,227	55.1%	32.7%
Mini Bus	315	274	590	2.0%	1.8%
Bus	711	695	1,406	4.8%	8.5%
Mini LCV	1,323	1,313	2,636	8.9%	5.3%
LCV	1,663	1,498	3,161	10.7%	9.6%
Truck-2 Axle	785	797	1,581	5.4%	9.6%
Truck-3Axle	415	395	810	2.7%	4.9%
MAV	1,522	1,522	3,044	10.3%	27.6%
OSV	4	7	12	0.0%	0.1%
ADT	15,077	14,390	29,467	100.0%	-
PCU	25,228	24,404	49,632	-	100.0%

Source: Crisil Intelligence

Panniyankara TP clocks 49,632 PCU on an average daily basis. CJV and Mini LCV category together contributes to nearly 64% among total traffic plying at project stretch. However, in PCU terms the contribution of CJV is 33%. MAV is the 2nd largest category that contributes to the traffic at project stretch. MAV has 10% and 28% share contribution in total traffic and total PCU respectively. Higher share of CJV signifies heavy passenger traffic on Panniyankara TP.

Share of Passenger and freight vehicle is shown below.

Figure 3-2: PCU share: Panniyankara



Source: Survey Data, Crisil Intelligence

Panniyankara Toll Plaza TVC: The daily traffic volume at Panniyankara Plaza based on the TVC survey for the seven-day period from Monday, April 07, 2025, to Sunday, April 13, 2025, shows that:

- Passenger vehicles constitute 69% of the tollable traffic and Goods vehicles (LCVs, Trucks, 3A vehicles, and OSVs) constitute 31% of the tollable traffic in vehicle terms.

- Cars are having the highest share with around 64%, followed by MAVs with 10% share.
- Average Daily traffic is about 29,467 and 49,632 in traffic vehicles and PCU terms respectively.

TVC survey data for the seven-day period is presented in the below table.

Table 3-4: Daily traffic volume at Panniyankara Plaza based on TVC survey

TVC	Car	LCV	Bus	Truck	3A	MAV	OSV	Total	PCU	LCV+Truck
Monday, April 7, 2025	16,444	3,379	1,417	1,401	804	2,795	21	26,261	45,051	4,780
Tuesday, April 8, 2025	15,619	3,424	1,266	1,689	929	3,326	15	26,268	47,442	5,113
Wednesday, April 9, 2025	15,746	3,678	1,273	1,675	815	3,455	15	26,657	48,167	5,353
Thursday, April 10, 2025	19,199	3,810	1,414	1,744	839	3,336	8	30,350	51,953	5,554
Friday, April 11, 2025	18,590	4,721	1,423	1,671	836	3,088	11	30,340	51,407	6,392
Saturday, April 12, 2025	24,658	4,298	1,507	1,738	876	3,161	8	36,246	57,729	6,036
Sunday, April 13, 2025	21,790	2,941	1,539	1,152	570	2,149	5	30,146	45,678	4,093
WADT	18,864	3,750	1,406	1,581	810	3,044	12	29,467	49,632	5,332
%Share-Nos	64.0%	12.7%	4.8%	5.4%	2.7%	10.3%	0.0%	100.0%	-	18.1%
%Share-PCU	38.0%	11.3%	8.5%	9.6%	4.9%	27.6%	0.1%	-	100.0%	20.9%

Source: Survey Data, Crisil Intelligence

3.3. TVC vs. TMS data

Toll Management system (TMS) data was provided for survey days, and comparison is made with TVC (survey data). Overall variations of traffic are observed to be about -0.7% which is within tolerable limits. Table below shows the plaza wise daily variation trend comparison.

Table 3-5: TVC vs TMS Comparison

TVC vs. TMS	CJV+LCV	Bus+2A	3A+MAV+OSV	Total
07.04.2025	-0.2%	-3.9%	0.0%	-0.6%
08.04.2025	0.1%	-4.5%	-1.9%	-0.8%
09.04.2025	0.0%	-7.7%	0.6%	-0.8%
10.04.2025	-0.3%	-5.2%	-0.3%	-0.9%
11.04.2025	1.3%	-8.5%	-1.4%	-0.2%
12.04.2025	-0.7%	-3.2%	-0.7%	-0.9%
13.04.2025	-0.5%	0.3%	-1.2%	-0.5%
WADT	-0.1%	-4.8%	-0.7%	-0.7%

Source: TMS Data, TVC Data, Crisil Intelligence

3.4. Origin-Destination (OD) and Commodity Analysis

3.4.1 Overview

Origin-Destination survey was carried out at Panniyankara toll plaza for 2 Days (48-hours), by roadside interview method as described in IRC: 102-1988. A random sampling approach was employed to interview both passenger and freight vehicles traversing the project road at the toll plaza locations. The survey aimed to gather information on various aspects, including origin, destination, frequency of trips, purpose of travel and for freight vehicles, the type of commodity being transported.

The regional distribution of tollable vehicles at the toll plaza locations has been estimated based on OD matrices is presented in below table and figure.

The project influencing states will provide an overview of the factors likely to influence the pattern of economic development and hence the flows and volumes of traffic on the project road.

3.4.2 Regional Influence

The regional distribution of tollable vehicles at the toll plaza locations has been estimated based on OD. The project influencing states will provide an overview of the factors likely to influence, the pattern of economic development and hence the flows and volumes of traffic on the project road.

Regional Influence: Passenger Traffic

Kerala has the highest influence of passenger vehicle 84.6%**.** Other regions like Tamil Nadu, Karnataka, Pudducherry, and Andhra Pradesh are also included in the list of contributors.

- Kochi and Munnar are one of the top tourism destinations of Kerala and hence attracts heavy tourism footfall.
- Project corridor is also a critical link providing movement between economic centres of Thrissur and Palakkad. Hence, workforce of all industrial as well as residential zones along project catchment is using project road itself.

Regional Influence for passenger traffic is given in the below table.

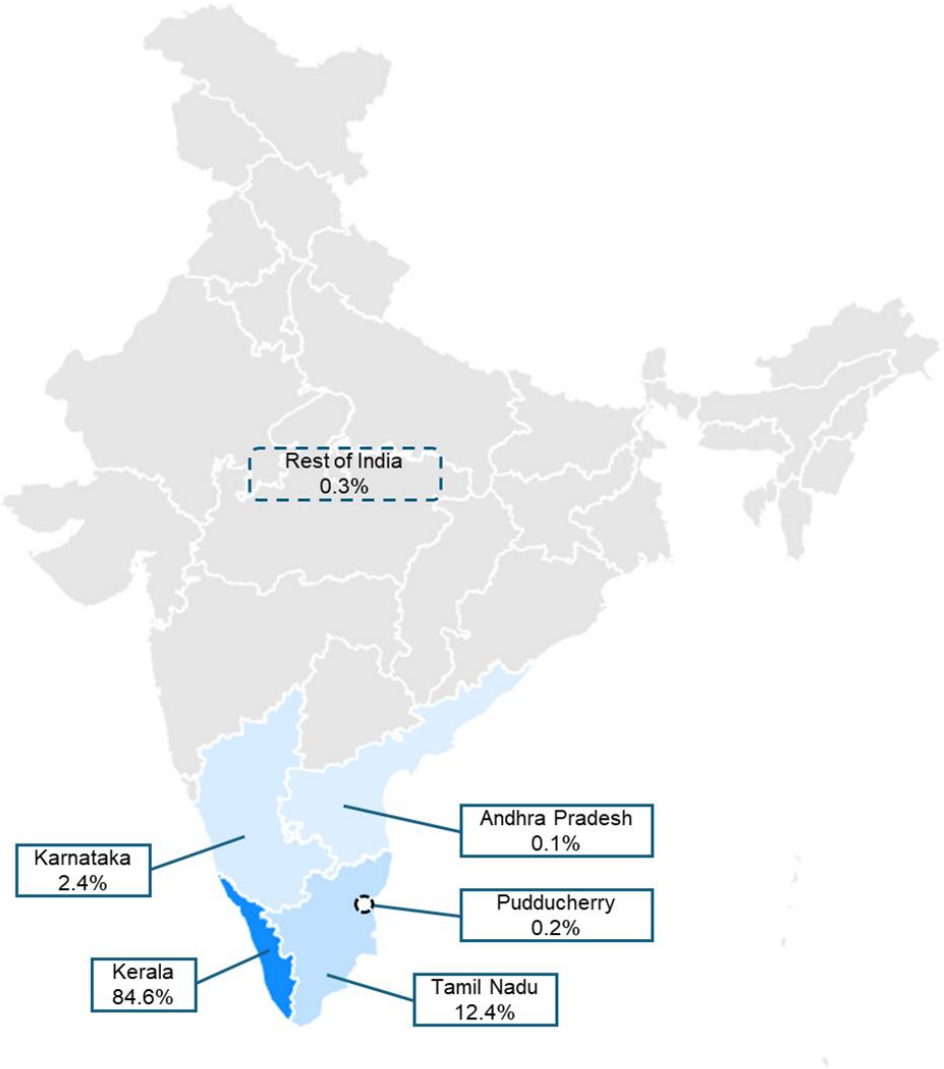
Table 3-6: Regional Influence in % for passenger traffic

State/Region	% Influence
Kerala	84.6%
Tamil Nadu	12.4%
Karnataka	2.4%
Pudducherry	0.2%
Andhra Pradesh	0.1%
Rest of India	0.3%

Source: Survey data, Crisil Intelligence

Image below represents the Regional Influence for passenger movements.

Figure 3-3: Regional Influence map for Passenger Vehicle



Source: Survey data, Crisil Intelligence

Regional Influence: Freight Traffic

- Kerala and Tamil Nadu have the highest influence on goods traffic which is attributable to ~95% of overall freight traffic movement between both states.
- Agri produce, construction materials and courier parcel are key commodities plying on project stretch which is attributable to consumption and construction linked usage in the catchment areas of project stretch. NH544 is the gateway to Kerala state from easter side and it is also a key linkage between quarries and crusher units of Palakkad to rest of the state

Table 3-7: Regional Influence in % for goods traffic

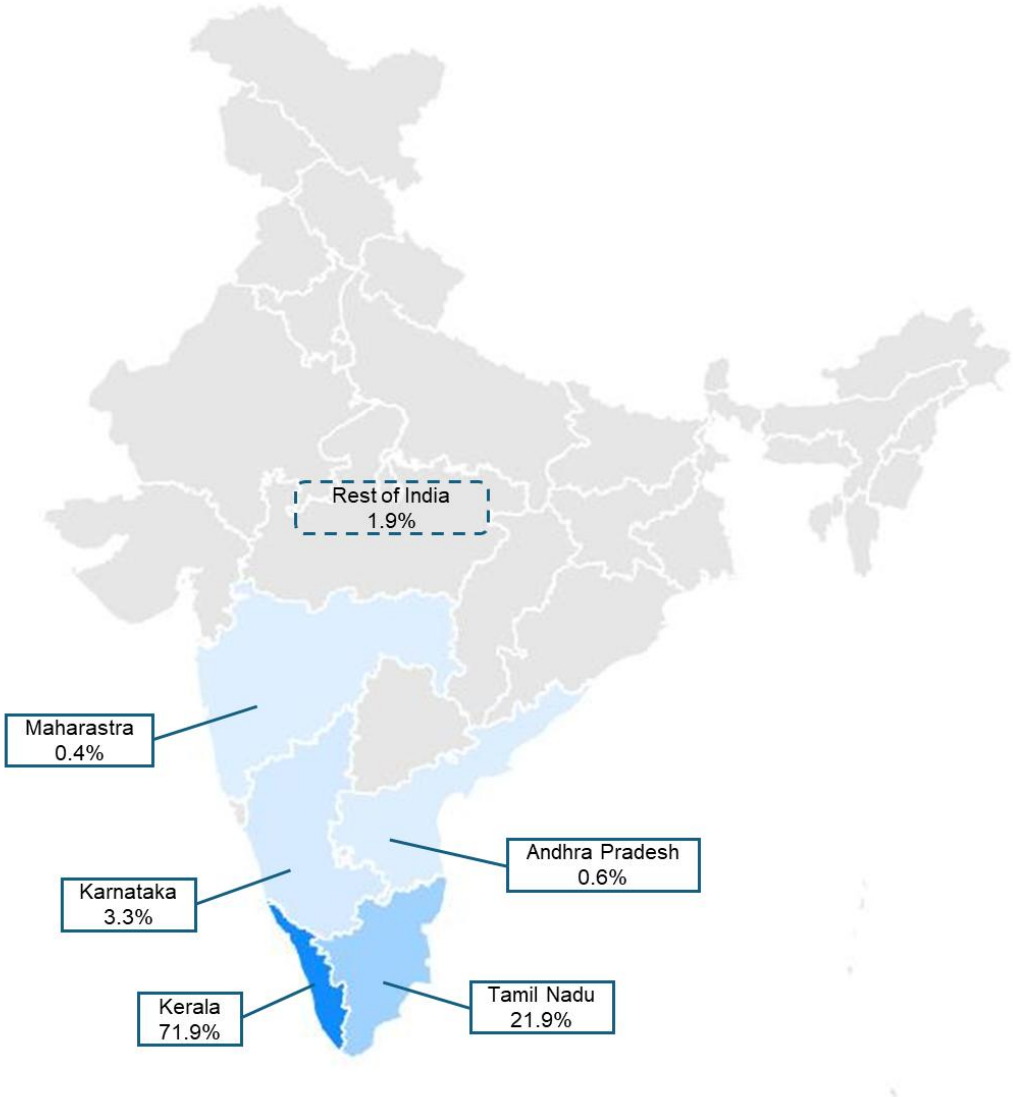
State/Region	% Influence
Kerala	71.9%
Tamil Nadu	21.9%

State/Region	% Influence
Karnataka	3.3%
Andhra Pradesh	0.6%
Maharashtra	0.4%
Rest of India	1.9%

Source: Survey data, Crisil Intelligence

Image below represents the Regional Influence for freight movements.

Figure 3-4: Regional Influence map for Goods Vehicle



Source: Survey data, Crisil Intelligence

3.4.3 Zonal Influence

Zonal influence: Passenger Traffic

The zonal influence on passenger traffic is presented in Table below. Thrissur and Palakkad are the dominant influencer in Panniyankara TP, accounting for ~40% of passenger traffic, followed closely by Vadakkenchery at ~13%. Rest of India category also plays a substantial role as it accounts for ~32% of passenger traffic, indicating a broader geographic distribution of travel patterns and it is attributable to region's transportation network is

connectivity to broader geographic area, with people traveling from outside the local area contributing to the traffic volume.

Table 3-8: Zonal influence in % for Passenger traffic

State/Region	% Influence
Thrissur	20.5%
Palakkad	19.7%
Vadakkencherry	13.2%
Pattikkad	7.1%
Kochi	7.0%
Rest of India	32.5%

Source: Survey data, Crisil Intelligence

Zonal influence: Goods Traffic

The zonal influence on goods traffic is presented in Table below. For goods traffic, Palakkad and Thrissur have a significant influence accounting for ~30% which is attributable to local movement of construction material. Kochi and Coimbatore are also among major contributors which is attributable to construction material linked and consumption linked commodity movement.

As the project road provides gateway to the Kerala state, share of "Rest of India" category is also significant accounting for ~40%, which is attributable to diverse split of trip generating and trip attraction nodes being catered using project stretch.

Table 3-9: Zonal influence in % for Goods traffic

State/Region	% Influence
Palakkad	15.4%
Thrissur	15.1%
Kochi	14.2%
Coimbatore	8.6%
Vadakkencherry	6.1%
Rest of India	40.6%

Source: Survey data, Crisil Intelligence

3.4.4 Top OD Pairs

Passenger Vehicle

Passenger trips between Palakkad, Vadakkenchery and Thrissur are ~30% of overall passenger trips which is attributable to higher local commuting of passengers on project road led by economic activities and business trips.

Table 3-10: Top OD pairs for Passenger Vehicle

OD Pairs	% Share
Palakkad To Thrissur	17.1%
Vadakkencherry To Thrissur	9.6%
Vadakkencherry To Pattikkad	7.9%
Palakkad To Kochi	4.7%
Coimbatore To Thrissur	4.3%

OD Pairs	% Share
Palakkad To Ernakulam	4.1%
Palakkad To Pattikkad	3.8%
Vadakkencherry To Kochi	3.4%
Coimbatore To Kochi	2.5%
Pollachi To Thrissur	2.1%

Source: Survey data, Crisil Intelligence

Goods Vehicle

The top Origin-Destination (OD) pairs for Goods Vehicles reveal key freight routes in the corridor. Notably, intra-Kerala routes dominate the landscape, with Palakkad to Thrissur, Palakkad to Kochi, and Palakkad to Ernakulam emerging as key corridors, accounting for 12.9%, 5.7%, and 3.6% of goods vehicle movement, respectively. Furthermore, the data highlights the importance of interstate connectivity, with Kochi serving as a critical logistics hub connecting to major cities outside Kerala, including Bengaluru (2.8%) and Chennai (2.6%). Coimbatore also demonstrates strong logistics links with Kerala, with notable connections to Kochi (6.2%), Thrissur (4.1%), and Ernakulam (2.3%). Overall, the data underscores the pivotal role of Palakkad and Coimbatore as origin points for goods movement into major Kerala destinations, while also emphasizing Kochi's position as a key player in broader logistics networks, both within and outside the state.

List of top OD pairs for project stretch is presented in tables below.

Table 3-11: Top OD pairs for Goods Vehicle

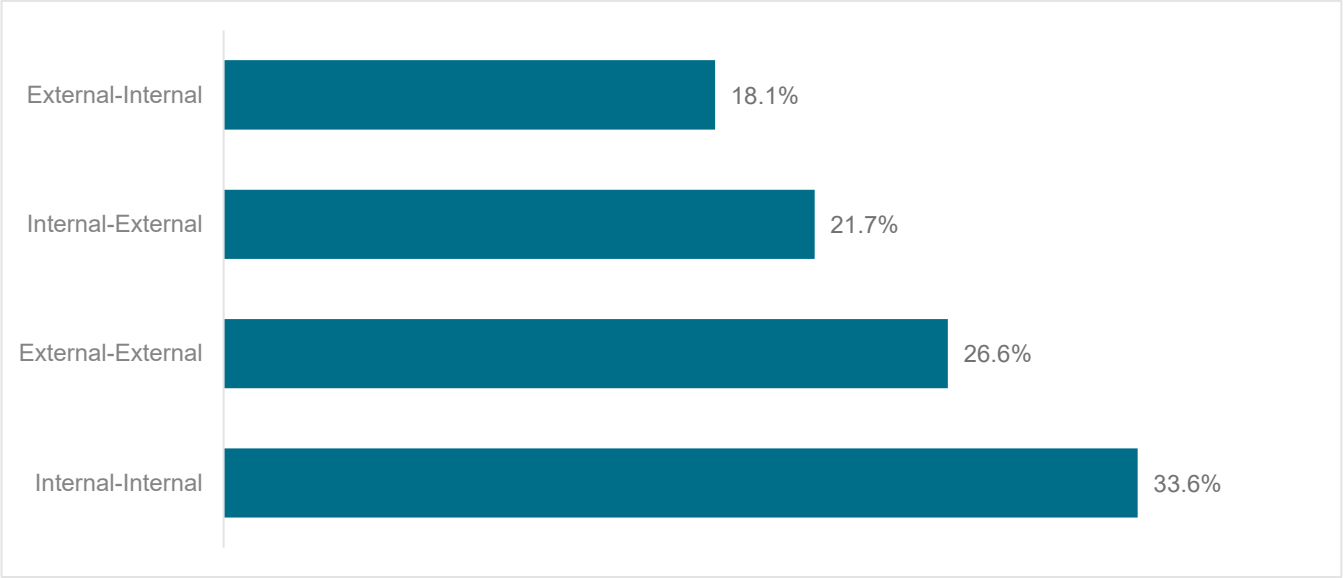
OD Pairs	% Share
Palakkad To Thrissur	12.9%
Coimbatore To Kochi	6.2%
Palakkad To Kochi	5.7%
Vadakkencherry To Thrissur	4.7%
Coimbatore To Thrissur	4.1%
Palakkad To Ernakulam	3.6%
Bengaluru To Kochi	2.8%
Chennai To Kochi	2.6%
Palakkad To Aluva	2.5%
Coimbatore To Ernakulam	2.3%

Source: Survey data, Crisil Intelligence

3.4.5 Internal - External Analysis

The zones which fall along the project road and very near project road are considered as internal zones and other zones are considered as external zones. If both end of the trips are internal, those trips are internal-internal trips. If one end of the trips is internal and other is external those trips are internal to external and external to internal trips. If both ends of the trips are external, those are external-external trips. Internal-External analysis is presented in the below figure.

Figure 3-5: Internal – External Influence



Source: Survey data, Crisil Intelligence

Internal-Internal trips, which are journeys both originating and terminating within the regional influence area, constitute the largest share ~34% at Panniyankara TP highlighting that a significant majority of travel demand arises from local or intra-regional connectivity.

External-External trips, representing pure through-traffic bypassing the region, are second largest (~27% at Panniyankara TP), indicating the project corridor's role is to support local as well as long-haul or non-regional freight and passenger flows.

Short Distance: Short-distance traffic is prominent between Panniyankara, Palakkad, Vadakancherry, Aluva, Ernakulam, and Thrissur, forming a vital intra-regional corridor within central Kerala. These locations are interconnected by dense road networks that support frequent passenger and freight movement driven by economic activities such as trade, employment, education, and services. Ernakulam, as a commercial hub, attracts significant daily traffic from nearby towns like Aluva and Vadakancherry, while Palakkad and Thrissur serve as key transit and market centres. This local connectivity plays a crucial role in sustaining regional mobility and economic integration.

Medium Distance: Medium-distance travel between Coimbatore and Pollachi in Tamil Nadu to Thrissur in Kerala forms a significant regional transit corridor that facilitates both passenger and goods movement. This route supports a steady flow of commercial vehicles transporting agricultural produce, textiles, and industrial goods from Tamil Nadu into Kerala, while also accommodating daily commuters, traders, and tourists. Coimbatore, being a major industrial and textile hub, generates high outbound freight traffic, much of which is directed toward Thrissur's commercial markets and distribution centres. The corridor also serves as an important link for inter-state connectivity, contributing to the economic integration of western Tamil Nadu and central Kerala.

Long distance: Long-distance freight movement along this corridor is primarily driven by 3-axle trucks (3A) and multi-axle vehicles (MAVs), facilitating high-volume transport between major industrial and commercial hubs in Tamil Nadu and Karnataka—such as Coimbatore, Pollachi, Madurai, Chennai, and Bangalore—and key destinations in Kerala including Ernakulam, Kochi, and surrounding regions. These routes handle the transportation of a wide range of goods including machinery, consumer products, textiles, automotive parts, and perishable items. The corridor plays a vital role in sustaining Kerala's consumption-driven economy by ensuring a continuous supply of goods from the more industrialized neighbouring states. It also serves as a critical logistics network for export-import activities through Kochi port, linking inland production centres with maritime trade gateways.

3.4.6 Commodity Distribution

OD analysis was carried out to understand the various freight vehicles being used to transport different commodities. Table below presents the commodity distribution across project stretch is presented in the table below.

Table 3-12: Commodity Distribution (in %)

Commodities	LCV	2 Axle Truck	3 Axle Truck	MAV	Grand Total
Agri Produce	21.9%	16.7%	10.7%	10.6%	17.3%
Automobiles	0.9%	1.9%	2.1%	3.2%	1.7%
Chemical products	3.3%	1.5%	1.8%	1.9%	2.6%
Coal	0.0%	0.0%	0.0%	0.1%	0.1%
Construction materials	4.9%	7.6%	15.9%	18.5%	9.7%
Consumer Foods	5.2%	5.2%	5.3%	3.4%	4.7%
Consumer Products	3.8%	3.9%	4.3%	3.6%	3.8%
Container	0.5%	0.8%	1.0%	1.1%	0.8%
Courier & parcel	9.0%	10.9%	7.1%	7.0%	8.6%
Empty	26.0%	21.5%	22.5%	21.9%	24.1%
Iron & Steel Products	1.6%	3.5%	2.7%	3.3%	2.4%
Machinery	1.0%	1.4%	1.8%	0.9%	1.1%
Milk & Animal Food	6.8%	4.3%	4.1%	3.7%	5.4%
Others	3.5%	4.3%	3.8%	3.4%	3.6%
Paper products	0.9%	1.1%	1.0%	1.0%	1.0%
Petroleum Products	2.0%	3.1%	4.7%	5.5%	3.3%
Pharmaceuticals	0.7%	0.8%	0.2%	0.6%	0.6%
Plastic products	1.9%	2.3%	1.2%	1.6%	1.8%
Plywood & Timber products	3.1%	4.0%	4.8%	4.4%	3.7%
Rubber products	0.6%	0.9%	1.0%	0.5%	0.6%
Textile & Footwear	1.0%	2.1%	1.4%	1.8%	1.4%
Tiles & Ceramic products	1.2%	1.9%	2.5%	2.1%	1.7%
Grand Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: OD Analysis, Crisil Intelligence

The analysis of freight movement across the toll plaza reveals that the major commodities being transported include Agri produce, construction materials, courier and parcel, and consumer goods (including milk and animal food), etc.

Agri Produce hold 17.1% overall share in which majority of share is held by horticulture crops followed by Rice and Wheat highlighting the importance of this corridor for the movement of farm products. Agri produce on project stretch is largely import-export and consumption driven.

Construction materials have 9.7% overall share which is second largest commodity plying on project stretch and largely driven by ongoing infrastructure, real estate expansion and urbanization along the corridor which drive the demand for construction materials, including cement, sand, stones, aggregate, etc. Outbound movement from Malabar cement factory and ACC Madukkarai Cement plant are largely driving construction material growth on project stretch. Construction material is largely destined to Thrissur, Kochi, Aluva and Ernakulam.

Courier and Parcel are a significant commodity transported on the project road, with a notable share of 8.6%

overall. Due to the increasing demand for e commerce goods and the easy availability of products at hand without going out has increased the demand for courier and parcels significantly in the past few years. The project road connects major cities of cities like Salem, Coimbatore, Bangalore etc. to the Palakkad, Thrissur, and Kochi city in Kerala region. The increasing urbanisation on the corridor is attributing to the movement at project stretch.

Milk and Animal Food which comprises Milk, Fish, Chicken and Eggs, are also having modest 5.4% share at project stretch. These commodities are largely consumption based and covers shorter distance movement. Commute between Coimbatore, Palakkad, Thrissur and Ernakulam are predominant for milk and animal food category. The increasing urbanisation on the corridor is attributing to the movement at project stretch.

Other notable commodities include **Consumer foods** (4.7%), **Consumer products** (3.8%), **Plywood and timber products** (3.7%), **Others** (3.6%) and **Petroleum Products** (3.3%), which reflect the growing importance of household consumption linked commodities.

Direction wise commodity distribution is presented in the below tables.

Table 3-13: Commodity Distribution (in %) direction wise for Panniyankara TP

Vehicles	LCV	2 Axle Truck	3 Axle Truck	MAV	Total	LCV	2 Axle Truck	3 Axle Truck	MAV	Total
Direction	Palakkad to Thrissur					Thrissur to Palakkad				
Agri Produce	33.4%	24.5%	13.5%	13.3%	25.4%	9.8%	9.0%	7.7%	7.8%	9.0%
Automobiles	0.9%	2.2%	3.1%	4.5%	2.2%	0.8%	1.6%	1.0%	1.8%	1.2%
Chemical products	5.2%	2.3%	2.1%	3.1%	4.0%	1.3%	0.7%	1.5%	0.7%	1.0%
Coal	0.0%	0.0%	0.0%	0.2%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%
Construction materials	6.9%	10.5%	22.0%	27.5%	14.0%	2.7%	4.8%	9.4%	9.3%	5.3%
Consumer Foods	6.1%	6.6%	6.6%	3.7%	5.5%	4.2%	3.8%	3.9%	3.0%	3.8%
Consumer Products	5.2%	5.8%	6.7%	6.0%	5.6%	2.4%	2.1%	1.7%	1.2%	2.0%
Container	0.1%	0.7%	0.8%	1.0%	0.5%	1.0%	0.9%	1.3%	1.2%	1.1%
Courier & parcel	9.7%	12.4%	7.5%	8.1%	9.5%	8.3%	9.4%	6.7%	5.9%	7.7%
Empty	6.8%	6.4%	8.7%	6.9%	6.9%	46.3%	36.4%	37.1%	37.3%	41.8%
Iron & Steel Products	1.6%	2.6%	1.6%	3.4%	2.2%	1.6%	4.4%	4.0%	3.2%	2.6%
Machinery	1.4%	2.0%	2.1%	1.5%	1.5%	0.7%	0.9%	1.5%	0.4%	0.7%
Milk & Animal Food	10.5%	6.4%	5.9%	5.5%	8.3%	2.9%	2.3%	2.2%	1.8%	2.5%
Others	3.1%	4.2%	4.0%	2.2%	3.0%	4.0%	4.4%	3.7%	4.7%	4.2%
Paper products	0.4%	0.6%	0.4%	0.1%	0.3%	1.5%	1.6%	1.8%	1.8%	1.6%
Petroleum Products	2.4%	2.4%	6.0%	5.2%	3.4%	1.6%	3.8%	3.4%	5.8%	3.2%
Pharmaceuticals	0.9%	1.0%	0.4%	1.0%	0.9%	0.4%	0.7%	0.0%	0.1%	0.3%
Plastic products	1.4%	2.5%	1.2%	1.8%	1.6%	2.4%	2.2%	1.3%	1.4%	2.0%

Vehicles	LCV	2 Axle Truck	3 Axle Truck	MAV	Total	LCV	2 Axle Truck	3 Axle Truck	MAV	Total
Direction	Palakkad to Thrissur					Thrissur to Palakkad				
Plywood & Timber products	2.0%	1.9%	2.4%	1.2%	1.8%	4.3%	6.1%	7.3%	7.6%	5.7%
Rubber products	0.4%	0.7%	0.7%	0.3%	0.4%	0.7%	1.1%	1.3%	0.7%	0.8%
Textile & Footwear	1.0%	2.4%	1.9%	2.2%	1.6%	1.1%	1.7%	0.8%	1.5%	1.3%
Tiles & Ceramic products	0.6%	1.9%	2.5%	1.6%	1.2%	1.9%	2.0%	2.6%	2.7%	2.2%
Grand Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Source: OD Analysis, Crisil Intelligence

Palakkad to Thrissur direction (inbound Kerala) is prominent as the inbound commodity movement at Panniyankara TP is dominant in this direction. Agri Produce, Chemicals, Consumer goods, etc. are having higher share as compared to Thrissur to Palakkad direction attributing to movement of consumption linked commodities for local as well as export usage.

Thrissur to Palakkad direction (Outbound Kerala) has ~42% of empty vehicular movement which is attributable to large scale movement of bulk and dirty commodities like Sand, Cement, Soil, Stones, Chemicals and food grains etc. As the Kerala is largely consumption-based economy, inbound movement of commodities and outbound movement of empty vehicles are justified. Outbound movement plywood and timber products are attributable to movement of raw timber wood, finished furniture and outputs from local wood based small scale industries.

3.4.7 Trip Length Distribution

Trip Length Distribution analysis gives distance-based patterns for project road traffic. Trip length is categorized into nine trip length groups. Trip length distribution table for different vehicle types is presented below.

Table 3-14: Trip Length Distribution

Trip Length	Cars	Bus	LCV	2 Axle Truck	3 Axle Truck	MAV
0 to 20	7.9%	1.7%	2.4%	1.1%	1.6%	0.9%
21 to 40	12.8%	7.3%	5.9%	4.9%	6.8%	5.2%
41 to 100	44.4%	61.8%	38.8%	33.1%	32.3%	27.3%
101 to 200	19.0%	13.2%	25.0%	24.5%	21.7%	24.9%
201 to 350	8.8%	7.1%	16.3%	15.8%	15.6%	16.5%
351 to 500	3.0%	5.0%	3.4%	5.8%	5.7%	6.6%
501 to 750	3.3%	2.9%	5.4%	8.4%	9.0%	9.0%
751 to 100	0.4%	0.5%	0.8%	1.6%	1.5%	1.4%
Beyond 1000 Km	0.4%	0.5%	2.0%	4.7%	5.9%	8.2%

Source: Crisil Intelligence

Cars are mostly short distance trip, about 65% of trip travel within 100 kms. In MAV about 75% trips are short distanced trip indicating goods are potentially transported to nearby destinations or transportation/distribution centres.

4 Traffic Assessment of Project Stretch

4.1 General

This section summarizes the historical performance of the project section in order to understand baseline traffic patterns comprising of historical tollable traffic and revenue growth, traffic and revenue composition, trip distribution, trip factors, seasonality and trend of traffic over the available data set.

The historical tollable traffic and revenue data mode wise was made available by client from April 2012 to July 2025 and is presented in below tables for all three-toll plaza on project corridor.

Table 4-1: Historical Traffic Data Availability

Data Source	Type of Data	Period
TMS Data	Traffic & Revenue Data Vehicle Wise	April 2022 - August 2026

Source: Client, Crisil Intelligence

4.1.1 Historical traffic analysis of Panniyankara Toll Plaza

The Passenger Car Unit (PCU) count for Fiscal Year 2024 exhibited an 8% year-over-year (YOY) growth compared to Fiscal Year 2023. Notably, the Car/Jeep/Vans (CJV) and Multi-Axle Vehicle (MAV) categories demonstrated robust growth, with YOY increases of 9% and 15%, respectively. Additionally, both Light Commercial Vehicle (LCV) and Bus/Truck categories recorded a 4% YOY growth during the same period.

Project stretch strategically connects many important locations of Kerala like tourism attraction Kochi, Kochi airport, Munnar, Beaches at western coast, and Vizhinjam port. Hence, it attracts lot of passenger vehicle traffic.

The summary of historic tollable TMS traffic data is presented in below table.

Table 4-2: Historic Traffic: Panniyankara Toll Plaza

FY Year	CJV	LCV	Bus/Truck	3A	MAV	OSV	Vehciles	PCU
2023	16,019	1,921	2,720	1,195	3,054	4	24,914	44,409
2024	17,532	2,004	2,832	1,041	3,496	3	26,909	47,906
2025	17,943	2,065	2,886	939	3,128	3	26,964	46,604
CAGR (23-25)	**5.8%**	**3.7%**	**3.0%**	**-11.4%**	**1.2%**	**-**	**4.0%**	**2.4%**

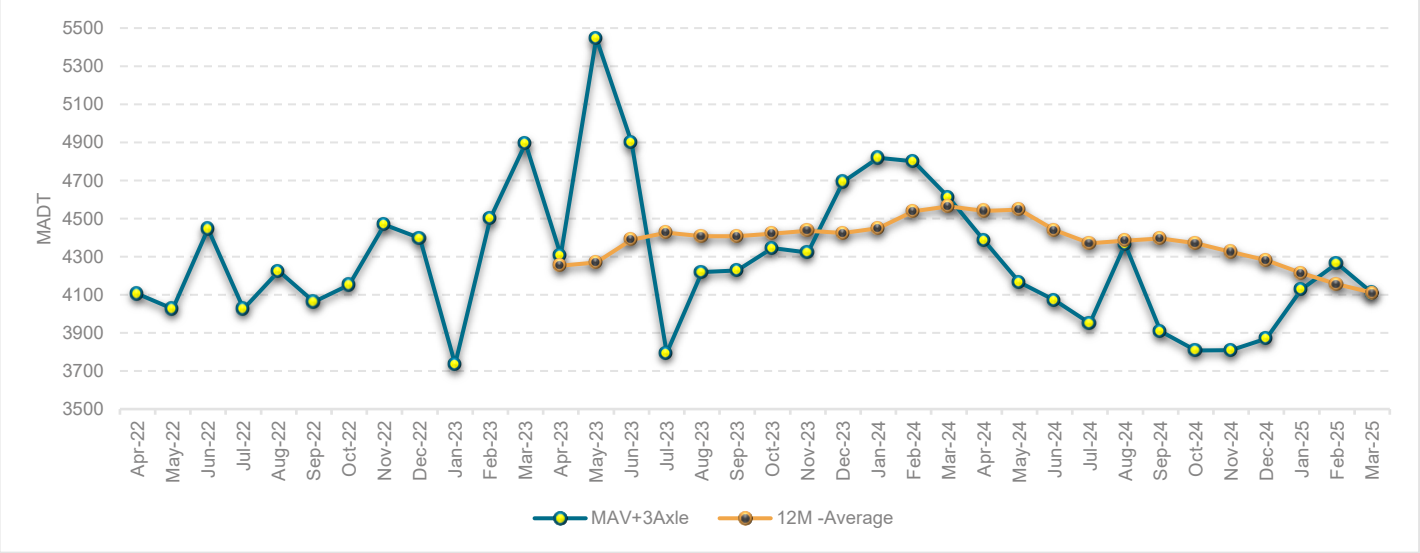
Source: Client TMS Data, Crisil Intelligence

Shutdown of illegal quarries near vicinity of project catchment area have resulted in slowdown of heavy goods vehicle on project road in fiscal year 2025 as compared to fiscal year 2024 resulting in overall PCU decline of 3% YOY. While the passenger vehicle and Bus/Truck category have experienced mild slowdown, the MAV category experienced a significant decline of 11% YOY in FY2025, Bus/2 Axle trucks and light goods vehicle growth remained modest, at approximately 2-3% YOY. In fiscal year 2024, the upward growth was driven by increased demand and ease in mining regulations in the state. Detailed assessment of downtrend in goods vehicles at project stretch is provided further in this section.

Chart below represents the slowdown in 3 Axle & MAV moving average trend as the 12 Months moving average shows downward trend in 3 Axle and MAV traffic combined. After peaking ~5500 mark in May 2023, 3A and MAV traffic did not achieve mark of 4900 trucks which is attributable to the impact of closure of quarries near catchment

area.

Figure 4-1: 12 months moving average trend of 3 Axle and MAV categories



Source: TMS data, Crisil Intelligence

4.2 Overview of Quarries in Kerala

Kerala is richly endowed with a wide spectrum of mineral occurrences and deposits, making it a prominent region for quarrying and mining activities. The state possesses significant reserves of heavy mineral sands—such as ilmenite, rutile, zircon, monazite, and sillimanite—alongside valuable deposits of gold, iron ore, bauxite, graphite, China clay (kaolin), fire clay, tile, brick clay, silica sand, lignite, limestone, dimension stone (granite), gemstones, magnesite, steatite, and various other strategic minerals. However, large-scale mining activities are predominantly limited to a select few minerals, mainly heavy mineral sands, China clay, and to a lesser extent, limestone/limeshell, silica sand, and granite. Quantitative data reveals that the majority of the quarry operations focus on granite (building stone), amounting to 552 active quarries, followed by laterite quarries at 46, while ordinary earth and silica sand quarries account for just 34 and 7, respectively. China clay, ordinary clay, and granite (dimension stone) quarries are negligible, with only one or two instances each.

District-level analysis highlights that Malappuram leads with 147 operational quarries, significantly surpassing other districts such as Palakkad (86), Thrissur (67), and Ernakulam (61). Districts like Thiruvananthapuram, Pathanamthitta, Kollam, Idukki, and Wayanad register much lower quarry counts, ranging from 29 to 11. Mineral depots, essential for mineral storage and logistics, show a similar concentration: Alappuzha leads with 175 depots, followed by Malappuram (146), Palakkad (133), and Ernakulam (123). At the lower end, Pathanamthitta and Kasaragod report the least mineral depots, at 57 and 46, respectively. In terms of depot type, granite dominates overwhelmingly with 1,405 depots, while ordinary sand, silica sand, and laterite depots are considerably fewer, at 19, 7, and 2, respectively.

4.2.1 Major events that impacted mining sector

Kerala state has been declared as an eco-sensitive zone due to its unique biodiversity and ecological significance as The Western Ghats, a mountain range that runs along the western coast of India, passes through Kerala and is home to a wide range of flora and fauna. The region is also prone to natural calamities, such as landslides and floods, which have devastating effects on the environment and human settlements. Kerala has experienced several

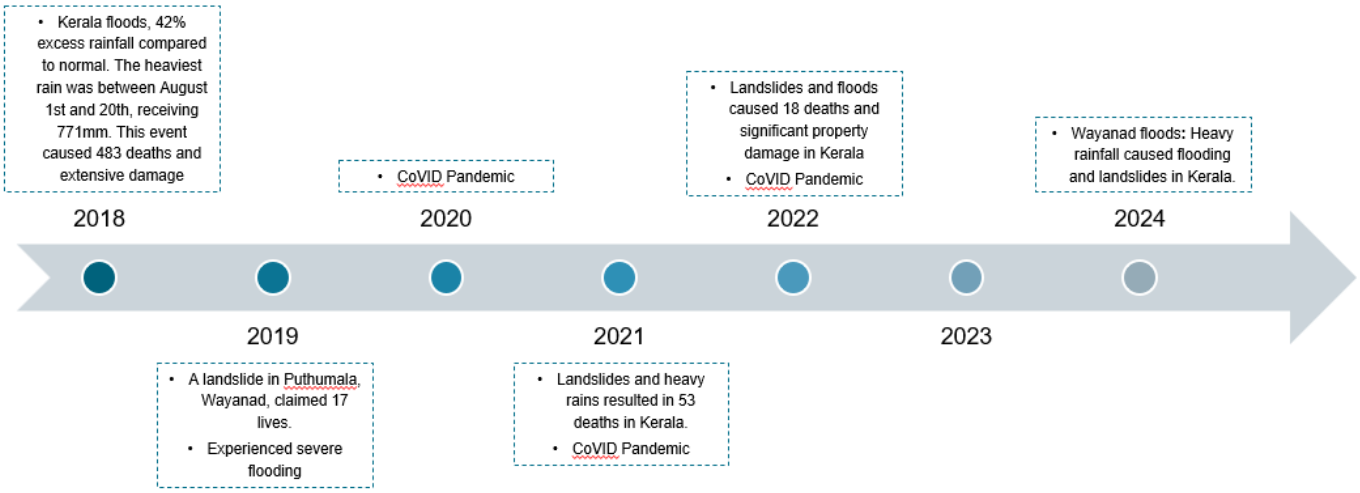
natural calamities during past decades. Kerala, a state in India, has been impacted with the challenges of environmental degradation due to illegal mining activities.

In an effort to conserve the Western Ghats and mitigate the impacts of environmental degradation, the Ministry of Environment and Forests established the Western Ghats Ecology Expert Panel (WGEEP) in 2010. The panel recommended that 75% of the Western Ghats be declared as an eco-sensitive zone, and the area was subsequently classified into Ecologically Sensitive Zones (ESZs). However, the implementation of these recommendations has been slow, and illegal mining activities have continued to pose a significant threat to the environment.

Recently, the Ministry of Environment and Forests clarified that the District Environment Impact Assessment Authority (DEIAA) has no authority to grant environmental clearances for mining activities. This directive is expected to halt operations at numerous quarries in Kerala, many of which have been operating with expired leases. Over 500 quarries may have been affected, and environmental clearances granted by DEIAA between 2016 and 2018 will remain valid until 2025 but must undergo reappraisal.

The move comes after Supreme Court and National Green Tribunal rulings, and amid allegations of illegal mining and collusion between politicians and miners in Kerala. The closure of illegal quarries is a significant step towards protecting the eco-sensitive zones of Kerala and mitigating the impacts of environmental degradation. The state government must now work towards implementing effective measures to prevent illegal mining and promote sustainable development in the region. Hence, illegal quarries in Kerala started facing closure from Nov 2024 onwards.

Figure 4-2: Historic calendar of calamities in Kerela



Source: Crisil Intelligence

4.2.2 Role of Tamil Nadu in Kerala's construction material crisis

The state of Tamil Nadu has been grappling with the repercussions of a sand mining scam, which has had far-reaching consequences on the environment, economy, and construction sector. The resulting ecological damage has been severe, with riverbank erosion, groundwater depletion, loss of agricultural land, and disruption of aquatic ecosystems being just a few of the devastating consequences. The National Green Tribunal (NGT) and the Justice Lokur Committee have highlighted the egregious violations, leading to bans on unregulated mining and underscoring the need for stringent norms and rigorous enforcement.

The sand mining scam has also had a significant impact on the construction sector, with artificial scarcity and inflated prices of aggregates and sand affecting construction costs and affordability. While legal and policy measures have been put in place to curb illegal mining, the effectiveness of these measures remains to be seen, and it is crucial that the government demonstrates a commitment to resolving the issue in the long term.

In a related development, the Tamil Nadu Mines Department's decision to impose a mineral-bearing land tax of ₹90 per tonne on crushed stone has sparked controversy and led to a quarry strike in the state. The tax, which was introduced on April 4, 2025, resulted in a cost increase of ₹1,378 per unit of rough boulder, causing Jalli and M-sand prices to rise by ₹700 per unit.

Furthermore, a change in the seigniorage fee calculation, from cubic metre to per tonne, added another ₹259 in costs, exacerbating the burden on the industry. In response, the Tamil Nadu Stone Quarries, Crusher Units, and Lorry Owners Association launched an indefinite strike from April 16, 2025, demanding the withdrawal of the tax. The strike, which disrupted supply and raised concerns from the construction sector, was eventually called off after talks on April 21, 2025, with the government agreeing to reduce the seigniorage fee and cancel the planned price hike, offering partial relief to the industry. Roadblocks due to curb on illegal mining and stringent norms impacted construction material traffic plying from Tamil Nadu to Kerala.

The closure of illegal quarries in Kerala and the imposition of a mineral-bearing land tax in Tamil Nadu have disrupted the supply of construction materials, leading to a shortage and decrease in goods traffic at project road.

4.3 Historic Toll Segmentation

Recent years toll segmentation has been analysed from vehicle wise and toll segmentation toll data provide by client. As the variations the recent years has been minimal, we have adopted latest FY25 and 4-Month-FY26 toll segmentation for future projections.

Table 4-3: Historic toll segmentation: Panniyankara

Vehicle Category	Single Journey	Return Journey	Monthly Pass	Local Pass	Exemptions	Total
FY-2023						
CJV	38.8%	47.3%	0.1%	0.1%	13.7%	100%
Bus	18.3%	59.0%	18.3%	0.0%	4.5%	100%
LCV	32.9%	64.4%	0.4%	0.0%	2.2%	100%
2A Truck	48.7%	49.4%	0.9%	0.0%	1.1%	100%
3A Truck	41.8%	54.7%	0.9%	0.0%	2.6%	100%
MAV	42.0%	56.7%	0.3%	0.0%	1.0%	100%
OSV	43.0%	19.6%	0.0%	0.0%	37.4%	100%
FY-2024						
CJV	35.9%	50.2%	0.1%	0.1%	13.7%	100%
Bus	18.7%	59.1%	20.5%	0.0%	1.7%	100%
LCV	32.9%	64.4%	0.4%	0.0%	2.2%	100%
2A Truck	48.4%	50.5%	0.9%	0.0%	0.3%	100%
3A Truck	40.0%	59.1%	0.2%	0.0%	0.7%	100%
MAV	40.0%	59.6%	0.1%	0.0%	0.4%	100%
OSV	58.2%	35.9%	0.0%	0.0%	5.9%	100%

Source: TMS Data, Crisil Intelligence

5 Base Traffic Estimation

5.1 Seasonality Factors

Traffic volumes on roads varies throughout the year, influenced by socio-economic activities in the surrounding regions. To accurately estimate the Annual Average Daily Traffic (AADT) for the road, it is crucial to account for these seasonal variations.

To achieve this, a seasonal correction factor is applied, which is derived from secondary data sources such as historical traffic data, fuel sales and similar indicators. In this assessment as long historic traffic data is available, consultants have the traffic data for seasonality

5.1.1 Seasonal correction Factors (SCF)

Seasonal correction factors for the latest years of FY 24 & FY 25 are tabulated below.

Table 5-1: Seasonal correction factors for FY 23, 24 and FY 25 – Panniyankara Toll Plaza

	CJV	LCV	Bus/Truck 2 Axle	3 Axle	MAV	OSV
FY2023						
Apr-22	1.0	0.9	1.0	0.9	1.1	0.9
May-22	1.0	1.0	1.0	0.9	1.1	0.8
Jun-22	1.1	1.1	1.0	0.8	1.0	0.8
Jul-22	1.1	1.1	1.0	1.0	1.1	0.9
Aug-22	1.1	1.0	1.0	1.0	1.0	0.9
Sep-22	1.0	1.1	1.1	1.0	1.1	0.9
Oct-22	1.0	1.1	1.0	1.0	1.0	0.9
Nov-22	1.0	0.9	1.0	1.0	0.9	1.2
Dec-22	0.9	1.0	0.9	1.1	0.9	1.0
Jan-23	0.9	1.0	1.0	1.2	1.1	1.5
Feb-23	1.0	1.0	1.0	1.1	0.9	1.4
Mar-23	1.1	0.9	1.0	1.0	0.8	1.3
FY2024						
Apr-23	0.9	0.9	1.0	1.0	1.1	1.0
May-23	0.9	1.0	1.0	0.8	0.8	1.0
Jun-23	1.1	1.1	1.0	0.9	0.9	1.2
Jul-23	1.1	1.1	1.0	1.1	1.2	1.8
Aug-23	1.0	1.0	1.0	1.0	1.1	1.1
Sep-23	1.0	1.1	1.0	1.0	1.1	0.9
Oct-23	1.0	1.0	1.0	1.0	1.0	0.8
Nov-23	1.1	1.0	1.0	1.0	1.1	1.2
Dec-23	0.9	1.0	0.9	1.0	1.0	0.9
Jan-24	0.9	1.0	1.0	1.0	0.9	0.8
Feb-24	1.1	1.0	1.0	1.0	0.9	0.9
Mar-24	1.1	0.9	1.0	1.0	1.0	0.9
FY2025						
FY25	CJV	LCV	Bus/Truck 2 Axle	3 Axle	MAV	OSV

	CJV	LCV	Bus/Truck 2 Axle	3 Axle	MAV	OSV
Apr-24	1.0	1.0	1.0	0.9	0.9	1.0
May-24	0.9	1.0	1.0	1.0	1.0	1.1
Jun-24	1.0	1.1	1.1	1.0	1.0	0.9
Jul-24	1.1	1.1	1.1	1.0	1.0	0.9
Aug-24	1.1	1.0	1.0	1.0	0.9	0.8
Sep-24	1.0	1.0	1.0	1.0	1.1	1.0
Oct-24	1.0	1.0	1.0	1.0	1.1	0.8
Nov-24	1.0	0.9	0.9	1.0	1.1	1.1
Dec-24	0.9	1.0	0.9	1.1	1.1	1.5
Jan-25	0.9	1.0	1.0	1.0	1.0	1.2
Feb-25	1.0	1.0	1.0	1.0	0.9	1.0
Mar-25	1.1	0.9	1.0	1.0	1.0	0.9

Source: Client TMS Data, Crisil Intelligence

5.2 Base Traffic Estimation

For base traffic (annual average daily traffic) estimation of the present study, current fiscal's 3-months (Apr-25 to July-25) of TMS traffic data were annualized using SCF factor of FY23 traffic data to arrive at the annual average daily traffic (AADT) for FY 26.

The AADT estimation for the base case for FY26 is presented table below

Table 5-2: Base Traffic Estimation - FY26 AADT

	CJV	LCV/MINIBUS	BUS	TRUCK 2 AXLE	TRUCK 3 AXLE	MAV+OSV	Total	PCU
AADT (FY25)	**17,946**	**2,065**	**1,358**	**1,528**	**939**	**3,129**	**26,965**	**46,600**
FY23(3-12 Month Factor)	1.02	1.01	1.01	1.01	0.90	1.07	0.85	
AADT FY26	**18,631**	**2,083**	**1,376**	**1,548**	**753**	**3,038**	**27,430**	**46,461**

Source: Client TMS Data, Crisil Intelligence

For estimating the base revenue, the toll rates applicable for FY 26 is multiplied with base year FY 26 ADDT traffic numbers by adopting the trip segmentation.

Table 5-3: Base Revenue -FY26

Vehicle Type	Car/Jeep/Van	Minibus	2 Axle Bus	LCV	Truck	3 Axle Truck	MAV	OSV	Total Veh.
2026	599.3	17.5	121.3	93.0	198.9	132.0	533.5	0.4	1,696.0

Source: Crisil Intelligence

6 Traffic Growth Estimation & Traffic Forecast

6.1 Approach for traffic growth rates estimation

Crisil, based on its coverage of 80+ sectors and the MSME industry, has developed a knowledge base to understand the growth of industries and demand across various regions and clusters. The growth expectations for various industries are applied to each vehicle category based on the commodity composition of the vehicle category. For example, the share of light commercial vehicles (LCVs) carrying agricultural commodities is expected to grow as per agricultural output growth; the share of LCVs carrying consumer products is expected to grow as per the volume growth of durables; and the share of Multi axle vehicles (MAVs) carrying steel commodities is expected to grow as per demand/supply volume of steel products based on regional dynamics. This approach helps Crisil provide a more accurate growth rate of commercial traffic in the region.

For passenger traffic, Crisil assesses the sale of passenger cars in the region, growth of vehicular population, purpose and frequency of passenger travel, population growth, expansion of the city, and infrastructure development in the catchment area.

Further, Crisil also examines the various factors that will impact traffic over the concession period, such as upcoming alternative road routes, truck aggregation by logistics players, dedicated freight corridors and other transportation options. Thus, the analysis considers the impact of central and state policies, growth in production and consumption centres along the stretch, and infrastructure in the adjoining regions. The report covers both growth drivers and restraints for the traffic along the stretch. CRISIL has enumerated and detailed the parameters that will positively/negatively impact the traffic on the stretch in the future.

Crisil has used its proprietary traffic projection methodology to project traffic using regional industry growth assumptions, macroeconomic developments, infra development and consumption centre growth factors of the catchment area and adjacent regions.

Figure 6-1: Commodity based approach: Illustrative example for Commercial vehicles

Commodity	MAV (Vehicles) Year 1	YoY growth	MAV (Vehicles) Year 2
Construction materials	300	9%	327
Consumer products	100	4%	104
Agri Produce	200	3%	206
Iron & Steel products	50	9%	55
Chemical products	200	5%	210
Total vehicles	XX		YY

Commodity	LCV (Vehicles) Year 1	YoY growth	LCV (Vehicles) Year 2
Construction materials	100	9%	109
Consumer products	200	4%	208
Agri Produce	50	3%	52
Iron & Steel products	300	9%	327
Chemical products	200	5%	210
Total vehicles	XX		YY

Growth rates for commodities are based on commodity specific demand/supply drivers and regional dynamics

6.2 Kerala State profile

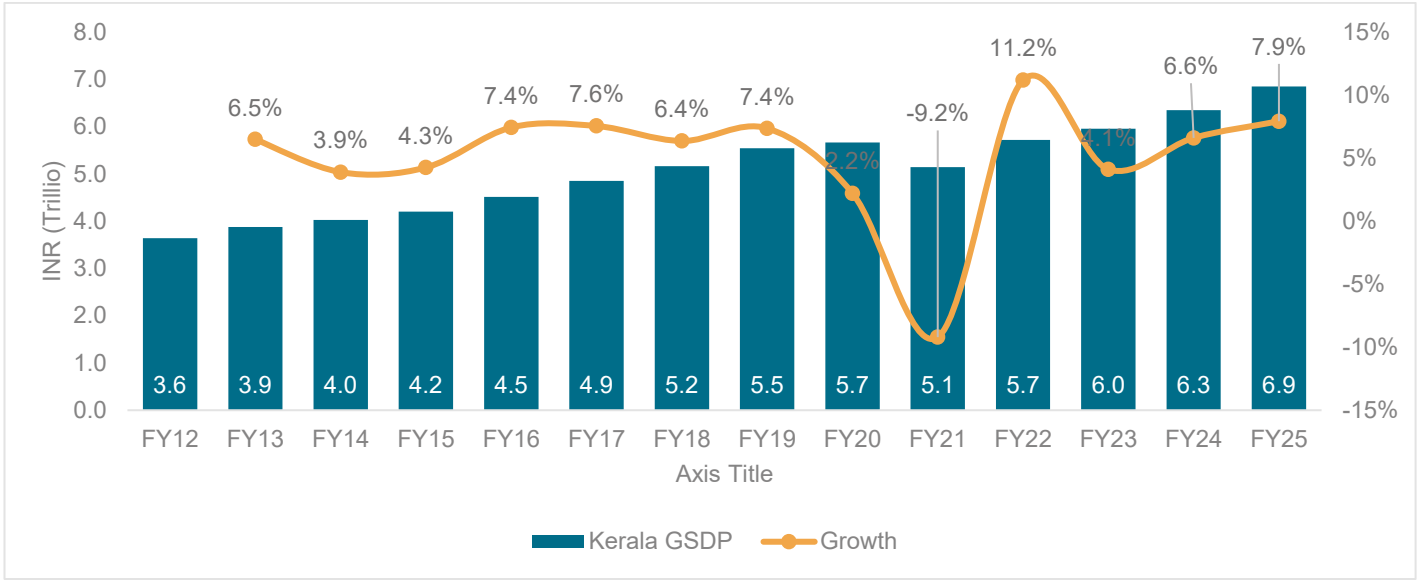
Located on the southwestern Malabar Coast of India, Kerala, affectionately known as "God's Own Country," spans 38,863 square kilometers along the Arabian Sea. Despite accounting for only 1.18% of India's total area, the state is home to ~3.5% of the country's population. Kerala's unique geography is characterized by a 580-kilometer coastline with an average width of 35-120 kilometers, bordered by Karnataka to the north, Tamil Nadu to the east, and the Laccadive Sea to the west. The state's diverse topography is divided into three distinct zones: the coastal lowlands, midland hills, and Western Ghats highlands, creating a variety of agro-climatic zones that support diverse economic activities. Kerala's tropical monsoon climate is marked by an average annual rainfall of 3,000mm, with precipitation from both southwest and northeast monsoons, ensuring abundant water resources through 44 rivers that create the state's famous backwater networks, which span over 1,500 kilometres of interconnected canals, rivers, and lakes and generates tourism footfall.

The service sector dominates the state's economy led by the Information Technology (IT) sector in software exports from government IT parks. The IT sector is a significant contributor to the state's economy, with major global corporations such as TCS, Wipro, IBM, Cognizant, and KPMG establishing operations in the state. The manufacturing sector contributes with traditional industries such as coir processing, cashew processing, marine products, spices, rubber, and handloom textiles playing a significant role. The state is home to five specialized Food Processing Parks and two Mega Food Parks, leveraging its agricultural strengths in spices, coconut, marine products, and cash crops.

Kerala's agriculture sector, despite occupying only 54% of the state's land area, demonstrates exceptional productivity and export orientation, contributing significantly to India's agricultural exports. The state is renowned as the "Spice Garden of India" and "Land of Coconuts," producing black pepper, nutmeg, cardamom, and ginger etc. The state produces ~75% of India's EU-certified seafood, with marine product exports. Kerala is also a significant producer of coffee, tea, rubber, and various horticultural crops, supported by its favourable tropical climate and abundant water resources.

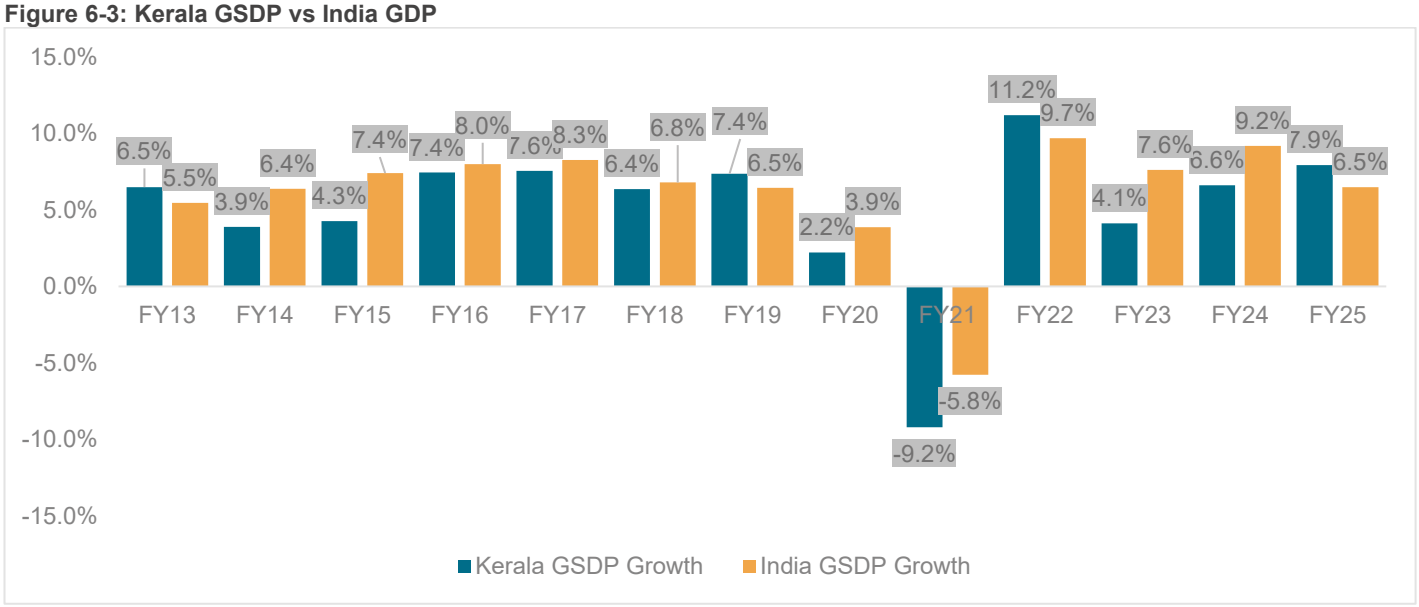
Kerala's strategic coastal location provides exceptional connectivity advantages through comprehensive maritime, aviation, road, and rail infrastructure. The Cochin Port, established in 1928, is one of India's major ports, handling diverse cargo including containers, petroleum products, fertilizers, and bulk commodities. The ports in Kerala accommodating large vessels and providing efficient connectivity to Karnataka, Tamil Nadu, and Kerala hinterland through integrated road, rail, and waterway networks. The comprehensive transportation infrastructure supports the state's role as a major exporter of spices, marine products, coir, cashews, textiles, and IT services to international markets.

Figure 6-2: Kerala GSDP at constant price



Source: MOSPI, Crisil Intelligence

Figure 6-3: Kerala GSDP vs India GDP



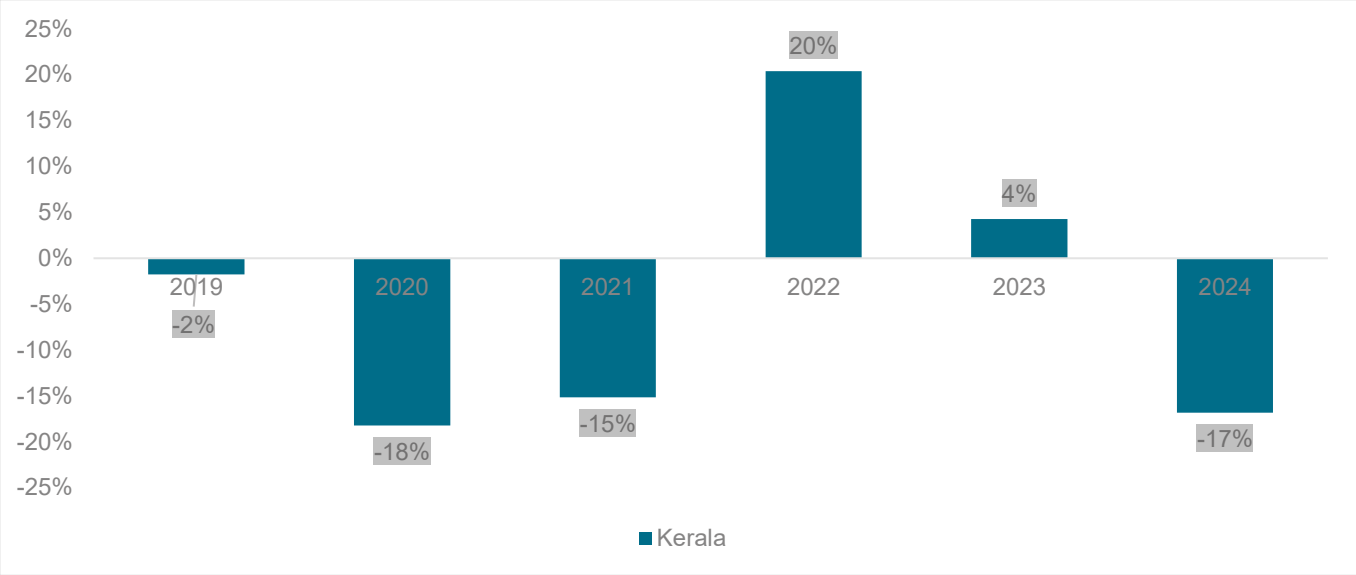
Source: MOSPI, Crisil Intelligence

6.3 Outlook for Car growth

The rate of car ownership in India has increased from 6.6 per 1,000 people in 2001 to 25 per 1,000 people in 2019. Despite India's car fleet growing at an annual rate of 10% for nearly 25 years, the rate of car ownership remains low compared to countries with similar economic status and significantly lower than developed countries, which have a rate of around 450 per 1,000 people. This low rate of car ownership indicates potential for continued growth in the coming years. With the ongoing increase in car ownership and improvements in the road network, the use of cars for inter-urban travel is showing a growing trend.

Vahan Dashboard by Ministry of Road Transport & Highways (MoRTH), shows good growth in motors cars for last decade has shown 4.7% registered vehicle growth. Motor cars data for Gujarat state from Vahan dashboard is compiled in the below chart.

Figure 6-4: Motor Car vehicle registration growth



Source: Vahan Dashboard, Ministry of Road Transport & Highways (MoRTH)

6.4 Tourism Overview

Kerala's tourism industry is a cornerstone of the state's economy, attracting over 2.2 crore domestic tourism footfall in 2023 establishing it as one of India's premier destinations. Recognized by National Geographic Traveler as one of the "ten paradises of the world" and listed by TIME magazine in 2022 among the 50 extraordinary destinations, Kerala's tourism success stems from its unique natural attractions, cultural heritage, and wellness offerings. The state's backwaters, a network of 1,500 kilometers of lagoons, lakes, and canals, provide unparalleled experiences through 1,000 houseboats operating primarily in Alleppey and Kumarakom regions. Ayurveda and wellness tourism attract international visitors seeking traditional treatments, while hill stations like Munnar, Wayanad, and Thekkady offer biodiversity experiences through 18 wildlife sanctuaries and 2 national parks.

Table 6-1: Tourist arrival statistics (Million)

Year	2023	2022	2021	2020	2019	CAGR (19-23)
India	2,510	1,731	678	610	2,322	1.96%
Kerala	22	19	8	5	18	4.44%

Source: Ministry of Tourism, Crisil Intelligence

India's total tourist arrivals increased from 2,322 million in 2019 to 2,510 million in 2023, showing recovery and growth. However, Kerala has clocked a modest 4.44% CAGR between FY19 to FY23.

Project road provides direct connectivity to Munnar and Kochi. CJV traffic has grown with modest 5.8% CAGR during FY23 to FY25 at toll plaza of project stretch. Considering slowdown in vehicle registration and mild growth in CJVs, a modest ~5.6% of CAGR is expected till the end of Concession period.

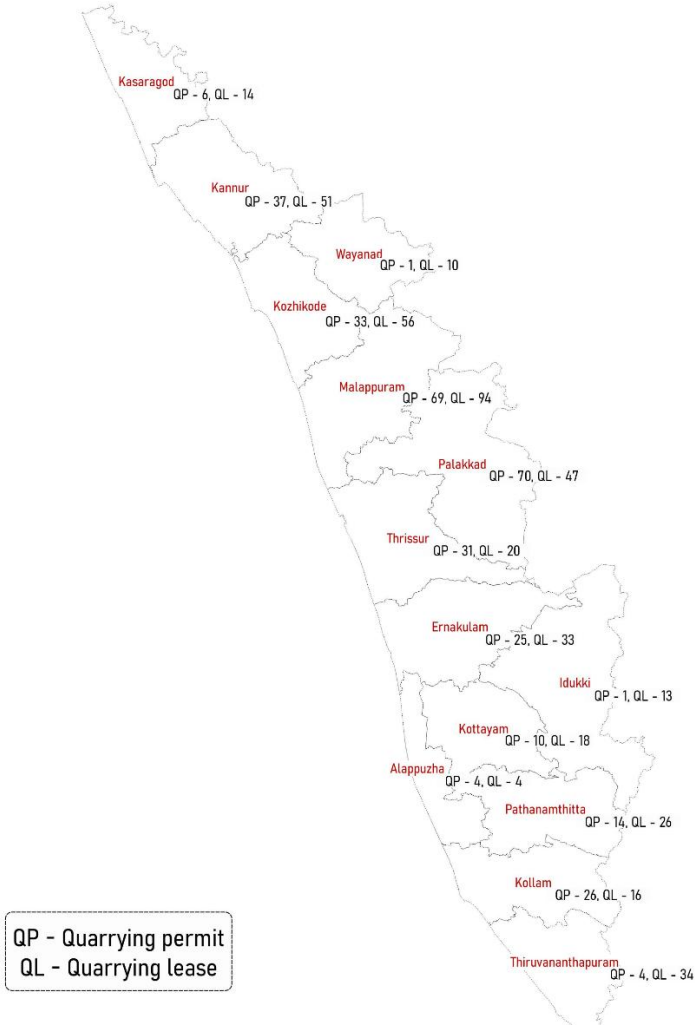
6.5 District wise details of Quarries in Kerala

Palakkad district is the major contributor of construction material traffic at project stretch. Kerala's construction material demand is also being catered by Malappuram, Kozhikode, and Kannur district. Traffic from Northern part of Kerala is travelling via NH-66 which is currently under upgradation and tollfree. Stakeholders' interactions in

project catchment have verified that the Kerala's demand for construction material is largely fulfilled by quarries housed in Kerala itself.

Image and table shown below represents the status of quarries, permits and leases in Kerala State. Quarrying permit is a short-term permit (up to 1 ha area and up to one year duration) issued for quarrying of minor minerals and Quarrying lease is a long-term permit (up to 12 years) issued for quarrying of minor minerals.

Figure 6-5: Key districts holding quarry permits & leases



Source: Kerala DMG, KOMPAS, Crisil Intelligence
Note: Numbers may vary depending on issuance/termination/completion of leases and permits

Table 6-2: Dealers' license statistics

Dealers License	Without Crusher	With Crusher
Thiruvananthapuram	139	27
Kollam	101	67
Pathanamthitta	43	21
Alappuzha	157	7
Kottayam	40	54
Idukki	30	32
Ernakulam	10	90
Thrissur	32	34

Dealers License	Without Crusher	With Crusher
Palakkad	47	89
Malappuram	29	101
Kozhikode	31	68
Wayanad	72	23
Kannur	57	95
Kasargod	25	23
Total	813	731

Source: Kerala DMG, KOMPAS, Crisil Intelligence

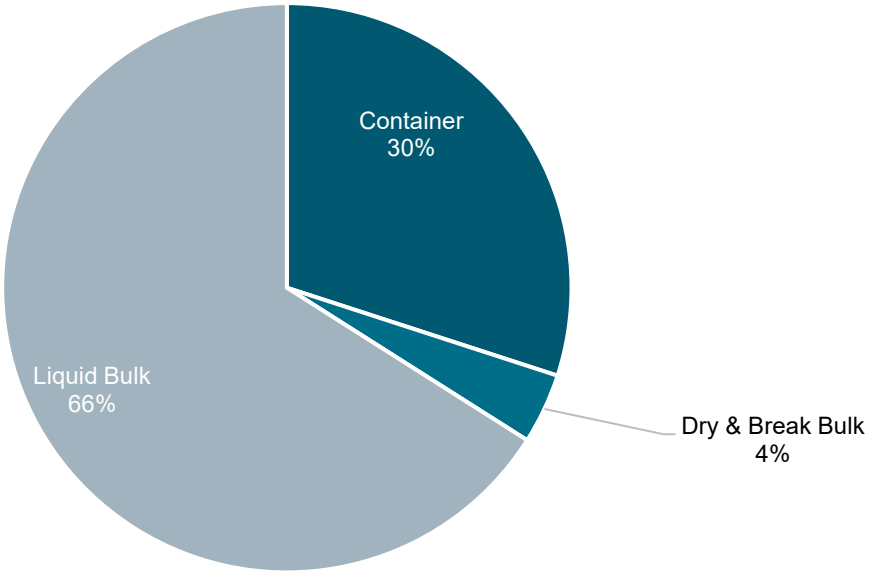
Project influence area including Thrissur, Palakkad and Ernakulam combined has 89 dealer's licenses without crusher and 213 dealer's licenses with crushers. Construction material demand in catchment area will be fulfilled with locally available construction material till stringent norms in Kerala and Tamil Nadu eases up leading to surge in traffic.

6.6 Cochin Port Assessment

Cochin Port achieved a record cargo throughput of 37.75 million metric tons (MMT) in FY 2024-25, representing a 3.94% increase over the previous fiscal year. Liquid bulk cargo dominated the port's traffic, accounting for 66% (25.10 MMT) of the total cargo, with crude oil being the major contributor (17.26 MMT).

Image below shows the cargo profile of Cochin port:

Figure 6-6: Cargo profile of Cochin port



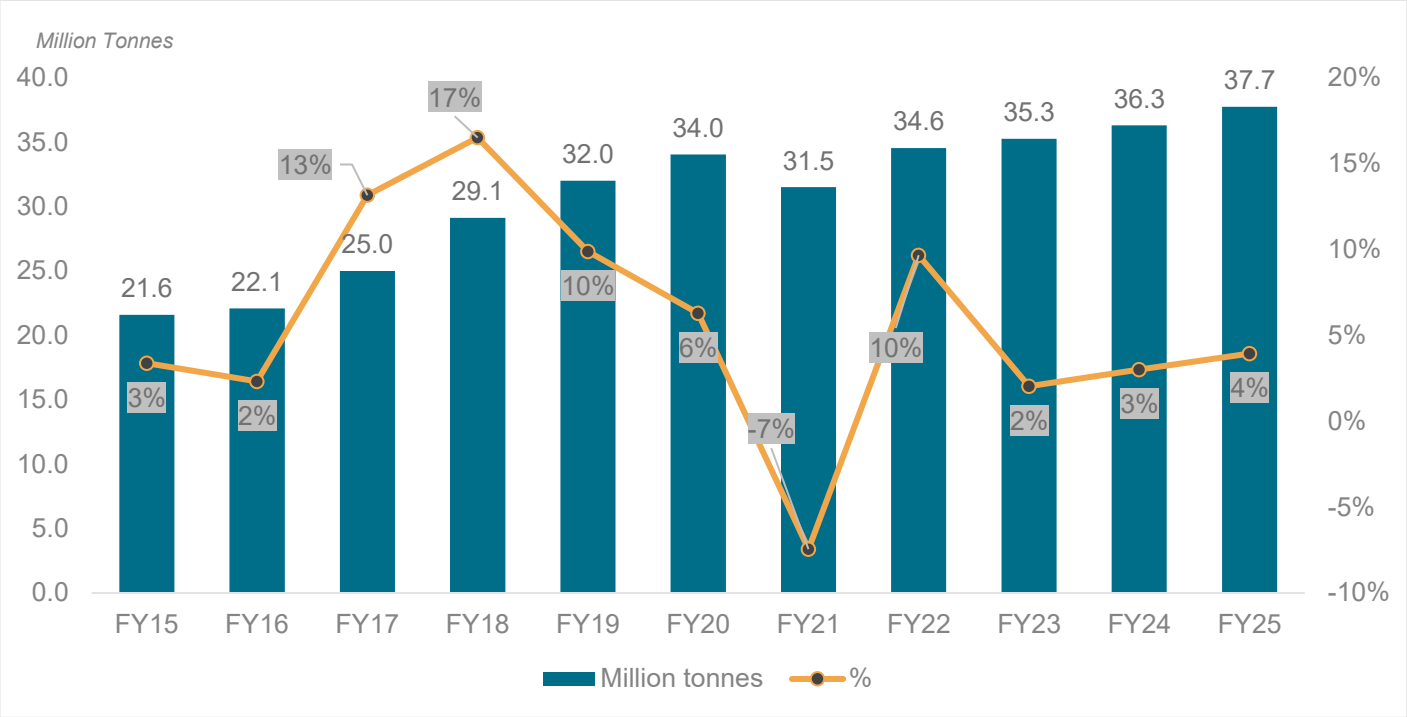
Source: Port website, Indian Ports Association, Cochin Port Authority, Crisil Intelligence

Containers constituted 30% of the port's cargo profile. The port handled a record 834,665 TEUs in FY 2024-25, registering an 11% growth compared to the previous year, with transhipment volume reaching 169,562 TEUs. The

average monthly throughput improved to 69,555 TEUs, clocking an 11% growth. The port handled 1.38 MMT of dry and break bulk cargo, which included cement, rock phosphate, salt, sulphur, and steel products, with cement handling increasing by 10.67% to 8.36 lakh MT during the FY.

Image below shows the traffic growth for Cochin port over years

Figure 6-7: Traffic growth for Cochin port



Source: Port website, Indian Ports Association, Cochin Port Authority, Crisil Intelligence

Import of of Agro and Chemicals at Cochin port in FY25 has increased while imports of Construction material, Packaging Products, Mineral/Metals and Iron & Steel has shown dip in FY25. Textile, Chemicals and Agro export have clocked upward movement while food products exports is down since last year. Automobile and Construction material export have remained on similar levels in FY25 vis-à-vis FY24

Table below details major EXIM commodity at Cochin port.

Table 6-3: Dealers' license statistics

Year	2025	Year	2025
Commodity	Imports	Commodity	Exports
Agro	23%	Textiles	28%
Chemicals	20%	Agro	24%
Construction	12%	Food products	12%
Packaging	9%	Reefer	10%
Metals/Minerals	7%	Chemicals	5%
Textiles	5%	Automobile	3%
Household items	4%	Machinery	2%
Iron and Steel	3%	Construction	2%
Machinery	3%	Household items	2%
Food products	3%	Metals/Minerals	2%

Source: Port website, Indian Ports Association, Cochin Port Authority, Crisil Intelligence

6.7 Commodity Overview

As mentioned in section primary data collection & analysis, the analysis of freight movement across the toll plaza reveals that the major commodities being transported include Agri produce, Construction Materials, Courier and Parcel, and Consumer goods (including Milk and animal food), etc.

Agri Produce

Agri Produce hold 17.1% overall share in which majority of share is held by horticulture crops followed by Rice and Wheat highlighting the importance of this corridor for the movement of farm products. In past 2 fiscal years (FY23-FY25), Kerala's Primary sector GSDP (barring Fishing and aquaculture as well as Mining and quarrying) at constant price has clocked ~1.5% CAGR which is better that long term average of ~0.75% CAGR growth over past 6 fiscals (FY19-25).

Thrissur, Palakkad and Ernakulam districts are major contributors to Agri bound movement. Palakkad is among the largest districts in terms of agricultural production, while Thrissur and Ernakulum are largest in terms of district output. So, as per horticulture production data upto Fiscal 2023 published by Directorate of Economics and Statistics, nearly 3.8% of CAGR growth for FY19-23 is recorded on overall basis for all 3 districts of Kerala. 7 years long term data of production shows that agriculture production has clocked 1.9% CAGR for Fiscal 2016-23. The Indian agriculture sector is highly volatile as it is still dependent on the outcome of the monsoon season.

Historical trends across key states to the project stretch i.e. Kerala and Tamil Nadu have shown volatile production figures of agriculture sector. Such volatility is evident across India. Crisil expects Agri produce to grow with 2-3% CAGR during concession period majorly led by horticulture and consumption demand.

Construction Materials

Construction materials have 9.7% overall share which is second largest commodity plying on project stretch and largely driven by ongoing infrastructure, real estate expansion and urbanization along the corridor which drive the demand for construction materials, including cement, sand, stones, aggregate, etc.

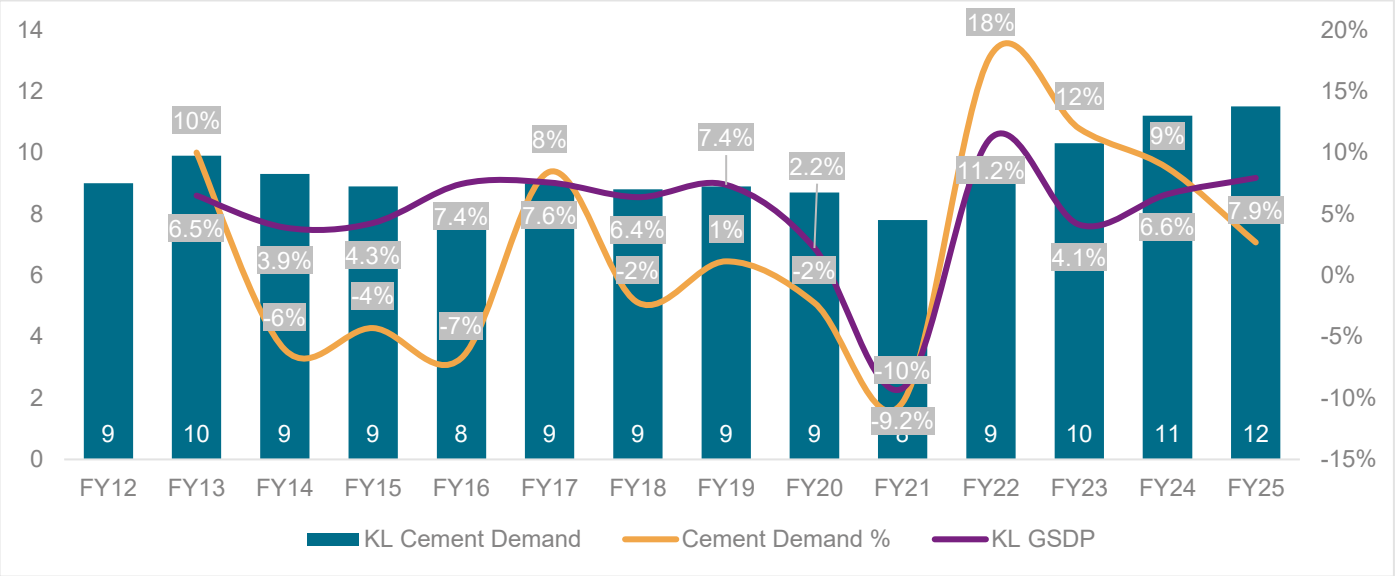
Outbound movement from Malabar cement factory and ACC Madukkarai Cement plant are largely driving construction material growth on project stretch. Construction material is largely destined to Thrissur, Kochi, Aluva and Ernakulam. Traffic will be supported by road construction in the shorter term, while in the industrial/commercial development across project stretch (food park, Kochi-Bengaluru Industrial Corridor, Urban projects in Ernakulum) will support growth in the long term

Kerala has witnessed mild ~4% CAGR growth in the past decade driven by factors such as impacted infrastructure development, industrialization, and urbanization due to adverse weather conditions and stringent norms related to mining activities. It is expected to grow on moderate pace in future years driven by factors such as ongoing infrastructure projects and growth in the housing segment.

Construction material demand is expected to grow by ~4-5% till the end of concession period majorly led by infra segment on lower base of construction activities and demand ramp up due to state elections followed by central elections.

Historical cement demand is shown in the image below.

Figure 6-8: Cement Demand growth in Kerala



Source: CMA, Industry, Crisil Research Estimates

Courier and Parcel

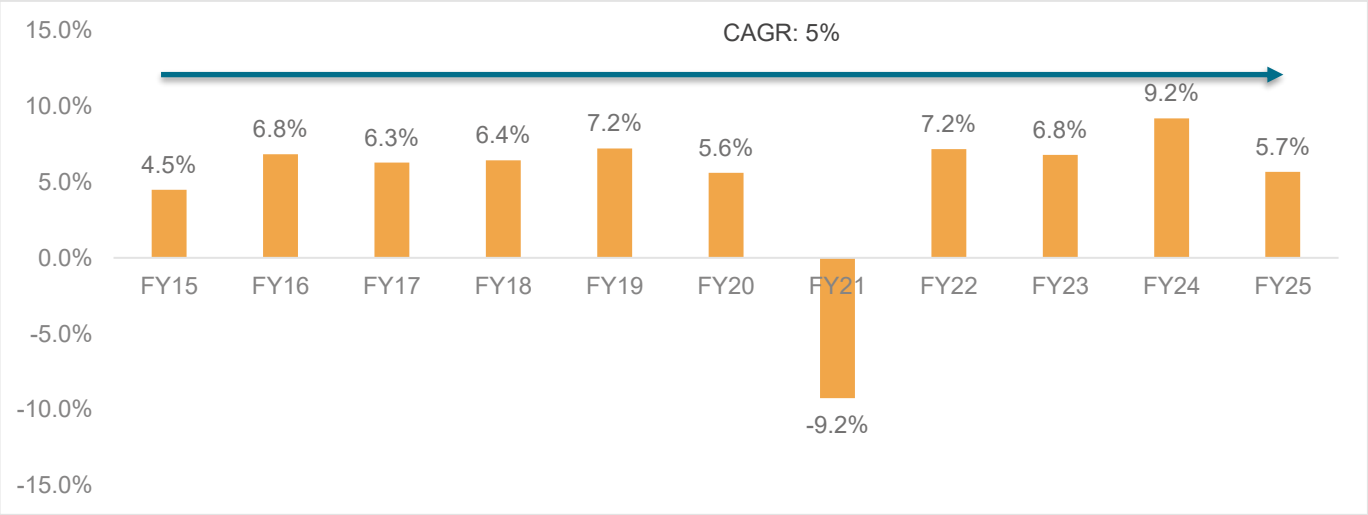
Kochi, Coimbatore, Palakkad, Thrissur, Ernakulam and Chennai are key origins and destinations for courier and parcel category representing medium to short distance movement. Courier parcel as a commodity is majorly e-commerce traffic, routed through warehousing hubs at Coimbatore and Bangalore. Roughly equal traffic is observed in both directions (from Kerala and to Kerala). Coimbatore and Bangalore, also cater to manufacturing traffic from Kerala.

As statewide developments are rapidly increasing, Tertiary sector growth is also in line with the same. Heavy proposed capex will increase in future growth of tertiary activities and hence the demand.

- Low online penetration, rising internet penetration and increasing online shoppers to drive growth in online retail

Tertiary sector growth for Kerala is shown in the image below. While the decadal growth remains modest 5% CAGR, recent fiscal 2023-25 growth has picked up by clocking over 7% CAGR for Tertiary sector. Courier and parcels category is likely to grow at 7% CAGR during the concession period.

Figure 6-9: Tertiary sector growth



Source: MOSPI, Crisil Intelligence

Consumer Goods

Consumer goods are inclusive of Consumer foods, Consumer products, Milk and Animal foods. The consumer product and foods category largely comprises processed food, FMCG, and other grocery items, driven by consumption demand in Kerala. Kerala to Tamil Nadu movement, however, fragmented, is also seen for processed food and grocery items. Fishing and aquaculture GSDP have clocked decadal CAGR growth of ~2.2% and in ~3.25% CAGR in fiscal 2023-25 in Kerala state.

The consumer foods industry is set for modest growth in the short term due to increased investments in the industry backed by favourable economic and demographic conditions in the key destination states. Ernakulum is a major marine processing cluster, with largest cold storage capacity. The region is also a major consumption center for food and groceries. Food processing clusters in Palakkad will further support the traffic.

Crisil expects traffic to sustain growth of ~3% CAGR over the long term. The industry is witnessing an increase in household consumption of food items and higher demand for packaged foods. The same will be favourable to the food processing cluster in Kerala. Kerala Industrial Infrastructure Development Corporation (KINFRA) has constructed a 'Mega Food Park' in Palakkad district. The Central processing Centre in Palakkad will be supported by Primary Processing Centers for Agri produce at Ernakulum, Thrissur, Malappuram and Wayanad. Development of food processing ecosystem will be positive. Planning of new Food Processing (Kalamassery) Project in Ernakulam district is also underway.

6.8 Commodity Outlook

Crisil Intelligence has forecasted the freight traffic growth based on the growth in relevant sectors influencing traffic in the region. Industry growth has been analysed and forecasted based on our proprietary database of industries for the surrounding regions that impact traffic on project road as well as our internal assessment on a relevant set of sectors at the pan India level.

Package wise forecast incorporates the regional dynamics including, but not limited to, investments, commodity trends, district output (GDDP) profile (primary/secondary, construction/manufacturing) etc.

The traffic for the coming years is projected by factoring in the impact of these parameters on commodity wise growth rates and is presented in below table.

Table 6-4: Commodity Outlook for the Project Section

Commodity	Share	FY26-30	FY30-35	FY 26-37
Agri Produce	17.3%	2.7%	2.3%	2.4%
Automobiles	1.7%	5.1%	4.2%	4.5%
Chemical products	2.6%	4.0%	3.1%	3.4%
Coal	0.1%	2.6%	2.1%	2.2%
Construction materials	9.7%	5.2%	5.5%	5.2%
Consumer Foods	4.7%	3.7%	2.8%	3.1%
Consumer Products	3.8%	3.7%	2.8%	3.1%
Container	0.8%	4.5%	3.6%	3.8%
Courier & parcel	8.6%	7.8%	7.0%	7.1%
Iron & Steel Products	2.4%	5.2%	5.5%	5.2%
Machinery	1.1%	2.9%	2.3%	2.4%
Milk & Animal Food	5.4%	3.7%	2.8%	3.1%
Others	3.6%	6.1%	5.3%	5.5%
Paper products	1.0%	4.5%	3.6%	3.8%
Petroleum Products	3.3%	2.7%	2.1%	2.2%
Pharmaceuticals	0.6%	3.6%	2.8%	3.0%
Plastic products	1.8%	4.5%	3.6%	3.8%
Plywood & Timber products	3.7%	3.6%	2.8%	3.0%
Rubber products	0.6%	4.5%	3.6%	3.8%
Textile & Footwear	1.4%	3.2%	2.5%	2.7%
Tiles & Ceramic products	1.7%	2.7%	2.1%	2.2%

Source: Industry, Crisil Intelligence

6.9 Traffic Projections

The total traffic projected in terms of PCUs based on most likely growth rates and after impacts is presented in below table.

Table 6-5: Traffic projections – Panniyankara TP

Financial Year	Car/Jeep/Van	LCV/Minibus	2 Axle Bus/truck	3 Axle Truck	MAV	OSV	Total Veh.	Total PCU
2026	18,631	2,083	2,924	753	3,036	2	27,430	46,461
2027	19,842	2,159	3,026	748	3,181	2	28,958	48,725
2028	21,100	2,239	3,134	747	3,506	2	30,727	51,885
2029	22,404	2,317	3,241	744	3,690	2	32,398	54,449
2030	23,753	2,393	3,348	740	3,876	2	34,112	57,057
2031	25,149	2,470	3,455	735	4,069	2	35,880	59,744
2032	26,589	2,548	3,563	730	4,267	2	37,699	62,502
2033	28,035	2,626	3,672	724	4,471	2	39,531	65,293
2034	29,485	2,704	3,781	717	4,681	3	41,371	68,111
2035	30,932	2,782	3,889	710	4,892	3	43,208	70,930
2036	32,375	2,858	3,997	701	5,106	3	45,039	73,744
2037	33,810	2,933	4,101	692	5,322	3	46,860	76,549
FY 26 - FY 37	**5.6%**	**3.2%**	**3.1%**	**-0.8%**	**5.2%**	**4.8%**	**5.0%**	**4.6%**

Source: Crisil Intelligence

6.10 Additional Truck Traffic

The construction sector in Kerala is facing a crisis due to the shortage of construction material including sand and

stones as the closure of illegal quarries in Kerala and the imposition of a mineral-bearing land tax in Tamil Nadu have disrupted the supply of construction materials, leading to a shortage and increased costs. The reduction in the number of operational quarries within the state and the obstruction of shipments from other states at border checkpoints have worsened the situation. The soaring prices of materials like metal, stone dust, and M-sand have deepened the crisis. As a result, despite the high cost, the construction sector has been heavily dependent on construction material imported from Tamil Nadu and locally sourced quarry materials as well.

To adjust the impact on construction material related traffic on project stretch due to aforesaid reasons, 150 MAVs have been added to base traffic numbers in FY2028 considering the relaxation on stringent norms and revival in construction activities in catchment area.

Crisil expects that stabilisation in quarrying and mining regulations in both Tamil Nadu as well as Kerala is less likely in current fiscal 2026. Kerala and Tamil Nadu state elections are scheduled in CY2026 after which construction activities in catchment area are likely to show uptick leading to surge in traffic. It is also expected that post state elections mining and quarrying regulations may ease up. Central elections are scheduled in CY2029, pre-election boost in infra segment in catchment area is also highly likely impacting surge in construction material traffic in influence regions.

6.11 Modification in concession period

As per clause 29.1 of concession agreement, the authority and concessionaire acknowledge that the traffic as on October 1st, 2019 (the Target Date) is estimated to be 50,275 PCUs per day (Target traffic) and hereby to determine the modification in concession period, if the Actual Average Traffic shall have fallen short of or exceeded the target traffic by more than 2.5 percent, then there will be an increase or reduction in concession period.

As per clause 29.2 of concession agreement, in the event actual average traffic exceed the target traffic, then for every 1 percent increase, the concession period shall be decreased by 0.75 percent thereof; provided that such reduction in concession period shall not any case exceed 10 per cent of the concession period.

Pursuant to the concession agreement, the actual concession period end date has been revised from 14th September 2032 to 14th September 2036, representing an extension of 1,461 days. This adjustment is attributable to the shortfall of target traffic volumes, as specified in the agreement.

7 Revenue forecast

7.1 General

The project section is under “open tolling system” which enables the concessionaire to collect tolls from long distance as well as short distance traffic joining the project from adjoining highways.

7.1.1 User Fee Schedule

In terms of tollable length for the project road is about 26.755 kms and 1.6 kms of tunnel section. In India, toll rates are as per notification by the Ministry of Road Transport and Highways in the National Gazette. The present toll rates are determined with reference to the published base toll rates and are adjusted annually at the beginning of each fiscal year equal to 40% of the movement in the wholesale price index in December of the preceding year plus a fixed 3%.

As per Gazette notification dated 05.12.2008, under National Highways Fee (Determination of Rates and Collection) Rules 2008 [GSR 838 (E)], Toll rates at Panniyankara Toll Plaza applicable for current fiscal (FY26) is provided below:

Table 7-1: Tolling Tickets

Ticket	Maximum number of one-way journeys allowed	Period of validity
Single/Normal	Single	-
Daily Pass	Multiple	24 hours
Monthly Pass	Multiple	One month from the date of payment
Local Personal	Multiple	One month from the date of payment

7.1.2 Toll Segmentation

Segmented traffic data of 4 months of FY26 data have been used to estimate the toll segmentation and the traffic tolling segmentation in (%) adopted for the present study for FY26 onwards is presented in below table.

Table 7-2: Toll segmentation in % - Panniyankara TP (4MFY26)

4MFY26	Single Journey	Return Journey	Monthly Pass	Local Pass	Exemptions	Total
Car/Jeep/Van	36.5%	54.1%	0.1%	0.7%	8.6%	100.0%
Minibus	31.6%	63.9%	4.4%	0.0%	0.1%	100.0%
2 Axle Bus	16.1%	66.9%	16.8%	0.0%	0.2%	100.0%
LCV	32.9%	64.4%	0.4%	0.0%	2.2%	100.0%
Truck	50.6%	48.3%	0.9%	0.0%	0.2%	100.0%
3 Axle Truck	49.3%	50.5%	0.0%	0.0%	0.1%	100.0%
MAV	50.3%	49.6%	0.0%	0.0%	0.1%	100.0%
OSV	71.0%	29.0%	0.0%	0.0%	0.0%	100.0%

Source: Historical toll data, Crisil Intelligence

7.1.3 Trip Rates

The trip rates are adopted based on the FY25 and 4 Month FY26 historic traffic data and trip rates for the present study for FY26 onwards is presented in below table.

Table 7-3: Trip rates adopted

Vehicle category	Single journey	Return journey	Monthly Pass	Special Trip	Local Pass
Car/Jeep/Van	1.00	2.00	50.00	1.00	50
Minibus	1.00	2.00	50.00	1.00	
2 Axle Bus	1.00	2.00	50.00	1.00	
LCV	1.00	2.00	50.00	1.00	
2 Axle Truck	1.00	2.00	50.00	1.00	
3 Axle Truck	1.00	2.00	50.00	1.00	
MAV	1.00	2.00	50.00	1.00	
OSV	1.00	2.00	50.00	1.00	

Source: Historical toll data, Crisil Intelligence

7.1.4 Tolling lengths

In terms of tollable length for the project road is about 26.755 kms and 1.6 kms of tunnel section. In India, toll rates are as per notification by the Ministry of Road Transport and Highways in the National Gazette. The present toll rates are determined with reference to the published base toll rates and are adjusted annually at the beginning of each fiscal year equal to 40% of the movement in the wholesale price index in December of the preceding year plus a fixed 3%.

Table 7-4: Tolling Lengths

Project Section	Toll Plaza Location (Kms)	Toll plaza Name	Length (km)
Vadakanchery (Km 236.135) to Thrissur (Km 264.490) section of NH544 a total length of 28.355 (26.755 km road + 1.6 km tunnel) in the state of Kerala	239.030	Panniyankara Toll Plaza	28.355

Source: Concession Agreement, Crisil Intelligence

7.1.5 Toll Rates Estimation

The toll rates (Rs/km) for the base year 2007 for different vehicle categories are as per fee rule/concession agreement mentioned above and are presented in the below table.

Table 7-5: Base Rate in Rs/km

Vehicle Type	Base rate of fee per km for the per km length
Car, Jeep, Van, or Light Motor Vehicle	0.61
Light Commercial Vehicle, Light Goods Vehicle or Minibus	1.07
Bus or Truck (Two Axles)	2.13
Three-axle commercial vehicles	3.43

Vehicle Type	Base rate of fee per km for the per km length
Heavy Construction Machinery (HCM) or Earth Moving Equipment (EME) or Multi Axle Vehicle (MAV) (four to six axles)	3.43
Oversized Vehicles (seven or more axles)	3.43

Source: Client's documents

Table 7-6: Toll fee for FY26

Toll rates	Single Journey	Return journey	Monthly Pass	Local Commercial	Local Pass
Car/Jeep/Van	115	170	3,825	55	350
Minibus	180	265	5,925	90	
2 Axle Bus	360	540	12,005	180	
LCV	180	265	5,925	90	
Truck	360	540	12,005	180	
3 Axle Truck	550	825	18,305	275	
MAV	550	825	18,305	275	
OSV	710	1,060	23,590	355	

Source: Fee notification, Crisil Intelligence

7.1.6 Review and Outlook of Whole-Sale price index (WPI)

The projected toll rates are dependent on Wholesale Price Index (WPI) assumptions for 2024 to 2036. For WPI projection, Crisil Intelligence has relied on inputs from Client. Past and outlook WPI growth is presented in below table.

Table 7-7: WPI

Year	WPI	Expected Year-on-year growth
2025	478.6	
2026	492.9	3.0%
2027	513.9	4.3%
2028	535.7	4.3%
2029	558.5	4.3%
2030	581.9	4.2%
2031	606.4	4.2%
2032	631.8	4.2%
2033	658.1	4.2%
2034	685.4	4.2%
2035	713.8	4.2%
2036	743.1	4.1%

Source: Projected WPI (P): - Client Input

7.2 Revenue Estimates

The revenue projections for the project road are presented in the below table.

Table 7-8: Revenue in ₹ Million for the Project Section: Panniyankara TP

Fiscal Year	Car/Jeep /Van	Minibus	2 Axle Bus	LCV	Truck	3 Axle Truck	MAV	OSV	Total	YOY
2026	599.3	17.5	121.3	93.0	198.9	132.0	533.5	0.4	1,696.0	
2027	671.2	18.8	130.3	99.7	214.0	135.8	579.3	0.5	1,849.4	**9.0%**
2028	740.2	20.5	141.1	109.3	231.8	142.1	669.0	0.5	2,054.6	**11.1%**
2029	820.9	21.8	152.8	116.3	251.4	148.0	735.9	0.6	2,247.7	**9.4%**
2030	909.8	23.7	164.2	126.1	269.6	153.2	804.9	0.6	2,452.0	**9.1%**
2031	1,004.9	25.6	177.4	136.4	291.3	159.2	883.9	0.7	2,679.4	**9.3%**
2032	1,127.3	27.7	191.8	147.5	314.7	165.8	972.5	0.7	2,947.9	**10.0%**
2033	1,231.8	29.7	207.1	158.1	340.1	171.6	1,063.2	0.8	3,202.4	**8.6%**
2034	1,364.0	32.1	222.3	171.0	364.4	178.2	1,166.4	0.9	3,499.2	**9.3%**
2035	1,482.2	34.6	239.5	184.2	392.4	184.0	1,272.7	1.0	3,790.7	**8.3%**
2036	1,631.1	37.4	258.2	198.4	422.2	190.3	1,390.3	1.0	4,128.9	**8.9%**
2037	1,771.4	40.0	277.0	211.8	451.5	196.1	1,513.1	1.1	4,462.1	**8.1%**
CAGR (26-37)	**10.4%**	**7.8%**	**7.8%**	**7.8%**	**7.7%**	**3.7%**	**9.9%**	**9.5%**	**9.2%**	

Source: Crisil Intelligence



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Traffic & Revenue Assessment for Ahmedabad-Maliya Road section of SH-17 and SH-07 from Km 13.930 to Km 194.633 in the state of Gujarat

Addendum

March 2026

Addendum Note:

This addendum serves to update the report released in November 2025 ("**Original Report**"), regarding traffic and revenue figures. Apart from the specific items included in this addendum dated [●], 2026 ("**Addendum**"), no other sections, findings, or conclusions of the Original Report have changed. It should also be highlighted that the assumptions stated in the addendum do not amend or affect any other assumptions or analytical elements in the Original Report.

The following updates have been made:

1. **Fiscal 2026 Estimates**: The base year estimates for Fiscal 2026 have been updated based on traffic data collected from April 2025 to January 2026. This update includes revisions to both traffic and revenue estimates for the base year, replacing the previous estimates, which were based on data from April 2025 to July 2025.
2. **Fiscal 2027 Revenue**: The revenue projections for Fiscal 2027 have been updated to reflect the most recent Wholesale Price Index (WPI) data available for January 2026. This update applies this asset where the January 2026 WPI is relevant for toll calculations.
3. **Traffic Growth Rates**: There have been no changes to the traffic growth rates applicable to the respective assets.

This addendum ensures that the report reflects the most current data and projections. Traffic and revenue details based on these updates are as provided below

Traffic (FY26E)

Toll plaza	Particulars	Traffic (in PCUs)
Sanand (TP01)	FY26E Traffic, based on April – January 2026 data	62,730
	FY26E Traffic, based on April – July 2025 data	59,861
Malvan (TP02)	FY26E Traffic based on April – January 2026 data	36,377
	FY26E Traffic, based on April – July 2025 data	34,493
Soladi (TP03)	FY26E Traffic based on April – January 2026 data	43,626
	FY26E Traffic, based on April – July 2025 data	44,342
Aniyari (TP04)	FY26E Traffic based on April – January 2026 data	33,605
	FY26E Traffic, based on April – July 2025 data	35,785

Revenue in Million (FY26E and FY27P)

FY26E Revenue based on April – January 2026 data	4,539.6
FY26E Revenue, *based on April – July 2025 data*	4,504.9
FY27P Revenue, *based on actual Jan 2026 WPI**	4,850.2
FY27P Revenue, *based on estimated Jan 2026 WPI**	4,824.2

**It is to be noted that the Jan month WPI is used for toll calculations for AMTL and not Dec month.*

Traffic growth rates and revenue projections applicable

Traffic growth rates

Vehicle category	FY 26 - FY 30	FY30-34	FY26-34	FY26-38	FY34-38
Sanand (TP01)					
CJV	7.5%	6.4%	6.9%	6.4%	5.2%
LCV/MINIBUS	3.6%	3.2%	3.4%	3.1%	2.6%
BUS	3.4%	3.1%	3.3%	3.1%	2.9%
TRUCK 2 AXLE	4.2%	3.6%	3.9%	3.6%	3.0%
TRUCK 3 AXLE	2.2%	1.6%	1.9%	1.6%	1.0%
MAV+OSV	5.3%	4.7%	5.0%	4.7%	4.1%
Total	**6.5%**	**5.7%**	**6.1%**	**5.6%**	**4.7%**

Vehicle category	FY 26 - FY 30	FY30-34	FY26-34	FY26-38	FY34-38
PCU	**5.7%**	**5.0%**	**5.4%**	**5.0%**	**4.3%**
Malvan (TP02)					
CJV	7.5%	6.4%	6.9%	6.4%	5.2%
LCV/MINIBUS	3.5%	3.0%	3.2%	3.0%	2.4%
BUS	3.4%	3.1%	3.3%	3.1%	2.9%
TRUCK 2 AXLE	4.1%	3.5%	3.8%	3.5%	2.8%
TRUCK 3 AXLE	2.1%	1.5%	1.8%	1.5%	0.9%
MAV+OSV	5.3%	4.6%	4.9%	4.6%	4.0%
Total	**6.2%**	**5.4%**	**5.8%**	**5.4%**	**4.5%**
PCU	**5.5%**	**4.8%**	**5.2%**	**4.8%**	**4.1%**
Soladi (TP03)					
CJV	7.5%	6.4%	6.9%	6.4%	5.2%
LCV/MINIBUS	3.2%	2.7%	3.0%	2.7%	2.2%
BUS	3.4%	3.1%	3.3%	3.1%	2.9%
TRUCK 2 AXLE	3.9%	3.3%	3.6%	3.3%	2.7%
TRUCK 3 AXLE	2.1%	1.5%	1.8%	1.5%	0.9%
MAV+OSV	5.4%	4.8%	5.1%	4.8%	4.1%
Total	**6.2%**	**5.5%**	**5.9%**	**5.4%**	**4.6%**
PCU	**5.6%**	**4.9%**	**5.3%**	**4.9%**	**4.2%**
Aniyari (TP04)					
CJV	7.5%	6.4%	6.9%	6.4%	5.2%
LCV/MINIBUS	3.2%	2.7%	3.0%	2.7%	2.2%
BUS	3.4%	3.1%	3.3%	3.1%	2.9%
TRUCK 2 AXLE	3.9%	3.3%	3.6%	3.3%	2.7%
TRUCK 3 AXLE	2.0%	1.4%	1.7%	1.4%	0.9%
MAV+OSV	5.3%	4.7%	5.0%	4.7%	4.0%
Total	**6.1%**	**5.4%**	**5.7%**	**5.3%**	**4.5%**
PCU	**5.5%**	**4.8%**	**5.1%**	**4.8%**	**4.1%**

Traffic projections

FY Year	CJV	LCV/MINI BUS	BUS	2 AT	3 AT	MAV+OSV	Total Veh.	Total PCU	YoY Growth (%)
Sanand (TP01)									
FY-2026	23,116	1,799	2,152	1,565	747	5,228	34,606	62,730	
FY-2027	24,919	1,870	2,227	1,636	766	5,524	36,941	66,467	6.0%
FY-2028	26,804	1,939	2,303	1,706	783	5,823	39,358	70,292	5.8%
FY-2029	28,771	2,008	2,381	1,776	799	6,126	41,862	74,220	5.6%
FY-2030	30,819	2,076	2,459	1,846	814	6,434	44,449	78,244	5.4%
FY-2031	32,947	2,145	2,538	1,916	828	6,749	47,123	82,380	5.3%
FY-2032	35,109	2,213	2,619	1,986	842	7,071	49,840	86,589	5.1%
FY-2033	37,297	2,283	2,700	2,057	855	7,401	52,593	90,862	4.9%
FY-2034	39,505	2,351	2,782	2,127	867	7,733	55,365	95,158	4.7%

FY Year	CJV	LCV/MINI BUS	BUS	2 AT	3 AT	MAV+OSV	Total Veh.	Total PCU	YoY Growth (%)
FY-2035	41,727	2,417	2,865	2,196	877	8,067	58,149	99,467	4.5%
FY-2036	43,956	2,482	2,948	2,263	886	8,401	60,937	103,778	4.3%
FY-2037	46,188	2,546	3,033	2,329	895	8,736	63,726	108,090	4.2%
FY-2038	48,415	2,609	3,118	2,396	902	9,079	66,518	112,430	4.0%
CAGR (26-34)	**6.9%**	**3.4%**	**3.3%**	**3.9%**	**1.9%**	**5.0%**	**6.1%**	**5.4%**	
CAGR (26-38)	**6.4%**	**3.1%**	**3.1%**	**3.6%**	**1.6%**	**4.7%**	**5.6%**	**5.0%**	
Malvan (TP02)									
FY-2026	8,036	550	488	810	332	5,028	15,244	36,377	
FY-2027	8,663	571	505	846	340	5,309	16,235	38,486	5.8%
FY-2028	9,318	592	522	881	348	5,593	17,255	40,631	5.6%
FY-2029	10,002	612	540	916	355	5,881	18,306	42,819	5.4%
FY-2030	10,714	631	558	951	361	6,172	19,387	45,044	5.2%
FY-2031	11,454	651	576	986	367	6,469	20,502	47,324	5.1%
FY-2032	12,206	671	594	1,020	373	6,772	21,635	49,645	4.9%
FY-2033	12,966	690	612	1,055	378	7,081	22,783	52,004	4.8%
FY-2034	13,734	709	631	1,089	383	7,391	23,938	54,368	4.5%
FY-2035	14,506	728	650	1,123	387	7,702	25,095	56,733	4.3%
FY-2036	15,281	746	669	1,155	391	8,011	26,252	59,092	4.2%
FY-2037	16,057	763	688	1,187	394	8,320	27,409	61,448	4.0%
FY-2038	16,831	780	707	1,219	397	8,635	28,569	63,827	3.9%
CAGR (26-34)	**6.9%**	**3.2%**	**3.3%**	**3.8%**	**1.8%**	**4.9%**	**5.8%**	**5.2%**	
CAGR (26-38)	**6.4%**	**3.0%**	**3.1%**	**3.5%**	**1.5%**	**4.6%**	**5.4%**	**4.8%**	
Soladi (TP03)									
FY-2026	9,784	700	568	840	382	6,094	18,367	43,626	
FY-2027	10,547	724	588	875	391	6,445	19,571	46,199	5.9%
FY-2028	11,345	749	608	910	400	6,800	20,812	48,822	5.7%
FY-2029	12,177	772	629	945	408	7,160	22,091	51,500	5.5%
FY-2030	13,044	795	649	979	416	7,523	23,407	54,225	5.3%
FY-2031	13,945	817	670	1,013	423	7,897	24,765	57,026	5.2%
FY-2032	14,860	840	692	1,047	429	8,279	26,147	59,880	5.0%
FY-2033	15,786	862	713	1,081	436	8,670	27,548	62,785	4.9%
FY-2034	16,720	883	735	1,115	442	9,062	28,957	65,699	4.6%
FY-2035	17,661	904	757	1,148	447	9,455	30,371	68,617	4.4%
FY-2036	18,604	925	779	1,180	451	9,847	31,785	71,531	4.2%
FY-2037	19,549	944	801	1,211	455	10,240	33,199	74,445	4.1%
FY-2038	20,491	963	823	1,242	459	10,640	34,619	77,388	4.0%
CAGR (26-34)	**6.9%**	**3.0%**	**3.3%**	**3.6%**	**1.8%**	**5.1%**	**5.9%**	**5.3%**	
CAGR (26-38)	**6.4%**	**2.7%**	**3.1%**	**3.3%**	**1.5%**	**4.8%**	**5.4%**	**4.9%**	
Aniyari (TP04)									
FY-2026	6,296	401	305	588	321	5,126	13,037	33,605	

FY Year	CJV	LCV/MINI BUS	BUS	2 AT	3 AT	MAV+OSV	Total Veh.	Total PCU	YoY Growth (%)
FY-2027	6,787	416	315	613	329	5,416	13,875	35,552	5.8%
FY-2028	7,301	429	326	637	336	5,709	14,738	37,531	5.6%
FY-2029	7,836	443	337	661	342	6,006	15,625	39,547	5.4%
FY-2030	8,394	456	348	685	348	6,305	16,536	41,594	5.2%
FY-2031	8,974	469	359	709	354	6,612	17,477	43,697	5.1%
FY-2032	9,563	482	371	732	359	6,926	18,433	45,839	4.9%
FY-2033	10,159	494	382	756	364	7,247	19,402	48,018	4.8%
FY-2034	10,760	507	394	780	369	7,568	20,377	50,202	4.5%
FY-2035	11,365	519	406	802	373	7,889	21,354	52,387	4.4%
FY-2036	11,973	531	417	825	376	8,210	22,331	54,566	4.2%
FY-2037	12,580	542	429	846	379	8,530	23,307	56,743	4.0%
FY-2038	13,187	553	441	868	382	8,857	24,288	58,944	3.9%
CAGR (26-34)	**6.9%**	**3.0%**	**3.3%**	**3.6%**	**1.7%**	**5.0%**	**5.7%**	**5.1%**	
CAGR (26-38)	**6.4%**	**2.7%**	**3.1%**	**3.3%**	**1.4%**	**4.7%**	**5.3%**	**4.8%**	

Revenue projections (Rs Million)

FY Year	Sanand (TP01)	Malvan (TP02)	Soladi (TP03)	Aniyari (TP04)	Total
FY26	1,510.8	823.6	1,400.5	804.6	4,539.6
FY27	1,630.8	875.2	1,492.4	851.8	4,850.2
FY28	1,752.6	941.2	1,615.5	922.7	5,232.1
FY29	1,860.7	1,016.3	1,725.7	991.2	5,593.9
FY30	1,999.2	1,085.2	1,846.1	1,054.9	5,985.4
FY31	2,141.4	1,171.0	1,969.6	1,123.9	6,405.9
FY32	2,298.4	1,253.5	2,102.4	1,218.5	6,872.8
FY33	2,439.1	1,341.5	2,246.7	1,291.1	7,318.3
FY34	2,625.0	1,439.7	2,404.5	1,378.0	7,847.1
FY35	2,785.6	1,523.6	2,564.0	1,468.8	8,341.9
FY36	2,970.0	1,633.4	2,715.9	1,567.0	8,886.3
FY37	3,167.8	1,720.8	2,881.3	1,657.5	9,427.5
FY38	3,337.5	1,843.1	3,055.5	1,758.8	9,994.9
CAGR (FY26-34)	**7.1%**	**7.2%**	**7.0%**	**7.0%**	**10.4%**
CAGR (FY26-38)	**6.8%**	**6.9%**	**6.7%**	**6.7%**	**6.8%**

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Crisil Intelligence is a leading provider of research, consulting, risk solutions and advanced data analytics, serving clients across government, private and public enterprises. We leverage our expertise in data-driven insights and strong benchmarking capabilities to help clients navigate complex external ecosystems, identify opportunities and mitigate risks. By combining cutting-edge analytics, machine learning and AI capabilities with deep industry knowledge, we empower our clients to make informed decisions, drive business growth and build resilient capacities.

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Traffic & Revenue Assessment for Maharashtra Karnataka Border to Sangareddy section of NH-65 (Deccan Tollways Private Limited – DTPL)



Addendum

March 2026

Addendum Note:

This addendum serves to update the report released in November 2025 ("**Original Report**"), regarding traffic and revenue figures. Apart from the specific items included in this addendum dated [●], 2026 ("**Addendum**"), no other sections, findings, or conclusions of the Original Report have changed. It should also be highlighted that the assumptions stated in the addendum do not amend or affect any other assumptions or analytical elements in the Original Report.

The following updates have been made:

1. **Fiscal 2026 Estimates**: The base year estimates for Fiscal 2026 have been updated based on traffic data collected from April 2025 to January 2026. This update includes revisions to both traffic and revenue estimates for the base year, replacing the previous estimates, which were based on data from April 2025 to July 2025.
2. **Fiscal 2027 Revenue**: The revenue projections for Fiscal 2027 have been updated to reflect the most recent Wholesale Price Index (WPI) data available for December 2025. This update applies to assets where the December 2025 WPI is relevant for toll calculations.
3. **Traffic Growth Rates**: There have been no changes to the traffic growth rates applicable to the respective assets.

This addendum ensures that the report reflects the most current data and projections. Traffic and revenue details based on these updates are as provided below

Traffic (FY26E)

(TP01)	FY26E Traffic based on April – January 2026 data	24,849
	FY26E Traffic, *based on April – July 2025 data*	24,389
(TP02)	FY26E Traffic based on April – January 2026 data	38,687
	FY26E Traffic, *based on April – July 2025 data*	38,778

Revenue in Million (FY26E and FY27P)

FY26E Revenue based on April – January 2026 data	2,652
FY26E Revenue, *based on April – July 2025 data*	2,637
FY27P Revenue, *based on actual Dec 2025 WPI*	2,856
FY27P Revenue, *based on estimated Dec 2025 WPI*	2,877

Traffic growth rates and revenue projections applicable

Traffic growth rates

Mangalgi TP

Vehicle Type	FY 26 - FY 31	FY 31 - FY 36	FY 36 - FY 41	FY 41 – FY 44	FY 26 - FY 44
Car/Jeep/Van	5.5%	4.7%	3.9%	3.4%	4.5%
LCV/Minibus	4.4%	4.2%	3.7%	3.2%	3.9%
2 Axle Bus	2.8%	2.6%	2.4%	2.2%	2.5%
Truck	4.6%	4.4%	3.8%	3.3%	4.1%
3 Axle Truck	-0.3%	1.2%	-0.6%	-1.3%	-0.1%
MAV	5.7%	5.3%	4.6%	4.0%	5.0%
OSV	5.7%	5.3%	4.6%	3.3%	5.0%
Total	**4.9%**	**4.5%**	**3.8%**	**3.4%**	**4.2%**
PCU	**4.8%**	**4.5%**	**3.9%**	**3.4%**	**4.2%**

Kamkole TP

Vehicle Type	FY 26 - FY 31	FY 31 - FY 36	FY 36 - FY 41	FY 41 – FY 44	FY 26 - FY 44
Car/Jeep/Van	6.0%	5.1%	4.2%	3.7%	4.9%
LCV/Minibus	3.9%	3.7%	3.2%	2.8%	3.5%
2 Axle Bus	2.9%	2.6%	2.4%	2.2%	2.5%
Truck	4.5%	4.3%	3.7%	3.2%	4.0%
3 Axle Truck	-0.5%	0.7%	-0.8%	-1.4%	-0.4%
MAV	5.4%	5.2%	4.4%	4.0%	4.8%
OSV	5.4%	5.2%	4.4%	3.5%	4.8%
Total	**5.3%**	**4.7%**	**4.0%**	**3.4%**	**4.5%**
PCU	**4.9%**	**4.5%**	**3.9%**	**3.7%**	**4.3%**

Traffic projections

Mangalgi TP

FY Year	Car/Jeep/Van	LCV/Minibus	Bus	2A Truck	3A Truck	MAV	OSV	Total	PCU	PCU Growth
FY 2026	6,140	580	545	1,371	699	2,218	4	11,555	24,849	
FY 2027	6,508	610	562	1,443	702	2,353	4	12,181	26,148	5.2%
FY 2028	6,885	641	578	1,518	705	2,494	4	12,824	27,487	5.1%
FY 2029	7,262	667	594	1,586	701	2,653	4	13,468	28,865	5.0%
FY 2030	7,645	694	611	1,653	695	2,807	4	14,109	30,213	4.7%
FY 2031	8,034	720	627	1,719	688	2,921	5	14,714	31,384	3.9%
FY 2032	8,437	749	644	1,792	683	3,061	5	15,371	32,715	4.2%
FY 2033	8,844	784	661	1,885	729	3,266	5	16,174	34,564	5.7%
FY 2034	9,257	816	678	1,965	729	3,423	5	16,873	36,023	4.2%
FY 2035	9,675	850	695	2,049	730	3,598	6	17,602	37,586	4.3%
FY 2036	10,096	884	712	2,134	731	3,777	6	18,340	39,178	4.2%
FY 2037	10,520	918	730	2,220	731	3,959	6	19,083	40,781	4.1%
FY 2038	10,947	952	747	2,305	725	4,140	7	19,823	42,366	3.9%
FY 2039	11,375	987	765	2,394	724	4,332	7	20,584	44,028	3.9%
FY 2040	11,804	1,023	783	2,482	717	4,523	7	21,339	45,670	3.7%
FY 2041	12,234	1,058	800	2,572	710	4,719	8	22,102	47,339	3.7%
FY 2042	12,665	1,093	818	2,659	701	4,913	8	22,856	48,982	3.5%
FY 2043	13,094	1,128	836	2,746	692	5,111	8	23,616	50,646	3.4%
FY 2044	13,523	1,163	854	2,835	683	5,313	9	24,379	52,330	3.3%
CAGR (FY 26 – FY 44)	4.5%	3.9%	2.5%	4.1%	-0.1%	5.0%	5.0%	4.2%	4.2%	

Kamkole TP

FY Year	Car/Jeep/Van	LCV/Minibus	Bus	2A Truck	3A Truck	MAV	OSV	Total	PCU	PCU Growth
FY 2026	14,314	960	1,029	1,862	942	2,537	4	21,648	38,687	
FY 2027	15,245	1,003	1,060	1,957	943	2,686	4	22,898	40,734	5.3%
FY 2028	16,194	1,044	1,090	2,048	939	2,813	5	24,132	42,671	4.8%
FY 2029	17,166	1,083	1,121	2,139	933	2,984	5	25,431	44,820	5.0%
FY 2030	18,161	1,122	1,152	2,229	924	3,150	5	26,744	46,957	4.8%
FY 2031	19,184	1,164	1,184	2,323	917	3,300	5	28,076	49,073	4.5%
FY 2032	20,226	1,206	1,216	2,419	908	3,454	6	29,435	51,232	4.4%
FY 2033	21,287	1,253	1,248	2,536	952	3,672	6	30,954	53,926	5.3%
FY 2034	22,365	1,299	1,281	2,644	951	3,857	6	32,404	56,327	4.5%
FY 2035	23,459	1,345	1,314	2,753	950	4,048	7	33,875	58,771	4.3%
FY 2036	24,565	1,392	1,346	2,865	947	4,244	7	35,366	61,256	4.2%
FY 2037	25,683	1,439	1,379	2,977	944	4,442	7	36,871	63,762	4.1%
FY 2038	26,811	1,486	1,412	3,088	934	4,641	8	38,381	66,262	3.9%
FY 2039	27,948	1,534	1,446	3,204	930	4,850	8	39,919	68,849	3.9%
FY 2040	29,091	1,581	1,479	3,320	919	5,060	8	41,459	71,425	3.7%
FY 2041	30,239	1,630	1,513	3,437	908	5,275	9	43,011	74,036	3.7%
FY 2042	31,391	1,676	1,546	3,551	896	5,488	9	44,557	76,620	3.5%
FY 2043	32,545	1,722	1,580	3,666	883	5,706	9	46,111	79,231	3.4%
FY 2044	33,699	1,769	1,613	3,782	870	5,928	10	47,671	81,866	3.3%
CAGR (FY 26 – FY 44)	**4.9%**	**3.5%**	**2.5%**	**4.0%**	**-0.4%**	**4.8%**	**4.8%**	**4.5%**	**4.3%**	

Revenue projections

FY Year	TP 1 _ Mangalgi TP	TP 2 _Kamkole TP	Total DTPL
FY 2026	1,082	1,570	2,652
FY 2027	1,168	1,688	2,856
FY 2028	1,284	1,852	3,136
FY 2029	1,406	2,028	3,434
FY 2030	1,537	2,220	3,757
FY 2031	1,669	2,425	4,094
FY 2032	1,831	2,646	4,477
FY 2033	2,014	2,913	4,927
FY 2034	2,187	3,175	5,363
FY 2035	2,391	3,466	5,856
FY 2036	2,605	3,785	6,390
FY 2037	2,835	4,106	6,942
FY 2038	3,082	4,456	7,538
FY 2039	3,350	4,844	8,194

FY Year	TP 1 _ Mangalgi TP	TP 2 _Kamkole TP	Total DTPL
FY 2040	3,631	5,254	8,886
FY 2041	3,926	5,680	9,606
FY 2042	4,240	6,143	10,383
FY 2043	4,579	6,649	11,228
FY 2044	4,969	7,190	12,159
FY 2045*	88	127	215
CAGR (FY 26 – FY 44)	**8.8%**	**8.8%**	**8.8%**

About Crisil Intelligence (formerly Market Intelligence & Analytics)

Crisil Intelligence is a leading provider of research, consulting, risk solutions and advanced data analytics, serving clients across government, private and public enterprises. We leverage our expertise in data-driven insights and strong benchmarking capabilities to help clients navigate complex external ecosystems, identify opportunities and mitigate risks. By combining cutting-edge analytics, machine learning and AI capabilities with deep industry knowledge, we empower our clients to make informed decisions, drive business growth and build resilient capacities.

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Traffic & Revenue assessment for Panipat Elevated Corridor Limited (PECL)



Addendum

March 2026

Addendum Note:

This addendum serves to update the report released in November 2025 ("**Original Report**"), regarding traffic and revenue figures. Apart from the specific items included in this addendum dated [●], 2026 ("**Addendum**"), no other sections, findings, or conclusions of the Original Report have changed. It should also be highlighted that the assumptions stated in the addendum do not amend or affect any other assumptions or analytical elements in the Original Report.

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1. **Fiscal 2026 Estimates**: The base year estimates for Fiscal 2026 have been updated based on traffic data collected from April 2025 to January 2026. This update includes revisions to both traffic and revenue estimates for the base year, replacing the previous estimates, which were based on data from April 2025 to July 2025.
2. **Fiscal 2027 Revenue**: The revenue projections for Fiscal 2027 have been updated to reflect the most recent Wholesale Price Index (WPI) data available, as applicable for respective assets. It should be noted that for this asset Mar WPI is applicable for toll rate calculations.
3. **Traffic Growth Rates**: There have been no changes to the traffic growth rates applicable to the respective assets.

This addendum ensures that the report reflects the most current data and projections. Traffic and revenue details based on these updates are as provided below

Traffic (FY26E)

PECL	FY26E Traffic based on April – January 2026 data	96,025
	FY26E Traffic, *based on April – July 2025 data*	93,634

Revenue in Million (FY26E and FY27P)

PECL	FY26E Revenue based on April – January 2026 data	1,197.1
	FY26E Revenue, *based on April – July 2025 data*	1,166.8
	FY27P Revenue, *based on estimated Mar 2026 WPI*	1,324.0

No change has been on the account of WPI, as actual Mar WPI is not available

Traffic growth rates and revenue projections applicable

Traffic growth rates

Vehicle category	FY27
CJV	6.0%
LCV/MINIBUS	3.5%
BUS	3.0%
TRUCK 2 AXLE	3.7%
TRUCK 3 AXLE	0.9%
MAV+OSV	3.9%
Total	**5.4%**
PCU	**4.7%**

Traffic projections

FY Year	CJV	LCV/MINIBUS	BUS	2 AT	3 AT	MAV+OSV	Total Veh.	Total PCU	YoY Growth (%)
FY-2026	48,089	2,557	2,433	2,454	1,871	5,295	62,699	96,025	
FY-2027	50,975	2,646	2,506	2,545	1,887	5,501	66,061	100,516	4.7%
Growth (FY26-FY27)	**6.0%**	**3.5%**	**3.0%**	**3.7%**	**0.9%**	**3.9%**	**5.4%**	**4.7%**	

Revenue projections

FY Year	PECL
FY26	1,197.1
FY27	1,324.0
Growth (FY26-FY27)	**10.6%**

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Traffic & Revenue Assessment of 4-Lane 131.650 km Rajkot-Jamnagar-Vadinar section of SH-25 and NH151A from Km 3.0 to Km 125.5 in Gujarat state



Addendum

March 2026

Addendum Note:

This addendum serves to update the report released in November 2025 ("**Original Report**"), regarding traffic and revenue figures. Apart from the specific items included in this addendum dated [●], 2026 ("**Addendum**"), no other sections, findings, or conclusions of the Original Report have changed. It should also be highlighted that the assumptions stated in the addendum do not amend or affect any other assumptions or analytical elements in the Original Report.

The following updates have been made:

1. **Fiscal 2026 Estimates**: The base year estimates for Fiscal 2026 have been updated based on traffic data collected from April 2025 to January 2026. This update includes revisions to both traffic and revenue estimates for the base year, replacing the previous estimates, which were based on data from April 2025 to July 2025.
2. **Fiscal 2027 Revenue**: The revenue projections for Fiscal 2027 have been updated to reflect the most recent Wholesale Price Index (WPI) data available for December 2025. This update applies to assets where the December 2025 WPI is relevant for toll calculations.
3. **Traffic Growth Rates**: There have been no changes to the traffic growth rates applicable to the respective assets.

This addendum ensures that the report reflects the most current data and projections. Traffic and revenue details based on these updates are as provided below

Traffic (FY26E)

Paddhari (TP01)	FY26E Traffic based on April – January 2026 data	31,999
	FY26E Traffic, *based on April – July 2025 data*	31,508
Dhrol (TP02)	FY26E Traffic based on April – January 2026 data	39,024
	FY26E Traffic, *based on April – July 2025 data*	37,499
Bed (TP03)	FY26E Traffic based on April – January 2026 data	40,719
	FY26E Traffic, *based on April – July 2025 data*	40,520

Revenue in Million (FY26E and FY27P)

FY26E Revenue based on April – January 2026 data	2,520.5
FY26E Revenue, *based on April – July 2025 data*	2,477.3
FY27P Revenue, *based on actual Dec 2025 WPI**	2,812.6
FY27P Revenue, *based on estimated Dec 2025 WPI**	2,764.4

*It is be noted that the toll calculations for RVTL is based on 5% fixed WPI throughout the concession period as per the CA, therefore impact of change in FY26 AADT is only applicable.

Traffic growth rates and revenue projections applicable

Traffic growth rates

FY26-30	Paddhari (TP01)	Dhrol (TP02)	Bed (TP03)
Car/Jeep/Van	7.7%	7.7%	7.7%
LCV/Minibus	0.6%	2.1%	2.0%
2 Axle Bus	3.4%	3.4%	3.4%
Truck	4.3%	4.2%	3.8%
3 Axle Truck	1.0%	2.8%	2.3%
MAV+OSV	4.9%	4.9%	4.4%
Total	6.8%	6.8%	6.8%
PCU	**5.9%**	**5.8%**	**5.8%**

Traffic projections

FY Year	Car/Jeep/Van	LCV/Minibus	2 Axle Bus	Truck	3 Axle Truck	MAV+OSV	Total Veh.	Total PCU	YoY Growth (%)
Paddhari (TP01)									
FY-2026	16,271	504	654	438	600	2,199	20,666	31,999	
FY-2027	17,613	508	677	458	607	2,311	22,174	34,000	6.3%
FY-2028	18,993	511	700	478	614	2,425	23,721	36,048	6.0%
FY-2029	20,408	514	724	499	619	2,541	25,304	38,139	5.8%
FY-2030	21,851	516	748	520	624	2,658	26,917	40,262	5.6%
CAGR (26-30)	**7.7%**	**0.6%**	**3.4%**	**4.3%**	**1.0%**	**4.9%**	**6.8%**	**5.9%**	
Dhrol (TP02)									
FY-2026	16,875	563	720	534	798	3,367	22,856	39,024	
FY-2027	18,267	576	745	557	822	3,539	24,506	41,429	6.2%
FY-2028	19,698	588	770	581	845	3,715	26,198	43,890	5.9%
FY-2029	21,165	600	796	605	868	3,895	27,929	46,400	5.7%
FY-2030	22,662	611	823	629	891	4,076	29,692	48,949	5.5%
CAGR (26-30)	**7.7%**	**2.1%**	**3.4%**	**4.2%**	**2.8%**	**4.9%**	**6.8%**	**5.8%**	
Bed (TP03)									
FY-2026	19,448	549	975	460	791	3,060	25,283	40,719	
FY-2027	21,053	561	1,009	478	811	3,201	27,114	43,195	6.1%
FY-2028	22,703	573	1,044	497	830	3,345	28,992	45,727	5.9%
FY-2029	24,393	584	1,079	515	849	3,491	30,912	48,309	5.6%
FY-2030	26,119	595	1,115	534	867	3,639	32,868	50,932	5.4%
CAGR (26-30)	**7.7%**	**2.0%**	**3.4%**	**3.8%**	**2.3%**	**4.4%**	**6.8%**	**5.8%**	

Revenue projections (Revenue in ₹ Million)

FY Year	Paddhari (TP01)	Dhrol (TP02)	Bed (TP03)	Total
FY26	867.9	606.5	1,046.1	2,520.5
FY27	966.5	687.9	1,158.2	2,812.6
FY28	1,072.1	756.3	1,273.2	3,101.6
FY29	1,182.2	848.3	1,413.3	3,443.9
FY30	1,310.9	916.6	1,555.3	3,782.8
CAGR (FY26-30)	**10.9%**	**10.9%**	**10.4%**	**10.7%**

TP3 is impacted by Reliance Road for which concessionaire gets additional claim. Compensation claim from which GSRDC for Reliance Road for TP3 is shown below.

Revenue projections for Reliance Road (Revenue in ₹ Million)

RIL Road	Car/Jeep/Van	Minibus	2 Axle Bus	LCV	Truck	3 Axle Truck	MAV	OSV	Total
FY26	0.0	1.0	1.4	1.1	1.8	29.4	113.6	0.0	148.3
FY27	0.0	1.0	1.5	1.2	2.0	31.5	124.5	0.0	161.8

RIL Road	Car/Jeep/Van	Minibus	2 Axle Bus	LCV	Truck	3 Axle Truck	MAV	OSV	Total
FY28	0.0	1.1	1.7	1.3	2.2	33.8	136.4	0.0	176.5
FY29	0.0	1.2	1.8	1.4	2.4	36.4	149.7	0.0	192.8
FY30	0.0	1.3	2.0	1.5	2.6	39.1	164.1	0.0	210.4

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Traffic & Revenue Assessment for Sambalpur-Rourkela section of SH-10 from Km 4.900 to Km 167.900 (length 163 km) in the state of Odisha



Addendum

March 2026

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3. **Traffic Growth Rates**: There have been no changes to the traffic growth rates applicable to the respective assets.

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Traffic (FY26E)

(TP01)- Nuakhurigaon, Rengali	FY26E Traffic based on April – January 2026 data	23,407
	FY26E Traffic, *based on April – July 2025 data*	23,813
(TP02)- Bhedabahal, Masanikani	FY26E Traffic based on April – January 2026 data	29,451
	FY26E Traffic, *based on April – July 2025 data*	30,583
(TP03)- Laing, Rajgangpur	FY26E Traffic based on April – January 2026 data	22,394
	FY26E Traffic, *based on April – July 2025 data*	20,397

Revenue in Million (FY26E and FY27P)

FY26E Revenue based on April – January 2026 data	3,019.0
FY26E Revenue, *based on April – July 2025 data*	3,069.4
FY27P Revenue, *based on actual Dec 2025 WPI*	3,241.9
FY27P Revenue, *based on estimated Dec 2025 WPI*	3,333.2

Traffic growth rates and revenue projections applicable

Traffic growth rates

Vehicle category	FY 26 - FY 30	FY30-35	FY35-40	FY 26-41
		TP01		
Car	6.1%	5.2%	4.6%	5.2%
LCV	4.4%	4.0%	3.8%	4.0%
2A	3.2%	3.0%	2.8%	3.0%
3A	1.1%	0.9%	0.7%	0.9%
MAV	4.7%	4.6%	4.3%	4.5%
2A-MM	2.9%	2.9%	2.6%	2.8%

Vehicle category	FY 26 - FY 30	FY30-35	FY35-40	FY 26-41
3A-MM	1.4%	1.4%	1.1%	1.3%
MAV-MM	4.6%	4.6%	4.4%	4.5%
Total Veh.	5.2%	4.7%	4.3%	4.7%
Total PCU	4.7%	4.4%	4.1%	4.4%
TP02				
Car	6.1%	5.2%	4.6%	5.2%
LCV	6.2%	5.5%	5.1%	5.5%
2A	3.6%	3.3%	3.1%	3.3%
3A	2.2%	1.9%	1.6%	1.9%
MAV	5.1%	4.8%	4.6%	4.8%
2A-MM	2.8%	2.8%	2.6%	2.7%
3A-MM	1.3%	1.3%	1.1%	1.2%
MAV-MM	3.8%	3.8%	3.6%	3.7%
Total Veh.	5.2%	4.7%	4.3%	4.7%
Total PCU	4.8%	4.5%	4.2%	4.5%
TP03				
Car	6.1%	5.2%	4.6%	5.2%
LCV	4.7%	4.4%	4.2%	4.4%
2A	3.9%	3.8%	3.5%	3.7%
3A	1.8%	1.6%	1.4%	1.6%
MAV	5.1%	5.0%	4.7%	4.9%
2A-MM	3.1%	3.1%	2.8%	3.0%
3A-MM	1.6%	1.7%	1.4%	1.5%
MAV-MM	4.5%	4.5%	4.3%	4.4%
Total Veh.	5.4%	4.9%	4.5%	4.9%
Total PCU	5.0%	4.8%	4.5%	4.7%

Traffic projections

FY	Car	LCV	2A	3A	MAV	2A-MM	3A-MM	MAV-MM	Total Veh.	Total PCU	YoY (%)
TP01											
2026	5,440	211	518	367	2,799	0	75	484	9,893	23,407	
2027	5,787	221	537	371	2,938	1	76	507	10,437	24,574	5.0%
2028	6,156	231	554	376	3,080	1	77	530	11,005	25,771	4.9%
2029	6,531	241	572	380	3,223	1	78	554	11,579	26,982	4.7%
2030	6,890	251	589	383	3,368	1	79	579	12,140	28,184	4.5%
2031	7,251	261	606	387	3,521	1	80	606	12,711	29,433	4.4%
2032	7,630	271	624	390	3,682	1	81	634	13,312	30,744	4.5%
2033	8,029	282	643	394	3,850	1	82	663	13,943	32,119	4.5%
2034	8,449	293	662	398	4,027	1	83	694	14,606	33,562	4.5%
2035	8,883	305	681	401	4,209	1	84	726	15,290	35,049	4.4%
2036	9,309	317	701	405	4,396	1	85	759	15,972	36,556	4.3%
2037	9,747	329	721	408	4,589	1	86	792	16,673	38,104	4.2%

FY	Car	LCV	2A	3A	MAV	2A-MM	3A-MM	MAV-MM	Total Veh.	Total PCU	YoY (%)
2038	10,198	342	741	411	4,787	1	87	827	17,393	39,692	4.2%
2039	10,660	354	761	414	4,990	1	88	862	18,131	41,320	4.1%
2040	11,134	367	782	416	5,198	1	89	899	18,886	42,986	4.0%
2041	11,619	381	802	419	5,412	1	90	936	19,659	44,690	4.0%
CAGR (27-41)	5.1%	4.0%	2.9%	0.9%	4.5%	2.7%	1.3%	4.5%	4.6%	4.4%	
TP02											
2026	4,196	112	372	213	3,390	0	11	1,787	10,082	29,451	
2027	4,463	120	386	218	3,575	0	11	1,857	10,631	30,933	5.0%
2028	4,748	127	400	223	3,762	0	12	1,928	11,201	32,450	4.9%
2029	5,037	135	414	228	3,951	0	12	2,000	11,778	33,986	4.7%
2030	5,314	143	428	232	4,143	0	12	2,074	12,347	35,524	4.5%
2031	5,592	151	442	237	4,342	0	12	2,152	12,928	37,116	4.5%
2032	5,885	159	457	241	4,552	0	12	2,233	13,539	38,788	4.5%
2033	6,193	168	472	246	4,773	0	12	2,318	14,181	40,543	4.5%
2034	6,517	177	488	251	5,005	0	12	2,406	14,856	42,386	4.5%
2035	6,852	186	504	255	5,246	0	13	2,496	15,552	44,286	4.5%
2036	7,180	196	520	260	5,495	0	13	2,588	16,252	46,227	4.4%
2037	7,518	207	537	264	5,752	0	13	2,681	16,973	48,222	4.3%
2038	7,865	217	554	269	6,017	0	13	2,777	17,713	50,273	4.3%
2039	8,222	228	570	273	6,290	0	13	2,875	18,472	52,377	4.2%
2040	8,588	239	587	277	6,572	0	13	2,974	19,250	54,535	4.1%
2041	8,962	251	605	281	6,861	0	13	3,075	20,048	56,746	4.1%
CAGR (27-41)	5.1%	5.4%	3.3%	1.8%	4.8%	2.7%	1.2%	3.7%	4.6%	4.4%	
TP03											
2026	4,293	154	347	177	2,176	0	11	1,438	8,597	22,394	
2027	4,567	162	362	180	2,292	0	12	1,505	9,080	23,559	5.2%
2028	4,858	170	376	184	2,411	0	12	1,573	9,584	24,758	5.1%
2029	5,154	177	391	187	2,532	0	12	1,643	10,096	25,979	4.9%
2030	5,438	185	405	190	2,655	0	12	1,715	10,600	27,203	4.7%
2031	5,722	194	420	193	2,788	0	12	1,793	11,122	28,503	4.8%
2032	6,021	202	436	196	2,928	0	13	1,874	11,670	29,869	4.8%
2033	6,336	211	453	199	3,075	0	13	1,959	12,247	31,303	4.8%
2034	6,668	221	470	202	3,230	0	13	2,048	12,853	32,811	4.8%
2035	7,010	230	488	206	3,391	0	13	2,140	13,479	34,367	4.7%
2036	7,346	240	505	209	3,557	0	14	2,234	14,106	35,952	4.6%
2037	7,692	251	523	212	3,728	0	14	2,331	14,752	37,583	4.5%
2038	8,048	261	542	215	3,905	0	14	2,430	15,415	39,259	4.5%

FY	Car	LCV	2A	3A	MAV	2A-MM	3A-MM	MAV-MM	Total Veh.	Total PCU	YoY (%)
2039	8,413	272	560	218	4,087	0	14	2,532	16,095	40,980	4.4%
2040	8,787	283	579	220	4,274	0	14	2,635	16,793	42,744	4.3%
2041	9,170	295	598	223	4,466	0	14	2,742	17,507	44,552	4.2%
CAGR (27-41)	5.1%	4.4%	3.7%	1.5%	4.9%	3.0%	1.5%	4.4%	4.8%	5.1%	

Revenue projections

FY Year	TP01	TP02	TP03	Total
2026	690.0	1,579.6	749.4	3,019.0
2027	736.1	1,698.3	807.6	3,241.9
2028	807.4	1,857.2	884.6	3,549.1
2029	881.4	2,019.6	963.9	3,864.9
2030	958.4	2,197.3	1,053.6	4,209.4
2031	1,049.0	2,396.7	1,152.0	4,597.6
2032	1,134.7	2,614.5	1,259.7	5,008.9
2033	1,235.8	2,848.0	1,377.3	5,461.1
2034	1,347.2	3,101.1	1,503.2	5,951.6
2035	1,475.0	3,368.6	1,641.1	6,484.8
2036	1,598.5	3,676.0	1,806.0	7,080.5
2037	1,740.9	3,996.7	1,960.1	7,697.7
2038	1,881.3	4,334.9	2,135.8	8,352.0
2039	2,044.2	4,713.6	2,330.9	9,088.7
2040	2,234.4	5,121.2	2,544.9	9,900.5
2041	2,408.6	5,549.6	2,751.1	10,709.3
CAGR (FY26-FY41)	**8.7%**	**8.7%**	**9.1%**	**8.8%**

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Traffic & Revenue Assessment for Samakhiali-Gandhidham section of NH-41 (old NH-8A) from Km 306.00 to Km 362.16 (length 56.16 km) in the state of Gujarat

Addendum

March 2026

Addendum Note:

This addendum serves to update the report released in November 2025 ("**Original Report**"), regarding traffic and revenue figures. Apart from the specific items included in this addendum dated [●], 2026 ("**Addendum**"), no other sections, findings, or conclusions of the Original Report have changed. It should also be highlighted that the assumptions stated in the addendum do not amend or affect any other assumptions or analytical elements in the Original Report.

The following updates have been made:

1. **Fiscal 2026 Estimates**: The base year estimates for Fiscal 2026 have been updated based on traffic data collected from April 2025 to January 2026. This update includes revisions to both traffic and revenue estimates for the base year, replacing the previous estimates, which were based on data from April 2025 to July 2025.
2. **Fiscal 2027 Revenue**: The revenue projections for Fiscal 2027 have been updated to reflect the most recent Wholesale Price Index (WPI) data available for December 2025. This update applies to assets where the December 2025 WPI is relevant for toll calculations.
3. **Traffic Growth Rates**: There have been no changes to the traffic growth rates applicable to the respective assets.

This addendum ensures that the report reflects the most current data and projections. Traffic and revenue details based on these updates are as provided below

Traffic (FY26E)

SBGTL	FY26E Traffic based on April – January 2026 data	100,040
	FY26E Traffic, *based on April – July 2025 data*	99,110

Revenue in Million (FY26E and FY27P)

FY26E Revenue based on April – January 2026 data	3,107
FY26E Revenue, based on April – July 2025 data	3,078
FY27P Revenue, based on actual Dec 2025 WPI	3,353
FY27P Revenue, based on estimated Dec 2025 WPI	3,371

Traffic growth rates and revenue projections applicable

Traffic growth rates

Vehicle category	FY 26- FY 30	FY30-35	FY26-35
Car/Jeep/Van	5.6%	4.8%	5.1%
LCV/Minibus	3.6%	3.0%	3.3%
2 Axle Bus	2.8%	2.4%	2.6%
Truck	4.1%	3.6%	3.8%
3 Axle Truck	2.2%	1.6%	1.8%
MAV+OSV	5.6%	5.0%	5.2%
Total Veh.	**5.4%**	**4.7%**	**5.0%**
Total PCU	**5.4%**	**4.8%**	**5.0%**

Traffic projections

Vehicle Type	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	CAGR (FY 26-35)
Car/Jeep/Van	10,643	11,281	11,931	12,591	13,259	13,935	14,617	15,303	15,993	16,685	5.1%
LCV/Minibus	598	622	645	667	689	711	733	755	777	798	3.3%
2 Axle Bus	768	791	814	837	859	881	902	923	944	965	2.6%
Truck	990	1,035	1,079	1,122	1,165	1,208	1,252	1,297	1,343	1,388	3.8%
3 Axle Truck	824	844	864	882	897	912	927	942	956	971	1.8%
MAV+OSV	17,879	18,953	20,022	21,101	22,196	23,330	24,510	25,739	27,019	28,328	5.2%
Total Veh.	**31,702**	**33,527**	**35,355**	**37,200**	**39,065**	**40,976**	**42,941**	**44,959**	**47,032**	**49,135**	**5.0%**
Total PCU	**99,743**	**105,515**	**111,268**	**117,068**	**122,936**	**128,987**	**135,256**	**141,748**	**148,473**	**155,327**	**5.0%**

Revenue projections

FY Year	Revenue
FY-2026	3,107
FY-2027	3,353
FY-2028	3,700
FY-2029	4,056
FY-2030	4,461
FY-2031	4,894
FY-2032	5,385
FY-2033	5,873
FY-2034	6,444
FY-2035	7,011
CAGR (26-35)	**9.5%**

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Traffic & Revenue Assessment of 6-Laning from Vadakkenchery (Km 236.135) to Thrissur (Km 264.490) section of NH-544 in Kerala state



Addendum

March 2026

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3. **Traffic Growth Rates**: There have been no changes to the traffic growth rates applicable to the respective assets.

This addendum ensures that the report reflects the most current data and projections. Traffic and revenue details based on these updates are as provided below

Traffic (FY26E)

SBGTL	FY26E Traffic based on April – January 2026 data	46,142
	FY26E Traffic, *based on April – July 2025 data*	46,461

Revenue in Million (FY26E and FY27P)

FY26E Revenue based on April – January 2026 data	1,690
FY26E Revenue, based on April – July 2025 data	1,696
FY27P Revenue, based on actual Dec 2025 WPI	1,820
FY27P Revenue, based on estimated Dec 2025 WPI	1,849

Traffic growth rates and revenue projections applicable

Traffic growth rates

Vehicle Type	FY 26 - FY 30	FY 30 - FY 35	FY 26 - FY 37
Car/Jeep/Van	6.3%	5.4%	5.6%
LCV/Minibus	3.5%	3.1%	3.2%
2 Axle Bus/truck	3.4%	3.0%	3.1%
3 Axle Truck	-0.4%	-0.8%	-0.8%
MAV	6.3%	4.8%	5.2%
OSV	5.1%	4.8%	4.8%
Total Veh.	**5.6%**	**4.8%**	**5.0%**
Total PCU	**5.2%**	**4.4%**	**4.6%**

Traffic projections

Vehicle Type	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	FY 26 - FY 37
Cars	18,235	19,420	20,651	21,927	23,248	24,614	26,023	27,439	28,857	30,274	31,687	33,091	**5.6%**
LCV/Minibus	2,134	2,211	2,293	2,373	2,451	2,530	2,609	2,689	2,769	2,849	2,927	3,003	**3.2%**
2 Axle Bus/truck	2,973	3,076	3,187	3,296	3,404	3,513	3,623	3,734	3,845	3,955	4,064	4,170	**3.1%**
3 Axle Truck	840	834	833	830	825	820	814	807	800	791	782	771	**-0.8%**
MAV	2,946	3,086	3,401	3,580	3,761	3,948	4,140	4,338	4,541	4,747	4,954	5,163	**5.2%**
OSV	2	2	2	3	3	3	3	3	3	3	4	4	**4.8%**
Total Veh.	**27,130**	**28,631**	**30,367**	**32,008**	**33,691**	**35,426**	**37,212**	**39,010**	**40,816**	**42,619**	**44,416**	**46,203**	**5.0%**
Total PCU	**46,142**	**48,367**	**51,465**	**53,983**	**56,545**	**59,183**	**61,891**	**64,630**	**67,395**	**70,161**	**72,922**	**75,672**	**4.6%**

Revenue projections

FY Year	Revenue
2026	1,690
2027	1,820
2028	2,028
2029	2,215
2030	2,409
2031	2,627
2032	2,870
2033	3,135
2034	3,403
2035	3,707
2036	4,036
2037	4,360
CAGR	**9.0%**

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Executive Summary for Toll Assets

Final Report

EPIC Transnet Infrastructure Pvt Ltd | **November 2025**



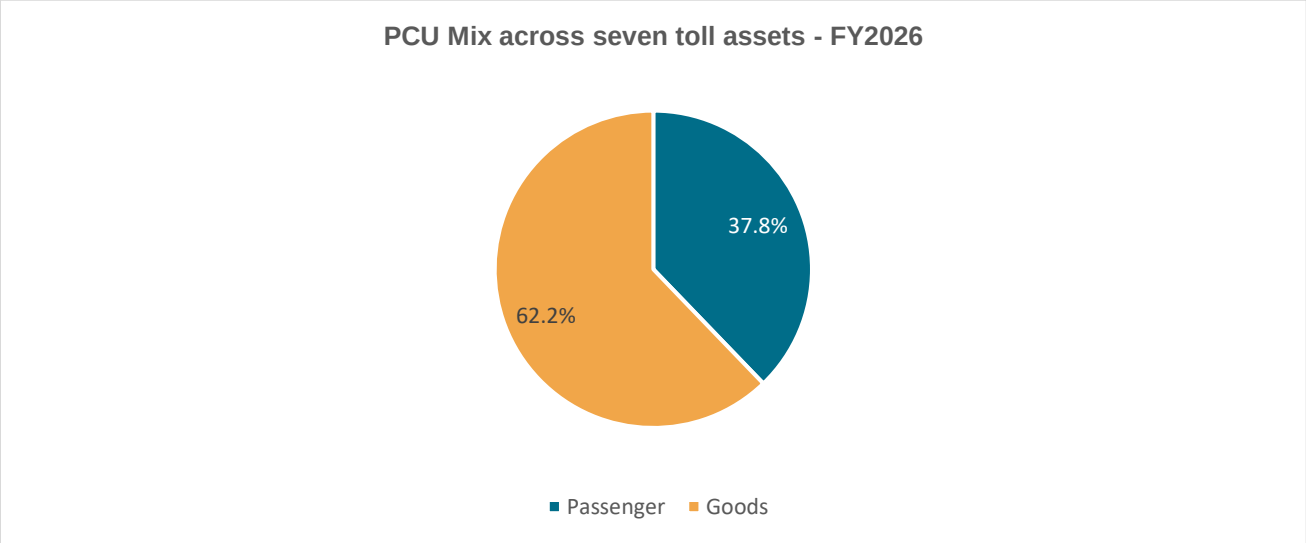
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1 Executive Summary for Toll Assets

The overall PCU composition across all toll assets reflects a well-diversified traffic base spread across multiple regions of the country. Passenger vehicles account for approximately 37.80% of the PCU mix in FY2026, while commercial / freight vehicles contribute around 62.20%[1], indicating a healthy balance between personal and economic mobility. In road traffic commercial traffic is typically less volatile than passenger traffic and more resilient during economic fluctuations thereby reducing risk and allowing more efficient resource planning and utilization, and in turn improving its operational efficiency for platforms/concessionaires with a higher share of commercial traffic.

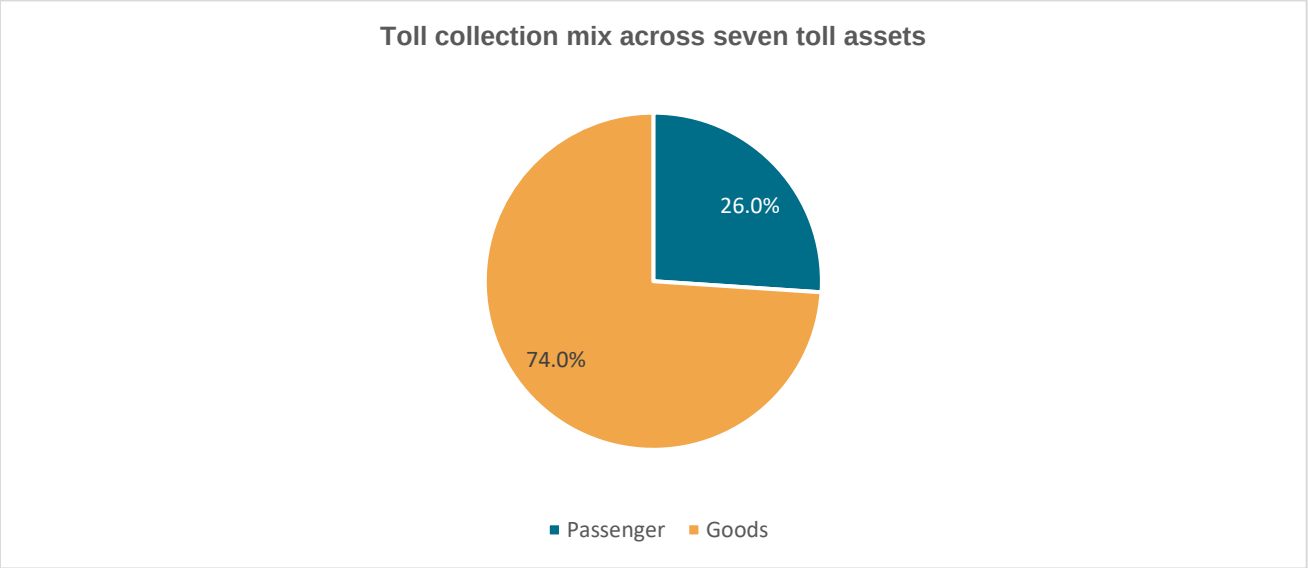


Source: Crisil Intelligence

In line with this, the revenue mix further highlights the strong presence of major economic and industrial corridors within the portfolio. Freight vehicles contribute nearly 74.00% of toll collection[2], underscoring the critical role of goods movement and logistics activity in driving asset performance. The remaining 26.00% toll collection is contributed by passenger traffic, reflecting steady commuter movement across key routes.

[1] The PCU Mix for FY2026 has been derived by applying historical seasonal correction factors to the actual traffic volumes recorded during April–July 2025, thereby estimating the base year traffic.

[2] Basis toll revenue computed for FY2026 for the toll assets forming part of the Initial Portfolio for Citius



Source: Crisil Intelligence

Overall, the portfolio demonstrates diversified geographic coverage and robust commercial traffic potential, positioning it well to benefit from ongoing infrastructure and economic growth trends. This combination of maturity, track record of consistent strong growth and significant residual life balances stability from established operations with a long runway for future value generation.

Furthermore, our toll roads are situated in major economic and industrial corridors and include:

- **Samkhiali Bhachau Gandhidham Tollway Pvt Ltd** ("SBGTPL"), Gujarat which is part of National Highway 8A ("NH8A"), which is the main traffic feeding arterial route for Kandla and Mundra Ports, connecting them to the hinterlands spread out in the interiors of Gujarat and extending to Rajasthan, Haryana, Punjab and beyond.

- **Rajkot Vadinar Tollway Pvt Ltd** ("RVTPL"), Gujarat, which is part of State Highway 25 ("SH-25"), which connects the industrial areas of Rajkot, Dhrol, Jamnagar and the mining quarries at Ran, Mevasa in Khambalia, and link to the ports of Bedi, Sikka and Vadinar and passes long major refinery complexes of Reliance and Essar. It facilitates access to major tourist destinations like Dwarka, Bet Dwarka and Porbandar.

- **Sambalpur Rourkela Tollway Pvt Ltd** ("SRTPL"), Odisha which the project road (part of SH-10) passes through Sambalpur, Jharsuguda and Sundargarh districts in Odisha, which are among the key industrial and mining regions of the State. About 50%-80% of traffic is locally generated and destined to be within the three project districts.

- **Ahmedabad Maliya Tollway Pvt Ltd** ("AMTPL"), Gujarat which connects the industrial areas of Sanand, Chharodi and Khoda, pharma hub at Moraiya, ceramic tiles manufacturers in Morbi and is part of the shortest route connecting the Kutch region and the nearby ports from Ahmedabad, Maharashtra, MP, and Southern India.

- **Deccan Tollways Pvt Ltd** ("DTPL"), Karnataka is part of NH-65 (old NH-9) originating from Pune and ending at Machilipatnam (AP), passing through Indapur, Solarpur, Omerga, Humnabad, Zaheerabad, Hyderabad, Suryapet and Vijayawada.

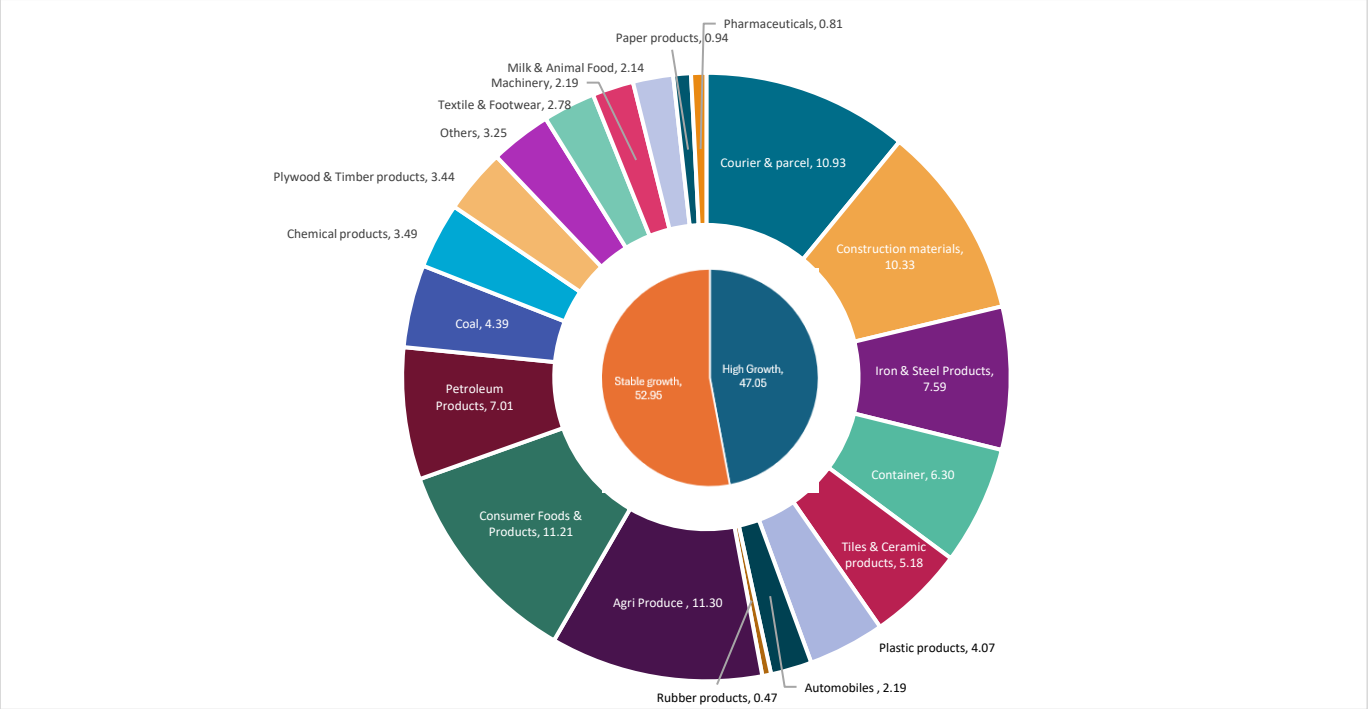
- **Thrissur Expressway Ltd.** ("TEL"), Kerala is part of NH-544, a critical corridor connecting Salem in Tamil Nadu to Kochi in Kerala and is a major arterial route linking Kerala with Tamil Nadu and the rest of India.

- **Panipat Elevated Corridor Pvt Ltd** ("PECPL"), forms part of NH1, which connects Delhi to Haryana and Punjab, crossing through Haryana and eastern Punjab along its route. It serves the high traffic stretch from Delhi to Sonipat, Panipat, Karnal, Ambala, and Jalandhar. The elevated section bypasses congestion within the city of Panipat.

Additionally, the commercial traffic operating on these road assets carry a variety of commodities, supporting additional stability through intra-portfolio dispersion and exposure to different industries. This approach helps mitigate the risks that could arise from over-concentration in a single region or market sector. The commercial traffic of the overall portfolio is almost evenly split, between high-growth and stable-growth sectors[3], with stable-growth sectors making up 52.95% and high-growth sectors 47.05% as of May 2025.The commercial traffic of portfolio assets is further diversified, with a combined 28.85% allocated to courier & parcel, construction material, iron and steel sectors. Our diversified commodity mix split in terms of total traffic, based on the sector as of May 2025 is provided in the infographic below:

[3] Commodities with a growth rate of >4.5% have been categorised as highgrowth sectors / commodities whereas growth rate </= 4.5% have been categorised as stable growth sector / commodities. The growth rates have been derived based on Crisil Intelligence analysis.

Commodities Split



Source: Crisil Intelligence

Detailed Asset Descriptions:

Samkhiali Bhachau Gandhidham Tollway Private Limited ("SBGTPL")

Asset description as per the Traffic Report

The project road of Samakhiali - Gandhidham section of NH-8A (new NH 41) with a length of 56.160 km, falls entirely under the jurisdiction of the Kutch district in the State of Gujarat. This national highway is the main traffic feeding arterial route for Kandla and Mundra Ports, connecting to the hinterlands spread out in the interiors of Gujarat and extending to Rajasthan, Haryana, Punjab and beyond. Mundra port is the largest commercial port in the country and a critical hub for container traffic. It handles a significant volume of cargo, including containers, dry bulk, liquid bulk, and automobiles. This unique location makes the corridor an essential route for the import and export movement of goods, ensuring consistent and high-volume freight flow. Since most of the cargo entering or leaving through these ports needs to be transported inland, the project corridor plays a vital role in the national logistics chain, especially for both containerized and bulk cargo. The project road also serves a cluster of small industrial areas developed along the stretch of the road.

Asset location

The following map illustrates the location of SBGTPL and the corridor it covers:









Network description as per the Traffic Report

*NH-41 plays a crucial role in India's port-led development and export-import logistics, acting as the primary surface transport artery connecting some of the country's largest ports to the hinterland. Facilitating port connectivity, it acts as a direct link between the Kandla Port, which is a major port and the national freight grid via NH-27 and NH-48. It supports multimodal logistics, linking railheads, Inland Container Depots ("**ICDs**"), and logistics parks around Gandhidham and Anjar. The asset has a rail corridor on one side and the sea on the other side, and consequently the project does not have any alternate route.*

Traffic characteristics as per Traffic Report

This project has been collecting toll for almost 15 years and demonstrates a stabilised and consistent traffic pattern.

a. ***Short distance:*** *Short-distance traffic flows between Samakhiyali and Gandhidham-Bhuj, primarily related to the industries located along this corridor. This route supports the local movement of raw materials and finished goods within the industrial and trading hubs in the region.*

b. ***Medium Distance:*** *Medium-distance traffic involves the movement of goods from industrial units in Morbi and Ahmedabad to Kandla and Mundra ports. This corridor handles a diverse mix of commodities, facilitating the transport of raw materials and finished products for export and import activities.*

c. ***Long Distance:*** *Long-distance traffic to or from Mundra and Kandla ports extends to Rajasthan, Punjab, Haryana, and other northern regions, as well as to southern and western parts of India. This flow supports the nationwide distribution of import-export cargo and industrial goods, making these ports critical gateways for trade across multiple regions.*

Commodity mix as per Traffic Report

The asset supports different types of commodities, as provided below, reflecting industrial supply chains and port-based logistics.

- ***Construction / Building Materials:*** *Represents the largest share of commodity traffic on the corridor. This includes cement, aggregates, and related construction inputs, likely driven by regional infrastructure development and real estate growth, as well as port infrastructure expansion.*
- ***Courier & Parcel Goods:*** *Indicates strong movement of general merchandise and packaged goods, including courier shipments and less-than-truckload cargo. Reflects the corridor's importance in logistics and e-commerce supply chains.*
- ***Empty Return Vehicles:*** *A high percentage of empty truck movement suggests directional cargo patterns, especially after deliveries to inland locations. Common in port corridors where outbound loads are heavier than return shipments.*
- ***Manufacturing Goods****: Includes transport of processed goods and machinery, highlighting the corridor's connectivity to manufacturing hubs across Gujarat and beyond.*
- ***Petroleum Products:*** *A significant volume of petroleum, oil, and lubricants movement reflects supply operations linked to refineries and port-based fuel distribution.*

Traffic volume as per Traffic Report

The table below provides the details of SBGTPL's the traffic volume and growth in the traffic volume for the period indicated:

Particulars	***For the year ended March 31***					
	2023		***2024***		***2025***	
	Actual traffic	***% increase from the previous period***	***Actual traffic***	***% increase from the previous period***	***Actual traffic***	***% increase from the previous period***
CJV[1]	*8,843*	*16.26%*	*9,748*	*10.24%*	*9,940*	*1.97%*
LCV[2]	*505*	*0.46%*	*519*	*2.84%*	*540*	*4.11%*
Bus	*723*	*18.64%*	*742*	*2.57%*	*745*	*0.48%*
2AT[3]	*774*	*15.02%*	*872*	*12.63%*	*924*	*5.97%*
MAV + OSV[4]	*15,560*	*4.06%*	*16,674*	*7.16%*	*17,687*	*6.08%*
Total Vehicles	*26,404*	*8.46%*	*28,554*	*8.14%*	*29,836*	*4.49%*
Total PCU	*84,110*	*5.81%*	*90,400*	*7.48%*	*95,349*	*5.47%*

Source: Traffic Reports.

Notes:

1. *Car/ Jeep / Van*
2. *Light Commercial Vehicles/ Minibus*
3. *Truck with Two Axles*
4. *Multi Axle Vehicle Multi Axle Vehicle, includes truck with Three Axles or more and Over Sized Vehicles*

Rajkot - Vadinar Tollway Private Limited ("RVTPL")

Asset description as per the Traffic Report

RVTPL is strategically positioned within India's largest petroleum refining zone, encompassing major players like Reliance and Nayara Energy in Jamnagar and Vadinar and, as a result, acts as a crucial freight corridor for both domestic and export-oriented fuel movement. The corridor acts as a key link between the western refinery belt and various parts of India, facilitating the flow of energy products, industrial goods, and raw materials. The project road lies within the districts of Rajkot, Jamnagar, and Devbhumi Dwarka in Gujarat, covering SH-25 from km 3.00 near Rajkot to km 125.55 near Vadinar. It serves key industrial hubs and ports including Bedi, Sikka, and Vadinar. The corridor also connects to mining areas in Khambhalia and links key urban centres and settlements such as Rajkot, Paddhari, Jamnagar, Depaliya, and Motikhavadi. It facilitates access to major tourist destinations like Dwarka, Bet Dwarka, and Porbandar.

Asset location as per the Traffic Report

The following map illustrates the location of RVTPL and the corridor it covers



The corridor links the ports of Bedi, Sikka and Vadinar and passes along major refinery complexes of Reliance and Nayara Energy. This project also connects key tourist destinations like Nageshwar Temple, Beyt, and Somnath Temple, as well as beachside locations in Gujarat. The project road provides seamless connectivity to important industrial towns like Rajkot, Jamnagar, and Dwarka, linking them to the hinterlands in Gujarat and beyond, ensuring multimodal integration with maritime trade routes. Its close proximity to Jamnagar Airport enhances regional connectivity for business and logistics operations. It also integrates with rail freight lines serving [refinery sidings] and port terminals.

Network description as per the Traffic Report

RVTPL corridor serves as a critical transportation link connecting major industrial hubs in Gujarat, with distinct commodity profiles at each toll plaza reflecting regional economic activities. It handles diverse cargo ranging from petroleum products and chemicals to agricultural commodities and construction materials. The project serves Reliance Industries' and Nayara Energy's massive refinery complexes at Vadinar and Sikka. The project road provides direct connectivity to Devbhumi Dwarka, which is the second largest tourism attraction zone in Gujarat. There are no short distance alternate routes available that will impact the traffic the project.

Traffic characteristics as per the Traffic Report

a. ***Short Distance:*** *Short-distance traffic for RVTPL is primarily observed between Rajkot and Jamnagar, including the GIDC units located in Jamnagar and various industrial establishments along the corridor. This movement is largely driven by the exchange of raw materials and finished goods between these closely linked industrial centers.*

b. ***Medium Distance:*** *Medium-distance traffic for RVTPL mainly flows from Jamnagar to Vadinar, encompassing the Reliance industrial units, and also extends towards Morbi. This corridor supports the movement of petroleum products, industrial goods, and raw materials, linking key production and processing centers within the region.*

c. ***Long-distance:*** *Long distance traffic for RVTPL originates primarily from the Reliance and Nayara facilities near Jamnagar, extending towards Porbandar, Rajasthan, Punjab, Ahmedabad, and other parts of India. This movement includes a mix of petroleum products and industrial cargo, highlighting the corridor's role in supporting nationwide distribution from major refining and industrial hubs in western Gujarat.*

Commodity mix as per the Traffic Report

The traffic on this corridor is predominantly freight-based, heavily skewed toward energy-related commodities, with a mix of supporting industrial and agricultural movements, and include the following:

- ***Petroleum Products:*** *Petroleum, oil, and lubricants form the backbone of the corridor's freight traffic. This high share reflects the intensive movement of refined products from Jamnagar and Vadinar refineries to distribution points across the country.*
- ***Empty Return Trips:*** *A significant percentage of the traffic consists of empty vehicles returning after delivery, largely due to the directional nature of petroleum distribution logistics. The variation in percentages indicates differences in cargo flows across toll plazas and time periods.*
- ***Construction / Building Materials:*** *Steady movement of construction materials supports ongoing development projects in the region, including industrial infrastructure and urban expansion.*
- ***Agricultural Commodities:*** *Reflects localized farm produce movements, possibly toward processing centers or domestic markets within Gujarat or nearby States.*
- ***Manufacturing Goods:*** *Represents transport of industrial goods such as machinery, parts, or processed materials, though limited in comparison to energy-related freight.*

Traffic volume as per the Traffic Report

The table below provides the details of the traffic value and growth in the traffic volume for the period indicated:

Particulars	For the year ended March 31					
	2023		2024		2025	
	Actual traffic	% increase from the previous period	Actual traffic	% increase from the previous period	Actual traffic	% increase from the previous period
RVTPL - TP 1 (Paddhari)						
CJV[1]	11,890	13.55%	13,353	12.30%	14,675	9.90%
LCV[2]	440	(8.24)%	458	4.07%	469	2.26%
Bus	560	17.36%	566	1.07%	590	4.23%
2AT[3]	335	15.27%	372	10.96%	402	8.12%
MAV[4]	2,128	(5.93)%	2,289	7.54%	2,534	10.71%
Total Vehicles	15,354	9.81%	17,038	10.96%	18,669	9.58%
Total PCU	24,815	4.80%	27,154	9.43%	29,757	9.58%
RVTPL - TP 2 (Dhroli)						
CJV[1]	11,924	14.19%	13,502	13.23%	14,897	10.33%
LCV[2]	492	3.22%	507	3.00%	520	2.65%
Bus	611	19.17%	624	2.08%	650	4.18%
2AT[3]	415	27.76%	428	3.04%	479	11.81%

MAV[4]	*2,732*	*1.06%*	*2,890*	*5.79%*	*3,260*	*12.81%*
Total Vehicles	*16,175*	*11.86%*	*17,951*	*10.98%*	*19,806*	*10.34%*
Total PCU	*28,035*	*8.51%*	*30,422*	*8.52%*	*33,733*	*10.88%*
RVTPL - TP 3 Bed						
CJV[1]	*13,190*	*24.12%*	*15,178*	*15.07%*	*16,608*	*9.42%*
LCV[2]	*478*	*20.36%*	*533*	*11.63%*	*525*	*(1.45)%*
Bus	*710*	*27.91%*	*779*	*9.73%*	*840*	*7.79%*
2AT[3]	*393*	*54.50%*	*428*	*8.87%*	*447*	*4.47%*
MAV[4]	*3,503*	*2.60%*	*3,644*	*4.03%*	*3,640*	*(0.11) %*
Total Vehicles	*18,274*	*19.85%*	*20,562*	*12.52%*	*22,060*	*7.28%*
Total PCU	*32,979*	*13.66%*	*35,997*	*9.15%*	*37,636*	*4.55%*

Source: Traffic Reports.

Notes:

1. *Car/ Jeep / Van*
2. *Light Commercial Vehicles/ Minibus*
3. *Truck with Two Axles*
4. *Multi Axle Vehicle + Over Sized Vehicle; includes Truck with Three Axles and more*

2. ***Sambalpur-Rourkela Tollway Private Limited ("SRTPL")***

Asset description as per the Traffic Report

This corridor, a strategic segment of SH-10 in Odisha, connects important districts of Sambalpur, Jharsuguda, and Sundargarh. The asset is also strategically located in a region where industrial activity and mineral resources converge, making it a critical freight corridor. The region includes prominent industrial zones and mineral-rich belts, particularly known for coal and iron ore deposits. The asset serves as a vital link between mining areas, industrial plants, and consumption centers, enabling efficient supply chain movements across Odisha and neighbouring states. This asset has been in operation for eight years. The project has demonstrated controlled violations and exemptions..

Asset location as per the Traffic Report

The SH-10 belt is among Odisha's most resource-rich and industrially active regions, hosting major public and private sector enterprises. Mining and mineral-based industries in Mahanadi Coalfields Limited, Rourkela Steel Plant, Vedanta Aluminum, Bhushan Power & Steel, Ultratech Cement, OCL India, and power utilities. Numerous thermal power plants and industrial townships are located along or near the corridor. The region contributes substantially to Odisha's industrial output and export capacity, driven by minerals, metal, and energy production. The asset serves neighbouring industrial clusters of iron, steel, aluminum, and cement. The road provides connectivity to the domestic airport in Jharsuguda. Angul and Raigarh, located in neighbouring districts, are also growing industrial cities that contribute to both passenger and goods traffic. Additionally, Coal India Limited manages significant coal mines situated in Sundargarh district, which support multiple industrial units in the region. The asset also provides direct connectivity to iron ore mines situated at Koira and Barbil. The industrial units, which include numerous SMEs in the region and mines are major contributors of traffic on the project road.

The following map illustrates the location of SRTL and the corridor it covers:









Network description as per Traffic Report

The asset interlinks with key transport corridors, including NH-53 (Kolkata–Mumbai Corridor) at Sambalpur and NH-143 near Rourkela, connecting to Keonjhar and Jamshedpur. Proximity to Jharsuguda Airport and Rourkela Airport enhances regional accessibility. Integration with major rail freight routes of East Coast Railway and Southeastern Railway, enabling multimodal logistics. Micro alternate routes were closed during the implementation stage and even passenger vehicles prefer not to use the alternate route because of the narrow road in poor condition and long distance while compared to the project road.

Traffic characteristics as per Traffic Report

a. ***Short Distance:*** *Short-distance traffic for SRTL flows primarily between Sambalpur and nearby industrial areas, including the industries in Jharsuguda and the industrial plants in Rourkela. This corridor supports local movement of raw materials and finished goods within these key industrial centers.*

b. ***Medium Distance:*** *Medium-distance traffic involves the movement of coal from MCL mines to industries located in Sambalpur, Jharsuguda, and Rourkela, along with the transport of finished byproducts. This corridor supports the supply chain between mining and industrial processing centers in the region.*

c. ***Long Distance:*** *Long-distance traffic primarily consists of iron ore transported from Keonjhar (Koida) to industries within the region, with finished products then moving onward to Andhra Pradesh and other parts of India. This route plays a crucial role in connecting mineral extraction centers with manufacturing hubs and broader markets across the country.*

Commodity mix as per the Traffic Report

The asset predominantly handles heavy industrial and mineral commodity categories as provided below:

- ***Manufacturing Goods:*** *A dominant category, reflecting movement of finished and semi-finished goods from local industries, steel plants, and fabrication units. The high range indicates variation across toll plazas and periods based on industrial output and demand.*

- ***Minerals:*** *Mainly includes coal and iron ore, transported from mining sites to industrial consumers such as power plants, steel units, and smelters, highlighting the asset's role as a key corridor for raw material movement.*

- ***Empty Vehicles:*** *A significant portion of vehicles return empty after delivery, typically in regions with unidirectional bulk commodity flow, especially from mines and plants to end-users. Indicates logistical imbalances common in freight corridors linked to extractive industries.*

Traffic volume as per the Traffic Report

The table below provides the details of SRTPL's traffic volume and growth in the traffic volume for the periods indicated:

Particulars	For the year ended March 31					
	2023		2024		2025	
	Actual traffic	% increase from the previous period	Actual traffic	% increase from the previous period	Actual traffic	% increase from the previous period
TP - 1						
CJV[(1)]	4,220	9.45%	4,637	9.89%	5,071	9.36%
LCV[(2)]	204	6.06%	221	8.33%	202	(8.49)%
2AT[(3)]	432	9.35%	446	3.27%	492	10.30%
3A[(4)]	771	(0.87)%	769	(0.23)%	658	(14.49)%
MAV[(5)]	2349	34.07%	3135	33.48%	3097	(1.21)%
Total Vehicles	7,976	14.38%	9,209	15.46%	9,521	3.39%
Total PCU	18,705	20.32%	22,724	21.49%	22,763	0.17%
TP - 2						
CJV	3,192	7.28%	3,302	3.45%	3,666	11.02%
LCV	169	(29.73)%	146	(13.77)%	105	(27.80)%
2A	301	12.50%	316	4.81%	348	10.14%
3A	273	3.05%	271	(0.61)%	257	(5.20)%
MAV	3679	37.51%	4630	25.84%	5049	9.06%
Total Vehicles	7,615	18.52%	8,666	13.79%	9,426	8.78%
Total PCU	21,726	27.98%	26,118	20.21%	28,362	8.59%
TP - 3						
CJV	3,400	3.48%	3,580	5.30%	3,817	6.61%
LCV	136	(0.02)%	206	51.45%	160	(22.26)%
2A	346	4.05%	336	(3.01)%	328	(2.35)%
3A	256	13.30%	234	(8.79)%	184	(21.34)%
MAV	2425	30.85%	3235	33.39%	3361	3.88%
Total Vehicles	6,564	12.51%	7,591	15.65%	7,850	3.41%
Total PCU	16,326	20.86%	20,157	23.46%	20,716	2.77%

Source: Traffic Reports.

Notes:

1. *Car/ Jeep / Van*
2. *Light Commercial Vehicles/ Minibus*
3. *Truck with Two Axles*
4. *Truck with Three Axles*
5. *Multi Axle Vehicle + Over Sized Vehicle*

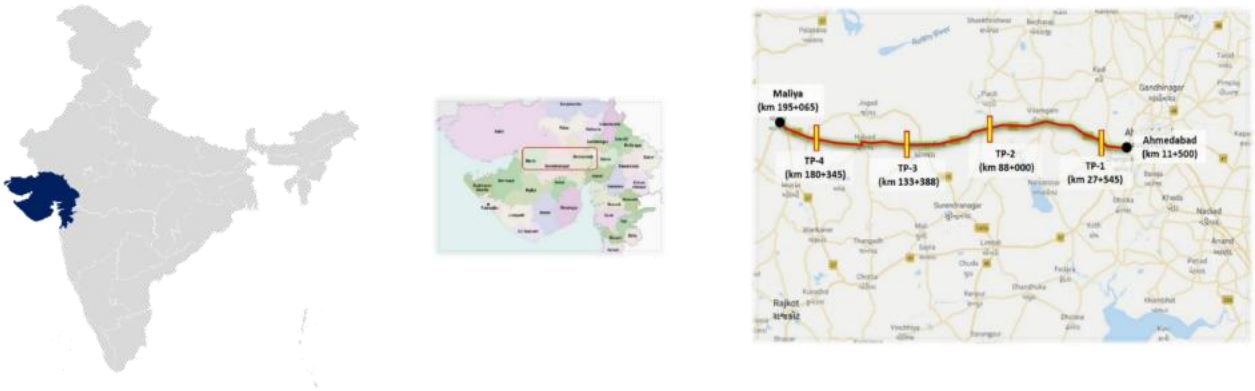
3. ***Ahmedabad Maliya Tollway Private Limited ("AMTPL")***

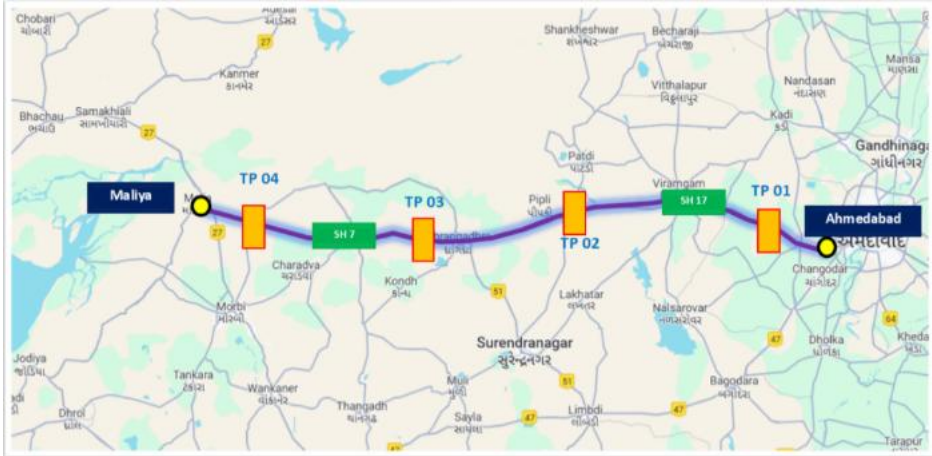
Asset description as per the Traffic Report

The Ahmedabad-Viramgam-Maliya section of SH-17 and SH-7 is one of many such critical corridors that had been 4-laned considering the future capacity constraints. The project highway connects the industrial areas of Sanand, Chharodi and Khoda, the pharmaceutical hub at Moraiya, ceramic tiles manufacturing hub in Morbi. It also provides connectivity to the important ports of Kandla and Mundra. Sanand has emerged as one of the fastest growing industrial hubs in the state and drawing investments from large domestic as well as multi-national companies. While having initial emerged as a hub for automotive, pharmaceutical and FMCG companies, Sanand is now pioneering India's semiconductor revolution. Also, the Kachchh district houses a large sponge iron plant. The asset is strategically positioned between Gujarat's major urban centre, Ahmedabad, and key port locations. This makes it a critical link for both industrial supply chains and port-based logistics. The corridor serves as a vital transit route connecting industrial clusters in central Gujarat with western coastal ports like Kandla and Mundra, enabling efficient inland and export-bound cargo movement. Having regard to increased industrial activity around the project road, GSRDC has proposed 6-laning of a 28.752 km section of the project highway.

Asset Location as per the Traffic Report

The following map illustrates the location of AMTPL and the corridor it covers:





Network description as per the Traffic Report

*The asset network is also the principal transportation backbone for Asia's largest ceramic and tile manufacturing cluster, concentrated around Morbi and Wankaner, making it a vital link in Gujarat's industrial economy and for ceramic raw material providing regions of Rajasthan. The project road connects the important cities of Ahmedabad, Vadodara, Surat in southern and eastern Gujarat to Bhuj, Gandhidham and Kutchh region in the west. The corridor benefits in terms of traffic contributors Sanand Industrial Corridor, Mandal-Becharaji Special Investment Region and Viramgam Industrial Cluster. The project stretch is also a key connecting route between the largest ceramic cluster of India (Morbi) and its key raw material providing regions of Rajasthan. The stretch experiences high-intensity freight movement, predominantly multi-axle heavy commercial vehicles ("**HCVs**") carrying port-bound and export-oriented cargo. It acts as the trunk feeder route for traffic originating from central Gujarat and Saurashtra's industrial clusters toward Mundra and Kandla ports. It also provides efficient access for industries in Sanand (automotive and engineering hub) and Morbi (ceramic and tile cluster) to the western export gateways. The corridor supports both inbound logistics (raw materials, fuel, packaging materials) and outbound exports (finished tiles, ceramics, and goods), ensuring balanced freight flow. This asset has an alternative route via NH-8A, which is 90 kilometers longer than the project road. NH-8A is currently being widened, and a structural toll rate will be enforced soon. As a result, traffic is unlikely to switch from the project road to the alternative route. Furthermore, the project road has been operational for more than 13 years without any recorded incidents of traffic diversion towards NH-8A under any circumstances. The section on NH-8A is currently mostly 6 laned but the tolling operation is for 4 lanes. As most of the 6 lane work is already complete, the traffic would have already shifted and the in-scope traffic which is almost negligible on the project road is the traffic which has been using the project road.*

Traffic Characteristics as per the Traffic Report

a. ***Short Distance:*** *Short-distance traffic in the Ahmedabad region is primarily concentrated between Ahmedabad and nearby industrial hubs such as Sanand GIDC, Morbi's ceramic cluster units, and surrounding industries. This movement is largely driven by the flow of raw materials and finished goods between the city and these key manufacturing zones.*

b. ***Medium Distance:*** *Medium-distance traffic from Ahmedabad extends towards industrial and logistics hubs such as Becharaji, Viramgam, Maliya, and Gandhidham. This corridor supports the movement of goods between Ahmedabad and key manufacturing, port-linked, and industrial zones, facilitating regional connectivity and trade flow.*

c. ***Long distance:*** *Long-distance traffic in the region primarily originates from Kandla Port and the Morbi ceramic tile cluster, moving towards the southern and eastern parts of India. This flow is driven by the distribution of export-import cargo and finished ceramic products to major consumption markets across the country, highlighting the strategic importance of these industrial zones in long-haul freight movement.*

Commodity mix as per the Traffic Report

This section is primarily driven by five major commodity categories, contributing significantly to its overall traffic profile, as provided below:

- ***Construction Materials:*** *This is the leading commodity group with high volume indicating continuous infrastructure development and construction activities in the region, including residential, industrial, and port-related projects.*
- ***Manufacturing Goods:*** *Strong movement of manufactured goods indicates the corridor's role in linking production hubs to markets and ports. Key sectors include machinery, engineering goods, and fabricated textiles.*
- ***Courier & Parcel Commodities:*** *Represents logistics and courier movement, indicating rising e-commerce and SME trade along the route. The wide range shows variation in demand across different toll plazas.*
- ***Empty Vehicle Movements****: A significant portion of traffic comprises empty return trips, especially due to directional cargo flows from ports, reflecting the need for efficient backhaul cargo strategies to balance load utilization.*
- ***Petroleum, Oil and Lubricants:*** *Regular flow of fuel and lubricants, supporting both industrial consumption and transport sector needs.*

Traffic volume as per the Traffic Report

The table below provides the details of AMTPL's the traffic volume and growth in the traffic volume for the periods indicated:

Particulars	For the year ended March 31					
	2023		2024		2025	
	Actual traffic	% increase from the previous period	Actual traffic	% increase from the previous period	Actual traffic	% increase from the previous period
Sanand (TP-1)						
CJV[1]	17,582	9.30%	19,596	11.46%	21,018	7.26%
LCV/Minibus [2]	1,340	6.13%	1,433	6.96%	1,601	11.74%
Bus	1,621	3.41%	1,718	5.96%	1,851	7.76%
Truck 2 Axle[3]	1,101	21.07%	1,240	12.56%	1,405	13.32%
MAV+OSV[4]	4,357	10.90%	4,494	3.16%	4,922	9.51%
Total Vehicles	26,000	9.46%	28,481	9.54%	30,797	8.13%
Total PCU	47,364	9.92%	50,842	7.34%	55,335	8.84%
Malvan (TP-2)						
CJV[1]	6,143	12.36%	6,657	8.38%	7166	7.65%
LCV/Minibus [2]	412	(7.71)%	445	8.21%	479	7.59%
Bus	452	15.20%	456	0.82%	466	2.16%
Truck 2 Axle[3]	688	31.55%	689	0.07%	715	3.76%
MAV+OSV[4]	4,243	11.76%	4,100	(3.37)%	4445	8.41%
Total Vehicles	11,938	12.35%	12,347	3.43%	13,271	7.48%
Total PCU	29,277	12.73%	29,210	(0.23)%	31,429	7.60%
Soladi (TP-3)						
CJV[1]	7,318	11.54%	8,073	10.32%	8,660	7.27%
LCV/Minibus [2]	605	2.90%	612	1.27%	656	7.16%
Bus	543	14.66%	552	1.60%	562	1.84%
Truck 2 Axle[3]	602	21.88%	675	12.18%	749	10.98%
MAV+OSV[4]	4,966	4.55%	5,416	9.05%	6,101	12.67%
Total Vehicles	14,034	9.08%	15,328	9.22%	16,729	9.14%
Total PCU	34,008	7.21%	37,043	8.92%	41,036	10.78%
Aniyari (TP -4)						
CJV[1]	5,192	16.43%	6,247	20.33%	6,361	1.82%
LCV/Minibus [2]	332	15.23%	378	13.65%	393	4.11%
Bus	287	22.74%	290	1.12%	289	(0.34)%
Truck 2 Axle[3]	436	23.67%	511	17.39%	551	7.66%
MAV+OSV[4]	4,268	9.34%	4,640	8.73%	5,088	9.66%
Total Vehicles	10,514	13.83%	12,067	14.76%	12,682	5.10%
Total PCU	27,063	11.76%	30,100	11.22%	32,368	7.53%

Source: Traffic Reports.

Notes:

1. *Car/ Jeep / Van*
2. *Light Commercial Vehicles/ Minibus*
3. *Truck with Two Axles*
4. *Multi Axle Vehicle + Over Sized Vehicle*

4. ***Deccan Tollways Private Limited ("DTPL")***

Asset description as per the Traffic Report

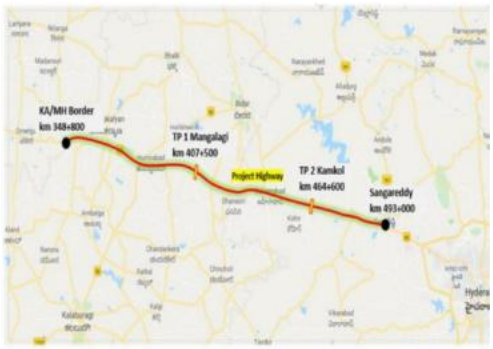
The NH- 65 (old NH-9) originates from Pune in the State of Maharashtra and ends at Machilipatnam in the state of Andhra Pradesh. The highway passes through several important cities such as Indapur, Solapur, Omerga, Humnabad, Zaheerabad, Hyderabad, Suryapet and Vijayawada with a total length of 920 km. The project road section of 144.99 km starts from the Maharashtra/Karnataka border in Karnataka and ends at Sangareddy in the State of Telangana. The asset is strategically situated on a key corridor connecting two major economic and industrial centers of India, Pune and Hyderabad. This alignment makes the assets a critical link for freight movement between Maharashtra and Telangana, serving both intra-state and inter-state logistics needs. Given its location, a significant share of commercial and industrial traffic between Pune and Hyderabad naturally passes through this corridor, ensuring steady and high-volume usage.

Asset location as per the Traffic Report

The following map illustrates the location of DTPL and the corridor it covers:









Network description as per the Traffic Report

The DTPL asset functions as a critical multi-commodity corridor, facilitating seamless freight movement between two of South India's most significant cities. The corridor intersects several major north-south routes, effectively forming feeder and distribution channels for long-haul freight. It connects with major corridors including, NH-48 (Mumbai–Chennai Corridor) near Pune and NH- 44 (Delhi–Bengaluru Corridor) near Hyderabad along with NH-16 (Kolkata–Chennai Coastal Corridor) near Vijayawada. Apart from the Chennai Surat Expressway, there are no major alternative routes at either the local or broader network level. Even minor alternate routes were identified, and potential leakages were addressed by installing check plazas.

Traffic Characteristics as per the Traffic Report

a. ***Short Distance:*** *Short-distance traffic for DTPL primarily flows between Humnabad, Bidar, and Zaheerabad, serving the industries located along this corridor and extending towards Hyderabad. This route facilitates local movement of raw materials and finished goods within these industrial and urban centers.*

b. ***Medium Distance:*** *Medium-distance traffic flows between the cement hubs in Kalaburgi and key industrial centers such as Bidar, Zaheerabad's Mahindra & Mahindra plant (likely to undergo an expansion), MRF Industries, and sugarcane processing units along the corridor. This movement primarily supports the transport of cement, industrial goods, and agricultural products within the region.*

c. ***Long distance:*** *Long-distance traffic moves from Gujarat, Mumbai, and Pune to Zaheerabad, Hyderabad, Bangalore, and Chennai, carrying a diverse mix of commodities including tiles, agricultural products, and auto components. This corridor plays a key role in connecting major industrial and commercial centers across western and southern India.*

Commodity mix as per the Traffic Report

The asset handles a wide range of commodity categories, as provided below, indicating a [robust] and balanced traffic base not overly reliant on a single sector:

- ***Courier & Parcel Commodities****: Strong movement of parcel freight highlights the corridor's role in express logistics and e-commerce. Includes courier shipments, general merchandise, and packaged goods.*

- ***Construction / Building Materials****: A key contributor to freight volume, reflecting active construction and infrastructure development in regions connected by the corridor. Likely, it includes cement, steel, sand, and aggregates.*
- ***Automobile / Manufacturing Goods****: Indicates the presence of industrial and automotive supply chains, particularly between Pune's industrial hubs and Hyderabad's manufacturing zones.*
- ***Empty Vehicle Movements****: Reflects directional cargo flows, especially from high-consumption areas to production hubs. High percentage of empty return trips is common in corridors with uneven cargo demand.*
- ***Agricultural Commodities****: A substantial component of freight volume, likely comprising food grains, pulses, vegetables, and perishables. Demonstrates the corridor's importance in agri-trade and rural supply chains.*

Traffic Volume as per the Traffic Report

The table below provides the details of DTPL's the traffic volume and growth in the traffic volume for the period indicated:

Particulars	For the year ended March 31					
	2023		2024		2025	
	Actual traffic	% increase from the previous period	Actual traffic	% increase from the previous period	Actual traffic	% increase from the previous period
Mangalgi (TP-1)						
CJV[1]	5,668	25.90%	5,860	3.38%	5,829	(0.53)%
LCV/Minibus [2]	523	(4.55)%	541	3.36%	554	2.42%
Bus	515	52.38%	514	(0.19)%	514	(0.09)%
Truck 2 Axle[3]	1,318	13.26%	1,332	1.05%	1,340	0.54%
Truck 3-Axle [4]	897	(1.18)%	814	(9.17)%	754	(7.36)%
MAV+OSV[45]	2,179	14.90%	2,143	(1.63)%	2,128	(0.69)%
Total Vehicles	11,101	18.65%	11,205	0.94%	11,119	(0.77)%
Total PCU	24,448	15.95%	24,298	(0.61)%	24,061	(0.98)%
Kamkole (TP-2)						
CJV[1]	11,197	21.02%	12,403	10.77%	13,203	6.45%
LCV/Minibus [2]	841	(3.76)%	859	2.10%	908	5.75%
Bus	1,009	31.12%	989	(2.01)%	950	(3.89)%
Truck 2 Axle[3]	1,548	13.92%	1,652	6.70%	1,761	6.57%
Truck 3-Axle [4]	1,071	(0.61)%	1,048	(2.15)%	993	(5.21)%
MAV+OSV[45]	2,359	16.66%	2,381	0.93%	2,399	0.74%
Total Vehicles	18,025	17.39%	19,331	7.25%	20,214	4.57%
Total PCU	33,959	15.97%	35,472	4.45%	36,472	2.82%

Source: Traffic Reports.

Notes:

1. *Car/ Jeep / Van*
2. *Light Commercial Vehicles/ Minibus*
3. *Truck with Two Axles*
4. *Truck with Three Axles*
5. *Multi Axle Vehicle + Over Sized Vehicle*

5. ***Thrissur Expressway Limited ("TEL")***

Asset description as per the Traffic Report

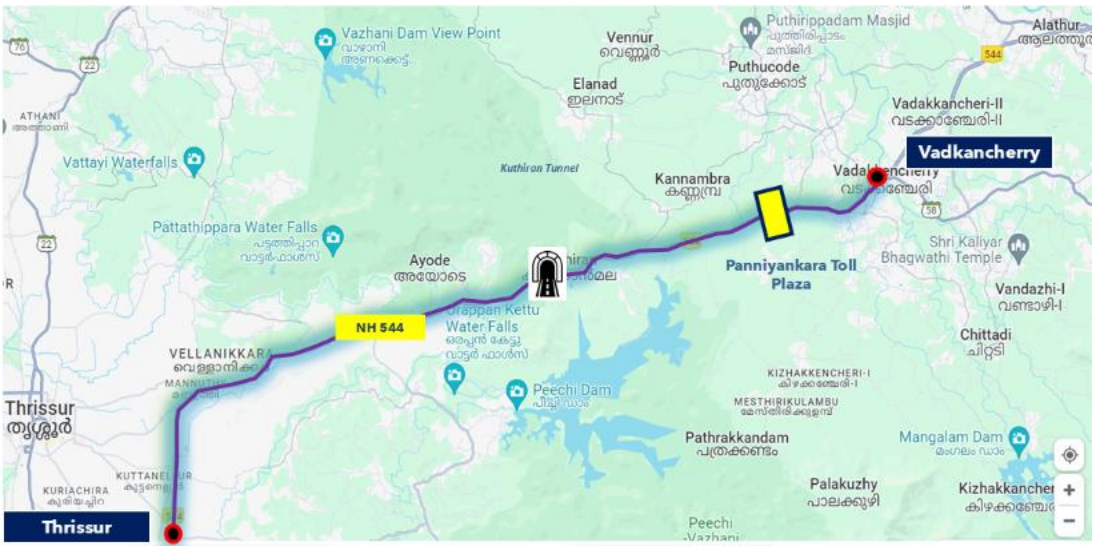
The asset is a 6-lane stretch of NH-544 (old NH-47), a critical corridor connecting Salem in Tamil Nadu to Kochi in Kerala. This highway serves as a major arterial route linking Kerala with Tamil Nadu and the rest of India. A key feature of this asset is the 1.60 km Kuthiran Tunnel, which is Kerala's first twin-tube tunnel with three lanes in each direction passing through the Peechi-Vazhani Wildlife Sanctuary. The tunnel significantly enhances traffic flow and safety by bypassing a previously congested and accident-prone ghat section. The route traverses several key cities including Thrissur, Palakkad, Coimbatore, and Erode.

Asset location as per the Traffic Report

The following map illustrates the location of TEL and the corridor it covers:









Network Description as per the Traffic Report

Kerala has limited access points to neighboring states due to its terrain. Major entry routes include, NH-66 from Mangalore (Karnataka) along the coast, NH-544 via this asset from the east, NH-85 from Madurai via Munnar, and NH-766 from Kollegal (Karnataka) through Mysuru to Kozhikode. Other routes, such as NH-183 through Kottayam and the southern corridor from Tirunelveli to Kochi, have difficult terrains and are unsuitable for heavy vehicles. This makes NH-544 a crucial logistics and transport lifeline into Kerala. The asset serves as a critical connectivity link between Tamil Nadu and Kerala, facilitating seamless movement of goods across state borders. This corridor plays a major role in regional logistics, supporting trade and supply chains between the industrial hubs of Tamil Nadu and the consumption-driven markets of Kerala. Kerala has a 590 km long coastline and is home to 18 ports, including the major port at Kochi. The asset is located approximately 110.00 km from Kochi port, which is especially important for port-related traffic and commercial activity moving inland from the coast. Kochi port handled 37.75 million metric tonnes of cargo in the Financial Year 2025. Moreover, this asset does not have any significant alternate route since alternative routes, such as NH-183 through Kottayam or the Southern Corridor from Tirunelveli to Kochi, have poor geometric condition and require long detour due to hilly terrain.

Traffic Characteristics as per the Traffic Report

a. ***Short Distance:*** *Short-distance traffic is prominent between Panniyankara, Palakkad, Vadakancherry, Aluva, Ernakulam, and Thrissur, forming a vital intra-regional corridor within central Kerala. These locations are interconnected by dense road networks that support frequent passenger and freight movement driven by economic activities such as trade, employment, education, and services. Ernakulam, as a commercial hub, attracts significant daily traffic from nearby towns like Aluva and Vadakancherry, while Palakkad and Thrissur serve as key transit and market centres. This local connectivity plays a crucial role in sustaining regional mobility and economic integration.*

b. ***Medium Distance:*** *Medium-distance travel between Coimbatore and Pollachi in Tamil Nadu to Thrissur in Kerala forms a significant regional transit corridor that facilitates both passenger and goods movement. This route supports a steady flow of commercial vehicles transporting agricultural produce, textiles, and industrial goods from Tamil Nadu into Kerala, while also accommodating daily commuters, traders, and tourists. Coimbatore, being a major industrial and textile hub, generates high outbound freight traffic, much of which is directed toward Thrissur's commercial markets and distribution centres. The corridor also serves as an important link for inter-state connectivity, contributing to the economic integration of western Tamil Nadu and central Kerala.*

c. ***Long distance:*** *Long-distance freight movement along this corridor is primarily driven by 3-axle trucks and multi-axle vehicles, facilitating high-volume transport between major industrial and commercial hubs in Tamil Nadu and Karnataka, such as Coimbatore, Pollachi, Madurai, Chennai, and Bangalore, and key destinations in Kerala including Ernakulam, Kochi, and surrounding regions. These routes handle the transportation of a wide range of goods including machinery, consumer products,*

textiles, automotive parts, and perishable items. The corridor plays a vital role in sustaining Kerala's consumption-driven economy by ensuring a continuous supply of goods from the more industrialized neighbouring states. It also serves as a critical logistics network for export-import activities through Kochi port, linking inland production centres with maritime trade gateways.

Commodity mix as per the Traffic Report

The asset handles a wide range of commodity categories as provided below, indicating a robust and balanced traffic base not overly reliant on a single sector.

- ***Agricultural Commodities:*** *A major driver of traffic, reflecting the movement of perishable and non-perishable agri-products such as vegetables, spices, coconuts, and grains. The volume indicates strong farm-to-market linkages and Kerala's dependence on inflows from Tamil Nadu.*
- ***Empty Vehicles:*** *A high percentage of empty return trips, likely due to directional trade imbalance, with heavier inflows to Kerala and limited outbound cargo. Common in corridors where consumption exceeds production at one end.*
- ***Construction / Building Materials:*** *Includes cement, steel, tiles, and aggregates, driven by ongoing construction and infrastructure activities in Kerala. Reflects the asset's importance for construction logistics.*

Traffic volume as per the Traffic Report

The table below provides the details of TEL's the traffic volume and growth in the traffic volume for the periods indicated:

Particulars	***For the year ended March 31***					
	2023		***2024***		***2025***	
	Actual traffic	***% increase from the previous period***	***Actual traffic***	***% increase from the previous period***	***Actual traffic***	***% increase from the previous period***
[●] (TP-1)						
CJV[1]	*16019*	*-*	*17,532*	*9.45%*	*17,943*	*2.34%*
LCV/Minibus [2]	*1921*	*-*	*2,004*	*4.32%*	*2,065*	*3.05%*
Bus &Truck 2 Axle	*2720*	*-*	*2,832*	*4.13%*	*2,886*	*1.90%*
Truck 3 Axle[3]	*1195*	*-*	*1,041*	*(12.87)%*	*939*	*(9.80)%*
MAV+OSV[4]	*3059*	*-*	*3,499*	*14.41%*	*3,130*	*(10.54)%*
Total Vehicles	*24914*	*-*	*26,909*	*8.01%*	*26,964*	*0.20%*
Total PCU	*44409*	*-*	*47,906*	*7.87%*	*46,604*	*(2.72)%*

Source: Traffic Reports.

Notes:

1. *Car/ Jeep / Van*
2. *Light Commercial Vehicles/ Minibus*
3. *Truck with Three Axles*
4. *Multi Axle Vehicle + Over Sized Vehicle*

6. ***Panipat Elevated Corridor Private Limited ("PECPL")***

Asset description as per the Traffic Report

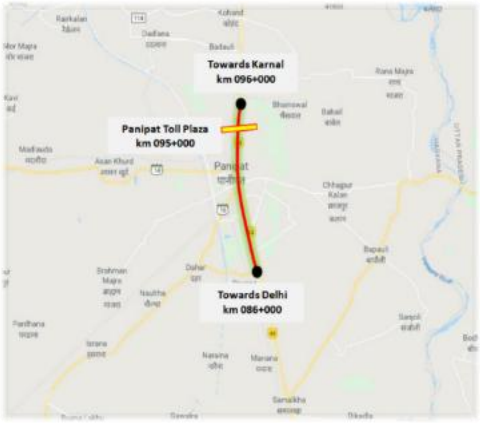
PECPL is strategically located in the state of Haryana, serving as a key link between Delhi and Chandigarh. The corridor spans approximately 10 km, including a 3.40 km, 6-lane elevated section that traverses the city of Panipat in a south-to-north direction. The entire corridor is access-controlled, meaning entry and exit are restricted to designated points located at either end of the road. Alongside the main carriageway, local service roads run parallel on both sides and are also included under the concession scope. A single toll plaza is positioned at the northern end of the corridor, north of Panipat, while a U-turn just south of the toll plaza enables toll-free movement for local traffic. The road infrastructure is of consistently high quality throughout, with access control ensuring that the main carriageway remains free from interference by non-motorized or low-speed local traffic, thereby enhancing safety and traffic efficiency. The corridor runs through a region with strong industrial presence, enabling diverse freight movement and a steady flow of both raw materials and finished goods. This asset has one of the longest operation histories in the entire portfolio. Traffic trends have seen different cycles and travel patterns are stabilized and consistent in movement.

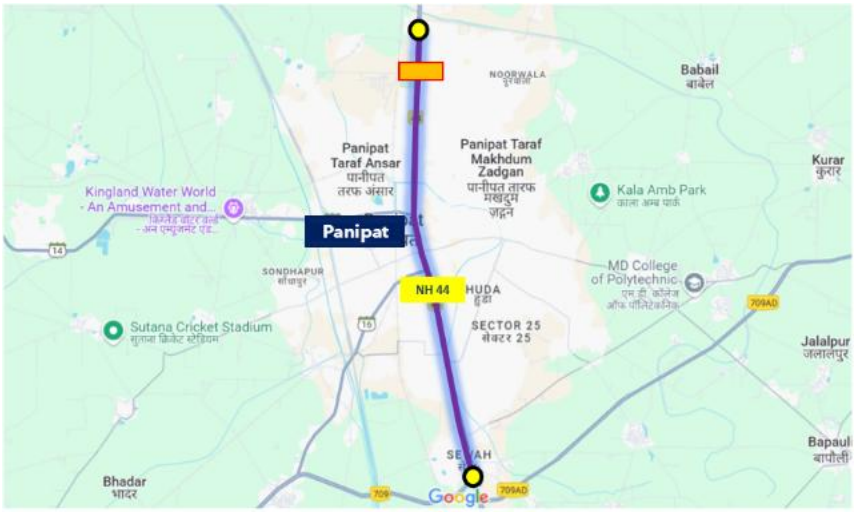
Asset location as per the Traffic Report

The following map illustrates the location of PECPL and the corridor it covers:









Network description as per the Traffic Report

The project road is part of NH-44 (old NH-1) which serves as a vital link between Delhi, Haryana, and Punjab, traversing through Haryana and eastern Punjab along its route passing through significant urban centers such as Sonipat, Panipat, Ambala, Ludhiana, Jalandhar, and Amritsar before ending at the Wagah border. The project corridor is a part of the longest national highway in India. It passes through the Union Territory of Jammu & Kashmir, in addition to the states of Punjab, Haryana, Delhi, Uttar Pradesh, Rajasthan, Madhya Pradesh, Maharashtra, Telangana, Andhra Pradesh, Karnataka, and Tamil Nadu spanning a length of 4,112 km. This highway, formed through the amalgamation of seven national highways, spans various regions, beginning with the Jammu-Srinagar National Highway (formerly NH-1A) from Srinagar in Jammu and Kashmir, extending through the former NH-1 in Punjab and Haryana, to reach Delhi. It incorporates parts of the former NH-2 from Delhi to Agra, including the former NH-3 (popularly known as Agra-Bombay National Highway) from Agra to Gwalior. The highway also comprises former NH-75 and former National Highway no. 26 to Jhansi, and former National Highway no. 7 via various cities such as Lakhnadon, Seoni, Nagpur, Adilabad, Hyderabad etc.

Traffic characteristics as per the Traffic Report

a. ***Short Distance**: Most of the traffic on the Delhi-Ambala route originates from Delhi, with Panipat and Sonipat also contributing significantly. Karnal and Ambala function as key hubs, attracting traffic from various northern regions. Additionally, Sonipat and Panipat serve as common destinations for vehicles traveling along this corridor.*

b. ***Medium Distance:** The medium-distance traffic along the Delhi–Ludhiana corridor primarily originates from Delhi, with Ludhiana acting as a major destination. Along the route, key cities such as Panipat, Karnal, Kurukshetra, and Ambala contribute to both originating and terminating traffic. This corridor supports a mix of regional and intercity movement, with Ludhiana serving as a significant industrial and commercial hub drawing traffic from various points along the way.*

c. ***Long Distance:** The long-distance traffic on this corridor extends beyond Ludhiana, with a notable portion heading towards Punjab and further into Jammu and Kashmir. These regions contribute to the overall traffic flow, with Punjab being a major destination due to its industrial and agricultural significance, while Jammu and Kashmir attracts long-haul movement related to trade and connectivity with northernmost parts of the country.*

Commodity mix as per the Traffic Report

The asset handles a wide variety of commodities, as provided below, reflecting the economic and industrial complexity of the region it serves:

- ***Empty Loads**: A significant share of traffic comprises empty return trips, which is typical for high-volume corridors with directional cargo flow, especially from manufacturing hubs.*
- ***Agricultural Products:** Strong representation of agri-based freight indicates robust trade in food grains, produce, and related goods; common in Punjab and Haryana regions.*
- ***FMCG Goods:** Reflects high consumer demand and regular supply chain movements to serve urban and semi-urban markets in and around the corridor.*
- ***Construction Materials:** Indicates ongoing development activities, including urban expansion, infrastructure projects, and real estate growth along the corridor.*
- ***Manufacturing Goods:** Represents a healthy share of industrial freight, driven by active manufacturing clusters in Punjab, Haryana, and the NCR region.*
- ***Empty Loads**: A significant share of traffic comprises empty return trips, which is typical for high-volume corridors with directional cargo flow, especially from manufacturing hubs.*

Traffic volume as per the Traffic Report

The table below provides the details of PECPL's the traffic volume and growth in the traffic volume for the periods indicated:

Particulars	For the year ended March 31					
	2023		2024		2025	
	Actual traffic	% increase from the previous period	Actual traffic	% increase from the previous period	Actual traffic	% increase from the previous period
CJV[1]	41,042	(0.39)%	42,580	3.75%	44,101	3.57%
LCV[2]	2,752	10.89%	2,419	(12.11)%	2,442	0.97%
Bus	2,062	26.81%	2,217	7.50%	2,416	8.99%
Truck*	9,715	(8.96)%	9,171	(5.60)%	9,187	0.17%
PCU	80,504	(1.61)%	80,373	(0.16)%	82,575	2.74%

Source: Traffic Reports.

Notes:

1. *Car/ Jeep / Van*
2. *Light Commercial Vehicles/ Minibus*
3. **Truck with Two Axles +Multi Axle Vehicle + Over Sized Vehicle*



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ANNEXURE D – SPECIAL PURPOSE COMBINED FINANCIAL STATEMENTS

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INDEPENDENT AUDITOR'S REPORT ON SPECIAL PURPOSE COMBINED FINANCIAL STATEMENTS OF CITIUS TRANSNET INVESTMENT TRUST

To
The Board of Directors,
EAAA Transinfra Managers Limited (the "Investment Manager") in its capacity as the Investment Manager of Citius Transnet Investment Trust (the "Trust")
Plot 294/3 Edelweiss House,
Off CST Road, Kalina, Santacruz East,
Mumbai, Maharashtra 400098

Opinion

We have audited the attached special purpose combined financial statements of Citius Transnet Investment Trust (hereinafter referred to as the "Trust"), its asset special purpose vehicle entities (as listed in Annexure 1) (collectively the "Asset SPVs" or "SPVs" or "components") (the Trust and SPVs together referred to as "the SPV Group") which comprises of the Combined Balance Sheet as at December 31, 2025, March 31, 2025, March 31, 2024 and March 31, 2023; the Combined Statement of Profit and Loss (including other comprehensive income); the Combined Statement of Changes in Equity and the Combined Statement of Cash Flows for the nine months period ended December 31, 2025 and years ended March 31, 2025, March 31, 2024 and March 31, 2023 and a summary of material accounting policies and other additional financial disclosures as required under Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014, as amended from time to time and Securities and Exchange Board of India (SEBI) master circular no. SEBI/HO/DDHS-PoD-2/P/CIR/2025/102 dated July 11, 2025 and other circulars issued thereunder (the "InvIT Regulations") (together referred to as the "Special Purpose Combined Financial Statements").

The Special Purpose Combined Financial Statements have been prepared in accordance with the basis of preparation as set out in note 2(A) to the Special Purpose Combined Financial Statements.

In our opinion and to the best of our information and according to the explanations given to us and based on the consideration of reports of other auditors on separate financial statements and on the other financial information of the components, as noted in the 'Other Matters' paragraph, the aforesaid Special Purpose Combined Financial Statements give a true and fair view in accordance with the basis of preparation set out in Note 2(A) to the Special Purpose Combined Financial Statements, of the state of affairs of the SPV Group as at December 31, 2025, March 31, 2025, March 31, 2024 and March 31, 2023, its loss (including other comprehensive income), its changes in equity and its cash flows for the nine months period ended December 31, 2025 and years ended March 31, 2025, March 31, 2024 and March 31, 2023.

Basis for Opinion

We conducted our audit of the Special Purpose Combined Financial Statements in accordance with the Standards on Auditing (SAs), and other pronouncements issued by the Institute of Chartered Accountants of India (the "ICAI"). Our responsibilities under those Standards are further described in the 'Auditor's Responsibilities for the audit of the Special Purpose Combined Financial Statements' section of our report. We are independent of the SPV Group in accordance with the 'Code of Ethics' issued by the ICAI and we have fulfilled our other ethical responsibilities in accordance with the Code of Ethics. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion on the Special Purpose Combined Financial Statements.

Emphasis Of Matter

We draw attention to Note 2(A) to the Special Purpose Combined Financial Statements, which describes the basis of preparation (including presentation) of this Special Purpose Combined Financial Statements. The Special Purpose Combined Financial Statements have been prepared by the Investment Manager for inclusion in the the offer document and the final offer document (collectively, the "Offer Documents") in connection with the proposed initial public offering of the units of the Trust. As a result, the Special Purpose Combined Financial Statements may not be suitable for another purpose. Our report is intended

solely for the purpose of inclusion in the Offer Documents and is not to be used, referred to or distributed for any other purpose.

Our opinion is not modified in respect of the above matter.

Responsibilities of Management and Those Charged with Governance for the Special Purpose Combined Financial Statements

The Board of Directors of the Investment Manager is responsible for the preparation and presentation of these Special Purpose Combined Financial Statements that give a true and fair view of the financial position, financial performance including other comprehensive income, cash flows and changes in equity of the SPV Group in accordance with the basis of preparation as set out in Note 2(A) to the Special Purpose Combined Financial Statements.

The respective Board of Directors of the components included in the SPV Group are responsible for maintenance of adequate accounting records in accordance with the provisions of the Act for safeguarding of the assets of their respective component and for preventing and detecting frauds and other irregularities; selection and application of appropriate accounting policies; making judgments and estimates that are reasonable and prudent; and the design, implementation and maintenance of adequate internal financial controls, that were operating effectively for ensuring the accuracy and completeness of the accounting records, relevant to the preparation and presentation of the Special Purpose Combined Financial Statements that give a true and fair view and are free from material misstatement, whether due to fraud or error, which have been used for the purpose of preparation of the Special Purpose Combined Financial Statements by the Board of Directors of the Investment Manager, as aforesaid.

In preparing the Special Purpose Combined Financial Statements, the respective Board of Directors of the components included in the SPV Group are responsible for assessing the ability of their respective component to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the SPV Group or to cease operations, or has no realistic alternative but to do so.

The respective Board of Directors of the components are also responsible for overseeing the respective component financial reporting process.

Auditor's Responsibilities for the audit of the Special Purpose Combined Financial Statements

Our objectives are to obtain reasonable assurance about whether the Special Purpose Combined Financial Statements as a whole is free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with SAs will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these Special Purpose Combined Financial Statements.

As part of an audit in accordance with SAs, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the Special Purpose Combined Financial Statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the SPV Group's internal control.

- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.

- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the ability of the SPV Group to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the Special Purpose Combined Financial Statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the SPV Group to cease to continue as a going concern.

- Evaluate the overall presentation, structure and content of the Special Purpose Combined Financial Statements, including the disclosures, and whether the Special Purpose Combined Financial Statements represent the underlying transactions and events in a manner that achieves fair presentation.

- Obtain sufficient appropriate audit evidence regarding the financial information of the components or business activities within the SPV Group of which we are the independent auditors and whose financial information we have audited, to express an opinion on the Special Purpose Combined Financial Statements. We are responsible for the direction, supervision and performance of the audit of the financial statements of such components included in the Special Purpose Combined Financial Statements of which we are the independent auditors. For the other entities included in the Special Purpose Combined Financial Statements, which have been audited by other auditors, such other auditors remain responsible for the direction, supervision and performance of the audits carried out by them. We remain solely responsible for our audit opinion.

We communicate with those charged with governance of the Trust regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

We also provide those charged with governance of the Trust with a statement that we have complied with relevant ethical requirements regarding independence, and to communicate with them all relationships and other matters that may reasonably be thought to bear on our independence, and where applicable, related safeguards.

Other Matters

We did not audit the financial statements of:

- 9 components, whose financial statements reflects total assets of Rs. 83,081.51 million as at December 31, 2025, total revenues of Rs. 14,501.40 million and net cash outflows of Rs. 307.33 million for the nine months period ended December 31, 2025 as considered in the Special Purpose Combined Financial Statements.
- 9 components, whose financial statements reflects total assets of Rs. 95,426.39 million as at March 31, 2025, total revenues of Rs. 19,138.49 million and net cash outflows of Rs. 11,537.77 million for the year ended March 31, 2025 as considered in the Special Purpose Combined Financial Statements.
- 13 components, whose financial statements reflects total assets of Rs. 1,17,421.11 million as at March 31, 2024, total revenues of Rs. 17,966.10 million and net cash inflows of Rs. 9,132.22 million for the year ended March 31, 2024 as considered in the Special Purpose Combined Financial Statements.
- 13 components, whose financial statements reflects total assets of Rs. 1,26,443.78 million as at March 31, 2023, total revenues of Rs. 16,850.62 million and net cash inflows of Rs. 2,192.54 million for the year ended March 31, 2023 as considered in the Special Purpose Combined Financial Statements.

These financial statements have been audited by other auditors, which financial statements and auditor's reports have been furnished to us by the Management. Our opinion on the Special Purpose Combined Financial Statements, in so far as it relates to the amounts and disclosures included in respect of such components is based solely on the reports of such other auditors.

Our opinion above on the Special Purpose Combined Financial Statements, and our report on Other Legal and Regulatory Requirements below, is not modified in respect of the above matters with respect to our reliance on the work done and the reports of the other auditors.

Report on Other Legal and Regulatory Requirements

As required by the InvIT Regulations and based on our audit and on the consideration of reports of the other auditors on financial statements/financial information and the other financial information of the components, as noted in the 'Other Matters' paragraph we report, to the extent applicable:

a) We/the other auditors whose reports we have relied upon have sought and obtained all the information and explanations which to the best of our knowledge and belief were necessary for the purposes of our audit of the aforesaid Special Purpose Combined Financial Statements;

b) The Combined Balance Sheets and the Combined Statements of Profit and Loss (including other comprehensive income) dealt with by this Report are in agreement with the books of account maintained for the purpose of preparation of the Special Purpose Combined Financial Statements;

c) In our opinion, the aforesaid Special Purpose Combined Financial Statements comply with the basis of preparation as stated in Note 2(A) to the Special Purpose Combined Financial Statements; and

d) The statement of Net assets at Fair Value and Statement of Total Returns at Fair value are prepared in accordance with the requirements of the InvIT Regulations and circulars issued thereunder.

For S R B C & CO LLP
Chartered Accountants
ICAI Firm Registration Number: 324982E/E300003

per Paul Alvares
Partner
Membership Number: 105754
UDIN: 26105754STFMYV8343
Place: Pune
Date: March 23, 2026

Annexure 1: List of Asset SPVs

S.No.	Name of the Entity
1	EPIC Concesiones 3 Private Limited (formerly known as L&T Infrastructure Development Projects Limited)
2	SRPL Roads Private Limited (Formerly known as Sekura Roads Limited)
3	Thrissur Expressway Limited
4	Jorabat Shillong Expressway Limited
5	Dibang Infra Projects Private Limited (Formerly known as Dibang Infra Projects Limited)
6	Dhola Infra Projects Private Limited (Formerly known as Dhola Infra Projects Limited)
7	Panipat Elevated Corridor Private Limited (Formerly known as Panipat Elevated Corridor Limited)
8	Samkhiali Bhachau Gandhidham Tollway Private Limited (Formerly known as L&T Samkhiali Gandhidham Tollway Limited)
9	Rajkot-Vadinar Tollway Private Limited (Formerly known as L&T Rajkot-Vadinar Tollway Limited)
10	Ahmedabad - Maliya Tollway Private Limited (Formerly known as Ahmedabad - Maliya Tollway Limited)
11	Deccan Tollways Private Limited (Formerly known as L&T Deccan Tollways Limited)
12	Sambalpur - Rourkela Tollway Private Limited (Formerly known as L&T Sambalpur - Rourkela Tollway Limited)
13	Epic Concesiones Private Limited*
14	Rewin Infrastructure Limited*
15	Vadodara Bharuch Tollway Limited*
16	Palanpur-Swaroopgunj Road Project Limited (Formerly known as L&T Interstate Road Corridor Limited)*

* The Asset SPVs merged with EPIC Concessions 3 Private Limited (formerly known as L&T Infrastructure Development Projects Limited) w.e.f 11th April 2024.

SPV Group
(As defined in Note 1 - Corporate Information)

Special Purpose Combined Balance Sheet
All amounts in Rupees millions unless otherwise stated

Particulars	Notes	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
ASSETS					
(1) Non-current assets					
(a) Property, plant and equipment	3(A)	148.54	151.51	118.80	97.05
(b) Investment properties	3(B)	18.11	18.49	18.97	19.44
(c) Intangible assets	3(D)	51,552.21	56,653.84	64,406.14	70,575.94
(d) Right-of-use assets	3(C)	87.33	58.26	27.98	7.23
(e) Capital work in progress	3(F)	2.11	-	-	-
(f) Intangible assets under development	3(E)	3.80	45.17	35.00	1.90
(g) Financial assets					
(i) Receivable under service concession arrangements	(5)	8,494.83	9,532.55	10,985.00	11,944.92
(ii) Other financial assets	(6)	157.13	508.65	308.95	741.75
(h) Income tax assets (net)	(22)	722.58	689.53	730.01	660.17
(i) Other non-current assets	(7)	70.67	66.43	76.27	1,129.29
Total non-current assets		61,257.31	67,724.43	76,707.12	85,177.69
(2) Current assets					
(a) Financial assets					
(i) Investments	(4)	8,367.57	7,548.32	4,197.95	5,582.13
(ii) Trade receivables	(8)	484.27	223.68	228.24	394.07
(iii) Cash and cash equivalents	9(A)	1,539.86	1,857.33	13,405.18	4,273.21
(iv) Bank balances other than (iii) above	9(B)	3,826.99	2,654.90	4,194.70	7,195.50
(v) Receivable under service concession arrangements	(5)	1,861.45	1,385.16	772.49	1,700.46
(vi) Other financial assets	(6)	3,144.95	1,974.76	2,718.43	9,249.84
(b) Other current assets	(7)	261.01	341.81	854.81	396.60
Total current assets		19,486.10	15,985.96	26,371.80	28,791.81
Total assets		80,743.41	83,710.39	1,03,078.92	1,13,969.50
EQUITY AND LIABILITIES					
EQUITY					
(a) Capital	10(A)	774.13	493.34	6,789.16	7,629.06
(b) Share capital pending issuance	10(B)	-	253.85	-	-
(c) Other equity	10(C)	(40,440.39)	(41,521.71)	(22,556.01)	(15,391.32)
(d) Instruments entirely equity in nature	10(D)	6,537.44	3,847.99	4,410.89	3,628.13
Total Equity		(33,128.82)	(36,926.53)	(11,355.96)	(4,134.13)
LIABILITIES					
(1) Non-current liabilities					
(a) Financial liabilities					
(i) Borrowings	(11)	36,240.04	38,671.15	42,667.76	49,060.25
(ii) Lease liabilities	(32)	48.52	36.26	21.02	-
(iii) Other financial liabilities	(14)	41,341.91	41,041.31	41,109.10	39,225.55
(b) Deferred tax liabilities (net)	(22)	31.58	31.58	58.33	54.53
(c) Provisions	(12)	4,514.03	2,723.78	4,282.56	2,772.31
Total non-current liabilities		82,176.08	82,504.08	88,138.77	91,112.64
(2) Current liabilities					
(a) Financial liabilities					
(i) Borrowings	(11)	22,847.86	28,328.79	19,047.49	12,799.25
(ii) Lease liabilities	(32)	44.78	26.95	8.72	8.36
(iii) Trade payables					
- Total outstanding dues of micro enterprises and small enterprises	(13)	22.68	122.88	105.21	85.20
- Total outstanding dues of creditors other than micro enterprises and small enterprises	(13)	1,071.63	981.40	1,247.40	3,145.24
(iv) Other financial liabilities	(14)	3,612.28	3,241.20	2,768.34	6,205.33
(b) Other current liabilities	(15)	320.16	274.44	491.27	1,390.82
(c) Provisions	(12)	3,776.76	5,157.18	2,615.23	3,343.46
(d) Current tax liabilities (net)	(22)	-	-	12.45	13.33
Total current liabilities		31,696.15	38,132.84	26,296.11	26,990.99
Total liabilities		1,13,872.23	1,20,636.92	1,14,434.88	1,18,103.63
Total equity and liabilities		80,743.41	83,710.39	1,03,078.92	1,13,969.50

Summary of material accounting policies 2(B)
The accompanying notes form an integral part of these special purpose combined financial statements

As per our report of even date attached

For S R B C & CO LLP
Chartered Accountants
Firm Registration No: 324982E/E300003

per Paul Alvares
Partner
Membership Number : 105754

Place : Pune
Date : March 23, 2026

For and on behalf of the Board of Directors of
EAAA TransInfra Managers Limited
(as Investment Manager of Citius TransNet Investment Trust)

Bhavyang Oza
Chief Investment Officer and
Whole-time Director
DIN No. : 11315739

Sreekumar Chatra
Director

DIN No. : 07149285

Padmanabhan P.
Chief Financial Officer

Place : Mumbai
Date : March 23, 2026

SPV Group
(As defined in Note 1 - Corporate Information)

Special Purpose Combined Statement of Profit and Loss
All amounts in Rupees millions unless otherwise stated

Particulars	Notes	Nine months period ended December 31, 2025	Year ended March 31, 2025	Year ended March 31, 2024	Year ended March 31, 2023
INCOME					
Revenue from operations	(16)	14,963.64	19,870.46	18,731.73	17,735.16
Other income	(17)	740.25	1,785.71	1,653.57	1,117.79
Total income		15,703.89	21,656.17	20,385.30	18,852.95
EXPENSES					
Operation and maintenance expense	(18)	2,941.39	5,585.34	5,947.26	6,277.21
Employee benefits expense	(19)	373.39	548.60	569.84	594.92
Finance costs	(20)	8,316.74	11,506.41	13,053.33	10,085.06
Depreciation and amortisation expense	3(G)	5,256.75	6,998.42	6,922.15	7,094.90
Other expenses	(21)	959.79	1,172.72	1,274.13	1,139.17
Total expenses		17,848.06	25,811.49	27,766.71	25,191.26
Loss before tax		(2,144.17)	(4,155.32)	(7,381.41)	(6,338.31)
Tax expense:					
(1) Current tax	(22)	46.31	42.64	355.56	200.32
(2) Deferred tax	(22)	-	(26.75)	3.80	(4.05)
(3) Adjustment of tax relating to earlier periods	(22)	-	6.30	0.41	5.50
		46.31	22.19	359.77	201.77
Loss for the period/year [A]		(2,190.48)	(4,177.51)	(7,741.18)	(6,540.08)
Other comprehensive income					
Items not to be reclassified to profit or loss in subsequent period					
Re-measurement of defined benefit plans, net of tax		(13.17)	(12.48)	0.65	(0.30)
Total other comprehensive income for the period/year, net of tax [B]		(13.17)	(12.48)	0.65	(0.30)
Total comprehensive income for the period/year, net of tax [A+B]		(2,203.65)	(4,189.99)	(7,740.53)	(6,540.38)
Earnings per unit (refer note 23)					

Summary of material accounting policies 2(B)
The accompanying notes form an integral part of these special purpose combined financial statements

As per our report of even date attached
For S R B C & CO LLP
Chartered Accountants
Firm Registration No: 324982E/E300003

For and on behalf of the Board of Directors of
EAAA TransInfra Managers Limited
(as Investment Manager of Citius TransNet Investment Trust)

per Paul Alvares
Partner
Membership Number : 105754

Bhavyang Oza
Chief Investment Officer and Whole-time Director
DIN No. : 11315739

Sreekumar Chatra
Director
DIN No. : 07149285

Place : Pune
Date : March 23, 2026

Padmanabhan P.
Chief Financial Officer

Place : Mumbai
Date : March 23, 2026

SPV Group
(As defined in Note 1 - Corporate Information)

Special Purpose Combined Statement of Changes in Equity
All amounts in Rupees millions unless otherwise stated

A. Capital

Particulars	Amount
As at April 1, 2022	7,629.06
Issue of capital	-
Reduction of capital	-
As at March 31, 2023	7,629.06
Issue of capital	-
Reduction of capital (on account of acquisition of subsidiary)	(839.90)
As at March 31, 2024	6,789.16
Issue of capital (Bonus Share)	24,250.00
Reduction of capital (on account of acquisition/merger of subsidiary)	(30,545.82)
As at March 31, 2025	493.34
Issue of capital	280.79
Reduction of capital	-
As at December 31, 2025	774.13

B. Share Capital Pending Issuance

Share capital pending issuance pertains to issue of equity shares by Epic Concesiones 3 Private Limited pursuant to the scheme of merger, as further referred to in note 34.
During the period ended December 31, 2025, Epic Concesiones 3 Private Limited has issued equity shares to IYP II, IYP IIA & IIYP II as follows:

Name of the Allottees	No. of shares in millions	Amount as at December 31, 2025	Amount as at March 31, 2025	Amount as at March 31, 2024	Amount as at March 31, 2023
Infrastructure Yield Plus II (IYP II)	16.50	-	165.00	-	-
Infrastructure Yield Plus IIA (IYP IIA)	6.35	-	63.46	-	-
India Infrastructure Yield Plus II (IIYP II)	2.54	-	25.39	-	-
Total	25.39	-	253.85	-	-

C. Other equity

Particulars	Reserves and Surplus							Total
	Securities Premium	Capital Redemption Reserve	Capital Reserve	Debenture Redemption Reserve	General Reserve	Retained Earnings	Equity Component of Compound Financial Instruments	
As at April 1, 2022	9,974.53	11,368.50	475.24	1,078.57	238.83	(30,189.39)	206.19	(6,847.53)
Loss for the year	-	-	-	-	-	(6,540.08)	-	(6,540.08)
Other comprehensive income, net of tax	-	-	-	-	-	(0.30)	-	(0.30)
Adjustment on account of payments made to erstwhile parent	-	-	-	-	-	(6.64)	-	(6.64)
Carve out differences routed through retained earnings	-	-	-	-	-	(1,996.78)	-	(1,996.78)
As at March 31, 2023	9,974.53	11,368.50	475.24	1,078.57	238.83	(38,733.18)	206.19	(15,391.32)
Loss for the year	-	-	-	-	-	(7,741.18)	-	(7,741.18)
Other comprehensive income, net of tax	-	-	-	-	-	0.65	-	0.65
Adjustment on account of payments made to erstwhile parent	-	-	-	-	-	(68.82)	-	(68.82)
Transferred / Addition to reserve	-	-	-	(178.40)	-	178.40		(0.00)
Equity component of non convertible debenture	-	-	-	-	-	-	2,402.24	2,402.24
Created on account of acquisition of subsidiaries	-	-	423.90	-	-	-	-	423.90
Carve out differences routed through retained earnings	-	-	-	-	-	(2,181.47)	-	(2,181.47)
As at March 31, 2024	9,974.53	11,368.50	899.14	900.17	238.83	(48,545.61)	2,608.43	(22,556.01)
Loss for the year	-	-	-	-	-	(4,177.51)	-	(4,177.51)
Other comprehensive income, net of tax	-	-	-	-	-	(12.48)	-	(12.48)
Issue of Bonus Shares	(9,974.53)	(11,368.50)	(309.20)	-	(238.83)	(2,358.94)	-	(24,250.00)
Adjustment on account of payments made to erstwhile parent	-	-	-	-	-	(114.10)	-	(114.10)
Transfer/ Addition during the year	-	-	(213.41)	6.81	-	206.60	-	0.00
Equity component of non convertible debenture	-	-	-	-	-	-	(149.71)	(149.71)
Created on account of acquisition of subsidiaries	-	-	6,582.45	-	-	-	-	6,582.45
Carve out differences routed through retained earnings	-	-	-	-	-	3,155.64	-	3,155.64
As at March 31, 2025	-	-	6,958.98	906.98	-	(51,846.39)	2,458.72	(41,521.71)
Loss for the period	-	-	-	-	-	(2,190.48)	-	(2,190.48)
Other comprehensive income, net of tax	-	-	-	-	-	(13.17)	-	(13.17)
Premium on issue of equity shares	429.06	-	-	-	-	-	-	429.06
Carve out differences routed through retained earnings	-	-	-	-	-	2,855.92	-	2,855.92
As at December 31, 2025	429.06	-	6,958.98	906.98	-	(51,194.12)	2,458.72	(40,440.39)

SPV Group
(As defined in Note 1 - Corporate Information)

Special Purpose Combined Statement of Changes in Equity
All amounts in Rupees millions unless otherwise stated

D. Instruments entirely equity in nature

Particulars	Instruments entirely equity in nature		
	Compulsorily Convertible Debentures (CCDs)	Compulsorily Convertible Preference Shares (CCPS)	Total
As at April 1, 2022	2,685.70	700.13	3,385.83
Add: Issued during the year	240.30	2.00	242.30
As at March 31, 2023	2,926.00	702.13	3,628.13
Add: Issued during the year	1,166.59	-	1,166.59
Add: Changes on account of reclassification	-	116.17	116.17
Less: Converted to non convertible debenture	500.00	-	500.00
As at March 31, 2024	3,592.59	818.30	4,410.89
Less: Changes on account of reclassification	(562.70)	-	(562.70)
Less: Redeemed during the year	-	0.20	0.20
As at March 31, 2025	3,029.89	818.10	3,847.99
Add: Transfer during the period	-	2,689.45	2,689.45
As at December 31, 2025	3,029.89	3,507.55	6,537.44

Summary of material accounting policies 2(B)
The accompanying notes form an integral part of these special purpose combined financial statements

As per our report of even date attached
For S R B C & CO LLP
Chartered Accountants
Firm Registration No: 324982E/E300003

per Paul Alvares
Partner
Membership Number : 105754

Place : Pune
Date : March 23, 2026

For and on behalf of the Board of Directors of
EAAA TransInfra Managers Limited
(as Investment Manager of Citius TransNet Investment Trust)

Bhavyang Oza
Chief Investment Officer and
Whole-time Director
DIN No. : 11315739

Sreekumar Chatra
Director

DIN No. : 07149285

Padmanabhan P.
Chief Financial Officer

Place : Mumbai
Date : March 23, 2026

SPV Group
(As defined in Note 1 - Corporate Information)

Special Purpose Combined Statement of Cash Flows
All amounts in Rupees millions unless otherwise stated

Particulars	Nine months period ended December 31, 2025	Year ended March 31, 2025	Year ended March 31, 2024	Year ended March 31, 2023
Cash flow from operating activities				
Loss before tax	(2,144.17)	(4,155.32)	(7,381.41)	(6,338.31)
Adjustments to reconcile loss before tax to net cash flows:				
Depreciation and amortisation expense	5,256.75	6,998.42	6,922.15	7,094.90
Finance costs	8,316.74	11,506.41	13,053.33	10,085.06
Interest income	(342.83)	(622.27)	(937.22)	(790.44)
Net gain on fair valuation of current investments	(44.77)	(119.41)	(15.04)	(110.89)
Profit on sale of current investments	(303.60)	(424.30)	(397.65)	(176.70)
(Gain)/loss on disposal of property, plant and equipment	(1.33)	0.26	3.90	(2.20)
Interest income on account of claim settlement with authorities (net)	-	(532.57)	(143.37)	-
Liabilities no longer required written back	(1.54)	(24.71)	(106.43)	(16.85)
Modification gain on financial asset	-	-	(16.43)	-
Rental income	(3.38)	(1.90)	(1.59)	(0.16)
Bad debts written off	0.37	25.26	128.17	17.84
Provision for doubtful debts	5.10	0.16	12.97	0.05
Modification loss on financial assets	-	-	38.29	-
Finance income on receivable under service concession arrangements	(821.32)	(1,189.76)	(1,352.97)	(1,526.52)
Periodic major maintenance expenses	1,664.48	2,879.25	3,449.31	3,944.38
Operating profit before working capital changes	11,580.50	14,339.52	13,256.01	12,180.16
Working capital adjustment				
(Increase) / Decrease in other financial assets	(201.49)	129.93	432.99	527.28
(Increase) / Decrease in receivable under service concession arrangements	1,382.75	2,029.54	3,202.56	2,726.10
(Increase) / Decrease in other assets	70.39	510.13	427.02	(261.31)
(Increase) / Decrease in trade receivables	(266.06)	4.56	165.83	(127.23)
Increase / (Decrease) in trade payables	(9.97)	195.27	(483.28)	(38.19)
Increase / (Decrease) in other financial liabilities	(2,808.23)	(3,954.86)	(2,971.33)	(3,816.24)
Increase / (Decrease) in other liabilities	45.72	(216.83)	(899.55)	(96.64)
Increase / (Decrease) in provisions	(1,900.45)	(2,650.34)	(3,318.31)	(1,876.12)
Cash flow generated from operations	7,893.16	10,386.92	9,811.94	9,217.81
Income tax paid (net of refund)	(73.01)	62.60	(419.43)	(138.56)
Net cash flow from operating activities [A]	7,820.15	10,449.52	9,392.51	9,079.25
Cash flow from investing activities				
Purchase of property, plant and equipment, investment property and Intangible assets	(90.62)	(301.98)	(1,989.72)	(603.70)
Proceeds from road authorities on settlement	-	1,055.27	581.56	-
Proceeds from sale of property, plant and equipment, investment property and Intangible assets	1.33	-	-	12.73
Proceeds from / (Investment) in fixed deposits with banks having maturity more than 3 months (net)	(1,673.17)	1,836.45	9,422.76	(1,411.54)
Proceeds from/(Investment) in mutual funds (net)	(470.88)	(2,806.66)	1,796.87	1,091.01
Interest received	220.38	635.38	898.07	379.25
Rental income	3.38	1.90	1.59	-
Adjustments on account of acquisition of subsidiaries (refer note 34)	-	(24,272.10)	-	-
Net cash flow (used in)/from investing activities [B]	(2,009.58)	(23,851.74)	10,711.13	(532.25)
Cash flow from financing activities				
Proceeds from issue of share capital (including securities premium)	455.99	-	0.10	0.50
Proceeds from transfer of compulsorily convertible preference shares	2,689.45	-	-	-
Proceeds from issue of compulsorily convertible debentures	1,550.00	-	666.59	240.30
Proceeds from borrowings	7,436.78	46,851.59	22,417.36	2,730.00
Repayment of borrowings	(16,898.82)	(41,716.60)	(21,533.61)	(9,140.36)
Repayment of non convertible debentures	-	-	-	(1,750.00)
Payment of principal portion of lease liabilities	(22.16)	(22.11)	(8.82)	(9.99)
Payment of interest portion of lease liabilities	(4.95)	(5.36)	(1.19)	(2.04)
Payment of interest and other finance costs	(4,190.25)	(6,408.79)	(10,330.63)	(4,241.38)
Movement of owner's net investment (carve-out difference)	2,855.92	3,155.64	(2,181.47)	5,587.33
Net cash generated (used in)/from financing activities [C]	(6,128.04)	1,854.37	(10,971.67)	(6,585.64)
Net increase / (decrease) in cash and cash equivalents [A+B+C]	(317.47)	(11,547.85)	9,131.97	1,961.36
Cash and cash equivalents at the beginning of the period/ year	1,857.33	13,405.18	4,273.21	2,311.85
Cash and cash equivalents at the end of the period/ year	1,539.86	1,857.33	13,405.18	4,273.21

SPV Group
(As defined in Note 1 - Corporate Information)

Special Purpose Combined Statement of Cash Flows
All amounts in Rupees millions unless otherwise stated

Notes:
1) Components of cash and cash equivalents (refer note 9(A))

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Cash on hand	14.83	22.15	29.24	19.51
Balances with banks in current accounts	1,515.03	1,159.56	9,355.44	954.93
Deposits with original maturity of less than three months	10.00	675.62	4,020.50	3,298.77
	1,539.86	1,857.33	13,405.18	4,273.21

2) The above Special Purpose Combined Statement of Cash Flows has been prepared under the "Indirect Method" as set out in Indian Accounting Standard (Ind AS) - 7 "Statement of Cash Flows".
3) Refer note 11C for changes in liabilities arising from financing activities.
4) Non cash movement included in investing and financing activities - Issue of bonus shares in year ended March 31, 2025 (Refer note 10(A)).

Summary of material accounting policies 2(B)
The accompanying notes form an integral part of these special purpose combined financial statements

As per our report of even date attached

For S R B C & CO LLP
Chartered Accountants
Firm Registration No: 324982E/E300003

per Paul Alvares
Partner
Membership Number : 105754

Place : Pune
Date : March 23, 2026

For and on behalf of the Board of Directors of
EAAA TransInfra Managers Limited
(as Investment Manager of Citius TransNet Investment Trust)

Bhavyang Oza
Chief Investment Officer and
Whole-time Director
DIN No. : 11315739

Sreekumar Chatra
Director

DIN No. : 07149285

Padmanabhan P.
Chief Financial Officer

Place : Mumbai
Date : March 23, 2026

1. Corporate Information

The Special Purpose Combined Financial Statements of Citius Transnet Investment Trust (hereinafter referred to as the "Trust"), comprise financial statements of SRPL Roads Private Limited ("SRPL)", EPIC Concesiones 3 Private Limited ("EPIC 3"), EPIC Concesiones Private Limited ("EPIC") (together referred as "the investment entities"), Dhola Infra Projects Private Limited ("Dhola"), Dibang Infra Projects Private Limited ("Dibang"), Thrissur Expressway Limited ("TEL"), Jorabat Shillong Expressway Limited ("JSEL"), Ahmedabad Maliya Tollway Private Limited ("AMTL"), Rajkot Vadinar Tollway Private Limited ("RVTL"), Samkhiali Bhachau Gandhidham Tollway Private Limited ("SGTL"), Sambalpur Rourkela Tollway Private Limited ("SRTL"), Deccan Tollway Private Limited ("DTL"), Panipat Elevated Corridor Private Limited ("PECL"), Palanpur Swaroopgunj Road Project Limited ("PSRPL"), Rewin Infrastructure Limited ("RIL"), Vadodara Bharuch Tollway Limited ("VBTL") (together referred as "asset SPVs" or "SPVs") (the Investment Entities and SPVs together referred as "Components") (the Trust and Components together referred to as "the SPV Group"). The Components are private limited companies registered under Companies Act except JSEL, TEL, RIL, PSRPL & VBTL which are public limited and are domiciled in India.

The SPVs have entered into Concession agreement with Ministry of Road Transport and Highways ('MoRTH')/ National Highways Authority of India ('NHAI') / State Road Development Corporation ('SRDC') to Design, Build, Finance, Operate and Transfer (DBFOT) or build, operates and transfer (BOT) national or state highways in various locations in India.

EPIC Transnet Infrastructure Private Limited (the "ETIPL" or "the Sponsor") has set up Citius Transnet Investment Trust as an irrevocable trust under the Indian Trust Act, 1882 pursuant to Trust Deed dated July 21, 2025. The Trust has been settled for an initial sum of Rs. 10,000/-. The Trust has been registered as an Infrastructure Investment Trust ('InvIT') with Securities Exchange Board of India ('SEBI') under the Securities Exchange Board of India (Infrastructure Investment Trust) Regulations, 2014, as amended from time to time, vide Certificate of Registration (IN/InvIT/25-26/0032) dated August 01, 2025. The registered office of the Trust is located at Plot 294/3, Edelweiss House, off CST Road, Kalina, Santacruz East, Mumbai - 400 098, Maharashtra, India. The Trustee to the Trust is Axis Trustee Services Limited (the "Trustee"), Investment manager for the Trust is EAAA Transinfra Managers Limited (the "Investment Manager").

The object and purpose of the Trust, as described in the Trust Deed, is to carry on the activities of an infrastructure investment trust, as permissible under SEBI (Infrastructure Investment Trusts) Regulations, 2014 as amended from time to time including circulars, notifications, clarifications and guidelines issued thereunder (the "InvIT Regulations"), to raise funds through the Trust, to make investments in accordance with the InvIT Regulations and the investment strategy and to carry on the activities as may be required for operating the Trust, including incidental and ancillary matters thereto.

As required by the Guidance Note on Combined and Carve-Out Financial Statements issued by the Institute of Chartered Accountants of India, the details of various entities included in the Special Purpose Combined Financial Statements is as given below:

Name of Component	**Principal activity**	Country of **Incorporation**
SRPL Roads Private Limited	Investment Entity	India
EPIC Concesiones 3 Private Limited	Investment Entity	India
EPIC Concesiones Private Limited	Investment Entity (Merged with EPIC 3 w.e.f April 11, 2024)	India
Dhola Infra Projects Private Limited	Construction and operation of highways	India
Dibang Infra Projects Private Limited	Construction and operation of highways	India
Thrissur Expressway Limited	Construction and operation of highways	India
Jorabat Shillong Expressway Limited	Construction and operation of highways	India
Ahmedabad Maliya Tollway Private Limited	Construction and operation of highways	India

Name of Component	**Principal activity**	Country of **Incorporation**
Rajkot-Vadinar Tollway Private Limited	Construction and operation of highways	India
Samkhiali Bhachau Gandhidham Tollway Private Limited	Construction and operation of highways	India
Sambalpur Rourkela Tollway Private Limited	Construction and operation of highways	India
Panipat Elevated Corridor Private Limited	Construction and operation of highways	India
Deccan Tollway Private Limited	Construction and operation of highways	India
Palanpur Swaroopgunj Road Project Limited	Construction and operation of highways (Merged with EPIC 3 w.e.f April 11, 2024)	India
Rewin Infrastructure Limited	Construction and operation of highways (Merged with EPIC 3 w.e.f April 11, 2024)	India
Vadodara Bharuch Tollway Limited	Construction and operation of highways (Merged with EPIC 3 w.e.f April 11, 2024)	India

Note: All the above SPVs are proposed to be held by the Trust. Further, all the SPVs are operational. Refer note 31(A) of Ind AS 115 for Date of commencement of commercial operation for each operating SPVs.

The special purpose combined financial statements were approved for issue in accordance with resolution passed by the Board of Directors of the Investment Manager, acting on behalf of the Trust on March 23, 2026.

2(A) **Basis of preparation**

The Special Purpose Combined Financial Statements comprise the Special Purpose Combined Balance Sheet as at December 31, 2025, March 31, 2025, March 31, 2024 and March 31, 2023; the Special Purpose Combined Statement of Profit and Loss (including Other Comprehensive Income), the Special Purpose Combined Statement of Cash Flows, the Special Purpose Combined Statement of Changes in Equity for the nine months period ended December 31, 2025 and years ended March 31, 2025, March 31, 2024 and March 31, 2023, the Statement of Net Assets at Fair Value as at December 31, 2025, the Statement of Total Returns at Fair Value for the nine months period ended December 31, 2025 and year ended March 31, 2025 and a summary of material accounting policies and other explanatory information with other additional disclosures (collectively referred as "Special Purpose Combined Financial Statements").

The Special Purpose Combined Financial Statements have been prepared in accordance with the Guidance Note on Combined and Carve-out Financial Statements, Guidance note on Reports in Company Prospectus (Revised 2019) issued by the Institute of Chartered Accountants of India (the "ICAI") (the "Guidance Notes"), to the extent not inconsistent with SEBI (Infrastructure Investment Trusts) Regulations, 2014, SEBI master circular no. SEBI/HO/DDHS-PoD-2/P/CIR/2025/102 dated July 11, 2025, ('SEBI Circular') and other circulars issued thereunder ('InvIT Regulations'), as amended and in accordance with Indian Accounting Standards (Ind AS) notified under the Companies (Indian Accounting Standards) Rules, 2015 (as amended from time to time) and other accounting principles generally accepted in India, notes mentioned below and material accounting policies described in note 2(B) and presentation requirements of Division II of Schedule III to the Companies Act, 2013 (as amended from time to time), with the exceptions and modifications as mentioned in InvIT Regulations. Specific attention is drawn to the following aspects:

– In preparing these Special Purpose Combined Financial Statements, "Capital" represent shareholder's investment in the asset SPVs.

– As on date of Special Purpose Combined Financial Statements, the Trust has not issued any units and hence, the earnings per unit could not be computed.

The Special Purpose Combined Financial Statements are Special Purpose Financial Statements and have been prepared by the Investment Manager to meet the requirements of the InvIT Regulations and for inclusion in the Offer Document(s) ('OD') prepared by the Investment Manager in connection with the proposed initial public issue of units of the Trust. As a result, the Special Purpose Combined Financial Statements may not be suitable for any other purpose.

Since the Trust was newly set up on August 01, 2025 and has been in existence for a period lesser than three completed financial years, and the historical financial statements of the Trust are not available for the entire portion of the reporting period, hence in accordance with the requirements of the InvIT Regulations, the Special Purpose Combined Financial Statements have been disclosed even for the periods when such historical financial statements were not available. Further, as required by the InvIT regulations, the Special Purpose Combined Financial Statements are prepared based on an assumption that all the Components were part of the Trust for such period when the Trust was not in existence. Accordingly, all the Components which are proposed to be owned by the Trust have been combined for the periods presented.

During the period ended December 31, 2025, Scheme of Amalgamation between EPIC Concesiones Private Limited ('EPIC'), EPIC Concesiones 3 Private Limited ('EPIC 3) , Vadodara Bharuch Tollway Limited ('VBTL'), Rewin Infrastructure Limited ('RIL') and Palanpur Swaroopgunj Road Project Limited ('PSRPL') is approved by the National Company Law Tribunal with the appointed date of April 11, 2024 wherein EPIC , VBTL, RIL and PSRPL shall be merged with EPIC 3. However, as required by the SEBI Circular, in the preparation of these Special Purpose Combined Financial Statements, all entities acquired are individually considered as part of the Trust for all the periods presented in accordance with the guidance prescribed in the SEBI Regulations with their net assets as at April 01, 2022 being considered at book value in the preparation of the Special Purpose Combined Financial Statements. These financial statements have been combined using historical basis for all periods presented.

The difference arising, if any between carrying values of investments in subsidiaries and corresponding net assets of subsidiaries has been recognised as an adjustment on account of acquisition of subsidiaries in the Capital reserve under Other Equity.

This Special Purpose Combined Financial Statements may not be representative of the position which may prevail after the components are transferred to Citius Transnet Investment Trust.

The Special Purpose Combined Financial Statements have been prepared on a going concern basis. These Special Purpose Combined Financial Statements have been prepared on the historical cost basis except for the following assets and liabilities which have been measured at fair value or at revalued amount:

- Certain financial assets and liabilities measured at fair value (refer accounting policy regarding financial instruments)
- Defined benefit plans, plan assets measured at fair value; (refer accounting policy on defined benefit plans for details)

The Special Purpose Combined Financial Statements are presented in Indian Rupees and all values are rounded to nearest million (Rs. '000,000), except when otherwise indicated.

Basis of Combination and Carve-out

The Special Purpose Combined Financial Statements have been prepared using uniform accounting policies for like transactions and other events in similar circumstances. The financial statements/ information of all the components/assets transferred used for the purpose of combination are drawn up to the same reporting date i.e. nine months period ended December 31, 2025 and years ended on March 31, 2025, March 31, 2024, and March 31, 2023. The Special Purpose Combined Financial Statements have been prepared using the principles of consolidation as per Ind AS 110—Consolidated Financial Statements and the Guidance Notes, to the extent applicable. However, unlike consolidated financial statements, the Special Purpose Combined Financial Statements does not have any parent company.

The procedure for preparing Special Purpose Combined Financial Statements of the Trust are stated below:

– The financial statements of all the components were combined by combining/adding like items of assets, liabilities, equity, income, expenses and cash flows.

– The financial statements of all the components were combined based on the assumption that all the components were part of a single group for the entire period presented.

– Intragroup assets, liabilities, equity, income, expenses and cash flows relating to transactions between components of the Trust are eliminated in full.

Carve-**out financial information of the carved**-out assets/businesses

The Special Purpose Combined Financial Statements have been prepared by excluding certain subsidiaries / entities from EPIC 3 which are not proposed to be transferred to the Trust. Accordingly, investments in such subsidiaries as of December 31, 2025, March 31, 2025, March 31, 2024, and March 31, 2023 have been carved out and excluded from these Special Purpose Combined Financial Statements (referred to as the 'Carved-out Entities'). There are no assets which have been carved in for the purpose of preparation of Special Purpose Combined Financial Statements.

For the purpose of preparation of Special Purpose Combined Financial Statements:

– the financial information of carved-out entities have been prepared using principles prescribed in the Guidance Note on Combined and Carve-out Financial Statements

– the net assets pertaining to Investments in the wholly owned subsidiaries of EPIC 3: Neelambur Madukkarai Tollway Limited, Watrak Infrastructure Private Limited, Kudgi Transmission Limited, PNG Tollway Limited and Chennai - Tada Tollway Limited have been carved out from EPIC 3 pertaining to Carved-out-entities in accordance with the requirements of InvIT Regulations.

The following basis of allocation has been followed in preparing Carve-out Financial Information for the carved out and carved in assets for use in the preparation of Special Purpose Combined Financial Statements:

– Income and expenses, which can be directly identified to carved-out entities/assets are treated as direct operating income or expenses. Similar principle has been applied for identification of specific assets and liabilities related to the carved-out entities/assets. Accordingly, assets, liabilities, revenue and expenses directly attributable to the carved-out entities/assets have been specifically identified and excluded in the Carve-out Financial Information. Certain other expenses are allocated in the ratio of revenue.

– No specific guidance is available for allocation of common income, expenses, assets and liabilities to carve-out entities. Accordingly, in preparing historical carved out financial information, certain accounting conventions commonly accepted and deemed appropriate by the Management have been applied. The allocation basis used is appropriate and reflects the Management's best estimate of how the underlying goods and services have been consummated by the carved-out entities. However, the financial position of the carved-out entities post allocation may not accurately reflect the financial position that would have been reported had the operations of these assets been carried out in a separate standalone entity or the position which may prevail in the future.

– Income taxes have been recorded as if the carved-out were a separate legal entity filing a separate tax return in their local jurisdiction. Tax expense has been arrived at in accordance with the Guidance Note on Combined and Carve-out Financial Statements. Accordingly, current and deferred tax income/expenses have been computed using the tax rates and tax laws that have been enacted or substantively enacted by the end of the reporting period and the taxable income of the carved-out entities.

– The difference between the assets and liabilities of the carved out financial statements as on each Balance Sheet date has been disclosed as 'Carved out difference' in Retained Earnings under Capital in accordance with the requirements of Guidance Note.

2(B) Material accounting policies

2.1 Current versus Non-**current classification**

The SPV Group segregates assets and liabilities into current and non-current categories for presentation in the Special Purpose Combined Balance Sheet after considering its normal operating cycle and other criteria set out in Ind AS 1, "Presentation of Financial Statements". For this purpose, current assets and liabilities include the current portion of non-current assets and liabilities respectively. Deferred tax assets and liabilities are always classified as non-current.

The operating cycle is the time between the acquisition of assets for processing and their realization in cash and cash equivalents. The SPV Group has identified period up to twelve months as its operating cycle.

2.2 Fair value measurement

The SPV Group measures financial instruments, such as, investments in mutual funds, at fair value at each balance sheet date.

Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. The fair value measurement is based on the presumption that the transaction to sell the asset or transfer the liability takes place either:

- In the principal market for the asset or liability, or
- In the absence of a principal market, in the most advantageous market for the asset or liability

The principal or the most advantageous market must be accessible by the SPV Group.

The fair value of an asset or a liability is measured using the assumptions that market participants would use when pricing the asset or liability, assuming that market participants act in their economic best interest.

A fair value measurement of a non-financial asset takes into account a market participant's ability to generate economic benefits by using the asset in its highest and best use or by selling it to another market participant that would use the asset in its highest and best use.

The SPV Group uses valuation techniques that are appropriate in the circumstances and for which sufficient data are available to measure fair value, maximising the use of relevant observable inputs and minimising the use of unobservable inputs.

All assets and liabilities for which fair value is measured or disclosed in the Special Purpose Combined Financial Statements are categorised within the fair value hierarchy, described as follows, based on the lowest level input that is significant to the fair value measurement as a whole:

Level 1 - Quoted (unadjusted) market prices in active markets for identical assets or liabilities

Level 2- Valuation techniques for which the lowest level input that is significant to the fair value measurement is directly or indirectly observable

Level 3 -Valuation techniques for which the lowest level input that is significant to the fair value measurement is unobservable

For assets and liabilities that are recognised in the Special Purpose Combined Financial Statements on a recurring basis, the SPV Group determines whether transfers have occurred between levels in the hierarchy by re-assessing categorisation (based on the lowest level input that is significant to the fair value measurement as a whole) at the end of each reporting period.

At each reporting date, the Management analyses the movements in the values of assets and liabilities which are required to be remeasured or re-assessed as per the group accounting policies. For this analysis, the Management verifies the major inputs applied in the latest valuation by agreeing the information in the valuation computation to contracts and other relevant documents.

The Management also compares the change in the fair value of each asset and liability with relevant external sources to determine whether the change is reasonable.

For the purpose of fair value disclosures, the SPV Group has determined classes of assets and liabilities on the basis of the nature, characteristics and risks of the asset or liability and the level of the fair value hierarchy as explained above.

This note summarises accounting policy for fair value. Other fair value related disclosures are given in the relevant notes as below.

- Disclosures for valuation methods, significant estimates and assumptions (note 2(C))
- Quantitative disclosures of fair value measurement hierarchy (note 28)
- Investment properties (note 2.7)
- Financial instruments (including those carried at amortised cost) (note 2.16)

2.3 **Revenue Recognition**

Revenue from contract with customers

Revenue from contracts with customers is recognised upon transfer of control of the promised goods or services to the customers at an amount that reflects the consideration the SPV Group expects to be entitled in exchange for those goods or services, net of indirect taxes, penalties, or other similar items. The SPV Group has generally concluded that it is the principal in its revenue arrangements, because it typically controls the goods or services before transferring them to the customers.

Revenue from goods and services related to construction and operation of highways primarily include (i) income arising on toll collection, (ii) Construction/operational and maintenance income and (iii) fixed annuity income under Service concession agreements. The accounting policies for the specific revenue streams of the SPV Group are summarized below:

Construction revenue

Revenue from Construction contracts are recognised over time to the extent of performance obligation satisfied and control is transferred to the Customer and revenue is recognised using the percentage completion method. The stage of completion is assessed by reference to cost incurred. Contract costs are recognised as an expense in the Statement of Profit and Loss in the accounting periods in which the work to which they relate is performed.

Change of scope services includes services performed for MoRTH/NHAI other than mentioned in a service concession arrangement. Revenue related to change of scope services, utility shifting services, its supervision and other claims (demonetisation relief, Covid relief etc.) are accounted for when there is certainty of realization and can be measured reliably.

Amounts received as advance from customer are disclosed in the Special Purpose Combined Balance Sheet as contract liability and termed as "Advances from customer". The amounts billed on customer for work performed and are unconditionally due for payment i.e. only passage of time is required before payment falls due, are disclosed in the Special Purpose Combined Balance Sheet as "Trade Receivables".

Operational and maintenance Income

SPV group is required to carry out operations and maintenance on the road annually with an obligation to carry out periodic maintenance in terms of the concession at regular intervals. Revenue is recognized when services are performed and contractually billable.

Income from Service Concession Arrangement (Finance Income)

SPVs having unconditional contractual right to receive cash i.e. fixed annuity recognise the considerations given by the grantor i.e. MoRTH/NHAI in accordance with the Appendix D to Ind AS 115 – Service Concession Arrangements under financial assets model. Under financial assets model, asset SPV has an unconditional contractual right to receive cash during concession period. The finance income is calculated on the basis of the effective interest rate in accordance with the Ind AS 109. Such income is duly adjusted for any variation in the amount and timing of the cash flows in the period in which such variation occurs. Finance income is accounted for as other operating income.

Income arising **from Toll Collection**

SPVs which are entitled to Toll collections from the users of the infrastructure facility constructed by it under the Service Concession Arrangement recognise income upon completion of the performance obligation which largely coincides with actual toll collection from the user i.e. when the traffic passes through toll plazas.

Annual toll passes provide users the right to access and use the toll road for a specified period. The SPV Group's obligation is to provide continuous access over the validity period of the pass. Toll revenue, including revenue from passes, is recognized in the Statement of Profit and Loss as and when the right to collect toll arises in accordance with the concession arrangement. Revenue from sale of smart card is recognised as and when the cards are issued to the Users.

Variable Consideration

The nature of the SPV Group's contracts gives rise to several types of variable consideration, including claims, award, change in law, liquidated damages and penalties. The SPV Group recognizes revenue for variable consideration when it is probable that a significant reversal in the amount of cumulative revenue recognized will not occur.

The SPV Group's claim for extra work and escalation in rates relating to execution of contracts are recognized as revenue in the year in which said claims are finally accepted by the customers.

Contract balances

Contract assets

A contract asset is the right to consideration in exchange for goods or services transferred to the customer. If an asset SPV performs by transferring goods or services to a customer before the customer pays consideration or before payment is due, a contract asset is recognised for the earned consideration that is conditional.

Contract assets represent revenue recognized in excess of amounts billed and include unbilled receivables. Unbilled receivables, which represent an unconditional right to payment subject only to the passage of time, are reclassified to accounts receivable when they are billed under the terms of the contract.

Contract assets are subject to impairment assessment. Refer to accounting policies on impairment of financial assets in 2.16 Financial instruments – initial recognition and subsequent measurement

Trade receivables

A receivable is recognised if an amount of consideration that is unconditional (i.e., only the passage of time is required before payment of the consideration is due). Refer to accounting policies of financial assets in section 2.16 financial instruments – initial recognition and subsequent measurement.

Contract liabilities

A contract liability is the obligation to transfer goods or services to a customer for which SPV Group has received consideration (or an amount of consideration is due) from the customer. If a customer pays consideration before SPV Group transfers goods or services to the customer, a contract liability is recognised when the payment is received, or the payment is due (whichever is earlier). Contract liabilities are recognised as revenue when SPV Group performs under the contract (i.e., transfers control of the related goods or services to the customer).

Other income

Interest income

For all financial instruments measured at amortized cost, interest income is recorded using effective interest rate (EIR), which is the rate that exactly discounts the estimated future cash payments or receipts through the expected life of the financial instruments or a shorter period, where appropriate, to the net carrying amount of the financial asset. Interest income is included in other income in the statement of profit and loss.

Others

Other income includes gain on sale of investments, insurance proceeds and other miscellaneous income. Other Income is recognised when right to receive is established.

2.4 Government Grants

Government grants relating to construction and upgradation of infrastructure are considered as a part of total outlay of the construction project and are reduced from the cost of such project appearing under intangible assets (refer note 2.8 and 2.9)

2.5 Taxes

Tax expense comprises current tax expense and deferred tax.

Current income tax

Current income tax assets and liabilities are measured at the amount expected to be recovered from or paid to the taxation authorities. The tax rates and tax laws used to compute the amount are those that are enacted or substantively enacted, at the reporting date in the country where the SPV Group operates and generates taxable income.

Current income tax relating to items recognised outside profit or loss is recognised outside profit or loss (either in other comprehensive income or in equity). Current tax items are recognised in correlation to the underlying transaction either in OCI or directly in equity. Management periodically evaluates positions taken in the tax returns with respect to situations in which applicable tax regulations are subject to interpretation and considers whether it is probable that a taxation authority will accept an uncertain tax treatment. The SPV Group reflects the effect of uncertainty for each uncertain tax treatment by using either most likely method or expected value method, depending on which method predicts better resolution of the treatment.

Deferred Tax

Deferred tax is provided using the balance sheet approach on temporary differences between the tax base of assets and liabilities and their carrying amounts for financial reporting purposes at the reporting date.

Deferred tax assets and liabilities are measured at the tax rates that are expected to apply in the year when the asset is realised, or the liability is settled, based on tax rates (and tax laws) that have been enacted or substantively enacted at the reporting date.

Deferred tax relating to items recognised outside profit or loss is recognised outside profit or loss (either in other comprehensive income or in equity). Deferred tax items are recognised in correlation to the underlying transaction either in OCI or directly in equity.

Deferred tax assets are recognised to the extent that it is probable that future taxable profits will be available against which they can be used. Deferred tax liabilities are recognised for all taxable temporary differences. The existence of unused tax losses is strong evidence that future taxable profit may not be available. Therefore, in case of a history of recent losses, SPV Group recognises a deferred tax asset only to the extent that it has sufficient taxable temporary differences or there is convincing other evidence that sufficient taxable profit will be available against which such deferred tax asset can be realised. Deferred tax assets – unrecognised or recognised, are reviewed at each reporting date and are recognised/ reduced to the extent that it is probable/ no longer probable respectively that the related tax benefit will be realised.

The SPV Group offsets deferred tax assets and deferred tax liabilities if and only if it has a legally enforceable right to set off current tax assets and current tax liabilities and the deferred tax assets and deferred tax liabilities, relate to income taxes levied by the same taxation authority on either the same taxable entity or different taxable entities which intend either to settle current tax liabilities and assets on a net basis, or to realise the assets and liabilities simultaneously, in each future period in which significant amounts of deferred tax liabilities or assets are expected to be settled or recovered.

Minimum alternate tax (MAT) paid in a year is charged to the statement of profit and loss as current tax for the year. The deferred tax asset is recognised for MAT credit available only to the extent that it is probable that the concerned company will pay normal income tax during the specified period, i.e., the period for which MAT credit is allowed to be carried forward. In the year in which the company recognizes MAT credit as an asset, it is created by way of credit to the statement of profit and loss and shown as part of deferred tax asset. The SPV Group reviews the "MAT credit entitlement" asset at each reporting date and writes down the asset to the extent that it is no longer probable that it will pay normal tax during the specified period.

Goods and Services Tax (GST)

Expenses and assets are recognised net of the amount of GST paid, except:

- When the tax incurred on a purchase of assets or services is not recoverable from the taxation authority, in which case, the tax paid is recognised as part of the cost of acquisition of the asset or as part of the expense item, as applicable
- When receivables and payables are stated with the amount of tax included

The net amount of tax recoverable from, or payable to, the taxation authority is included as part of other current/non-current assets/ liabilities in the balance sheet.

2.6 Property, Plant and Equipment

Items of Property, plant and equipment are stated at cost, net of accumulated depreciation and accumulated impairment losses, if any. Such cost includes the cost of replacing part of the plant and equipment and borrowing costs for qualifying assets if the recognition criteria are met. All repair and maintenance costs are recognised in profit or loss as incurred. Freehold land is carried at historical cost.

Subsequent Cost

The cost of replacing part of an item of property, plant and equipment is recognised in the carrying amount of the item if it is probable that the future economic benefits embodied within the part will flow to the SPV Group and its cost can be measured reliably. The carrying amount of the replaced part is de-recognised. The costs of the day-to-day servicing of property, plant and equipment are recognised in the Statement of Profit and Loss.

Depreciation is calculated on a straight-line basis over the estimated useful lives of assets.

The SPV Group provides depreciation based on following useful life:

Asset Class	**Estimated Useful Life**	Useful life as per Schedule II of the Companies Act
Building	50 Years	60 Years
Plant and equipment	5-15 Years	5-15 Years
Vehicles	5-10 Years	8 – 10 Years
Furniture and fixtures & Electrical installation	10 Years	10 Years
Office equipment	5 Years	5 Years
Computers	3 Years	3-6 Years
Leasehold improvements	3 Years	NA

The management believes that these estimated useful lives are realistic and reflect fair approximation of the period over which the assets are likely to be used.

The residual values, useful lives and methods of depreciation of property, plant and equipment are reviewed at each financial year end and adjusted prospectively, if appropriate.

An item of property, plant and equipment and any significant part initially recognised is derecognised upon disposal or when no future economic benefits are expected from its use or disposal. Any gain or loss arising on derecognition of the asset (calculated as the difference between the net disposal proceeds and the carrying amount of the asset) is included in the statement of profit and loss when the asset is derecognised.

2.7 Investment **properties**

Investment property comprises completed property (land or a building or part of a building or both) that is held, or to be held, to earn rentals or for capital appreciation or both. Property held under a lease is classified as investment property when it is held to earn rentals or for capital appreciation or both. It does not include property held use in the supply of goods or services or for administrative purposes, nor it includes property held for sale in the ordinary course of business.

Investment properties are measured initially at cost, including transaction costs. Subsequent to initial recognition, investment properties are stated at cost less accumulated depreciation and accumulated impairment loss, if any.

The cost includes the cost of replacing parts and borrowing costs for qualifying assets if the recognition criteria is met. When significant parts of the investment properties are required to be replaced at intervals, the SPV Group depreciates them separately based on their specific useful lives. All other repair and maintenance costs are recognised in profit or loss as incurred.

Investment properties are depreciated using the straight line method over the estimated useful lives. Investment properties have a useful life of 50 years. The management believes that these estimated useful lives are realistic and reflect fair approximation of the period over which the assets are likely to be used.

Though the SPV Group measures investment properties using cost-based measurement, the fair value of investment properties are disclosed in the notes. Fair values are determined based on an annual evaluation performed by an accredited external independent valuer applying a valuation model.

Investment properties are derecognised either when they have been disposed of or when they are permanently withdrawn from use and no future economic benefit is expected from their disposal. The difference between the net disposal proceeds and the carrying amount of the asset is recognised in profit or loss in the period of derecognition.

Transfers are made to (or from) investment properties only when there is a change in use. Transfers between investment property and owner-occupied property do not change the carrying amount of the property transferred and they do not change the cost of that property for measurement or disclosure purposes.

2.8 Intangible Assets Under Service Concession Arrangements

Toll collection rights obtained in consideration for rendering construction services, represent the right to collect toll revenue from the users of the public service (road) during the concession period in respect of Build-Operate-Transfer ("BOT") and design, build, finance, operate and transfer (DBFOT) project undertaken by the asset SPVs.

Intangible Assets i.e. Right to collect toll/tariff are recognised when the SPV Group has been granted rights to charge a toll/tariff from the users of such public services and such rights do not confer an unconditional right on the SPV Group to receive cash or another financial asset and when it is probable that future economic benefits associated with the rights will flow to the SPV Group and the cost of the asset can be measured reliably.

Under the Concession Agreements, where the SPV Group has received the right to charge users of the public service, such rights are recognised and classified as "Intangible Assets" in accordance with Appendix C- 'Service Concession Arrangements' of Ind AS 115- 'Revenue from Contracts with Customers'. Such right is not an unconditional right to receive consideration because the amounts are contingent to the extent that the public uses the service. Toll collection rights are capitalized as intangible assets upon completion of the project when the asset SPV receives the completion certificate from the MoRTH/NHAI/SRDC as specified in the Concession Agreement, at the cumulative construction costs (including related margins) plus the present value of base obligation towards negative grants and additional concession fee payable to MoRTH/NHAI/SRDC, if any. Additional concession fee payable above base obligation is recognised as other expense.

Till completion of construction of the project, such arrangements are recognised as "Intangible assets under development" and are recognised at cumulative construction cost (including related margins) and borrowing costs if the recognition criteria are met. The other income received during the construction period is reduced from the carrying amount of Intangible assets under development.

An asset carried under concession arrangements is derecognized on disposal or when no future economic benefits are expected from its future use or disposal. Extension of concession period by the authority in compensation for claims made by the asset SPV are considered by the Management while determining useful lives of the toll collection rights when it is probable that such claims will be received and can be measured reliably.

The intangible assets which are recognised in the form of right to charge users of the infrastructure asset are amortized over period of operation of the facility on a straight line basis.

Intangible assets are assessed for impairment whenever there is an indication that the intangible asset may be impaired. The amortisation period and the amortisation method for an intangible asset are reviewed at least at the end of each reporting period. Changes in the expected useful life or the expected pattern of consumption of future economic benefits embodied in the asset are considered to modify the amortisation period or method, as appropriate, and are treated as changes in accounting estimates. The amortisation expense on intangible assets is recognised in the statement of profit and loss unless such expenditure forms part of carrying value of another asset.

2.9 Other Intangible assets

Intangible assets acquired separately are measured on initial recognition at cost. Following initial recognition, intangible assets are carried at cost less any accumulated amortisation and accumulated impairment losses.

Other intangible assets comprise of cost for software and other application software acquired.

Intangible assets with finite lives are amortised over the useful economic life and assessed for impairment whenever there is an indication that the intangible asset may be impaired. The amortisation period and the amortisation method for an intangible asset with a finite useful life are reviewed at least at the end of each reporting period. Changes in the expected useful life or the expected pattern of consumption of future economic benefits embodied in the asset are considered to modify the amortisation period or method, as appropriate, and are treated as changes in accounting estimates. The amortisation expense on intangible assets with finite lives is recognised in the statement of profit and loss unless such expenditure forms part of carrying value of another asset.

An intangible asset is derecognised upon disposal (i.e., at the date the recipient obtains control) or when no future economic benefits are expected from its use or disposal. Any gain or loss arising upon derecognition of the asset (calculated as the difference between the net disposal proceeds and the carrying amount of the asset) is included in the statement of profit and loss when the asset is derecognised.

2.10 Premium Deferment

Premium Deferral (i.e., premium payable less paid after adjusting premium deferment) is aggregated under premium deferred obligation in the Combined Balance Sheet. The interest payable on the above is aggregated under premium deferral obligation. Present value of minimum/fixed deferred premium is capitalised as part of intangible assets.

2.11 Borrowing Costs

Borrowing costs directly attributable to the acquisition or construction of an asset that necessarily takes a substantial period of time to get ready for its intended use or sale (qualifying asset) are capitalised as part of the cost of the asset. All other borrowing costs are expensed in the period in which they occur. Borrowing costs consist of interest and other costs that an entity incurs in connection with the borrowing of funds.

Borrowing costs includes interest, commitment charges, brokerage, underwriting costs, discounts / premiums, financing charges and all ancillary / incidental costs incurred in connection with the arrangement of borrowing.

Investment income earned on the temporary investment of specific borrowings pending their expenditure on qualifying assets is deducted from the borrowing costs eligible for capitalization.

In case of concession arrangement under intangible asset model, borrowing costs attributable to the construction of infrastructure assets are capitalized up to the date of the final completion certificate of the asset / facility received from the authority for its intended use specified in the Concession Agreement. All borrowing costs subsequent to the capitalization of the intangible assets are charged to the Statement of Profit and Loss in the period in which such costs are incurred.

2.12 Leases

The SPV Group assesses at contract inception whether a contract is, or contains, a lease. That is, if the contract conveys the right to control the use of an identified asset for a period of time in exchange for consideration

Group as a lessee

The SPV Group applies a single recognition and measurement approach for all leases, except for short-term leases and leases of low-value assets. The SPV Group recognises lease liabilities to make lease payments and right-of-use assets representing the right to use the underlying assets

Right-of-use assets

The SPV Group recognises right-of-use assets at the lease commencement date (i.e., the date the underlying asset is available for use). Right-of-use assets are measured at cost, less any accumulated depreciation and impairment losses, and adjusted for any remeasurement of lease liabilities. The cost of right-of-use assets includes the amount of lease

liabilities recognised, for any lease payments made at or before the commencement date, plus any initial direct cost incurred, less any lease incentives received. Right-of-use assets are depreciated on a straight-line basis from the commencement date to the earlier of the end of the useful life or the end of the lease term, as follows:

- Buildings – 3 - 5 years

The right-of-use assets are also subject to impairment. Refer to the accounting policies in 2.13 "Impairment of non-financial assets".

Lease Liabilities

At the commencement date of the lease, the SPV Group recognises lease liabilities measured at the present value of lease payments to be made over the lease term. The lease payments include fixed payments (including in substance fixed payments) less any lease incentives receivable, variable lease payments that depend on an index or a rate, and amounts expected to be paid under residual value guarantees., In calculating the present value of lease payments, the SPV Group uses its incremental borrowing rate at the lease commencement date because the interest rate implicit in the lease is not readily determinable. After the commencement date, the amount of lease liabilities is increased to reflect the accretion of interest and reduced for the lease payments made. In addition, the carrying amount of lease liabilities is remeasured if there is a modification, a change in the lease term, a change in the lease payments (e.g., changes to future payments resulting from a change in an index or rate used to determine such lease payments) or a change in the assessment of an option to purchase the underlying asset.

Lease payments on short-term leases and leases of low-value assets are recognised as expense on a straight-line basis over the lease term.

2.13 Impairment of non-financial assets

The SPV Group assesses, at each reporting date, whether there is an indication that an asset may be impaired. If any indication exists, or when annual impairment testing for an asset is required, the SPV Group estimates the asset's recoverable amount. An asset's recoverable amount is the higher of an assets or cash-generating unit's (CGU) fair value less costs of disposal and its value in use. The recoverable amount is determined for an individual asset, unless the asset does not generate cash inflows that are largely independent of those from other assets or group of assets. When the carrying amount of an asset or CGU exceeds its recoverable amount, the asset is considered impaired and is written down to its recoverable amount.

In assessing value in use, the estimated future cash flows are discounted to their present value using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset. In determining fair value less costs of disposal, recent market transactions are taken into account. If no such transactions can be identified, an appropriate valuation model is used. These calculations are corroborated by valuation multiples, quoted share prices for publicly traded companies or other available fair value indicators.

Impairment losses of non-financial assets are recognised in the statement of profit and loss.

For assets excluding goodwill, an assessment is made at each reporting date to determine whether there is an indication that previously recognised impairment losses no longer exist or have decreased. If such indication exists, the SPV Group estimates the asset's or CGU's recoverable amount. A previously recognised impairment loss is reversed only if there has been a change in the assumptions used to determine the asset's recoverable amount since the last impairment loss was recognised. The reversal is limited so that the carrying amount of the asset does not exceed its recoverable amount, nor exceed the carrying amount that would have been determined, net of depreciation/amortization, had no impairment loss been recognised for the asset in prior years. Such reversal is recognised in the statement of profit or loss unless the asset is carried at a revalued amount, in which case, the reversal is treated as a revaluation increase

2.14 **Provisions and Contingent liabilities**

Provisions

Provisions are recognised when the SPV Group has a present obligation (legal or constructive) as a result of past event, it is probable that an outflow of resources embodying economic benefits will be required to settle the obligation and a reliable estimate can be made of the amount of the obligation. These are reviewed at each balance sheet date and adjusted to reflect the current best estimates. The expense relating to a provision is presented in the statement of profit and loss net of any reimbursement.

If the effect of the time value of money is material, provisions are discounted using a current pre-tax rate that reflects, when appropriate, the risks specific to the liability. When discounting is used, the increase in the provision due to the passage of time is recognised as a finance cost.

Provision for Major Maintenance

As per the concession agreements, the SPV Group is obligated to carry out major maintenance of the roads under concession. The SPV Group estimates the likely provision required towards the same and accrues the cost on a straight-line basis over the period at the end of which maintenance would be required, in the Combined Statement of Profit and Loss.

The SPV Group estimates and provides for contractual obligations as per SCA with the Concessionaire to restore the infrastructure to a specified level of serviceability at periodic intervals during the SCA period or before it is handed over to the Concessionaire. These estimates are corroborated through purchase orders/ work orders placed or to be placed by the SPV Group as per the periodical maintenance estimate reports issued by an independent field expert and major maintenance strategy/ methodology approved by the Independent Consultant appointed by the Concessionaire.

As the estimated cost is based on the various assumptions such as current infrastructure (road, pavements, etc.) condition, expected timings of costs, inflation in material cost, discount rate, government policies etc., hence the management is required to apply judgement over these factors for revalidating the provision for expenses which is reviewed at each reporting date.

Contingent liability

Contingent liability is

(a) a possible obligation arising from past events and whose existence will be confirmed only by the occurrence or non-occurrence of one or more uncertain future events not wholly within the control of the entity, or
(b) a present obligation that arises from past events but is not recognised because:
    - it is not probable that an outflow of resources embodying economic benefits will be required to settle the obligation, or
    - the amount of the obligation cannot be measured with sufficient reliability.

The SPV Group does not recognize a contingent liability, but it discloses its existence and other required disclosures in notes to the financial statements, unless the possibility of any outflow of resources in settlement is remote.

Contingent Asset

A contingent asset is a possible asset that arises from past events and whose existence will be confirmed only by- the occurrence or non-occurrence of one or more uncertain future events not wholly within the control of the entity. The SPV Group does not recognize the contingent asset in its special purpose combined financial statements since this may result in the recognition of income that may never be realised. Where an inflow of economic benefits is probable, the

SPV Group disclose a brief description of the nature of contingent assets at the end of the reporting period. However, when the realisation of income is virtually certain, then the related asset is not a contingent asset and the SPV recognize such assets.

Provisions, contingent liabilities and contingent assets are reviewed at each reporting date.

2.15 **Retirement and other employee benefits**:

The SPV Group provides post-employment benefits through various defined contribution and defined benefit plans.

Defined contribution plans (Provident Fund)

Retirement benefit in the form of provident fund is a defined contribution scheme. The SPV Group has no obligation, other than the contribution payable to the provident fund. The SPV Group recognizes contribution payable to the provident fund scheme as an expense, when an employee renders the related service. If the contribution payable to the scheme for service received before the balance sheet date exceeds the contribution already paid, the deficit payable to the scheme is recognized as a liability after deducting the contribution already paid.

Defined benefit plans (Gratuity)

Post-employment benefit in the form of gratuity fund scheme is a defined benefit plan. The cost of providing benefits under the defined benefit plan is determined using projected unit credit method ('PUCM').

Remeasurements, comprising of actuarial gains and losses, the effect of the asset ceiling, excluding amounts included in net interest on the net defined benefit liability and the return on plan assets (excluding amounts included in net interest on the net defined benefit liability), are recognised immediately in the balance sheet with a corresponding debit or credit to retained earnings through OCI in the period in which they occur. Remeasurements are not reclassified to the statement of profit and loss in subsequent periods.

Past service costs are recognised in statement of profit and loss on the earlier of:
- The date of the plan amendment or curtailment, and
- The date on which the SPV Group recognises related restructuring costs

Net interest is calculated by applying the discount rate to the net defined benefit liability or asset. The SPV Group recognises the following changes in the net defined benefit obligation as an expense in the Special Purpose Combined Statement of Profit and Loss:

- Service costs comprising current service costs, past-service costs, gains and losses on curtailments and non-routine settlements; and
- Net interest expense or income

Short term benefits

Short term employee benefit obligations are measured on an undiscounted basis and are expensed as a related service provided. A liability is recognized for the amount expected to be paid under short term cash bonus or profit sharing plans if the SPV Group has a present legal or constructive obligation to pay this amount as a result of past service provided by the employee and the obligation can be estimated reliably.

Provision for Compensated absences

Accumulated leave, which is expected to be utilized within the next 12 months, is treated as short-term employee benefit. The SPV Group measures the expected cost of such absences as the additional amount that it expects to pay as a result of the unused entitlement that has accumulated at the reporting date. The SPV Group recognizes expected cost of short-term employee benefit as an expense, when an employee renders the related service.

The SPV Group treats accumulated leave expected to be carried forward beyond twelve months, as long-term employee benefit for measurement purposes.

Such long-term compensated absences are provided for based on the actuarial valuation using the projected unit credit method at the reporting date. Remeasurement gains/losses are immediately taken to the statement of profit and loss and are not deferred. The obligations are presented as current liabilities in the balance sheet if the entity does not have an unconditional right to defer the settlement for at least twelve months after the reporting date.

2.16 Financial instruments

A financial instrument is any contract that gives rise to a financial asset of one entity and a financial liability or equity instrument of another entity.

Financial assets:

Initial recognition and measurement

Financial assets are classified, at initial recognition, and subsequently measured at amortised cost, fair value through other comprehensive income (OCI), and fair value through profit or loss.

The classification of financial assets at initial recognition depends on the financial asset's contractual cash flow characteristics and the SPV Group's business model for managing them. With the exception of trade receivables that do not contain a significant financing component or for which the SPV Group has applied the practical expedient, the SPV Group initially measures a financial asset at its fair value plus, in the case of a financial asset not at fair value through profit or loss, transaction costs. Trade receivables that do not contain a significant financing component or for which the SPV Group has applied the practical expedient are measured at the transaction price determined under Ind AS 115. Refer to the accounting policies in section (2.3) Revenue from contracts with customers.

In order for a financial asset to be classified and measured at amortised cost or fair value through OCI, it needs to give rise to cash flows that are 'solely payments of principal and interest (SPPI)' on the principal amount outstanding. This assessment is referred to as the SPPI test and is performed at an instrument level. Financial assets with cash flows that are not SPPI are classified and measured at fair value through profit or loss, irrespective of the business model.

The SPV Group's business model for managing financial assets refers to how it manages its financial assets in order to generate cash flows. The business model determines whether cash flows will result from collecting contractual cash flows, selling the financial assets, or both. Financial assets classified and measured at amortised cost are held within a business model with the objective to hold financial assets in order to collect contractual cash flows while financial assets classified and measured at fair value through OCI are held within a business model with the objective of both holding to collect contractual cash flows and selling.

Subsequent measurement

For purposes of subsequent measurement, financial assets are classified in two categories:

- Financial assets at amortised cost (debt instruments)
- Financial assets at fair value through profit or loss

There are no financial assets designated at fair value through OCI.

Financial assets at **amortised cost:**

A 'financial asset' is measured at the amortised cost if both the following conditions are met:

a. The asset is held within a business model whose objective is to hold assets for collecting contractual cash flows, and
b. Contractual terms of the asset give rise on specified dates to cash flows that are solely payments of principal and interest (SPPI) and interest (SPPI) on the principal amount outstanding.

This category is the most relevant to the SPV Group. After initial measurement, such financial assets are subsequently measured at amortised cost using the effective interest rate (EIR) method and are subject to impairment as per the accounting policy applicable to 'Impairment of financial assets.' Amortised cost is calculated by taking into account any discount or premium on acquisition and fees or costs that are an integral part of the EIR. The EIR amortisation is included in other income in the profit or loss. The losses arising from impairment are recognised in the profit or loss. The SPV Group's financial assets at amortised cost includes receivables under service concession agreements, trade receivables, and security deposits.

Financial assets at fair value through pro**fi**t or loss:

Financial assets in this category are those that are held for trading and have been either designated by management upon initial recognition or are mandatorily required to be measured at fair value under Ind AS 109 i.e. they do not meet the criteria for classification as measured at amortised cost or FVOCI. Management only designates an instrument at FVTPL upon initial recognition, if the designation eliminates, or significantly reduces, the inconsistent treatment that would otherwise arise from measuring the assets or liabilities or recognising gains or losses on them on a different basis. Such designation is determined on an instrument-by-instrument basis.

Financial assets at fair value through profit or loss are carried in the balance sheet at fair value with net changes in fair value recognised in the statement of profit and loss.

Derecognition

A financial asset (or, where applicable, a part of a financial asset or part of a group of similar financial assets) is primarily derecognised (i.e. removed from the SPV Group's Special Purpose Combined Balance Sheet) when:

- The rights to receive cash flows from the asset have expired, or
- The SPV Group has transferred its rights to receive cash flows from the asset or has assumed an obligation to pay the received cash flows in full without material delay to a third party under a 'pass-through' arrangement; and either (a) the SPV Group has transferred substantially all the risks and rewards of the asset, or (b) the SPV Group has neither transferred nor retained substantially all the risks and rewards of the asset, but has transferred control of the asset.

When the SPV Group has transferred its rights to receive cash flows from an asset or has entered into a pass-through arrangement, it evaluates if and to what extent it has retained the risks and rewards of ownership. When it has neither transferred nor retained substantially all of the risks and rewards of the asset, nor transferred control of the asset, the SPV Group continues to recognise the transferred asset to the extent of the SPV Group's continuing involvement. In that case, the SPV Group also recognises an associated liability. The transferred asset and the associated liability are measured on a basis that reflects the rights and obligations that the SPV Group has retained.

Continuing involvement that takes the form of a guarantee over the transferred asset is measured at the lower of the original carrying amount of the asset and the maximum amount of consideration that the SPV Group could be required to repay.

Impairment of financial assets:

Further disclosures relating to impairment of financial assets are also provided in the following notes:

- Disclosures for significant assumptions –note 2(C)
- Trade receivables and contract assets – note 2.3

For trade receivables and contract assets, the SPV Group applies a simplified approach in calculating ECLs. Therefore, the SPV Group does not track changes in credit risk, but instead recognises a loss allowance based on lifetime ECLs at each reporting date.

For financial assets other than service concession receivables, as per Ind AS 109, the SPV Group considers a financial asset in default when contractual payments are past due. However, in certain cases, the SPV Group may also consider a financial asset to be in default when internal or external information indicates that the SPV Group is unlikely to receive the outstanding contractual amounts in full before taking into account any credit enhancements held by the SPV Group. A financial asset is written off when there is no reasonable expectation of recovering the contractual cash flows. The SPV Group's service concession receivables do not contain significant financing component and loss allowance on service concession receivables is measured at an amount equal to lifetime expected losses i.e. expected cash shortfall.

The impairment losses and reversals are recognised in statement of profit and loss.

Reclassification of financial assets

The SPV Group determines classification of financial assets on initial recognition. For financial assets which are debt instruments, a reclassification is made only if there is a change in the business model for managing those assets. Changes to the business model are expected to be infrequent. The SPV Group's senior management determines change in the business model as a result of external or internal changes which are significant to the SPV Group's operations. Such changes are evident to external parties. A change in the business model occurs when the SPV Group either begins or ceases to perform an activity that is significant to its operations. If the SPV Group reclassifies financial assets, it applies the reclassification prospectively from the reclassification date which is the first day of the immediately next reporting period following the change in business model. The SPV Group does not restate any previously recognised gains, losses (including impairment gains or losses) or interest.

Modification of Cash Flows of financial assets and revision in estimates of Cash flows

When the contractual cash flows of a financial asset are renegotiated or otherwise modified and the renegotiation or modification does not result in the derecognition of that financial asset in accordance with Ind AS 109, the SPV Group recalculates the gross carrying amount of the financial asset and recognizes a modification gain or loss in profit or loss. The gross carrying amount of the financial asset is recalculated as the present value of the renegotiated or modified contractual cash flows that are discounted at the financial asset's original effective interest rate. Any costs or fees incurred are adjusted to the carrying amount of the modified financial asset and are amortized over the remaining term of the modified financial asset.

If the SPV Group revises its estimates of payments or receipts (excluding modifications and changes in estimates of expected credit losses), it adjusts the gross carrying amount of the financial asset or amortized cost of a financial liability to reflect actual and revised estimated contractual cash flows. The SPV Group recalculates the gross carrying amount of the financial asset or amortized cost of the financial liability as the present value of the estimated future contractual cash flows that are discounted at the financial instrument's original effective interest rate. The adjustment is recognized in statement of profit and loss.

Financial Liabilities:

Initial recognition, measurement and presentation

Financial liabilities are classified, at initial recognition, as financial liabilities at fair value through profit or loss, loans and borrowings, payables, as appropriate.

All financial liabilities are recognised initially at fair value and, in the case of loans and borrowings and payables, net of directly attributable transaction costs.

The SPV Group's financial liabilities include trade payables, loans and borrowings including bank overdrafts and other financial liabilities.

Subsequent measurement

For purposes of subsequent measurement, financial liabilities are classified in two categories:

- Financial liabilities at fair value through profit or loss
- Financial liabilities at amortised cost (loans and borrowings)

Financial liabilities at fair value through profit or loss

Financial liabilities at fair value through profit or loss include financial liabilities held for trading and financial liabilities designated upon initial recognition as at fair value through profit or loss.

Financial liabilities are classified as held for trading if they are incurred for the purpose of repurchasing in the near term.

Gains or losses on liabilities held for trading are recognised in the profit or loss.

Financial liabilities are designated upon initial recognition as at fair value through profit or loss only if the criteria in Ind AS 109 are satisfied. For liabilities designated as FVTPL, fair value gains/ losses attributable to changes in own credit risk are recognized in OCI. These gains/ losses are not subsequently transferred to P&L. However, the SPV Group may transfer the cumulative gain or loss within equity. All other changes in fair value of such liability are recognised in the statement of profit and loss. The SPV Group has not designated any financial liability at fair value through profit or loss.

Financial liabilities at amortised cost (Loans and borrowings)

This is the category most relevant to the SPV Group. After initial recognition, interest-bearing loans and borrowings are subsequently measured at amortised cost using the EIR method. Gains and losses are recognised in profit or loss when the liabilities are derecognised as well as through the EIR amortisation process.

Amortised cost is calculated by taking into account any discount or premium on acquisition and fees or costs that are an integral part of the EIR. The EIR amortisation is included as finance costs in the statement of profit and loss.

This category generally applies to borrowings.

Derecognition

A financial liability is derecognised when the obligation under the liability is discharged or cancelled or expires. When an existing financial liability is replaced by another from the same lender on substantially different terms, or the terms of an existing liability are substantially modified, such an exchange or modification is treated as the derecognition of the original liability and the recognition of a new liability. The difference in the respective carrying amounts is recognised in the statement of profit and loss.

Offsetting of financial instruments

Financial assets and financial liabilities are offset and the net amount is reported in the Special Purpose Combined Balance Sheet if there is a currently enforceable legal right to offset the recognised amounts and there is an intention to settle on a net basis, to realise the assets and settle the liabilities simultaneously.

Convertible preference shares:

Convertible preference shares are separated into liability and equity components based on the terms of the contract.

On issuance of the convertible preference shares, the fair value of the liability component is determined using a market rate for an equivalent non-convertible instrument. This amount is classified as a financial liability measured at amortised cost (net of transaction costs) until it is extinguished on conversion or redemption.

The remainder of the proceeds is allocated to the conversion option that is recognised and included in equity since conversion option meets Ind AS 32 criteria for fixed to fixed classification. Transaction costs are deducted from equity, net of associated income tax. The carrying amount of the conversion option is not remeasured in subsequent years.

Transaction costs are apportioned between the liability and equity components of the convertible preference shares based on the allocation of proceeds to the liability and equity components when the instruments are initially recognised.

Equity **vs. financial liability classification:**

An equity instrument is any contract that evidences a residual interest in the assets of an entity after deducting all of its liabilities. Equity instruments issued by the SPV Group are recognised at the proceeds received, net of direct issue costs. The SPV Group classifies a financial instrument issued by it as equity instrument only if below conditions are met:

- The instrument includes no contractual obligation to deliver cash or another financial asset to another entity. Nor it includes any obligation to exchange financial assets or financial liabilities with another entity under conditions that are potentially unfavourable to the issuer.
- If the instrument will, or may, be settled in the SPV Group's own equity instruments, it is non-derivative instrument that includes no contractual obligation for the SPV Group to deliver a variable number of its own equity instruments. If the instrument is derivative, then it should be settled only by the SPV Group exchanging a fixed amount of cash or another financial asset for a fixed number of its own equity instruments.

  All other instruments are classified as financial liability and accounted for using the accounting policy applicable to the Financial Liabilities.

2.17 Cash and Cash Equivalents:

Cash and cash equivalent in the balance sheet comprise cash at banks and on hand and short-term deposits with an original maturity of three months or less, that are readily convertible to a known amount of cash and subject to an insignificant risk of changes in value.

2.18 Cash **fl**ow statement

Special Purpose Combined Cash flow statement is prepared segregating the cash flows from operating, investing and financing activities. Cash flow from operating activities is reported using indirect method. Under the indirect method, the net profit/(loss) is adjusted for the effects of:

a. transactions of a non-cash nature;
b. any deferrals or accruals of past or future operating cash receipts or payments; and
c. all other items of income or expense associated with investing or financing cash flows.

The cash flows from operating, investing and financing activities of the SPVs are segregated based on the available information. Cash and cash equivalents (including bank balances) are reflected as such in the cash flow statement. Those cash and cash equivalents which are not available for general use as on the date of Balance Sheet are also included under this category with a specific disclosure.

2.19 Earnings per unit:

Basic earnings per unit is calculated by dividing the net profit or loss for the period/year attributable to unit holders (after deducting attributable taxes) by the weighted average number of units outstanding during the period/year.

For the purpose of calculating diluted earnings per unit, the net profit or loss for the period/year attributable to unit holders (after deducting attributable taxes) and the weighted average number of units outstanding during the period/year are adjusted for the effects of all dilutive potential equity units.

2.20 **Segment reporting:**

The SPV Group has structured its operations into one reportable segment of Construction and operation of highways. The management monitors the operating results of the activity of Construction and operation of highways for the purpose of making decisions about resource allocation and performance assessment. Segment performance is evaluated based on profit or loss and is measured consistently with profit or loss reported in the Special Purpose Combined Financial Statements. As the SPV Group's operations are structured into one reportable business segment i.e. Construction and operation of highways. Hence separate segment disclosures are not made.

2.21 Events **after the reporting period**

If the SPV Group receives information after the reporting period, but prior to the date of approved for issue, about conditions that existed at the end of the reporting period, it will assess whether the information affects the amounts that it recognises in its Special Purpose Combined Financial Statements. The SPV Group will adjust the amounts recognised in its Special Purpose Combined Financial Statements to reflect any adjusting events after the reporting period and update the disclosures that relate to those conditions in light of the new information. For non-adjusting events after the reporting period, the SPV Group will not change the amounts recognised in its Special Purpose Combined Financial Statements but will disclose the nature of the non-adjusting event and an estimate of its financial effect, or a statement that such an estimate cannot be made, if applicable .

2.22 Combined statement of net assets at fair value

The disclosure of Statement of Net Assets at Fair Value comprises of the fair values of the total assets and fair values of the total liabilities of individual components. The fair value of the assets are reviewed regularly by Management with reference to independent assets and market conditions existing at the reporting date, using generally accepted market practices. The independent valuers are leading independent appraisers with a recognised and relevant professional qualification and with recent experience in the location. Judgment is also applied in determining the

extent and frequency of independent appraisals. Such independent appraisals and the assumptions used are reviewed at each balance sheet date.

2.23 Statement of Total Returns at Fair Value

The disclosure of total returns at fair value comprises of the total comprehensive income as per the Combined Statement of Profit and loss and other changes in fair value of investment property and intangible assets where the cost model is followed which were not recognised in total comprehensive income.

2(C) **Significant accounting judgements, estimates and assumptions**

The preparation of the SPV Group's Special Purpose Combined Financial Statements requires management to make judgements, estimates and assumptions that affect the reported amounts of revenues, expenses, assets and liabilities, and the accompanying disclosures, and the disclosure of contingent liabilities. Uncertainty about these assumptions and estimates could result in outcomes that require a material adjustment to the carrying amount of assets or liabilities affected in future periods.

Other disclosures relating to the SPV Group's exposure to risks and uncertainties includes:

- Capital management note 33
- Financial risk management objectives and policies note 29
- Sensitivity analyses disclosures note 29

In the process of applying the SPV Group's accounting policies, management has made the following judgements and estimates, which have the most significant effect on the amounts recognised in the Special Purpose Combined Financial Statements:

Judgements

Service Concession arrangement:

The Cash flow model indicates the cash flow to be generated over the project lifecycle. The key inputs of the model comprise of annuity inflows, estimations on cost to build and maintain the asset and other operational efficiencies. These inputs are based on circumstances existing and management judgement / assumption on the future expectations based on current situations. Judgements include management view on expected earnings in future years, changes in interest rates, cost inflation, government policy changes, etc. These input assumptions could affect the reported cash flow from the related assets and accordingly these assumptions are reviewed periodically.

De**fi**ned Bene**fi**t Plan:

The cost of the defined benefit gratuity plan and the present value of the gratuity obligation are determined using actuarial valuation. An actuarial valuation involves making various assumptions that may differ from actual developments in the future. These include the determination of the discount rate, future salary increases and mortality rates. Due to the complexities involved in the valuation and its long-term nature, a defined benefit obligation is highly sensitive to changes in these assumptions. All assumptions are reviewed at each reporting date.

Estimates

Provision for Scheduled Maintenance**/ Contractual obligation to restore the infrastructure to a specified level of** serviceability

The SPV Group has contractual obligation to maintain the infrastructure to a specified level of serviceability or restore the infrastructure to a specified condition during the concession period and/or at the time of hand over to the grantor of the service concession agreement. Such obligations pertaining to periodic maintenance are measured at the best estimate of the expenditure that would be required to settle the obligation at the balance sheet date. In case of concession arrangements under financial asset model, such costs are recognized in the period in which such costs are actually incurred.

Impairment of Intangible assets and Service concession receivables

The SPV Group comprises entities either under Right to Toll Model or Right to Fixed Annuity Model. The SPV Group performs valuation using discounted cash flow method at each reporting date for each of such SPV which is considered as value in use for the purpose of calculation of impairment of Intangible asset (Rights under Service Concession Arrangements) or service concession receivable (as the case may be).

This valuation includes various management assumptions including revenue growth and future traffic for toll projects, expected operation and maintenance expense of highways, major maintenance of highways etc. Management has also obtained report from independent traffic consultant for revenue growth and future traffic and a report from technical consultant for estimated operation and maintenance expense/ periodic major maintenance expense for each of the SPV. These independent traffic study reports also include an assumption with respect to additional concession period over and above the present concession agreement in certain SPVs as below. These assumptions have significant implications in computation of value in use as at each reporting date.

Ahmedabad - Maliya Tollway Private Limited (AMTL): GSRDC has proposed a reduction in the concession period by 2.2 years in the First Concession Agreement on the grounds of use of different multipliers as per IRC 64 – 1990. Management is confident that classification considered by the management for computation of multiplier is appropriate and no such reduction is expected. Management has also obtained independent legal opinion in this regard. Accordingly, management has disregarded this reduction for the purpose of computation of above value in use. Theis matter is presently under arbitration.

Further, an extension of 1 year period has also been considered for the purpose of computation of value in use on the basis of estimated future traffic and rights of AMTL under present Service Concession Agreement.

Samkhiali Bhachau Gandhidham Tollway Private Limited (SGTL): NHAI has proposed a reduction in the concession period by 1.89 years in the First Concession Agreement on the grounds of use of different multipliers as per IRC 64 – 1990. However, management is confident that classification considered by the management for computation of multiplier is appropriate and no such reduction is expected. Management has also obtained independent legal opinion in this regard. Accordingly, management has disregarded this reduction for the purpose of computation of above value in use. Theis matter is presently under arbitration.

Deccan Tollway Private Limited (DTL): NHAI has proposed a reduction in the concession period by 2.4 years in the First Concession Agreement on the grounds of use of different multipliers as per IRC 64 – 1990. However, management is confident that classification considered by the management for computation of multiplier is appropriate and no such reduction is expected. Management has also obtained independent legal opinion in this regard. Accordingly, management has disregarded this reduction for the purpose of computation of above value in use. Theis matter is presently under arbitration.

Further, an extension of 5 years period has also been considered for the purpose of computation of value in use on the basis of estimated future traffic and rights of DTL under present Service Concession Agreement.

All above assumptions/estimates are critical in order to assess impairment of intangible asset/service concession receivable and also for computation of total returns at fair value and changes in fair value as included in these Special Purpose Combined Financial Statements.

2(D) **Recent accounting pronouncements**

New and amended standards

The SPV Group applied for the first-time certain standards and amendments, which are effective for annual periods beginning on or after 1 April 2025. The SPV Group has not early adopted any standard, interpretation or amendment that has been issued but is not yet effective.

(i) Amendments to Ind AS 21 - Lack of exchangeability

The Ministry of Corporate Affairs (MCA) notified the Companies (Indian Accounting Standards) Amendment Rules, 2025, which amend Ind AS 21, The Effects of Changes in Foreign Exchange Rates to specify how an entity should assess whether a currency is exchangeable and how it should determine a spot exchange rate when exchangeability is lacking. The amendments also require disclosure of information that enables users of its financial statements to understand how the currency not being exchangeable into the other currency affects, or is expected to affect, the entity's financial performance, financial position and cash flows.

The amendments are effective for annual reporting periods beginning on or after 1 April 2025. When applying the amendments, an entity cannot restate comparative information.

The amendments do not have a material impact on the SPV Group's special purpose combined financial statements.

(ii) Amendments to Ind AS 1 - **Classification of Liabilities as Current or Non**-current and Non-**current Liabilities** with Covenants

In August 2025, the MCA notified amendments to paragraphs 69 to 76 of Ind AS 1 to specify the requirements for classifying liabilities as current or non-current. The amendments clarify:

- What is meant by a right to defer settlement
- That a right to defer must exist at the end of the reporting period
- That classification is unaffected by the likelihood that an entity will exercise its deferral right
- That only if an embedded derivative in a convertible liability is itself an equity instrument would the terms of a liability not impact its classification

In addition, a requirement has been introduced to require disclosure when a liability arising from a loan agreement is classified as non-current and the entity's right to defer settlement is contingent on compliance with future covenants within twelve months.

If there is a breach of a material covenant of a long term loan arrangement on or before the end of the reporting period, resulting in the liability becoming payable on demand as at the reporting date, and the lender agrees—after the reporting period but before the financial statements are approved for issue—not to demand repayment for at least 12 months as a consequence of the breach, this shall be treated as an adjusting event. Accordingly, the entity is not required to classify the liability as current.

The amendments are effective for annual reporting periods beginning on or after 1 April 2025 retrospectively in accordance with Ind AS 8.

The amendments have resulted in additional disclosures in Note 11 but have not had an impact on the classification of SPV Group's liabilities.

(iii) Amendments to Ind AS 7 and Ind AS 107 - Supplier Finance Arrangements

In August 2025, the MCA notified amendments to Ind AS 7 Statement of Cash Flows and Ind AS 107 Financial Instruments: Disclosures to clarify the characteristics of supplier finance arrangements and require additional disclosure of such arrangements. The disclosure requirements in the amendments are intended to assist users of financial statements in understanding the effects of supplier finance arrangements on an entity's liabilities, cash flows and exposure to liquidity risk.

The amendments had no impact on the SPV Group's special purpose combined financial statements as the SPV Group does not have any supplier finance arrangements.

(iv) **International Tax Reform**—Pillar Two Model Rules – Amendments to Ind AS 12

In August 2025, the MCA notified amendments to Ind AS 12 Income Taxes in response to the OECD's BEPS Pillar Two rules and include:

- A mandatory temporary exception to the recognition and disclosure of deferred taxes arising from the jurisdictional implementation of the Pillar Two model rules; and
- Disclosure requirements for affected entities to help users of the financial statements better understand an entity's exposure to Pillar Two income taxes arising from that legislation, particularly before its effective date.

The mandatory temporary exception – the use of which is required to be disclosed – applies immediately. The remaining disclosure requirements apply for annual reporting periods beginning on or after April 01, 2025, but not for any interim periods ending on or before March 31, 2026.

The amendments had no impact on the SPV Group's special purpose combined financial statements as the SPV Group is not in scope of the Pillar Two model rules.

Standards issued but not yet effective

The new and amended standards that are notified by the Ministry of Corporate Affairs (MCA), but not yet effective, up to the date of issuance of the SPV Group's special purpose combined financial statements are disclosed below. The SPV Group will adopt these new and amended standards, when they become effective

(i) Amendments to Ind AS 1 - Classification of Liabilities as Current or Non-current and Non-current Liabilities with Covenants and Ind AS 10 Events after the Reporting Period

Ind AS 10 has been amended to remove the previous treatment under which a lender's post reporting date waiver granted before the financial statements were approved for issue of a breach of a material covenant in a long-term loan arrangement that occurred on or before the end of the reporting period, resulting in the liability becoming payable on demand at the reporting date, was regarded as an adjusting event.

For annual reporting periods beginning on or after April 01, 2026, any breach of a covenant whether material or immaterial occurring on or before the reporting date will, in accordance with Ind AS 1, require the related liability to be classified as current, unless the lender has granted a waiver of the breach on or before the reporting date and has agreed not to demand repayment for at least 12 months after the reporting date as a consequence of the breach. Such a waiver shall be treated as an adjusting event.

The amendments are effective for annual reporting periods beginning on or after April 01, 2026 retrospectively in accordance with Ind AS 8.

SPV Group
(As defined in Note 1 - Corporate Information)

Notes to the Special Purpose Combined Financial Statements
All amounts in Rupees millions unless otherwise stated

3(A) Property, plant and equipment

Particulars	Freehold land	Plant and equipment	Electrical Installations	Furniture and fixtures	Office equipment	Computers	Leasehold Improvement	Vehicles	Total
Gross carrying value									
As at April 1, 2022	10.62	122.65	34.04	30.22	29.31	41.25	-	70.13	338.22
Additions for the year	-	5.66	0.05	1.00	1.28	2.05	-	16.77	26.80
Disposals for the year	-	5.27	-	0.32	2.62	4.34	-	21.50	34.05
As at March 31, 2023	10.62	123.03	34.09	30.90	27.97	38.96	-	65.40	330.98
Additions for the year	-	22.81	1.30	3.05	2.88	2.23	1.07	19.69	53.02
Disposals for the year	-	4.56	0.10	0.92	5.16	3.96	-	12.54	27.24
As at March 31, 2024	10.62	141.27	35.29	33.03	25.69	37.23	1.07	72.55	356.76
Additions for the year	-	37.85	0.02	0.46	5.80	8.52	13.64	5.78	72.08
Disposals for the year	-	4.34	0.45	1.49	4.26	11.15	-	18.77	40.45
As at March 31, 2025	10.62	174.78	34.86	32.00	27.24	34.60	14.71	59.57	388.38
Additions for the period	-	12.26	0.01	0.01	2.10	7.41	0.00	13.47	35.26
Disposals for the period	-	-	-	1.03	0.50	2.43	-	22.77	26.73
As at December 31, 2025	10.62	187.04	34.87	30.98	28.84	39.58	14.71	50.27	396.91
Accumulated depreciation									
As at April 1, 2022	-	97.36	15.24	22.49	24.64	25.82	-	37.81	223.37
Depreciation for the year	-	6.47	3.38	1.98	2.40	8.36	-	11.11	33.69
Disposals for the year	-	4.75	-	0.30	1.54	3.19	-	13.35	23.13
As at March 31, 2023	-	99.09	18.62	24.17	25.49	30.98	-	35.57	233.92
Depreciation for the year	-	7.86	3.35	1.50	1.53	4.43	0.21	10.52	29.39
Disposals for the year	-	4.46	-	0.78	5.10	3.78	-	11.24	25.36
As at March 31, 2024	-	102.48	21.97	24.89	21.93	31.63	0.21	34.84	237.95
Depreciation for the year	-	9.36	3.43	1.71	2.06	3.10	4.03	9.68	33.37
Disposals for the year	-	4.27	0.29	1.49	3.95	9.59	-	14.86	34.46
As at March 31, 2025	-	107.57	25.11	25.11	20.03	25.14	4.24	29.67	236.86
Depreciation for the period	-	8.89	2.01	1.26	2.22	5.29	4.94	5.98	30.59
Disposals for the period	-	-	-	0.69	0.44	2.18	-	15.77	19.08
As at December 31, 2025	-	116.46	27.12	25.68	21.81	28.25	9.18	19.87	248.37
Net carrying value									
As at March 31, 2023	10.62	23.94	15.47	6.73	2.48	7.98	-	29.83	97.05
As at March 31, 2024	10.62	38.79	13.32	8.14	3.76	5.60	0.86	37.71	118.80
As at March 31, 2025	10.62	67.21	9.75	6.89	7.21	9.46	10.47	29.90	151.51
As at December 31, 2025	10.62	70.58	7.75	5.30	7.03	11.33	5.53	30.40	148.54

Note:

i. Certain property, plant and equipment of the SPV Group have been pledged for the borrowings taken by the SPV Group. Refer note 11.

ii. No revaluation has been done during the period/years presented with respect to Property, plant & equipment.

iii. On transition to Ind AS, the SPV Group has elected to continue with the carrying value of all Property, plant and equipment measured as per the previous GAAP and use that carrying value as the deemed cost of Property, plant and equipment.

SPV Group
(As defined in Note 1 - Corporate Information)

Notes to the Special Purpose Combined Financial Statements
All amounts in Rupees millions unless otherwise stated

3(B) Investment Properties

Particulars	Buildings
Gross carrying value	
As at April 1, 2022	23.72
Additions for the year	-
Disposals for the year	-
As at March 31, 2023	23.72
Additions for the year	-
Disposals for the year	-
As at March 31, 2024	23.72
Additions for the year	-
Disposals for the year	-
As at March 31, 2025	23.72
Additions for the period	-
Disposals for the period	-
As at December 31, 2025	23.72
Accumulated depreciation	
As at April 1, 2022	3.70
Depreciation for the year	0.58
Disposals for the year	-
As at March 31, 2023	4.28
Depreciation for the year	0.48
Disposals for the year	-
As at March 31, 2024	4.76
Depreciation for the year	0.48
Disposals for the year	-
As at March 31, 2025	5.24
Depreciation for the period	0.37
Disposals for the period	-
As at December 31, 2025	5.61
Net carrying value	
As at March 31, 2023	19.44
As at March 31, 2024	18.97
As at March 31, 2025	18.49
As at December 31, 2025	18.11

Note:
i. All the immovable properties are in the name of the SPV group/component.
ii. No revaluation has been done during the period/years presented with respect to Investment properties.

Disclosures pursuant to Ind AS 40 "Investment Properties"

Particulars	Nine months period ended December 31, 2025	Year ended March 31, 2025	Year ended March 31, 2024	Year ended March 31, 2023
Rental income derived from investment properties	1.42	1.90	1.59	1.11
Less: Depreciation for the period/year	(0.37)	(0.48)	(0.48)	(0.58)
Profit arising from investment properties before indirect expenses	1.05	1.42	1.11	0.53

Fair values of investment property: Rs. 70.80 millions as at March 31, 2025 (Rs. 56.50 millions as at March 31, 2024 and Rs. 55.40 millions as at March 31, 2023). The fair values of all the investment properties have been determined with the help of independent valuers. Valuation is based on government rates, market research and market trends, period and type of construction as considered appropriate.

The SPV Group performs fair valuation of investment properties on an annual basis and there is no significant change in fair value as at December 31, 2025 compared to March 31, 2025. All resulting fair value estimates for investment properties are included in level 2.

3(C) Right-of-use assets

Particulars	Office premises
Gross carrying value	
As at April 1, 2022	30.48
Additions for the year	-
Disposals for the year	-
As at March 31, 2023	30.48
Additions for the year	30.52
Disposals for the year	30.48
As at March 31, 2024	30.52
Additions for the year	50.22
Disposals for the year	-
As at March 31, 2025	80.74
Additions for the period	52.25
Disposals for the period	-
As at December 31, 2025	132.99
Amortisation and impairment	
As at April 1, 2022	13.10
Amortisation for the year	10.15
Disposals for the year	-
As at March 31, 2023	23.25
Amortisation for the year	9.77
Disposals for the year	30.48
As at March 31, 2024	2.54
Amortisation for the year	19.94
Disposals for the year	-
As at March 31, 2025	22.48
Amortisation for the period	23.18
Disposals for the period	-
As at December 31, 2025	45.66
Net carrying value	
As at March 31, 2023	7.23
As at March 31, 2024	27.98
As at March 31, 2025	58.26
As at December 31, 2025	87.33

Note:
Refer note 32 for disclosures related to Right of use assets

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3(D) Intangible assets

Particulars	Rights under service concession arrangements	Other intangible assets	Total
Gross carrying value			
As at April 1, 2022	96,149.36	567.22	96,716.58
Additions for the year	742.32	97.17	839.49
Disposals / adjustments for the year**	439.44	208.19	647.63
As at March 31, 2023	96,452.24	456.20	96,908.44
Additions for the year	1,378.53	31.56	1,410.09
Disposals / adjustments for the year**	720.66	35.55	756.21
As at March 31, 2024	97,110.11	452.21	97,562.32
Additions for the year	241.67	6.21	247.88
Disposals / adjustments for the year**	1,055.27	95.48	1,150.75
As at March 31, 2025	96,296.51	362.94	96,659.45
Additions for the period	89.47	11.70	101.17
Disposals / adjustments for the period	-	0.68	0.68
As at December 31, 2025	96,385.98	373.96	96,759.94
Amortisation and impairment			
As at April 1, 2022	19,055.98	434.23	19,490.21
Amortisation for the year	6,981.29	69.22	7,050.50
Disposal for the year	-	208.22	208.22
As at March 31, 2023	26,037.27	295.23	26,332.49
Amortisation for the year	6,835.75	46.76	6,882.51
Disposal for the year	23.39	35.44	58.83
As at March 31, 2024	32,849.63	306.55	33,156.17
Amortisation for the year	6,893.99	51.02	6,945.00
Disposal for the year	-	95.57	95.57
As at March 31, 2025	39,743.61	261.99	40,005.60
Amortisation for the period	5,164.05	38.56	5,202.61
Disposal for the period	-	0.48	0.48
As at December 31, 2025	44,907.66	300.07	45,207.73
Net carrying value			
As at March 31, 2023	70,414.97	160.97	70,575.94
As at March 31, 2024	64,260.48	145.66	64,406.14
As at March 31, 2025	56,552.90	100.95	56,653.84
As at December 31, 2025	51,478.32	73.89	51,552.21

Note:
i. Above intangible assets of the SPV Group have been pledged for the borrowings taken by the SPV Group. Refer note 11.
ii. Refer Note 31 for information (including remaining amortisation period) related to Service Concession Arrangements.

iii. **Adjustments includes Decapitalisations on account of descoping due to final settlement with contractors and authorities.
iv. On transition to Ind AS, the SPV Group has elected to continue with the carrying value of all intangible assets measured as per the previous GAAP and use that carrying value as the deemed cost of intangible assets.

3(E) Intangible assets under development

Particulars	Rights under service concession arrangements	Other intangible assets	Total
As at April 1, 2022	520.74	39.37	560.11
Additions during the year	221.58	26.23	247.81
Less: Capitalised during the year	742.32	63.70	806.02
As at March 31, 2023	-	1.90	1.90
Additions during the year	1,413.53	-	1,413.53
Less: Capitalised during the year	1,378.53	1.90	1,380.43
As at March 31, 2024	35.00	-	35.00
Additions during the year	251.84	-	251.84
Less: Capitalised during the year	241.67	-	241.67
As at March 31, 2025	45.17	-	45.17
Additions during the period	47.36	0.74	48.10
Less: Capitalised during the period	89.47	-	89.47
As at December 31, 2025	3.06	0.74	3.80

Note:
(i) Intangible assets under development pertaining to Rights under Service Concession Arrangements consists of construction cost of highways.
(ii) Intangible assets under development of the SPV Group have been pledged for the borrowings taken by the SPV Group. Refer note 11.

Intangible assets under development ageing schedule (IAUD):

As at December 31, 2025

Particulars	Amount in IAUD for a period of				
	Less than 1 year	1-2 years	2-3 years	More than 3 years	Total
Projects in progress	3.80	-	-	-	3.80
Projects temporarily suspended	-	-	-	-	-

As at March 31, 2025

Particulars	Amount in IAUD for a period of				
	Less than 1 year	1-2 years	2-3 years	More than 3 years	Total
Projects in progress	45.17	-	-	-	45.17
Projects temporarily suspended	-	-	-	-	-

As at March 31, 2024

Particulars	Amount in IAUD for a period of				
	Less than 1 year	1-2 years	2-3 years	More than 3 years	Total
Projects in progress	35.00	-	-	-	35.00
Projects temporarily suspended	-	-	-	-	-

As at March 31, 2023

Particulars	Amount in IAUD for a period of				
	Less than 1 year	1-2 years	2-3 years	More than 3 years	Total
Projects in progress	1.90	-	-	-	1.90
Projects temporarily suspended	-	-	-	-	-

There are no projects which are overdue/has exceeded its cost compared to original budget.

3(F) Capital Work in Progress

Particulars	Capital Work in Progress
As at April 1, 2022	-
Additions during the year	-
Less: Capitalised during the year	-
As at March 31, 2023	-
Additions during the year	-
Less: Capitalised during the year	-
As at March 31, 2024	-
Additions during the year	-
Less: Capitalised during the year	-
As at March 31, 2025	-
Additions during the period	2.11
Less: Capitalised during the period	-
As at December 31, 2025	2.11

There are no projects which are overdue/has exceeded its cost compared to original budget.

3(G) Depreciation and amortisation expense

Particulars	Nine months period ended December 31, 2025	Year ended March 31, 2025	Year ended March 31, 2024	Year ended March 31, 2023
Depreciation on property, plant and equipment (note 3A)	30.59	33.37	29.39	33.69
Depreciation on investment properties (note 3B)	0.37	0.48	0.48	0.58
Amortisation of right of use assets (note 3C)	23.18	19.94	9.77	10.15
Amortisation of intangible assets (note 3D)	5,202.61	6,944.63	6,882.51	7,050.49
	5,256.75	6,998.42	6,922.15	7,094.90

(4) Investments

Current

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Investments at fair value through Profit and Loss				
Quoted				
Investment in mutual funds (refer breakup below)	8,367.57	7,548.32	4,193.95	5,507.13
Investment others*	-	-	4.00	75.00
	8,367.57	7,548.32	4,197.95	5,582.13

* Investment others represent investment in mutual fund for which units were allotted subsequent to year end.

Aggregate book value of quoted investment	8,367.57	7,548.32	4,197.95	5,582.13
Aggregate market value of quoted investment	8,367.57	7,548.32	4,197.95	5,582.13
Aggregate book value of unquoted investment	-	-	-	-

Particulars	As at December 31, 2025		As at March 31, 2025		As at March 31, 2024		As at March 31, 2023	
	Units	Amount	Units	Amount	Units	Amount	Units	Amount
Axis Liquid Fund-Direct Growth	1,59,299.00	481.02	4,04,862.56	1,167.27	7,290.42	19.56	7,59,464.00	953.75
Axis Overnight Fund-Growth	-	-	-	-	-	-	3,192.00	3.78
ICICI Prudential Liquid Fund-Direct Plan-Growth	11,40,202.16	458.13	15,59,094.32	598.51	86,162.05	54.50	25,774.63	47.47
BOI AXA Liquid Fund-Regular Growth	-	-	-	-	-	-	1,17,275.00	301.08
UTI Liquid Cash Plan	15,187.13	67.59	15,187.13	64.56	-	-	3,23,207.91	1,184.06
UTI Overnight Fund - Direct Plan-Growth	-	-	-	-	81,340.00	266.58	1,26,121.00	387.02
SBI Liquid Fund-Direct Growth	6,42,457.00	2,726.64	3,76,401.50	1,526.68	2,21,047.96	821.53	64,158.47	226.05
SBI Overnight Fund-Direct Growth	53,241.24	230.30	90,726.31	376.81	14,084.32	54.87	14,839.26	54.15
Kotak Overnight Fund-Direct Growth	-	-	1,21,182.00	635.02	-	-	1,880.00	2.24
Kotak Liquid - Direct Plan - Growth	1,13,955.00	625.09	1,10,395.94	578.40	7,88,299.02	1,043.58	1,65,509.00	197.91
Mirae Asset Liquid Fund - Direct Plan - Growth	26,569.46	76.20	13,877.00	38.02	28,838.00	-	-	-
Mirae Asset Overnight Fund - Direct Plan - Growth	-	-	-	-	-	6.02	4,902.00	-
Tata Liquid Fund Direct Plan - Growth	3,57,221.00	1,531.07	1,90,816.07	998.08	77,552.00	295.49	93,535.85	110.59
Tata Overnight Fund Direct Plan - Growth	-	-	-	-	5,11,822.45	836.04	1,27,531.00	150.82
Nippon India Liquid Fund-Direct Plan-Growth	1,52,535.00	1,013.69	73,266.61	465.02	-	-	-	-
Nippon India Overnight Fund-Growth	40,819.45	5.83	46,293.44	293.82	30,04,507.10	789.62	1,62,164.48	447.76
Aditya Birla Liquid Fund-Direct Plan-Growth	1,11,921.00	49.08	3,79,845.88	159.05	-	-	-	-
Aditya Birla Overnight Fund - Regular Growth	-	-	-	-	-	-	1,68,928.94	204.27
Aditya Birla Overnight Fund - Direct Plan Growth	11,250.69	16.19	40,459.00	55.88	4,744.00	6.14	2,58,508.18	328.13
HSBC Liquid Fund - Direct Growth	3,03,567.89	821.22	2,28,761.21	591.19	-	-	815.00	0.95
HSBC Overnight Fund - Direct Growth	1,90,743.10	265.52	-	-	-	-	8,21,418.32	728.89
IDFC Overnight Fund - Direct Growth	-	-	-	-	-	-	1,195.62	178.21
	33,18,969.10	8,367.57	36,51,168.97	7,548.32	48,25,687.32	4,193.95	32,40,420.67	5,507.13

(5) Receivable under service concession arrangements (at amortised cost)

Non current:

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
(Unsecured, considered good)				
Service concession receivables (refer note 31)	8,494.83	9,532.55	10,985.00	11,944.92
	8,494.83	9,532.55	10,985.00	11,944.92

Current:

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
(Unsecured, considered good)				
Service concession receivables (refer note 31)	1,861.45	1,385.16	772.49	1,700.46
	1,861.45	1,385.16	772.49	1,700.46

Note - Above carrying value of receivables are subject to a charge to secure the SPV Group's secured borrowing. (refer note 11).

(6) Other financial assets (at amortised cost)

Non - Current

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
(Unsecured, considered good)				
Security deposits #	39.13	36.83	26.17	28.09
Fixed deposit having remaining maturity of more than twelve months*	118.00	471.82	282.78	713.66
(Unsecured, considered doubtful)				
Other receivables	50.00	50.00	50.00	50.00
Less: Provision for expected credit loss	(50.00)	(50.00)	(50.00)	(50.00)
	157.13	508.65	308.95	741.75

(6) Other financial assets (at amortised cost) (Contd.)

Current

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Fixed Deposits with banks having original maturity more than twelve months and remaining maturity is less than twelve months.*	2,764.97	1,910.07	2,395.76	8,386.84
Interest receivables on fixed deposits	171.74	56.11	153.26	122.10
Security deposits #	1.25	7.23	14.48	5.18
Other receivables				
From related parties	-	0.61	0.60	15.47
From others	5.03	0.46	4.08	41.88
Receivable from highway authorities - Considered Good	201.96	0.28	150.25	678.37
(Unsecured, considered doubtful)				
Receivable from highway authorities - Considered Doubtful	12.97	12.97	12.97	-
Less: Provision for doubtful debts	(12.97)	(12.97)	(12.97)	-
	3,144.95	1,974.76	2,718.43	9,249.84

Notes:

1. There is no amount due from director, other officer of the SPV Group or firm in which any director is a partner or private companies in which any director is a director at any time during reporting period.
2. # Security deposits are non-derivative financial assets and are refundable in cash.
3. * The deposit with bank includes earmarked deposit with banks/ lenders against Debt Service Reserve Account (DSRA) and Major Maintenance Reserve Account (MMRA) which is disclosed here amounts to:

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Fixed deposit with lien placed for the purpose of future major maintenance and DSRA requirements	2,629.54	2,371.89	1,759.70	7,599.86

(7) Other assets

Non current

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
(Unsecured, considered good)				
Balances with government authorities	28.98	26.96	63.90	59.32
Advance paid towards acquisition of SPV under share purchase agreement	-	-	-	614.80
Other Receivables	-	-	1.43	1.66
Taxes paid under protest	35.15	26.76	10.94	6.50
Capital advances	6.54	12.71	-	447.01
	70.67	66.43	76.27	1,129.29

Current

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
(Unsecured, considered good)				
Prepaid expenses	43.50	35.01	111.18	122.81
Advance to employees	1.07	0.73	0.16	0.34
Advance to vendors	55.81	42.93	398.65	81.16
Other receivables	1.01	0.49	6.64	5.35
Balances with government authorities	159.62	262.65	338.18	186.94
	261.01	341.81	854.81	396.60

(8) Trade receivables

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Secured, considered good	-	-	-	-
Unsecured, considered good	484.27	223.68	228.24	394.07
Trade receivable which have significant increase in credit risk	-	-	-	-
Trade receivable - Credit impaired	20.42	14.95	14.95	11.33
Total	504.69	238.63	243.19	405.40
Less : Allowance for expected credit loss	(20.42)	(14.95)	(14.95)	(11.33)
	484.27	223.68	228.24	394.07

Notes:

1. No trade or other receivable are due from directors or other officers of the SPV Group either severally or jointly with any other person. Nor any trade receivable are due from firms or private companies respectively in which any director is a partner, a director or a member.
2. Trade receivables are non-interest bearing and are generally on terms of 30 to 90 days.
3. Refer note 29(A) on credit risk of trade receivables, which explains how the SPV Group manages and measures credit quality of trade receivables that are neither past due nor impaired.
4. Refer note 30(i) for the ageing of trade receivables

9(A) Cash and cash equivalents

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Cash and cash equivalents				
Cash on hand	14.83	22.15	29.24	19.51
Balances with banks in current accounts	1,515.03	1,159.56	9,355.44	954.93
Deposits with original maturity of less than three months	10.00	675.62	4,020.50	3,298.77
	1,539.86	1,857.33	13,405.18	4,273.21

Short-term deposits are made for varying periods, depending on the immediate cash requirements of the SPV Group, and earns interest at the respective short-term deposit rates.

9(B) Bank balances other than Cash and cash equivalents

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Deposits with original maturity of more than three months and less than twelve months*	3,812.66	2,650.52	4,173.93	7,184.45
Earmarked balances with banks **	14.33	4.38	20.77	11.05
	3,826.99	2,654.90	4,194.70	7,195.50

** The earmarked balance with banks includes the amount set aside for unspent Corporate Social Responsibility (CSR) expenditure.

* The deposit with bank includes earmarked deposit with banks/ lenders against Debt Service Reserve Account (DSRA) and Major Maintenance Reserve Account (MMRA) which is disclosed here amounts to:

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
a. Fixed deposit with lien placed for the purpose of future major maintenance and DSRA requirements	2,856.44	1,760.31	2,435.05	1,176.20
b. Amount in escrow account placed for the purpose of future major maintenance	10.00	757.40	414.00	-
c. Other liens	796.96	2.30	-	-
	3,663.40	2,520.01	2,849.05	1,176.20

SPV Group
(As defined in Note 1 - Corporate Information)

Notes to the Special Purpose Combined Financial Statements
All amounts in Rupees millions unless otherwise stated

10(A) Capital[#]

Particulars	As at December 31, 2025		As at March 31, 2025		As at March 31, 2024		As at March 31, 2023	
	No. of shares in millions	Amount	No. of shares in millions	Amount	No. of shares in millions	Amount	No. of shares in millions	Amount
Authorized Capital:								
Equity shares of Rs. 10 each of Epic Concesiones 3 Private Limited	3,099.80	30,998.00	3,099.80	30,998.00	800.01	8,000.10	800.01	8,000.10
Equity shares of Rs. 10 each of SRPL Roads Private Limited	8.00	80.00	8.00	80.00	8.00	80.00	8.00	80.00
Equity shares of Rs. 10 each of Thrissur Expressway Limited	15.00	150.00	15.00	150.00	15.00	150.00	15.00	150.00
Equity shares of Rs. 10 each of Deccan Tollways Private Limited	310.00	3,100.00	310.00	3,100.00	310.00	3,100.00	310.00	3,100.00
Equity shares of Rs. 10 each of Epic Concesiones Private Limited	-	-	-	-	0.10	1.00	0.10	1.00
Equity shares of Rs. 10 each of Jorabat Shillong Expressway Limited	-	-	-	-	-	-	85.00	850.00
		34,328.00		34,328.00		11,331.10		12,181.10
Issued and subscribed and fully paid up:								
Equity shares of Rs. 10 each of Epic Concesiones 3 Private Limited	28.08	280.79	-	-	629.52	6,295.22	629.52	6,295.22
Equity shares of Rs. 10 each of SRPL Roads Private Limited	7.25	72.50	7.25	72.50	7.25	72.50	7.25	72.50
Equity shares of Rs. 10 each of Thrissur Expressway Limited	0.08	0.77	0.08	0.77	0.08	0.77	0.08	0.77
Equity shares of Rs. 10 each of Deccan Tollways Private Limited	42.01	420.07	42.01	420.07	42.01	420.07	42.01	420.07
Equity shares of Rs. 10 each of Epic Concesiones Private Limited	-	-	-	-	0.06	0.60	0.05	0.50
Equity shares of Rs. 10 each of Jorabat Shillong Expressway Limited	-	-	-	-	-	-	84.00	840.00
		774.13		493.34		6,789.16		7,629.06

Equity capital of the SPV group is line by line aggregate of the authorized share capital and paid-up share capital of each of the SPVs. It does not represent legal share capital of the SPV Group.
The Trust will complete the acquisition of the equity share capital of SPV Group after completion of its Initial Public Offer and accordingly, instead of disclosures of unit capital of the Trust, 100% equity share capital of all SPVs has been disclosed.

Terms/Rights attached to the equity capital
Each SPV/Investment Entity, has only one class of equity share. Each holder of equity shares is entitled to one vote per share. Each SPV/Investment Entity declares and pays dividends in Indian Rupees. The dividend proposed by the board of directors of respective SPV/Investment Entity is subject to approval of shareholders in the ensuing Annual General Meeting. In the event of liquidation of the SPV/Investment Entity, the holders of equity shares will be entitled to receive remaining assets of the respective SPV/Investment Entity, after distribution of all preferential amounts. The distribution will be in proportion to the number of equity shares held by the shareholders.

Issue of shares under rights issue
The SPV had issued 26,93,717 equity shares of face value of Rs. 10 each on right basis ('Rights Equity Shares'). In accordance with the terms of issue, Rs. 169.28 of the Issue Price (including premium of Rs. 159.28) per Rights Equity Share, was received from the concerned allottees and shares were allotted.

Details of shareholders

Particulars	As at December 31, 2025		As at March 31, 2025		As at March 31, 2024		As at March 31, 2023	
	No. of shares in millions	% holding	No. of shares in millions	% holding	No. of shares in millions	% holding	No. of shares in millions	% holding
Epic Concesiones 3 Private Limited								
Infrastructure Yield Plus II (IYP II)	16.50	59%	-	0%	-	0%	-	0%
Infrastructure Yield Plus IIA (IYP IIA)	7.86	28%	-	0%	-	0%	-	0%
India Infrastructure Yield Plus II (IIYP II)	3.72	13%	-	0%	-	0%	-	0%
Larsen & Toubro Limited	-	0%	-	0%	321.06	51%	321.06	51%
CPPIB India Private Holdings Inc	-	0%	-	0%	308.46	49%	308.46	49%
SRPL Roads Private Limited								
Edelweiss Infrastructure Yield Plus (EIYP) & its nominees	7.25	100%	7.25	100%	7.25	100%	7.25	100%
Thrissur Expressway Limited								
Edelweiss Infrastructure Yield Plus (EIYP) & its nominees	0.08	100%	0.08	100%	0.05	67%	-	0%
KMC Infratech Limited & its nominees	-	0%	-	0%	0.03	33%	0.08	100%
Deccan Tollways Private Limited								
Epic Concesiones 3 Private Limited	243.34	85%	243.34	85%	243.34	85%	243.34	85%
Neelambur Madukkarai Tollway Private Limited	42.00	15%	42.00	15%	42.00	15%	42.00	15%
Epic Concesiones Private Limited								
Infrastructure Yield Plus II (IYP II)	-	0%	-	0%	0.05	83%	0.05	100%
Infrastructure Yield Plus II (IYP IIA)	-	0%	-	0%	0.01	17%	-	0%
Jorabat Shillong Expressway Limited								
IL&FS Transportation Networks Limited & its nominees	-	0%	-	0%	840.00	100%	840.00	100%
SRPL Roads Private Limited & its nominees	840.00	100%	840.00	100%	-	0%	-	0%

Reconciliation of equity capital outstanding at the beginning and at the end of the reporting period

Particulars	As at December 31, 2025		As at March 31, 2025		As at March 31, 2024		As at March 31, 2023	
	No. of shares in millions	Amount	No. of shares in millions	Amount	No. of shares in millions	Amount	No. of shares in millions	Amount
At the beginning of the period/year	49.33	493.34	678.92	6,789.16	762.91	7,629.06	762.91	7,629.06
Add : Issued during the period/year	28.08	280.79	-	-	-	-	-	-
Add : Bonus shared issued during the period/year	-	-	2,425.00	24,250.00	-	-	-	-
Less: Equity Share Capital Cancelled on account of merger	-	-	(3,054.52)	(30,545.22)	-	-	-	-
Less: Adjustment on account of acquisition of subsidiary	-	-	(0.06)	(0.60)	(83.99)	(839.90)	-	-
Outstanding at the end of the period/year	77.41	774.13	49.33	493.34	678.92	6,789.16	762.91	7,629.06

SPV Group
(As defined in Note 1 - Corporate Information)

Notes to the Special Purpose Combined Financial Statements
All amounts in Rupees millions unless otherwise stated

10(B) Share Capital Pending Issuance

Share capital pending issuance pertains to issue of equity shares by Epic Concesiones 3 Private Limited pursuant to the scheme of merger, as further referred to in note 34.
During the period ended December 31, 2025, Epic Concesiones 3 Private Limited has issued equity shares to IYP II, IYP IIA & IIYP II as follows:

Name of the Allottees	No. of shares in millions	Amount as at December 31, 2025	Amount as at March 31, 2025	Amount as at March 31, 2024	Amount as at March 31, 2023
Infrastructure Yield Plus II	16.50	-	165.00	-	-
Infrastructure Yield Plus IIA	6.35	-	63.46	-	-
India Infrastructure Yield Plus II	2.54	-	25.39	-	-
Total	25.39	-	253.85	-	-

10(C) Other equity

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Securities Premium				
Balance as at the beginning of the period/year	-	9,974.53	9,974.53	9,974.53
Premium on issue of equity shares	429.06	-	-	-
Issue of Bonus Shares##	-	(9,974.53)	-	-
Closing balance	429.06	-	9,974.53	9,974.53
General Reserve				
Balance as at the beginning of the period/year	-	238.83	238.83	238.83
Issue of Bonus Shares##	-	(238.83)	-	-
Closing balance	-	-	238.83	238.83
Capital Redemption Reserve				
Balance as at the beginning of the period/year	-	11,368.50	11,368.50	11,368.50
Issue of Bonus Shares##	-	(11,368.50)	-	-
Closing balance	-	-	11,368.50	11,368.50
Capital Reserve				
Balance as at the beginning of the period/year	6,958.98	899.14	475.24	475.24
Created on account of acquisition of subsidiaries*	-	6,582.45	423.90	-
Transferred from retained earning on account of merger***	-	(213.41)	-	-
Issue of Bonus Shares##	-	(309.20)	-	-
Closing balance	6,958.98	6,958.98	899.14	475.24
Equity component of Compound Financial Instruments				
Balance as at the beginning of the period/year	2,458.72	2,608.43	206.19	206.19
(Transferred)/addition during the period/year	-	(149.71)	2,402.24	-
Closing balance	2,458.72	2,458.72	2,608.43	206.19
Debenture Redemption Reserve				
Balance as at the beginning of the period/year	906.98	900.17	1,078.57	1,078.57
Created/(transferred) from/to retained earnings	-	6.81	(178.40)	-
Closing balance	906.98	906.98	900.17	1,078.57
Retained Earnings				
Balance as at the beginning of the period/year	(51,846.39)	(48,545.61)	(38,733.18)	(30,189.39)
Loss for the period/year	(2,190.48)	(4,177.51)	(7,741.18)	(6,540.08)
Other comprehensive income, net of tax	(13.17)	(12.48)	0.65	(0.30)
Less:				
Issue of Bonus Shares ##	-	(2,358.94)	-	-
Adjustment on account of payments made to erstwhile parent#	-	(114.10)	(68.82)	(6.64)
Transferred to capital reserve on account of merger***	-	213.41	-	-
Transferred to/ from Debenture redemption reserve	-	(6.81)	178.40	-
Carve out differences routed through retained earnings**	2,855.92	3,155.64	(2,181.47)	(1,996.78)
Closing balance	(51,194.12)	(51,846.39)	(48,545.61)	(38,733.18)
Total	(40,440.39)	(41,521.71)	(22,556.01)	(15,391.32)

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Notes:

* Pertains to difference between carrying values of investments in subsidiary and corresponding net assets of subsidiaries, as further explained in basis of preparation.

** Pertains to effect of carve-out of certain subsidiaries / entities which are not proposed to be transferred to the Trust as further explained in basis of preparation.

*** Pertains transfer of retained earnings of Epic Concesiones Private Limited, Vadodara Bharuch Tollway Limited, Rewin Infrastructure Limited, and Palanpur–Swaroopgunj Road Project Limited as at March 31, 2024, which were combined prior to merger and subsequently transferred to Capital Reserve pursuant to the merger. (Refer Note 34)

Pertains to payments made to erstwhile parent of project SPVs on account of settlement of past claims.

Pertains to bonus shares issued by Epic Concesiones 3 Private Limited (formerly known as L&T Infrastructure Development Projects Limited) to Epic Concesiones Private Limited prior to the merger of Epic Concesiones Private Limited into Epic Concesiones 3 Private Limited (formerly known as L&T Infrastructure Development Projects Limited). (Refer Note 34)

Nature and purpose of reserves

Securities premium
Securities premium is used to record the premium received on issue of equity shares and preference shares classified as equity. The reserve can be utilised only for limited purposes such as issuance of bonus shares in accordance with the provisions of the Companies Act, 2013.

Debenture redemption reserve (DRR)
The SPV Group has issued non-convertible debentures. Accordingly, the Companies (Share capital and Debentures) Rules, 2014 (as amended), require the SPV Group to create DRR out of profits of the SPV Group available for payment of dividend. DRR is required to be created for an amount which is equal to 10% of the value of debentures issued. Though the DRR is required to be created over the life of debentures, the SPV Group has created DRR out of retained earnings for an amount which is higher than the minimum required at group level. The amount accumulated in DRR can be transferred back to General Reserve/ Retained Earning on redemption of debentures.

Capital reserve
Capital reserve represents the difference between value of the net assets transferred to the SPV Group in the course of business combinations and the consideration paid for such combinations.

General reserve
General reserve is the retained earning of the SPV Group which is kept aside out of the SPV Group's profits to meet future (known or unknown) obligations.

Retained earnings
Retained earnings are created from the profit/loss of the SPV Group, as adjusted for distributions to owners, transfers to other reserves, etc

Equity component of Compound Financial Instruments
The Equity Component of Compound Financial Instruments Reserve represents the equity portion of compound financial instruments, determined at the time of initial recognition. This reserve arises from allocating the fair value of the proceeds between the liability and equity components in accordance with Ind AS 32. The amount recorded in this reserve is not subsequently remeasured and will be transferred to share capital and securities premium upon conversion of the instrument, or retained within equity if the conversion option lapses.

Capital Redemption Reserve
Capital Redemption Reserve is created on redemption or buy-back of the Component's own shares out of profits otherwise available for distribution. The reserve represents the amount transferred from retained earnings equivalent to the nominal value of the shares redeemed. This reserve is maintained in accordance with statutory requirements and may be utilized only for issuing fully paid bonus shares.

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10(D) Instruments entirely equity in nature- Compulsorily Convertible Debentures (CCDs)

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Opening Balance	3,029.89	3,592.59	2,926.00	2,685.70
Add: Issued during the period/year	-	-	1,166.59	240.30
Less: Change on account of reclassification	-	562.70	-	-
Less: Converted to non convertible debenture	-	-	500.00	-
Closing balance	3,029.89	3,029.89	3,592.59	2,926.00

Instruments entirely equity in nature- Compulsorily Convertible Preference Shares (CCPS)

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Opening Balance	818.10	818.30	702.13	700.13
Add: Issued during the period/year	-	-	-	2.00
Add: Transfer during the period/ Changes on account of reclassification	2,689.45	-	116.17	-
Less: Redeemed during the period/year	-	0.20	-	-
Closing balance	3,507.55	818.10	818.30	702.13

Total Instrument entirely equity in nature	6,537.44	3,847.99	4,410.89	3,628.13

Compulsory Convertible Debentures (CCDs) issued to related parties

SRPL Roads Private Limited
As at December 31, 2025 , March 31, 2025, March 31, 2024 & March 31, 2023
Conversion
The option of conversion can be exercised by the CCDs holder at any time after a period of 3 months from the date of allotment of CCDs and before the expiry of Tenure; after giving notice of 7 working days to the Issuer for conversion.
At the option of the CCDs holder, each CCD of Rs. 1,000 each shall be converted into 100 Equity Shares of Rs. 10 each of the Company.
The CCDs remaining outstanding at the end of the Tenure, will be converted into Equity Shares in the manner mentioned above. Date of conversion for 30,19,889 CCD is March 28, 2029 and 10,000 CCD is December 06, 2030.

Interest payment
(i) Non-cumulative Interest 18% per annum subject to maximum of Cashflow Surplus of the Company as allowed by the senior lenders, if any, under financing documents and any limit prescribed by law.
(ii) The Interest shall be payable on semi-annual basis within 90 days from the end of the half financial year or at any time during the financial year as and when cash flow surplus is available with the Company. In the event of conversion of CCDs on or before the maturity date, the Interest for the period commencing from the beginning of the half financial year till conversion date shall be payable within 90 days from the end of the half financial year in which conversion took place.

10(D) Instrument entirely equity in nature- Compulsorily Convertible Debentures (CCDs) (Contd.)

Epic Concesiones Private Limited
As at March 31, 2024 & March 31, 2023
Conversion
At the option of the CCD holder, each CCD of Rs. 1,000/- each shall be converted into 100 Equity Shares of Rs. 10/- each of the Company.
The option of conversion can be exercised by the CCD holder at any time after a period of 3 months from the date of allotment of CCDs and before the expiry of Tenure; after giving notice of 7 working days to the Issuer for conversion or such lesser number of days as may be agreed between the CCD holder and the Issuer.
Interest
Non-cumulative Interest not exceeding 18% per annum subject to maximum of Cashflow Surplus of the Company and any limit prescribed by law.
The interest shall be payable on semi-annual basis within 90 days from the end of the half financial year. In the event of conversion of CCDs on or before the maturity date, the Interest for the period commencing from the beginning of the half financial year till conversion date shall be payable within 90 days from the end of the half financial year in which conversion took place.
Where in a financial year, the Company has sufficient operating cashflow surplus, it shall pay interest at lower of operating cashflow Surplus or 18% per annum on the face value of the CCDs. Where in a financial year, the company has no operating cashflow surplus, it would not be necessary to pay interest on the CCDs.

Compulsory Convertible Preference Shares (CCPS)

Samkhiali Bhachau Gandhidham Tollway Private Limited
As at December 31, 2025 , March 31, 2025, March 31, 2024 & March 31, 2023
The preference shares carry a preferential right vis-a-vis Equity shares of the Company with respective to payment of dividend and repayment in case of winding up or repayment of capital. Preference share holders shall be Non-participating rights in the surplus funds and surplus assets and profits on winding up which may remain after the entire capital has been repaid. Preference share holders would be paid dividend on non cumulative basis. Preference share holder carry voting rights as per provisions of Section 47 (2) of the Act. Since the Company does not have profits, no dividend is accrued or payable. Preference share will be converted into equity share at the option of the Company or at the completion of 10th year from the date of allotment.

Thrissur Expressway Limited
As at December 31, 2025 , March 31, 2025, March 31, 2024 & March 31, 2023
The Preference shareholder is not entitled to any Preference dividend as the issued shares do not carry any such dividend. The Preference share holders are entitled to receive notice of shareholder meeting and are entitled to vote in the meeting. The Preference shareholder has also the right to convert the Preference share into equity share of Rs.10 each at any time by giving a 30 days notice. In the absence of exercise of conversion rights by both the subjects i.e. the issuer & holder, Preference share shall be compulsorily converted into equity share of Rs.10 each after expiry of 20 years from the date of issue.

Ahmedabad - Maliya Tollway Private Limited
As at December 31, 2025
0.01% Compulsory convertible Preference Shares (CCPS) of Rs. 10 each
During the period ended December 31, 2025, Epic Concesiones 3 Private Limited transfer its investment in the preference shares of Ahmedabad - Maliya Tollway Private Limited ("AMTL") to IYP II, IYP IIA & IIYP II (together referred to as "IYP Funds").

Terms of Compulsory convertible Preference Shares (CCPS)

a) The 0.01% CCPS of Rs.10/- each, be converted at a ratio of 1:1, such that 1 (One) CCPS bearing a face value of Rs.10/- shall convert into 1 (One) equity share of a face value of Rs.10/-.
b) The preference shares carry a preferential right vis-a-vis Equity Shares of the SPV Group with respective to payment of dividend and repayment in case of a winding up or repayment of capital.
c) Preference shareholders shall be Non-participating rights in the surplus funds.
d) Preference shareholders shall be Non-participating rights in the surplus assets and profit on winding up which may remain after the entire capital has been repaid.
e) Preference shareholders would be paid dividend on non cumulative basis.
f) Preference shareholder carry voting rights as per provisions of Section 47 (2) of the Act..
g) Preference share shall be converted into equity share at the option of the SPV Group or at the completion of the 20th year from the date of allotment.

SPV Group
(As defined in Note 1 - Corporate Information)

Notes to the Special Purpose Combined Financial Statements
All amounts in Rupees millions unless otherwise stated

(11) Borrowings

A. Non - current:

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Borrowings at amortised cost*				
A. Secured				
Non Convertible Debentures	3,162.73	3,423.41	3,928.97	10,372.94
From banks	32,481.50	35,010.47	37,154.69	29,856.34
From financial institutions	1,550.73	2,010.66	9,094.54	13,284.76
Less: current maturities of long term borrowings	(5,282.66)	(4,594.84)	(10,577.38)	(6,018.39)
	31,912.30	35,849.70	39,600.82	47,495.65
B. Unsecured				
Non convertible debentures issued to related parties	2,957.74	2,821.45	2,923.11	1,377.78
Loans from related parties	-	-	143.83	129.45
Optionally convertible debentures	-	-	-	57.37
	2,957.74	2,821.45	3,066.94	1,564.60
Total non-current	34,870.04	38,671.15	42,667.76	49,060.25

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Borrowings at fair value through Profit and Loss				
Unsecured				
Compulsorily convertible debentures (CCDs)	1,370.00	-	-	-
Total non-current	1,370.00	-	-	-

B. Current:

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
A. Secured				
Current maturity of non convertible debentures	634.90	611.90	567.40	461.45
Current maturity of long term debt from bank	3,964.13	3,367.94	9,135.57	4,982.19
Current maturity of long term debt from financial institutions	683.63	615.00	874.41	574.75
	5,282.66	4,594.84	10,577.38	6,018.39
B. Unsecured				
Compulsorily convertible debentures (CCDs)	1,580.69	14,769.39	-	-
Loans from related parties	6,775.57	3,243.78	2,749.32	6,664.69
Compulsorily convertible preference shares (CCPS)	-	-	-	116.17
Non convertible debentures issued to related parties	9,208.94	5,720.78	5,720.78	-
	17,565.20	23,733.95	8,470.10	6,780.86
Total current	22,847.86	28,328.79	19,047.49	12,799.25

*Borrowings include unamortised transaction cost paid to lender on upfront basis.
For terms and condition related to borrowing refer note 11(D).

Aggregate secured borrowings	37,194.96	40,444.54	50,178.20	53,514.04
Aggregate unsecured borrowings	21,892.94	26,555.40	11,537.04	8,345.46
Aggregate secured and unsecured borrowings	59,087.90	66,999.94	61,715.24	61,859.50

C. Changes in liabilities arising from financing activities in terms of Ind AS 7:

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Total borrowings (including interest accrued but not due on borrowings)				
Opening balance	67,034.07	61,838.74	64,497.37	68,346.50
Proceeds	8,986.78	46,851.59	22,417.36	2,730.00
Repayments	(16,898.82)	(41,716.60)	(21,533.61)	(10,890.36)
Interest Paid	(4,190.25)	(6,408.79)	(10,330.63)	(4,241.38)
Non cash adjustments (Interest accrued but not paid, conversion of CCD to NCD/Modification gain/(loss))	4,348.24	6,469.13	6,788.25	8,552.60
Closing balance (including interest accrued but not due on borrowings)	59,280.02	67,034.07	61,838.74	64,497.37

Note: For changes in lease liabilities arising from financing activities refer note 32.

11 D. Terms and security details of borrowings

i) Dhola Infra Projects Private Limited

As at December 31, 2025, March 31, 2025, March 31, 2024 & March 31, 2023

A. Term loan from State bank of India

a. The repayment tenor of the facility would be in 15 (fifteen) structured semi-annual instalments with last instalment to be paid till November 30, 2028.

b. Security

(i) a first mortgage and charge on all the Borrower's immovable properties, both present and future, save and except Project Assets.

(ii) a first charge Security Interest on all the Borrower's tangible movable assets, including moveable plant and machinery, machinery spares, tools and accessories, furniture, fixtures, vehicles and all other movable assets and current assets, both present and future, of the Borrower, save and except Project Assets;

(iii) A first ranking pari passu charge over all bank accounts of the SPV including the DSRA, Escrow Account and the Sub - Accounts(or any account in substitution thereof) that may be opened in accordance with Escrow Agreement and the Supplementary Escrow Agreement, or any of the other Project Documents and all funds from time to time deposited therein, all permitted investments or other securities representing all amounts credited to the Escrow Account.

(iv) a first charge Security Interest on all intangibles assets including but not limited to goodwill, rights, Intellectual Property Rights, undertaking and uncalled capital, present and future;

(v) A first ranking pari passu charge by way of assignment of all rights, title and interest pursuant to and in accordance with the substitution agreement providing for step- in rights to the extent permitted in and in accordance with the Concession Agreement.

(vi) A pledge of 51% of the fully paid up equity capital of the SPV held by the SRPL Roads Private Limited (Holding company of Dhola Infra Projects Private Limited).

(vii) SPV's non-convertible debentures, held by EIYP amounting to Nil (March 31, 2025 - Nil, March 31, 2024 - Rs. 721.33 Mn, March 31, 2023 - Rs. 721.33 Mn) has been pledged against secured loan with SBI.

c. Interest payment

The Applicable Interest Rate is based on the External Credit Rating of the Facility and is calculated as the aggregate of the (i) SBI 6 (six)-month MCLR; and (ii) Spread, plus applicable interest tax or other statutory levy (if any) and with half-yearly resets. W.e.f. January 1, 2025 (i) SBI 3 (Three)-month MCLR; and (ii) Spread, plus applicable interest tax or other statutory levy (if any) and with reset of every 3 months. Interest rate ranging from 7.85% to 8.75% p.a.
(FY 2024-25 8.65% to 9.05% p.a., FY 2023-24 8.10% to 8.65% p.a. and FY 2022-23 7.65% to 8.60% p.a.)

d. Repayment schedule :

Date of repayment	Amount in INR Mn
May 31, 2023	229.49
November 30, 2023	238.22
May 31, 2024	241.80
November 30, 2024	249.34
May 31, 2025	264.43
November 30, 2025	275.15
May 31, 2026	283.49
November 30, 2026	294.21
May 31, 2027	303.34
November 30, 2027	314.85
May 31, 2028	325.18
November 30, 2028	303.87
Total	3,323.37

B. Non convertible debentures issued to related parties

a. The SPV has issued 671,330 (March 31, 2025: 721,330, March 31, 2024: 772,130, March 31, 2023: 772,130) unsecured non convertible debenture of face value of Rs. 1,000 each to Edelweiss Investment Yield Plus ("EIYP"). The term of the NCDs shall be till February 29, 2032, or such extended term as may be determined by the Board of the SPV with the prior written consent of the Lender (Final Redemption Date).

b. Interest payment

The NCD holders are entitled to a non-cumulative interest at an annual interest rate not exceeding 16% (March 31, 2025 -16%, March 31, 2024 -13%, March 31, 2023 -13%) per annum on the outstanding value of the NCDs subject to cash surplus (after satisfaction of Restricted Payment Conditions ("RPC")/ other conditions under agreements with rupee lenders to the satisfaction of the rupee lenders) of the SPV or as allowed by the rupee lenders under existing financing documents and any limit permissible by law (interest Amount).

The interest shall be paid as a simple interest (on pay-as-able basis) on half yearly basis, on or before the expiry of 90 days from the end of half financial year ending on 30th September and 31st March (i.e. by 29th December and 29th June) or next succeeding day if the interest payment day falls on a holiday.

c. Redemption

At any time out of cash surplus of the SPV after satisfaction of Restricted Payment Conditions as defined under existing financing documents and as allowed by the rupee lenders.

ii) Dibang Infra Projects Private Limited

i. Term loan from State bank of India
As at December 31, 2025, March 31, 2025, March 31, 2024 & March 31, 2023

a. The repayment tenor of the facility would be in 15 (fifteen) structured semi-annual instalments starting with last instalment to be paid on September 29, 2029.

b. Security
(i) a first mortgage and charge on all the Borrower's immovable properties, both present and future, save and except Project Assets.
(ii) a first charge on Security Interest on all the Borrower's tangible movable assets, including moveable plant and machinery, machinery spares, tools and accessories, furniture, fixtures, vehicles and all other movable assets and current assets, both present and future, of the Borrower, save and except Project Assets;
(iii) A first ranking pari passu charge over all bank accounts of the SPV including the DSRA, Escrow Account and the Sub - Accounts(or any account in substitution thereof) that may be opened in accordance with Escrow Agreement and the Supplementary Escrow Agreement, or any of the other Project Documents and all funds from time to time deposited therein, all permitted investments or other securities representing all amounts credited to the Escrow Account.
(iv) a first charge Security Interest on all intangibles assets including but not limited to goodwill, rights, Intellectual Property Rights, undertaking and uncalled capital, present and future;
(v) A first ranking pari passu charge by way of assignment of all rights, title and interest pursuant to and in accordance with the substitution agreement providing for step- in rights to the extent permitted in and in accordance with the Concession Agreement.
(vi) A pledge of 51% of the fully paid up equity capital of the SPV held by SRPL Roads Private Limited (Holding company of Dibang Infra Projects Private Limited).
(vii) SPV's non-convertible debentures, held by EIYP amounting to Nil (March 31, 2025 - Nil, March 31, 2024 - Rs. 554.85 Mn, March 31, 2023 - Rs. 554.85 Mn) has been pledged against secured loan with SBI.

c. Interest payment
The Applicable Interest Rate is based on the External Credit Rating of the Facility and is calculated as the aggregate of the (i) SBI 6 (six)-month MCLR; and (ii) Spread, plus applicable interest tax or other statutory levy (if any) and with half-yearly resets. W.e.f. January 1, 2025 (i) SBI 3 (Three)-month MCLR; and (ii) Spread, plus applicable interest tax or other statutory levy (if any) and with reset of every 3 months. Interest rate ranging from 7.85% to 8.75% p.a.
(FY 2024-25 8.60% to 8.95% p.a., FY 2023-24 8.60% to 8.65% p.a. and FY 2022-23 7.65% to 8.60% p.a.)

d. Repayment schedule :

Date of repayment	Amount in INR Mn
September 30, 2023	157.84
March 31, 2024	164.42
September 30, 2024	165.05
March 31, 2025	170.06
September 30, 2025	184.78
March 31, 2026	192.61
September 30, 2026	199.50
March 31, 2027	205.76
September 30, 2027	212.96
March 31, 2028	219.85
September 30, 2028	226.43
March 31, 2029	235.51
September 30, 2029	211.88
Total	2,546.65

ii. Non convertible debentures issued to related parties
As at December 31, 2025, March 31, 2025, March 31, 2024 & March 31, 2023

a. The SPV has issued 554,850 (March 31,2025 : 554,850, March 31,2024 : 605,650, March 31,2023 : 605,650) unsecured non convertible debenture of face value of Rs. 1,000 each to Edelweiss Investment Yield Plus ("EIYP"). The term of the NCDs shall be till November 30, 2032, or such extended term as may be determined by the Board of the SPV with the prior written consent of the Lender (Final Redemption Date).

b. Interest payment
The NCD Holders are entitled to a non-cumulative interest at an annual interest rate not exceeding 16% (March 31, 2025 -16%, March 31, 2024 -13%, March 31, 2023 -13%) per annum on the outstanding value of the NCDs subject to Cash Surplus (after satisfaction of Restricted Payment Conditions ("RPC")/ other conditions under agreements with Rupee Lenders to the satisfaction of the Rupee Lenders) of the SPV or as allowed by the Rupee Lenders under Existing Financing Documents and any limit permissible by law (interest Amount).

The interest shall be paid as a simple interest (on pay-as-able basis) on half yearly basis, on or before the expiry of 90 days from the end of half financial year ending on 30th September and 31st March (i.e. by 29th December and 29th June) or next succeeding day if the interest payment day falls on a holiday.

c. Redemption
At any time out of Cash Surplus of the SPV after satisfaction of Restricted Payment Conditions as defined under Existing Financing Documents and as allowed by the Rupee Lenders.

iii) Jorabat Shillong Expressway Limited

As at December 31, 2025, March 31, 2025, March 31, 2024 & March 31, 2023

Non convertible debenture (Secured (Listed))

The SPV has issued and allotted 88,336 Secured, Redeemable, Listed, Non-Convertible Debentures, in the form of Separately Transferable Redeemable Principal Parts (the "Debentures") of the face value of Rs. 1,00,000/- (Rupees One Lakh only) each, amounting to up to Rs. 8,833.60 millions on Private Placement Basis comprising:

(i) 64,120 redeemable, listed, rated, secured non-convertible senior debentures aggregating to up to INR 6,412.00 Mn ("Series I Debentures" or "Senior Debentures"); and

(ii) 24,216 redeemable, listed, rated, secured non-convertible junior debentures aggregating to up to INR 2,421.60 Mn ("Series II Debentures" or "Junior Debentures")

These NCDs are secured by first charge on all the following assets of the SPV in favour of the Debenture Trustee, acting for the benefit of the Subscriber ("Security") of Series I debentures:

(i) Hypothecation/Mortgage of all movable, tangible and intangible assets, receivables, current assets, loans & advances, cash and investments created as part of the Projects to the extent permissible under the Concession Agreements;

(ii) A first charge on all Escrow Accounts and their sub-accounts maintained by the Issuer, all monies lying in Escrow Accounts and the sub-accounts including DSRA and the Major Maintenance Reserve Account, into which all the Project revenues, (excluding claims made towards cost overrun in the Project), all monies received from the Authority, including that under the Concession Agreement, and including all Annuity (as defined in the Concession Agreement) payments, all monies/refunds received due to any revocation of any contingent liability, all insurance proceeds, including insurance claims settlement and insurance premium refunds etc, refund of any statutory dues including all Tax refunds, all Termination Payments (as defined in the Concession Agreement) made by Authority and all amounts pursuant to the redemption of the Debentures pursuant to the Share Purchase Agreement, are deposited;

(iii) Assignment of the rights, title, benefits, and demands of JSEL under Project documents, to the extent covered by and in accordance with the Substitution Agreement/s as per each Concession Agreements;

(iv) Assignment of all rights under Project guarantees and undertakings obtained pursuant to construction contract, service and operations contract, if any,

(v) First ranking assignment of all contracts / documents, insurance Policies / Contracts, clearances and interests of the Issuer / SPV.

(vi) Non-disposal Undertakings (NDU) in relation to 100% (One Hundred percent) of Shares of the Issuer in case the pledge of 51% (fifty one percent) of Shares of the Issuer on a fully diluted basis is not created. However, upon creation of pledge of 51% (fifty one percent) of Shares of the Issuer, the NDU shall be reduced to 49% (Forty Nine Percent) of Shares of the Issuer;

(vii) Charge on the unsecured loan, if any, brought by the Sponsor;

(viii) The Non-disposal Undertakings (NDU)/Pledge on Shares shall be restricted till the Fund Life End Date.

Provided that the Security interest stipulated hereinabove shall exclude the Project Assets (as defined in and in accordance with the Concession Agreement).

Second charge on above security in favour of Subordinate Series II debentures.

SPV Group
(As defined in Note 1 - Corporate Information)

Notes to the Special Purpose Combined Financial Statements
All amounts in Rupees millions unless otherwise stated

Details of Secured Redeemable Non-Convertible Debentures [NCDs] :

Series of NCDs	Face value per NCD (Rs.)	Rate of interest % p.a.	Terms of repayment	Date of redemption	No. of NCDs issued	No. of NCDs outstanding December 31, 2025	No. of NCDs outstanding March 31, 2025	No. of NCDs outstanding March 31, 2024	No. of NCDs outstanding March 31, 2023
JSEL NCD 8.30 SERIES 1STRPP-1 2019	26,136	8.30	Semi Annually	1-Mar-19	6,604	-	-	-	6,604
JSEL NCD 8.30 SERIES 1STRPP-2 2020	1,00,000	8.30	Semi Annually	28-Feb-20	3,823	-	-	-	3,823
JSEL NCD 8.30 SERIES 1STRPP -3 2021	1,00,000	8.30	Semi Annually	1-Mar-21	4,021	-	-	-	4,021
JSEL NCD 8.30 SERIES 1STRPP- 4 2022	1,00,000	8.30	Semi Annually	1-Mar-22	4,549	-	-	-	4,549
JSEL NCD 8.30 SERIES 1STRPP 5 2023	1,00,000	8.30	Semi Annually	1-Mar-23	4,282	-	-	-	4,282
JSEL NCD 8.30 SERIES 1STRPP 6 2024	1,00,000	8.30	Semi Annually	1-Mar-24	4,619	-	-	-	4,619
JSEL NCD 8.30 SERIES 1STRPP 7 2025	1,00,000	8.30	Semi Annually	28-Feb-25	4,942	-	-	4,942	4,942
JSEL NCD 8.30 SERIES 1 STRPP 8 2026	1,00,000	8.30	Semi Annually	27-Feb-26	6,119	3,123	6,119	6,119	6,119
JSEL NCD 8.30 SERIES 1 STRPP 9 2027	1,00,000	8.30	Semi Annually	1-Mar-27	6,582	6,582	6,582	6,582	6,582
JSEL NCD 8.30 SERIES 1 STRPP 10 2028	1,00,000	8.30	Semi Annually	1-Mar-28	6,177	6,177	6,177	6,177	6,177
JSEL NCD 8.30 SERIES 1 STRPP 11 2029	1,00,000	8.30	Semi Annually	1-Mar-29	6,599	6,599	6,599	6,599	6,599
JSEL NCD 8.30 SERIES 1 STRPP 12 2030	1,00,000	8.30	Semi Annually	31-Jan-30	5,803	5,803	5,803	5,803	5,803
JSEL NCD 8.45 SERIES 2 STRPP 1 2019	26,133	8.45	Semi Annually	1-Mar-19	2,495	-	-	-	2,495
JSEL NCD 8.45 SERIES 2 STRPP 2 2020	1,00,000	8.45	Semi Annually	28-Feb-20	1,444	-	-	-	1,444
JSEL NCD 8.45 SERIES 2 STRPP 3 2021	1,00,000	8.45	Semi Annually	1-Mar-21	1,519	-	-	-	1,519
JSEL NCD 8.45 SERIES 2 STRPP 4 2022	1,00,000	8.45	Semi Annually	1-Mar-22	1,718	-	-	-	1,718
JSEL NCD 8.45 SERIES 2 STRPP 5 2023	1,00,000	8.45	Semi Annually	1-Mar-23	1,618	-	-	-	1,618
JSEL NCD 8.45 SERIES 2 STRPP 6 2024	1,00,000	8.45	Semi Annually	1-Mar-24	1,744	-	-	-	1,744
JSEL NCD 8.45 SERIES 2 STRPP 7 2025	1,00,000	8.45	Semi Annually	28-Feb-25	1,866	-	-	732	1,866
JSEL NCD 8.45 SERIES 2 STRPP 8 2026	1,00,000	8.45	Semi Annually	27-Feb-26	2,311	-	-	-	2,311
JSEL NCD 8.45 SERIES 2 STRPP 9 2027	1,00,000	8.45	Semi Annually	1-Mar-27	2,485	-	-	-	2,485
JSEL NCD 8.45 SERIES 2 STRPP 10 2028	1,00,000	8.45	Semi Annually	1-Mar-28	2,333	-	-	-	2,333
JSEL NCD 8.45 SERIES 2 STRPP 11 2029	1,00,000	8.45	Semi Annually	1-Mar-29	2,492	2,492	2,492	2,492	2,492
JSEL NCD 8.45 SERIES 2 STRPP 12 2030	1,00,000	8.45	Semi Annually	31-Jan-30	2,191	2,191	2,191	2,191	2,191
Total					88,336	32,967	35,963	41,637	88,336

11 D. Terms and security details of borrowings (Contd.)

iii) Jorabat Shillong Expressway Limited (Contd.)

As at March 31, 2024 & March 31, 2023.

Unsecured loan from related Parties:

Loan from related parties as at March 31, 2023 has been taken from IL&FS Transportation Networks Limited, Sabarmati Capital One Limited, Skill Training Assessment Management Partners Limited, Rohtas Bio Energy Limited and IL&FS Airport Limited and carried interest of 15.5% - 16.5% per annum on outstanding loan balances.

During the financial year 2023-24, Pursuant to Share Purchase Agreement dated October 19, 2023,The SPV has converted the existing dues of erst while promoter group in to 0% Unsecured, Non convertible debentures of Rs.4,297.57 million at face value of Rs.1,000/-per Debentures which has been further described below.

Terms of Non convertible debentures.

As at December 31, 2025, March 31, 2025 & March 31, 2024

During the financial year ended March 31, 2024, Pursuant to Share Purchase Agreement dated October19, 2023.The SPV has converted the existing dues of erst while promoter group in to 0% Unsecured, Non convertible debentures of Rs.4,297.57 million at face value of Rs.1,000/-per debenture.

During the year ended March 31, 2024, coupon rate on Unsecured, Unlisted 0% Non- Convertible Debentures is changed from 0% per annum to 16% per annum on the outstanding value of the NCDs, Subject to availability of the surplus cash and satisfaction of restricted payment condition as provided under the financing documents or as allowed by Senior Lenders/Debenture Trustee of Listed NCDs.

Term:

The term of the NCDs shall be March 31, 2031 or such extended term as may be determined by the Board of the SPV with the prior written consent of the holder of the NCDs ("Debenture Holder").

Payment

Subject to availability of the surplus cash and satisfaction of restricted payment condition as provided under the financing documents or as allowed by Senior Lenders/Debenture Trustee of Listed NCDs, Debenture Holder shall be entitled to receive a non cumulative interest at an annual coupon rate not exceeding 16% on the outstanding value of the NCDs (the "Coupon Amount").

The interest shall be paid semi-annually i.e. for half year ended on September 30 and March 31 (the "Interest Period") as a simple interest on pay-as-able basis, on or before the expiry of 90 days from the Interest Period i.e. by December 29 and June 29 (the "Due Date of Interest Payment") for respective Interest Period, or next succeeding day if the Due Date of Interest Payment falls on a holiday.

The first interest period shall be from April 1, 2024 to

Redemption

NCDs shall be redeemable, in full or part, on the following terms:

At any time out of the cash surplus of the SPV after satisfaction of restricted payment conditions provided under the financing documents and as allowed by the Senior Lenders; or With the prior written consent of the Senior Lenders.

Redemption amount will be the outstanding value of the NCDs or a part thereof, as the case may be (the "Redemption Amount").

iv) Thrissur Expressway Limited

a. Term loan from bank (Secured)

As at December 31, 2025, March 31, 2025 and March 31, 2024

Security

(i) a first charge by way mortgage over all immovable properties of the Borrower, if any, both present and future, save and except the Project Assets;

(ii) a first charge over all moveable plant and machinery, machinery spares, tools and accessories, furniture, fixtures, vehicles and all other movable assets, both present and future, save and except the tangible movable assets included in the Project Assets;

(iii) a first charge on the entire current asset including but not limited to all operating accounts, deposits, inventory, investment, book debts, operating cash flow, receivables, commissions, revenue, of whatsoever nature and whenever arising, cash and cash equivalents, , both present and future, save and except the tangible movable assets included in the Project Assets;

(iv) a first charge over all accounts of the Borrower, including the Escrow Account, sub-accounts (or any account in substitution thereof) that may be opened in pursuant to the provision of this Agreement and the Supplementary Escrow Agreement, other Project Documents wherein revenues, disbursement, and all funds of the borrower, including the receivables and Permitted Investments or other securities shall, from time to time, be deposited therein, Provided that.

(a) the charge created on the asset as specified above shall be applied to the order priority specified in clause 31 of the concession agreement and clause 4 of the Escrow agreement and not beyond.

(b) the charge over all receivables from the project shall be enforceable by the Security Trustee to the extent and for the purpose of ensuring that the receivable are credited to the Escrow Account for the purpose of being applied to the order of priority as specified in Article 31 of the Concession Agreement and Clause 4 of the Escrow Agreement and not beyond that;

(v) a first charge on all intangible assets including but not limited to goodwill, rights, undertakings and uncalled capital, both present and future, of the Borrower, excluding the Project Assets (provided that all receivables from the Project shall be deposited in the Escrow Account and the charges on the same shall be limited to the extent permissible in accordance with the order of priority of waterfall specified in the Clause 31 of the Concession Agreement and Clause 4 of the Escrow Agreement). Further, a charge on uncalled capital, as mentioned above, shall be subject to the provisions of Clause 5.3 and 7.1 (k) and Clause 31 of the Concession Agreement.

(vi) a first Charge by way of hypothecation and /or assignment in :

(a) all the rights, title, interest, benefits, claims and demands, whatsoever, of the Borrower in, to or under the other Project Documents;

(b) all the rights, title and interest of the Borrower in, to or under all Clearances, to the extent permissible by Applicable Law, both present and future;

(c) all the rights, title, interest, benefits, claims and demands, whatsoever, of the Borrower in, any letter of credit, guarantee including contractor guarantees and liquidated damages and performance bond provided by any party to the Project Documents, both present and future; and

(d) all of the right, title, interest, benefits, claims and demands, whatsoever, of the Borrower in, to or under all Insurance Contracts procured by borrower or procured by any of the contractor for the benefit of the borrower, both present and future;

Provided that such assignment in accordance with Clause 10.21.1(f) (Security) above shall be enforceable in the manner specified under the substitution agreement so as to enable the Nominated Company (as defined under the Concession Agreement) to substitute the Borrower in respect thereof, as per the Substitution Agreement; and (ii) that such enforceability of assignment/ charge (as set out above) shall only prevail for the purpose of ensuring that all receivables are credited to the Escrow Account for the purpose of being applied in the order of priority specified in Article 31 of the Concession Agreement and Clause 4 of the Escrow Agreement and not beyond that.

Repayment Details

Repayment of Loans is to be done in 30 structured instalments ranging from Rs. 57.4 Mn to Rs. 795.4 million from December 2023 to September 2030 in accordance with Repayment schedule set forth in Schedule II of Rupee Loan Agreement dated August 03, 2023

Interest

All Obligations in relation to the Assigned Loans (other than in relation to costs, charges, fees and expenses payable/ to be reimbursed to the Secured Parties in terms of the Financing Documents) shall accrue at 3 month SBI MCLR + 40 to 65 basis points i.e. 8.70% - 8.95% p.a. (FY 2024-25- 8.85% to 9.25% p.a., FY 2023-24 8.85% p.a.) for current year based on credit rating.

b. Non Convertible Debentures from Edelweiss Infrastructure Yield fund (Unsecured).
As at December 31, 2025, March 31, 2025, & March 31, 2024
The SPV had issued 46,100 (March 2025:- Nil, March 2024:- 57,20,782 and March 2023:- Nil) Non Convertible Debentures ("NCDs") of Face Value of INR 1,000 with coupon of 9% amounting to INR 46.10 Mn (March 2025:- Nil, March 2024:- 5,720.78 and March 2023:- Nil) to EIYP.
The NCDs shall be redeemable, at the option of the Issuer either in full or in part, on the following terms:
-Out of the cash surplus of the Issuer after satisfaction of restricted payment conditions provided under the financing documents and/or as allowed by the Senior Debt Lender, subject to adherence to terms of the Concession Agreement and Escrow Agreement; or
-With the prior written consent of the Senior Debt Lender and approval of Debenture Holder(s); or
-On Final Redemption Date after satisfaction of restricted payment conditions provided under the financing documents and/or as allowed by the Senior Debt Lender, if required.
Redemption amount will be the outstanding value of NCDs or a part thereof as the case may be (the "Redemption Amount"). In case of Redemption Notice (as defined below) is issued during the Interest Period, Coupon Amount for the Redemption Amount will be computed for the period until redemption.
Coupon rate not exceeding 9% on the outstanding value of the NCDs, Subject to availability of the surplus cash and satisfaction of restricted payment condition as provided under the financing documents or as allowed by Senior Lenders, Debenture Holder.
The interest shall be paid semi-annually i.e. for half year ended on September 30 and March 31 (the "Interest Period") as a simple interest on pay-as-able basis, on or before the expiry of 90 days from the Interest Period i.e. by December 29 and June 29 (the "Due Date of Interest Payment") for respective Interest Period, or next succeeding day if the Due Date of Interest Payment falls on a holiday.
The first interest period shall be from the date of allotment of the NCDs to March 31, 2024 and payable on or before June 29, 2024.
Redemption date: 31/03/2026

c. Optionally convertible debentures issued to KMC Infratech Limited
As at March 31, 2023

Type of Security	Optionally Convertible Debentures
Value of Debentures	Rs. 336 per debenture (Rupees Three Hundred Thirty Six Only)
Coupon Rate	12% per Annum
Frequency of payment of Interest	Annual payment unless otherwise determined by Board. In the event of absence of sufficient Cash to make the Coupon payment, the coupon amount would accrue and will be due for payment post COD of the Project or at the discretion of the Board or at Subsequent year or years when there is sufficient Cash to make the payment
Default Interest Rate	None
Conversion and Redemption**	The COD Holder shall have right to convert the OCDs in to equity share of the SPV at anytime by giving 30 days written notice subject to the provisions of the Companies Act, 2013. However, it is repayable on Demand subject to the consent of Senior Lenders (i.e., Project lenders of the SPV).
Redemption Price	At Par
Security	Un Secured

**Optionally convertible Debentures from KMC Infratech Limited repaid in full during the March 2024

d. Compulsorily Convertible Preference Shares (CCPS)
As at March 31, 2023
During year ended March 31, 2023, The SPV has taken term loan & NCD from Financial Institution and at the time of availing the loan Financial Institution changed the terms of CCPS shall to not be allowed to be converted into equity shares of the SPV or transferred, become due or be payable under any circumstances whatsoever until the Final Settlement Date. Subject to the terms contained herein, KMCIL hereby relinquishes any claims they may have against the Company in connection with the CCPS until the Final Settlement Date.

e. Term Loan - India Resurgence ARC Private Limited
As at March 31, 2023
Security

i) a first charge over all immovable properties of the Borrower, both present and future, save and except the immovable assets included in the Project Assets;

ii) moveable plant and machinery, machinery spares, tools and accessories, furniture, fixtures, vehicles and all other movable assets, both present and future, save and except the tangible movable assets included in the Project Assets;

iii) a first charge over all accounts of the Borrower, including the Escrow Account, sub-accounts (or any account in substitution thereof) that may be opened in accordance with this Agreement and the Supplementary Escrow Agreement, or any of the other Project Documents and all funds deposited therein, from time to time, all receivables and Permitted Investments or other securities. Provided that any proceeds from enforcement of such security interest shall be deposited in the Escrow Account and the amounts lying in the Escrow Account being applied to the extent of waterfall of priority of payment as specified in Article 31 of the Concession Agreement and Clause 4 of the Escrow Agreement and not beyond that;

iv) a first charge on all the intangible assets of the Borrower, including but not limited to goodwill, rights, undertakings of the Borrower and uncalled capital both present and future, save and except the intangible assets of the Borrower included in the Project Assets, provided that, all receivables arising therefrom (including under any claim made by the Borrower on NHA1) shall be deposited into the Escrow Account and charge on the same shall be subject to the extent permissible as per the priority specified in the Article 31 of the Concession Agreement and Clause 4 of the Escrow Agreement. Further, a charge on uncalled capital, as set in above, shall be subject however to the provisions of Articles 5.3, 7.1(k) and 31 of the Concession Agreement, provided that the same being applied to the extent of waterfall of priority of payment as specified in Article 31 of the Concession Agreement and Clause 4 of the Escrow Agreement and not beyond that.

v) a first ranking assignment of the rights, title, interest, benefits, claims and demands, whatsoever, of the Borrower in, to or under the Concession Agreement, in accordance with the provisions of the Substitution Agreement;

vi) a first ranking assignment/ charge by way of security in:
(i) all the rights, title, interest, benefits, claims and demands, whatsoever, of the Borrower in, to or under the other Project Documents;
(ii) all the rights, title and interest of the Borrower in, to or under all such approvals as are required to be sought from any Governmental Authority;
(iii) all the rights, title, interest, benefits, claims and demands, whatsoever, of the Borrower in, any letter of credit, guarantee including contractor guarantees and liquidated damages and performance bond provided by any party to the Project Documents and
(iv) all of the right, title, interest, benefits, claims and demands, whatsoever, of the Borrower in, to or under all Insurance Contracts.
Provided that such assignment/ charge created in accordance with Clause 4.1.1(f) (Security) above shall be enforceable by the Security Trustee or on their behalf (i) in the manner specified in the Substitution Agreement so as to enable the Nominated Company (as defined under the Concession Agreement) to substitute the Borrower in respect thereof, as per the Substitution Agreement; and (ii) that such enforceability of assignment/ charge (as set out above) shall only prevail for the purpose of ensuring that all receivables are credited to the Escrow Account for the purpose of being applied in the order of priority specified in Article 31 of the Concession Agreement and Clause 4 of the Escrow Agreement and not beyond that.

vii) a first ranking pledge of all the Securities of the Borrower till the Final Settlement Date. The pledged Securities shall be free from any restrictive covenants/liens or other encumbrance pursuant to any other contractual arrangement. Provided that, any action of enforcing the pledged Securities shall be subject to the provisions of the Concession Agreement and will
require the prior written approval of NHA1, if required in terms of the Concession Agreement;

viii) unconditional and irrevocable personal guarantee by each of the Individual Obligors, provided that the guarantee shall secure all the Obligations due and payable in terms of the Financing Documents other than payment/ repayment of the Fixed Interest and Group 6 Repayment Instalment in terms hereof;

ix) unconditional and irrevocable corporate guarantee by each of the Promoters, provided that the guarantee shall secure all the Obligations due and payable in terms of the Financing Documents other than payment/ repayment of the Fixed Interest and Group 6 Repayment Instalment in terms hereof;

x) Demand Promissory Note and letter of continuity from the Borrower; and

xi) Undated cheques signed by the Borrower

Repayment details
Repayment of Loans is to be done in 45 structured instalments ranging from Rs.6.73 Crores to Rs.252.16 crores on commencing from Feb 2022 to September 2025 in accordance with Repayment schedule set forth in Schedule 12 of Debt Agreement dated August 30,2022.
Interest
All Obligations in relation to the Assigned Loans (other than in relation to costs, charges, fees and expenses payable/ to be reimbursed to the Secured Parties in terms of the Financing Documents) shall accrue at 10.50%, compounded monthly.

f. Non convertible debenture - India Resurgence ARC Private Limited
As at March 31, 2023
Security

i) a first charge over all immovable properties of the Issuer, both present and future, save and except the immovable assets included in the Project Assets;

ii) a first charge on all tangible moveable assets of the Issuer, including moveable plant and machinery, machinery spares, tools and accessories, furniture, fixtures, vehicles and all other movable assets, both present and future, save and except the tangible movable assets included in the Project Assets;

iii) a first charge over all accounts of the Issuer, including the Escrow Account, sub-accounts (or any account in substitution thereof) that may be opened in accordance with this Deed and the Supplementary Escrow Agreement, or any of the other Project Documents and all funds deposited therein, from time to time, all receivables and Permitted Investments or other securities. Provided that any proceeds from enforcement of such security interest shall be deposited in the Escrow Account and the amounts lying in the Escrow Account being applied to the extent of waterfall of priority of payment as specified in Article 31 of the Concession Agreement and Clause 4 of the Escrow Agreement and not beyond that;

iv) a first charge on all the intangible assets of the Issuer, including but not limited to goodwill, rights, undertakings of the Issuer and uncalled capital both present and future, save and except the intangible assets of the Issuer included in the Project Assets, provided that, all receivables arising therefrom (including under any claim made by the Issuer on NHAI) shall be deposited into the Escrow Account and charge on the same shall be subject to the extent permissible as per the priority specified in the Article 31 of the Concession Agreement and Clause 4 of the Escrow Agreement. Further, a charge on uncalled capital, as set in above, shall be subject however to the provisions of Articles 5.3, 7.1(k) and 31 of the Concession Agreement, provided that the same being applied to the extent of waterfall of priority of payment as specified in Article 31 of the Concession Agreement and Clause 4 of the Escrow Agreement and not beyond that;

v) a first ranking assignment of the rights, title, interest, benefits, claims and demands, whatsoever, of the Issuer in, to or under the Concession Agreement, in accordance with the provisions of the Substitution Agreement;

vi) a first ranking assignment/ charge by way of security in:
(i) all the rights, title, interest, benefits, claims and demands, whatsoever, of the Issuer in, to or under the other Project Documents;
(ii) all the rights, title and interest of the Issuer in, to or under all such approvals as are required to be sought from any Governmental Authority;
(iii) all the rights, title, interest, benefits, claims and demands, whatsoever, of the Issuer in, any letter of credit, guarantee including contractor guarantees and liquidated damages and performance bond provided by any party to the Project Documents; and
(iv) all of the right, title, interest, benefits, claims and demands, whatsoever, of the Issuer in, to or under all Insurance Contracts

Provided that such assignment/ charge created in accordance with Clause 6.1.1(f) (Security) above shall be enforceable by the Debenture Trustee or on their behalf (i) in the manner specified in the Substitution Agreement so as to enable the Nominated Company (as defined under the Concession Agreement) to substitute the Issuer in respect thereof, as per the Substitution Agreement; and (ii) that such enforceability of assignment/ charge (as set out above) shall only prevail for the purpose of ensuring that all receivables are credited to the Escrow Account for the purpose of being applied in the order of priority specified in Article 31 of the Concession Agreement and Clause 4 of the Escrow Agreement and not beyond that;

vii) a first ranking pledge of all the Securities of the Issuer till the Final Settlement Date. The pledged Securities shall be free from any restrictive covenants/liens or other encumbrance pursuant to any other contractual arrangement. Provided that, any action of enforcing the pledged Securities shall be subject to the provisions of the Concession Agreement and will require the prior written approval of NHAI if required in terms of the Concession Agreement.

viii) unconditional and irrevocable personal guarantee by each of the Individual Obligors;

ix) unconditional and irrevocable corporate guarantee by each of the Promoters

x) Demand Promissory Note and letter of continuity from the Issuer; and

xii) Undated cheques signed by the Issuer

Redemption Details
The Debentures and all other Obligations shall be repaid in full on the Maturity Date.
Interest
All Obligations in relation to the Debentures (other than in relation to costs, charges, fees and expenses payable/ to be reimbursed to the Secured Parties in terms of the Debentures Documents) shall accrue at Investor IRR on a monthly basis. All Obligations in relation to costs, charges, fees and expenses payable/ to be reimbursed to the Secured Parties in terms of the Debenture Documents shall accrue at 20.50% (twenty point five zero percent) per annum, compounded monthly, which accrued amounts shall be paid on demand.

The Issuer shall pay interest on the Series A Debentures at Fixed Interest Rate on monthly basis (the “Fixed Interest”).The Fixed Interest on the Series A Debentures shall be payable by the Issuer on each Fixed Interest Payment Date.

g. Compulsory Convertible Debentures (CCDs):
As at December 31, 2025
Face Value:
The CCDs shall have face value of INR 100/- (Rupees One Hundred only) and issued in minimum lot sizes of INR 25 crores.
Conversion Terms:
The Instruments shall be converted in the hands of the Investor into equity shares of Issuer / TEL (unless refinanced or redeemed by the Issuer) pursuant to terms contained herewith at the end of 31st July 2028 ("Tenure") or earlier at the option of the SPV under certain terms. Details are captured in Debenture Subscription Agreement.

Instrument issued at par value i.e. Face Value of INR 100/- (Rupees One Hundred Only) will accrue @ 12% per annum. The outstanding accrued value will be converted into equity shares of TEL considering the fair market value ("FMV") of TEL on the date of conversion.
Where, fair market value shall be computed by independent chartered accountant or registered valuer as appointed by the Issuer for this purpose.
Notwithstanding anything mentioned herein in this term sheet, CCDs shall not convert into equity shares of TEL in excess of 14% on a fully diluted basis.

In the event that, subject to receipt of requisite regulatory and corporate authorizations, market conditions and other relevant considerations, the Proposed InvIT is launching the Offer, the Instrument maybe swapped in lieu of units of the Proposed InvIT upon consummation of the formation transactions relating to the same. In such a case, Instrument issued at par value i.e. Face Value of INR 100/- (Rupees One Hundred Only) will accrue @ 12% per annum. The outstanding accrued value of the Instrument will be exchanged into units of the Proposed InvIT considering the projected market capital of Proposed InvIT at the time of listing (as mutually agreed amongst the parties) .
CCDs cannot be transferred without approval of the Issuer and execution of subordination agreement with Senior Lenders of TEL.

v) Ahmedabad - Maliya Tollway Private Limited (Formerly known as Ahmedabad Maliya Tollway Limited)
As at December 31, 2025, March 31, 2025, March 31, 2024 & March 31, 2023
The SPV has entered into a Rupee Loan agreement with State Bank of India on March 21, 2024. Consequent to the agreement execution, the Company has availed term loan for an amount of Rs. 8,185.7 millions from State Bank of India on March 28, 2024. The SPV has settled the term loan to others i.e. Aseem Infrastructure Limited on March 28, 2024. However, the term loan outstanding to banks and NCD's are settled on April 02, 2024 and hence the same is shown as current borrowings in the year ended March 31, 2024.

Particulars	Effective interest rate	Terms of repayment
Term loans from banks*	3 months MCLR + applicable spread	Refinancing happened on March 28, 2024. Repayable in 25 unequal quarterly instalments from March 2024 to March 2030 at specified amounts. Interest is payable on monthly instalments.
Term loans from banks **	9.25%	Refinancing happened on August 28, 2017 and Repayable in 151 unequal instalments from September 2017 to March 2030 at specified amounts. However, the term loans are settled on April 02, 2024 and hence the same is shown as current borrowings.
Loan from Group Companies (Unsecured)	16.00%	SPV undertakes to repay Group Companies ICD amount and pay interest subject to availability of the cashflow surplus and satisfaction of restricted payment condition as provided under the financing documents or as allowed by Senior Lenders. Group Companies shall be entitled to receive a non-cumulative interest at an annual coupon rate not exceeding 16% on the outstanding value of the ICDs.

*Nature of security for term loans from banks:
The Facility together with interest, Default Interest, Additional Interest, costs, charges, expenses and other monies whatsoever stipulated and due to the Secured Parties in accordance with the terms of the Financing Documents, shall be secured by the Security Interest as stated hereunder, to the extent permitted under the Concession Agreement and save and except the List of Claims, by the following ("Security")

i) a first charge by way of mortgage over the immovable assets of the Borrower, if any, both present and future, save and except (i) the Project Assets, and (ii) subject to Clause 10.22.2A (Security), the Identified Land;

ii) a first charge over all the movable assets of the Borrower including machinery, machinery spares, tools and accessories, all other movable assets, both present and future, save and except the Project Assets;

iii) a first charge on the entire current assets including but not limited to all operating accounts, deposits, inventory, investments, book debts, operating cash flows, receivables, commissions, revenues of whatsoever nature and whenever arising, cash and cash equivalents, both present and future, of the Borrower;

vi) a first charge over all accounts of the Borrower, including without limitation, the Escrow Account and the sub- accounts (or any account in substitution thereof), opened pursuant to the provisions of this Agreement, the Escrow Agreement, the Supplementary Escrow Agreement and other Transaction Documents, wherein all revenues, disbursements, and all funds of the Borrower including the Receivables and all Permitted Investments or other securities shall, from time to time, be deposited therein.

v) a first charge on all intangible assets including but not limited to goodwill, rights, undertakings and uncalled capital, both present and future, of the Borrower, excluding the Project Assets

vi) a first charge by way of hypothecation and/or assignment in: (i) all the rights, title, interests, benefits, claims and demands whatsoever of the Borrower in the Project Documents, both present and future; (ii) the rights, title, interests, benefits, claims and demands of the Borrower in, to and under all the Clearances, to the extent permissible by Applicable Law, both present and future; (iii) all the rights, title, interests, benefits, claims and demands whatsoever of the Borrower in any letter of credit, guarantee (including contractor guarantees), and liquidated damages and performance bond provided by any party under the Project Documents, both present and future; and (iv) all the rights, title, interests, benefits, claims and demands whatsoever of the Borrower under all Insurance Contracts procured by the Borrower or procured by any of the contractors for the benefit of the Borrower, both present and future.

**Nature of security for term loans from banks:
Secured Indian rupee term loan from banks and financial institutions are secured by a pari passu first charge inter se lenders over:
a) All immovable properties both present and future, including all real estate rights;
b) all tangible movable assets, including movable plant and machinery, equipment, machinery spares, tools and accessories, current assets and all other movable assets(except project assets), both present and future;
c) Investment property;
d) all rights, title, interest, benefits, claims and demands(excluding project assets), whatsoever of the borrower in any project documents, contracts and licenses to and all assets of the project;
e) all rights, title, interest, benefits, claims and demands in respect of the accounts , that may be opened in terms of the project documents; and
f) all amounts owing to, received and receivable by the SPV.

vi) Deccan Tollways Private Limited (Formerly known as L&T Deccan Tollways Limited)
As at December 31, 2025 & March 31, 2025

i) During the year ended March 31, 2025, the SPV has entered into a refinance facility agreement with State Bank of India on August 21, 2024. Consequent to the agreement execution, the SPV has availed term loan for an amount of Rs. 9,512 Mn from State Bank of India on August 27, 2024. The SPV has settled the term loan outstanding to earlier lenders including Group Companies on the same day.

ii) The SPV availed an unsecured borrowings from group Companies, and the same is shown as current borrowings. The interest rate and Terms of repayment is given in the below table

Secured Borrowings

Particulars	Effective interest rate	Terms of repayment
Term loans from banks*	3 months MCLR + applicable spread	Repayable in 49 unequal quarterly instalments commenced from September 2024

Unsecured Borrowings

Particulars	Effective interest rate	Terms of repayment
Loan from Group Companies	8.50% - 12.00%	During the period ended December 31, 2025, a novation agreement dated November 03, 2025, is entered between Holding Company, SPV & Group Company for outstanding inter corporate deposit ("ICD"). SPV undertakes to repay Group Companies ICD amount and pay interest subject to availability of the cashflow surplus and satisfaction of restricted payment condition as provided under the financing documents or as allowed by Senior Lenders. Group Companies shall be entitled to receive a non-cumulative interest at an annual coupon rate not exceeding 16% on the outstanding value of the ICDs.

*Nature of security for Term Loans

The Facility together with interest, Default Interest, Additional Interest, costs, charges, expenses and other monies whatsoever stipulated and due to the Secured Parties in accordance with the terms of the Financing Documents, shall be secured by the Security Interest as stated hereunder, to the extent permitted under the Concession Agreement and save and except the List of Claims, by the following ("Security")

i) a first charge by way of mortgage over the immovable assets of the Borrower, if any, both present and future, save and except the Project Assets

ii) a first charge over all the movable assets of the Borrower including machinery, machinery spares, tools and accessories, all other movable assets, both present and future, save and except the Project Assets;

iii) a first charge on the entire current assets including but not limited to all operating accounts, deposits, investments, book debts, operating cash flows, receivables, commissions, revenues of whatsoever nature and whenever arising, cash and cash equivalents, both present and future, of the Borrower;

iv) a first charge over all accounts of the Borrower, including without limitation, the Escrow Account and the sub- accounts (or any account in substitution thereof), opened pursuant to the provisions of this Agreement, the Escrow Agreement, the Supplementary Escrow Agreement and other Transaction Documents, wherein all revenues, disbursements, and all funds of the Borrower including the Receivables and all Permitted Investments or other securities shall, from time to time, be deposited therein

v) a first charge on all intangible assets including but not limited to goodwill, rights, undertakings and uncalled capital, both present and future, of the Borrower, excluding the Project Assets

vi) a first charge by way of hypothecation and/or assignment in: (i) all the rights, title, interests, benefits, claims and demands whatsoever of the Borrower in the Project Documents, both present and future; (ii) the rights, title, interests, benefits, claims and demands of the Borrower in, to and under all the Clearances, to the extent permissible by Applicable Law, both present and future; (iii) all the rights, title, interests, benefits, claims and demands whatsoever of the Borrower in any letter of credit, guarantee (including contractor guarantees), and liquidated damages and performance bond provided by any party under the Project Documents, both present and future; and (iv) all the rights, title, interests, benefits, claims and demands whatsoever of the Borrower under all Insurance Contracts procured by the Borrower or procured by any of the contractors for the benefit of the Borrower, both present and future.

For the year ended March 31, 2024 & March 31, 2023

i) For the year ended March 31, 2024, The SPV has executed the novation agreement dated April 07, 2022 and other supplementary agreements for including L&T Transportation Infrastructure Limited as a lender and Co-Promoter. The repayment of Rs. 300 million shall be subservient to the existing senior debt and shall commence after full repayment of existing senior debt obligations. The balance unsecured borrowings of Rs. 280 million is shown as current borrowings as the same is repayable on demand and carries no interest.

ii) As per the novation agreement dated October 18, 2023, the SPV novated the existing term loan outstanding amount of Rs. 1,527.6 million of Indian Bank to Tata Cleantech Capital Limited on October 26, 2023.

iii) During the year ended March 31, 2024, the SPV availed an unsecured borrowings amounting to Rs. 965 million from L&T Infrastructure Development Projects Limited, and the same is shown as current borrowings as the same is repayable on demand and carries interest.

Secured Borrowings

Particulars	Effective interest rate	Terms of repayment
Term loans from banks(Tranche A)	1 year MCLR + applicable spread	Repayable in 162 unequal monthly instalments commenced from October 2017
Term loans from financial institution(Tranche A)	Prime Lending rate NPLR-LT	Repayable in 90 unequal monthly instalments commenced from October 2023
Term loan from financial Institution(Tranche B)	Base rate + applicable spread	Repayable in 120 unequal monthly instalments commenced from April 2021

Unsecured Borrowings

Particulars	Effective interest rate	Terms of repayment
Loan from Group Companies	10.55%	The repayment of Rs. 300 millions shall be subservient to the existing senior debt and shall commence after full repayment of existing senior debt obligations.

Nature of security for Term Loans

(i) Secured by first charge by way of hypothecation on all movable/immovable assets of the SPV, both present and future, excluding Project assets as defined in the Concession Agreement.

(ii) First charge on Project book debts, operating cash flows, receivables, commissions, insurance proceeds, revenues of whatsoever nature and wherever arising, present and future.

(iii) Assignment of all the rights, title, interest, benefits, claims and demands, whatsoever of the SPV.

(iv) Escrow account to the extent of waterfall of priorities of payment as permitted to the lenders under Escrow Agreement.

(v) Debt Service Coverage Ratio support amount.

(vi) First charge of all the SPV's rights, interests related to the proposed project under the letter of credit (if any), guarantee or performance bond provided by any party.

vii) Rajkot-Vadinar Tollway Private Limited (Formerly L&T Rajkot-Vadinar Tollway Limited)
As at December 31, 2025, March 31, 2025, March 31, 2024 & March 31, 2023

Particulars	Effective interest rate	Terms of repayment
Term loan from Financial Institution#	6 months MCLR + applicable spread	SPV has entered in to a refinance facility agreement with "Aseem Infrastructure Finance Limited" on 28th March 2023. Consequent to the same, the SPV has obtained term loan for Rs. 2,730 millions repayable in 19 unequal quarterly instalments from April 2023 to December 2027. Interest is payable on monthly instalments.
Loan from Group Companies (Unsecured)	12.00%	The SPV has taken loan from Group SPV bearing non-cumulative interest at an annual coupon rate not exceeding 12% subject to the cashflow surplus in the SPV and as per the agreed terms and conditions with the lenders.
Term loan from Financial Institution*	8.30%	SPV has entered into an assignment-cum-amendment agreement to the facility agreement of "Aseem Infrastructure Finance Limited" on September 18, 2025. Consequent to the same, the SPV has assigned term loan of Rs. 1,150 Mn to "NIIF Infrastructure Finance Limited" from "Aseem Infrastructure Finance Limited" term loan facility. Interest is payable on monthly instalments and repayable in 10 unequal quarterly instalments from September 2025 to December 2027.
Non-convertible debentures (Unsecured)	12.00%	During the period ended December 31, 2025, a novation agreement dated November 03, 2025, is entered between Holding Company, SPV & Group Company for outstanding inter corporate deposit ("ICD"). Subsequent to novation of ICD to Group Company these ICD were converted into Non-convertible debentures each having face value of Rs. 1,000 per debenture amounting to Rs. 2,522 Mn bearing non-cumulative interest at an annual coupon rate not exceeding 12% subject to cashflow surplus in the SPV and as per the agreed terms and conditions with the NCD holder.

Nature of security for term loans from financials institutions:
First ranking charge
(a) all the tangible movable assets of the SPV, both present and future (except the Project Assets);
(b) all the intangible assets of the SPV including but not limited to Intellectual Property Rights and goodwill of the SPV and any uncalled capital, both present and future (except the Project Assets);
(c) all other movable assets owned by the SPV, that may at present or hereafter be held by any party anywhere to the order and disposition of the SPV or in the course of transit or delivery, (both present and future) (except the Project Assets) together with all benefits, rights and incidentals attached thereto, both present and future (the “First Hypothecated Assets”);
(d) all the bank accounts of the SPV (other than the Distribution Account), both present and future, including the Existing Account, Escrow Account and all sub-accounts including the Debt Service Reserve Account and all rights, title, interest, benefit, claims and demands whatsoever of the SPV in, to, under and in respect of all such bank accounts (other than the Distribution Account) (including the Escrow Account, the Debt Service Reserve Account and all sub-accounts thereof) or any replacement thereof and all Permitted Investments, other investments or other securities of the SPV (the “Second Hypothecated Assets”).

* Nature of security for term loans from financials institutions:
1. first charge on all the Borrower's tangible movable assets, including movable plant and machinery, machinery spares, tools and accessories, furniture, fixtures, vehicles and all other movable assets, both present and future (except the Project Assets);
2. first charge over all Accounts (other than the Distribution Account), the Existing Account and all other bank accounts of the Borrower including the Escrow Account and the sub-accounts (other than the Distribution Account), including the Debt Service Reserve Account
3. first charge over the current and non-current assets of the Borrower, both present and future (except the Project Assets);
4. first charge on all revenues and receivables of the Borrower whether or not deposited in the Accounts or the Existing Account,
5. first charge over the current and non-current assets of the Borrower, both present and future (except the Project Assets);
6. first charge on all revenues and receivables of the Borrower whether or not deposited in the Accounts or the Existing Account, the book debts of the Borrower, the operating cash flows of the Borrower and all other commissions and revenues and cash of the Borrower (including Termination Payments), both present and future (except the Project Assets);
7. first charge on all intangible assets, goodwill, intellectual property rights, undertaking and uncalled capital of the Borrower, both present and future (except the Project Assets);
8. first charge and assignment by way of security, in:
i. all the rights, title, interests, benefits, claims and demands whatsoever of the Borrower in the Project Documents (except the Project Assets);
ii. the rights, title, interests and benefits of the Borrower in, to and under all the Clearances, to the extent permissible by Applicable Law (except the Project Assets);
iii. all the rights, title, interests, benefits, claims and demands whatsoever of the Borrower in any letter of credit, guarantee (including contractor guarantees) and liquidated damages (including Contractual Damages) and
performance bond provided by any Project Participant (except the Project Assets);
iv. all the rights, title, interests, benefits, claims and demands whatsoever of the Borrower under all Insurance Contracts (except the Project Assets);
v. assignment, in favour of the Lenders' Representative, of the Borrower's rights, title and interest in the Concession (including the right to substitute the Borrower), and execution of the Substitution Agreement;
vi. a first ranking pledge of the Pledged Securities held by the Pledgor;

viii) Sambalpur Rourkela Tollway Private Limited (Formerly L&T Sambalpur Rourkela Tollway Limited)
As at December 31, 2025, March 31, 2025, March 31, 2024 & March 31, 2023

Particulars	Effective interest rate	Terms of repayment
Term loans from banks#	3 months MCLR + applicable spread	During FY 2024-25, SPV has entered in to a refinance facility agreement with "State Bank of India" on April 12, 2024. Consequent to the same, the SPV has obtained term loan for Rs. 7,127 Million repayable in 40 unequal quarterly instalments from September 2024 to June 2035. Interest is payable on monthly instalments.
Term loans from banks**	9.00%	For FY 2023–24 and FY 2022–23, the loan is repayable in 132 unequal monthly instalments, with repayments having commenced in May 2018.

Nature of security for Term loans:
(i) Secured by first charge by way of hypothecation on all movable/immovable assets of the SPV, both present and future, excluding Project assets as defined in the Concession Agreement.
(ii) First charge on Project book debts, operating cash flows, receivables, commissions, insurance proceeds, revenues of whatsoever nature and wherever arising, present and future.
(iii) Assignment of all the rights, title, interest, benefits, claims and demands, whatsoever of the SPV.
(iv) Escrow account to the extent of waterfall of priorities of payment as permitted to the lenders under Escrow Agreement.
(v) Debt Service Coverage Ratio Support Amount.
(vi) First charge of all the SPV's rights, interests related to the project under the letter of credit (if any), guarantee or performance bond provided by any party.

** Nature of Security for Term loans:
i) a first pari passu charge by way of mortgage over the immovable assets of the Borrower, if any, both present and future, save and except the Project Assets.

ii) a first pari passu charge over all the movable assets of the Borrower including machinery, machinery spares, tools and accessories, all other movable assets, both present and future, save and except the Project Assets;
iii) a first pari passu charge on the entire current assets including but not limited to all operating accounts, deposits, inventory, investments, book debts, operating cash flows, receivables, commissions, revenues of whatsoever nature and whenever arising, cash and cash equivalents, both present and future, of the Borrower;
iv) a first pari passu charge over all accounts of the Borrower, including without limitation, the Escrow Account and the sub- accounts (or any account in substitution thereof), opened pursuant to the provisions of this Agreement, the Escrow Agreement, the Supplementary Escrow Agreement and other Transaction Documents, wherein all revenues, disbursements, and all funds of the Borrower including the Receivables and all Permitted Investments or other securities shall, from time to time, be deposited therein.
v) a first pari passu charge on all intangible assets including but not limited to goodwill, rights, undertakings and uncalled capital, both present and future, of the Borrower, excluding the Project Assets.

ix) Panipat Elevated Corridor Private Limited (Formerly Known as Panipat Elevated Corridor Limited)
As at December 31, 2025, March 31, 2025, March 31, 2024 & March 31, 2023

Loans from related parties	Effective interest rate	Terms of repayment
Non convertible Debentures (Unsecured)	8.50%	During the period ended December 31, 2025, a novation agreement dated November 03, 2025, is entered between Holding Company, SPV & Group Company for outstanding inter corporate deposit ("ICD"). Subsequent to novation of ICD to Group Company these ICD were converted into Non-convertible debentures each having face value of Rs. 1,000 per debenture amounting to Rs. 470 Mn bearing non-cumulative interest at an annual coupon rate not exceeding 8.50% subject to cashflow surplus in the SPV and as per the agreed terms and conditions with the NCD holder. The term of the NCDs shall be till March 31, 2027 or such extended term as may be mutually agreed between the Issuer and the holder of NCDs ("Final Redemption Date"). Subject to maximum of Cashflow Surplus of the Company, after satisfaction of restricted payment conditions of the financing documents executed with secured lenders and any limit prescribed by law. The first coupon payment shall be for the period commencing from the date of allotment till March 31, 2026, payable by June 29, 2026.

x) Samkhiali Bhachau Gandhidham Tollway Private Limited (formerly known as L&T Samkhiali Gandhidham Tollway Limited)
As at December 31, 2025, March 31, 2025, March 31, 2024 & March 31, 2023

Particulars	Effective interest rate	Terms of repayment
Term loans from banks	9.00% to 10.50%	Monthly Principal and Interest repayment as per repayment schedule.
Loan from Group Companies	G - Sec rate (based on transaction date)	Repayable on or before March 31, 2025 - amount Rs. 1,500 million
	Interest free	Repayable on demand
	8.50%	Loan shall be payable till March 31, 2025 or on any date as mutually agreed by the lender and the Company as borrower. The interest payable shall be subject of availability cash surplus at company. Amount Rs. 618 million. Subject to availability of the cashflow surplus of the Borrower, Lender shall be entitled to receive a non-cumulative interest at an annual coupon rate not exceeding 8.50%.

Nature of security for Term loans from banks:
The rupee term loans from banks are secured by a first mortgage and charge on all immovable properties except project assets more particularly:
(a) the freehold non-agricultural land
(b) a first charge on tangible moveable assets except project assets
(c) a charge on the accounts
(d) a charge on all intangibles
(e) charge on uncalled capital
(f) in case of substitution under the Substitution agreement, assignment by way of security of the rights, title and interest , to, under the Project Documents, Government approvals and insurance contracts
(g) rights, title, interest, benefits, claims and demands in, to, under or in respect of all receivables.
The loans are further secured by a pledge of 51% of equity shares upto two years from Commercial Operations Date.

xi) Epic Concesiones 3 Private Limited (Formerly L&T Infrastructure Development Projects Limited)
As at December 31, 2025 & March 31, 2025

Terms of repayment of Compulsory Convertible Debentures
Conversion
At the option of the CCD holder, each CCD of Rs. 1,000/- each shall be converted into 100 Equity Shares of Rs. 10/- each of the SPV.
The option of conversion can be exercised by the CCD holder at any time after a period of 3 months from the date of allotment of CCDs and before the expiry of Tenure; after giving notice of 7 working days to the Issuer for conversion or such lesser number of days as may be agreed between the CCD holder and the Issuer.

The holder(s) of the Compulsory Convertible Debentures (CCDs) also have the option, at their discretion, to convert the CCDs into Non-Convertible Debentures (NCDs). These NCDs once converted shall be redeemable, in whole or in part, at the request of the NCD holders.

Interest payment
Non-cumulative Interest not exceeding 18% per annum subject to maximum of Cashflow Surplus of the SPV and any limit prescribed by law.
The interest shall be payable on semi-annual basis within 90 days from the end of the half financial year. In the event of conversion of CCDs on or before the maturity date, the Interest for the period commencing from the beginning of the half financial year till conversion date shall be payable within 90 days from the end of the half financial year in which conversion took place.
Where in a financial year, the SPV has sufficient operating cashflow surplus, it shall pay interest at lower of operating cashflow Surplus or 18% per annum on the face value of the CCDs. Where in a financial year, the SPV has no operating cashflow surplus, it would not be necessary to pay interest on the CCDs.

11 D. Terms and security details of borrowings (Contd.)

Disclosure as per Ind AS 1 "Presentation of Financial Statements" for Loan covenants

i) Ahmedabad - Maliya Tollway Private Limited (Formerly known as Ahmedabad Maliya Tollway Limited)
The secured term loan from bank is subject to the following financial covenants:

a) Debt Service Coverage Ratio (DSCR) shall be maintained at not less than 1.20 at annual intervals for the entire tenor of the Facility. DSCR means ratio of cash flow available for debt servicing (CFADS) to an amount equal to the sum of interest/coupon on and repayment of the term loan in trailing 12 months.
b) the Debt/ CFADS ratio shall be maintained at not more than 7.50.
c) the Interest Service Coverage Ratio (ISCR) shall be maintained at not less than 1.50. ISCR means ratio of CFADS to an amount equal to the sum of the interest on the secured Facilities for the trailing 12 months as per the applicable Lending Rate.

The above financial covenants are tested half yearly, at 30 September and 31 March.

ii) Deccan Tollways Private Limited (Formerly known as L&T Deccan Tollways Limited)
The secured term loan from bank is subject to the following financial covenants:

a) Debt Service Coverage Ratio (DSCR) shall be maintained at not less than 1.20 at annual intervals for the entire tenor of the Facility. DSCR means ratio of cash flow available for debt servicing (CFADS) to an amount equal to the sum of interest/coupon on and repayment of the term loan in trailing 12 months.
b) the Debt/ CFADS ratio shall be maintained at not more than 6.50.
c) the Interest Service Coverage Ratio (ISCR) shall be maintained at not less than 1.70. ISCR means ratio of CFADS to an amount equal to the sum of the interest on the secured Facilities for the trailing 12 months as per the applicable Lending Rate.

The above financial covenants are tested half yearly, at 30 September and 31 March.

iii) Sambalpur Rourkela Tollway Private Limited (Formerly L&T Sambalpur Rourkela Tollway Limited)
The secured term loan from bank is subject to the following financial covenants:

a) Debt Service Coverage Ratio (DSCR) shall be maintained at not less than 1.20 at annual intervals for the entire tenor of the Facility. DSCR means ratio of cash flow available for debt servicing (CFADS) to an amount equal to the sum of interest/coupon on and repayment of the term loan in trailing 12 months.
b) the Debt/ CFADS ratio shall be maintained at not more than 8.00.
c) the Interest Service Coverage Ratio (ISCR) shall be maintained at not less than 2.00. ISCR means ratio of CFADS to an amount equal to the sum of the interest on the secured Facilities for the trailing 12 months as per the applicable Lending Rate.

The above financial covenants are tested half yearly, at 30 September and 31 March.

iv) Rajkot-Vadinar Tollway Private Limited (Formerly L&T Rajkot-Vadinar Tollway Limited)
The secured term loan from financial institution is subject to the following financial covenant:

Debt Service Coverage Ratio (DSCR) shall be maintained at not less than 1.10 at annual intervals for the entire tenor of the Facility.

Debt Service Coverage Ratio or DSCR shall mean the ratio of (A) and (B) as below:
(A) the aggregate of operating cash flow available for debt servicing (profit after tax after providing for/ expensing major maintenance expense plus depreciation plus amortization plus other non-cash items plus Interest plus all infusion brought in by Sponsor towards meeting debt service requirements of the Borrower in connection with the Facility, O&M and major maintenance expenses expensed from P&L (profit and loss)); and
(B) an amount equal to the sum of Interest, Commission, Repayment Installments payable to Lenders for the period.

The above financial covenant is tested half yearly, at 30 September and 31 March.

v) Dhola Infra Projects Private Limited
The secured term loan from bank is subject to the following financial covenants:

a) Debt Service Coverage Ratio (DSCR) shall be maintained at not less than 1.20 at annual intervals for the entire tenor of the Facility. DSCR means ratio of cash flow available for debt servicing (CFADS) to an amount equal to the sum of interest/coupon on and repayment of the term loan and other financing costs payable of the borrower for that period.
b) the Debt/ EBIDTA ratio shall be maintained at not more than 4.75.
c) the Interest Service Coverage Ratio (ISCR) shall be maintained at not less than 2.15. ISCR means ratio of CFADS to an amount equal to the sum of the interest on the secured Facilities for that period as per the applicable Lending Rate.

The above financial covenants are tested half yearly, at 30 September and 31 March.

vi) Dibang Infra Projects Private Limited

The secured term loan from bank is subject to the following financial covenants:

a) Debt Service Coverage Ratio (DSCR) shall be maintained at not less than 1.20 at annual intervals for the entire tenor of the Facility. DSCR means ratio of cash flow available for debt servicing (CFADS) to an amount equal to the sum of interest/coupon on and repayment of the term loan and other financing costs payable of the borrower for that period.
b) the Debt/ EBIDTA ratio shall be maintained at not more than 5.30.
c) the Interest Service Coverage Ratio (ISCR) shall be maintained at not less than 2.15. ISCR means ratio of CFADS to an amount equal to the sum of the interest on the secured Facilities for that period as per the applicable Lending Rate.

The above financial covenants are tested half yearly, at 30 September and 31 March.

vii) Jorabat Shillong Expressway Limited

The secured non convertible debenture from bank is subject to the following financial covenant:

Debt Service Coverage Ratio (DSCR) shall be maintained at not less than 1.10 at annual intervals for the entire tenor of the Facility.
DSCR means DSCR = Annuity received (as defined in the Concession Agreement) Less O&M (excluding Major Maintenance Expenditure) and administrative & general expenses less Tax paid less infusion into MMRA as per Schedule XII less any cost overrun on MMRA plus infusion by Sponsor Group divided by Debt Servicing Requirement pertaining to the relevant 12 months period.

The above financial covenant is tested half yearly, at 30 September and 31 March.

viii) Thrissur Expressway Limited

The secured term loan from bank is subject to the following financial covenants

a) Debt Service Coverage Ratio (DSCR) shall be maintained at not less than 1.20 at annual intervals for the entire tenor of the Facility. DSCR means ratio of cash flow available for debt servicing (CFADS) to an amount equal to the sum of interest/coupon on and repayment of the term loan in trailing 12 months.
b) the Debt/ CFADS ratio shall be maintained at not more than 7.50.
c) the Interest Service Coverage Ratio (ISCR) shall be maintained at not less than 1.50. ISCR means ratio of CFADS to an amount equal to the sum of the interest on the secured Facilities for the trailing 12 months as per the applicable Lending Rate.

The above financial covenants are tested half yearly, at 30 September and 31 March.

Financial Covenants of SPV Group

All the SPVs within the Group have satisfied all the financial covenants as prescribed in the terms of respective loan/debenture agreement as at December 31, 2025. The SPVs within the Group has no indication that it will have difficulty complying with covenant in the next 12 months.

(12) Provisions

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Non-current :				
Provision for gratuity (refer note 25 & 41)	45.45	20.57	15.86	14.67
Provision for periodic major maintenance (refer note 24)	4,468.58	2,703.21	4,266.70	2,757.63
	4,514.03	2,723.78	4,282.56	2,772.31

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Current :				
Provision for gratuity (refer note 25 & 41)	0.34	0.18	0.04	0.47
Provision for compensated absences (refer note 25 & 41)	17.66	18.89	23.21	37.69
Provision for periodic major maintenance (refer note 24)	3,758.76	5,138.11	2,591.98	3,305.30
	3,776.76	5,157.18	2,615.23	3,343.46

(13) Trade payables

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Total outstanding dues of micro enterprises and small enterprises	22.68	122.88	105.21	85.20
Total outstanding dues of creditors other than micro enterprises and small enterprises	1,071.63	981.40	1,247.40	3,145.24
	1,094.31	1,104.28	1,352.61	3,230.44

Trade payables are non-interest bearing and are normally settled on 30 to 60 day terms. Refer note 30(ii) for the ageing of trade payables.

(14) Other financial liabilities (At amortised cost)

Non Current

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Premium obligation/Concession fees payable to highway authorities (refer note (i))	22,922.45	23,695.96	24,301.27	24,665.59
Deferred premium obligation to highway authorities (refer note (ii))	11,335.53	11,328.53	11,934.98	10,715.46
Interest accrued on premium obligation (refer note (i & ii))	7,078.62	6,005.36	4,857.56	3,828.34
Security Deposits	5.31	11.46	15.29	16.16
	41,341.91	41,041.31	41,109.10	39,225.55

Notes:

i In connection with the grant of the Concession, the SPV Group is obligated to pay premium/concession fee to highway authorities as specified in the respective Service Concession Agreements. The SPV Group has recorded this liability for the amount payable to highway authorities over the concession period, applying an effective interest rate ranging from 10.5% to 12.25%.

ii In respect of certain project SPVs highway authorities have approved deferment of premium obligation and it carries interest @ 2% over and above the Reserve Bank of India bank rate. The repayment is in accordance with the cash surplus accruing in the respective project SPVs over the concession period.

(14) Other financial liabilities (At amortised cost) (Contd.)

Current

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Interest accrued but not due on borrowings	192.11	34.13	123.50	2,637.87
Payable for capital supplies / services	2.32	9.79	0.33	160.63
Premium obligation/Concession fees payable to highway authorities (refer note (i) above)	1,217.77	972.43	847.77	739.41
Deferred premium obligation to highway authorities (refer note (ii) above)	1,995.94	1,955.42	1,237.43	2,365.06
Interest accrued on premium obligation (refer note (i & ii) above)	-	-	253.56	54.05
Employee benefits payable	18.39	34.22	35.75	58.48
Payable to highway authorities	182.11	222.99	238.18	128.88
Other payables	3.64	12.22	31.82	60.95
	3,612.28	3,241.20	2,768.34	6,205.33

(15) Other liabilities

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Current				
Advances received from authorities	189.57	196.20	230.47	1,218.04
Statutory dues payable	115.37	59.69	250.45	156.37
Other liabilities	15.22	18.55	10.35	16.41
	320.16	274.44	491.27	1,390.82

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(16) Revenue from operations

Particulars	Nine months period ended December 31, 2025	Year ended March 31, 2025	Year ended March 31, 2024	Year ended March 31, 2023
Revenue from contracts with customers				
Toll collection	13,804.48	17,179.29	16,196.21	15,259.26
Income from operation and maintenance services	298.26	1,332.44	998.45	543.41
Income from change of scope	39.58	31.23	26.49	40.79
Construction revenue	-	137.74	157.61	365.18
	14,142.32	18,680.70	17,378.76	16,208.64
Other operating revenue				
Finance income on receivable under service concession arrangements	821.32	1,189.76	1,352.97	1,526.52
	821.32	1,189.76	1,352.97	1,526.52
	14,963.64	19,870.46	18,731.73	17,735.16

Refer note 31 for "Disclosures pursuant to Indian Accounting Standard (Ind AS) 115, Revenue from Contracts with Customers".

(17) Other income

Particulars	Nine months period ended December 31, 2025	Year ended March 31, 2025	Year ended March 31, 2024	Year ended March 31, 2023
Net gain on sale of investment in mutual funds	303.60	424.30	397.65	176.70
Net gain on investments measured at fair value through profit and loss	44.77	119.41	15.04	110.89
Profit on sale of property, plant and equipment (net)	1.33	-	-	1.73
Income from insurance claims	39.70	18.67	23.72	1.22
Rental income	3.38	1.90	1.59	1.11
Provision/Liabilities no longer required written back	1.54	24.71	106.43	16.85
Modification gain on financial assets	-	-	16.43	-
Interest income on :				
Fixed deposits	336.01	538.22	929.23	784.98
Financial assets recognised at amortised cost	0.47	0.53	0.71	0.68
Income tax refund	6.35	83.52	7.28	4.78
Interest Income on account of claim settlement with authorities	-	532.57	143.37	-
Miscellaneous income	3.10	41.88	12.11	18.85
	740.25	1,785.71	1,653.57	1,117.79

(18) Operation and maintenance expense

Particulars	Nine months period ended December 31, 2025	Year ended March 31, 2025	Year ended March 31, 2024	Year ended March 31, 2023
Toll management fees	326.18	407.17	323.51	246.40
Security services	106.31	149.46	137.97	121.58
Repairs and maintenance of highways	598.63	944.47	1,136.01	1,087.43
Periodic major maintenance expense	1,727.65	3,661.71	3,828.97	4,014.13
Construction expenses*	-	130.33	149.61	333.71
Change of scope expenses	13.66	15.26	5.57	66.64
Insurance	34.70	96.10	150.12	172.58
Power and fuel	77.75	114.21	128.64	150.40
Professional Fees	56.51	66.63	86.85	84.34
	2,941.39	5,585.34	5,947.26	6,277.21

* Pertains to sub-contracting charges and labour charges

(19) Employee benefit expense

Particulars	Nine months period ended December 31, 2025	Year ended March 31, 2025	Year ended March 31, 2024	Year ended March 31, 2023
Salaries, wages and bonus	317.82	484.33	499.04	525.75
Gratuity expenses (refer note 25 & 41)	14.95	7.71	7.10	9.78
Contribution to provident and other funds (refer note 25)	26.69	25.38	26.55	24.45
Staff welfare expenses	13.93	31.18	37.15	34.95
	373.39	548.60	569.84	594.92

(20) Finance costs

Particulars	Nine months period ended December 31, 2025	Year ended March 31, 2025	Year ended March 31, 2024	Year ended March 31, 2023
Interest for financial liabilities at amortised cost				
- Term loan	2,430.93	3,902.04	4,385.63	4,453.40
- Non-convertible debentures	590.65	895.98	3,438.48	883.01
- Compulsorily Convertible Debentures (CCDs)	1,266.03	1,251.07	-	-
- Unsecured loans	47.42	95.06	0.65	8.14
- Lease liabilities	4.95	5.36	1.19	2.04
- Additional concession fees	3,329.39	4,439.84	4,389.31	4,207.86
Unwinding of Interest on major maintenance provision (refer note 24)	634.17	741.78	651.68	364.08
Other borrowing costs*	13.20	175.27	186.40	166.53
	8,316.74	11,506.41	13,053.33	10,085.06

*Other borrowing costs includes term loan processing fees, prepayment charges of term loan and commitment fees for restructuring of debt.

(21) Other expenses

Particulars	Nine months period ended December 31, 2025	Year ended March 31, 2025	Year ended March 31, 2024	Year ended March 31, 2023
Legal and professional fees	301.53	326.44	296.73	330.26
Additional concession fees	502.72	522.19	425.55	460.34
Rent (Expense relating to leases of low-value assets)	23.58	46.51	41.73	37.44
Rates and taxes	5.83	12.79	5.99	12.27
Travelling expenses	32.53	62.07	77.38	74.85
Directors fees	0.15	0.74	10.14	8.66
Office insurance expenses	7.60	12.06	17.61	15.83
Office maintenance expenses	18.66	95.66	109.43	113.08
CSR expenditure	-	29.45	14.04	41.22
Bad debts written off	0.37	25.26	128.17	17.84
Provision for doubtful debts	5.10	0.16	12.97	0.05
Loss/ disposal of property, plant and equipment/Intangible asset (net)	-	0.26	3.90	-
Modification loss on financial assets	-	-	38.29	-
Miscellaneous expenses	61.72	39.12	92.20	27.33
	959.79	1,172.72	1,274.13	1,139.17

(22) Income tax

Balance sheet

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Income tax assets (net)	722.58	689.53	730.01	660.17
	722.58	689.53	730.01	660.17

The major components of income tax expense for the period/year are:

Statement of profit and loss

Particulars	Nine months period ended December 31, 2025	Year ended March 31, 2025	Year ended March 31, 2024	Year ended March 31, 2023
Current income tax:				
Current income tax	46.31	42.64	355.56	200.32
Deferred tax	-	(26.75)	3.80	(4.05)
Tax relating to earlier periods	-	6.30	0.41	5.50
Income tax expense reported in the statement of profit or loss	46.31	22.19	359.77	201.77

The reconciliation between the provision of income tax of the SPV Group and amounts computed by applying the Indian statutory income tax rate to profit before tax is as follows:

Particulars	Nine months period ended December 31, 2025	Year ended March 31, 2025	Year ended March 31, 2024	Year ended March 31, 2023
Loss before tax	(2,144.17)	(4,155.32)	(7,381.41)	(6,338.31)
Enacted income tax rate in India	25.17%	25.17%	25.17%	25.17%
Computed expected tax	(539.64)	(1,045.81)	(1,857.75)	(1,595.22)
Effect of:				
Impact due to change in tax rates	-	(26.75)	-	-
Deferred tax asset not recognised on losses*	585.95	1,094.75	2,213.72	1,801.04
Others	-	-	3.80	(4.05)
Income tax expense recognised in the statement of profit and loss	46.31	22.19	359.77	201.77

* In the absence of reasonable certainty about future taxable profits arising from respective SPVs, management has not recognised deferred tax assets on carried forward losses.

The SPV Group has accumulated business tax losses which arose in India of INR 30,556.93 millions (March 31, 2025: INR 30,556.93 millions, March 31, 2024: INR 32,201.10 millions and March 31, 2023: INR 30,909.71 millions) that are available for offsetting for eight years against future taxable profits of the respective SPV's in which the losses arose. These losses will expire from March 31, 2026 to March 31, 2033.

The SPV Group has accumulated long term capital losses which arose in India of INR 900.51 millions (March 31, 2025: INR 900.51 millions, March 31, 2024: INR 13,233.16 millions and March 31, 2023: INR 13,246.78 millions) that are available for offsetting for eight years against future taxable capital profits of the respective SPV's in which the losses arose. These losses will expire from March 31, 2026 to March 31, 2033.

Breakup of deferred tax asset/liabilities

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Deferred tax assets				
Provision for gratuity	11.52	5.22	4.00	3.81
Provision for compensated absences	4.45	4.75	5.84	9.49
Others	10.23	16.22	25.96	26.30
Total	26.20	26.20	35.80	39.60
Deferred tax liabilities				
On unrealised gain on fair valuation of financial assets	57.78	57.78	94.13	94.13
Total	57.78	57.78	94.13	94.13
Net deferred tax asset	(31.58)	(31.58)	(58.33)	(54.53)
Net deferred tax liabilities recognised (DTA restricted to the extent of DTL, except MAT credit entitlement)	31.58	31.58	58.33	54.53

MAT Credit has not been recognised in the absence of certainty of future sufficient taxable profit for utilisation of MAT Credit.

(23) Earnings per unit ("EPU")

The number of units that Citius Transnet Investment Trust ("The Trust") will issue to investors in connection with the proposed Initial Public Issue is not presently ascertainable. Hence the disclosures in respect of Earnings per unit have not been presented.

(24) Provision for periodic major maintenance

The SPV Group is required to operate and maintain the project highway during the entire concession period and hand over the project back to the Authority as per the maintenance standards prescribed in Concession agreement.

For this purpose, a regular maintenance along with periodic maintenances is required to be performed. Normally periodic maintenance includes resurface of pavements, repairs of structures and other equipment's and maintenance of service roads.

The maintenance/overlay costs may vary based on the actual usage during maintenance period. Accordingly, on the grounds of matching cost concept and based on technical estimates, a provision for major maintenance expenses is reviewed and is provided for in the financial statements annually.

Movement in provision

Particulars	Nine months period ended December 31, 2025	Year ended March 31, 2025	Year ended March 31, 2024	Year ended March 31, 2023
Carrying amount as at the beginning of the period/year	7,841.32	6,858.68	6,062.93	3,414.80
Add: Additional provision made during the period/year	1,664.48	2,879.25	3,449.31	3,944.38
Less: Utilisation of provision during the period/year	1,912.63	2,638.39	3,305.24	1,660.33
Add: Effect of unwinding of interest	634.17	741.78	651.68	364.08
Carrying amount as at the end of the period/year	8,227.34	7,841.32	6,858.68	6,062.93
- Presented as Non-Current	4,468.58	2,703.21	4,266.70	2,757.63
- Presented as Current	3,758.76	5,138.11	2,591.98	3,305.30

Notes:

i. The expected period of utilisation of non-current provision is as per project lifecycle of the respective project SPVs.

ii. The expected period of utilisation of current provision is within next 1 year.

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(25) Disclosures for Employee Benefits

Sl. No.	Particulars	Nine months period ended December 31, 2025	Year ended March 31, 2025	Year ended March 31, 2024	Year ended March 31, 2023
a.	Defined Contribution plan				
	Contribution to Provident fund	16.67	21.17	21.26	20.81
	Total	16.67	21.17	21.26	20.81

The SPV Group's provident fund is the defined contribution plans. The SPV Group's is required to contribute a specified percentage of payroll costs to the recognised provident fund to fund the benefits. The only obligation of the Company with respect to these plans is to make the specified contributions.

b. Defined benefit plan - gratuity

The SPV Group has a defined benefit post employment gratuity plan. Every employee who has completed five years or more of service gets a gratuity pay-out as per the Payment of Gratuity Act, 1972.

The SPV Group operates gratuity plan through LIC's Group Gratuity scheme where every employee is entitled to the benefit equivalent to fifteen days salary last drawn for each completed year of service. The same is payable on termination of service or retirement whichever is earlier. The benefit vests after five years of continuous service.

The following table sets out the components of net gratuity benefit expense recognised in Special Purpose Combined Statement of Profit and Loss and the funded status and amounts recognised in the Special Purpose Combined Balance Sheet for the respective plans:

	Particulars	Nine months period ended December 31, 2025	Year ended March 31, 2025	Year ended March 31, 2024	Year ended March 31, 2023
i	Expense recognized in Statement of Profit & Loss for the period/year (Refer Note 19 - Employee benefits expense)				
	Current service cost	3.94	6.71	6.43	9.21
	Past service cost (refer note 41)	9.84	-	0.16	0.10
	Net interest cost	1.17	1.01	0.51	0.47
	Total expense charged to Statement of Profit & loss	14.95	7.71	7.10	9.78
ii	Expense recognized in Other Comprehensive Income for the period/year				
	Due to changes in demographic assumptions	(4.44)	-	-	-
	Due to changes in financial assumptions	15.53	2.57	0.41	(3.21)
	Due to changes in experience adjustments	2.43	11.21	(0.85)	2.76
	Return on plan assets excluding amounts included in Interest income	(0.35)	(1.30)	(0.21)	0.74
	Total expense/ (income) recognised in Other Comprehensive Income	13.17	12.48	(0.65)	0.30
iii	Amounts recognised in Balance Sheet are as follows				
	Present value of defined benefit obligation				
	- Wholly funded	89.75	72.00	59.17	65.13
	- Wholly unfunded	3.68	3.77	3.82	2.44
	Less : Fair value of plan assets	(47.64)	(55.02)	(47.09)	(52.43)
	Total	45.79	20.75	15.90	15.14
iv	Reconciliation of defined benefit obligation				
	Opening balance of defined benefit obligation	75.77	59.86	61.97	61.17
	Current service cost	3.94	7.04	7.04	7.34
	Interest cost	3.68	3.75	4.06	3.98
	Actuarial loss / (gain) due to changes in assumptions	13.59	13.13	(0.26)	1.35
	Past service cost (refer note 41)	9.84	-	-	-
	Effect of acquisition/ (divestiture)	1.23	-	-	-
	Transfer in/ (out)	(2.95)	(0.55)	0.16	0.12
	Benefits paid	(11.67)	(7.47)	(13.11)	(11.98)
	Closing Balance of defined benefit obligation	93.43	75.77	59.86	61.97
v	Reconciliation of Plan Assets:				
	Opening Value of Assets	55.03	46.12	52.48	51.73
	Expected return on plan assets	0.37	-	-	-
	Interest Income	2.11	3.18	3.60	3.56
	Return on plan assets excluding amounts included in interest income	0.74	1.17	0.17	(0.35)
	Contributions by employer	1.07	11.38	3.79	9.47
	Benefit Paid	(11.67)	(6.83)	(12.93)	(11.97)
	Closing value of plan assets	47.64	55.03	47.10	52.45
vi	The principal assumptions used in determining above defined benefit obligations for the Company's plan are as under:				
	Discount Rate	6% - 7.50%	6% - 7.50%	6% - 7.50%	6% - 7.50%
	Salary growth rate	6% - 10%	6% - 10%	6% - 10%	6% - 10%
	Withdrawal rates	3% to 15% based on the age band	3% to 15% based on the age band	3% to 15% based on the age band	3% to 15% based on the age band
	Mortality Rates	Indian Assured Lives Mortality (2012-14) ULT	Indian Assured Lives Mortality (2012-14) ULT	Indian Assured Lives Mortality (2012-14) ULT	Indian Assured Lives Mortality (2012-14) ULT
	Expected average remaining working life	4.5 years to 9.5 years	4.5 years to 9.5 years	4.5 years to 9.5 years	4.5 years to 9.5 years

(25) Disclosures for Employee Benefits (Contd.)

	Particulars	Nine months period ended December 31, 2025	Year ended March 31, 2025	Year ended March 31, 2024	Year ended March 31, 2023
vii	Sensitivity analysis of Defined benefit obligation (DBO) for changes in significant assumptions is as under:				
	Salary growth rate				
	50 basis - 100 basis point increase	96.69	73.49	57.62	61.62
	50 basis - 100 basis point decrease	90.45	68.95	54.18	58.04
	Discount Rate				
	50 basis - 100 basis point increase	90.37	68.97	54.21	58.04
	50 basis - 100 basis point decrease	96.85	73.50	57.63	61.44
	Withdrawal rate				
	50 basis - 100 basis point increase	92.83	71.10	56.12	59.81
	50 basis - 100 basis point decrease	94.11	70.90	55.55	59.46
	Mortality (increase in expected life)				
	increase in expected life by 1 year	Negligible change	Negligible change	Negligible change	Negligible change
	increase in expected life by 3 years	Negligible change	Negligible change	Negligible change	Negligible change
viii	Compensated absences				
	Expense pertaining to Compensated absences	7.46	2.82	6.07	6.18
	Outstanding liability for Compensated absences	17.66	18.89	23.21	37.69

c. Risk to the Plan

Following are the risk to which the plan exposes the entity :

i. Actuarial Risk: It is the risk that benefits will cost more than expected. This can arise due to one of the following reasons:
Adverse Salary Growth Experience: Salary hikes that are higher than the assumed salary escalation will result into an increase in obligation at a rate that is higher than expected.
Variability in mortality rates: If actual mortality rates are higher than assumed mortality rate assumption than the Gratuity benefits will be paid earlier than expected. Since there is no condition of vesting on the death benefit, the acceleration of cash flow will lead to an actuarial loss or gain depending on the relative values of the assumed salary growth and discount rate.
Variability in withdrawal rates: If actual withdrawal rates are higher than assumed withdrawal rate assumption than the Gratuity benefits will be paid earlier than expected. The impact of this will depend on whether the benefits are vested as at the resignation date.

ii. Investment Risk: For funded plans that rely on insurers for managing the assets, the value of assets certified by the insurer may not be the fair value of instruments backing the liability. In such cases, the present value of the assets is independent of the future discount rate. This can result in wide fluctuations in the net liability or the funded status if there are significant changes in the discount rate during the inter-valuation period.

iii. Liquidity Risk: Employees with high salaries and long durations or those higher in hierarchy, accumulate significant level of benefits. If some of such employees resign / retire from the company there can be strain on the cash flows.

iv. Market Risk: Market risk is a collective term for risks that are related to the changes and fluctuations of the financial markets. One actuarial assumption that has a material effect is the discount rate. The discount rate reflects the time value of money. An increase in discount rate leads to decrease in Defined Benefit Obligation of the plan benefits & vice versa. This assumption depends on the yields on the corporate / government bonds and hence the valuation of liability is exposed to fluctuations in the yields as at the valuation date.

v. Legislative Risk: Legislative risk is the risk of increase in the plan liabilities or reduction in the plan assets due to change in the legislation / regulation. The government may amend the Payment of Gratuity Act thus requiring the companies to pay higher benefits to the employees. This will directly affect the present value of the Defined Benefit Obligation and the same will have to be recognized immediately in the year when any such amendment is effective.

(26) Capital and other commitments

(a) Commitments

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Estimated amount of EPC contract remaining to be executed (net of advances)	-	46.60	-	-
Other capital commitment	7.71	4.99	0.16	0.16
Total	7.71	51.59	0.16	0.16

(b) Other Commitments

i The SPV Group is required to operate and maintain the project highway during the entire concession period and hand over the project back to the Authority as per the maintenance standards prescribed in concession agreement with authorities for Design-Build-Finance-Operate-Transfer ("DBFOT") highways for the period of 18 to 25 years for its SPV assets.

ii The Government of Gujarat through Gujarat State Road Development Corporation Limited vide its letter GSRDC/CS/Shantipura Chokdi to Khoraj/2025/2923 dated 07/10/2025 awarded AMTPL with a contract to augment the section of existing four-lane from Chainage 13.930 to Chainage 42.682 to six-lane (for a length of 28.752 km) forming part of the Existing Project Highway. Pursuant to this, During the period ended December 31, 2025, AMTPL has entered into an EPC contract of Rs. 9,015 millions for construction of above road.

(27) Contingent liabilities

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
In respect of Income Tax matters (refer note (i))	1,215.19	1,376.31	2,178.51	1,709.61
In respect of Indirect Tax matters (refer note (ii))	2,566.10	2,567.66	2,446.30	190.38
In respect of guarantee and securities offered (refer note (iii))	775.19	2,133.70	3,718.70	3,985.50
In respect of other matters (refer note (iv))	573.35	9.75	9.75	58.63
Total	5,129.83	6,087.42	8,353.26	5,944.12

i The SPV Group is contesting Income tax related demand/notices with respect to certain disallowance proposed by the Income tax authorities such as method of amortisation of intangibles, notional interest computed under IND AS etc. Management believes that it's position will likely be upheld in the appellate process. No expense has been accrued in the special purpose combined financial statements for the tax demands/notices raised. The management believes that the ultimate outcome of the proceedings will not have a material adverse effect on the SPV Group financial position and results of the operations.

ii The SPV Group is contesting Excise, Service Tax and Goods and Services Tax related demand/notices with respect to additional tax demanded by the tax authorities on certain annuity payments collected from highway authorities. Management believes that it's position will likely be upheld in the appellate process. No expense has been accrued in the special purpose combined financial statements for the tax demands/notices raised. The management believes that the ultimate outcome of the proceedings will not have a material adverse effect on the SPV Group financial position and results of the operations.

iii Guarantees include bank guarantees given against certain on going arbitrations on behalf of EPIC Transnet Infrastructure Private Limited (formerly known as Watrak Infrastructure Private Limited)/Neelambur Madukkari Tollway Private Limited (formerly known as Transportation Infrastructure Limited), DSRA (Debt Service Reserve Account) and bid bond guarantees.

iv The SPV Group has received communication from Accountant General, Ahmedabad, the Office of the Superintendent of Stamps and Registration, Gandhinagar alleging that the Concession Agreement ("CA") was not adequately stamped and has instructed to pay additional stamp duty for Ahmedabad - Maliya Tollway Private Limited ("AMTPL") & Rajkot-Vadinar Tollway Private Limited ("RVTPL"). No liability has been recognised in the special purpose combined financial statements for the demand raised. The management believes that the ultimate outcome of the proceedings will not have a material adverse effect on the SPV Group financial position and results of the operations.

(28) Fair value disclosures

(i) Fair value hierarchy

For financial instruments measured at fair value in the Balance sheet, a three level fair value hierarchy is used that reflects the significance of inputs used in measurements. The hierarchy gives highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (Level 1 measurements) and lowest priority to unobservable inputs (Level 3 measurements).

The categories used are as follows :

- Level 1 : Quoted (unadjusted) market prices in active markets for identical assets or liabilities
- Level 2 : Valuation techniques for which the lowest level input that is significant to the fair value measurement is directly or indirectly observable.
- Level 3 : Valuation techniques for which the lowest level input that is significant to the fair value measurement is unobservable.

For assets and liabilities which are carried at fair value, the classification of fair value calculations by category is summarized below -

Particulars	Fair value measurement at end of the reporting period using		
	Level 1	Level 2	Level 3
Assets measured at fair value			
December 31, 2025			
Investment in mutual funds	8,367.57	-	-
March 31, 2025			
Investment in mutual funds	7,548.32	-	-
March 31, 2024			
Investment in mutual funds	4,197.95	-	-
March 31, 2023			
Investment in mutual funds	5,582.13	-	-
Liabilities for which fair value disclosure are given:			
December 31, 2025			
Borrowings	-	1,370.00	-
March 31, 2025			
Borrowings	-	-	-
March 31, 2024			
Borrowings	-	-	-
March 31, 2023			
Borrowings	-	-	-

Particulars	Fair value measurement at end of the reporting period using		
	Level 1	Level 2	Level 3
Assets for which fair values are disclosed			
December 31, 2025			
Investment Properties*	-	70.80	-
Total assets	-	-	1,55,627.51
March 31, 2025			
Investment Properties	-	70.80	-
Total assets	-	-	1,49,388.52
March 31, 2024			
Investment Properties	-	56.50	-
Total assets	-	-	1,60,154.35
March 31, 2023			
Investment Properties	-	55.40	-

The fair value of investments in mutual fund units is based on the net asset value ('NAV') as stated by the issuers of these mutual fund units in the published statements as at each reported balance sheet date. NAV represents the price at which the issuer will issue further units of mutual fund and the price at which issuers will redeem such units from the investor.

*The SPV Group performs fair valuation of investment properties on an annual basis and there is no significant change in fair value as at December 31, 2025 compared to March 31, 2025.

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The Group is required to present the Statement of total assets at fair value and Statement of total returns at fair value as per SEBI Circular No. SEBI/HO/DDHS-PoD-2/P/CIR/2025/102 dated July 11, 2025 as a part of these Special purpose combined financial statements - Refer Statement of Net assets at fair value and Statement of Total Returns at fair value.
The inputs to the valuation models for computation of fair value of assets for the above mentioned statements are taken from observable markets where possible, but where this is not feasible, a degree of judgement is required in establishing fair values. Judgements include considerations of inputs such as WACC, Tax rates, Inflation rates, etc.

The significant unobservable inputs used in the fair value measurement required for disclosures as above categorised within Level 3 of the fair value hierarchy as above together with a quantitative sensitivity analysis as at December 31, 2025, March 31, 2025 and March 31, 2024 are as shown below:

Description of significant unobservable inputs to valuation:

Significant unobservable inputs	Input for December 31, 2025	Input for March 31, 2025	Input for March 31, 2024	Sensitivity of Input to the fair value	Increase/(decrease) in fair value as at		
					December 31, 2025	March 31, 2025	March 31, 2024
WACC	7.59% - 10.41%	8.26% - 10.79%	8.69% - 11.21%	0.50%	(3,029.98)	(2,827.78)	(2,904.40)
				-0.50%	3,171.88	2,963.70	3,048.67
Tax rate (normal tax and MAT)	MAT: 16.31% - 17.47% Tax: 25.17% - 34.94%	MAT: 16.69% - 17.47% Tax: 25.17% - 34.94%	MAT: 16.69% - 17.47% Tax: 25.17% - 34.94%	2.00%	(1,303.26)	(815.10)	(684.37)
				-2.00%	1,279.04	817.07	699.53
Inflation rate for expenses	5.00% - 5.75%	3.49% - 5.32%	3.49% - 5.32%	1.00%	(767.21)	(178.40)	(157.53)
				-1.00%	713.59	185.89	167.03

(ii) Fair Value of instruments measured at amortised cost:
Set out below is a comparison, by class, of the carrying amounts and fair value of the SPV Group's financial instruments:

Particulars	As at December 31, 2025		As at March 31, 2025	
	Carrying value	Fair value	Carrying value	Fair value
Financial assets				
Cash and cash equivalents	1,539.86	1,539.86	1,857.33	1,857.33
Other bank balances	3,826.99	3,826.99	2,654.90	2,654.90
Trade receivables	484.27	484.27	223.68	223.68
Receivable under service concession arrangements	10,356.28	10,356.28	10,917.71	10,917.71
Other financial assets	3,302.08	3,302.08	2,483.41	2,483.41
Total financial assets	19,509.48	19,509.48	18,137.03	18,137.03
Financial liabilities				
Borrowings	59,087.90	59,087.90	66,999.94	66,999.94
Lease liabilities	93.30	93.30	63.21	63.21
Trade payables	1,094.31	1,094.31	1,104.28	1,104.28
Other financial liabilities	44,954.19	44,954.19	44,282.51	44,282.51
Total financial liabilities	1,05,229.70	1,05,229.70	1,12,449.94	1,12,449.94

Particulars	As at March 31, 2024		As at March 31, 2023	
	Carrying value	Fair value	Carrying value	Fair value
Financial assets				
Cash and cash equivalents	13,405.18	13,405.18	4,273.21	4,273.21
Other bank balances	4,194.70	4,194.70	7,195.50	7,195.50
Trade receivables	228.24	228.24	394.07	394.07
Receivable under service concession arrangements	11,757.49	11,757.49	13,645.38	13,645.38
Other financial assets	3,027.38	3,027.38	9,991.59	9,991.59
Total financial assets	32,612.99	32,612.99	35,499.75	35,499.75
Financial liabilities				
Borrowings	61,715.24	61,715.24	61,859.50	61,859.50
Lease liabilities	29.74	29.74	8.36	8.36
Trade payables	1,352.61	1,352.61	3,230.44	3,230.44
Other financial liabilities	43,877.44	43,877.44	45,430.88	45,430.88
Total financial liabilities	1,06,975.03	1,06,975.02	1,10,529.17	1,10,529.17

The carrying amount of financial assets and financial liabilities measured at amortised cost in these special purpose combined financial statements are a reasonable approximation of their fair values since the SPV Group does not anticipate that the carrying amounts would be significantly different from the values that would eventually be received or settled. The fair value of the financial assets and liabilities is included at the amount at which the instrument could be exchanged in a current transaction between willing parties, other than in a forced or liquidation sale. The following methods and assumptions were used to estimate the fair values:
(a) Long-term receivables are evaluated by the group based on parameters such as interest rates, individual credit worthiness of the customer and other market risk factors.
(b) The fair values of the SPV Group's loans and receivables from/to related parties and others are determined by applying discounted cash flows ('DCF') method, using discount rate that reflects the issuer's borrowing rate as at the end of the reporting period. The own non-performance risk as at the reporting period end was assessed to be insignificant.
(c) The fair values of the SPV Group's Premium obligation/Concession fees payable to highway authorities and others are determined by applying discounted cash flows ('DCF') method, using discount rate that reflects the issuer's borrowing rate as at the end of the reporting period.
(d) The long term borrowing facilities availed by the SPV Group with a variable rate of interest are subject to changes in underlying interest rate indices. The management believes that the current rate of interest on these variable rate loans are in close approximation from market rates applicable to the SPV Group. Therefore, the management estimates that the fair value of these borrowings are approximate to their respective carrying values.

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(29) Financial Risk Management

(i) Financial instruments by category:

Particulars	As at December 31, 2025			As at March 31, 2025		
	Amortised cost	FVTPL	FVOCI	Amortised cost	FVTPL	FVOCI
Financial assets						
Cash and cash equivalents	1,539.86	-	-	1,857.33	-	-
Investments	-	8,367.57	-	-	7,548.32	-
Other bank balances	3,826.99	-	-	2,654.90	-	-
Trade receivables	484.27	-	-	223.68	-	-
Receivable under service concession arrangements	10,356.28	-	-	10,917.71	-	-
Other financial assets	3,302.08	-	-	2,483.41	-	-
Total	19,509.48	8,367.57	-	18,137.03	7,548.32	-
Financial liabilities						
Borrowings	57,717.90	1,370.00	-	66,999.94	-	-
Lease liabilities	93.30	-	-	63.21	-	-
Trade payables	1,094.31	-	-	1,104.28	-	-
Other financial liabilities	44,954.19	-	-	44,282.51	-	-
Total	1,03,859.70	1,370.00	-	1,12,449.94	-	-

Particulars	As at March 31, 2024			As at March 31, 2023		
	Amortised cost	FVTPL	FVOCI	Amortised cost	FVTPL	FVOCI
Financial assets						
Cash and cash equivalents	13,405.18	-	-	4,273.21	-	-
Investments	-	4,197.95	-	-	5,582.13	-
Other bank balances	4,194.70	-	-	7,195.50	-	-
Trade receivables	228.24	-	-	394.07	-	-
Receivable under service concession arrangements	11,757.49	-	-	13,645.38	-	-
Other financial assets	3,027.38	-	-	9,991.59	-	-
Total	32,612.99	4,197.95	-	35,499.75	5,582.13	-
Financial liabilities						
Borrowings	61,715.24	-	-	61,859.50	-	-
Lease liabilities	29.74	-	-	8.36	-	-
Trade payables	1,352.61	-	-	3,230.44	-	-
Other financial liabilities	43,877.44	-	-	45,430.88	-	-
Total	1,06,975.03	-	-	1,10,529.17	-	-

(ii) Risk Management

The SPV Group's principal financial liabilities comprise borrowings, trade and other payables and other financial liabilities. The main purpose of these financial liabilities is to finance the SPV Group's operations. The SPV Group's principal financial assets include investments, trade receivables, cash and short-term deposits, receivable under service concession and other financial assets that derive directly from its operations.

The SPV Group is exposed to market risk, credit risk and liquidity risk. The SPV Group's senior management oversees the management of these risks. The SPV Group reviews and agrees policies for managing each of these risks, which are summarised below.

The Risk Management policies of the SPV Group are established to identify and analyse the risks faced by the SPV Group, to set appropriate risk limits and controls and to monitor risks and adherence to limits. Risk management policies and systems are reviewed regularly to reflect changes in market conditions and the SPV Group's activities. Management has overall responsibility for the establishment and oversight of the SPV Group's risk management framework.

(A) Credit risk

Credit risk is the risk that a counterparty will not meet its obligations under a financial instrument or customer contract, leading to a financial loss. The SPV Group is exposed to credit risk from its operating activities (primarily service concession receivables) and from its financing activities, including deposits with banks and other financial instruments.

(i) Service concession receivables:

SPVs are engaged in business of Design-Build-Finance-Operate-Transfer of highways and currently derive toll income, annuity income from highways authorities. Receivables are typically not secured by any form of credit support such as letters of credit, performance guarantees or escrow arrangements. Credit risk on receivable under service concession is limited as the customers of the SPV Group consists of the government entities having a strong credit worthiness. Service concession receivables that are potentially subject to concentrations of credit risk and failures by counter-parties to discharge their obligations in full or in a timely manner is limited due to credit risk of receivables is low.

(ii) Trade receivables:
The SPV Group has limited exposure to trade receivables, as toll collections are primarily through the FASTag mechanism. Toll receipts from annual passes and CJV claims are also credited to the bank within a few days, resulting in minimal credit risk associated with trade receivables.

(iii) Other financial assets
Credit risk from balances deposited/invested with banks as well as investments made in mutual funds, is managed by the SPV Group's senior management in accordance with the SPVs' treasury policy approved by the Board of Directors. Investments of surplus funds are made only with approved counterparties and within limits assigned to each counterparty. Counterparty limits are reviewed by the top management on an annual basis, and may be updated throughout the year subject to approval of the Board of Directors. The limits are set to minimise the concentration of risks and therefore mitigate financial loss through a counterparty's potential failure to make payments. Based on this policy, the SPV Group does not foresee any risk on account of credit losses, either in the scheduled commercial bank deposits which are made with AA+ rated banks and also in regard to mutual funds which is primarily debt oriented funds. No loss allowances have been provided for trade receivables or other receivables (which are considered good) from financing activities like cash and bank deposits, mutual funds and other similar deposits.

The SPV Group's maximum exposure to credit risk for the components of the Special Purpose Combined Balance Sheet as at December 31, 2025, March 31, 2025, March 31, 2024 and March 31, 2023 is the carrying amounts of Investments, Trade Receivables, Cash and Cash Equivalents and Other financial assets as disclosed in Note 4, 8, 9 and 6 respectively. However, the credit risk is low due to reasons mentioned above.

(B) Liquidity risk
Liquidity risk is the risk that the SPV Group may not be able to meet its present and future cash and collateral obligations without incurring unacceptable losses. The SPV Group's objective is to, at all times maintain optimum levels of liquidity to meet its cash and collateral requirements. The SPV Group closely monitors its liquidity position and deploys a robust cash management system. It maintains adequate sources of financing including debt and overdraft from banks at an optimised cost.
The SPV Group's maximum exposure to credit risk for the components of the balance sheet as at December 31, 2025, March 31, 2025, March 31, 2024 and March 31, 2023 is the carrying amounts. The liquidity risk is managed on the basis of expected maturity dates of the financial liabilities. The average credit period taken to settle trade payables is about 30 to 90 days. The other payables are with short-term durations. The carrying amounts are assumed to be a reasonable approximation of fair value. The following table analysis financial liabilities by remaining contractual maturities (on undiscounted basis):

Particulars	On demand	Up to 1 year	1 - 2 years	2 - 5 years	>5 years	Total
As at December 31, 2025						
Borrowings	1,580.69	21,514.49	6,631.51	20,392.71	10,408.36	60,527.76
Other financial liabilities	-	398.57	-	-	5.31	403.88
Trade payables	-	1,094.31	-	-	-	1,094.31
Additional concession fees liabilities / Deferred premium obligation/Interest accrued thereon	-	3,213.71	2,688.70	11,565.75	46,409.05	63,877.21
Lease liabilities	-	52.70	34.04	17.62	-	104.36
	1,580.69	26,273.78	9,354.24	31,976.09	56,822.71	1,26,007.51
As at March 31, 2025						
Borrowings	14,769.39	13,559.42	6,820.65	17,850.37	14,373.64	67,373.47
Other financial liabilities	-	313.35	-	-	11.46	324.81
Trade payables	-	1,104.28	-	-	-	1,104.28
Additional concession fees liabilities / Deferred premium obligation/Interest accrued thereon	-	2,744.81	3,008.76	11,725.46	44,252.32	61,731.35
Lease liabilities	-	32.07	30.18	8.55	-	70.80
	14,769.39	17,753.92	9,859.59	29,584.38	58,637.42	1,30,604.70
As at March 31, 2024						
Borrowings	2,749.32	16,298.17	7,418.18	23,627.01	11,862.26	61,954.94
Other financial liabilities	-	429.58	-	-	15.29	444.87
Trade payables	-	1,352.60	-	-	-	1,352.60
Additional concession fees liabilities / Deferred premium obligation/Interest accrued thereon	-	2,283.94	2,744.81	10,304.08	44,378.64	59,711.47
Lease liabilities	-	11.35	12.94	10.08	-	34.37
	2,749.32	20,375.64	10,175.94	33,941.17	56,256.19	1,23,498.26
As at March 31, 2023						
Borrowings	6,664.69	6,134.57	4,335.17	17,910.48	27,028.61	62,073.52
Other financial liabilities	-	3,046.80	-	-	16.16	3,062.96
Trade payables	-	3,230.41	-	-	-	3,230.41
Additional concession fees liabilities / Deferred premium obligation	-	3,012.05	2,425.32	9,926.89	44,610.90	59,975.16
Lease liabilities	-	8.82	-	-	-	8.82
	6,664.69	15,432.64	6,760.49	27,837.37	73,405.68	1,30,100.87

(C) Market risk

Market risk is the risk that the fair value of future cash flows of a financial instrument will fluctuate because of changes in market prices. Market risk comprises three types of risk: interest rate risk, currency risk and other price risk. Financial instruments affected by market risk include loans and borrowings, deposits. However, the SPV Group does not have equity, currency and other price risk as at December 31, 2025, March 31, 2025, March 31, 2024 and March 31, 2023.

Interest rate risk

Interest rate risk is the risk that the fair value of future cash flows of the financial instruments will fluctuate because of changes in market interest rates. The SPV Group is mainly exposed to the risk due to borrowings having variable rate of interest.

Exposure of interest rate risk

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Borrowings bearing fixed rate of interest	26,016.69	29,978.81	15,466.01	18,602.23
Borrowings bearing variable rate of interest	33,071.21	37,021.13	46,249.23	43,257.27

Interest rate sensitivity

A change in 50 bps in interest rates would have following impact on profit / (loss) before tax

Particulars	For nine months period ended December 31, 2025	For the year ended March 31, 2025	For the year ended March 31, 2024	For the year ended March 31, 2023
Increase by 50 bps - decrease in profit/(loss)	(124.02)	(185.11)	(231.25)	(216.29)
Decrease by 50 bps - increase in profit/(loss)	124.02	185.11	231.25	216.29

A change in 50 bps in interest rates would have following impact on equity, net of tax

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Increase by 50 bps - decrease in equity	(92.80)	(138.52)	(173.05)	(161.85)
Decrease by 50 bps - increase in equity	92.80	138.52	173.05	161.85

30(i) Trade receivables Ageing Schedule

Particulars	Unbilled dues	Not due	Outstanding for following period from due date of payment #					Total
			< 6 Months	6 Months – 1 Year	1 – 2 Years	2 – 3 Years	> 3 Years	
As at December 31, 2025								
Undisputed Trade Receivables – Considered Good	7.62	-	475.00	0.40	1.25	-	-	484.27
Undisputed Trade Receivables – Which have significant increase in credit risk	-	-	-	-	-	-	-	-
Undisputed Trade Receivables – Credit Impaired	5.10	-	-	-	-	-	15.32	20.42
Disputed Trade Receivables – Considered Good	-	-	-	-	-	-	-	-
Disputed Trade Receivables – Which have significant increase in credit risk	-	-	-	-	-	-	-	-
Disputed Trade Receivables – Credit Impaired	-	-	-	-	-	-	-	-
Total	12.72	-	475.00	0.40	1.25	-	15.32	504.69
As at March 31, 2025								
Undisputed Trade Receivables – Considered Good	9.93	-	213.38	-	-	0.37	-	223.68
Undisputed Trade Receivables – Which have significant increase in credit risk	-	-	-	-	-	-	-	-
Undisputed Trade Receivables – Credit Impaired	-	-	-	-	-	3.63	11.32	14.95
Disputed Trade Receivables – Considered Good	-	-	-	-	-	-	-	-
Disputed Trade Receivables – Which have significant increase in credit risk	-	-	-	-	-	-	-	-
Disputed Trade Receivables – Credit Impaired	-	-	-	-	-	-	-	-
Total	9.93	-	213.38	-	-	4.00	11.32	238.63
As at March 31, 2024								
Undisputed Trade Receivables – Considered Good	39.53	32.18	148.18	0.22	1.41	-	6.72	228.24
Undisputed Trade Receivables – Which have significant increase in credit risk	-	-	-	-	-	-	-	-
Undisputed Trade Receivables – Credit Impaired	-	-	-	-	3.63	-	11.33	14.95
Disputed Trade Receivables – Considered Good	-	-	-	-	-	-	-	-
Disputed Trade Receivables – Which have significant increase in credit risk	-	-	-	-	-	-	-	-
Disputed Trade Receivables – Credit Impaired	-	-	-	-	-	-	-	-
Total	39.53	32.18	148.18	0.22	5.04	-	18.04	243.19
As at March 31, 2023								
Undisputed Trade Receivables – Considered Good	21.55	1.90	362.85	-	1.05	6.71	-	394.07
Undisputed Trade Receivables – Which have significant increase in credit risk	-	-	-	-	-	-	-	-
Undisputed Trade Receivables – Credit Impaired	-	-	-	-	-	-	11.33	11.33
Disputed Trade Receivables – Considered Good	-	-	-	-	-	-	-	-
Disputed Trade Receivables – Which have significant increase in credit risk	-	-	-	-	-	-	-	-
Disputed Trade Receivables – Credit Impaired	-	-	-	-	-	-	-	-
Total	21.55	1.90	362.85	-	1.05	6.71	11.33	405.40

Ageing has been prepared on the basis of transaction dates, where the due dates have not been specified.

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Notes to the Special Purpose Combined Financial Statements
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30 (ii) Trade payables Ageing Schedule

Particulars	Unbilled dues	Not due	Outstanding for following period from due date of payment #				Total
			< 1 Year	1 – 2 Years	2 – 3 Years	> 3 Years	
As at December 31, 2025							
Total outstanding dues of micro enterprises and small enterprises	-	12.54	7.61	2.53	-	-	22.68
Total outstanding dues of creditors other than micro enterprises and small enterprises	709.64	209.07	113.23	21.63	5.52	12.54	1,071.63
Disputed dues of micro enterprises and small enterprises	-	-	-	-	-	-	-
Disputed dues of creditors other than micro enterprises and small enterprises	-	-	-	-	-	-	-
Total	709.64	221.61	120.84	24.16	5.52	12.54	1,094.31
As at March 31, 2025							
Total outstanding dues of micro enterprises and small enterprises	-	19.32	102.64	0.92	-	-	122.88
Total outstanding dues of creditors other than micro enterprises and small enterprises	229.50	376.15	255.37	96.74	12.38	11.26	981.40
Disputed dues of micro enterprises and small enterprises	-	-	-	-	-	-	-
Disputed dues of creditors other than micro enterprises and small enterprises	-	-	-	-	-	-	-
Total	229.50	395.47	358.01	97.66	12.38	11.26	1,104.28
As at March 31, 2024							
Total outstanding dues of micro enterprises and small enterprises	0.66	73.10	30.50	0.14	-	0.81	105.21
Total outstanding dues of creditors other than micro enterprises and small enterprises	328.21	534.63	334.90	24.17	19.75	5.73	1,247.40
Disputed dues of micro enterprises and small enterprises	-	-	-	-	-	-	-
Disputed dues of creditors other than micro enterprises and small enterprises	-	-	-	-	-	-	-
Total	328.87	607.73	365.40	24.31	19.75	6.54	1,352.60
As at March 31, 2023							
Total outstanding dues of micro enterprises and small enterprises	0.03	64.13	20.23	-	0.21	0.60	85.20
Total outstanding dues of creditors other than micro enterprises and small enterprises	290.54	372.65	149.77	6.40	21.37	2,304.51	3,145.24
Disputed dues of micro enterprises and small enterprises	-	-	-	-	-	-	-
Disputed dues of creditors other than micro enterprises and small enterprises	-	-	-	-	-	-	-
Total	290.57	436.78	170.01	6.40	21.58	2,305.11	3,230.44

Ageing has been prepared on the basis of transaction dates, where the due dates have not been specified.

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SPV Group
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Notes to the Special Purpose Combined Financial Statements
All amounts in Rupees millions unless otherwise stated

31(A) Disclosures pursuant to Indian Accounting Standard (Ind AS) 115, Revenue from Contracts with Customers

1. Disaggregation of revenue from contracts with customers

Particulars	Nine months period ended December 31, 2025	Year ended March 31, 2025	Year ended March 31, 2024	Year ended March 31, 2023
i) Types of service rendered				
Toll collection	13,804.48	17,179.29	16,196.21	15,259.26
Income from operation and maintenance services	298.26	1,332.44	998.45	543.41
Income from change of scope	39.58	31.23	26.49	40.79
Construction revenue	-	137.74	157.61	365.18
Total	14,142.32	18,680.70	17,378.76	16,208.64
ii) Based on geography				
India	14,142.32	18,680.70	17,378.76	16,208.64
Outside India	-	-	-	-
Total	14,142.32	18,680.70	17,378.76	16,208.64
iii) Timing of Revenue recognition				
Revenue from services transferred to customers at a point in time	13,804.48	17,179.29	16,196.21	15,259.26
Revenue from services transferred to customers over time	337.84	1,501.41	1,182.55	949.38
	14,142.32	18,680.70	17,378.76	16,208.64

2. Contract balances #
The following table provides information about Trade receivables, Receivable under service concession arrangements and contract liabilities from the contracts with customers.

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Trade receivable*				
Opening balance	223.68	228.24	394.07	266.84
Closing balance	484.27	223.68	228.24	394.07
Receivable under service concession arrangements**				
Opening balance	10,917.71	11,757.49	13,645.38	16,371.48
Closing balance	10,356.28	10,917.71	11,757.49	13,645.38
Contract Liabilities***				
Opening balance	196.20	230.47	1,218.04	1,246.23
Closing balance	189.57	196.20	230.47	1,218.04

The movement between contract balances mainly pertains to revenue recognised during the period/year and corresponding payment received against same.

* Trade receivables are non-interest bearing and are generally due as per the terms and condition of contract.
** Receivable under service concession arrangements are recognised as per Appendix D to Ind AS 115, when the SPV Group has an unconditional right to receive cash at the direction of the grantor under the service concession agreement.
*** Contract liabilities include advances received from road authorities. Revenue recognised out of opening contract liabilities has been disclosed above as construction revenue/income from change of scope.

3. There is no adjustment made to the contract price, and therefore the revenue recognised in the statement of profit and loss is in agreement with the contracted price under the contract.

4. Performance obligation
Income from Toll Collection
The performance obligation in service of toll collection is recorded as per rates notified by highway authorities and approved by management and payment is generally due at the time of providing service.

Income from Annuity
The performance obligation is satisfied over time as the assets is under control of customer and they simultaneously receives and consumes the benefits provided by the SPV Group. The SPV Group receives progressive payment toward provision of services.

Change of Scope/Construction Revenue
Income from sale of services is recognised when (or as) the company satisfies performance obligation by transferring promised services to the customer i.e. over the period of time for income from change of scope.

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Notes to the Special Purpose Combined Financial Statements
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5. Disclosure under Appendix - D & E to Ind AS 115 - " Service Concession Arrangements"

Name of Concessionaire	Nature of Project	Start of Concession period under concession agreement (Appointed Date)	End of Concession Period under Concession Agreement	Period of Original Concession Since the appointed date (In Years)	Construction completed date or the schedule completion date under the concession agreement as applicable
Annuity Projects:					
Dhola Infra Projects Private Limited	DBFOT - Annuity	17-06-2011	28-02-2030 (extended date)	17 years	31-08-2017
Dibang Infra Projects Private Limited	DBFOT - Annuity	11-06-2011	18-11-2030 (extended date)	17 years	19-05-2018
Jorabat Shillong Expressway Limited	DBFOT - Annuity	12-01-2011	11-01-2031	20 years	28-01-2016
Toll Projects:					
Thrissur Expressway Limited	DBFOT - Toll	15-09-2012	14-09-2032	20 years	09-03-2022
Ahmedabad - Maliya Tollway Private Limited	DBFOT - Toll	12-10-2009	19-05-2036 (extended date)	22 years	07-04-2012
Deccan Tollways Private Limited	DBFOT - Toll	01-04-2014	31-03-2039	25 years	14-10-2017
Rajkot-Vadinar Tollway Private Limited	DBFOT - Toll	12-09-2009	20-02-2030 (extended date)	20 years	27-01-2012
Samkhiali Bhachau Gandhidham Tollway Private Limited	DBFOT - Toll	11-09-2010	12-11-2034 (extended date)	24 years	04-01-2020
Panipat Elevated Corridor Private Limited	DBFOT - Toll	23-01-2006	31-01-2027 (extended date)	20 years	17-07-2008
Sambalpur Rourkela Tollway Private Limited	DBFOT - Toll	15-07-2014	14-07-2036	22 years	13-03-2018

Notes:
i) The above projects have the following rights and obligations:
(a) Right to use the specified asset
(b) Obligations to provide or rights to expect provision of services
(c) Obligations to deliver or rights to receive at the end of the Concession.
ii) In terms of Service Concession Arrangement, the SPV's are obligated to carry out Major Maintenance (overlay) of the roads at the end of specified periods.

31(B) Project wise break up of revenue from operations

Particulars	Nine months period ended December 31, 2025	Year ended March 31, 2025	Year ended March 31, 2024	Year ended March 31, 2023
Dhola Infra Projects Private Limited	388.23	658.82	582.34	644.54
Dibang Infra Projects Private Limited	325.04	384.14	428.95	454.73
Jorabat Shillong Expressway Limited	406.31	1,479.25	1,183.17	789.69
Thrissur Expressway Limited	1,262.62	1,628.30	1,674.55	1,497.82
Ahmedabad - Maliya Tollway Private Limited	3,285.94	4,003.37	3,642.64	3,709.98
Deccan Tollways Private Limited	1,981.81	2,466.11	2,422.63	2,284.27
Rajkot-Vadinar Tollway Private Limited	1,972.73	2,291.56	2,104.68	2,594.38
Samkhiali Bhachau Gandhidham Tollway Private Limited	2,262.37	2,803.84	2,616.75	2,320.46
Panipat Elevated Corridor Private Limited	894.68	1,115.90	1,088.72	1,053.65
Sambalpur Rourkela Tollway Private Limited	2,183.91	3,039.18	2,830.34	2,196.42
Palanpur-Swaroopgunj Road Project Limited	-	-	156.95	189.22
Total Project wise revenue from operations (Gross)	14,963.64	19,870.46	18,731.73	17,735.16
Eliminations	-	-	-	-
Total Project wise revenue from operations	14,963.64	19,870.46	18,731.73	17,735.16

(32) Ind AS 116 - "Leases":

The SPV Group has lease contracts for immovable property for 3 years -5 years. The SPV Group's obligations under its leases are secured by the lessor's title to the leased assets. Generally, the SPV Group is restricted from assigning and subleasing the leased assets. The lease contracts include extension and termination options and variable lease payments, which are further discussed below.

The Company's significant leasing arrangements are in respect of office premises taken on leave and licence basis.

(i) The SPV Group applies the short-term lease recognition exemptions and the expense relating to short-term leases is disclosed under other expenses.

(ii) The effect of depreciation and interest related to Right of use asset and lease liabilities is reflected in the Special Purpose Combined Statement of Profit and Loss under the heading "Depreciation and amortisation expense" and "Finance costs" (Refer note 3(G) & note 20).

(iii) The effective interest rate for lease liabilities is between the range of 9% to 11%.

Amount recognized in balance sheet:

Movement of Right of use assets

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Balance as at the beginning of the period/year	58.26	27.98	7.23	17.38
Addition during the period/year	52.25	50.22	30.52	-
Amortisation during the period/year	(23.18)	(19.94)	(9.77)	(10.15)
Balance at the end of the period/year	87.33	58.26	27.98	7.23

Movement of lease liabilities

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Balance at the beginning of the period/year	63.21	29.74	8.36	18.35
Addition of lease liabilities	52.25	50.22	30.52	-
Interest accrued	4.95	5.36	1.19	2.03
Payment of lease liabilities	(27.11)	(22.11)	(10.33)	(12.02)
Balance at the end of the period/year	93.30	63.21	29.74	8.36

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Current lease liabilities	44.78	26.94	8.72	8.36
Non-current lease liabilities	48.52	36.26	21.02	-
Total lease liabilities (discounted)	93.30	63.20	29.74	8.36

Amount recognized in statement of profit and loss:

Particulars	Nine months period ended December 31, 2025	Year ended March 31, 2025	Year ended March 31, 2024	Year ended March 31, 2023
Depreciation expense on right-of-use asset	23.18	19.94	9.77	10.15
Interest expense (included in finance costs)	4.95	5.36	1.19	2.03
Charge to statement of profit and loss	28.13	25.30	10.96	12.18

Following is maturity profile of contractual undiscounted cash flow:

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Less than one year	52.70	32.07	11.35	8.82
One to two years	34.04	30.18	12.94	-
Two to five years	17.62	8.55	10.08	-
Total	104.36	70.80	34.37	8.82

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(33) Capital management

For the purpose of the SPV Group's capital management, capital includes issued capital including share capital pending issuance and all other equity reserves attributable to the equity holders of the SPV Group. The primary objective of the SPV Group's capital management is to ensure that it maintains a strong credit rating and healthy capital ratios in order to support its business and maximise shareholder value.

The Board of Directors of the Investment Manager and the management of the Project SPV shall have the primary responsibility of the Trust and the Project SPV respectively to maintain a strong capital base and reduce the cost of capital through prudent management of deployed funds and leveraging opportunities in domestic and international financial markets so as to maintain investor, creditor and market confidence and to sustain future development of the business.

The SPV Group manages its capital structure and makes adjustments to it in light of changes in economic conditions and the requirements of the financial covenants. To maintain or adjust the capital structure, the SPV Group may return capital to shareholders or issue new shares. The SPV Group monitors capital using a gearing ratio, which is net debt divided by total capital plus net debt. The SPV Group's policy is to keep the gearing ratio optimum. The SPV Group includes within net debt, interest bearing borrowings less cash and cash equivalents, Investment in mutual funds and fixed deposits.

Particulars	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Borrowings	59,087.90	66,999.94	61,715.24	61,859.50
Less: cash and other bank balances and investments	(16,617.39)	(14,442.44)	(24,476.37)	(26,151.34)
Net debt [A]	42,470.51	52,557.50	37,238.87	35,708.16
(a) Capital	774.13	493.34	6,789.16	7,629.06
(b) Share capital pending issuance	-	253.85	-	-
(c) Other equity	(40,440.39)	(41,521.71)	(22,556.01)	(15,391.32)
(d) Instruments entirely equity in nature	6,537.44	3,847.99	4,410.89	3,628.13
Total capital [B]	(33,128.82)	(36,926.52)	(11,355.96)	(4,134.13)
Net debt and Capital [C=A+B]	9,341.69	15,630.99	25,882.92	31,574.03
Gearing ratio (in times) [A/C]	4.55	3.36	1.44	1.13

In order to achieve this overall objective, the SPV Group's capital management, amongst other things, aims to ensure that it meets financial covenants attached to the interest-bearing loans and borrowings that define capital structure requirements.

No changes were made in the objectives, policies or processes for managing capital.

(34) Acquisition of Subsidiaries

EPIC Concesiones 3 Private Limited

Epic Concesiones 3 Private Limited (formerly known as L&T Infrastructure Development Projects Limited), including its subsidiaries, was previously a subsidiary of Larsen & Toubro Limited. The shareholders of Epic Concesiones 3 Private Limited, namely Larsen & Toubro Limited and Canada Pension Plan Investment Board, entered into a Share Purchase Agreement with Epic Concesiones Private Limited on December 16, 2022, for the transfer of their entire shareholding in Epic Concesiones 3 Private Limited (including its subsidiaries).

The acquisition was completed on April 10, 2024, and accordingly, Epic Concesiones 3 Private Limited, including its subsidiaries, ceased to be a subsidiary of Larsen & Toubro Limited with effect from April 11, 2024.

Subsequently, the Board of Directors of Epic Concesiones 3 Private Limited, in its meeting held on May 10, 2024, approved a Composite Scheme of Arrangement under Sections 230 to 232 and other applicable provisions of the Companies Act, 2013. The Scheme provides for the amalgamation of wholly owned subsidiaries and Epic Concesiones Private Limited, namely:

Epic Concesiones Private Limited (Transferor Company 1), Vadodara Bharuch Tollway Limited (Transferor Company 2), Rewin Infrastructure Limited (Transferor Company 3), and Palanpur-Swaroopgunj Road Project Limited (Transferor Company 4) with and into Epic Concesiones 3 Private Limited (the Transferee Company). The appointed date under the Scheme was April 11, 2024.

The Composite Scheme of Arrangement has been duly approved by the National Company Law Tribunal, Chennai Bench, vide its order dated September 12, 2025.

The difference between purchase consideration and carrying amount of investment appearing in Epic Concesiones 3 Private Limited has been adjusted in the capital reserve for the purpose of preparation this special purpose combined financial statement as explained in basis of preparation.

Jorabat Shillong Expressway Limited

In view of approval granted by the NCLT vide order dated July 14, 2023, NCLAT vide order dated September 15, 2023 and thereafter the execution of the Share Purchase Agreement dated October 19, 2023, transfer of shareholding has been completed on November 16, 2023. Post the requisite approvals from NHAI, the SRPL Roads Private Limited (Formerly known as Sekura Roads Private Limited) acquired 100% stake in Jorabat Shillong Expressway Limited (JSEL) from IL&FS ITNL and took over the management of JSEL from November 17, 2023.

IL&FS ITNL has transferred 84.00 million number of shares of face value of Rs.10 each to the SRPL Roads Private Limited (Formerly known as Sekura Roads Private Limited) which represents 100% equity stake of the JSEL.

The difference between purchase consideration and underlying equity of JSEL has been adjusted in the capital reserve for the purpose of preparation this special purpose combined financial statement.

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(35) The Special Purpose Combined Financial Statements are prepared after considering the adjustments as required pursuant to section 3.3.7 of SEBI Circular no. SEBI/HO/DDHS-PoD-2/P/CIR/2025/102 dated July 11, 2025. Below disclosure compiles with the adjustments made to the audited financial statements of the SPV Group for the financial year ended March 31, 2025, March 31, 2024 and March 31, 2023 respectively, while preparing these Special Purpose Combined Financial Statements:

(i) Impact on Combined Balance Sheet

Particulars	Note Reference	As at March 31, 2025			As at March 31, 2024			As at March 31, 2023		
		General Purpose Financial Statements	Adjustments	Special Purpose Financial Statements	General Purpose Financial Statements	Adjustments	Special Purpose Financial Statements	General Purpose Financial Statements	Adjustments	Special Purpose Financial Statements
ASSETS										
(1) Non-current assets										
(a) Property, plant and equipment	Note 1	146.16	5.35	151.51	115.74	3.06	118.80	94.77	2.28	97.05
(b) Capital work-in-progress		45.20	(45.20)	-	-	-	-	-	-	-
(c) Investment properties	Note 2	21.30	(2.81)	18.49	19.41	(0.44)	18.97	21.22	(1.77)	19.44
(d) Right of use assets		58.31	(0.05)	58.26	27.98	-	27.98	7.23	-	7.23
(e) Intangible assets	Note 3	52,974.18	3,679.66	56,653.84	59,303.19	5,102.95	64,406.14	63,969.86	6,606.08	70,575.94
(f) Intangible assets under development	Note 4	-	45.17	45.17	35.00	(0.00)	35.00	1.90	(0.00)	1.90
(g) Investments in subsidiaries	Note 5	1,818.94	(1,818.94)	-	3,979.92	(3,979.92)	-	2,823.81	(2,823.81)	-
(h) Financial assets										
(i) Investments	Note 6	1.40	(1.40)	-	795.59	(795.59)	-	-	-	-
(ii) Receivable under service concession arrangements	Note 7	-	9,532.55	9,532.55	-	10,985.00	10,985.00	-	11,944.92	11,944.92
(iii) Other financial assets	Note 12	9,949.63	(9,440.98)	508.65	6,802.02	(6,493.07)	308.95	6,899.58	(6,157.83)	741.75
(i) Income tax assets (net)	Note 8	350.45	339.08	689.53	583.77	146.25	730.01	520.70	139.46	660.17
(j) Deferred tax assets (net)		26.20	(26.20)	-	35.80	(35.80)	-	39.60	(39.60)	-
(k) Other assets	Note 9	1,293.65	(1,227.22)	66.43	902.97	(826.70)	76.27	813.96	315.33	1,129.29
Total non-current assets		66,685.42	1,039.01	67,724.43	72,601.38	4,105.74	76,707.12	75,192.63	9,985.06	85,177.69
(2) Current assets										
(a) Financial assets										
(i) Investments	Note 10	7,548.15	0.17	7,548.32	3,403.81	794.14	4,197.95	5,582.10	0.03	5,582.13
(ii) Trade receivables	Note 13	188.94	34.74	223.68	175.63	52.61	228.24	341.88	52.19	394.07
(iii) Cash and cash equivalents	Note 11	2,300.71	(443.38)	1,857.33	13,298.37	106.81	13,405.18	1,763.90	2,509.31	4,273.21
(iv) Bank balances other than disclosed in (iii) above	Note 11	4,245.69	(1,590.79)	2,654.90	6,805.63	(2,610.93)	4,194.70	18,577.89	(11,382.40)	7,195.50
(v) Receivable under service concession arrangements	Note 7	-	1,385.16	1,385.16	-	772.49	772.49	146.18	1,554.28	1,700.46
(vi) Other financial assets	Note 11	1,830.25	144.51	1,974.76	5,568.14	(2,849.72)	2,718.43	8,065.72	1,184.12	9,249.84
(b) Current tax assets (net)	Note 8	56.88	(56.88)		151.54	(151.54)		105.47	(105.47)	
(c) Other assets	Note 9	227.88	113.93	341.81	803.49	51.32	854.81	1,282.27	(885.68)	396.60
Total current assets		16,398.49	(412.53)	15,985.96	30,206.61	(3,834.82)	26,371.80	35,865.42	(7,073.63)	28,791.81
Total assets		83,083.91	626.48	83,710.39	1,02,807.99	270.92	1,03,078.92	1,11,058.05	2,911.43	1,13,969.50

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(i) Impact on Combined Balance Sheet (Contd.)

Particulars	Note Reference	As at March 31, 2025			As at March 31, 2024			As at March 31, 2023		
		General Purpose Financial Statements	Adjustments	Special Purpose Financial Statements	General Purpose Financial Statements	Adjustments	Special Purpose Financial Statements	General Purpose Financial Statements	Adjustments	Special Purpose Financial Statements
EQUITY AND LIABILITIES										
EQUITY										
(a) Capital	Note 14	747.24	(253.90)	493.34	6,789.15	-	6,789.16	7,629.05	-	7,629.06
(b) Share capital pending issuance	Note 14	-	253.85	253.85	-	-	-	-	-	-
(c) Other equity	Note 14	(29,889.32)	(11,632.39)	(41,521.71)	(9,706.95)	(12,849.05)	(22,556.01)	(2,744.22)	(12,647.10)	(15,391.32)
(d) Instrument entirely equity in nature	Note 14	5,126.15	(1,278.16)	3,847.99	3,534.12	876.77	4,410.89	2,928.00	700.13	3,628.13
Total equity		(24,015.93)	(12,910.59)	(36,926.53)	616.32	(11,972.28)	(11,355.96)	7,812.84	(11,946.97)	(4,134.13)
LIABILITIES										
(1) Non-current liabilities										
(a) Financial liabilities		-								
(i) Borrowings	Note 15	66,994.82	(28,323.67)	38,671.15	72,312.84	(29,645.08)	42,667.76	74,210.50	(25,150.25)	49,060.25
(ii) Lease liabilities		36.27	(0.01)	36.26	21.02	-	21.02	-	-	-
(iii) Other financial liabilities	Note 16	4,301.58	36,739.73	41,041.31	4,028.07	37,081.03	41,109.10	3,889.86	35,335.69	39,225.55
(b) Deferred tax liabilities (net)		57.78	(26.20)	31.58	94.13	(35.80)	58.33	94.13	(39.60)	54.53
(c) Provisions	Note 18	1,196.32	1,527.46	2,723.78	1,410.44	2,872.12	4,282.56	1,630.74	1,141.57	2,772.31
Total non-current liabilities		72,586.77	9,917.31	82,504.08	77,866.50	10,272.27	88,138.77	79,825.23	11,287.41	91,112.64
(2) Current liabilities										
(a) Financial liabilities										
(i) Borrowings	Note 15	29,620.58	(1,291.79)	28,328.79	19,167.26	(119.77)	19,047.49	13,753.72	(954.47)	12,799.25
(ii) Lease liability		26.95	(0.00)	26.95	8.72	-	8.72	8.36	-	8.36
(iii) Trade payables										
- Total Outstanding dues to micro enterprises and small enterprises	Note 17	82.62	40.26	122.88	105.19	0.02	105.21	118.11	(32.91)	85.20
- Total Outstanding dues of creditors other than micro enterprises and small enterprises	Note 17	871.05	110.35	981.40	1,130.89	116.50	1,247.40	2,455.26	689.98	3,145.24
(iv) Other financial liabilities	Note 16	570.49	2,670.71	3,241.20	1,681.57	1,086.77	2,768.34	3,954.64	2,250.69	6,205.33
(b) Other liabilities		536.50	(262.07)	274.44	677.61	(186.34)	491.27	1,488.17	(97.35)	1,390.82
(c) Provisions	Note 18	2,804.88	2,352.30	5,157.18	1,526.51	1,088.73	2,615.23	1,628.43	1,715.02	3,343.46
(d) Current tax liabilities (net)		-	-	-	27.43	(14.97)	12.45	13.30	0.03	13.33
Total current liabilities		34,513.07	3,619.76	38,132.83	24,325.17	1,970.93	26,296.11	23,419.99	3,570.99	26,990.98
Total equity and liabilities		83,083.91	626.48	83,710.39	1,02,807.99	270.92	1,03,078.92	1,11,058.05	2,911.43	1,13,969.50

SPV Group
(As defined in Note 1 - Corporate Information)

Notes to the Special Purpose Combined Financial Statements
All amounts in Rupees millions unless otherwise stated

(ii) Impact on Combined statement of profit and loss and total comprehensive income (Note 35 contd.)

Particulars	Note Reference	Year ended March 31, 2025			Year ended March 31, 2024			Year ended March 31, 2023		
		General Purpose Financial Statements	Adjustments	Special Purpose Financial Statements	General Purpose Financial Statements	Adjustments	Special Purpose Financial Statements	General Purpose Financial Statements	Adjustments	Special Purpose Financial Statements
INCOME										
Revenue from operations	Note 19	18,366.88	1,503.58	19,870.46	17,409.20	1,322.53	18,731.73	15,978.85	1,756.31	17,735.16
Other income	Note 20	4,178.35	(2,392.65)	1,785.71	1,624.85	28.72	1,653.57	1,445.73	(327.94)	1,117.79
Total income		22,545.23	(889.06)	21,656.17	19,034.05	1,351.25	20,385.30	17,424.59	1,428.37	18,852.95
EXPENSES										
Operation and maintenance expense	Note 21	6,366.19	(780.85)	5,585.34	5,413.40	533.85	5,947.26	3,148.90	3,128.30	6,277.21
Employee benefit expense		566.63	(18.03)	548.60	586.44	(16.60)	569.84	613.94	(19.02)	594.92
Depreciation and amortisation expense	Note 22	5,778.29	1,220.13	6,998.42	5,538.98	1,383.17	6,922.15	4,649.01	2,445.89	7,094.90
Finance costs	Note 23	10,958.91	547.49	11,506.41	12,887.90	165.43	13,053.33	10,072.99	12.07	10,085.06
Other expenses	Note 24	867.78	304.94	1,172.72	1,037.03	237.10	1,274.13	875.42	263.75	1,139.17
Total expenses		24,537.80	1,273.69	25,811.49	25,463.75	2,302.95	27,766.70	19,360.27	5,830.99	25,191.26
Profit/(Loss) before tax		(1,992.57)	(2,162.75)	(4,155.32)	(6,429.70)	(951.70)	(7,381.41)	(1,935.69)	(4,402.62)	(6,338.31)
Exceptional Items	Note 25	(910.76)	910.76	-	264.94	(264.94)	-	(57.90)	57.90	-
Loss before tax		(1,081.81)	(3,073.51)	(4,155.32)	(6,694.64)	(686.76)	(7,381.41)	(1,877.79)	(4,460.52)	(6,338.31)
Tax expense:										
(1) Current tax		43.61	(0.97)	42.64	355.56	0.00	355.56	200.23	0.09	200.32
(2) Deferred tax		(26.75)	(0.00)	(26.75)	3.80	-	3.80	(4.00)	(0.05)	(4.05)
(3) Tax relating to earlier periods		5.34	(0.97)	6.30	0.37	(0.04)	0.41	5.47	(0.03)	5.50
		22.20	(1.94)	22.19	359.73	(0.04)	359.77	201.70	0.01	201.77
Profit/(Loss) for the period/year [A]		(1,104.01)	(3,071.58)	(4,177.51)	(7,054.37)	(686.73)	(7,741.18)	(2,079.49)	(4,460.53)	(6,540.07)
Other Comprehensive Income										
Other Comprehensive Income not to be reclassified to profit or loss in subsequent period										
Re-measurement of defined benefit plans, net of tax		(6.40)	(6.08)	(12.48)	0.64	0.01	0.65	(0.24)	(0.06)	(0.30)
-Fair value of Investments through other comprehensive income		-	-	-	-	-		589.00	(589.00)	-
Total other comprehensive income for the period/year, net of tax [B]		(6.40)	(6.08)	(12.48)	0.64	0.01	0.65	588.76	(589.06)	(0.30)
Total comprehensive income for the period/year, net of tax [A+B]		(1,110.41)	(3,077.65)	(4,189.99)	(7,053.73)	(686.71)	(7,740.53)	(1,490.72)	(5,049.58)	(6,540.37)

SPV Group
(As defined in Note 1 - Corporate Information)

Notes to the Special Purpose Combined Financial Statements
All amounts in Rupees millions unless otherwise stated

(iii) Impact on Combined Statement of Cash Flows (Note 35 contd.)

Particulars	Note Reference	Year ended March 31, 2025			Year ended March 31, 2024			Year ended March 31, 2023		
		General Purpose Financial Statements	Adjustments	Special Purpose Financial Statements	General Purpose Financial Statements	Adjustments	Special Purpose Financial Statements	General Purpose Financial Statements	Adjustments	Special Purpose Financial Statements
Cashflow from										
Net cash flow from operating activities [A]	Note 26	11,527.91	(1,078.38)	10,449.52	10,964.96	(1,572.46)	9,392.51	11,022.43	(1,943.18)	9,079.25
Net cash flow from/(used in) investing activities [B]	Note 26	9,412.19	(33,263.93)	(23,851.74)	12,864.93	(2,153.79)	10,711.13	3,809.81	(4,342.06)	(532.25)
Net cash generated from/(used in) financing activities [C]	Note 26	(31,937.73)	33,792.10	1,854.37	(12,295.36)	1,323.69	(10,971.67)	(15,379.98)	8,794.34	(6,585.64)
Net cash generated from/(used in) [D]=[A]+[B]+[C]		(10,997.63)	(550.21)	(11,547.84)	11,534.53	(2,402.56)	9,131.97	(547.74)	2,509.09	1,961.35

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(iv) Analysis of adjustments made between General purpose Financial Statements and Special purpose Financial Statements (Note 35 contd.)

Note	Particulars	Remarks
1	Property, plant and equipment	Adjustments are on account of following: a) Change in the method of depreciation from the Written Down Value (WDV) method to the Straight Line Method (SLM) in certain SPVs, undertaken to ensure consistency and alignment with the depreciation policy followed by other SPVs; and b) Regrouping of investment property to Property, plant and equipment appropriately reflect its classification and presentation.
2	Investment property	Regrouping of investment property to Property, plant and equipment appropriately reflect its classification and presentation.
3	Intangible Assets	Adjustments are on account of following: a) Capitalisation of Intangible Assets – Right to toll on account of Additional Concession Fees payable to the authority against the right to toll in AMTPL, RVTPL and SBGTL; and b) Change in the method of amortisation from the Revenue-Based Amortisation (RBA) method to the Straight-Line Method (SLM) in certain SPVs, to ensure consistency with the Group's accounting policy. c) Decapitalisation of receivables under the service concession agreement, representing the reversal of amortisation previously reversed pursuant to claim settlement.
4	Intangible assets under development	Amounts have been reclassified from Capital Work-in-Progress to Intangible Assets under Development to reflect the nature of the underlying projects.
5	Investments in subsidiaries	Adjustments are on account of : Carve out of Non-InvIT related Investments from EPIC 3
6	Investments	Adjustment is on account of reclassification of fixed deposits to Current financial assets.
7	Receivable under service concession arrangements	The adjustments are on account of the separate presentation of receivables from the service concession authority, reclassified within Financial Assets from 'Other Financial Assets' to 'Receivables under Service Concession Arrangements' in the Special Purpose Combined Financial Statements.
8	Income tax assets (net)	Adjustments are on account of reclassification from Current Assets to Non Current Assets in Special Purpose Combined Financial Statements.
9	Other non-current assets and current assets	Adjustments are on account of : a) reclassification of tax assets from Other Assets; b) reclassification of capital advances from Current to Non-current; and c) write-off of receivables pertaining to the COVID claim and claim receivable from GSRDC. d) reclassification of advance to vendor from trade payables
10	Investments	Adjustment is on account of reclassification of non-convertible debentures to Current financial assets
11	Cash and cash equivalents and other Bank Balances	Adjustments are on account of regrouping of Fixed Deposits and Interest on Fixed Deposits
12	Other non-financial assets and current financial assets	Adjustments are on account of regrouping of Fixed Deposits and Interest on Fixed Deposits
13	Trade receivables	Adjustments are on account of : a) Reclassification of FASTag receivables from Other Financial Assets to Trade Receivables; and b) the reclassification of change of scope receivables from Other Financial Assets to Trade Receivables.
14	Total Equity	Adjustments are on account of : A) Opening adjustment: Other equity as on April 1, 2022 has been adjusted on account of: -Transfer of the notional interest portion on the equity component of loans, previously classified from Retained Earnings to instruments entirely equity in nature,; -Change in the method of accounting for the additional concession fee liability; -Revision in estimates for periodic major maintenance; -Write-off of receivables pertaining to the COVID claim and claim receivable from GSRDC; B) Carve-out adjustments pertaining to EPIC 3 entities not forming part of the InvIT. C) Consequential impact: Adjustments in Other Equity and the Combined Statement of Profit and Loss made consequent to the adjustments explained above.
15	Borrowing	Adjustments are on account of : a) Reclassification from Non Current to Current, b) Reclassification of Deferred Payment liabilities from Borrowing to Other Financial Liabilities c) Change in the method of accounting for the additional concession fee liability
16	Other Financial liabilities	Adjustments are on account of: a) reclassification of Additional concession fees liability from Borrowing to Other Financial Liabilities. b) CCPS reclassed to Instrument entirely equity in nature c) Increase in liability on account of capitalisation of Right to toll on account of Additional Concession Fees payable to the authority against the right to toll in AMTL and RVTL; d) Reclassification of retention payable to Trade payables e)Provision for expenses reclassified from other liabilities to Trade payables
17	Trade Payable	Adjustments are on account of: a) Reclassification of retention payable to Trade payables b) Provision for expenses reclassified from other liabilities to Trade payables

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(iv) Analysis of adjustments made between General purpose Financial Statements and Special purpose Financial Statements (Note 35 contd.)

Note	Particulars	Remarks
18	Provisions	Adjustment is on account of change in MMR provision estimate in combined financial statements.
19	Revenue from operations	The change in the method of accounting for the additional concession fee liability has resulted in an increase in revenue, as amounts previously reduced from revenue are now recognized as income. This change also has a consequential impact on operation and maintenance expenses and depreciation.
20	Other Income	Adjustments are on account of: a) Carve-out adjustments pertaining to EPIC 3 entities not forming part of the InvIT. b) Reclassification of exceptional items to other income
21	Operation & Maintenance expenses	Adjustment is on account of change in MMR provision estimate in combined financial statements.
22	Depreciation and amortisation expenses	Adjustment is on account of Change in the method of depreciation from the Written Down Value (WDV) method to the Straight Line Method (SLM) in certain SPVs, undertaken to ensure consistency and alignment with the depreciation policy followed by other SPVs
23	Finance Costs	Adjustments are on account of: a) Reclassification of modification liability from Other Expenses to Finance Cost, b) Unwinding of the Major Maintenance Reserve (MMR) due to a revision in the MMR provision estimate, and c) Increase in interest on ACF resulting from the change in the method of accounting for the additional concession fee liability.
24	Other expenses	Adjustment is on account of reclassification of modification loss from Other expenses to Finance cost
25	Exceptional item	Adjustment is on account of Reclassification of exceptional items to other income
26	Cash flows from Operating activities, Investing Activities and Financing Activities	Adjustments in Cash flows from Operating activities, Investing Activities and Financing Activities has been made consequent to the adjustments (explained above) and reclassification of fixed deposit, wherever applicable for the year ended March 31, 2025, March 31, 2024 and March 31, 2023.

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(36) Related Party Disclosures

SPV group has identified related parties and related party transactions as per IND AS 24 and Parties to the InvIT. The list of related parties and their transactions given in these Special Purpose Combined Financial Statements are line-by-line combination of all the transactions with related parties entered into by the SPVs and balances between the SPVs subject to elimination for transaction and balances between the SPV Group. Parties to the InvIT include Sponsor Group, Investment Manager, Project Manager, Trustee and Promoters, directors of Sponsor Group, Investment Manager, Project Manager and Trustee. All transactions with them have been included in the list below.

(A) List of related parties as per InvIT regulations

Parties of the Trust

Sponsor	EPIC Transnet Infrastructure Private Limited (formerly known as Watrak Infrastructure Private Limited)
Investment Manager	EAAA TransInfra Managers Limited
Project Manager	EPIC Transnet Project Management Private Limited (formerly known as Chennai Tada Tollway Limited)
Trustee	Axis Trustee Services Limited
Partners of the parties to the Trust mentioned above	Not Applicable

Sponsor Group

Sponsor: EPIC Transnet Infrastructure Private Limited (formerly known as Watrak Infrastructure Private Limited)

Related Party	Relation
EPIC Transnet Project Management Private Limited	Entity controlled by Sponsor
Infrastructure Yield Plus II (IYP II)	Entity who control the Sponsor
Infrastructure Yield Plus IIA (IYP IIA)	Entity who control the Sponsor
India Infrastructure Yield Plus II (IIYP)	Entity who control the Sponsor
Epic Concesiones 2 Private Limited	Entity under common control
Neelambur Madukkarai Tollway Private Limited	Entity under common control
Mr. Manish Chitkara	Director
Mr. Tharuvai Venugopal Rangaswami	Director
Mr. Jimmy Jain	Director
Mr. Shravan Agarwal (upto November 15, 2025)	Director
Mr. Sreekumar Chatra (w.e.f November 13, 2025)	Director

Epic Concesiones 2 Private Limited

Related Party	Relation
Mr. Sreekumar Chatra	Director
Mr. Tharuvai Venugopal Rangaswami	Director
Mr. Sushanth Sujir Nayak	Director
Mr. Manish Chitkara	Director

Neelambur Madukkarai Tollway Private Limited (formerly known as L&T Transportation Infrastructure Limited)

Related Party	Relation
Mr. Parthasarathy Padmanabhan	Director
Mrs. Esther Malini Victor	Director
Mr. Mohankumar Kolli	Director
Mr. Satyan Kumar	Director

Investment Manager: EAAA TransInfra Managers Limited

Related Party	Relation
Mr. Sreekumar Chatra	Director
Mr. Suresh Gurumani	Additional Director
Mrs. Vidya Basarkod	Additional Director
Mr. Bhavyang Ramniklal Oza	Whole-time director
Mr. Emandi Sankara Rao (w.e.f October 16, 2025)	Additional Director
Mr. Subahoo Chordia (w.e.f October 16, 2025)	Additional Director

Project Manager: EPIC Transnet Project Management Private Limited (formerly known as Chennai Tada Tollway Limited)

Related Party	Relation
Mr. Manish Chitkara	Director
Mr. Shravan Agarwal	Director
Mr. Biren Sudhirbhai Fozdar (w.e.f November 3, 2025)	Director

Trustee: Axis Trustee Services Limited

Related Party	Relation
Mr. Prashant Ramrao Joshi	Director
Mr. Arun Mehta	Independent Director
Mr. Parmod Kumar Nagpal	Independent Director
Mr. Rahul Ranjan Choudhary	Managing Director
Mr. Bipin Saraf Kumar	Director

(B) List of related parties as per Ind AS 24

SRPL Roads Private Limited (formerly known as Sekura Roads Private Limited)

Related Party	Relation
Edelweiss Infrastructure Yield Plus (EIYP)	Holding Entity
SEPL Energy Private Limited	Entity under common control
NRSS XXXI (B) Transmission Limited	Entity under common control
Enviro Solaire Private Limited	Entity under common control
Nirjara Solaire Urja Private Limited	Entity under common control
Northern Solaire Prakash Private Limited	Entity under common control
Pokaran Solaire Energy Private Limited	Entity under common control
Solaire Power Private Limited	Entity under common control
Solaire Surya Urja Private Limited	Entity under common control
Solaire Urja Private Limited	Entity under common control
Solairedirect Projects India Private Limited	Entity under common control
Suprasanna Solaire Energy Private Limited	Entity under common control
Suryauday Solaire Prakash Private Limited	Entity under common control
Ujjvalatejas Solaire Urja Private Limited	Entity under common control
Solaire Pro Urja Private Limited	Entity under common control
Darbhanga Motihari Transmission Company Limited	Fellow Subsidiary
Mr. Manish Chitkara (upto November 15, 2025)	Director
Mr. Tharuvai Venugopal Rangaswami (upto November 19, 2025)	Director
Mr. Kevinkumar Parshottambhai Chothani (w.e.f. November 11, 2025)	Director
Mr. Pramod Mulchand Sharma (w.e.f. November 11, 2025)	Director
Mr. Sandip Das (w.e.f. November 11, 2025)	Director

Dhola Infra Projects Private Limited (formerly known as Dhola Infra Projects Limited)

Related Party	Relation
Edelweiss Infrastructure Yield Plus (EIYP)	Ultimate Holding Entity
SEPL Energy Private Limited	Entity under common control
Mr. Parmod Sharma (upto May 19, 2023)	Director
Mr. Sandeep Das	Director
Mr. Mohan Kumar Kolli	Director
Mr. Niraj Mohanty (w.e.f. May 16, 2023) (Upto April 21, 2025)	Director

Dibang Infra Projects Private Limited (formerly known as Dibang Infra Projects Limited)

Related Party	Relation
Edelweiss Infrastructure Yield Plus (EIYP)	Ultimate Holding Entity
SEPL Energy Private Limited	Entity under common control
Mr. Parmod Sharma (upto May 19, 2023)	Director
Mr. Mohan Kumar Kolli	Director
Mr. Sandeep Das	Director
Mr. Niraj Mohanty (w.e.f. May 16, 2023) (Upto April 21, 2025)	Director

Jorabat Shillong Expressway Limited

Related Party	Relation
Edelweiss Infrastructure Yield Plus (EIYP) (w.e.f. November 16, 2023)	Ultimate Holding Entity
IL&FS Transportation Networks Limited (ITNL) (upto November 15, 2023)	Holding Company
Infrastructure Leasing & Financial Services Limited (upto November 15, 2023)	Holding Company of ITNL
IL&FS Airport Limited (upto November 15, 2023)	Fellow Subsidiary
Livia India Limited (upto November 15, 2023)	Fellow Subsidiary
Sabarmati Capital One Limited (upto November 15, 2023)	Fellow Subsidiary
Skill Training Assessment Management Partners Ltd. (upto November 15, 2023)	Fellow Subsidiary
Rohtas Bio Energy Limited (upto November 15, 2023)	Fellow Subsidiary
IL&FS Financial Services Limited (upto November 15, 2023)	Fellow Subsidiary
Elsamex Maintenance Services Limited (upto November 15, 2023)	Fellow Subsidiary
SEPL Energy Private Limited (w.e.f. November 16, 2023)	Entity under common control
Mr. Vijay Kini (upto July 06, 2023)	Director
Mr. Rajnish Saxena (upto November 15, 2023)	Director
Mr. Mohit Bhasin (upto October 01, 2022)	Director
Mr. Ravi Kumar Praveen (upto November 15, 2023)	Director
Mr. Krishna Ghag (Upto November 17, 2023)	Director
Mr. Pramod Mulchand Sharma (w.e.f. November 17, 2023)	Director
Mr. Vanrajsinh Dolatsinh Dodiya (w.e.f. November 17, 2023)	Director
Mr. Rajender Kumar (w.e.f. December 1, 2024)	Independent Director
Mrs. Nidhi Pande (w.e.f. December 1, 2024)	Director
Mr. Sandip Das (w.e.f. November 17, 2023)	Director
Mr. Apoorv Vinodbhai Darji (w.e.f. November 17, 2023)(upto November 30, 2024)	Director
Mr. Nilanjan Chakraborty (w.e.f. October 30, 2023)	Chief Financial Officer
Ms. Ankita Sagar Mithiya (w.e.f. October 30, 2023)	Company secretary
Mr. Prabhat Dutta (w.e.f. October 30, 2023)	Manager
Mr. Jitendra Kumar Mishra (w.e.f. May 24, 2024)	Director

SPV Group
(As defined in Note 1 - Corporate Information)

Notes to the Special Purpose Combined Financial Statements
All amounts in Rupees millions unless otherwise stated

Thrissur Expressway Limited

Related Party	Relation
KMC Constructions Limited (Upto October 30, 2023)	Ultimate Holding Company
KMC Infratech Limited (Upto October 30, 2023)	Holding Company
Guruvayoor Infrastructure Private Limited (Upto October 30, 2023)	Associate of Holding Company
Edelweiss Infrastructure Yield Plus (EIYP) (w.e.f. October 30, 2023)	Ultimate Holding Company
SEPL Energy Private Limited (w.e.f. October 30, 2023)	Entity under common control
Mr. Rajender Kumar (w.e.f. December 01, 2024)	Independent Director
Mr. Shravan Agarwal (w.e.f. November 26, 2024)	Director
Mr. Sandip Das (w.e.f. October 30, 2023)	Director
Mr. Vipul Mittal (w.e.f. October 30, 2023)	Chief Financial Officer
Mr. Mohan kumar Kolli (w.e.f. October 30, 2023)	Director
Ms. Deepika Surendra Agrawal (w.e.f. October 30, 2023)	Company secretary
Mr. Vanrajsinh Dolatsinh Dodiya (w.e.f. October 30, 2023)	Independent Director
Mr. Gangupam Sateesh (w.e.f. March 01, 2024)	Manager

Epic Concesiones 3 Private Limited (formerly known as L&T Infrastructure Development Projects Limited)

Related Party	Relation
Larsen & Toubro Limited (Upto April 10 2024)	Ultimate Holding
Infrastructure Yield Plus II (IYP II) (w.e.f April 10, 2024)	Holding Entity
Infrastructure Yield Plus IIA (IYP IIA) (w.e.f April 10, 2024)	Ultimate Holding Entity
India Infrastructure Yield Plus II (IIYP II) (w.e.f April 10, 2024)	Ultimate Holding Entity
CPP Investment Board Singaporean Holdings 1 Pte. Limited (Upto April 10 2024)	Entity having joint control
CPP Singaporean Holdings Pte 1 Ltd (Upto April 10 2024)	Entity under common control
CPPIB Inc. (Upto April 10 2024)	Entity under common control
CPPIB India Private Holdings Inc. (Upto April 10 2024)	Entity under common control
Neelambur Madukkarai Tollway Private Limited (Upto November 17 2025)	Subsidiary Company
EPIC Transnet Project Management Private Limited (Upto May 23 2025)	Subsidiary Company
PNG Tollway Limited (upto 27 March 2025)	Subsidiary Company
Kudgi Transmission Limited (Upto April 10 2024)	Subsidiary Company
EPIC Transnet Infrastructure Private Limited (Upto May 20 2025)	Subsidiary Company
LTI Mindtree Limited (Upto April 10 2024)	Fellow Subsidiary
L&T Hydrocarbon Engineering Limited (Upto April 10 2024)	Fellow Subsidiary
L&T Shipbuilding Limited (Upto April 10 2024)	Fellow Subsidiary
L&T Infrastructure Engineering Limited (Upto April 10 2024)	Fellow Subsidiary
L&T Finance Limited (Upto April 10 2024)	Fellow Subsidiary
L&T Metro Rail (Hyderabad) Limited (Upto April 10 2024)	Fellow Subsidiary
International Seaports (Haldia) Private Limited (Upto April 10 2024)	Associate of Subsidiary Company
Mr. R Shankar Raman (Upto April 10 2024)	Chairman and Non-executive director
Mr. D.K.Sen (Upto April 10 2024)	Managing Director
Mr. Sudhakar Rao (Upto April 10 2024)	Independent Director
Ms. Vijayalakshmi Rajaram Iyer (Upto April 10 2024)	Independent Director
Mr. Pushkar Vijay Kulkarni (Upto April 10 2024)	Non-executive Director
Dr. A.Veeraraghavan (Upto April 10 2024)	Independent Director
Mr. Sachin Johri (Upto April 10 2024)	Chief Executive
Larsen & Toubro Officers & Supervisory Staff Provident Fund (Upto April 10 2024)	Post employment benefit plan
Interise Investment Managers Limited (upto 27th February 2024)	Associate Company
Mr. Vijayanand Semletty (w.e.f April 10 2024)	Key Management Personnel
Ms. Khyati Parekh (w.e.f April 10 2024)	Key Management Personnel
Mr. Sachin Sahasrabudhe (w.e.f April 10 2024)	Key Management Personnel
Mr. Pramod Sushila Kapoor (Upto April 22, 2024)	Chief Financial Officer
Infrastructure Yield Plus II (IYP II)	Holding Entity
Infrastructure Yield Plus IIA (IYP IIA)	Holding Entity
India Infrastructure Yield Plus II (IIYP II)	Holding Entity
EPIC Green Urja Private Limited	Entity under common control
SEPL Energy Private Limited	Entity under common control
EPIC Concesiones 2 Private Limited	Entity under common control
EPIC Transnet Infrastructure Private Limited	Fellow Subsidiary
EPIC Transnet Project Management Private Limited	Fellow Subsidiary
Neelambur Madukkarai Tollway Private Limited (w.e.f November 18, 2025)	Fellow Subsidiary
Mr. Ravi Masabattula (Upto April 22 2024)	Company Secretary
Ms. Sree Nagamani Alluri (Upto April 15, 2025)	Company Secretary
Mr. Manish Chitkara	Key Managerial Personnel
Mr. Tharuvai Venugopal Rangaswami	Key Managerial Personnel
Mr. Niraj Mohanty (w.e.f January 22, 2025)	Director
Mr. P Padmanabhan (w.e.f April 22, 2024) (Upto November 11, 2025)	Director
Mrs. Esther Malini Victor (w.e.f January 22, 2025)	Director
Mr. Mohankumar Kolli (w.e.f January 22, 2025)	Director
Ms. Avani Gala (w.e.f April 17, 2025)	Company Secretary

SPV Group
(As defined in Note 1 - Corporate Information)

Notes to the Special Purpose Combined Financial Statements
All amounts in Rupees millions unless otherwise stated

Ahmedabad Maliya Tollway Private Limited (Formerly known as Ahmedabad - Maliya Tollway Limited)

Related Party	Relation
Larsen & Toubro Limited (upto April 10, 2024)	Ultimate Holding Company
Infrastructure Yield Plus II (IYP II) (w.e.f April 10, 2024)	Ultimate Holding Entity
Infrastructure Yield Plus IIA (IYP IIA) (w.e.f April 10, 2024)	Ultimate Holding Entity
India Infrastructure Yield Plus II (IIYP II) (w.e.f April 10, 2024)	Ultimate Holding Entity
Epic Concesiones 3 Private Limited	Holding Company
EPIC Transnet Infrastructure Private Limited	Fellow Subsidiary
Mr. Rajesh Nanikram Tilokani (Upto October 12, 2025)	Manager
Dr. J.N.Singh (upto April 11, 2024)	Independent Director
Dr. K.Satyanarayana (upto April 11, 2024)	Key Managerial Personnel
Mr. L.Lakshmi Narasimhan	Key Managerial Personnel
Mr. T Sukumar	Key Managerial Personnel
Mrs. Esther Malini Victor	Director
Mr. Pramod Sushila Kapoor (upto April 11, 2024)	Key Managerial Personnel
Mr. Satyan Kumar (w.e.f April 11, 2024)	Director
Mr. Pramod Mulchand Sharma (w.e.f April 11, 2024)	Director
Ms. Karishma Sharma (w.e.f May 15, 2025)	Company secretary

Panipat Elevated Corridor Private Limited (Formerly known as Panipat Elevated Corridor Limited)

Related Party	Relation
Larsen & Toubro Limited (Upto April 10, 2024)	Ultimate Holding Company
Infrastructure Yield Plus II (IYP II) (w.e.f April 10, 2024)	Ultimate Holding Entity
Infrastructure Yield Plus IIA (IYP IIA) (w.e.f April 10, 2024)	Ultimate Holding Entity
India Infrastructure Yield Plus II (IIYP II) (w.e.f April 10, 2024)	Ultimate Holding Entity
Epic Concesiones 3 Private Limited	Holding Company
Neelambur Madukkarai Tollway Private Limited (w.e.f November 18, 2025)	Fellow Subsidiary
Mr. Anupam Mishra (up to March 11, 2023)	Manager
Mr. Gyan Prakash Sharma (w.e.f March 11, 2023) (Upto April 11, 2024)	Manager
Mr. Sarath M	Chief Financial Officer
Ms. Priti Sharma	Company Secretary
Mr. Ashwin Mahalingam (Upto April 11, 2024)	Independent Director
Mr. N Raghavan (Upto April 11, 2024)	Independent Director
Mrs. Esther Malini Victor	Director
Mr. Sandip Das (w.e.f April 11, 2024)	Director
Mr. Promod Sharma (w.e.f April 11, 2024)	Director
Mr. Umang Agrawal (w.e.f May 15, 2025)(Upto January 22, 2026)	Company Secretary

Rajkot - Vadinar Tollway Private Limited (Formerly known as L & T Rajkot-Vadinar Tollway Limited)

Related Party	Relation
Larsen & Toubro Limited (Up to 10th April, 2024)	Ultimate Holding Company
Infrastructure Yield Plus II (IYP II) (w.e.f April 10, 2024)	Ultimate Holding Entity
Infrastructure Yield Plus IIA (IYP IIA) (w.e.f April 10, 2024)	Ultimate Holding Entity
India Infrastructure Yield Plus II (IIYP II) (w.e.f April 10, 2024)	Ultimate Holding Entity
Epic Concesiones 3 Private Limited	Holding Company
Kudgi Transmission Limited	Fellow Subsidiary
EPIC Transnet Infrastructure Private Limited	Fellow Subsidiary
Neelambur Madukkarai Tollway Private Limited (w.e.f November 18, 2025)	Fellow Subsidiary
Mr. Ashish Jaiswal	Manager
Mr. Lalit Singh Chakravarti (up to October 31, 2022)	Manager
Mr. S.A.Nagarajan	Key Managerial Personnel
Mr. S. Srinivasan	Key Managerial Personnel
Mr. Satyanarayana Naga Kalidindi (Upto April 10, 2024)	Independent Director
Mr. Jagadip Narayan Singh (Upto April 10, 2024)	Independent Director
Mr. P Padmanabhan (w.e.f April 9, 2024)	Director
Mr. Satyan Kumar (w.e.f April 11, 2024)	Director
Mr. Pramod Sharma (w.e.f April 11, 2024)	Director
Mr. Arun Rajput (w.e.f May 15, 2025)	Company Secretary

Deccan Tollways Private Limited (Formerly known as L&T Deccan Tollways Limited)

Related Party	Relation
Larsen & Toubro Limited (Up to 10th April, 2024)	Ultimate Holding Company
Infrastructure Yield Plus II (IYP II) (w.e.f April 10, 2024)	Ultimate Holding Entity
Infrastructure Yield Plus IIA (IYP IIA) (w.e.f April 10, 2024)	Ultimate Holding Entity
India Infrastructure Yield Plus II (IIYP II) (w.e.f April 10, 2024)	Ultimate Holding Entity
Epic Concesiones 3 Private Limited	Holding Company
EPIC Transnet Infrastructure Private Limited	Fellow Subsidiary
Neelambur Madukkarai Tollway Private Limited	Associate Company
Mr. Veeraragavan Amirthalingam, (upto April 11, 2024)	Independent Director
Mr. Koshy Varghese (upto April 11, 2024)	Independent Director
Ms. Samyuktha Surendran (upto April 11, 2024)	Independent Director
Mr. Pramod Sushila Kapoor (upto April 11, 2024)	Director
Mr. Rajesh Vichare (upto November 24, 2025)	Manager
Mr. R G Ramachandran (upto March 26, 2024)	Director
Ms. Rambabu Yerra, (upto June 20, 2022)	Chief Financial Officer
Mr. P. Padmanabhan (w.e.f July 11, 2022) (Upto April 09, 2024)	Chief Financial Officer
Mr. P. Padmanabhan (w.e.f April 10, 2024)	Director
Mr. Satyan Kumar (w.e.f April 11, 2024)	Director
Mr. Sandip Das (w.e.f April 11, 2024)	Director
Ms. Nikita Sinha (w.e.f May 19, 2025)	Company Secretary

Sambalpur-Rourkela Tollway Private Limited (Formerly known as L&T Sambalpur - Rourkela Tollway Limited)

Related Party	Relation
Larsen & Toubro Limited (Upto April 10, 2024)	Ultimate Holding Company
Infrastructure Yield Plus II (IYP II) (w.e.f April 10, 2024)	Ultimate Holding Entity
Infrastructure Yield Plus IIA (IYP IIA) (w.e.f April 10, 2024)	Ultimate Holding Entity
India Infrastructure Yield Plus II (IIYP II) (w.e.f April 10, 2024)	Ultimate Holding Entity
Epic Concesiones 3 Private Limited	Holding Company
EPIC Transnet Infrastructure Private Limited	Fellow Subsidiary
Neelambur Madukkarai Tollway Private Limited (w.e.f November 18, 2025)	Fellow Subsidiary
Mr. Veeraragavan Amirthalingam (upto April 11, 2024)	Independent Director
Ms. Samyuktha Surendran (upto April 11, 2024)	Independent Director
Mr. P.S. Kapoor (upto April 11, 2024)	Director
Mr. R.G. Ramchandran (upto March 28, 2024)	Director
Ms. Shambhavi Nagarajan	Company Secretary
Mr. Debendra Kumar Barik (upto November 19, 2025)	Manager
Mr. P. Padmanabhan (w.e.f from April 9, 2024)	Director
Mr. Niraj Mohanty (w.e.f April 11, 2024)	Director
Mr. Sandip Das (w.e.f April 11, 2024)	Director
Ms. Nidhi Pande (w.e.f April 11, 2024)	Director
Mr. Gobinda Chandra Das (upto March 9, 2026)	Chief Financial Officer

Samakhiali Gandhidham Tollway Private Limited (Formerly known as L&T Samkhiali Gandhidham Tollway Limited)

Related Party	Relation
Larsen & Toubro Limited (Upto April 10, 2024)	Ultimate Holding Company
Infrastructure Yield Plus II (IYP II) (w.e.f April 10, 2024)	Ultimate Holding Entity
Infrastructure Yield Plus IIA (IYP IIA) (w.e.f April 10, 2024)	Ultimate Holding Entity
India Infrastructure Yield Plus II (IIYP II) (w.e.f April 10, 2024)	Ultimate Holding Entity
Epic Concesiones 3 Private Limited	Holding Company
L&T Transportation Infrastructure Limited (Up to April 10, 2024)	Fellow Subsidiary
EPIC Transnet Infrastructure Private Limited	Fellow Subsidiary
Neelambur Madukkarai Tollway Private Limited (w.e.f November 18, 2025)	Fellow Subsidiary
Ms. Indubala C	Chief Financial Officer
Mr. Bhushan Babubhai Parmar (Upto April 28, 2025)	Manager
Mr. Pramod Sushila Kapoor (Upto April 11, 2024)	Director
Mrs. Esther Malini Victor	Director
Mr. Prakash Nayak (upto December 25, 2021)	Manager
Mr. Satyanarayana Kalidindi Naga (Upto April 11, 2024)	Independent Director
Mr. Jagadip Narayan Singh (Upto April 11, 2024)	Independent Director
Mr. Satyan Kumar (w.e.f April 4, 2024)	Director
Ms. Sipra Paul (Upto April 11, 2024)	Company Secretary
Mr. Pramod Mulchand Sharma (w.e.f April 11, 2024)	Director
Mr. Amit Bajaj (w.e.f April 30, 2025)	Company Secretary

Rewin Infrastructure Limited (upto April 10, 2024)

Related Party	Relation
Larsen & Toubro Limited	Ultimate Holding Company
Mr. Pramod Sushila Kapoor	Director
Mrs. Esther Malini Victor	Director
Mr. R G Ramachandran	Chief Financial Officer

Palanpur-Swaroopgunj Road Project Limited (formerly known as L&T Interstate Road Corridor Limited) (upto April 10, 2024)

Related Party	Relation
Larsen & Toubro Limited (upto April 10, 2024)	Ultimate Holding Company
L&T Chennai - Tada Tollway Limited (upto April 10, 2024)	Fellow Subsidiary
Ms. Samyuktha Surendran	Independent Director
Mr. Ashwin Mahalingam, (upto March 11, 2024)	Independent Director
Mr. P G Suresh, (upto August 9, 2023)	Director
Mr. R G Ramachandran, (upto March 26, 2024)	Director
Mr. P. Padmanabhan (w.e.f March 30, 2024)	Director
Mrs. Esther Malini Victor	Director
Mr. Mohan Kumar Koli	Key Managerial Personnel
Ms. Nidhi Pandey	Key Managerial Personnel
Mr. Pramod K. Sharma	Key Managerial Personnel
Mr. Bhaskar Ranganath Malsagar, (upto May 5, 2022)	Manager
Mr. Siva Perumal (upto August 9, 2023)	Manager
Mr. Bhargav Kumar Bhatt (w.e.f September 10, 2023)	Key Managerial Personnel
Mr. Manoj Kumar Singh	Chief Financial Officer
Mr. P S Kapoor	Company Secretary

Vadodara Bharuch Tollway Limited (formerly known as L & T Vadodara Bharuch Tollway Limited) (Upto April 10, 2024)

Related Party	Relation
Larsen & Toubro Limited	Ultimate Holding Company
Mr. P. Padmanabhan	Director
Mrs. Esther Malini Victor	Director
Mr. Mohan Kolli	Director
Mr. Niraj Mohanty	Director
Mr. N Raghavan	Independent Director
Mr. Sekhar Nappa Srinivasan	Manager
Mr. Vijay Pathak	Chief Financial Officer
Mr. J N Singh	Independent Director

EPIC Concesiones Private Limited (Upto April 10, 2024)

Related Party	Relation
Infrastructure Yield Plus II (IYP II)	Holding Company
Kudgi Transmission Limited	Wholly owned Subsidiary
India Infrastructure Yield Plus II (IIYP II)	Entity having substantial interest
EPIC Concesiones 2 Private Limited	Entity under common control
Mr. Manish Chitkara	Key Managerial Personnel
Mr. Tharuvai Venugopal Rangaswami	Key Managerial Personnel

Related Party Disclosures (Note 36 Contd.)

(C) Details of transactions during the period/year:

Description	Nine months period ended December 31, 2025	Year ended March 31, 2025	Year ended March 31, 2024	Year ended March 31, 2023
Transactions during the period/year:				
Issue of Compulsory Convertible Debentures (CCD)				
Edelweiss Infrastructure Yield Plus (EIYP)	-	-	794.19	50.00
Infrastructure Yield Plus II (IYP II)	117.00	10,798.60	203.59	190.30
Infrastructure Yield Plus II (IYP IIA)	45.00	4,225.90	168.81	-
India Infrastructure Yield Plus II (IIYP II)	18.00	1,631.59	-	-
Issue of Non- Convertible Debentures (NCD)				
Edelweiss Infrastructure Yield Plus (EIYP)	46.10	-	10,018.35	-
Conversion of Intercorporate Borrowing (ICD) to NCD				
EPIC Transnet Infrastructure Private Limited	2,992.06	-	-	-
Neelambur Madukkarai Tollway Private Limited	450.00	-	-	-
Issue of Equity shares (Including Securities Premium)				
Infrastructure Yield Plus II (IYP IIA)	255.66	-	-	-
India Infrastructure Yield Plus II (IIYP II)	200.33	-	-	-
Proceeds from transfer of ICD				
EPIC Transnet Infrastructure Private Limited	6,010.63	-	-	-
Neelambur Madukkarai Tollway Private Limited	1,380.00	-	-	-
Repayment of Non- Convertible Debentures				
Edelweiss Infrastructure Yield Plus (EIYP)	50.00	101.60	500.00	-
Infrastructure Yield Plus II (IYP II)	8,814.00	1,592.45	-	-
Infrastructure Yield Plus IIA (IYP IIA)	3,282.69	702.39	-	-
India Infrastructure Yield Plus II (IIYP II)	1,271.91	154.66	-	-
Repayment of unsecured loan				
KMC Infratech Limited	-	-	-	638.10
KMC Constructions Limited	-	-	-	4.71
Neelambur Madukkari Tollway Private Limited	-	2,259.02	1,500.00	-
Kudgi Transmission Limited	-	767.00	-	-
Repayment of Optionally Convertible Debentures				
KMC Infratech Limited	-	-	57.37	-
Proceeds from transfer of compulsorily convertible preference shares				
Infrastructure Yield Plus II (IYP II)	1,580.43	-	-	-
Infrastructure Yield Plus IIA (IYP IIA)	752.52	-	-	-
India Infrastructure Yield Plus II (IIYP II)	356.49	-	-	-
Repayment of Inter corporate borrowing (ICD)				
Kudgi Transmission Limited	417.00	150.00	-	-

SPV Group
(As defined in Note 1 - Corporate Information)

Notes to the Special Purpose Combined Financial Statements
All amounts in Rupees millions unless otherwise stated

Details of transactions during the period/year:

Description	Nine months period ended December 31, 2025	Year ended March 31, 2025	Year ended March 31, 2024	Year ended March 31, 2023
Interest Expense on Compulsory Convertible Debentures				
Infrastructure Yield Plus II (IYP II)	773.60	780.70	-	-
Infrastructure Yield Plus IIA (IYP IIA)	311.77	300.27	-	-
India Infrastructure Yield Plus II (IIYP II)	130.21	120.11	-	-
Edelweiss Infrastructure Yield Plus (EIYP)	50.00	50.00	-	-
Interest expense on unsecured loan (expense)				
Neelambur Madukkari Tollway Private Limited	22.43	38.25	0.58	-
Kudgi Transmission Limited	25.00	56.80	-	-
Interest Expense on Non-convertible Debenture				
Edelweiss Infrastructure Yield Plus (EIYP)	334.62	450.33	179.11	179.11
Interest on Unsecured loan from KMCIL				
KMC Infratech Limited	-	-	-	8.14
Interest on OCDs				
KMC Infratech Limited	-	-	4.02	6.68
Transfer of Liabilities/Assets (net)				
EPIC Transnet Project Management Private Limited	2.48	-	-	-
Reimbursement of Expenses from				
Edelweiss Infrastructure Yield Plus (EIYP)	-	0.70	1.38	17.09
SEPL Energy Private Limited	0.04	1.28	2.32	0.04
Larsen & Toubro Limited	-	-	1.70	1.40
Reimbursement of Expenses to				
SEPL Energy Private Limited	0.90	6.40	5.37	0.54
NRSS XXXI (B) Transmission Limited	-	-	-	0.00
Neelambur Madukkarai Tollway Private Limited	0.48	-	-	-
Darbhanga Motihari Transmission Co. Ltd.	-	-	-	0.01
Enviro Solaire Private Limited	-	-	-	0.00
Nirjara Solaire Urja Private Limited	-	-	-	0.00
Northern Solaire Prakash Private Limited	-	-	-	0.01
Pokaran Solaire Energy Private Limited	-	-	-	0.00
Solaire Power Private Limited	-	-	-	0.00
Solaire Surya Urja Private Limited	-	-	-	0.01
Solaire Urja Private Limited	-	-	-	0.01
Solairedirect Projects India Private Limited	-	-	-	0.00
Suprasanna Solaire Energy Private Limited	-	-	-	0.00
Suryauday Solaire Prakash Private Limited	-	-	-	0.00
Ujjvalatejas Solaire Urja Private Limited	-	-	-	0.00
Solaire Pro Urja Private Limited	-	-	-	0.00
KMC Infratech Limited	-	-	3.81	-
KMC Constructions Limited	-	-	2.51	0.39
Epic Concesiones 2 Private Limited	-	5.16	-	-
Krishna Parekh	-	-	0.01	-
Manish Chitkara	0.01	0.15	0.19	0.20
Mohankumar Kolli	0.00	0.08	0.10	0.01
Deepika Agrawal	0.18	0.24	0.08	-
Gangupam Sateesh	2.10	2.51	-	-
Debendra Kumar Barik	-	4.02	3.54	3.42
Gobinda Chandra Das	-	2.51	2.32	2.27
Sandeep Das	-	0.00	0.00	-
Niraj Mohanty	-	0.00	0.00	-
Pramod Sharma	-	-	-	0.08
Jitendra Kumar Mishra	0.47	-	-	-
Nilanjan Chakraborty	1.10	-	-	-

Details of transactions during the period/year:

Description	Nine months period ended December 31, 2025	Year ended March 31, 2025	Year ended March 31, 2024	Year ended March 31, 2023
Pass through Claim				
KMC Infratech Limited	-	97.87	-	-
EPC Advance Given				
KMC Constructions Limited	-	-	1,182.63	370.04
Restoration Work/Service Roads Repairing Works				
KMC Constructions Limited	-	-	-	13.13
Balance Written back				
KMC Constructions Limited	-	-	1.28	-
Balance Written off				
KMC Infratech Limited	-	-	5.89	-
COS work done				
KMC Constructions Limited	-	-	40.67	140.02
Hybrid Work/O&M work				
KMC Constructions Limited	-	-	13.86	13.96
Purchase of goods and services				
KMC Constructions Limited	-	-	-	141.48
Larsen & Toubro Limited	-	-	62.26	86.23
Neelambuar Madukkarai Tollway Private Limited	5.25	-	-	-
LTI Mindtree Limited	-	-	16.50	27.60
Investment related receivables				
Larsen & Toubro Limited	-	-	-	614.80
Rent paid				
Larsen & Toubro Limited	-	-	48.20	51.10
Lease rental income				
L&T Metro Rail (Hyderabad) Limited	-	-	1.00	-
Larsen & Toubro Limited	-	0.10	1.00	-
Towards employer contribution				
Larsen & Toubro Officers and Supervisory Staff Provident Fund	-	-	7.80	9.10
Sale of Investments				
CPP Investment Board Private Holdings (4) INC.	-	-	-	5,225.00
CPPIB India Private Holdings Inc.	-	-	519.90	-

Details of transactions during the period/year:

Description	Nine months period ended December 31, 2025	Year ended March 31, 2025	Year ended March 31, 2024	Year ended March 31, 2023
Investment in Equity shares				
Interise Investment Managers Limited	-	-	773.59	-
Dividend received				
International Seaports Haldia (Private) Limited	-	-	54.10	88.50
Director sitting fees				
Independent/Non-executive directors	-	0.46	2.50	2.30
Tharuvai Venugopal Rangaswami	0.06	0.35	0.24	-
Jagadip Narayan Singh	-	-	1.92	1.87
Satyanarayana Kalidindi Naga	-	-	1.21	1.06
N Raghavan	-	-	0.50	0.28
Veeraragavan Amirthalingam	-	0.02	0.81	0.78
Samyuktha Surendran	-	-	0.68	0.55
Mr. Koshy Varghese	-	-	0.40	0.40
Deputation Cost				
IL&FS Transportation Networks Limited	-	-	-	2.49
Infrastructure Leasing & Financial Services Limited	-	-	37.39	-
Larsen & Toubro Limited	-	-	13.28	-
Miscellaneous Expense				
Elsamex Maintenance Services Limited	-	-	-	1.48
Supervision Fees				
Elsamex Maintenance Services Limited	-	-	5.31	1.63
Operation & Maintenance Cost				
Elsamex Maintenance Services Limited	-	-	73.45	94.59
Major Maintenance cost				
Elsamex Maintenance Services Limited	-	-	-	1.19
Damages Recovered				
Elsamex Maintenance Services Limited	-	-	7.88	-
Insurance Reimbursement				
Elsamex Maintenance Services Limited	-	-	7.12	-
Unsecured Loan Given				
EPIC Transnet Project Management Private Limited	-	-	23.50	-
Purchase of Property, Plant & Equipment				
Epic Transnet Infrastructure Private Limited	-	5.60	-	-
Sale of Property, Plant & Equipment				
Epic Concesiones 2 Private Limited	0.19	-	-	-
Salary and Perquisites/Remuneration of Directors*				
Bhushan Babubhai Parmar	-	2.96	2.76	2.34
Rajesh Vichare	4.31	4.09	3.46	3.38
Prashanth Kumar Singh	-	-	-	1.47
Rajesh Nanikram Tilokani	2.28	3.93	3.69	2.18
Amit Bajaj	0.13	-	-	-
Umang Agrawal	0.13	-	-	-
Karishma Sharma	0.13	-	-	-
Nikita Sinha	0.13	-	-	-
Arun Rajput	0.13	-	-	-
Debendra Kumar Barik	2.82	4.02	3.54	3.42
Gobinda Chandra Das	2.21	2.51	2.32	2.27
Ankita Sagar Mithiya	0.18	-	-	-
Prabhat Dutta	1.78	-	-	-
P Padmanabhan	16.15	-	-	-
Esther Malini Victor	9.40	-	-	-
Arun Rajput	0.15	-	-	-
Lalit Singh Chakravarti	-	-	-	1.08
Ashish Jaiswal	-	-	2.70	0.68

(D) Details of outstanding balances:

Description	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Optionally Convertible Debentures				
KMC Infratech Limited	-	-	-	57.37
Compulsory Convertible Debentures				
Edelweiss Infrastructure Yield Plus (EIYP)	3,029.89	3,029.89	3,029.89	2,735.70
Infrastructure Yield Plus II (IYP II)	903.04	9,600.05	393.89	190.30
Infrastructure Yield Plus IIA (IYP IIA)	454.63	3,692.33	168.81	-
India Infrastructure Yield Plus II (IIYP II)	223.02	1,476.93	-	-
Compulsorily Convertible Preference Shares (CCPS)				
Infrastructure Yield Plus II (IYP II)	1,580.43	-	-	-
Infrastructure Yield Plus IIA (IYP IIA)	752.52	-	-	-
India Infrastructure Yield Plus II (IIYP II)	356.49	-	-	-
EPIC Transnet Infrastructure Private Limited	700.00	700.00	700.00	700.00
Edelweiss Infrastructure Yield Plus (EIYP)	116.17	116.17	77.83	-
KMC Infratech Limited	-	-	38.34	116.17
Non Convertible Debentures				
Edelweiss Infrastructure Yield Plus (EIYP)	11,126.86	10,944.64	11,046.24	1,377.78
Neelambur Madukkarai Tollway Private Limited	450.00	-	-	-
EPIC Transnet Infrastructure Private Limited	2,992.06	-	-	-
Interest on Compulsory Convertible Debentures				
Edelweiss Infrastructure Yield Plus (EIYP)	50.00	10.00	-	-
Interest on Non Convertible Debentures				
Edelweiss Infrastructure Yield Plus (EIYP)	49.45	-	89.56	89.31
Interest Payable on Unsecured Loans				
KMC Infratech Limited	-	-	-	4.01
Livia India Limited	-	-	-	45.00
Sabarmati Capital One Limited	-	-	-	45.40
Skill Training Assessment Management Partners Ltd.	-	-	-	56.47
Rohtas Bio Energy Limited	-	-	-	48.38
IL&FS Airport Limited	-	-	-	83.17
Short Term Loan				
IL&FS Transportation Networks Limited	-	-	-	1,978.39
Sabarmati Capital One Limited	-	-	-	600.00
Skill Training Assessment Management Partners Ltd.	-	-	-	620.00
Rohtas Bio Energy Limited	-	-	-	620.00
IL&FS Airport Limited	-	-	-	1,597.00
COS & Utility Shifting & Other EPC Advances				
KMC Constructions Limited	-	-	-	447.00
Corporate Guarantee to Lenders				
KMC Constructions Limited	-	-	-	11,333.63

Details of outstanding balances:

Description	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Trade Payable/Retention Money Payable				
IL&FS Transportation Networks Limited	-	-	-	1,680.45
Elsamex Maintenance Services Limited	-	-	-	7.97
EPIC Transnet Infrastructure Private Limited	-	6.30	-	-
Larsen & Toubro Limited	-	-	10.13	-
SEPL Energy Private Limited	0.26	2.47	3.19	-
Epic Concesiones 2 Private Limited	-	6.08	-	-
KMC Constructions Limited	-	-	3.55	-
Neelambur Madukkari Tollway Private Limited	4.77	-	-	-
IL&FS Transportation Networks Limited	-	-	-	512.57
Elsamex Maintenance Services Limited	-	-	-	5.54
Trade Receivables				
SEPL Energy Private Limited	0.28	-	-	-
Epic Concesiones 2 Private Limited	0.19	-	-	-
Other Payable				
EPIC Transnet Project Management Private Limited	2.48	-	-	-
Larsen & Toubro Limited	-	-	0.10	0.05
Edelweiss Infrastructure Yield Plus (EIYP)	-	-	0.07	-
Other Receivables				
Larsen & Toubro Limited	-	-	2.70	605.80
Edelweiss Infrastructure Yield Plus (EIYP)	-	-	-	16.90
Unsecured Loan				
Epic Transnet Infrastructure Private Limited	3,218.58	-	-	-
Kudgi Transmission Limited	-	617.00	-	-
Neelambur Madukkari Tollway Private Limited	3,557.52	2,627.52	3,049.82	1,549.30
Mobilisation Advance				
IL&FS Transportation Networks Limited	-	-	-	14.53
Reimbursement of Expenses Receivable				
KMC Infratech Limited	-	-	-	1.99
Reimbursement of Expense Payable				
SEPL Energy Private Limited	-	1.29	-	-
Livia India Limited	-	-	-	0.30
Sabarmati Capital One Limited	-	-	-	1.57
Manish Chitkara	-	-	-	0.01
Deepika Agarwal	0.02	-	-	-
Infrastructure Leasing & Financial Services Limited	-	-	-	10.47
IL&FS Financial Services Limited	-	-	-	71.59

Notes:

*Does not include provisions for gratuity and leave encashment liabilities, since the provisions are based on actuarial valuations.

(E) Terms and conditions of transactions with related parties:

The sales to and purchases from related parties are made on terms equivalent to those that prevail in arm's length transactions. The loans to related parties are interest bearing and repayable on demand. Outstanding balances at the period/year end are unsecured and interest free and settlement occurs in cash.

There have been no guarantees provided or received for any related party receivables or payables, other than those disclosed above. For the current and previous periods/years, the SPV Group has not recorded any impairment of receivables relating to amounts owed by related parties. This assessment is undertaken each financial period/year through examining the financial position of the related party and the market in which the related party operates.

(37) Disclosures as required by SEBI Circular No. SEBI/HO/DDHS-PoD-2/P/CIR/2025/102 dated July 11, 2025

A. Statement of net assets at fair value as at December 31, 2025 [refer note (iii) below]:

Particulars		Book Value	Fair Value
I	Total Assets [Refer Notes (i) to (ii)]	80,743.41	1,55,627.51
II	Total Liabilities	1,13,872.23	1,13,872.23
III	Net Assets (I-II)	(33,128.82)	41,755.28
IV	No. of Units	(Refer note (i) below)	(Refer note (i) below)
V	NAV per units (III/IV)	(Refer note (i) below)	(Refer note (i) below)

Notes:

(i) The number of units that Trust will issue to investors in connection with the proposed initial public issue of units of the Trust is not presently ascertainable. Accordingly, disclosure in respect of Net Asset Value (NAV) per unit have not been given.

(ii) Project wise break up of fair value of assets as at December 31, 2025:

Particulars		Enterprise Value	Other adjustment (refer note iv)	Fair Value
I	Dhola Infra Projects Private Limited	3,442.05	1,215.93	4,657.98
II	Dibang Infra Projects Private Limited	2,483.89	1,015.11	3,498.99
III	Jorabat Shillong Expressway Limited	5,210.25	1,749.28	6,959.53
IV	Thrissur Expressway Limited	13,086.71	3,606.68	16,693.39
V	Ahmedabad Maliya Tollway Private Limited	16,307.66	7,401.74	23,709.41
VI	Deccan Tollways Private Limited	19,200.49	12,437.69	31,638.17
VII	Rajkot Vadinar Tollway Private Limited	4,970.84	3,864.61	8,835.46
VIII	Samkhiali Bhachau Gandhidham Tollway Private Limited	11,992.35	11,347.96	23,340.31
IX	Panipat Elevated Corridor Private Limited	850.01	550.71	1,400.71
X	Sambalpur Rourkela Tollway Private Limited	27,400.11	6,764.87	34,164.97
	Sub total	1,04,944.36	49,954.58	1,54,898.92
XI	Assets in the immediate holding companies	-	728.59	728.59
	Total Assets	1,04,944.36	50,683.17	1,55,627.51

(iii) Project wise break up of fair value of total assets includes break up of 10 SPVs as at December 31, 2025 as disclosed above are based on the fair valuation report dated March 23, 2026 of the independent valuer appointed by the Investment Manager under the InvIT Regulations.

(iv) Other adjustments represents cash and cash equivalents, other bank balances, fixed deposits, investments in mutual funds, external borrowings and interest thereon, fair value attributable to minority interest and net assets of the Trust, intermediate holding companies and project manager as they are not considered as a part of enterprise value in the valuation report.

B. Statement of Total Return at fair value [refer note (i) below]:

Particulars	Nine months period ended December 31, 2025	Year ended March 31, 2025
Total Comprehensive Income (As per the Combined Statement of Profit and Loss)	(2,203.65)	(4,189.99)
Add: Other Changes in Fair Value (e.g., in investment property, property, plant & equipment (if cost model is followed)) not recognized in Total Comprehensive Income (Refer Note (i) below)	9,205.98	8,602.70
Total Return	7,002.33	4,412.71

(i) In the above statement, Other changes in fair value for nine months period ended December 31, 2025 and year ended March 31, 2025 has been computed based on the difference in fair values of total assets as at December 31, 2025, March 31, 2025 and March 31, 2024 respectively. The fair values of total assets as at December 31, 2025, March 31, 2025 and March 31, 2024 are based solely on the valuation reports dated March 23, 2026 of the independent valuer appointed by Investment Manager under the InvIT Regulations.

SPV Group
(As defined in Note 1 - Corporate Information)

Notes to the Special Purpose Combined Financial Statements
All amounts in Rupees millions unless otherwise stated

C. Statement showing operating cash flows from the projects for all the SPV's:

Particulars	Nine months period ended December 31, 2025	Year ended March 31, 2025	Year ended March 31, 2024	Year ended March 31, 2023
Net Cash from Operating Activities				
SRPL Roads Private Limited	(10.50)	(43.71)	(71.03)	(119.00)
Dhola Infra Projects Private Limited	389.86	976.55	1,643.13	338.44
Dibang Infra Projects Private Limited	247.94	712.31	693.82	665.64
Jorabat Shillong Expressway Limited	524.15	507.35	114.91	1,258.55
Thrissur Expressway Limited	999.12	1,600.71	2,565.62	1,315.75
Epic Concesiones Private Limited	-	-	(70.98)	(152.88)
Epic Concesiones 3 Private Limited	(773.18)	720.00	(429.48)	(391.18)
Ahmedabad Maliya Tollway Private Limited	2,062.42	1,105.92	1,307.52	1,278.94
Deccan Tollways Private Limited	1,489.57	415.08	(274.74)	992.43
Rajkot Vadinar Tollway Private Limited	705.16	924.61	901.60	860.62
Samkhiali Bhachau Gandhidham Tollway Private Limited	(59.56)	2,242.98	560.21	763.26
Panipat Elevated Corridor Private Limited	697.07	295.23	510.18	625.92
Sambalpur Rourkela Tollway Private Limited	1,548.11	992.49	1,851.04	1,475.76
Palanpur Swaroopgunj Road Project Limited	-	-	149.18	261.03
Vadodara Bharuch Tollway Limited	-	-	(32.04)	(94.02)
Rewin Infrastructure Limited	-	-	(26.42)	-
Net cash flow from projects	7,820.15	10,449.52	9,392.51	9,079.25

D. Capitalisation statement

Particulars	Pre Issue as at December 31, 2025	As adjusted for issue**
Non-current borrowings	36,240.04	
Current borrowings	17,565.20	
Current maturities of non-current borrowings (including interest accrued)	5,474.77	
Total Debt (A)	59,280.01	
Equity:		Refer Note below
Capital	774.13	
Other equity	(40,440.39)	
Instrument entirely equity in nature	6,537.44	
Net Shareholder's fund (B)	(33,128.82)	
Debt equity ratio [A/B]	(1.79)	

**Note: Corresponding details post initial issue are not available, hence the required disclosures have not been provided in the above table.

E. Debt payment history

	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
SRPL Roads Private Limited				
Carrying amount of debt at the beginning of the period/year	-	-	-	-
Additional borrowings during the period/year	-	-	-	-
Repayments during the period/year	-	-	(500.00)	-
Other adjustments / settlements during the period/year*	-	-	500.00	-
Carrying amount of debt at the end of the period/year	-	-	-	-
Interest Payments (Cash Outflow)	(10.00)	(40.00)	-	-
Dhola Infra Projects Private Limited				
Carrying amount of debt at the beginning of the period/year	3,070.86	3,363.16	4,063.35	4,500.03
Additional borrowings during the period/year	-	-	-	-
Repayments during the period/year	(589.68)	(300.29)	(709.67)	(438.02)
Other adjustments / settlements during the period/year*	4.99	7.99	9.48	1.34
Carrying amount of debt at the end of the period/year	2,486.17	3,070.86	3,363.16	4,063.35
Interest Payments (Cash Outflow)	(186.00)	(388.14)	(358.55)	(401.26)
Dibang Infra Projects Private Limited				
Carrying amount of debt at the beginning of the period/year	2,427.58	2,806.07	3,119.90	3,422.55
Additional borrowings during the period/year	-	-	-	-
Repayments during the period/year	(184.87)	(386.06)	(322.65)	(302.60)
Other adjustments / settlements during the period/year*	4.81	7.57	8.82	(0.04)
Carrying amount of debt at the end of the period/year	2,247.52	2,427.58	2,806.07	3,119.90
Interest Payments (Cash Outflow)	(157.93)	(312.66)	(285.53)	(306.98)
Jorabat Shillong Expressway Limited				
Carrying amount of debt at the beginning of the period/year	4,968.68	5,474.30	13,316.88	13,316.88
Additional borrowings during the period/year	-	-	-	-
Repayments during the period/year	(299.60)	(567.45)	(6,634.16)	-
Other adjustments / settlements during the period/year*	225.20	61.83	(1,208.42)	-
Carrying amount of debt at the end of the period/year	4,894.28	4,968.68	5,474.30	13,316.88
Interest Payments (Cash Outflow)	(151.65)	(683.77)	(1,211.93)	-
Thrissur Expressway Limited				
Carrying amount of debt at the beginning of the period/year	13,162.42	13,623.07	9,536.30	10,870.59
Additional borrowings during the period/year	1,416.10	-	13,805.98	-
Repayments during the period/year	(557.95)	(476.16)	(9,535.21)	(1,416.37)
Other adjustments / settlements during the period/year*	10.98	15.50	(184.00)	82.08
Carrying amount of debt at the end of the period/year	14,031.56	13,162.42	13,623.07	9,536.30
Interest Payments (Cash Outflow)	(478.01)	(699.71)	(5,682.92)	(164.20)
Epic Concesiones 3 Private Limited				
Carrying amount of debt at the beginning of the period/year	14,769.30	-	-	-
Additional borrowings during the period/year	180.00	28,903.89	-	-
Repayments during the period/year	(13,368.61)	(14,758.19)	-	-
Other adjustments / settlements during the period/year*	-	623.60	-	-
Carrying amount of debt at the end of the period/year	1,580.69	14,769.30	-	-
Interest Payments (Cash Outflow)	(1,215.58)	(1,329.16)	-	-
Ahmedabad - Maliya Tollway Private Limited				
Carrying amount of debt at the beginning of the period/year	7,213.37	13,885.97	7,324.94	8,134.90
Additional borrowings during the period/year**	2,005.55	-	8,185.65	-
Repayments during the period/year	(685.38)	(6,689.49)	(1,640.00)	(810.74)
Other adjustments / settlements during the period/year*	12.04	16.90	15.38	0.78
Carrying amount of debt at the end of the period/year	8,545.58	7,213.37	13,885.97	7,324.94
Interest Payments (Cash Outflow)	(461.70)	(880.22)	(748.10)	(821.75)

	As at December 31, 2025	As at March 31, 2025	As at March 31, 2024	As at March 31, 2023
Deccan Tollways Private Limited				
Carrying amount of debt at the beginning of the period/year	9,863.70	9,902.04	9,940.49	10,381.40
Additional borrowings during the period/year**	2,114.16	9,812.81	-	-
Repayments during the period/year	(285.87)	(9,825.52)	(57.51)	(458.17)
Other adjustments / settlements during the period/year*	5.50	(25.63)	19.06	17.26
Carrying amount of debt at the end of the period/year	11,697.49	9,863.70	9,902.04	9,940.49
Interest Payments (Cash Outflow)	(623.92)	(934.50)	(1,015.63)	(968.95)
Rajkot-Vadinar Tollway Private Limited				
Carrying amount of debt at the beginning of the period/year	2,990.41	2,179.20	3,410.61	4,386.40
Additional borrowings during the period/year**	2,522.06	240.00	-	2,730.00
Repayments during the period/year	(463.20)	(409.50)	(1,235.20)	(3,692.60)
Other adjustments / settlements during the period/year*	3.03	980.70	3.79	(13.19)
Carrying amount of debt at the end of the period/year	5,052.30	2,990.41	2,179.20	3,410.61
Interest Payments (Cash Outflow)	(127.57)	(269.82)	(237.42)	(364.76)
Samkhiali Bhachau Gandhidham Tollway Private Limited				
Carrying amount of debt at the beginning of the period/year	617.45	2,816.37	2,718.57	3,938.00
Additional borrowings during the period/year**	478.91	-	425.73	-
Repayments during the period/year	-	(1,220.35)	(1,828.60)	(1,221.30)
Other adjustments / settlements during the period/year*	-	(978.57)	1,500.67	1.87
Carrying amount of debt at the end of the period/year	1,096.35	617.45	2,816.37	2,718.57
Interest Payments (Cash Outflow)	-	(15.20)	(153.83)	(267.85)
Panipat Elevated Corridor Private Limited				
Carrying amount of debt at the beginning of the period/year	1,067.00	450.00	450.00	450.00
Additional borrowings during the period/year**	270.00	767.00	-	-
Repayments during the period/year	(417.00)	(150.00)	-	-
Other adjustments / settlements during the period/year*	-	-	-	-
Carrying amount of debt at the end of the period/year	920.00	1,067.00	450.00	450.00
Interest Payments (Cash Outflow)	-	(95.05)	-	-
Sambalpur Rourkela Tollway Private Limited				
Carrying amount of debt at the beginning of the period/year	6,849.18	7,215.07	7,516.92	7,975.35
Additional borrowings during the period/year	-	7,127.89	-	-
Repayments during the period/year	(321.13)	(7,447.75)	(306.58)	(457.39)
Other adjustments / settlements during the period/year*	7.91	(46.03)	4.73	(1.04)
Carrying amount of debt at the end of the period/year	6,535.96	6,849.18	7,215.07	7,516.92
Interest Payments (Cash Outflow)	(446.75)	(664.65)	(686.44)	(677.08)
Palanpur-Swaroopgunj Road Project Limited				
Carrying amount of debt at the beginning of the period/year	-	-	461.54	1,002.40
Additional borrowings during the period/year	-	-	-	-
Repayments during the period/year	-	-	(472.54)	(593.21)
Other adjustments / settlements during the period/year*	-	-	11.01	52.35
Carrying amount of debt at the end of the period/year	-	-	-	461.54
Interest Payments (Cash Outflow)	-	-	(246.74)	(283.71)

*Includes the effect of the transaction cost paid to lender on upfront basis and other settlements during the period/year

** During the period ended December 31, 2025, a novation agreement dated November 03, 2025 was executed for the outstanding inter-corporate deposit ("ICD") with Sponsor Group Companies . The additional borrowings include an amount of Rs. 7,390.68 million related to this novation.

F. Contingent liabilities
For disclosures relating to contingent liabilities, refer to Note 27

G. Commitments
For disclosure relating to commitments, refer Note 26

H. Related Party Disclosure
For disclosure relating to related party disclosure, refer Note 36

(38) Information on segment reporting pursuant to Ind AS 108 - Operating Segment

The Group has structured its operations into one reportable segment of Construction and operation of highways. The management monitors the operating results of the activity of Construction and operation of highways for the purpose of making decisions about resource allocation and performance assessment. Segment performance is evaluated based on profit or loss and is measured consistently with profit or loss reported in the Special Purpose Combined Financial Statements. As the Group's operations are structured into one reportable business segment i.e. Construction and operation of highways. Hence separate segment disclosures are not made.

Further entire revenue from operations of the SPVs Group is generated within India and all the property, plant & equipment and intangible assets are acquired within India.

There is no single customer which contribute more than 10% of revenue from operation in any of reportable period.

(39) Details of ongoing litigation against SPVs Group

Ahmedabad Maliya Tollway Private Limited

Pursuant to the terms of the concession agreement dated September 17, 2008 entered between AMTPL and Gujarat State Road Development Corporation Limited (the "GSRDC") ("AMTPL CA") , in order to determine modifications to the term of the concession period ("Concession Period"), AMTPL is required to determine the actual traffic volume ("ATV") by traffic sampling on specific target dates. Further, as per the AMTPL CA, if the ATV differs from the target traffic volume ("TTV"), the Concession Period may be deemed to be extended or reduced, as the case may be. An independent engineer ("IE") was engaged to conduct the traffic sampling and had submitted the report to the GSRDC. Subsequent to the examination of the reports submitted by the IE, GSRDC noted that the ATV had exceeded the TTV as mentioned in the AMTPL CA. Thereafter, GSRDC vide its letter dated July 19, 2024 reduced the Concession Period by 2.2 years, in accordance with the terms of the AMTPL CA. AMTPL submitted a response letter dated August 2, 2024 to GSRDC, stating that, inter alia, the methodology adopted by IE for calculation of ATV is not in line with the provisions of AMTPL CA. AMTPL has also requested for a joint meeting with GSRDC and IE. The matter is currently pending.

Samakhiali Gandhidham Tollway Private Limited

Samkhiali Bhachau Gandhidham Tollway Private Limited (SBGTL) has initiated arbitration proceedings as per the terms of the Service Concession Agreement ("SCA") relating to the proposed reduction in the concession period by 2.4 years by NHAI, which is contrary to the claims made by the Company that no adjustment in the concession period is required due to target traffic. After considering the relevant provisions of the Concession Agreement, supporting traffic studies, computations, and independent legal advice, management is confident that the Company will be able to succeed in arbitration. Accordingly, pending the final outcome of arbitration, management has continued to consider the original concession period for the purposes of preparation of these financial statements.

Deccan Tollways Private Limited

Deccan Tollways Private Limited (DTPL) has received an intimation term of the Service Concession Agreement ("SCA") of the proposed reduction in the concession period by 1.89 years by NHAI, which is contrary to the claims made by the Company for extension required of the concession period due to target traffic. After evaluating the relevant provisions of the Concession Agreement, reviewing traffic studies, computations, and independent legal advice, management is confident that the Company will be successful in dispute resolution procedure, thereby securing the extension of the concession period as claimed.

Dhola Infra Projects Private Limited

The company has received show cause notice (SCN) for an amount of Rs. 419.50 millions pertaining to GST on annuity collections from the authorities. The management believes that the ultimate outcome of the said notice will not have a material adverse effect on the SPV Group financial position and results of the operations.

Dibang Infra Projects Private Limited

The company has received show cause notice (SCN) for an amount of Rs. 212.62 millions pertaining to GST on annuity collections from the authorities. The management believes that the ultimate outcome of the said notice will not have a material adverse effect on the SPV Group financial position and results of the operations.

Management is confident that outcome of any of the above litigation will not have material adverse effects on the special purpose combined financial statements.

(40) The SPV Group has net current liabilities of Rs. 12,210.05 Millions as at December 31, 2025 (March 31, 2025: Rs. 22,146.88 Millions) (including current maturities of long term loan and short term loan from related parties, Compulsory Convertible debentures and non-banking financial institution of Rs. 22,847.86 Millions). Further, during the period ended December 31, 2025, the SPV Group has incurred loss of Rs. 2,190.48 Millions (March 31, 2025: Rs. 4,177.51 Millions) . The SPV Group has incurred losses in the last few years and has accumulated losses of Rs. 40,440.39 Millions as at December 31, 2025. Considering the future cash flow projections of the Project SPV backed by projected traffic by an expert, fair value of the project by an expert valuer indicating the fair value is significantly higher and that the trust proposes to acquire the 100% stake in Project SPVs and has undertaken to refinance the existing sub-ordinate loan facilities from related parties and a non-banking financial institution, availed by the Project SPV from the proceeds of Units proposed to be issued by the Trust, at an interest rate below the existing contractual interest rate, the management is confident that the SPV Group will be able to meet its obligations in the next twelve months as they fall due. Accordingly, these special purpose combined financial statements have been prepared using the going concern assumption.

(41) New labour codes implemented across the country effective November 21, 2025

On November 21, 2025, the Central Government issued four separate notifications in the Official Gazette announcing implementation of four Labour Codes, viz., the Code on Wages, 2019, the Industrial Relations Code, 2020, the Code on Social Security, 2020 and the Occupational Safety, Health and Working Conditions Code, 2020. These four codes replace and consolidate 29 existing labour laws. Following the implementation of the four labour codes, the Central Government has pre-published the draft rules on December 31, 2025 under the respective Labour Codes, for public comment and the final rules are expected to be notified in due course both at centre and states.

The four codes have prescribed many changes including definition of wages and matter relevant for determination of employment benefits both during and post-employment period including gratuity to all employees, leave benefits, etc.

The incremental impact on provisions for employee benefits expenses of Rs. 14.08 Million towards gratuity and compensated absences primarily arises due to change in wage definition. The SPV Group has concluded that the changes do not have any material impact on its financial statements.The SPV Group continues to monitor the finalisation of Central/State Rules and clarifications from the Government on other aspects of the Labour Code and would provide appropriate accounting effect as and when such clarifications are issued/rules are notified.

(42) Other Information

(i) The Components does not have any Benami property, where any proceeding has been initiated or pending against the Components for holding any Benami property.
(ii) The Components does not have any transactions with companies struck off under section 248 of Companies Act, 2013.
(iii) The Components does not have any charges or satisfaction which is yet to be registered with ROC beyond the statutory period.
(iv) The Components have not traded or invested in Crypto currency or Virtual Currency during the financial period/year.
(v) The Components have not advanced or loaned or invested funds to any other persons or entities, including foreign entities (Intermediaries) with the understanding that the Intermediary shall directly or indirectly lend or invest in other persons or entities identified in any manner whatsoever by or on behalf of the Components (Ultimate Beneficiaries) or Provide any guarantee, security or the like to or on behalf of the Ultimate Beneficiaries.
(vi) The Components have not received any fund from any persons or entities, including foreign entities (Funding Party) with the understanding (whether recorded in writing or otherwise) that the Component shall directly or indirectly lend or invest in other persons or entities identified in any manner whatsoever by or on behalf of the Funding Party (Ultimate Beneficiaries) or provide any guarantee, security or the like on behalf of the Ultimate Beneficiaries.
(vii) The Components does not have any such transaction which is not recorded in the books of accounts that has been surrendered or disclosed as income during the period/year in the tax assessments under the Income Tax Act, 1961, such as, search or survey or any other relevant provisions of the Income Tax Act, 1961.
(viii) The Components have not been declared as wilful defaulter by the bank or financial institution (as defined under Companies Act, 2013) or consortium thereof, in accordance with the guideline on wilful defaulter issued by the Reserve Bank of India.

(43) Events after reporting date

There were no significant events that occurred subsequent to the reporting period other than the events disclosed in the relevant notes.

As per our report of even date attached
For S R B C & CO LLP
Chartered Accountants
Firm Registration No: 324982E/E300003

per Paul Alvares
Partner
Membership Number : 105754

Place : Pune
Date : March 23, 2026

For and on behalf of the Board of Directors of
EAAA TransInfra Managers Limited
(as Investment Manager of Citius TransNet Investment Trust)

Bhavyang Oza
Chief Investment Officer and
Whole-time Director
DIN No. : 11315739

Sreekumar Chatra
Director
DIN No. : 07149285

Padmanabhan P.
Chief Financial Officer

Place : Mumbai
Date : March 23, 2026

ANNEXURE E - PROJECTIONS OF REVENUE FROM OPERATIONS AND CASH FLOW FROM OPERATING ACTIVITIES

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Independent Auditor's Report on projections of revenue from operations and cash flow from operating activities and underlying assumptions

To
The Board of Directors,
EAAA Transinfra Managers Limited (the "Investment Manager") in its capacity as the Investment Manager of Citius Transnet Investment Trust (the "Trust")
Plot 294/3 Edelweiss House,
Off CST Road, Kalina, Santacruz East,
Mumbai, Maharashtra 400098

1. We have examined the accompanying Statement of projections of revenue from operations and cash flow from operating activities and the underlying assumptions of the Citius Transnet Investment Trust (the "Trust"), Dhola Infra Projects Private Limited (formerly known as Dhola Infra Projects Limited), Dibang Infra Projects Private Limited (formerly known as Dibang Infra Projects Limited), Thrissur Expressway Limited, Jorabat Shillong Expressway Limited, Ahmedabad - Maliya Tollway Private Limited (formerly known as Ahmedabad - Maliya Tollway Limited), Rajkot-Vadinar Tollway Private Limited (formerly known as L & T Rajkot-Vadinar Tollway Limited), Samkhiali Bhachau Gandhidham Tollway Private Limited (formerly known as L&T Samkhiali Gandhidham Tollway Limited), Sambalpur - Rourkela Tollway Private Limited (formerly known as L&T Sambalpur - Rourkela Tollway Limited), Deccan Tollways Private Limited (formerly known as L&T Deccan Tollways Limited), Panipat Elevated Corridor Private Limited (formerly known as Panipat Elevated Corridor Limited) (individually referred to as "SPV" and collectively referred to as "Project SPVs") (the Trust and Project SPVs together referred to as 'Trust Group'), for the years ending March 31, 2027, March 31, 2028, March 31, 2029 and March 31, 2030 along with basis of preparation and the significant assumptions (Statement of projections along with the related assumptions for the Trust Group are hereinafter referred to as the "Projection Information") , annexed to this report for the purpose of inclusion in the Offer Document and Final Offer Document (collectively, the "Offering Documents") prepared by EAAA Transinfra Managers Limited (the "Investment Manager") in connection with the proposed Initial Public Offering of Units of the Trust (the "Offering"). SPVs are proposed to be acquired by the Trust from each of their respective existing shareholders.

2. The preparation and presentation of the Projection Information, including the underlying assumptions, as set out in Note 3 to Projection Information, is the responsibility of the Investment Manager and has been approved by Board of Directors of the Investment Manager. Our responsibility is to examine the evidence supporting the assumptions (excluding hypothetical assumptions) and other information to the Projection Information. Our responsibility does not include verification of projections. Therefore, we do not vouch for the accuracy of the same.

3. The Projection Information has been prepared by the Investment Manager in accordance with the requirements of the Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014 issued by the Securities and Exchange Board of India ("SEBI") on September 26, 2014, as amended from time to time and any circulars issued thereunder (the "InvIT Regulations") for inclusion in the Offer Documents using a set of assumptions that include hypothetical assumptions about future events and management's actions that are not necessarily expected to occur, as set out in Note 3 to the Projection Information and has been approved by the Board of Directors of the Investment Manager. Consequently, users are cautioned that the Projection Information may not be appropriate for purposes other than that described above.

4. We have examined the evidence supporting the assumptions and other information in the Projection Information on a test basis taking into consideration:

(a) the terms of our engagement agreed with you vide our engagement letter dated October 29, 2025 requesting us to carry out work on the Projection Information, proposed to be included in the Offering; and

(b) Standard on Assurance Engagement 3400, "The Examination of Prospective Financial Information", issued by the Institute of Chartered Accountants of India.

5. Based on our examination of the evidence supporting the assumptions (excluding the hypothetical assumptions mentioned in Note 3 to the Projection Information), read with para 7 below, nothing has come to our attention which causes us to believe that such assumptions do not provide a reasonable basis for the Projection Information.

6. Further, nothing has come to our attention that causes us to believe, that the Projection Information, read with the Basis of Preparation and notes therein, has not been properly prepared on the basis of the assumptions as set out in Note 3 to the Projection Information and on a consistent basis, to the extent applicable, with the accounting policies and the basis of preparation of the historical Special Purpose Combined Financial Statements of the Trust Group as required by the InvIT Regulations, prepared in accordance with Indian Accounting Standards as defined in Rule 2(1)(a) of the Companies (Indian Accounting Standards) Rules, 2015, as amended from time to time, prescribed under Section 133 of the Companies Act, 2013. Our report on such historical Special Purpose Combined Financial Statements expressed unmodified opinion.

7. We draw attention to Note 3 to the Projection Information, the management of Investment Manager has assumed hypothetical assumptions in preparation of Projection Information. Our conclusion is not modified in respect of this matter.

8. Events and circumstances frequently do not occur as expected. Even if the events anticipated under the hypothetical assumptions described above occur, actual results are still likely to be different from the Projection Information since other anticipated events frequently do not occur as expected and the variation may be material. The actual results may therefore differ materially from those forecasted and projected. For the reasons set out above, we do not express any opinion as to the possibility of achievement of the Projection Information.

9. InvIT Regulations require the independent auditor to issue a report on the Projection Information and this report is issued for the sole purpose of the Offering in accordance with Indian InvIT Regulations. Our work has not been carried out in accordance with auditing or other standards and practices generally accepted in jurisdictions outside India, including in the United States of America, and accordingly should not be relied upon as if it had been carried out in accordance with those standards and practices. US securities regulations do not require profit forecasts to be reported on by a third party. This report should not be relied upon by prospective investors in the United States of America, including persons who are Qualified Institutional Buyers as defined under Rule 144A under the United States Securities Act of 1933 participating in the Offering. We accept no responsibility and deny any liability to any person who seeks to rely on this report and who may seek to make a claim in connection with any offering of securities on the basis that they had acted in reliance on such information under the protections afforded by United States of America law and regulation.

10. We have no responsibility to update our report for events and circumstances occurring after the date of the report.

11. This report is intended solely for inclusion in the Offering Documents in connection with the Offering. It should not be used by any other person or for any other purpose. Accordingly, we do not accept or assume any liability or any duty of care for any other purpose or to any other person to whom this report is shown or into whose hands it may come.

For S R B C & CO LLP
Chartered Accountants
ICAI Firm Registration Number: 324982E/E300003

per Paul Alvares
Partner
Membership Number: 105754
UDIN: 26105754XOXCPK9633
Place: Pune
Date: April 01, 2026

Citius Transnet Investment Trust
Notes to the Statement of projections of revenue from operations and cash flow from operating activities

1. General Information:

Citius Transnet Investment Trust ("Citius" or the "Trust") was setup as an irrevocable trust under the Indian Trust Act, 1882 and registered as an Infrastructure Investment Trust ("InvIT") with Securities Exchange Board of India ("SEBI") under the SEBI (Infrastructure Investment Trust) Regulations, 2014 vide Certificate of Registration (IN/InvIT/25-26/0032) dated August 1, 2025.

EPIC Transnet Infrastructure Private Limited (the "Sponsor") is the Sponsor of the Trust. The Trustee to the Trust is Axis Trustee Services Limited (the "Trustee"). Investment Manager for the Trust is EAAA Transinfra Managers Limited (the "Investment Manager") and the Project Manager for the Trust is EPIC Transnet Project Management Private Limited (the "Project Manager").

The object and purpose of the Trust, as described in the Trust Deed, is to carry on the activity of an infrastructure investment trust as permissible under SEBI (Infrastructure Investment Trusts) Regulations, 2014 as amended from time to time including circulars, notifications, clarifications and guidelines issued thereunder (the "InvIT Regulations") to raise funds through the Trust, to make investments in accordance with the InvIT Regulations and the investment strategy and to carry on the activities as may be required for operating the Trust, including incidental and ancillary matters thereto.

Following project entities are proposed to be transferred to the Trust:

1. SRPL Roads Private Limited ("SRPL")
2. Epic Concesiones 3 Private Limited ("EPIC 3")
3. Thrissur Expressway Limited ("TEL")
4. Sambalpur-Rourkela Tollway Private Limited ("SRTPL")
5. Ahmedabad-Maliya Tollway Private Limited ("AMTPL")
6. Rajkot-Vadinar Tollway Private Limited ("RVTPL")
7. Deccan Tollways Private Limited ("DTPL")
8. Samkhiali Bhachau Gandhidham Tollway Private Limited ("SBGTPL")
9. Panipat Elevated Corridor Private Limited ("PECPL")
10. Dibang Infra Projects Private Limited ("Dibang")
11. Dhola Infra Projects Private Limited ("Dhola")
12. Jorabat Shillong Expressway Limited ("JSEL")

SRPL and EPIC 3 will be intermediate holding companies of the SPVs under the Trust (the "Intermediate Holding Companies").

2. Basis of preparation of projections of revenue from operations and cash flow from operating activities

The projection of revenue from operations and cash flows from operating activities ("Projections") of 10 SPVs (collectively referred as "Project SPVs") and the Trust along with Project SPVs (collectively referred to as "Trust Group") individually for the financials years ending March 31, 2027, March 31, 2028 March 31, 2029, and March 31, 2030 ("Projection period") along with the basis of preparation and other explanatory information and the significant assumptions (the "Statement of Projections") have been compiled by Investment Manager to the Trust and has been approved by the Board of Directors of the Investment Manager to the Trust solely for inclusion in the offer document/ final offer document in connection with the listing. Therefore, the use of these Statement of Projections is not appropriate and should not be used or relied upon for any purpose other than described above.

The Statement of Projections have been prepared based on the accounting policies for recognition and measurement used for preparation of the Special Purpose Combined Financial Statements of the Trust Group in accordance with Indian Accounting Standards ("Ind AS") as defined in Rule 2(1)(a) of the Companies (Indian Accounting Standards) Rules, 2015, prescribed under Section 133 of the Companies Act, 2013 read with InvIT Regulations and the Guidance Note on Combined and Carve-Out Financial Statements issued by the Institute of Chartered Accountants of India.

Though the aforesaid Projections are prepared using the principles of the Ind AS framework, they do not provide for all the detailed disclosures as required under Ind AS. Projected Operational cash flows of the SPVs and Trust have been calculated using the direct method under Ind AS 7- Statement of Cash Flows and is computed by deducting the projected operating expenses from the projected revenue from operations and non-cash expenses (if any). Projected cash flow from operations does not include any items pertaining to financing or investing nature. Cash flows from operating activities are reported before taxes.

The Statement of Projections are presented in Indian Rupees (INR) which is also the functional currency of the Trust Group. All values are rounded to the nearest millions, unless otherwise indicated.

The Projections include the following information:

I. Projections of revenue from operations and operating cash flows for each of the SPVs for the financial years ending March 31, 2027, March 31, 2028, March 31, 2029, and March 31, 2030.
II. Projections of revenue from operations and operating cash flows for the Trust Group for the financial years ending March 31, 2027, March 31, 2028, March 31, 2029, and March 31, 2030.
III. Summary of significant assumptions and other explanatory information.

The Trust Group follows March 31 as its accounting year end.

It is clarified that the Statement of Projections have been prepared on the basis of a mixture of best-estimates (i.e., assumptions as to future events which are expected to take place and the actions expected to take place as of the date the information is prepared) and hypothetical assumptions (about future events and actions which may or may not necessarily take place).

3. Significant assumptions:

The Statement of Projections has been prepared based on the significant assumptions including hypothetical assumptions summarized below.

The Investment Manager has obtained the Traffic reports from the third-party traffic consultant expert namely Crisil Limited ("Traffic Consultant") for all its Project SPVs and the Technical reports from third-party technical consultant experts namely Ramboll India Private Limited and Samarth Infraengg. Technocrats Private Limited ("Technical Consultants") in assessment of the assumptions, market fundamentals, industry drivers and outlook amongst other things for the preparations of the Statement of Projections.

SRTPL, DTPL, PECPL, SBGTPL, AMTPL, RVTPL and TEL are exclusively toll based projects and Dibang, Dhola and JSEL are fixed annuity projects payable semi-annually.

Revenue of the toll-based projects is based on and subject to various estimates, forecast and assumptions that are subjective in nature. The Traffic Reports and Statement of Projections consider current expectations and views on future influencing events and contain forecasts, projections and other forward-looking statements that relate to future events. The future traffic growth considered in the Statement of Projections are taking into consideration the factors like country's GDP growth, economic survey inputs, current and future growth of traffic in the specific corridor of the project, traffic mix in the relevant geographical section of the project, development of alternative traffic options, both as competitive roads or as an alternative transport mode availability, demographic/industrial development in the vicinity of the project, fuel prices, local government policies on natural resources extraction, etc., as per the Report of the Traffic Consultant.

The annuity-based projects are the one where the revenue is based on periodicity of the receipt of annuity income, income arising from the maintenance of the roads and depending on the future major maintenance expenditure that are considered necessary for the project. The revenue for the annuity-based projects is estimated adopting financial assets model of accounting as per the Indian Accounting Standards ("Ind AS").

The Technical Reports and Statement of Projections consider current status of the maintenance requirement of the projects and future period expectation depending on the pattern of the traffic. It also considers the forecasted major

maintenance need of the project based on the life expectancy of the structure of the road and its effectiveness in meeting the requisite quality expectations as per the Report of the Technical Consultant.

The Statement of Projections contains forecasts and projections that relate to future events including hypothetical assumptions, which by nature, are subject to significant risks and uncertainties. Events and circumstances may not occur as expected. Even if the events anticipated under the hypothetical assumptions that are considered in the Statement of Projects occur, actual outcomes could be different from those stated in the Statement of Projections.

However, the Investment Manager does not expect that actual traffic volumes to differ materially from the future traffic volumes expressed or implied in the Traffic Reports and reflected in these Statements of Projections. The Investment Manager considers these projections to be fair and reasonable as of the report date.

The assumptions used in the Projections by the Investment Manager are in line with the information and assumptions as per analysis of the industry experts.

The projections of the Trust Group have been prepared by combining the projections of revenue from operations and cash flows from operating activities of the Trust and Project SPVs, eliminating transactions (vis., interest on loan) between the Trust and Project SPVs and after considering following assumptions:

A. Revenue from Operations:

For Project SPVs

Revenue from operations of the SPVs consists of revenue from toll collection, construction services, operation and maintenance and finance income on financial assets recognised in accordance with Ind AS 109. Revenue projections do not include any other income (operating or otherwise) or income from short-term investment as these have not been material historically and are not likely to be material in the Projections period.

i. Revenue from toll collection

Revenue from toll collection is projected based on Traffic report obtained from the Traffic Consultant (the "Traffic Report"). The projections of revenue from operations is based on base case scenario who has based its report considering the actual traffic data for the period upto January 2026 and toll tariff rates for the financial year ending March 31, 2026. The key variables for toll income growth, tollable traffic growth, future traffic mix and the Wholesale Price Index (“WPI”) are based on the Traffic Report.

Summary of estimates and details of the assumptions are as set forth below:

Project	**March 31, 2027**		**March 31, 2028**		**March 31, 2029**		**March 31, 2030**	
	Average Revenue growth rate	**WPI rate #**	**Average Revenue growth rate**	**WPI rate #**	**Average Revenue growth rate**	**WPI rate #**	**Average Revenue growth rate**	**WPI rate #**
AMTPL	8.77%	2.00%	8.12%	4.30%	6.78%	4.30%	7.00%	4.30%
DTPL	9.02%	0.83%	10.02%	4.30%	9.50%	4.30%	9.41%	4.30%
PECPL^	10.50%	3.00%	NA	NA	NA	NA	NA	NA
RVTPL *$	12.18%	No WPI Linkage	10.21%	No WPI Linkage	10.94%	No WPI Linkage	9.80%	No WPI Linkage
SGTPL	10.10%	0.83%	10.27%	4.30%	9.81%	4.30%	9.99%	4.30%
SRTPL	8.05%	0.83%	9.58%	4.30%	8.88%	4.30%	8.91%	4.30%
TEL	9.28%	0.83%	11.10%	4.30%	9.40%	4.30%	8.76%	4.30%

* In case of RVTPL annual toll rate increase is fixed at 5% per annum over the previous year rates rounded off to nearest Rs. 5 as per the provisions of the Concession Agreement.
$ The concession period for RVTPL will conclude on February 20, 2030.
# WPI applicability is as per the provisions of the concession agreement applicable to the relevant assets.

^ Since the WPI is published in the month of July, WPI for March 2027 is assumed based on actual WPI published in July 2025 for PECPL.

Further, the assumptions for the Traffic mix for the toll-based Project SPVs considered by the Traffic Consultant as on the date of the report and by Board of Directors of the Investment Manager are tabulated in Annexure I to these notes.

ii. Revenue from construction service

All the Project SPVs have received Final Completion Certificate (COD) from National Highway Authorities of India / respective State authorities.

The Government of Gujarat through Gujarat State Road Development Corporation Limited vide its letter GSRDC/CS/Shantipura Chokdi to Khoraj/2025/2923 dated October 7, 2025 awarded AMTPL with a contract to augment the section of existing four-lane from Chainage 13.930 to Chainage 42.682 to six-lane (for a length of 28.752 km) forming part of the Existing Project Highway and its construction, operation and maintenance on build, operate and transfer ("BOT") basis. The construction of additional lane is expected to commence in FY27 and be completed in FY28. Accordingly, the projected revenue from operations of AMTPL includes revenue from construction services of INR 5,033 million and INR 4,118 million for FY27 and FY28 respectively as per relevant Ind AS. The construction of six lanes is expected to be completed in FY 28. The above amount is as per executed EPC term sheet entered between AMTPL with third party EPC contractors.

iii. Revenue from operation and maintenance

Operation and maintenances income in case of annuity projects are estimated after taking into consideration operation and maintenances cost, other costs, share service charges expected to be increased and charged by Project Manager to the SPVs.

iv. Finance income on financial assets

Annuity based Project SPVs construct / upgrade infrastructure (construction) used to provide to public service and operates and maintains that infrastructure (operation service) for a specified period as per the concession agreement whereby the concessionaire provides unconditional right to receive fixed annuity after the construction period.

Considering above, these Project SPVs recognised financial asset to the extent that it has an unconditional contractual right to receive fixed annuity as per the requirement of Appendix D to Ind AS 115 – Service Concession Arrangements whereby Finance Income to be recognised on the financial assets is based on effective interest rate. To determine effective interest rate, contractual inflow and outflow for entire concession period are estimated. Accordingly, the Investment Manager has estimated contractual inflow after considering the inflow from milestone, annuity, Operation & Maintenance etc. as specified in concession agreement. Further, outflow is estimated after considering the outflow on account of Operation & maintenance cost taken from Technical Due Diligence Report carried by Independent Technical Consultant.

B. Operating expenses (in Project SPVs):

i. Operation and maintenance expenses

The operation and maintenance cost includes routine, periodic/major maintenance, insurance costs, electricity and power charges, manpower costs, operational and toll maintenance expenses independent engineer’s cost and administrative charges, including, but not limited to, road and site work expenses, employee benefit expenses and other operating and maintenance costs. Those costs are projected based on the Investment Manager’s estimates of cost assumptions considering the inputs and other factors from the reports provided by the Technical Consultants (the “Technical Report”) for the respective Project SPVs. The Investment Manager has considered escalation factor of 5%- 5.75% per annum depending on the project.

The Investment Manager has estimated operation and maintenance expenses in the projected cash flow from operating activities after considering the Technical Report and management estimate of expenses as well as based on expected timing of cash outflow.

ii. Major Repair and Maintenance expenses

We confirm that major repair cost as estimated by an external third-party Technical Consultants, namely Ramboll India Private Limited and Samarth Infraengg. Technocrats Private Limited in the Technical Report and management estimate is complete in all aspects for the Project SPVs. The employee cost and other administrative costs are part of the maintenance cost so estimated by the Technical Consultants.

We further confirm that the projected operating and maintenance cost corresponds with the projected traffic and is primarily based on the currently available information on actual operating and maintenance costs associated with the operation of the Project SPVs. Based on the concession agreement, the potential periodic / major maintenance cost is provided for in the statement of profit and loss for each financial year, and in the financial year of actual expenditure, the same is adjusted against the provision created for the same. The Statement of Projections does not envisage any unanticipated expenses which may be incurred due to any unforeseen circumstances.

The Investment Manager has estimated major repair and maintenance expenses in the projected cash flow from operating activities after considering the Technical Report and management estimate of expenses as well as based on expected timing of cash outflow.

iii. Project Manager fees

The Project Manager Fees is considered based on the Investment Manager's expectations of the expenses that will be incurred during the current year and next three years. The Project Manager fee considered is 1.5% of gross revenue of the Project SPVs per annum plus Goods and Services Tax at rate as applicable. The Project Manager fees will be paid out of the cash flows from the Project SPVs.

iv. Shared service costs

The Investment Manager has considered shared services costs amounting to 0.5% of gross revenue of each Project SPVs per annum plus Goods and Services Tax at rate as applicable to be paid to the Intermediate Holding Companies.

C. Operating expenses (at Trust level)

i. Investment Manager fees

Investment manager fee has been considered based on the Investment Management Agreement dated July 22, 2025 ("IMA"). The Investment manager fee is higher of (a) Up to 1.5% of the gross revenue of the InvIT Assets or (b) INR 150 million subject to an escalation of 7% per annum plus Goods and Services Tax at rate as applicable. Based on the management estimate that the InvIT will be listed on April 20, 2026, the Investment manager fee has been considered from April 20, 2026. The Investment Manager fee is assumed as 1.18% (including GST) and considered as INR 314 million, INR 320 million, INR 282 million and INR 302 million for FY27, FY28, FY29 and FY30 respectively.

ii. Other Trust Expenses

The Trust expenses are mainly projected based on the quotations obtained from various intermediaries or expected terms and conditions of the relevant agreements and/or based on Management's experience and judgement. The other expenses comprise of fees for traffic consultants, technical consultants, auditor, compliances, valuer fees, legal fees etc., at the Trust level. The Investment Manager has estimated other expenses of INR 70 million for FY27 and this amount is escalated by 5% per annum from FY28 to FY30.

D. Construction Costs

The Government of Gujarat through Gujarat State Road Development Corporation Limited vide its letter GSRDC/CS/Shantipura Chokdi to Khoraj/2025/2923 dated October 7, 2025 awarded AMTPL with a contract to augment the section of existing four-lane from Chainage 13.930 to Chainage 42.682 to six-lane (for a length of 28.752 km) forming part of the Existing Project Highway and its construction, operation and maintenance on build, operate and transfer ("BOT") basis

The construction of additional lane is expected to commence in FY27 and be completed in FY28. Accordingly, the projected cash flow from operating activities of AMTPL includes construction expense of INR 5,033 million and INR 4,118 million for FY27 and FY28 respectively as per relevant Ind AS. The construction of six lanes is expected to be completed in FY28. The construction expense is estimated as per executed EPC term sheet entered between AMTPL with third party EPC contractors.

E. Changes in Working Capital

Project SPVs – Toll collection is substantially through electronic collection, except for passenger cars in case of Gujarat Government state projects where compensation is received from the authority on regular period basis. Routine expenses at SPV levels are more a period cost, which follow a definitive pattern. We confirm that the changes in working capital are the difference in the net working capital amount from one accounting period to the next. Net working capital is defined as net of current assets and current liabilities. The effective working capital is relatively small in certain instances. Further, we believe the operating working capital is fairly stable and not expected to change materially over the projections period, other than premium payable to authorities and expenditure towards major maintenance. These have been considered in cash flow from operating activities.

Trust and Intermediate Holding Companies - Changes in working capital for the Trust and Intermediate Holding Companies has been considered as Nil during the projected period.

F. Income Taxes

As the actual outflow on account of direct taxation would be dependent on various factors including but not limited to the final capital structure, prior period MAT credit, depreciation, etc, the cash flow from operating activities have been reported before taxes.

G. Other assumptions:

The Investment Manager has made following additional assumptions in preparing the Statement of Projections:

1. We confirm that the Trust and Intermediate Holding Companies being holding entities of the Project SPVs and since the Revenue of these entities include Interest income from the Project SPVs which gets eliminated at consolidated level, revenue from operations for these entities has been assumed to be Nil over the Projection period. However, operating expenses at Trust level are being assumed in the projections.
2. In preparation for the Trust's listing, the cost structure of the Intermediate Holding Companies has been reviewed by the Investment Manager. Post-listing, several oversight and administrative functions currently performed at the Intermediate Holding Companies will be centralised and restructured. Consequently, the Investment Manager has assumed that payroll and related operating expenses within the Intermediate Holding Companies will reduce significantly. These expenses of Intermediate Holding Companies after restructuring will be reimbursed at cost from the Project SPVs in the form of Shared Service Costs which are considered in the projected cash flow from operating activities of the Project SPVs.
3. The initial portfolio of Project SPVs is assumed to remain unchanged throughout the Projection period. No further assets are assumed to be acquired (including those mentioned in ROFO documents) or no assets are assumed to be divested during the Projection period.
4. The concession agreement of PECPL ends in FY27 and accordingly, projected revenue from operations and cash flow from operating activities for FY28, FY29 and FY30 has been considered Nil.

Citius Transnet Investment Trust
Notes to the Statement of projections of revenue from operations and cash flow from operating activities

5. The concession agreement of RVTPL ends on February 20, 2030 and accordingly, projected revenue from operations and cash flow from operating activities for FY30 has been considered for the period from April 01, 2029 to February 20, 2030.
6. It has been assumed that no outflows on account of any litigations related matters including current pending litigations/Contingent liabilities is expected to become due during the Projection period.
7. It has been assumed that no liability or liquidated damages on account of default in concession agreement shall devolve upon the Project SPVs during the Projection period.
8. It has been assumed for the purpose of projections that there will be no material change in taxation legislation or other applicable legislation during the Projection period
9. No change in fair value of all financial instruments has been assumed during the Projection period.
10. No gain or loss has been considered on account of changes in foreign exchange rates, interest rates and derivative instruments.
11. The relevant tax exemptions, tax remissions, and preferred tax treatments granted remain valid and applicable and that the terms and conditions thereto are complied with.
12. The Projections have been prepared in accordance with Indian Accounting Standards (Ind AS) and interpretations that are effective for the period ended December 31, 2025. The Statement of Projections does not take into account the impact of any Indian Accounting Standards and interpretations issued but not effective or not issued as at above date which may become effective during the Projections period may have an impact on the Projections and to that extent the actual figures may vary from the projections.
13. The Projections are based on assumptions and are subject to number of factors. Investors should be aware that future events, including actual traffic growth rates, cannot be predicted with any certainty and there may be deviations from the figures projected in the Projections. The Projections have been prepared based on the Traffic Report's base case scenario for traffic volume growth rates, and no analysis has been performed to demonstrate the sensitivity of the Projections to changes in traffic volume growth rates or other assumptions.
14. Projections of cash flows from operating activities includes premium payable to the highway authorities determined in accordance with the contractual terms stipulated under the respective Concession Agreements.
15. The data considered is based on independent technical due diligence report and may differ from that considered therein.
16. GST on annuities, O&M payments etc. have been considered at 18% i.e. prevailing GST rate as at date.
    For FY27, revenue from operations and cash flows from operating activities represents projected revenue from operations and cash flows from operating activities for the entire year.

Citius Transnet Investment Trust
Notes to the Statement of projections of revenue from operations and cash flow from operating activities

Annexure I

Average Annual Daily Traffic ("AADT")

AADT	DTPL			
Vehicle Type	**FY27**	**FY28**	**FY29**	**FY30**
Car/Jeep/Van	10,877	11,540	12,214	12,903
LCV/Minibus	807	843	875	908
2 Axle Bus	811	834	858	881
Truck	1,700	1,783	18,63	1,941
3 Axle Truck	823	822	817	810
MAV+OSV	2,524	2,658	2,823	2,983
Total Vehicles	**17,540**	**18,478**	**19,450**	**20,426**
Total PCU	**33,441**	**35,079**	**36,843**	**38,585**

AADT	RVTPL			
Vehicle Type	**FY27**	**FY28**	**FY29**	**FY30 (till February 20, 2030)**
Car/Jeep/Van	18,978	20,465	21,989	21,028
LCV/Minibus	548	557	566	513
2 Axle Bus	810	838	866	799
Truck	498	519	540	501
3 Axle Truck	747	763	779	709
MAV+OSV	3,017	3,162	3,309	3,088
Total Vehicles	**24,598**	**26,304**	**28,048**	**26,965**
Total PCU	**39,541**	**41,888**	**44,283**	**41,723**

AADT	AMTPL			
Vehicle Type	**FY27**	**FY28**	**FY29**	**FY30**
Car/Jeep/Van	12,729	13,692	14,697	15,743
LCV/Minibus	895	927	959	989
BUS	909	940	972	1,004
TRUCK 2 AXLE	993	1,034	1,075	1,115
TRUCK 3 AXLE	457	467	476	485
MAV+OSV	5,674	5,981	6,293	6,609
Total Vehicles	**21,656**	**23,041**	**24,471**	**25,945**
PCU	**46,676**	**49,319**	**52,022**	**54,777**

AADT	TEL			
Vehicle Type	**FY27**	**FY28**	**FY29**	**FY30**
Car/Jeep/Van	19,420	20,651	21,927	23,248
LCV/Minibus	2,211	2,293	2,373	2,451
2 Axle Bus/truck	3,076	3,187	3,296	3,404
3 Axle Truck	834	833	830	825
MAV	3,086	3,401	3,580	3,761
OSV	2	2	3	3
Total Vehicles	**28,631**	**30,367**	**32,008**	**33,691**
Total PCU	**48,367**	**51,465**	**53,983**	**56,545**

Citius Transnet Investment Trust
Notes to the Statement of projections of revenue from operations and cash flow from operating activities

AADT	SRTPL			
Vehicle Type	**FY27**	**FY28**	**FY29**	**FY30**
Car	4,939	5,254	5,574	5,881
LCV	168	176	184	193
2A	428	443	459	474
3A	256	261	265	268
MAV	2,935	3,084	3,235	3,389
2A-MM	0	0	0	0
3A-MM	33	34	34	34
MAV-MM	1,290	1,344	1,399	1,456
Total Vehicles	**10,049**	**10,597**	**11,151**	**11,696**
Total PCU	**26,355**	**27,660**	**28,982**	**30,304**

AADT	SBGTPL			
Vehicle Type	**FY27**	**FY28**	**FY29**	**FY30**
Car/Jeep/Van	11,281	11,931	12,591	13,259
LCV/Minibus	622	645	667	689
2 Axle Bus	791	814	837	859
Truck	1,035	1,079	1,122	1,165
3 Axle Truck	844	864	882	897
MAV+OSV	18,953	20,022	21,101	22,196
Total Vehicles	**33,527**	**35,355**	**37,200**	39,065
Total PCU	**105,515**	**111,268**	**117,068**	**122,936**

AADT	PECPL
Vehicle Type	**FY27 (till January 31, 2027)**
Car/Jeep/Van	42,735
LCV/Minibus	2,218
2 Axle Bus	2,101
Truck	2,134
3 Axle Truck	1,582
MAV+OSV	4,612
Total Vehicles	**55,382**
Total PCU	**84,268**

CITIUS TRANSNET INVESTMENT TRUST
Statement of Projections of Revenue from Operations and Cash Flow from Operating Activities
All amounts are in INR millions

A) For the year ending 31 March 2027

Particulars	AMTPL	PECPL	SRTPL	SBGTPL	DTPL	RVTPL	TEL	Dhola	JSEL	Dibang	Citius InvIT	Citius Combined
Revenue from operations	9,883	1,110	3,242	3,353	2,856	2,974	1,819	459	479	436	-	26,611
Cash flow from operating activities*	3,014	680	1,665	1,301	1,181	1,747	1,253	891	1,266	600	(384)	13,214

B) For the year ending 31 March 2028

Particulars	AMTPL	PECPL	SRTPL	SBGTPL	DTPL	RVTPL	TEL	Dhola	JSEL	Dibang	Citius InvIT	Citius Combined
Revenue from operations	9,350	N/A	3,549	3,700	3,135	3,278	2,027	426	1,281	334	-	27,080
Cash flow from operating activities*	3,223	N/A	2,996	1,891	1,414	855	1,804	1,022	1,184	647	(393)	14,643

C) For the year ending 31 March 2029

Particulars	AMTPL	PECPL	SRTPL	SBGTPL	DTPL	RVTPL	TEL	Dhola	JSEL	Dibang	Citius InvIT	Citius Combined
Revenue from operations	5,594	N/A	3,865	4,056	3,434	3,637	2,215	347	475	280	-	23,903
Cash flow from operating activities*	187	N/A	3,253	2,250	1,623	1,233	1,978	1,015	1,283	700	(359)	13,163

D) For the year ending 31 March 2030

Particulars	AMTPL	PECPL	SRTPL	SBGTPL	DTPL	RVTPL	TEL	Dhola	JSEL	Dibang	Citius InvIT	Citius Combined
Revenue from operations	5,985	N/A	4,209	4,461	3,756	3,565	2,409	270	370	580	-	25,605
Cash flow from operating activities*	3,582	N/A	3,553	636	1,852	2,175	2,087	894	705	578	(383)	15,679

* Cashflow from operating activities are reported before taxes (Refer note 3 of Significant assumptions for the Projections).

For and on behalf of the Board of Directors of
EAAA Transinfra Managers Limited
(as Investment Manager of Citius Transnet Investment Trust)

Bhavyang Oza
Director
DIN No. : 11315739
Place: Mumbai
Date: April 01, 2026