NATIONAL HIGHWAYS INFRA TRUST

(Registered in the Republic of India as an irrevocable trust set up under the Indian Trusts Act, 1882, on October 19, 2020, and registered as an infrastructure investment trust under the Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014, as amended, on October 28, 2020, having registration number IN/InvIT/20-21/0014. The Units of the Trust were listed on the Stock Exchanges on November 10, 2021.)

Principal Place of Business: G - 5 & 6, Sector 10, Dwarka, New Delhi – 110 075
Tel: +91 11 2507 6536; **Fax**: +91 11 2507 6536; **Compliance Officer**: Smt. Gunjan Singh
E-mail: nhit@nhai.org; **Website**: www.nhaiinvit.in

SPONSOR	INVESTMENT MANAGER	TRUSTEE
NATIONAL HIGHWAYS AUTHORITY OF INDIA	NATIONAL HIGHWAYS INFRA INVESTMENT MANAGERS PRIVATE LIMITED	IDBI TRUSTEESHIP SERVICES LIMITED

ISSUE OF [●] UNITS^ (THE "UNITS") BY WAY OF AN INSTITUTIONAL PLACEMENT TO ELIGIBLE INVESTORS, REPRESENTING AN UNDIVIDED BENEFICIAL INTEREST IN THE NATIONAL HIGHWAYS INFRA TRUST (THE "TRUST") AT A PRICE OF ₹ [●] PER UNIT ("OFFER PRICE"), AGGREGATING TO ₹ [●] MILLION BY THE TRUST (THE "OFFER")
THE FLOOR PRICE IS ₹ 109.00 PER UNIT*. EACH BIDDER MUST MAKE A BID AT OR ABOVE THE FLOOR PRICE. BIDS BELOW THE FLOOR PRICE SPECIFIED, ARE LIABLE TO BE REJECTED.
^ THE IM BOARD BY WAY OF ITS RESOLUTION DATED AUGUST 30, 2022 AND THE UNITHOLDERS OF THE TRUST BY WAY OF THEIR RESOLUTION DATED SEPTEMBER 23, 2022, HAVE APPROVED THE ISSUE OF UP TO 13,12,05,200 UNITS AT OR ABOVE THE BASE PRICE OF ₹ 107.12 PER UNIT.
****AS APPROVED BY THE IM BOARD BY WAY OF ITS RESOLUTION DATED SEPTEMBER 27, 2022.***

THE OFFER, AND THE DISTRIBUTION OF THE PRELIMINARY PLACEMENT DOCUMENT AND THE PLACEMENT DOCUMENT, WILL BE MADE ONLY TO ELIGIBLE INVESTORS IN RELIANCE UPON CHAPTER 7 ON '*GUIDELINES FOR PREFERENTIAL ISSUE AND INSTITUTIONAL PLACEMENT OF UNITS BY LISTED INVITS*' OF SEBI MASTER CIRCULAR NO. SEBI/HO/DDHS/DDHS_DIV3/P/CIR/2022/53 DATED APRIL 26, 2022, AS AMENDED FROM TIME TO TIME ("SEBI INSTITUTIONAL PLACEMENT GUIDELINES") AND THE SECURITIES AND EXCHANGE BOARD OF INDIA (INFRASTRUCTURE INVESTMENT TRUSTS) REGULATIONS, 2014, AS AMENDED ("INVIT REGULATIONS"). NO OFFER IS BEING MADE TO THE PUBLIC OR ANY OTHER CLASS OF INVESTORS.

The Units of the Trust are proposed to be listed on National Stock Exchange of India Limited ("**NSE**") and BSE Limited ("**BSE**" and together with NSE, the "**Stock Exchanges**"). The Trust has received in-principle approval from NSE and BSE for listing of the Units pursuant to letters dated September 29, 2022. Applications shall be made to the Stock Exchanges for obtaining the final listing and trading approvals for the Units to be Allotted pursuant to the Offer. The Stock Exchanges assume no responsibility for the correctness of any statements made, opinions expressed or reports contained herein. Admission of the Units to be Allotted pursuant to the Offer for trading on the Stock Exchanges should not be taken as an indication of the merits of the Trust or of the Units. A copy of the Preliminary Placement Document, has been, and a copy of the Placement Document will be delivered to NSE and BSE.

The Offer Price, should not be taken to be indicative of the market price of the Units after the Units are listed. No assurance can be given regarding an active or sustained market for trading in the Units or regarding the price at which the Units will be traded after listing. This Preliminary Placement Document has not been, and will not be, registered as a prospectus, will not be circulated or distributed to the public at large in India or any other jurisdiction, and will not constitute a public offer in India or any other jurisdiction.

The Units have not been and will not be registered under the United States Securities Act of 1933, as amended (the "**Securities Act**") 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. Accordingly, 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 occur. The Units are transferable only in accordance with the restrictions described under the section entitled *"Selling and Transfer Restrictions"* on page 215 of this Preliminary Placement Document.

THIS PRELIMINARY PLACEMENT DOCUMENT WILL BE PERSONAL TO EACH ELIGIBLE INVESTOR. THIS PRELIMINARY PLACEMENT DOCUMENT HAS BEEN PREPARED BY THE TRUST SOLELY FOR PROVIDING INFORMATION IN CONNECTION WITH THE OFFER. YOU MAY NOT, AND ARE NOT AUTHORIZED TO, (1) DELIVER THIS PRELIMINARY PLACEMENT DOCUMENT TO ANY OTHER PERSON; OR (2) REPRODUCE THIS PRELIMINARY PLACEMENT DOCUMENT IN ANY MANNER WHATSOEVER. ANY DISTRIBUTION OR REPRODUCTION OF THIS PRELIMINARY PLACEMENT DOCUMENT, IN WHOLE OR IN PART, IS UNAUTHORIZED. FAILURE TO COMPLY WITH THIS INSTRUCTION MAY RESULT IN A VIOLATION OF THE SECURITIES AND EXCHANGE BOARD OF INDIA (INFRASTRUCTURE INVESTMENT TRUSTS) REGULATIONS, 2014, AS AMENDED OR OTHER APPLICABLE LAWS OF INDIA AND OF OTHER JURISDICTIONS.

INVESTMENTS IN UNITS INVOLVE RISKS AND INVESTORS SHOULD NOT INVEST ANY FUNDS IN THE OFFER UNLESS THEY CAN AFFORD TO TAKE THE RISK OF LOSING THEIR ENTIRE INVESTMENT. IN MAKING AN INVESTMENT DECISION, INVESTORS MUST RELY ON THEIR OWN EXAMINATION OF THE TRUST, THE UNITS, THE OFFER, AND THE PLACEMENT DOCUMENT, INCLUDING THE RISKS INVOLVED. INVESTORS ARE ADVISED TO CAREFULLY READ THE PLACEMENT DOCUMENT, INCLUDING THE SECTION ENTITLED "*RISK FACTORS*" ON PAGE 61 BEFORE MAKING AN INVESTMENT DECISION. EACH ELIGIBLE INVESTOR IS ADVISED TO CONSULT ITS OWN ADVISORS, ABOUT THE CONSEQUENCES OF AN INVESTMENT IN THE UNITS BEING ISSUED PURSUANT TO THE PLACEMENT DOCUMENT.

Unless a serially numbered Placement Document along with an Application Form is addressed to a particular Eligible Investor, no invitation to offer shall be deemed to have been made to such Eligible Investor to make an offer to subscribe to Units pursuant to the Offer. For further details, please see the section entitled "*Offer Procedure*" on page 222. The distribution of the Preliminary Placement Document or the Placement Document or the disclosure of its contents without the Trustee's or Investment Manager's prior consent, to any person, is unauthorized and prohibited.

Each addressee, by accepting delivery of this Preliminary Placement Document, agrees to observe the foregoing restrictions and shall make no copies of this Preliminary Placement Document or any documents referred to in this Preliminary Placement Document.

LEAD MANAGERS		REGISTRAR AND UNIT TRANSFER AGENT
ICICI SECURITIES LIMITED ICICI Venture House, Appasaheb Marathe Marg, Prabhadevi, Mumbai - 400 025 Maharashtra, India **Tel:** +91 22 6807 7100 **E-mail:** nhitinvit@icicisecurities.com **Investor Grievance E-mail:** customercare@icicisecurities.com **Contact Person:** Sumit Singh/ Rupesh Khant **Website:** www.icicisecurities.com **SEBI Registration Number:** INM000011179	**SBI CAPITAL MARKETS LIMITED** 202, Maker Tower 'E', Cuffe Parade, Mumbai 400 005, Maharashtra, India **Tel:** +91 22 2217 8300 **E-mail:** nhaiinvit@sbicaps.com **Investor Grievance E-mail:** investor.relations@sbicaps.com **Contact Person:** Mandeep Singh **Website:** www.sbicaps.com **SEBI Registration Number:** INM000003531	**KFin Technologies Limited** Selenium, Tower B Plot No- 31 and 32, Financial District Nanakramguda, Serilingampally Hyderabad, Rangareddy 500 032 Telangana, India Tel.: +91 040 6716 2222 E-mail: einward.ris@kfintech.com Investor Grievance E-mail: nhai.invit@kfintech.com Website: www.kfintech.com Contact Person: M. Murali Krishna SEBI Registration No.: INR000000221 CIN: U72400TG2017PLC117649

This Preliminary Placement Document is dated September 29, 2022.

The information in this Preliminary Placement Document is not complete and may be changed. The Offer is meant only for Eligible Investors on an institutional placement basis and is not an offer to the public or to any other class of investors to purchase the Units. This Preliminary Placement Document is not an offer to sell any Units and is not soliciting an offer to subscribe for or buy the Units in any jurisdiction where such offer or sale is not permitted. It is being issued for the sole purpose of information or discussion relating to the Units that may be Allotted through the Placement Document .

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NOTICE TO INVESTORS

The statements contained in this Preliminary Placement Document relating to the Trust and the Units are, in all material respects, true and accurate and not misleading, and the opinions and intentions expressed in this Preliminary Placement 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 to the Investment Manager. There are no material facts in relation to the Trust and the Units, the omission of which would, in the context of the Offer, make any statement in this Preliminary Placement Document misleading in any material respect. Further, the Investment Manager has made all reasonable enquiries to ascertain such facts and to verify the accuracy of all such information and statements.

The Lead Managers have not separately verified any information (financial, legal or otherwise) contained in this Preliminary Placement Document. Accordingly, none of the Lead Managers or any of their respective shareholders, employees, counsel, officers, directors, representatives, agents, associates or affiliates make any express or implied representation, warranty or undertaking, and accept no responsibility or liability as to the accuracy or completeness of the information contained in this Preliminary Placement Document or any other information supplied in connection with the Offer or the distribution of the Units, other than in relation to themselves.

Each Bidder acknowledges that such person has neither relied on the Lead Managers nor any of their respective shareholders, employees, counsel, officers, directors, representatives, agents, associates 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 Preliminary Placement Document as legal, business, tax, accounting or investment advice.

No person is authorized to give any information or to make any representation not contained in this Preliminary Placement 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 Lead Managers. The delivery of this Preliminary Placement Document, at any time, does not imply that the information contained in it is correct as of any time subsequent to its date.

Certain U.S. Matters

The Units to be issued pursuant to the Offer 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 Offer or the accuracy or adequacy of this Preliminary Placement 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 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. Accordingly, the Units are only being offered and sold outside the United States in "offshore transactions" as defined in, and in reliance on, Regulation S and the applicable laws 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 215 of this Preliminary Placement Document.

Each purchaser of the Units offered by the Placement Document will be deemed to have made the representations, agreements and acknowledgments as described in this section titled "*Notice to Investors – Representations by Eligible Investors*" on page 1 and in the section entitled "*Selling and Transfer Restrictions*" on page 215.

Notice to Investors in certain other jurisdictions

The distribution of this Preliminary Placement Document and the issue of the Units in certain jurisdictions may be restricted by law. As such, this Preliminary Placement Document does 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 or the Lead Managers which would permit an Offer of the Units or distribution of this Preliminary Placement Document in any jurisdiction, other than India. Accordingly, the Units may not be offered or sold, directly or indirectly, and neither this Preliminary Placement Document nor any Offer 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. Please see the section entitled "*Selling and Transfer Restrictions*" on page 215.

Representations by Eligible Investors

References herein to "you" or "your" is to each Eligible Investor in the Offer.

By purchasing, or subscribing to, Units pursuant to the Offer, you are deemed to have represented to the Trustee, the Investment Manager and the Lead Managers, and acknowledge and agree as follows:

(1) You are entitled to acquire the Units under the laws of all relevant jurisdictions and that you have all necessary capacity and have obtained all necessary consents, governmental or otherwise and authorisations to enable you to commit to this participation in the Offer and to perform your obligations in relation thereto (including, without limitation, in the case of any person on whose behalf you are acting, all necessary consents and authorisations to agree to the terms set out or referred to in this Preliminary Placement Document) and will honour such obligations;

(2) You undertake to (i) hold, manage or dispose of any Units that are Allotted to you in accordance with the InvIT Regulations and all other applicable laws; and (ii) to comply with all requirements under applicable law in relation to reporting obligations, if any, in this relation;

(3) You will make all necessary filings, in relation to the Offer and your investment in Units, with appropriate governmental, statutory or regulatory authorities, including the RBI, as may be required, in accordance with applicable law, including in your respective jurisdiction;

(4) You agree to provide on request in a timely manner, and consent to the use and disclosure (including to any taxation or other regulatory authorities) of, any information or documentation in relation to yourself and, if and to the extent required, the direct or indirect beneficial ownership of your Units (if any), as may be necessary for the Trust (or the Trustee and its agents) and the Investment Manager to comply with any regulatory obligations and/or prevent the withholding of tax or other penalties under FATCA, the CRS or other similar exchange of tax information regimes. You acknowledge and agree that you shall have no claim against the Trust (or the Trustee and its agents) and the Investment Manager for any losses suffered by you (including in relation to the direct or indirect beneficial ownership of your Units (if any)) as a result of such use or disclosure of such information or documentation to, any relevant regulatory, governmental or statutory authority;

(5) You are aware that the Units have not been, and will not be, registered through a prospectus under the InvIT Regulations, or under any other law in force in India. This Preliminary Placement Document will be submitted to the Stock Exchanges;

(6) You confirm that, either: (i) you have not participated in or attended any investor meetings or presentations by the Trust, or its agents ("**Presentations**") with regard to the Trust, the Units or the Offer; or (ii) if you have participated in or attended any Presentations, you understand and acknowledge that the Lead Managers or the Trustee may not have knowledge of the statements that the Trust, or its agents may have made at such Presentations and are therefore unable to determine whether the information provided to you at such Presentations may have included any material misstatements or omissions, and, accordingly you acknowledge that the Lead Managers, the Trustee (or its agents) or the Investment Manager have advised you not to rely in any way on any information that was provided to you at such Presentations;

(7) None of the Investment Manager, the Trustee or any of the Lead Managers or any of their respective shareholders, members, directors, officers, employees, counsel, representatives, agents or affiliates is making any recommendations to you or advising you regarding the suitability of any transactions it may enter into in connection with the Offer and that participation in the Offer is on the basis that you are not and will not, up to the Allotment, be a client of the Lead Managers. None of the Trustee, the Investment Manager, the Lead Managers or any of their respective shareholders, members, employees, counsel, officers, directors, representatives, agents or affiliates have any duties or responsibilities to you for providing the protection afforded to their clients, or for providing advice in relation to the Offer and are in no way acting in a fiduciary capacity towards you;

(8) All statements, other than statements of historical fact included in this Preliminary Placement Document, including, without limitation, those regarding the Trust's financial position, business strategy, plans and objectives for future operations, the Investment Objectives, and the Projections of Revenue from Operations and Cash Flow from Operating Activities, are forward-looking statements. Such forward-looking statements involve known and unknown risks, uncertainties and other important factors that could cause actual results to be materially different from future results, performance or achievements expressed or implied by such forward-looking statements. Such forward-looking statements are based on numerous assumptions regarding the Trust's present and future business strategies and the environment in which the Trust will operate in the future. You should not place undue reliance on forward-looking statements, which speak only as of the date of this Preliminary Placement Document. The Trust, the Trustee, the Investment Manager and the Lead Managers or any of their respective shareholders, members, directors, officers, employees, counsel, representatives, agents, associates or affiliates assume no responsibility to update any of the forward-looking statements contained in this Preliminary Placement Document;

(9) You have been provided a serially numbered copy of the Preliminary Placement Document and will be deemed to have read the Preliminary Placement Document in its entirety, including, in particular, the section entitled "*Risk Factors*" on page 61;

(10) You are aware and understand that the Units are being offered only to Eligible Investors and are not being offered to the general public and the Allotment shall be on a discretionary basis;

(11) You have made, or are deemed to have made, as applicable, the representations provided in the section entitled "*Selling and Transfer Restrictions*" on page 215;

(12) You (i) are not acquiring or subscribing for the Units as a result of any "directed selling efforts" (as defined in Regulation S) and (ii) are acquiring or subscribing for the Units in an "offshore transaction" as defined in, and in reliance on, Regulation S, and are not an affiliate of the Trust or the Lead Managers or a person acting on behalf of such an affiliate;

(13) You understand and agree that the Units are transferable only in accordance with the restrictions described in the section entitled "*Selling and Transfer Restrictions*" on page 215, and you warrant that you will comply with such restrictions;

(14) In making your investment decision, you have (i) relied on your own examination of the Trust, the Units and the terms of the Offer, including the merits and risks involved, (ii) made and will continue to make your own assessment of the Trust, the Units and the terms of the Offer based solely on the information contained in the Placement Document, (iii) consulted your own independent advisors or otherwise have satisfied yourself concerning, without limitation, the effects of local laws, (iv) relied solely on the information contained in the Placement Document and no other disclosure or representation by the Investment Manager or the Lead Managers or any other party; (v) received all information in the Placement Document that you believe is necessary or appropriate in order to make an investment decision in respect of the Trust and the Units, and (vi) relied upon your own investigation in deciding to invest in the Offer;

(15) You have such knowledge and experience in financial, business and investment matters as to be capable of evaluating the merits and risks of an investment in the Units. You and any accounts for which you are subscribing to the Units, (i) are each able to bear the economic risk of the investment in the Units; (ii) will not, subject to the terms of this Placement Document, look to any of the Investment Manager, the Trustee, or the Lead Managers or any of their respective shareholders, members, employees, counsel, officers, directors, representatives, agents or affiliates for all, or part, of any such loss or losses that may be suffered due to your investment in the Units; and (iii) are able to sustain a complete loss on the investment in the Units; (iv) have no need for immediate liquidity with respect to the investment in the Units, and (v) have no reason to anticipate any change in your or their circumstances, financial or otherwise, which may cause or require any sale or distribution by you or them of all or any part of the Units. You acknowledge that an investment in the Units involves a high degree of risk and that the Units are, therefore, a speculative investment. You are seeking to subscribe to the Units in the Offer for your own investment and not with a view to resell or distribute in any manner that could characterise you as an underwriter or similar party in any jurisdiction;

(16) The Trustee, the Investment Manager, the Lead Managers or any of their respective shareholders, members, directors, officers, employees, counsel, representatives, agents or affiliates have not provided you with any legal, financial or tax advice or otherwise made any representations regarding the tax consequences of the Units (including but not limited to, the Offer and the use of the proceeds of the Offer). You will obtain your own independent legal, financial or tax advice and will not rely on the Investment Manager, the Trustee, the Lead Managers or any of their respective shareholders, members, employees, counsel, officers, directors, representatives, agents or affiliates or the Investment Manager when evaluating the tax consequences in relation to the Units (including but not limited to the Offer and the use of the proceeds of the Offer). You waive and agree not to assert any claim against the Lead Managers, the Trustee or the Investment Manager with respect to the tax aspects of the Units or the Offer or as a result of any tax audits by tax authorities, in relation to the Units and the Offer, wherever situated;

(17) You are not the Trustee, or the Valuer or an employee of the Valuer involved in the valuation of the Project SPV;

(18) You are aware that (i) we have received the in-principle approval from NSE dated September 29, 2022, and the in-principle approval from BSE dated September 29, 2022, respectively, and (ii) the application for the final listing and trading approvals will be made only after Allotment. There can be no assurance that the final approvals for listing and trading of the Units will be obtained in a timely manner, or at all. The Trust, the Trustee, the Investment Manager or the Sponsor shall not be responsible for any delay or non-receipt of such final approvals (except to the extent prescribed under the InvIT Regulations) or any loss arising from such delay or non-receipt;

(19) You shall not undertake any trade in the Units credited to your demat account until such time that the final listing and trading approvals for the Units have been issued by the Stock Exchanges, subject to compliance with applicable law;

(20) The only information you are entitled to rely on, and on which you have relied, in committing yourself to acquire the Units, shall be contained in the Placement Document, such information being all that you deem necessary to make an investment decision in respect of the Units and that you have neither received nor relied on any other information given or representations, warranties or statements made by the Trustee, the Lead Managers, the Investment Manager, and neither the Trustee, the Lead Managers nor the Investment Manager will be liable for your decision to accept an invitation to participate in the Offer based on any other information, representation, warranty or statement that you have obtained or received;

(21) You understand that the Units to be Allotted in this Offer will, when issued, be credited as fully paid and will rank *pari passu* in all respects with all other Units, including in respect of the right to receive all distributions declared, made or paid in respect of the Units after the Allotment. For details, please see the section entitled "*Distribution*" on page 199;

(22) You are eligible to Bid for, and hold, Units, so Allotted. Your unitholding after the Allotment of the Units shall not exceed the investment level permissible as per any applicable law and regulation;

(23) You agree to indemnify and hold the Trustee, Investment Manager, and the Lead Managers harmless from any and all costs, claims, liabilities and expenses (including legal fees and expenses) arising out of or in connection with any breach of the representations and warranties in this section;

(24) The Trustee, the Investment Manager, the Lead Managers, their respective shareholders, members, employees, counsel, offices, directors, representatives, agents or affiliates, will rely on the truth and accuracy of the foregoing representations, warranties, acknowledgements and undertakings which are given to the Lead Managers on their own behalf and on behalf of the Trust, the Investment Manager, the Trustee, and the same are irrevocable;

(25) You are eligible to invest in India and in the Units under applicable law, including the FEMA Rules, and have not been prohibited by SEBI or any other statutory, regulatory or judicial authority from buying, selling or dealing in securities;

(26) You understand that, subject to the terms of this Placement Document, neither the Lead Managers, the Investment Manager nor the Trustee has any obligation to purchase or subscribe to all, or any part, of the Units purchased by you in the Offer, or to support any losses directly or indirectly sustained or incurred by you for any reason whatsoever in connection with the Offer;

(27) Any dispute arising in connection with the Offer will be governed by, and construed in accordance with, the laws of the Republic of India and the courts at New Delhi shall have exclusive jurisdiction to settle any disputes which may arise out of or in connection with this Preliminary Placement Document or the Placement Document; and

(28) You have made, or are deemed to have made, as applicable, the representations provided in this section and each of the representations, warranties, acknowledgements and agreements set out above shall continue to be true and accurate at all times, up to, and including, the Allotment, listing and trading of the Units in the Offer.

Available Information

The Investment Manager agrees to comply with any undertakings given by it from time to time in connection with the Units to the Stock Exchanges and, without prejudice to the generality of foregoing, shall furnish to the Stock Exchanges all such information as the rules of the Stock Exchanges may require in connection with the listing of the Units on such Stock Exchanges.

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 INVESTMENT MANAGER, THE LEAD MANAGERS OR ANY OF THEIR RESPECTIVE SHAREHOLDERS, MEMBERS, EMPLOYEES, COUNSEL, OFFICERS, DIRECTORS, MEMBERS, 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 EXCHANGE 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 ITS SHAREHOLDERS, MEMBERS, EMPLOYEES, COUNSEL, OFFICERS, DIRECTORS, MEMBERS, 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 Preliminary Placement Document uses the definitions and abbreviations set forth below which you should consider when reading the information contained herein.

References to any legislation, act, regulations, rules, guidelines, circulars, notifications, clarifications or policies shall be to such legislation, act, regulations, rules, guidelines, circulars, notifications, clarifications 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 Preliminary Placement Document, but not defined herein shall have the meaning ascribed to such terms under the InvIT Regulations, SEBI Institutional Placement Guidelines, the SEBI Act, the Depositories Act, and the rules and regulations made thereunder.

Notwithstanding the foregoing, the terms not defined but used in the sections entitled "Audited Financial Information", "Taxation" and "Legal and other Information" on pages 247, 231 and 204, respectively, shall have the meanings ascribed to such terms in those respective sections.

In this Preliminary Placement Document, unless the context otherwise requires, a reference to "we", "us" and "our" refers to the Trust and the Project SPV on a consolidated basis.

Trust Related Terms

Term	Description
A&F Policy	The Asset acquisition and unit funding policy adopted by the Investment Manager pursuant to the resolution of the IM Board dated September 30, 2021
Abu Road - Swaroopganj Project	The Abu Road – Swaroopganj section of NH 27 with a total length of 31 kms, in the state of Rajasthan
Additional Concession Agreements	The following concession agreements entered into between NHAI and NHIPPL on September 26, 2022: (i) Concession Agreement for the tolling, operation, maintenance transfer of Agra bypass Section (from km 0.000 to km 32.800) of NH-19 in the state of Uttar Pradesh; (ii) Concession Agreement for the tolling, operation, maintenance transfer of Borkhedi-Wadner-Deodhari-Kelapur Section (from km 36.600 to km 175.000) of NH-44 in the state of Maharashtra; and (iii) Concession Agreement for the tolling, operation, maintenance transfer of Shivpuri – Jhansi Section (from km 1305.087 to km 1380.387) of NH-27 in the states of Madhya Pradesh and Uttar Pradesh.
Agra Bypass Project	Agra Bypass section with a total length of 32.80 kms, connecting NH19 (old NH2) to NH44 (old NH7) in Uttar Pradesh
Appointed Date	In relation to: (i) the Initial Toll Roads: the date on which all Conditions Precedent (as specified in the relevant Concession Agreement) have been satisfied, being, December 16, 2021; and (ii) the Target Toll Roads: the date on which all Conditions Precedent (as specified in the relevant Concession Agreement) have been satisfied.
Asset Revenue Information	Revenue data of the InvIT Assets as has been historically collected through toll collection and maintenance contracts, for the financial years ended March 31, 2022, March 31, 2021 and March 31, 2020 and for the period from April 1, 2022 to August 31, 2022
Associate	Associate shall have the meaning set forth in Regulation 2(1)(b) of the InvIT Regulations. Since (i) the Sponsor is a body corporate whose capital is funded by the Central Government and members are appointed and executive decisions taken by the President of India (acting through the Department of Personnel and Training and MoRTH), and (ii) the President of India is the Promoter of the Investment Manager, persons or entities that may be classified as "associates" of the Sponsor and Investment Manager in terms of Regulation 2(1)(b)(ii) and Regulation 2(1)(b)(iii) of the InvIT Regulations, have not been identified as 'associates' of the Sponsor and the Investment Manager. Further, since the Project Manager is a wholly-owned subsidiary of the Sponsor, it has not been identified as 'associates' of the Sponsor and the Investment Manager.

Term	Description
Audited Financial Information	The standalone financial statements of the Trust and the Project SPV, as of and for the year ended March 31, 2021 and the audited consolidated financial statements of the Trust as of and for the year ended March 31, 2022 and notes and other explanatory information provided thereto
Auditors	A.R. & Co., Chartered Accountants, present statutory auditors of the Trust
Audit Committee	The audit committee of the Investment Manager constituted in accordance with the Companies Act
Borkhedi - Kelapur Project	Borkhedi-Kelapur-Maharashtra/Telangana border stretch of NH44 (old NH7) with a total length of 138.15 kms, in the state of Maharashtra
Borrowing Policy	The borrowing policy of the Trust adopted by the Investment Manager pursuant to a resolution of the IM Board dated February 3, 2021, as amended pursuant to the resolution of the IM Board dated September 27, 2021 and as amended from time to time
Compliance Officer	The compliance officer of the Trust
Concessionaire	The Project SPV
Concession Agreements	Collectively, the Initial Concession Agreements and Additional Concession Agreements
Chittorgarh – Kota and Chittorgarh Bypass Project	Chittorgarh – Kota section of NH 27 with a total length of 160.50 kms, in the state of Rajasthan
Distribution Policy	The distribution policy adopted by the Investment Manager pursuant to a resolution of its board of directors dated February 3, 2021, as amended pursuant to the resolution of the IM Board dated September 27, 2021 and as amended from time to time
ESDD Report	Limited environment and social due diligence reports, issued by Ramboll India Private Limited dated September 2022, in relation to the Target Toll Reports as set out in **Annexure D** of this Preliminary Placement Document
IM Board	The board of directors of the Investment Manager
Initial Concession Agreements	The following concession agreements entered into between NHAI and NHIPPL on March 30, 2021: i. Concession Agreement for the tolling, operation, maintenance transfer of Maharashtra/Karnataka border (Kagal) (from km 515+000 to km 592+705) of NH-48 in the State of Maharashtra/Karnataka; ii. Concession Agreement for the tolling, operation, maintenance transfer of Chittorgarh Bypass to Kota Section (from km 891+929 to km 1052+429) of NH-27 in the State of Rajasthan; iii. Concession Agreement for the tolling, operation, maintenance transfer of Kothakota Bypass – Kurnool Section (from km 135+469 to km 211+000) of NH-44 in the State of Telangana; iv. Concession Agreement for the tolling, operation, maintenance transfer of Abu Road to Swaroopganj Section (from km 646+000 to km 677+000) of NH-27 in the State of Rajasthan; and v. Concession Agreement for the tolling, operation, maintenance transfer of Palanpur/ Khemana to Abu-Road Section (from km 601+000 to km 646+000) of NH-27 in the State of Gujarat, Rajasthan.
Initial Toll Roads	Collectively, (i) Abu Road - Swaroopganj Project; (ii) Chittorgarh – Kota and Chittorgarh Bypass Project; (iii) Kothakota Bypass – Kurnool Project; (iv) Maharashtra/Karnataka Border (Kagal) – Belgaum Project; and (v) Palanpur/Khemana Abu Road Project
Investment Management Agreement	Investment management agreement dated October 21, 2020, entered into between the Trustee (on behalf of the Trust) and the Investment Manager, as amended from time to time
Investment Manager or NHIIMPL	National Highways Infra Investment Managers Private Limited
Investment Objectives	The investment objectives of the Trust, as provided under the section entitled "*Overview of the Trust*" on page 24
InvIT Assets	InvIT assets as defined in Regulation 2(1)(zb) of the InvIT Regulations, in this case being the concessions granted under the Concession Agreements, in respect of the Initial Toll Roads and the Target Toll Roads
InvIT Documents	Collectively, (i) The Trust Deed; (ii) the Investment Management Agreement; (iii) the Project Implementation and Management Agreement; and (iv) such other policies, documents, agreements and letters executed in connection with the Trust, as originally executed and amended, modified, supplemented or restated from time to time, together with the respective annexures, schedules and exhibits, if any
Kothakota Bypass – Kurnool Project	The Kothakota bypass – Kurnool section of NH 44 with a total length of 74.6 kms, connecting the states of Telangana to Andhra Pradesh.

Term	Description
Limited Review Financial Information	Statement of unaudited consolidated interim financial information of the Trust, and other explanatory notes thereto, for the quarter ended June 30, 2022 and the limited review report of our statutory auditors dated September 21, 2022
Maharashtra/Karnataka Border (Kagal) – Belgaum Project	The Belgaum – Kagal section of NH 48 with a total length of 77.7 kms, connecting the states of Karnataka and Maharashtra
Palanpur/Khemana Abu Road Project	The Palanpur/Khemana – Abu Road section of NH 27 with a total length of 45 kms, connecting the states of Gujarat and Rajasthan
Parties to the Trust	The Sponsor, the Trustee, the Investment Manager and the Project Manager
Project Implementation and Management Agreement	Project implementation and management agreement dated March 30, 2021, together with the amendment dated September 27, 2022 entered into amongst the Trustee (on behalf of the Trust), the Project Manager, the Investment Manager and the Project SPV, as amended by way of an amendment agreement to the project implementation and management agreement dated September 29, 2021.
Project Manager or NHIPMPL	National Highways InvIT Project Managers Private Limited
Project SPV Facilities	The loans provided by the Trust to the Project SPV in accordance with the Project SPV Facility Agreements, as entered into from time to time
Project SPV Facility Agreements	The facility agreements each dated September 30, 2021, entered into between the Trust (acting through the Trustee), the Trustee, the Investment Manager and the Project SPV in relation to the Initial Toll Roads and the facility agreements proposed to be entered into between the Trust (acting through the Trustee), the Trustee, the Investment Manager and the Project SPV in relation to the Target Toll Roads
Project SPV or NHIPPL	National Highways Infra Projects Private Limited
Related Parties	Related parties, as defined under Regulation 2(1)(zv) of the InvIT Regulations
Relevant Stock Exchange	Relevant stock exchange, as defined under Clause 2.2 of the SEBI circular no. SEBI/HO/DDHS/DDHS/CIR/P/2019/143 dated November 27, 2019, as amended by SEBI circular no. SEBI/HO/DDHS/DDHS_Div3/P/CIR/2022/0115 dated August 26, 2022
SEBI Exemption	Letter received from SEBI bearing reference no. SEBI/HO/DDHS_Div3/OW/P/2022/49489/1 dated September 3, 2022 in relation to the exemptions in relation to disclosure of financial information for the Trust, the Sponsor and the Investment Manager and asset revenue information of the Toll Roads. For further details, see "*Management's Discussion And Analysis Of Factors By The Directors Of The Investment Manager Affecting The Financial Condition, Results Of Operations And Cash Flows – SEBI Exemptions*: on page 193.
Shivpuri Jhansi Project	Jhansi-Shivpuri section of NH 27 with a total length of 75.30 kms, connecting the districts of Jhansi in the state of Uttar Pradesh and Shivpuri in the state of Madhya Pradesh
Sponsor	National Highways Authority of India
Sponsor Director	A director nominated on the IM Board by the Sponsor
SPV(s)	Special purpose vehicles, as defined in Regulation 2(1)(zy) of the InvIT Regulations
Target Toll Roads	Collectively, (i) Agra Bypass Project; (ii) Borkhedi - Kelapur Project; and (iii) Shivpuri Jhansi Project
Technical Consultants	M/s Consulting Engineers Group Ltd. and Samarth Infraengg Technocrats Private Limited
Technical Reports	Technical due diligence reports concerning the Target Toll Roads entitled "*Technical Due Diligence of the National Highway stretches viz: Agra Bypass (32.80 Km) connecting km. 176.80 of NH 2 to Km 13.030 of NH 3 in the state of Uttar Pradesh, and Four lane of Shivpuri-Jhansi from Km. 1305+000 to Km. 1380+387 (Total Length- 75 Km) on NH-27 in the state of Madhya Pradesh & Uttar Pradesh*" issued by M/s Consulting Engineers Group Ltd. dated August 29, 2022 and technical report entitled "*Tolling, Operation, Maintenance and Transfer of Borkhedi-Wadner - Deodhari – Kelapur – Maharashtra / Telangana Border (from km 36.600 to km 175.000) of NH-44 in the State of Maharashtra*", issued by Samarth Infraengg Technocrats Private Limited dated August 29, 2022, which forms part of this Preliminary Placement Document, as set out in Annexure B
Toll Roads	Collectively, the Initial Toll Roads and the Target Toll Roads
Traffic Consultant(s)	Ramboll India Private Limited, Steer Davies Gleave India Private Limited and CRISIL Research
Traffic Reports	The traffic reports prepared by the Traffic Consultants in respect of the Target Toll Roads, which forms part of this Preliminary Placement Document, as set out in Annexure C.
Transitional Support Agreement	The transitional support agreement dated September 26, 2022 entered into amongst the Sponsor, Project Manager and the Project SPV in relation to the Target Toll Roads. For further details, please see the section entitled "*Related Party Transactions – Transitional Support Agreement*" on page 200.
Trust	National Highways Infra Trust
Trust Deed	Trust deed dated October 19, 2020, entered into between the Sponsor and the Trustee
Trustee	IDBI Trusteeship Services Limited

Term	Description
Unexpired Cash Flow	The amount calculated by multiplying the concession fee with the percentages provided in the relevant Concession Agreements
Unitholder(s)	Any Person who holds Units (as hereinafter defined) upon making a defined contribution as determined by the Trustee
Unit	An undivided beneficial interest in the Trust, and such Units together represent the entire beneficial interest in the Trust
UPSI Policy	The unpublished price sensitive information policy adopted by the Investment Manager pursuant to a resolution of its board of directors dated February 3, 2021, as amended pursuant to the resolution of the IM Board dated September 27, 2021 and March 30, 2022
Valuation Report	The valuation report dated August 30, 2022, issued by the Valuer, which sets out their opinion as to the fair enterprise value of the Initial Toll Roads and Target Toll Roads as on July 31, 2022, which is set out in Annexure A to the Preliminary Placement Document
Valuer	RBSA Valuation Advisors LLP

Offer Related Terms

Term	Description
Allocated/ Allocation	The allocation of Units, to successful Bidders on the basis of the Application Form submitted by them, by the Investment Manager, in consultation with the Lead Managers
Allot/ Allotment/ Allotted	Unless the context otherwise requires, the issue and allotment of Units to successful Bidders, pursuant to the Offer
Allottees	Bidders to whom Units are issued and Allotted pursuant to the Offer
Application Form	The serially numbered form pursuant to which Eligible Investors shall submit a Bid for the Units in the Offer
Bid(s)	Indication of interest of an Eligible Investor, as provided in the Application Form, to subscribe for the Units at a price being at or above the floor price specified in the Placement Document, in terms of the Placement Document and the Application Form
Bid Amount	The Bid Price multiplied by the total number of Units Bid for by a Bidder as indicated in the Application Form
Bid/Offer Closing Date	October 3, 2022
Bid/Offer Opening Date	September 30, 2022
Bid/Offer Period	Period between the Bid/Offer Opening Date and the Bid/Offer Closing Date, inclusive of both days, during which Eligible Investors submitted their Bids
Bid Lot/ Minimum Bid Size	A minimum of 2,400,000 Units and in multiples of 10 Units thereafter
Bid Price	An amount per Unit, at or above the Floor Price as indicated by a Bidder in the Application Form
Bidder	Any Eligible Investor, who made a Bid pursuant to the terms of the Placement Document and the Application Form
Business Day	Any day from Monday to Friday, excluding any public holiday
Cash Escrow Account	'No-lien' and 'non-interest bearing' account opened with the Escrow Collection Bank and in whose favour Bidders transferred money through direct credit/NEFT/NECS/RTGS in respect of the Bid Amount when submitting a Bid
Cash Escrow Agreement	The cash escrow agreement dated September 29, 2022, entered into amongst the Trust (acting through the Trustee), the Investment Manager, the Lead Managers, the Sponsor and the Escrow Collection Bank for, among others, collection of the Bid Amounts and for remitting refunds, if any, of the amounts collected, to the Bidders
Client ID	Client identification number maintained with one of the Depositories in relation to a demat account
Closing Date	The date on which Allotment of Units pursuant to the Offer shall be made, i.e. on or about October 12, 2022
Demographic Details	Details of the Bidders, including the Bidder's address, name of the Bidder's father/husband, investor status, occupation and bank account details, PAN, DP ID and Client ID
Designated Date	The date of credit of Units to the Eligible Investors' demat accounts
Eligible Investors	Institutional Investors
Escrow Collection Bank	ICICI Bank Limited
Final Placement Memorandum	The final placement memorandum dated November 3, 2021, issued in relation to the initial offer of units by way of fresh issue in accordance with the InvIT Regulations and SEBI circular dated December 24, 2019 (Circular No.: SEBI/HO/DDHS/DDHS/CIR/P/2019/161) available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html
Floor Price	The price of ₹ 109.00 at or above which the Offer Price will be finalised and below which no Bids will be accepted
Offer	Issue of [●] Units by way of a fresh issue, through an institutional placement to Eligible Investors aggregating up to ₹ [●] million by the Trust

Institutional Investors	Institutional investors as defined in Regulation 2(1)(ya) of the InvIT Regulations
I-Sec	ICICI Securities Limited
Listing Agreements	The listing agreements to be entered into with the Stock Exchanges by the Trust, in line with the format as specified under the Securities and Exchange Board of India circular number CIR/CFD/CMD/6/2015 dated October 13, 2015 on "Format of uniform Listing Agreement"
Listing Date	The date on which the Units offered pursuant to the Offer will be listed on the Stock Exchanges
Lead Managers	I-Sec and SBICAP
Mutual Funds	Mutual funds registered with SEBI under the Securities and Exchange Board of India (Mutual Funds) Regulations, 1996
Net Proceeds	Proceeds of the Offer that will be available to the Trust, i.e., Offer Proceeds, less Offer expenses apportioned to the Trust
Offer Expenses	Expenses in relation to the Offer
Offer Price	₹ [●] per Unit
Offer Proceeds	The proceeds of the Offer that are available to the Trust. For further details about the use of the Offer Proceeds, please see the section entitled "*Use of Proceeds*" on page 188
Offer Size	The offer of [●] Units aggregating to ₹ [●] million
Placement Agreement	The placement agreement dated September 29, 2022 entered into among the Trust (acting through its Trustee), the Trustee, the Investment Manager, the Project Manager and the Lead Managers
Placement Document	The placement document to be issued in relation to this Offer in accordance with the SEBI Institutional Placement Guidelines, the InvIT Regulations and circulars issued therein
Preliminary Placement Document	This preliminary placement document dated September [29], 2022 issued in accordance with the SEBI Institutional Placement Guidelines, the InvIT Regulations and the circulars issued therein.
Registrar and Unit Transfer Agent or Registrar	KFin Technologies Limited
SBICAP	SBI Capital Markets Limited
Working Day	Working Day, with reference to (a) Bid/Offer Period, shall mean all days, excluding Saturdays, Sundays and public holidays, on which commercial banks in Mumbai are open for business; and (b) the time period between the Bid/ Offer 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
%	Percentage
2A	2 Axle truck
3A	3 Axle truck
AB	Agra Bypass Project
AADT	Annual Average Daily Traffic
ADT	Average Daily Traffic
AP	Palanpur/Khemana Abu Road Project
AR	Alternate Route
AS	Abu Road – Swaroopganj Project
BIA	Broad Influence Area
BOT	Build Operate Transfer
BRO	Border Roads Organisation
BWK	Borkhedi – Kelapur Project
CAGR	Compounded Annual Growth Rate
CJV	Cars / Jeeps / Vans
CK	Chittorgarh – Kota & Chittorgarh Bypass Project
COD	Commercial Operations Date
CRISIL Report	Report entitled "*Report on Roads and Highways*" released in Mumbai by CRISIL Research in September 2022
DBFOT	Design, Build, Finance, Operate and Transfer
DEA	Department of Economic Affairs
DME	Delhi Mumbai Expressway
DPR	Detailed Project Report
ETC	Electronic Toll Collection
FY	Financial Year

Term	Description
GDP	Gross Domestic Product
GSDP	Gross State Domestic Product
HAM	Hybrid Annuity Model
HCV	Heavy Commercial Vehicles
HME	Heavy Machinery and Equipment
IDC	Interest during construction
IHMCL	Indian Highways Management Company Limited
IIA	Immediate Influence Area
IRC	Indian Road Congress
InvIT	Infrastructure Investment Trust
JEPL	Jadcherla Expressways Private Limited
KK	Kothakota Bypass – Kurnool Highway Project
Km	Kilometre
LCV	Light Commercial Vehicle
M Bus	Minibus
MAV	Multi Axle Vehicle
MH-B	Maharashtra/ Karnataka Border (Kagal) – Belgaum Project
MLCV	Mini LCV
NCT	National Capital Territory
NH	National Highway
NHAI	National Highways Authority of India
NHDP	National Highways Development Program
NHIIMPL or NHIMPL	National Highways Infra Investment Managers Private Limited
NHTIS	National Highway Toll Information System
NIP	National Infrastructure Pipeline
NPV	Net Present Value
NRRDA	National Rural Road Department Agency
NSDP	National State Domestic Production
O&M	Operation and Maintenance
OD	Origin Destination
OD	Origin-Destination survey
OECD	Organisation for Economic Cooperation and Development
OECD	Organisation for Economic Cooperation and Development
PCU	Passenger Car Unit
PIA	Project Influence Area
PR	Project Road
PWD	Public Works Departments
RNP	Registered Number Plate
RUCS	Road User Cost Study
SCF	Seasonality Correction Factors
SCOD	Scheduled commercial operations date
SEZ	Special Economic Zone
SH	State Highway
SJ	Shivpuri – Jhansi Project
SPV	Special Purpose Vehicle
T&R	Traffic and Revenue
TMS	Traffic Management System
TOT	Toll-Operate-Transfer
TP	Toll Plaza
TVC	Traffic Volume Count
VOC	Vehicle Operating Cost
VOT	Value of Time
WATL	Western Andhra Expressways Limited
WPI	Wholesale Price Index
YOY	Year on Year
YTD	Year to Date

Abbreviations

Term	Description
AIF	Alternative Investment Fund as defined in and registered with SEBI under the SEBI AIF Regulations
BSE	BSE Limited

Term	Description
CCEA	Cabinet Committee on Economic Affairs
CCI	Competition Commission of India
CDSL	Central Depository Services (India) Limited
CIN	Corporate Identity Number
Companies Act	Companies Act, 1956 and/or the Companies Act, 2013, as applicable
Companies Act, 1956	Erstwhile, Companies Act, 1956
Companies Act, 2013	Companies Act, 2013, read with the rules and regulations, thereunder
Competition Act	Competition Act, 2002
Depository	A depository registered with SEBI under the Securities and Exchange Board of India (Depositories and Participants) Regulations, 2018
Depositories Act	Depositories Act, 1996
DIN	Director Identification Number
FEMA	Foreign Exchange Management Act, 1999, 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
Income Tax Act or IT Act	The Income-tax Act, 1961
Ind AS	Companies (Indian Accounting Standards) Rules, 2015, notified on February 19, 2015 by the MCA, including any amendments or modifications thereto
Indian GAAP	Generally Accepted Accounting Principles in India
Indian GAAS	Generally Accepted Auditing Standards in India
InvIT	Infrastructure investment trust
InvIT Regulations	Securities and Exchange Board of India (Infrastructure Investment Trust) Regulations, 2014, including any circulars, modifications, clarifications and amendments thereto
IRDAI	Insurance Regulatory and Development Authority of India
MCA	Ministry of Corporate Affairs, Government of India
MoEF	Ministry of Environment, Forest and Climate Change
MoRTH	Ministry of Road Transport and Highways
NACH	National Automated Clearing House
NEFT	National Electronic Funds Transfer
NHAI	National Highways Authority of India
NHAI Act	National Highways Authority of India Act, 1988, as amended
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
RoC	Registrar of Companies, Delhi and Haryana at New Delhi
Rs./Rupees/INR/₹	Indian Rupees
RTGS	Real Time Gross Settlement
SCRA	Securities Contracts (Regulation) Act, 1956
SCRR	Securities Contracts (Regulation) Rules, 1957
SEBI	Securities and Exchange Board of India constituted under the SEBI Act
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
SEBI Circular on Financial Disclosures	SEBI Circular (CIR/IMD/DF/114/2016) dated October 20, 2016 on 'Disclosure of Financial Information in Offer Document/Placement Memorandum for InvITs'
SEBI Debenture Trustees Regulations	Securities and Exchange Board of India (Debenture Trustees) Regulations, 1993
SEBI FPI Regulations	Securities and Exchange Board of India (Foreign Portfolio Investors) Regulations, 2019
SEBI FVCI Regulations	Securities and Exchange Board of India (Foreign Venture Capital Investors) Regulations, 2000
SEBI ICDR Regulations	Securities and Exchange Board of India (Issue of Capital and Disclosure Requirements) Regulations, 2018
SEBI Institutional Placement Guidelines	Chapter 7 read with Annexure 7 on '*Guidelines for preferential issue and institutional placement of units by listed InvITs*' of SEBI Master Circular No.

Term	Description
	SEBI/HO/DDHS/DDHS_Div3/P/CIR/2022/53 dated April 26, 2022, as amended from time to time
Securities Act	U.S. Securities Act of 1933
Stock Exchanges	BSE Limited and the National Stock Exchange of India Limited
U.S./U.S.A./United States	United States of America
USD/US$	United States Dollars

PRESENTATION OF FINANCIAL DATA AND OTHER INFORMATION

Certain Conventions

All references in this Preliminary Placement Document to "India" are to the Republic of India.

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

Financial Data

The Trust was settled on October 19, 2020, and has acquired ownership of the Project SPV on November 3, 2021. The audited standalone financial information of the Trust for the period from its date of settlement, i.e. October 19, 2020 up to March 31, 2021, the audited consolidated financial information of the Trust as of and for the year ended March 31, 2022 and limited review unaudited interim consolidated financial information statements of the Trust for the three months period ended June 30, 2022, prepared in accordance with Ind AS, is included in this Preliminary Placement Document.

As the Project SPV was incorporated on July 23, 2020, the summary financial information of the Project SPV for Fiscals 2020, is not available for disclosure in this Preliminary Placement Document. However, the summary financial information of the Project SPV for Fiscal 2021 and 2022 has been included in this Preliminary Placement Document along with the limited review financial results for the three months period ended June 30, 2022 on page 48. In relation to the Initial Toll Roads, the asset revenue information that NHAI has historically been collecting through toll collection and maintenance contracts, as disclosed in the section titled "*Asset Revenue Information*" on page 313 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html is relied upon. Additionally, the asset revenue as has been historically collected by the Project SPV through toll collection and maintenance contracts, from December 16, 2021 (i.e. the Appointed Date in terms of the Initial Concession Agreements) to August 31, 2022 has been disclosed in the section entitled "*Asset Revenue Information*" on page 244. Further, no separate financial information, including actual revenue data for the Target Toll Roads, are currently available, which could be used to clearly ascertain financial information including revenue and expenses in respect of each of the Target Toll Roads. Accordingly, in lieu of the combined financial statements of the Trust along with the Project SPV and in terms of the SEBI Exemption, the revenue data that NHAI has historically been collecting through toll collection and maintenance contracts, as communicated by way of its letter dated September 21, 2022, has been included in the section entitled "*Asset Revenue Information*" on page 244. The said amounts being collected are at times intermittent on account of gaps in tolling contract periods and would not be a true reflection of the revenue that these Target Toll Roads are actually generating. Please refer to "*Risk Factors - We have no operating history for Target Toll Roads and limited historical financial information and, as such, there are limited financial statements presented in this Preliminary Placement Document*" on page 62 in this regard.

Further, this Preliminary Placement Document includes summary financial information of the Sponsor, as of and for the financial years ended March 31, 2020 and March 31, 2019 and March 31, 2018 derived from the audited standalone financial statements of the Sponsor for the respective years along with available limited review financials for the half year ended March 31, 2021. For further details, please see the sections entitled "*Summary Financial Information of the Sponsor*" on page 34.

Further, as highlighted in the section entitled "*Parties to the Trust*" on page 93, the Investment Manager was incorporated on July 25, 2020. Accordingly, the summary financial information of the Investment Manager for Fiscal 2020, is not available for disclosure in this Preliminary Placement Document. However, the summary financial information of the Investment Manager for Fiscals 2021 and 2022 has been included in this Preliminary Placement Document on page 44. However, please note that the financial information of the Investment Manager for Fiscal 2022, has been audited by the statutory auditor appointed by the Comptroller and Auditor General of India ("**CAG**") and was supplementary audited by the CAG, in accordance with the Companies Act, 2013, as amended, is included in this Preliminary Placement Document.

The degree to which the financial information included in this Preliminary Placement Document will provide meaningful information is entirely dependent on the reader's level of familiarity with Indian accounting policies and practices, the Companies Act, Ind AS, Indian GAAP and the InvIT Regulations. Any reliance by persons not familiar with Indian accounting policies and practices on the financial disclosures presented in this Preliminary Placement Document should accordingly be limited.

The financial year for the Trust and Parties to the Trust commences on April 1 and ends on March 31 of the next year; accordingly, all references to a particular financial year, unless stated otherwise, are to the 12 month period ended on March 31 of that year.

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

Currency and Units of Presentation

All references to:

- "Rupees" or "₹" or "INR" or "Rs." are to Indian Rupee, the official currency of the Republic of India; and
- "USD" or "US$" are to United States Dollar, the official currency of the United States.

Except otherwise specified, certain numerical information in this Preliminary Placement Document have been presented in "million" units. One million represents 1,000,000 and one billion represents 1,000,000,000. One lakh represents 1,00,000 and one crore represents 1,00,00,000.

Unless the context requires otherwise, any percentage amounts, as set forth in this Preliminary Placement Document, have been calculated on the basis of the Audited Financial Information, and the summary financial statements of the Sponsor.

Exchange Rates

This Preliminary Placement 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 dates indicated, information with respect to the exchange rate between the Rupee and the US$ (in Rupees per US$):

Currency	June 30, 2022	March 31, 2022	March 31, 2021	March 31, 2020
1 US$	78.94	75. 81	73.50	75.39

Source: www.rbi.org.in and www.fbil.org.in
In the event that March 31 of any of the respective years is a public holiday, the previous calendar day not being a public holiday has been considered.
The above exchange rates are for the purpose of information only and may not represent the rates used by the Trust for purpose of preparation or presentation of its financial statements. The rates presented are not a guarantee that any person could have on the relevant date converted any amounts at such rates or at all.

Industry and Market Data

Unless stated otherwise, industry and market data used in this Preliminary Placement Document has been obtained or derived from publicly available information, as well as from the Report titled "*Roads and Highways*" dated September 2022, prepared by CRISIL Research ("**CRISIL Report**'). The CRISIL Report is subject to the following disclaimer:

"*CRISIL Research, a division of CRISIL Limited (CRISIL) has taken due care and caution in preparing this report (Report) based on the Information obtained by CRISIL from sources which it considers reliable (Data). However, CRISIL does not guarantee the accuracy, adequacy or completeness of the Data / Report and is not responsible for any errors or omissions or for the results obtained from the use of Data / Report. This Report is not a recommendation to invest / disinvest in any entity covered in the Report and no part of this Report should be construed as an expert advice or investment advice or any form of investment banking within the meaning of any law or regulation. CRISIL especially states that it has no liability whatsoever to the subscribers / users / transmitters/ distributors of this Report. Without limiting the generality of the foregoing, nothing in the Report is to be construed as CRISIL providing or intending to provide any services in jurisdictions where CRISIL does not have the necessary permission and/or registration to carry out its business activities in this regard.* ***National Highways Infra Trust*** *will be responsible for ensuring compliances and consequences of non-compliances for use of the Report or part thereof outside India. CRISIL Research operates independently of, and does not have access to information obtained by CRISIL Ratings Limited / CRISIL Risk and Infrastructure Solutions Ltd (CRIS), which may, in their regular operations, obtain information of a confidential nature. The views expressed in this Report are that of CRISIL Research and not of CRISIL Ratings Limited / CRIS. No part of this Report may be published/reproduced in any form without CRISIL's prior written approval.*"

Although the Investment Manager believes that the industry and market data used in this Preliminary Placement Document is reliable, it has not been independently verified by the Investment Manager, the Trustee or the Lead Managers, or any of their affiliates or advisors and their accuracy and completeness are not guaranteed and their reliability cannot be assured. The data used in these sources may have been re-classified by us 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 in the section entitled "*Risk Factors*" on page 61. Accordingly, no investment decisions should be based on such information.

The extent to which the market and industry data used in this Preliminary Placement Document is meaningful depends 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 business of the Trust is conducted, and methodologies and assumptions may vary widely among different industry sources.

Traffic Consultants

The traffic reports in Annexure C, as well as the data used in this Preliminary Placement Document from those reports, have been prepared by the Traffic Consultants.

Disclaimers from the Traffic Consultants

Disclaimer from CRISIL Research

"*CRISIL Research, a division of CRISIL Limited (CRISIL) has taken due care and caution in preparing this report (Report) based on the Information obtained by CRISIL from sources which it considers reliable (Data). However, CRISIL does not guarantee the accuracy, adequacy or completeness of the Data / Report and is not responsible for any errors or omissions or for the results obtained from the use of Data / Report. This Report is not a recommendation to invest / disinvest in any entity covered in the Report and no part of this Report should be construed as an expert advice or investment advice or any form of investment banking within the meaning of any law or regulation. CRISIL especially states that it has no liability whatsoever to the subscribers / users / transmitters/ distributors of this Report. Without limiting the generality of the foregoing, nothing in the Report is to be construed as CRISIL providing or intending to provide any services in jurisdictions where CRISIL does not have the necessary permission and/or registration to carry out its business activities in this regard National Highways Infra Trust will be responsible for ensuring compliances and consequences of non-compliances for use of the Report or part thereof outside India. CRISIL Research operates independently of, and does not have access to information obtained by CRISIL Ratings Limited / CRISIL Risk and Infrastructure Solutions Ltd (CRIS), which may, in their regular operations, obtain information of a confidential nature. The views expressed in this Report are that of CRISIL Research and not of CRISIL Ratings Limited / CRIS. No part of this Report may be published/reproduced in any form without CRISIL's prior written approval*."

Disclaimer from Steer Davies Gleave India Private Limited

"*This document includes selected provisions of or a summary of the Project Drone: T&R DD report_2.0_29082022 (the "Report") prepared by Steer, Davies & Gleave India Private Limited, solely in its capacity as the Traffic Consultant (the "Traffic Consultant"), on behalf of NHIIMPL (the "Client") for the Offer and is not a full statement of the terms of the Reports. Accordingly, such summary or excerpt is qualified in its entirety by reference to and is subject to the full text of the Report, which are attached hereto to the Preliminary Placement Memorandum/Placement Document, as Annexure C. Investors must view the summaries in the context of the full Report, which are subject to the limitations and disclaimers in such Report. Without limiting the generality of the foregoing, the Report is expressly subject to the qualifications, assumptions made, procedures followed, matters considered and any limitations on the scope of work contained therein.*

Investors should note that these summaries, and the Reports, are provided only as of the date set forth therein and do not contemplate any event, circumstances, or changes with respect to Offer or otherwise after such date. The foregoing summaries of the Report may include projected information and data (financial and otherwise), and other forward-looking information, that may or may not occur or prove to be accurate. Such projected and forward-looking information is based on current expectations and projections about future events which are beyond the control of the Traffic Consultant, the Client or any other participant in the Offer, and such projections and information can be affected by inaccurate assumptions. While these projections and information were prepared in good faith, no assurance can be given as to the accuracy or adequacy of such projections and information, or the assumptions underlying such projections and information.

TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, THE LIABILITY OF THE TRAFFIC CONSULTANT FOR ANY LOSS, DAMAGE, COST OR EXPENSE SUFFERED OR INCURRED BY ALL PERSONS OR ENTITIES AND FOR ALL CLAIMS RESPECTING ITS WORK PERFORMED IN CONNECTION WITH THE PROJECT IS HEREBY LIMITED IN THE AGGREGATE TO THE AMOUNT OF FEES ACTUALLY PAID BY THE CLIENT TO THE TRAFFIC CONSULTANT IN CONNECTION WITH THE PROJECT. "

Disclaimer from Ramboll India Private Limited

This Report is intended for the NATIONAL HIGHWAYS INFRA INVESTMENT MANAGERS PRIVATE LIMITED's sole and exclusive use and is not for the benefit of any third party and may not be distributed to, disclosed in any form to, used by, or relied upon by, any third party, except as agreed between the Parties, without prior written consent of Ramboll, which consent may be withheld in its sole discretion.

Use of this Report or any information contained herein, if by any party other than the Client, shall be at the sole risk of such party and shall constitute a release and agreement by such party to defend and indemnify Ramboll and its officers, employees from and against any liability for direct, indirect, incidental, consequential or special loss or damage or other liability of any nature arising from its use of the Report or reliance upon any of its content. To the maximum extent permitted by law, such release from and indemnification against liability shall apply in contract, tort (including negligence), strict liability, or any other theory of liability

In preparing this report, Ramboll India Private Limited relied, in whole or in part, on data and information provided by National Highways Infra Investment Managers Private Limited, 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.

MARKET PRICE INFORMATION

In this section, all market price information provided for Fiscal 2022 refers to such information for the period beginning November 10, 2021 (i.e. the date of listing of the Units on the BSE and NSE) until March 31, 2022. Further, market price information has been included for a period from April 1, 2022 to August 31, 2022.

As on the date of this Preliminary Placement Document, 5,952,00,000 Units are issued, subscribed and are fully paid up. The units have been listed and are available for trading on BSE and NSE. As on September 28, 2022, the closing price of the Units on BSE and NSE are not available since the units of the Trust were not traded.

(i) The following tables set forth the reported high, low, average market prices and the trading volumes of the Units on the Stock Exchanges on the dates on which such high and low prices were recorded and the total trading volumes for Fiscal 2022:

BSE:

Fiscal Year	High (₹)	Date of high	Number of Units traded on date of high	Total turnover of Units traded on date of high (₹ million)	Low (₹)	Date of low	Number of Units traded on date of low	Total turnover of Units traded on date of low (₹ million)	Average price for the fiscal year (₹)	Units traded in the fiscal year	
										Volume	(in ₹ million)
FY2022*	116.10	March 7, 2022	200,000	23.22	101.99	November 18, 2021	400,000	40.80	107.02	1,800,000	187.62

** The market price data pertaining to the period from the date of listing of units i.e. with effect from November 10, 2021.*
(Source: www.bseindia.com)

NSE:

Fiscal Year	High (₹)	Date of high	Number of Units traded on date of high	Total turnover of Units traded on date of high (₹ million)	Low (₹)	Date of low	Number of Units traded on date of low	Total turnover of Units traded on date of low (₹ million)	Average price for the fiscal year (₹)	Units traded in the month	
										Volume	(in ₹ million)
FY2022*	120.00	February 17, 2022	2,000,000	21.80	101.25	November 12, 2021	2,000,000	203.00	103.64	35,200,000	3,609.01

** The market price data pertaining to the period from the date of listing of units i.e. with effect from November 10, 2021.*
(Source: www.nseindia.com)

Notes:

1. *High, low are based on the daily high and low prices respectively.*
2. *Average prices are based on the daily closing prices.*
3. *In case of two days with the same high or low prices, the date with the higher volume of units has been considered.*

(ii) The following tables set forth the reported high, low and average market prices and the trading volumes of the Units on the Stock Exchanges on the dates on which such high and low prices were recorded during each of the last six months:

BSE:

Month	High (₹)	Date of high	Number of Units traded on date of high	Total turnover of Units traded on date of high (in ₹ million)	Low (₹)	Date of low	Number of Units traded on date of low	Total turnover of Units traded on date of low (in ₹ million)	Average price for the month (₹)	Units traded in the month	
										Volume	(in ₹ million)
March 2022	116.10	March 7, 2022	200,000	23.22	116.10	March 7, 2022	200,000	23.22	116.10	200,000	23.22
April 2022	-	-	-	-	-	-	-	-	-	-	-
May 2022	-	-	-	-	-	-	-	-	-	-	-
June 2022	-	-	-	-	-	-	-	-	-	-	-
July 2022	-	-	-	-	-	-	-	-	-	-	-
August 2022	-	-	-	-	-	-	-	-	-	-	-

(Source: www.bseindia.com)

NSE:

Month	High (₹)	Date of high	Number of Units traded on date of high	Total turnover of Units traded on date of high (in ₹ million)	Low (₹)	Date of low	Number of Units traded on date of low	Total turnover of Units traded on date of low (₹ million)	Average price for the month (₹)	Units traded in the month	
										Volume	(in ₹ million)
March 2022	-	-	-	-	-	-	-	-	-	-	-
April 2022	114.00	April 20, 2022	200,000	22.80	114.00	April 20, 2022	200,000	22.80	114.00	200,000	22.80
May 2022	120.00	May 10, 2022	200,000	24.00	120.00	May 10, 2022	200,000	24.00	120.00	200,000	24.00
June 2022	-	-	-	-	-	-	-	-	-	-	-
July 2022	-	-	-	-	-	-	-	-	-	-	-
August 2022	114.00	August 19, 2022	200,000	22.80	114.00	August 19, 2022	200,000	22.80	114.00	200,000	22.80

(Source: www. nseindia.com)

Notes:

1. *High, low are based on the daily High and Low prices respectively.*
2. *Average prices are based on the daily closing prices.*
3. *In case of two days with the same high or low prices, the date with the higher volume of units has been considered.*
4. *Since the units of the Trust have not been traded, no such data is available for the specific months.*
5. *The data disclosed above has not resulted in any change in the capital structure of the Trust.*

The market price on the Stock Exchanges on August 31, 2022, the first working day following the approval of the Board of the Investment Manager for the Issue, is not available since the units of the Trust were not traded on Stock Exchanges.

FORWARD-LOOKING STATEMENTS

Certain statements contained in this Preliminary Placement 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", "may", "objective", "plan", "potential", "project", "pursue", "seek to", "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 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 and cash flows, 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 Preliminary Placement Document that are not historical facts.

The Valuation Report included in this Preliminary Placement 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 include projections and estimates in relation to traffic growth and operation and maintenance expenses respectively, and accordingly, should be read in conjunction with the relevant notes and assumptions thereto.

Actual results may differ materially from those suggested by the forward-looking statements 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, cash flow projections, exposure to market risks, the outcome of any legal or regulatory proceedings, the future impact of new accounting standards, regulatory changes pertaining to the infrastructure sector in India and our ability to respond to them, general economic and political conditions in India which have an impact on our business activities or investments, changes in competition, and the Project Manager's ability to operate and maintain the Project SPV and successfully implement any technological changes. 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 interest income and 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 in the sections entitled "*Risk Factors*", "*Industry Overview*", "*Our Business*" and "*Management's Discussion and Analysis of Factors by the Directors of the Investment Manager affecting the Financial Condition, Results of Operations and Cash Flows*", on pages 61, 97, 107 and 191, 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 and financial information include, but are not limited to, the following:

- the monies received from the Offer proceeds shall be retained in the Cash Escrow Account until the completion of the allotment of units to the Sponsor pursuant to the proposed preferential issue to Sponsor and will be refunded to the Bidders in case the proposed issue of Units on a preferential basis to the Sponsor is not completed prior to the Allotment of Units;
- we have no operating history for Target Toll Roads and limited historical financial information and, as such, there are limited financial statements presented in this Preliminary Placement Document;
- we must maintain certain investment ratios, which may present additional risks to us;
- we may not be able to make distributions to Unitholders or the level of distributions may fall;
- the Trust is proposing to undertake a public issue of secured, rated, listed, redeemable, non-convertible debentures. We cannot assure that that Trust will be able to successfully raise the debt and any failure to raise capital may have an adverse effect on our results of operations;
- the completion of the transactions contemplated by the debt financing documentation entered into may be subject to certain closing and other conditions that may prevent us from providing debt financing to the Project SPV;
- the regulatory framework governing infrastructure investment trusts in India is evolving and the interpretation and enforcement thereof involve uncertainties, which may have a material, adverse effect on the ability of certain categories of investors to invest in the Units, our business, financial condition and results of operations and our ability to make distributions to Unitholders; and
- our Project SPV may not be able to claim depreciation in relation to toll collection rights acquired from the Sponsor.

Forward-looking statements, Valuation Report and Technical Reports reflect current views as of the date of the respective reports included in this Preliminary Placement 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 believes that the expectations and the assumptions upon which such forward-looking statements are based are reasonable at this time, the Investment Manager does not assure Bidders that such expectations will prove to be correct or accurate. Given these uncertainties, Bidders are cautioned not to place undue reliance on such forward-looking statements. In any event, these statements speak only as of the date of this Preliminary Placement Document

or the respective dates indicated in this Preliminary Placement Document, and the Trust, the Investment Manager and the Lead Managers or any of their affiliates or advisors, undertake no obligation to update or revise any of the 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 Preliminary Placement 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.

THE OFFER

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

Trust	National Highways Infra Trust is a contributory irrevocable trust set up under the Indian Trusts Act, 1882, and registered as an infrastructure investment trust under the InvIT Regulations on October 28, 2020, having registration number IN/InvIT/20-21/0014
Offer	Issue of [●] Units by way of an institutional placement to Eligible Investors, representing an undivided beneficial interest in the Trust through an institutional placement aggregating up to ₹ [●] million by the Trust
Floor Price	₹ 109.00 per Unit
Offer Price	₹ [●] per Unit
Bid Lot/ Minimum Bid Size	A minimum of 2,400,000 Units and in multiples of 10 Units thereafter
Bid/Offer Opening Date	September 30, 2022
Bid/Offer Closing Date	October 3, 2022
Sponsor	National Highways Authority of India
Trustee	IDBI Trusteeship Services Limited
Investment Manager	National Highways Infra Investment Managers Private Limited
Project Manager	National Highways InvIT Project Managers Private Limited
Eligible Investors	Institutional Investors subject to applicable law
Authority for this Offer	This Offer was authorised and approved by the IM Board on August 30, 2022 and by the Unitholders on September 23, 2022.
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 the section entitled "*Parties to the Trust*" on page 93.
Units issued and outstanding immediately prior to this Offer	595,200,000 Units
Units issued and outstanding immediately after this Offer	[●]* Units
Sponsor Units as on the date of this Preliminary Placement Document	95,600,000 Units. The Units held by the Sponsor will rank *pari passu* with, and have the same rights as the Units to be Allotted to other Bidders pursuant to the Offer.
Distribution	Please see the section entitled "*Distribution*" on page 199.
Indian Taxation	Please see the section entitled "*Taxation"* on page 231.
Use of Proceeds	Please see the section entitled *"Use of Proceeds*" on page 188.
Listing	The Units are proposed to be listed on NSE and BSE. The Trust has received the in-principle approvals from NSE and BSE pursuant to their letters dated September 29, 2022, for the listing of the Units. The Investment Manager shall apply to NSE and BSE for the final listing and trading approvals, after the Allotment and after the credit of the Units to the beneficiary accounts with the Depository Participants and the Units shall be listed within two working days from the date of Allotment. The Trust shall also file the Placement Document, along with the allotment report, containing the details of the allottees and allotment made, with SEBI within seven days of Allotment.
Closing Date	The date on which Allotment of the Units pursuant to this Offer shall be made, i.e. on or about [●]
Ranking	The Units being issued will rank *pari passu* in all respects, including rights in respect of distribution. The Unitholders will be entitled to participate in distribution, if any, declared by the Trust after the date of Allotment. Please see the section entitled "*Rights of Unitholders*" on page 219.
Lock-in and Rights of Unitholders	For details, please see the sections entitled "*Information concerning the Units*" and "*Rights of Unitholders*" on pages 185 and 219, respectively.
Risk Factors	Prior to making an investment decision, Bidders should consider carefully the matters discussed in the section entitled "*Risk Factors*" on page 61.

* *The IM Board by way of its resolution dated August 30, 2022 and September 27, 2022 and the unitholders of the Trust by way of their resolution dated September 23, 2022, have approved the Issue of 131,205,200 Units at or above the base price of ₹ 107.12 per Unit. The IM Board by way of its resolution dated September 27, 2022 have approved the Floor Price of ₹ 109.00 per Unit. Of the 131,205,200 Units, the Trust proposes to undertake the issue of up to 26,241,040 Units to the Sponsor, on a preferential basis ("***Preferential Issue***"), in accordance with the SEBI Institutional Placement Guidelines and the InvIT Regulations. The IM Board by way of its resolution dated September 17, 2022 has approved the Preferential Issue. The Sponsor, by way of its letter dated September 29, 2022, has confirmed its willingness to subscribe to at least 19,602,600 Units being offered pursuant to the Preferential Issue and such number of Units as may be approved by the Unitholders, in their meeting scheduled on October 10, 2022, at or above the Floor Price.*

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

In accordance with the InvIT Regulations, no Unitholder shall enjoy superior voting or any other rights over another Unitholder. Further, there shall not be multiple classes of Units.

None of the respective members of the Sponsor or promoters or partners or directors of the Investment Manager or Trustee is a fugitive economic offender declared under section 12 of the Fugitive Economic Offenders Act, 2018.

For further details in relation to this Offer, including the basis for the calculation of Issue Price and method of application, please see the section entitled "*Offer Procedure*" on page 222 and the Valuation Report as set out in Annexure A to this Preliminary Placement Document.

OVERVIEW OF THE TRUST

Except as stated herein below, for an overview of the Trust, please see the section entitled "*Overview of the Trust*" on page 24 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html.

1. The details of fee and expenses as disclosed in the section entitled "*Overview of the Trust – Details of credit ratings*" on page 24 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html shall be replaced as follows:

"***Fee and expenses***

Annual Expenses

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

The estimated recurring expenses on an annual basis are as follows:

(₹ in million)

Particulars	***Estimated Expenses***
Trustee fee	*0.96*
Investment Manager fee	*110.00*^
Project Manager fee	*84.00*
Fee payable to the credit rating agencies	*0.06*
Auditor fee, Valuer fee, other intermediaries and consultants and others	*2.56***

^*Effective from October 21, 2020 with annual escalation as per the terms of the Investment Management Agreement.*
***Estimated fee for the financial year ended March 31, 2023.*

Offer Expenses

The total expenses of this Offer are estimated to be approximately ₹ [●] million which will be incurred by the Trust. For details in relation to the expenses for this Offer, please see the section entitled "Use of Proceeds" on page 188."

2. The details of credit ratings as disclosed in the section entitled "*Overview of the Trust – Details of credit ratings*" on page 25 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html shall be replaced as follows:

"***Details of credit ratings***

The Trust has been given a rating of

(i) Provisional Care AAA/Stable by Care Ratings Limited on August 25, 2022, as revalidated on September 23, 2022, for proposed long-term non-convertible debenture issue aggregating up to ₹ 1,500 crore, the rationale for which is available at its website www.careedge.in;

(ii) (a) Provisional IND AAA/Stable for proposed public issue of non-convertible debentures aggregating up to ₹ 1,500 crore, (b) IND AAA/Stable as long-term issue rating; (c) Provisional IND AAA/Stable for proposed rupee term loan of ₹ 8,500 crore; and (d) IND AAA/Stable for proposed rupee term loan of ₹ 20,000 crore, by India Ratings and Research on September 20, 2022 the rationale for which is available at its website, www.indiaratings.co.in."

3. The paragraphs provided below shall be included as a new paragraph in the section entitled "Overview of the Trust" on page 24 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html.

"***Description of the Toll Roads***

The details of the Toll Roads, held by the Trust as on the date of this Preliminary Placement Document, are as follows:

S. No.	***Toll Roads***	***Length of the Toll Road***	***Connecting States***
Initial Toll Roads			
1.	*Abu road - Swaroopganj*	*31.000*	*Rajasthan to Gujarat*
2.	*Chittorgarh – Kota & Chittorgarh Bypass*	*160.500*	*Madhya Pradesh -Rajasthan*
3.	*Kothakota Bypass – Kurnool Highway*	*74.622*	*Telangana – Andhra Pradesh*

4.	*Palanpur/Khemana – Abu Road*	*45.000*	*Gujarat - Rajasthan*
5.	*Maharashtra Border – Belgaum*	*77.705*	*Maharashtra -Karnataka*
Target Toll Roads			
1.	*Agra Bypass*	*32.800*	*Uttar Pradesh-Madhya Pradesh*
2.	*Borkhedi Kelapur Project Highway*	*138.150*	*Maharashtra – Telanagna*
3.	*Shivpuri Jhansi Project Highway*	*75.300*	*Madhya Pradesh – Uttar Pradesh*

Insurance in relation to the Toll Roads

The Trustee confirms that the Project SPV and the Initial Toll Roads have adequate insurance as of the date of this Preliminary Placement Document.".

FORMATION TRANSACTIONS IN RELATION TO THE TRUST

Except as stated herein below, for an overview of the formation transactions in relation to the Trust in relation to the Initial Toll Roads, please see the section entitled "*Formation Transactions in Relation to the Trust*" on page 26 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html.

1. The details of borrowings of the Trust as disclosed in the section entitled "*Formation Transactions in Relation to the Trust – Borrowings of the Trust*" on page 26 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html shall be replaced as follows:

   "***Borrowings of the Trust***

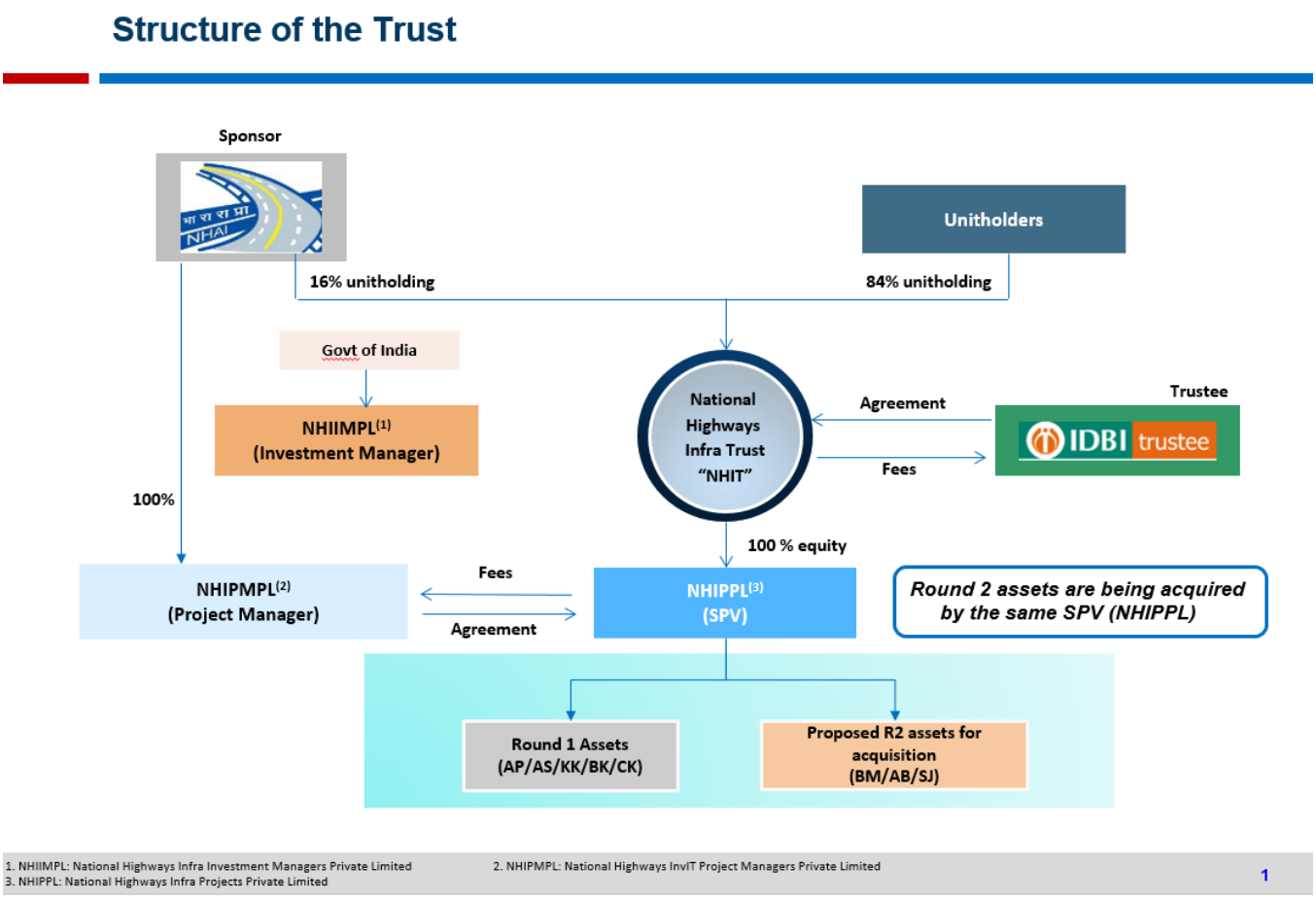
   *The Trust has entered into a loan agreement dated September 29, 2021, with certain lenders for availing loans amounting to approximately ₹ 20,000.00 million ("**Trust Loans**"). As on the date of this Preliminary Placement Memorandum, the Trust has drawn down Facility A amount equivalent to ₹ 14,800.00 million. For details in relation to the terms of the Trust Loans please see the section entitled "Financial Indebtedness and Deferred Payments" on page 190.*"

2. The details of proposed post-listing structure of the Trust as disclosed in the section entitled "*Formation Transactions in Relation to the Trust – Proposed post-listing structure*" on page 27 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html shall be replaced as follows:

   "***Proposed post-listing structure***

   For details of the pre-Offer and post-Offer unitholding structure of the Trust, please see the section entitled "Information concerning the Units" on page 185.

   The following structure illustrates the relationship between the Trust, the Trustee, the Sponsor, the Investment Manager, the Project Manager and the Unitholders that is proposed at the Listing Date:



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SUMMARY FINANCIAL INFORMATION OF THE TRUST

(*The remainder of this page has intentionally been kept blank*)

NATIONAL HIGHWAYS INFRA TRUST

Unaudited Standalone Interim Balance sheet as at 30 June 2022

1. Balance Sheet as at 30 June 2022 and 31 March 2022:

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	AS AT 30th June, 2022	AS AT 31st March, 2022
	(Unaudited)	*(Audited)*
ASSETS		
1) Non - Current Assets		
(a) Financial Assets		
(i) Investments	1,39,553.52	1,39,553.52
(ii) Loans	5,73,843.90	5,78,386.20
(iii) Other Financial Assets	2,875.97	3,170.81
2) Current Assets		
(a) Financial Assets		
(i) Investments	-	992.16
(ii) Cash and Cash Equivalents	11,328.12	4,801.17
(iii) Loans	31,796.10	27,253.80
(iv) Other Financial Assets	16,610.37	10,656.50
(b) Other Current Assets	25.68	12.46
TOTAL ASSETS	**7,76,033.66**	**7,64,826.63**
EQUITY AND LIABILITIES		
EQUITY		
1) Unit Capital	6,01,152.00	6,01,152.00
2) Initial Settlement Amount	0.10	0.10
3) Other Equity	28,282.50	16,415.14
LIABILITIES		
1) Non-Current Liabilities		
(a) Financial Liabilities		
(i) Borrowings	1,45,035.17	1,45,556.94
(b) Deferred Tax liabilites	-	3.16
2) Current Liabilities		
(a) Financial Liabilities		
(i) Borrowings	1,250.00	980.86
(ii) Trade Payables		
(a) Total Outstanding, dues of micro and small enterprises	-	-
(b) Total outstanding, dues of creditors other than micro and small enterprises	1.07	313.29
(iii) Other Financial Liabilities	27.42	143.56
(b) Other Current Liabilities	266.66	99.80
(c) Current Tax Liabilities (Net)	18.74	161.77
TOTAL EQUITY & LIABILITIES	**7,76,033.66**	**7,64,826.63**

NATIONAL HIGHWAYS INFRA TRUST

Unaudited Standalone Interim Statement of Profit and Loss for the quarter ended 30 June 2022

2. Statement of Profit and Loss

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	Quarter ended		Year ended
	30th June 2022	**30th June 2021**	**31st March 2022**
	(Unaudited)	*(Audited)*	*(Audited)*
INCOME			
Revenue from Operations	19,513.63	-	22,843.13
Other Income	85.68	-	993.74
Total Income	**19,599.31**	**-**	**23,836.87**
EXPENSES			
Investment Manger Fees	301.67	-	1,931.71
Trustee Fees	2.39	-	3.73
Finance Charges	2,647.76	-	3,154.43
Other Expenses	23.17	-	115.25
Total Expenses	**2,974.99**	**-**	**5,205.13**
Profit/(Loss) before Exceptional Items and Tax	16,624.32	-	18,631.74
Exceptional Items (net)			-
Profit / (Loss) before Tax	**16,624.32**	**-**	**18,631.74**
Tax Expenses			
Current Tax	39.78	-	436.36
Deferred Tax expense/(credit)	(3.16)	-	3.16
Total Tax	**36.62**	**-**	**439.52**
Profit/ (loss) for the period	**16,587.69**	**-**	**18,192.23**
Other Comprehensive Income			
Items that will not be reclassified to Profit and Loss	-	-	-
Items that will be reclassified to Profit and Loss	-	-	-
	-	-	-
Total Comprehensive Income for the period	**16,587.69**	**-**	**18,192.23**

NATIONAL HIGHWAYS INFRA TRUST

Disclosures pursuant to SEBI circulars (SEBI Master Circular No. CIRSEBI/HO/DDHS_Div3/P/CIR/2021/1673 dated

3. Statement of Net Distributable Cash Flows (All amounts in ₹ lakh unless otherwise stated)

S. No.	PARTICULARS	30 JUNE, 2022	31 MARCH, 2022
1	**Profit after tax as per Statement of profit and loss/income and expenditure (standalone) (A)**	**16,587.69**	**18,192.23**
2	**Add:** Depreciation and amortization as per statement of profit and loss account. Incase of Impairment reversal, same needs to be deducted from profit and loss.	-	-
3	**Add/Less:** Loss/gain on sale of infrastructure assets	-	-
4	**Add:** Proceeds from sale of infrastructure assets adjusted for the following: 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)(a) of the InvIT regulations	-	-
5	**Add:** Proceeds from sale of infrastructure assets not distributed pursuant to an earlier plan to re-invest, if such proceeds are not intended to be invested subsequently, net of any profit/ (loss) recognised in profit and loss account	-	-
6	**Add/ Less:** Any other item of non- cash expense/ non cash income (net of actual cash flows for these items), if deemed necessary by the Investment Manager. For example, any decrease/ increase in carrying amount of an asset or a liability recognised in profit and loss /income and expenditure on measurement of the asset or the liability at fair value; Interest cost as per effective interest rate method, deferred tax lease rents recognised on a straight line basis, etc.	(5,006.24)	(8,233.88)
7	**Less:** Repayment of external debt (principal) / redeemable preference shares /debentures, etc. (excluding refinancing) / net cash set aside to comply with DSRA requirements under loan agreements and other reserves.	(1,131.35)	(5,204.50)
8	**Total Adjustment (B)**	(6,137.58)	(13,438.39)
9	**Net Distributable Cash Flows (C) = (A+B)**	**10,450.11**	**4,753.84**

NATIONAL HIGHWAYS INFRA TRUST

Unaudited Consolidated Interim Balance sheet as at 30 June 2022

1. Balance Sheet as at 30 June 2022 and 31 March 2022:

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	AS AT 30th June, 2022	AS AT 31st March, 2022
	(Unaudited)	*(Audited)*
ASSETS		
1) Non - Current Assets:		
(a) Property, Plant and Equipment	1.21	0.46
(b) Goodwill	10,144.46	10,144.46
(c) Intangible assets	7,30,543.98	7,33,984.39
(d) Financial Assets		
(i) Other Financial Assets	2,875.97	3,170.81
(e) Deferred Tax Assets	820.91	262.53
2) Current Assets		
(a) Financial Assets		
(i) Investments	-	992.16
(ii) Trade receivables	79.47	600.47
(iii) Cash and Cash Equivalents	12,456.39	5,389.78
(iv) Other financial assets	268.53	5.38
(b) Other current assets	239.11	347.29
TOTAL ASSETS	**7,57,430.03**	**7,54,897.72**
EQUITY AND LIABILITIES		
EQUITY		
1) Initial settlement amount	0.10	0.10
2) Unit Capital	6,01,152.00	6,01,152.00
3) Other Equity	6,619.25	5,059.25
LIABILITIES		
1) Non-Current liabilities:		
(a) Financial liabilities		
(i) Borrowings	1,45,035.17	1,45,556.94
(b) Provisions	1,234.44	403.37
2) Current Liabilities		
(a) Financial liabilities		
(i) Borrowings	1,250.00	980.86
(ii) Trade Payables		
(a) Total Outstanding, dues of micro and small enterprises		-
(b) Total outstanding, dues of creditors other than	1,479.72	1,101.23
(iii) Other financial liabilities	318.87	241.41
(b) Other current liabilities	321.71	240.75
(c) Provisions	0.03	0.03
(d) Current Tax Liabilities (Net)	18.74	161.77
TOTAL EQUITY & LIABILITIES	**7,57,430.03**	**7,54,897.72**

NATIONAL HIGHWAYS INFRA TRUST

Unaudited Consolidated Interim Statement of Profit and Loss for the quarter ended 30 June 2022

2. Statement of Profit and Loss

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	Quarter ended 30th June 2022	Year ended 31st March 2022
	(Unaudited)	*(Audited)*
INCOME		
Revenue from Operations	13,737.41	13,960.55
Other Income	111.72	1,014.53
Total Income	**13,849.13**	**14,975.08**
EXPENSES		
Investment Manger Fees	301.67	1,931.71
Trustee Fees	2.39	3.73
Operating Expenses	1,213.57	849.77
Project Management Fees	247.80	290.43
Employee Benefits Expenses	11.70	2.12
Finance Charges	2,653.10	3,154.43
Depreciation & Amortization Expense	3,440.45	1,055.65
Other Expenses	216.71	676.86
Total Expenses	**8,087.39**	**7,964.71**
Profit/(Loss) before Exceptional Items and Tax	5,761.74	7,010.37
Exceptional Items (net)		-
Profit / (Loss) before Tax	**5,761.74**	**7,010.37**
Tax Expenses		
Current Tax	39.78	436.36
Deferred Tax expense/(credit)	(558.38)	(262.32)
Total Tax	**(518.60)**	**174.04**
Profit/ (loss) for the period	**6,280.34**	**6,836.33**
Other Comprehensive Income		
Items that will not be reclassified to Profit and Loss	-	-
Items that will be reclassified to Profit and Loss	-	-
	-	-
Total Comprehensive Income for the period	**6,280.34**	**6,836.33**
Earnings per Unit		
Basic	1.06	1.15
Diluted	1.06	**1.15**

NATIONAL HIGHWAYS INFRA TRUST

UNAUDITED CONSOLIDATED CASH FLOW STATEMENT FOR THE PERIOD ENDED 30TH JUNE, 2022

(All amounts in ₹ lakh)

	PARTICULARS	AS AT 30th June, 2022	AS AT 31st March, 2022
A.	**OPERATING ACTIVITIES**		
	Net Profit/(Loss) Before Tax	5,761.74	7,010.37
	Adjustments to reconcile profit before tax to net cash flows:		
	Depreciation and Amortization	3,440.45	1,055.65
	Loss/ (Gain) on sale of Investments (net)	(30.92)	(682.62)
	Loss / (Gain) on Fair Valuation of Investments	-	(7.38)
	Interest Accrued on Bank FD	(45.39)	(5.86)
	Finance Cost (net)	2,643.34	3,154.43
	Operating Profit/(Loss) before Working Capital Changes	**11,769.22**	**10,524.59**
	Working Capital Adjustments:		
	Decrease / (Increase) in Trade & Other Receivables	521.00	(600.47)
	Decrease / (Increase) in Other Non Current Financial Assets	-	(3,170.81)
	Decrease / (Increase) in Other Current Financial Assets	(217.76)	0.59
	Decrease / (Increase) in Other Current Assets	108.18	(347.29)
	Increase / (Decrease) in Trade & Other Payables	378.49	651.07
	Increase / (Decrease) in Other Financial Liabilities	77.47	(7,34,867.55)
	Increase / (Decrease) in Provisions	831.07	403.40
	Increase / (Decrease) in Other Current Liabilities	80.96	238.59
	Increase / (Decrease) in Current Tax Liabilities	(143.04)	(0.59)
		1,636.36	**(7,37,693.06)**
	Income Tax paid	(39.78)	(274.00)
	Net Cash Flows from/(used in) Operating Activities	**13,365.81**	**(7,27,442.47)**
B.	**INVESTING ACTIVITIES**		
	Purchase of Property, Plant & Equipment, including CWIP, capital	(0.80)	(0.50)
	Purchase of Non Current Investments	(1,755.00)	(1.52)
	Sale of non current Investments	2,049.84	-
	Purchase of Current Investments	-	(5,96,271.00)
	Sale of Current Investments	1,023.08	5,95,968.84
	Net cash flows from (used in) Investing activities	**1,317.12**	**(304.19)**
C.	**FINANCING ACTIVITIES**		
	Proceeds from Issue of Unit Capital	-	5,91,000.00
	One Time Expense paid	(18.26)	(1,364.94)
	Distribution to Unit Holders	(4,702.08)	-
	Proceeds from Long Term Borrowings (net of processing fees)	-	1,47,646.00
	Repayment of Long Term Borrowings	(253.52)	(1,001.59)
	Finance Costs Paid	(2,642.46)	(3,143.04)
	Net cash flows from (used in) Financing activities	**(7,616.32)**	**7,33,136.43**
	Net Increase/Decrease in Cash and Cash equivalents (A+B+C)	7,066.61	5,389.78
	Cash and cash equivalents at the beginning of the year	5,389.78	-
	Cash and cash equivalents at the end of the year	**12,456.39**	**5,389.78**

NATIONAL HIGHWAYS INFRA TRUST

Disclosures pursuant to SEBI circulars (SEBI Master Circular No. CIRSEBI/HO/DDHS_Div3/P/CIR/2021/1673 dated 29 November 2021 issued under the InvIT

3. Statement of Net Distributable Cash Flows (All amounts in ₹ lakh unless otherwise stated)

S. No.	PARTICULARS	30TH JUNE, 2022	31ST MARCH, 2022
1	**Profit after tax as per Statement of profit and loss/income and expenditure (standalone) (A)**	**16,587.69**	**18,192.23**
2	**Add:** Depreciation and amortization as per statement of profit and loss account. Incase of Impairment reversal, same needs to be deducted from profit and loss.	-	-
3	**Add/Less:** Loss/gain on sale of infrastructure assets	-	-
4	**Add:** Proceeds from sale of infrastructure assets adjusted for the following: 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)(a) of the InvIT regulations	-	-
5	**Add:** Proceeds from sale of infrastructure assets not distributed pursuant to an earlier plan to re-invest, if such proceeds are not intended to be invested subsequently, net of any profit/ (loss) recognised in profit and loss account	-	-
6	**Add/ Less:** Any other item of non- cash expense/ non cash income (net of actual cash flows for these items), if deemed necessary by the Investment Manager. For example, any decrease/ increase in carrying amount of an asset or a liability recognised in profit and loss /income and expenditure on measurement of the asset or the liability at fair value; Interest cost as per effective interest rate method, deferred tax lease rents recognised on a straight line basis, etc.	(5,006.24)	(8,233.88)
7	**Less:** Repayment of external debt (principal) / redeemable preference shares /debentures, etc. (excluding refinancing) / net cash set aside to comply with DSRA requirements under loan agreements and other reserves.	(1,131.35)	(5,204.50)
8	**Total Adjustment (B)**	(6,137.58)	(13,438.39)
9	**Net Distributable Cash Flows (C) = (A+B)**	**10,450.11**	**4,753.84**

NATIONAL HIGHWAYS INFRA TRUST

CONSOLIDATED BALANCE SHEET AS AT 31st MARCH, 2022

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	NOTE NO.	AS AT 31st March, 2022	AS AT 31st March, 2021
ASSETS			
1) Non - Current Assets			
(a) Property, Plant and Equipment	3	0.46	-
(b) Goodwill	4	10,144.46	-
(c) Intangible assets	5	7,33,984.39	-
(d) Financial Assets			
(i) Other Financial Assets	6	3,170.81	-
(e) Deferred Tax Assets	7	262.53	-
2) Current Assets			
(a) Financial Assets			
(i) Investments	8	992.16	-
(ii) Trade receivables	9	600.47	-
(iii) Cash and Cash Equivalents	10	5,389.78	-
(iv) Other financial assets	11	5.38	0.10
(b) Other current assets	12	347.29	-
TOTAL ASSETS		**7,54,897.72**	**0.10**
EQUITY AND LIABILITIES			
EQUITY			
1) Unit Capital	13	6,01,152.00	-
2) Initial settlement amount		0.10	0.10
3) Other Equity	14	5,059.25	(67.90)
LIABILITIES			
1) Non-Current liabilities			
(a) Financial liabilities			
(i) Borrowings	15	1,45,556.94	-
(b) Provisions	16	403.37	-
2) Current Liabilities			
(a) Financial liabilities			
(i) Borrowings	17	980.86	-
(ii) Trade Payables	18		
(a) Total Outstanding, dues of micro and small enterprises		-	-
(b) Total outstanding, dues of creditors other than micro and small enterprises		1,101.23	-
(iii) Other financial liabilities	19	241.41	67.81
(b) Other current liabilities	20	240.75	0.09
(c) Provisions	21	0.03	-
(d) Current Tax Liabilities (Net)	22	161.77	
TOTAL EQUITY & LIABILITIES		**7,54,897.72**	**0.10**

Significant Accounting Policies 1 - 2

The accompanying notes form an integral part of these consolidated financial statements. 3 - 56

This is the Consolidated Balance Sheet referred to in our report of even date.

For A.R. & Co.
Chartered Accountants
Firm Registration no. 002744C

Sd/-
CA Naresh Kumar Karn
Partner
M.No.077887

Date : 23.05.2022
Place : New Delhi

For and on behalf of the National Highways Infra Investment Managers Private Limited (Investment Manager of National Highways Infra Trust)

Sd/-
Suresh Krishan Goyal
Director
DIN: 02721580

Sd/-
Mahavir Parsad Sharma
Director
DIN: 03158413

Sd/-
Mathew George
Chief Financial Officer

Sd/-
Gunjan Singh
Compliance Officer

NATIONAL HIGHWAYS INFRA TRUST

CONSOLIDATED STATEMENT OF PROFIT AND LOSS FOR THE YEAR ENDED 31ST MARCH, 2022

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	NOTE NO.	YEAR ENDED 31st March, 2022	YEAR ENDED 31st March, 2021
INCOME			
Revenue from Operations	23	13,960.55	-
Other Income	24	1,014.53	-
TOTAL INCOME		**14,975.08**	-
EXPENSES			
Investment Manger Fee		1,931.71	-
Trusteeship Fee		3.73	4.21
Operating Expenses	25	1,140.21	-
Employee Benefits Expenses	26	2.12	-
Finance Charges	27	3,154.43	-
Depreciation & Amortization Expense	28	1,055.65	-
Other Expenses	29	676.86	63.69
TOTAL EXPENSES		**7,964.71**	**67.90**
Profit/(Loss) before Exceptional Items and Tax		**7,010.37**	**(67.90)**
Exceptional Items (net)		-	
Profit / (Loss) before Tax		**7,010.37**	**(67.90)**
Tax Expenses	30		
Current Tax		436.36	-
MAT Credit Utilized / (Entitlement)		-	-
Provision for Tax for Earlier Years		-	-
Deferred Tax expense/(credit)		(262.32)	-
Total Tax		174.04	-
Profit/ (loss) for the period		**6,836.33**	**(67.90)**
Other Comprehensive Income			
Items that will not be reclassified to Profit and Loss		-	-
Items that will be reclassified to Profit and Loss		-	-
		-	-
Total Comprehensive Income for the period		**6,836.33**	**(67.90)**
Earnings per Unit			
Basic	31	1.15	-
Diluted	31	**1.15**	-

Significant Accounting Policies 1 - 2
The accompanying notes form an integral part of these financial statements. 3 - 56

This is the Statement of Profit and Loss referred to in our report of even date.

For A.R. & Co.
Chartered Accountants
Firm Registration no. 002744C

For and on behalf of the National Highways Infra Investment Managers Private Limited (Investment Manager of National Highways Infra Trust)

Sd/-
CA Naresh Kumar Karn
Partner
M.No.077887

Sd/-
Suresh Krishan Goyal
Director
DIN: 02721580

Sd/-
Mahavir Parsad Sharma
Director
DIN: 03158413

Date : 23.05.2022
Place : New Delhi

Sd/-
Mathew George
Chief Financial Officer

Sd/-
Gunjan Singh
Compliance Officer

NATIONAL HIGHWAYS INFRA TRUST

CONSOLIDATED CASH FLOW STATEMENT FOR THE YEAR ENDED 31ST MARCH, 2022

(All amounts in ₹ lakh unless otherwise stated)

	YEAR ENDED 31st March, 2022	YEAR ENDED 31st March, 2021
A. OPERATING ACTIVITIES		
Net Profit/(Loss) Before Tax	7,010.37	
Adjustments to reconcile profit before tax to net cash flows:		
Depreciation and Amortization	1,055.65	
Loss/ (Gain) on sale of Investments (net)	(682.62)	
Loss / (Gain) on Fair Valuation of Investments	(7.38)	
Interest Accrued on Bank FD	(5.86)	
Finance Cost (net)	3,154.43	
Operating Profit/(Loss) before Working Capital Changes	**10,524.59**	
Working Capital Adjustments:		
Decrease / (Increase) in Trade & Other Receivables	(600.47)	
Decrease / (Increase) in Other Non Current Financial Assets	(3,170.81)	
Decrease / (Increase) in Other Current Financial Assets	0.59	
Decrease / (Increase) in Other Current Assets	(347.29)	
Increase / (Decrease) in Trade & Other Payables	651.07	
Increase / (Decrease) in Other Financial Liabilities	(7,34,867.55)	
Increase / (Decrease) in Provisions	403.40	
Increase / (Decrease) in Other Current Liabilities	238.59	
Increase / (Decrease) in Current Tax Liabilities	(0.59)	
	(7,37,693.06)	
Income Tax paid	(274.00)	
Net Cash Flows from/(used in) Operating Activities	**(7,27,442.47)**	
B. INVESTING ACTIVITIES		
Purchase of Property, Plant & Equipment, including CWIP, capital	(0.50)	
Purchase of Non Current Investments	(1.52)	
Purchase of Current Investments	(5,96,271.00)	
Sale of Current Investments	5,95,968.84	
Net cash flows from (used in) Investing activities	**(304.19)**	
C. FINANCING ACTIVITIES		
Proceeds from Issue of Unit Capital	5,91,000.00	
One Time Expense paid	(1,364.94)	
Proceeds from Long Term Borrowings (net of processing fees)	1,47,646.00	
Repayment of Long Term Borrowings	(1,001.59)	
Finance Costs Paid	(3,143.04)	
Net cash flows from (used in) Financing activities	**7,33,136.43**	
Net Increase/Decrease in Cash and Cash equivalents (A+B+C)	5,389.78	
Cash and cash equivalents at the beginning of the year	-	
Cash and cash equivalents at the end of the year	**5,389.78**	

This is the Cash Flow Statement referred to in our report of even date.

For A.R. & Co.
Chartered Accountants
Firm Registration no. 002744C

For and on behalf of the National Highways Infra Investment Managers Private Limited (Investment Manager of National Highways Infra Trust)

Sd/-
CA Naresh Kumar Karn
Partner
M.No.077887

Date : 23.05.2022

Sd/-
Suresh Krishan Goyal
Director
DIN: 02721580

Sd/-
Mahavir Parsad Sharma
Director
DIN: 03158413

Sd/-
Mathew George
Chief Financial Officer

Sd/-
Gunjan Singh
Compliance Officer

SUMMARY FINANCIAL INFORMATION OF THE SPONSOR

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NATIONAL HIGHWAYS AUTHORITY OF INDIA

G-5 & 6, Sector-10, Dwarka, New Delhi-110075

Unaudited Financial Results for half year ended 31st March 2021

(as per annexure 1 of SEBI circular CIR/IMD/DF1/69/2016 dated Aug. 10, 2016)

Rs. in Lakhs

S. No.	Particulars	Half year ended		Year ended
		31st March, 2021	31st March, 2020	31st March, 2020
		Unaudited	Unaudited	Unaudited
1.	Total income from Operations	NA	NA	NA
2.	Net Profit/(Loss) for the period (before prior period, Tax, Exceptional and or Extraordinary Items)	(6,79,110.48)	(26,645.41)	(7,04,569.15)
3.	Net Profit/(Loss) for the period before Tax (after Exceptional and or Extraordinary Items)	(2,37,164.47)	(28,733.60)	(49,23,127.11)
4.	Net Profit/(Loss) for the period after tax (after Exceptional and or Extraordinary Items)	(2,37,164.47)	(28,733.60)	(49,23,127.11)
5.	Total Comprehensive Income for the period (comprising Profit/Loss for the period (after tax) and Other Comprehensive Income (after tax)*	(2,37,164.47)	(28,733.60)	(49,23,127.11)
6.	Paid up Equity Share Capital	2,60,39,420.92	2,18,23,450.89	2,18,23,450.89
7.	Reserves excluding Revaluation Reserve / (Debit Balance of Profit & Loss A/C)	(53,26,791.85)	(50,72,128.00)	(50,72,128.00)
8.	Net worth (6-7)	2,07,12,629.07	1,67,51,322.89	1,67,51,322.89
9.	Paid up Debt Capital/Outstanding Debt	3,07,16,261.17	2,48,83,166.07	2,48,83,166.07
10.	Outstanding Redeemable Preference Shares	-	-	-
11.	Debt Equity Ratio **	1.48	1.14	1.14
12.	Earnings per share (of Rs. ..... /- each) (for continuing and discontinued operations)- 1. Basic 2. Diluted	NA	NA	NA
13.	Capital Redemption Reserve	-	-	-
14.	Debenture Redemption Reserve	-	-	-
15.	Debt Service Coverage Ratio	NA	NA	NA
16.	Interest Service Coverage Ratio	NA	NA	NA

*Expenses are capitalized as per accounting policy of the Authority.

Debt Equity Ratio= Debt Outstanding / Shareholders' Fund*

1

S.K.MEHTA & CO. CHARTERED ACCOUNTANTS FRN.000178N

***Shareholder's Fund = Capital Base, Cess Fund, Additional Budgetary Support, Net of Plough Back of Toll Remittance after deducting maintenance expenses of Toll Plazas and Reserve & Surplus/ Debit Balance of Profit & Loss A/C.

a) NHAI is constituted by an Act of Parliament for development, maintenance & management of National Highways. NHAI is an "Executing Agency" of Government of India and therefore does not have its own income or expenses.
b) Entire capital of the Authority is provided by Government of India and the capital is not divided into shares. Highway projects are shown as Assets held on behalf of Government of India (Completed and Ongoing).
c) Audit of the accounts of the Authority is carried out by the C&AG on annual basis. Annual financials 2019-20 are under audit.
d) On the basis of observation of C&AG, completed National Highways (NH) have been capitalized and depreciated in 2019-20 and onwards, as per the policy approved in 2019-20.
e) The figures for the previous period have been regrouped/ rearranged wherever necessary to make them comparative.
f) NHAI does not have its own source of income; however, during the 2nd half year 2020-21, NHAI has generated an income of Rs.21.21 crores, mainly through sale of tender documents.
g) Depreciation for 2020-21 on the national highways completed till 31.03.2020 have been charged on actual basis. Depreciation on highways completed during 2020-21, due to non-availability of cost allocation data immediately, have been calculated and charged on the basis of moving average of actual depreciation of past twenty-one year subject to final depreciation in the annual financials for 2020-21.
h) Depreciation on Fixed Assets (except in case of disposal of asset) and provisions are year-end exercise, therefore, has been charged for the full year in the half year ended on 31st March 2021.
i) Prior period adjustment in depreciation has been adjusted through exceptional items.
j) Figures for the half year ended 31st March, 2021 have been subjected to "Limited Review" by a Chartered Accountant Firm and approved by Board of Authority through circulation on 11.05.2021.
k) As on 31st March, 2021, no investor complaint is pending. The credit rating of NHAI assigned at the time of issue has not been downgraded. NHAI has not defaulted in payment of interest for non-convertible debt securities and loans etc. Also, the properties charged are adequate in discharging the due repayment to bond holders i.e. interest and redemption amount.
l) During the half year ended 31st March, 2021 NHAI has collected Rs.6,415.48 crore as toll revenue and deposited Rs.6404.67 crore to CFI.
m) As on 31st March 2020, there is a contingent liability of Rs.71,764.54 crore and USD 3,39,185.03 in Arbitration and Rs. 5,991.97 crore in Court Cases. NHAI on the other hand has claimed 42,945.90 crore in Arbitration and 13,561.51 crore in Court Cases. Figures for 31st March, 2021 is under compilation.

For and on behalf of the Board of the Authority

Member (Finance) **Chairman**

Date: 11.05.2021
Place: New Delhi

S.K. Mehta & Co.
Chartered Accountants
Firm's Registration Number 00478N

S.K. MEHTA & CO. FRN.000478N CHARTERED ACCOUNTANTS

(CA Jyoti Bagga)
Partner
Membership No. 087002

NATIONAL HIGHWAYS AUTHORITY OF INDIA

G-5 & 6, Sector-10, Dwarka
NEW DELHI - 110 075

BALANCE SHEET AS AT 31st MARCH, 2021

	PARTICULARS	SCHEDULE	CURRENT YEAR Rs. In Lakhs	PREVIOUS YEAR Rs. In Lakhs
	(1)	(2)	(3)	(4)
I.	**SOURCES OF FUNDS**			
1	**Shareholders' Fund**			
	a) Capital	1	26111353.19	2,19,02,669.11
	b) Reserves & Surplus	2	-	-
2	**Grants**			
	a) Capital	3	14,08,210.33	13,98,210.33
3	**Borrowings**	4	3,07,16,261.17	2,48,83,166.07
	TOTAL		**5,82,35,824.69**	**4,81,84,045.52**
II.	**APPLICATION OF FUNDS**			
1	**Fixed Assets**	5		
	a) Gross Block		24,706.29	22,927.29
	b) Less: Assets created out of Grant		758.11	758.11
	c) Assets out of Own Fund		23,948.18	22,169.18
	d) Less: Depreciation		12,772.42	11,449.98
	e) Net Block		11,175.76	10,719.20
	Assets held on behalf of GoI			
	a) Completed		2,55,32,301.73	2,20,85,894.44
	b) Ongoing		3,15,38,628.77	2,42,03,759.62
	Total (a+b)		5,70,70,930.50	4,62,89,654.06
	Total		**5,70,82,106.26**	**4,63,00,373.26**
2	**Investment**	6	2,04,597.34	95,177.34
3	**Current Assets, Loans and Advance**	7		
	a) Inventories		-	-
	b) Deposits, Loans & Advances		46,53,984.84	45,81,634.85
	c) Interest accrued but not due on deposits		2,845.16	2,836.50
	d) Interest accrued and due on CALA deposits		6,039.20	5,888.13
	e) Cash & Bank Balance		5,23,473.33	6,34,527.58
	f) Inter Unit Account		(0.00)	-
	sub total		**51,86,342.53**	**52,24,887.07**
	Less: Current Liabilities and Provisions			
	a) Liabilities	8	42,28,508.19	34,28,401.31
	b) Reserves & Provisions	9	8,713.26	7,990.84
	sub total		**42,37,221.44**	**34,36,392.15**
	Net Current Assets		**9,49,121.09**	**17,88,494.91**
4	**Misc. Expenditure** (to the extent not written off)	10		
5	**Profit & Loss Account** (Debit balance if any)			
	TOTAL		**5,82,35,824.69**	**4,81,84,045.52**

Significant Accounting Policy (Schedule 18) and Notes on Accounts (Schedule 19) are integral part of this Financial Statements.

For and on behalf of the Board of the Authority

Place : New Delhi.
Date : 30.07.2021

Member (Finance) **Chairman**

NATIONAL HIGHWAYS AUTHORITY OF INDIA

G- 5& 6, Sector -10, Dwarka
NEW DELHI - 110 075

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDED 31st MARCH, 2021

	PARTICULARS	SCHEDULE	CURRENT YEAR Rs. In Lakhs	PREVIOUS YEAR Rs. In Lakhs
	(1)	(2)	(3)	(4)
I.	**INCOME**			
	a) Value of Work done			
	b) Other income	11	2,781.30	1,261.30
	c) Interest (Gross)	12	0.03	0.15
	d) Net Increase/Decrease in Work-in-progress (+)/(-)	13		
	TOTAL INCOME		2,781.33	1,261.45
II.	**EXPENDITURE**			
	a) Construction Stores/Material consumed			
	Other stores,spares & tools etc.consumed			
	Work Expenses	14	-	-
	Personnel & Administrative Expenses	15	48,022.67	44,246.68
	Finance Charges	16	5.10	6.51
	Depreciation		1,453.44	1,286.21
	Assets of Small Value Charged Off		26.44	25.08
	Exceptional Item			
	Provision for diminution in the value of investment		-	-
	Less: Provision transferred to Capital (Sch-1)		-	-
	TOTAL EXPENDITURE		49,507.65	45,564.48
	Profit / (Loss) for the period		(46,726.31)	(44,303.04)
	Add: Prior Period Items net(+/-) (details to be given)	17	(3,063.89)	(4,582.72)
	Transfer of Net Establishment Expenses for the year to Sch-5		49,790.21	48,885.76
	Less/Add: Provision for Taxation		-	-
	Net Profit			
	Less: Transfer to Capital Reserve			
	Less: Transfer to other specific Reserve/ fund			
	Less/Add: Transfer to/Transfer from General Reserve (+/-)			
	Less/Add: Surplus brought forward from previous year			
	Surplus carried to Balance Sheet			

For and on behalf of the Board of the Authority

Place : New Delhi
Date : 30.07.2021

Member (Finance) **Chairman**

NATIONAL HIGHWAYS AUTHORITY OF INDIA
G 5& 6, Sector 10, Dwarka
New Delhi- 110075

CASH FLOW STATEMENT FOR THE YEAR ENDED 31st MARCH, 2021

	CURRENT YEAR Rs. In Lakhs	PREVIOUS YEAR Rs. In Lakhs
A. Cash flow from operating activities:		
Net profit before tax	(46,726.31)	(44,303.04)
Adjustments for:		
Depreciation	1,453.44	1,286.21
Profit/Loss on sale of assets	(4.89)	(5.39)
Interest income	(0.03)	(0.15)
Operating profit before working capital changes	**(45,277.79)**	**(43,022.36)**
Adjustments for:		
(Increase)/Decrease in Deposits, Loans & Advances	(72,349.99)	17,34,343.09
Increase/(Decrease) in liabilities	8,00,106.87	(21,64,388.36)
(Increase)/Decrease in Provision for Gratuity and Leave Encashment	722.42	889.45
Cash flow before extraordinary item & prior period items	**6,83,201.50**	**(4,72,171.39)**
Prior period items	(3,063.89)	(4,582.72)
Net cash generated from operating activities	**6,80,137.61**	**(4,76,754.11)**
B. Cash flow from investing activities:		
Purchase of fixed assets	-1,914.00	(5,177.24)
Realisation from sale of assets	8.88	9.95
(Increase)/Decrease in Capital Work in progress	(90,84,224.57)	(78,32,613.01)
(Increase)/Decrease in investment	(1,09,420.00)	(1,560.00)
Interest Income	1,97,477.83	2,27,263.74
Capital Reserve (Receipts)	1,57,630.52	26,765.46
Net cash used in investing activities	**(88,40,441.34)**	**(75,85,311.11)**
C. Cash flow from financing activities:		
Capital Base	3,260.00	-
Cess funds received from Govt of India	23,85,000.00	11,09,100.00
Capital additional budgetary receipts	2,80,000.00	1,00,000.00
EAP Grant Received & utilised towards Revenue Expenditure	10,000.00	15,700.00
Adjusted Plough back of Toll Remittance,etc	15,40,424.08	14,08,167.82
Net decrease in loan from ADB due to Exchange Loss after Adjustment of Repayments	(9,154.20)	(2,027.66)
Proceeds from issue of 54EC Capital Gains Tax-Free Bonds	3,42,730.60	4,45,081.30
Proceeds from issue of Taxable bonds	45,80,260.00	49,53,600.00
Proceeds from NSSF Loan & SBI Term Loan	15,85,000.00	21,00,000.00
Redemption of 54EC Capital Gains Tax- Free Bonds	(6,65,741.30)	(5,57,274.20)
Interest and other expenditure on Bond	(20,02,529.70)	(15,31,479.51)
Net cash generated from financing activities	**80,49,249.47**	**80,40,867.75**
Net increase/(decrease) in cash and cash equivalents (A+B+C)	**(1,11,054.26)**	**(21,197.47)**
Opening cash and cash equivalents	6,34,527.58	6,55,725.06
Closing cash and cash equivalents	**5,23,473.33**	**6,34,527.58**
Notes:		
Cash and cash equivalents include:		
Cash and cheques in hand / in transit	1.30	1.35
Balance with banks-Current Account	1,41,972.38	78,188.52
Balance with banks-Savings Bank Account	3,45,754.56	5,28,641.74
Balance with banks-Fixed Deposit Account	35,745.09	27,695.98
Balance as per books of account	**5,23,473.33**	**6,34,527.58**

For and on behalf of the Board of the Authority

Place: New Delhi
Date: 30.07.2021

30.7.21
Member (Finance)

Chairman

NATIONAL HIGHWAYS AUTHORITY OF INDIA

G-5 & 6, Sector-10, Dwarka
NEW DELHI - 110 075

BALANCE SHEET AS AT 31st MARCH, 2020

	PARTICULARS	SCHEDULE	CURRENT YEAR Rs. In Lakh	PREVIOUS YEAR Rs. In Lakh
	(1)	(2)	(3)	(4)
I.	**SOURCES OF FUNDS**			
1	**Shareholders' Fund**			
	a) Capital	**1**	21,902,669.11	19,285,401.29
	b) Reserves & Surplus	**2**	-	-
2	**Grants**			
	a) Capital	**3**	1,398,210.33	1,382,510.33
3	**Borrowings**	**4**	24,883,166.07	17,943,786.63
	TOTAL		**48,184,045.52**	**38,611,698.26**
II.	**APPLICATION OF FUNDS**			
1	**Fixed Assets**	**5**		
	a) Gross Block		22,927.29	17,652.59
	b) Less: Assets created out of Grant		758.11	758.11
	c) Assets out of Own Fund		22,169.18	16,894.48
	d) Less: Depreciation		11,449.98	10,061.76
	e) Net Block		10,719.20	6,832.73
	Assets held on behalf of GoI			
	a) Completed		22,085,894.44	
	b) Ongoing		24,203,759.62	
	Total (a+b)		46,289,654.06	37,131,458.01
	Total		**46,300,373.26**	**37,138,290.73**
2	**Investment**	**6**	**95,177.34**	**93,617.34**
3	**Current Assets, Loans and Advance**	**7**		
	a) Inventories		-	-
	b) Deposits, Loans & Advances		4,581,634.85	6,315,984.74
	c) Interest accrued but not due on deposits		2,836.50	2,421.71
	d) Interest accrued and due on CALA deposits		5,888.13	5,549.75
	e) Cash & Bank Balance		634,527.58	655,725.06
	f) Inter Unit Account		-	0.00
	sub total		**5,224,887.07**	**6,979,681.25**
	Less: Current Liabilities and Provisions			
	a) Liabilities	**8**	3,428,401.31	5,592,789.67
	b) Reserves & Provisions	**9**	7,990.84	7,101.39
	sub total		**3,436,392.15**	**5,599,891.07**
	Net Current Assets		**1,788,494.91**	**1,379,790.18**
4	Misc. Expenditure (to the extent not written off)	**10**		
5	**Profit & Loss Account** (Debit balance if any)			
	TOTAL		**48,184,045.52**	**38,611,698.26**

Significant Accounting Policy (Schedule 18) and Notes on Accounts (Schedule 19) are integral part of this Financial Statement.

For and on behalf of the Board of the Authority

Place : New Delhi
Date : 24.06.2021

Sd/-
Member (Finance)

Sd/-
Chairman

NATIONAL HIGHWAYS AUTHORITY OF INDIA

G-5 & 6, Sector -10, Dwarka
NEW DELHI - 110 075

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDED 31st MARCH, 2020

	PARTICULARS	SCHEDULE	CURRENT YEAR Rs. In Lakh	PREVIOUS YEAR Rs. In Lakh
	(1)	(2)	(3)	(4)
I.	**INCOME**			
	a) Value of Work done			
	b) Other income	**11**	1,261.30	1,143.66
	c) Interest (Gross)	**12**	0.15	0.30
	d) Net Increase/Decrease in Work-in-progress (+)/(-)	**13**		
	TOTAL INCOME		**1,261.45**	**1,143.96**
II.	**EXPENDITURE**			
	a) Construction Stores/Material consumed Other stores,spares & tools etc. consumed			
	Work Expenses	**14**	-	-
	Personnel & Administrative Expenses	**15**	44,246.68	45,460.82
	Finance Charges	**16**	6.51	9.85
	Depreciation		1,286.21	1,382.99
	Assets of Small Value Charged Off		25.08	43.84
	Exceptional Item			
	Provision for diminution in the value of investment		-	-
	Less: Provision transferred to Capital (Sch-1)		-	-
	TOTAL EXPENDITURE		**45,564.48**	**46,897.50**
	Profit / (Loss) for the period		(44,303.04)	(45,753.54)
	Add: Prior Period Items net(+/-) (details to be given)	17	(4,582.72)	(1,419.95)
	Transfer of Net Establishment Expenses for the year to Sch-5		**48,885.76**	**47,173.48**
	Less/Add: Provision for Taxation		-	-
	Net Profit			
	Less: Transfer to Capital Reserve			
	Less: Transfer to other specific Reserve/Fund			
	Less/Add: Transfer to/Transfer from General Reserve (+/-)			
	Less/Add: Surplus brought forward from previous year			
	Surplus carried to Balance Sheet			

For and on behalf of the Board of the Authority

Place : New Delhi
Date : 24.06.2021

Sd/-
Member (Finance)

Sd/-
Chairman

NATIONAL HIGHWAYS AUTHORITY OF INDIA

G-5 & 6, Sector -10, Dwarka
NEW DELHI - 110 075

CASH FLOW STATEMENT FOR THE YEAR ENDED 31st MARCH, 2020

		CURRENT YEAR Rs. In Lakh	PREVIOUS YEAR Rs. In Lakh
A.	**Cash flow from operating activities:**		
	Net profit before tax	(44,303.04)	(45,753.54)
	Adjustments for:		
	Depreciation	1,286.21	1,382.99
	Profit/Loss on sale of assets	(5.39)	(4.45)
	Interest income	(0.15)	(0.30)
	Operating profit before working capital changes	**(43,022.36)**	**(44,375.30)**
	Adjustments for:		
	(Increase)/Decrease in Deposits, Loans & Advances	1,734,349.89	(1,242,152.30)
	Increase/(Decrease) in Liabilities	(2,164,388.36)	1,456,532.17
	(Increase)/Decrease in Provision for Gratuity and Leave Encashment	889.45	2,170.63
	Cash flow before extraordinary item & prior period items	**(472,171.39)**	**172,175.20**
	Prior period items	(4,582.72)	(1,419.95)
	Net cash generated from operating activities	**(476,754.11)**	**170,755.26**
B.	**Cash flow from investing activities:**		
	Purchase of fixed assets	(5,177.24)	(1,480.11)
	Realisation from sale of assets	9.95	15.21
	(Increase)/Decrease in Capital Work in progress	(7,832,613.01)	(7,642,832.35)
	(Increase)/Decrease in investment	(1,560.00)	-
	Interest Income	227,263.74	240,122.79
	Capital Reserve (Receipts)	26,765.46	20,591.80
	Net cash used in investing activities	**(7,585,311.11)**	**(7,383,582.67)**
C	**Cash flow from financing activities:**		
	Cess funds received from Govt of India	1,109,100.00	1,156,900.00
	Capital additional budgetary receipts	100,000.00	-
	EAP Grant Received & utilised towards Revenue Expenditure	15,700.00	(719.11)
	Adjusted Plough back of Toll Remittance,etc	1,408,167.82	1,750,574.91
	Net decrease in loan from ADB due to Exchange Loss after Adjustment of Repayments	(2,027.66)	(2,186.92)
	Proceeds from issue of 54EC Capital Gains Tax-Free Bonds	445,081.30	470,634.60
	Proceeds from issue of Taxable bonds	4,953,600.00	1,751,040.00
	Proceeds from NSSF Loan & SBI Term Loan	2,100,000.00	3,900,000.00
	Redemption of 54EC Capital Gains Tax- Free Bonds	(557,274.20)	(428,117.00)
	Interest and other expenditure on Bond	(1,531,479.51)	(1,133,369.66)
	Net cash generated from financing activities	**8,040,867.75**	**7,464,756.81**
	Net increase/(decrease) in cash and cash equivalents (A+B+C)	**(21,197.47)**	**251,929.40**
	Opening cash and cash equivalents	655,725.06	403,795.66
	Closing cash and cash equivalents	**634,527.58**	**655,725.06**
	Notes:		
	Cash and cash equivalents include:		
	Cash and cheques in hand / in transit	1.35	-
	Balance with banks-Current Account	78,188.52	61,641.24
	Balance with banks-Savings Bank Account	528,641.74	564,947.91
	Balance with banks-Fixed Deposit Account	27,695.98	29,135.90
	Balance as per books of account	**634,527.58**	**655,725.06**

For and on behalf of the Board of the Authority

Place : New Delhi
Date: 24.06.2021

Sd/-
Member (Finance)

Sd/-
Chairman

SUMMARY BALANCE SHEET

S. No.	Particulars	As on 31.03.2019 (Rs. In Lakhs)	As on 31.03.2018 (Rs. In Lakhs)
I.	**Sources of Funds**		
1.	**Shareholders' Fund**		
	a) Capital	1,92,85,401.29	1,63,77,926.38
	b) Reserves & Surplus	-	-
2.	**Grants**		
	a) Capital	13,82,510.33	13,83,229.45
3.	**Borrowings**	1,79,43,786.63	1,22,52,415.96
	TOTAL	**3,86,11,698.26**	**3,00,13,571.79**
II.	**Application of Funds**		
1.	**Fixed Assets**		
	a) Gross Block	17,652.59	16,163.18
	b) Less:- Assets Created Out of Grant	758.11	612.58
	c) Assets out of own fund	16,894.48	15,550.60
	d) Less:- Depreciation	10,061.76	8,804.24
	e) Net Block	6,832.73	6,746.36
	f) Assets held on behalf of GOI (completed & ongoing)	3,71,31,458.01	2,85,64,371.53
	Total	**3,71,38,290.73**	**2,85,71,117.89**
2.	**Investment**	**93,617.34**	**93,617.34**
3.	**Current Assets, Loans and Advances**		
	a) Inventories	-	-
	b) Deposits, Loans & Advances	63,15,984.74	50,73,832.44
	c) Interest accrued but not due on deposits	2,421.71	4,326.74
	d) Interest accrued and due on CALA Deposits	5,549.75	8,069.98
	e) Cash & Bank Balances	6,55,725.06	4,03,795.66
	f) Inter Unit Account	-	-
	Sub total	**69,79,681.25**	**54,90,024.83**
	Less:- Current Liabilities and Provisions		
	a) Liabilities	55,92,789.67	41,36,257.50
	b) Reserves & Provisions	7,101.39	4,930.77
	Sub Total	**55,99,891.07**	**41,41,188.27**
	Net Current Assets	**13,79,790.18**	**13,48,836.56**
4	**Misc. Expenditure**		
	(to the extent not written off)		
5	**Profit & Loss Account**		
	(Debit Balance, if any)		
	TOTAL	**3,86,11,698.26**	**3,00,13,571.79**

SUMMARY PROFIT & LOSS ACCOUNT

S. No.	Particulars	For the year ended on 31.03.2019 (Rs. In Lakhs)	For the year ended on 31.03.2018 (Rs. In Lakhs)
I.	**Income**		
	a) Value of Work Done		
	b) Other Income	1,143.66	1,381.89
	c) Interest (Gross)	0.30	0.41
	d) Net Increase/ Decrease in		
	Work-in-progress (+)/(-)		
	Total Income	**1,143.96**	**1,382.30**
II.	**Expenditure**		
	a) Construction Stores/Material Consumed		
	Other stores, spares & tools etc. consumed		
	Work Expenses	-	-
	Personnel & Administrative Expenses	45,460.82	38,230.45
	Finance Charges	9.85	8.36
	Depreciation	1,382.99	1,027.75
	Assets of Small Value Charged off	43.84	36.96
	Exceptional Item		
	Provision for diminution in the value of Investment	-	-
	Less:- Provision transferred to Capital	-	-
	Total Expenditure	**46,897.50**	**39,303.52**
	Profit/ (Loss) for the period	**(45,753.54)**	**(37,921.22)**
	Add:- Prior Period Items net (+/-)	(1,419.95)	(1,305.05)
	Transfer of Net Establishment Expenses for the year	**47,173.48**	**39,226.27**
	Less/Add : Provision for Taxation	-	-
	Net Profit		
	Less:- Transfer to Capital Reserve		
	Less:- Transfer to other specific Reserve/fund		
	Less/Add:- Transfer to/ Transfer from General Reserve (+/-)		
	Less/Add:- Surplus brought forward from previous year		
	Surplus carried to Balance Sheet		

SUMMARY CASH FLOW STATEMENT

S. No.	Particulars	For the year ended on 31.03.2019 (Rs. In Lakhs)	For the year ended on 31.03.2018 (Rs. In Lakhs)
A.	**Cash Flow from Operating Activities:-**		
	Net Profit before tax	(45,753.54)	(37,921.22)
	Adjustments for:-		
	Depreciation	1,382.99	1,027.75
	Profit/Loss on Sale of assets	(4.45)	(3.20)
	Interest Income	(0.30)	(0.41)
	Operating profit before working capital changes	**(44,375.30)**	**(36,897.08)**
	Adjustments for		
	(Increase)/Decrease in Deposits, Loans & Advances	(12,42,152.30)	(17,78,512.25)
	Increase/(Decrease) in liabilities	14,56,532.17	9,49,158.62
	(Increase)/Decrease in Provision for gratuity and Leave encashment	2,170.63	810.61
	Cash flow before extraordinary Item & prior period items	**1,72,175.20**	**(8,65,440.09)**
	Prior period item	(1,419.95)	(1,305.05)
	Net Cash generated from operating activities	**1,70,755.26**	**(8,66,745.14)**
B.	**Cash Flow from Investing Activities**		
	Purchase of fixed assets	(1,480.11)	(3,713.53)
	Realisation from sale of assets	15.21	6.00
	(Increase)/Decrease in Capital Work in Progress	(76,42,832.35)	(62,79,050.43)
	(Increase)/Decrease in Investment	-	(2,658.34)
	Interest Income	2,40,122.79	2,24,294.28
	Capital Reserve(Receipts)	20,591.80	32,922.86
	Net cash used in Investing activities	**(73,83,582.67)**	**(60,28,199.16)**
C.	**Cash Flow from financing Activities**		
	Cess funds received from Govt of India	11,56,900.00	12,42,945.00
	Capital additional budgetary receipts	-	4,15,000.00
	EAP Grant utilized towards Revenue Expenditure	(719.11)	17,586.44
	Adjusted plough back of Toll Remittance, etc	17,50,574.91	7,60,600.92
	Net decrease in loan from ADB due to Exchange Loss after Adjustment of Repayments	(2,186.92)	(4,949.65)
	Proceeds from issue of 54EC Capital Gains Tax-Free Bonds	4,70,634.60	6,65,741.30
	Proceeds from issue of Tax-able Bonds, Masala Bonds & NSSF Loan	17,51,040.00	43,87,500.00

	Proceeds From NSSF Loan & SBI Term Loan	39,00,000.00	-
	Redemption of Capital Gains Tax-Free Bonds	(4,28,117.00)	(3,34,340.40)
	Interest and Other expenditure on Bond	(11,33,369.66)	(6,89,023.91)
	Net cash generated from financing activities	**74,64,756.81**	**64,61,059.69**
	Net increase(decrease) in cash and cash equivalents (A+B+C)	**2,51,929.40**	**(4,33,884.60)**
	Operating cash and cash equivalents	4,03,795.66	8,37,680.26
	Closing cash and cash equivalents	**6,55,725.06**	**4,03,795.66**
	Notes:		
	Cash and cash equivalents Include:		
	Cash and cheques in hand/ in transit	-	1.10
	Balance with banks-Current Account	61,641.24	90,400.98
	Balance with banks-Saving Bank Account	5,64,947.91	2,78,858.78
	Balance with banks-Fixed Deposit Account	29,135.90	34,534.80
	Balance as per books of account	**6,55,725.06**	**4,03,795.66**

SUMMARY FINANCIAL INFORMATION OF THE INVESTMENT MANAGER

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NATIONAL HIGHWAYS INFRA INVESTMENT MANAGERS PRIVATE LIMITED

BALANCE SHEET AS AT 31ST MARCH, 2022

(All amounts in ₹ lakh)

PARTICULARS	NOTE NO.	AS AT 31st March, 2022	AS AT 31st March, 2021
ASSETS			
1) Non - Current Assets:			
(a) Property, Plant and Equipment	3	7.25	-
(b) Intangible assets	4	0.79	-
(c) Financial Assets			
i) Other Financials Asset	5	550.00	-
(d) Deferred tax assets	6	5.67	-
(e) Other Non Current Tax Assets (Net)	7	66.56	-
2) Current Assets:			
(a) Financial Assets			
(i) Cash and Cash Equivalents	8	72.03	1,418.23
(ii) Other than Bank Balances	9	970.00	-
(iii) Other financial assets	10	59.52	-
(b) Other current assets	11	10.57	13.88
Total Assets		**1,742.39**	**1,432.11**
EQUITY AND LIABILITIES			
EQUITY			
(a) Equity Share Capital	12	1,100.00	1,100.00
(b) Other Equity	13	481.15	276.90
LIABILITIES			
1) Non-Current liabilities:			
(a) Financial liabilities			
(i) Provision	14	23.05	-
2) Current Liabilities			
(a) Financial liabilities			
(i) Trade Payables	15		
(a) Total Outstanding, dues of micro and small enterprises		0.23	-
(b) Total outstanding, dues of creditors other than micro and small enterprises		41.78	36.17
(ii) Other financial liabilities	16	63.77	12.98
(b) Other current liabilities	17	31.56	6.06
(c) Provisions	18	0.85	-
Total Equity and Liabilities		**1,742.39**	**1,432.11**

Significant Accounting Policies 1-2
The accompanying notes form an integral part of these financial statements. 3-43

This is the Balance Sheet referred to in our report of even date.

For ASC & Associates
Chartered Accountants
Firm Registration no. 011863N

CA Chandmal Khandelwal
Partner
M.No. 037956

Date : 05-07-2022
Place : New Delhi

For and on behalf of the National Highways Infra Investment Managers Private Limited

Suresh Krishan Goyal
Director
DIN: 02721580
Place : New Delhi

Mahavir Parsad Sharma
Director
DIN: 03158413
Place : New Delhi

Mathew George
Chief Financial Officer
Place : New Delhi

Gunjan Singh
Company Secretary
Place : New Delhi

NATIONAL HIGHWAYS INFRA INVESTMENT MANAGERS PRIVATE LIMITED

STATEMENT OF PROFIT AND LOSS FOR THE YEAR ENDED 31ST MARCH, 2022

(All amounts in ₹ lakh)

PARTICULARS	NOTE NO.	YEAR ENDED 31-03-2022	YEAR ENDED 31-03-2021
INCOME			
Revenue from Operations	19	1,637.04	-
Other Income	20	28.47	-
Total Income		**1,665.51**	**-**
EXPENSES			
Employee Benefits Expense	21	499.91	49.55
Depreciation & Amortization Expense	22	1.12	-
Other Expenses	23	295.93	173.55
Total Expenses		**796.96**	**223.10**
Profit/(Loss) before Exceptional Items and Tax		**868.55**	**(223.10)**
Exceptional Items (net)		-	
Profit / (Loss) before Tax		**868.55**	**(223.10)**
Tax Expenses			
Current Tax	24	169.97	-
Deferred Tax expense/(credit)		(5.67)	
Total Tax		164.30	-
Profit/ (loss) for the period		704.25	(223.10)
Other Comprehensive Income			
Items that will not be reclassified to Profit and Loss		-	-
Items that will be reclassified to Profit and Loss		-	-
		-	-
Total Comprehensive Income for the period		704.25	(223.10)
Earnings per Equity Share (Par Value Rs.10/-each) -			
Basic	25	6.40	(2.03)
Diluted	25	**6.40**	**(2.03)**

Significant Accounting Policies	1-2
The accompanying notes form an integral part of these financial statements.	3-43

This is the Profit and Loss Account referred to in our report of even date.

For ASC & Associates
Chartered Accountants
Firm Registration no. 011863N

CA Chandmal Khandelwal
Partner
M.No. 037956

Date : 05-07-2022
Place : New Delhi

For and on behalf of the National Highways Infra Investment Managers Private Limited

Suresh Krishan Goyal
Director
DIN: 02721580
Place : New Delhi

Mahavir Parsad Sharma
Director
DIN: 03158413
Place : New Delhi

Mathew George
Chief Financial Officer
Place : New Delhi

Gunjan Singh
Company Secretary
Place : New Delhi

NATIONAL HIGHWAYS INFRA INVESTMENT MANAGERS PRIVATE LIMITED
CASH FLOW STATEMENT FOR THE YEAR ENDED 31ST MARCH, 2022

(All amounts in ₹ lakh)

	PARTICULARS	YEAR ENDED 31-03-2022	YEAR ENDED 31-03-2021
A.	**OPERATING ACTIVITIES**		
	Net Profit/(Loss) Before Tax	868.55	(223.10)
	Adjustments to reconcile profit before tax to net cash flows:		
	Depreciation and Amortization	1.12	-
	Interest earned on Investments	(28.47)	-
	Operating Profit/(Loss) before Working Capital Changes	841.20	(223.10)
	Working Capital Adjustments:		
	Decrease / (Increase) in Trade and Other Receivables	-	-
	Decrease / (Increase) in Inventories	-	-
	Decrease / (Increase) in Financial Assets	(59.52)	-
	Decrease / (Increase) in Non Current/ Current Assets	3.31	(13.88)
	Increase / (Decrease) in Trade & Other Payables	5.85	55.21
	Decrease / (Increase) in Other Financial Liabilities	50.79	-
	Increase / (Decrease) in Provisions	23.90	-
	Decrease / (Increase) in Other Current Liabilities	25.50	-
		891.03	**(181.77)**
	Income Tax paid	(236.54)	-
	Net Cash Flows from/(used in) Operating Activities	**654.49**	**(181.77)**
B.	**INVESTING ACTIVITIES**		
	(Purchase)/ Sale of Property, Plant & Equipment	(9.16)	-
	Investment in FDRs	(1,498.34)	-
	Interest Received	6.81	-
	Net cash flows from/ (used in) Investing activities	**(1,500.69)**	**-**
C.	**FINANCING ACTIVITIES**		
	Proceeds from issue of shares (including Share Premium)*	-	1,100.00
	Proceeds from long term Borrowings	-	500.00
	Repayment of long term Borrowings	(500.00)	-
	Net cash flows from (used in) Financing activities	**(500.00)**	**1,600.00**
	Net Increase/Decrease in Cash and Cash equivalents (A+B+C)	(1,346.20)	1,418.23
	Cash and cash equivalents at the beginning of the year	1,418.23	-
	Cash and cash equivalents at the end of the year	**72.03**	**1,418.23**

The accompanying notes form an integral part of these financial statements.

This is the Cash Flow Statement referred to in our report of even date.

For ASC & Associates
Chartered Accountants

Firm Registration no. 011863N

CA Chandmal Khandelwal
Partner
M.No. 037956

Date : 05-07-2022
Place : New Delhi

For and on behalf of the National Highways Infra Investment Managers Private Limited

Suresh Krishan Goyal
Director
DIN: 02721580
Place : New Delhi

Mahavir Parsad Sharma
Director
DIN: 03158413
Place : New Delhi

Mathew George
Chief Financial Officer
Place : New Delhi

Gunjan Singh
Company Secretary
Place : New Delhi

SUMMARY FINANCIAL INFORMATION OF THE PROJECT SPV

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NATIONAL HIGHWAYS INFRA PROJECTS PRIVATE LIMITED

Unaudited Balance Sheet as at 30th June, 2022

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	NOTE NO.	AS AT 30TH JUNE, 2022	AS AT 31ST MARCH, 2022
ASSETS			
1) Non - Current Assets:			
(a) Property, Plant and Equipment	2	1.21	0.46
(b) Intangible Assets	3	7,30,543.98	7,33,984.39
(c) Deferred Tax Assets (net)	4	820.91	265.69
2) Current Assets:			
(a) Financial Assets			
(i) Trade Receivables	5	79.47	600.47
(ii) Cash and Cash Equivalents	6	1,128.27	588.61
(iii) Others Financial Assets	7	222.92	-
(b) Other Current Assets	8	213.42	334.83
Total Assets		**7,33,010.18**	**7,35,774.44**
EQUITY AND LIABILITIES			
EQUITY			
(a) Equity Share Capital	9	1,29,410.00	1,29,410.00
(b) Other Equity	10	(21,664.18)	(11,356.83)
LIABILITIES			
1) Non-Current Liabilities:			
(a) Financial Liabilities			
(i) Borrowings	11	5,73,843.90	5,78,386.20
(b) Provisions	12	1,234.44	403.37
2) Current Liabilities:			
(a) Financial Liabilities			
(i) Short Term Borrowings	13	31,796.10	27,253.80
(i) Trade Payables	14		
(a) Total Outstanding, dues of micro and small enterprises		-	-
(b) Total Outstanding, dues of creditors other than micro and small enterprises		1,478.64	787.94
(ii) Other Financial Liabilities	15	16,856.21	10,748.98
(b) Other Current Liabilities	16	55.04	140.95
(c) Provisions	17	0.03	0.03
Total Equity and Liabilities		**7,33,010.18**	**7,35,774.44**
Significant Accounting Policies	1		

For and on behalf of the Board of directors

Suresh Krishan Goyal	**Mahavir Parsad Sharma**
Director	**Director**
DIN: 02721580	**DIN: 03158413**

NATIONAL HIGHWAYS INFRA PROJECTS PRIVATE LIMITED

Unaudited Statement of Profit and Loss for the period ended 30th June 2022

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	NOTE NO.	1 APRIL 2022 to 30 JUNE 2022	YEAR ENDED 31ST MARCH, 2022
INCOME			
Revenue from Operations	18	13,737.41	13,960.55
Other Income	19	26.04	20.79
Total Income		**13,763.45**	**13,981.33**
EXPENSES			
Operating Expenses	20	1,213.57	849.77
Project Management Fees		247.80	290.43
Employee Benefits Expense	21	11.70	2.12
Finance Charges	22	19,518.98	22,843.13
Depreciation & Amortization Expense	23	3,440.45	1,055.65
Other Expenses	24	193.53	561.61
Total Expenses		**24,626.03**	**25,602.71**
Profit/(Loss) before Exceptional Items and Tax		**(10,862.58)**	**(11,621.38)**
Exceptional Items (net)		-	
Profit / (Loss) before Tax		**(10,862.58)**	**(11,621.38)**
Tax Expenses			
Current Tax		-	-
Deferred Tax Expense/(Credit)	25	(555.22)	(265.48)
Total Tax		**(555.22)**	**(265.48)**
Profit/ (loss) for the period		**(10,307.35)**	**(11,355.90)**
Other Comprehensive Income			
Items that will not be reclassified to Profit and Loss		-	-
Items that will be reclassified to Profit and Loss		-	-
		-	-
Total Comprehensive Income for the period		**(10,307.35)**	**(11,355.90)**
Earnings per Equity Share (Par Value Rs.10/-each) -			
Basic	26	(2.69)	(2.97)
Diluted	26	**(2.69)**	**(2.97)**

Significant Accounting Policies 1

For and on behalf of the Board of directors

Suresh Krishan Goyal	**Mahavir Parsad Sharma**
Director	**Director**
DIN: 02721580	**DIN: 03158413**

NATIONAL HIGHWAYS INFRA PROJECTS PRIVATE LIMITED

CASH FLOW STATEMENT FOR THE PERIOD ENDED 30TH JUNE, 2022

(All amounts in ₹ lakh unless otherwise stated)

	PARTICULARS	PERIOD ENDED 30TH JUNE, 2022	YEAR ENDED 31ST MARCH, 2022
A.	**OPERATING ACTIVITIES**		
	Net Profit/(Loss) Before Tax	(10,862.6)	(11,621.4)
	Adjustments to reconcile profit before tax to net cash flows:		-
	Depreciation and Amortization	3,440.5	1,055.7
	Loss/ (Gain) on sale of Investments (net)	(26.0)	(20.8)
	Finance Cost (net)	19,513.6	22,843.1
	Operating Profit/(Loss) before Working Capital Changes	12,065.5	**12,256.6**
	Working Capital Adjustments:		
	Decrease / (Increase) in Trade and Other Receivables	521.0	(935.3)
	Decrease / (Increase) in Financial Assets	(222.9)	-
	Decrease / (Increase) in Non Current/ Current Assets	121.4	-
	Increase / (Decrease) in Trade & Other Payables	690.7	787.9
	Decrease / (Increase) in Other Financial Liabilities	193.6	(7,34,943.3)
	Increase / (Decrease) in Provisions	831.1	403.4
	Decrease / (Increase) in Other Current Liabilities	(85.9)	140.9
		14,114.4	**(7,22,289.7)**
	Income Tax paid	-	0.0
	Net Cash Flows from/(used in) Operating Activities	**14,114.4**	**(7,22,289.7)**
B.	**INVESTING ACTIVITIES**		
	Purchase of Property, Plant & Equipment and Intangible Assets, including CWIP, Capital Creditors and Capital Advances	(0.8)	(0.5)
	(Purchase)/ Sale of non current Investments	(6,336.0)	(4,951.0)
	(Purchase)/ Sale of current Investments (net)	6,362.0	4,971.8
	Net cash flows from (used in) Investing activities	**25.2**	**20.3**
C.	**FINANCING ACTIVITIES**		
	Proceeds from issue of shares (including Share Premium)	-	1,29,400.0
	Working Capital Borrowings from Banks/other short term loans (net)	-	27,253.8
	Proceeds from long term borrowings	-	5,78,386.2
	Finance Costs paid	(13,600.0)	(12,192.0)
	Net cash flows from (used in) Financing activities	**(13,600.0)**	**7,22,848.0**
	Net Increase/Decrease in Cash and Cash equivalents (A+B+C)	539.7	578.6
	Cash and cash equivalents at the beginning of the year	588.6	**10.0**
	Cash and cash equivalents at the end of the period	**1,128.3**	**588.6**

NATIONAL HIGHWAYS INFRA PROJECTS PRIVATE LIMITED

Balance Sheet as at 31st March, 2022

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	NOTE NO.	AS AT 31st MARCH, 2022	AS AT 31st MARCH, 2021
ASSETS			
1) Non - Current Assets:			
(a) Property, Plant and Equipment	2	0.46	-
(b) Intangible assets	3	7,33,984.39	7,35,040.00
(c) Deferred Tax Assets (net)	4	265.69	0.21
		7,34,250.54	**7,35,040.21**
2) Current Assets:			
(a) Financial Assets			
(i) Trade receivables	5	600.47	-
(ii) Cash and Cash Equivalents	6	588.61	10.00
(b) Other current assets	7	334.83	-
		1,523.90	**10.00**
Total Assets		**7,35,774.44**	**7,35,050.21**
EQUITY AND LIABILITIES			
EQUITY			
(a) Equity Share Capital	8	1,29,410.00	10.00
(b) Other Equity	9	(11,356.83)	(0.93)
		1,18,053.17	**9.07**
LIABILITIES			
1) Non-Current liabilities:			
(a) Financial liabilities			
(i) Borrowings	10	5,78,386.20	-
(b) Provisions	11	403.37	-
		5,78,789.57	**-**
2) Current Liabilities:			
(a) Financial liabilities			
(i) Short Term Borrowings	12	27,253.80	-
(i) Trade Payables	13		-
(a) Total Outstanding, dues of micro and small enterprises		-	-
(b) Total outstanding, dues of creditors other than micro and small enterprises		787.94	-
(ii) Other financial liabilities	14	10,748.98	7,35,041.12
(b) Other current liabilities	15	140.95	0.02
(c) Provisions	16	0.03	-
		38,931.70	**7,35,041.14**
Total Equity and Liabilities		**7,35,774.44**	**7,35,050.21**

Significant Accounting Policies 1
The accompanying notes form an integral part of these financial statements. 2-39

This is the Balance Sheet referred to in our report of even date.

For ARAJ & ASSOCIATES LLP
Chartered Accountants
Firm Registration No.-023981N/N-500116

(CA Jitendra Goyal)
Partner
M.No.517847
Date : 29.04.2022
Place : New Delhi

For and on behalf of the Board of directors

Suresh Krishan Goyal
Director
DIN: 02721580

Mahavir Parsad Sharma
Director
DIN: 03158413

Ajanta Sen
Company Secretary
M.No. F11079

NATIONAL HIGHWAYS INFRA PROJECTS PRIVATE LIMITED

Statement of Profit and Loss for the period ended 31st March 2022

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	NOTE NO.	YEAR ENDED 31-03-2022	YEAR ENDED 31-03-2021
INCOME			
Revenue from Operations	17	13,960.55	-
Other Income	18	20.79	-
Total Income		**13,981.33**	**-**
EXPENSES			
Operating Expenses	19	1,140.21	-
Employee Benefits Expense	20	2.12	-
Finance Charges	21	22,843.13	-
Depreciation & Amortization Expense	22	1,055.65	-
Other Expenses	23	561.61	1.14
Total Expenses		**25,602.71**	**1.14**
Profit/(Loss) before Exceptional Items and Tax		**(11,621.38)**	**(1.14)**
Exceptional Items (net)		-	
Profit / (Loss) before Tax		**(11,621.38)**	**(1.14)**
Tax Expenses			
Current Tax		-	-
Deferred Tax Expense/(Credit)	24	(265.48)	(0.21)
Total Tax		**(265.48)**	**(0.21)**
Profit/ (loss) for the period		**(11,355.90)**	**(0.93)**
Other Comprehensive Income			
Items that will not be reclassified to Profit and Loss		-	-
Items that will be reclassified to Profit and Loss		-	-
		-	-
Total Comprehensive Income for the period		**(11,355.90)**	**(0.93)**
Earnings per Equity Share (Par Value Rs.10/-each) -			
Basic	25	(2.97)	(0.09)
Diluted	25	**(2.97)**	**(0.09)**

Significant Accounting Policies 1

The accompanying notes form an integral part of these financial statements. 2-39

This is the Balance Sheet referred to in our report of even date.

For ARAJ & ASSOCIATES LLP
Chartered Accountants
Firm Registration No.-023981N/N-500116

For and on behalf of the Board of directors

(CA Jitendra Goyal)
Partner
M.No.517847
Date : 29.04.2022
Place : New Delhi

Suresh Krishan Goyal
Director
DIN: 02721580

Mahavir Parsad Sharma
Director
DIN: 03158413

Ajanta Sen
Company Secretary
M.No. F11079

NATIONAL HIGHWAYS INFRA PROJECTS PRIVATE LIMITED

CASH FLOW STATEMENT FOR THE YEAR ENDED 31ST MARCH, 2022

(All amounts in ₹ lakh unless otherwise stated)

	PARTICULARS	YEAR ENDED 31-03-2022	YEAR ENDED 31-03-2021
A.	**OPERATING ACTIVITIES**		
	Net Profit/(Loss) Before Tax	(11,621.38)	(1.14)
	Adjustments to reconcile profit before tax to net cash flows:		-
	Depreciation and Amortization	1,055.65	-
	Loss/ (Gain) on sale of Investments (net)	(20.79)	-
	Finance Cost (net)	22,843.13	-
	Operating Profit/(Loss) before Working Capital Changes	12,256.61	(1.14)
	Working Capital Adjustments:		
	Decrease / (Increase) in Trade and Other Receivables	(935.29)	-
	Decrease / (Increase) in Financial Assets	-	-
	Decrease / (Increase) in Non Current/ Current Assets	-	-
	Increase / (Decrease) in Trade & Other Payables	787.94	-
	Decrease / (Increase) in Other Financial Liabilities	(7,34,943.27)	7,35,041.14
	Increase / (Decrease) in Provisions	403.40	-
	Decrease / (Increase) in Other Current Liabilities	140.93	-
		(7,22,289.68)	**7,35,040.00**
	Income Tax paid	**0.00**	-
	Net Cash Flows from/(used in) Operating Activities	**(7,22,289.68)**	**7,35,040.00**
B.	**INVESTING ACTIVITIES**		
	Purchase of Property, Plant & Equipment and Intangible Assets, including CWIP, Capital Creditors and Capital Advances	(0.50)	(7,35,040.00)
	(Purchase)/ Sale of non current Investments	(4,951.00)	-
	(Purchase)/ Sale of current Investments (net)	4,971.79	-
	Net cash flows from (used in) Investing activities	**20.29**	**(7,35,040.00)**
C.	**FINANCING ACTIVITIES**		
	Proceeds from issue of shares (including Share Premium)	1,29,400.00	10.00
	Working Capital Borrowings from Banks/other short term loans (net)	27,253.80	-
	Proceeds from long term borrowings	5,78,386.20	-
	Finance Costs paid	(12,192.00)	-
	Net cash flows from (used in) Financing activities	**7,22,848.00**	**10.00**
	Net Increase/Decrease in Cash and Cash equivalents (A+B+C)	578.61	10.00
	Cash and cash equivalents at the beginning of the year	10.00	-
	Cash and cash equivalents at the end of the year	**588.61**	**10.00**

This is the Cash Flow Statement referred to in our report of even date.

For ARAJ & ASSOCIATES LLP
Chartered Accountants
Firm Registration No.-023981N/N-500116

(CA Jitendra Goyal)
Partner
M.No.517847
Date : 29.04.2022
Place : New Delhi

For and on behalf of the Board of directors

Suresh Krishan Goyal
Director
DIN: 02721580

Mahavir Parsad Sharma
Director
DIN: 03158413

Ajanta Sen
Company Secretary
M.No. F11079

SUMMARY OF BUSINESS

Overview

We are a registered infrastructure investment trust under the InvIT Regulations. We currently toll, operate and maintain a portfolio of five Initial Toll Roads (*defined below*) in the Indian states of Gujarat, Rajasthan, Telangana and Karnataka, and intend to toll, operate and maintain a portfolio of three Target Toll Roads (*defined below*) in the Indian states of, Telangana, Maharashtra, Uttar Pradesh and Madhya Pradesh under the Toll Operate Transfer ("**TOT**") model conceived by NHAI. These Initial Toll Roads (*defined below*) are operated and maintained pursuant to concessions granted by the NHAI. The Initial Toll Roads comprise five stretches spanning a total length of approximately 389 kms and the Target Toll Roads comprise three stretches spanning a total length of approximately 246 kms.

Our Sponsor is NHAI, an autonomous authority of the GoI under the MoRTH constituted on June 15, 1989 by an Act of the Indian Parliament titled - The National Highways Authority of India Act, 1988 (the "**NHAI Act**"). NHAI was operationalised in February 1995 with the appointment of a full-time Chairman and other members of the board. The functioning of NHAI is governed by the NHAI Act and the rules, and regulations framed thereunder.

The Project SPV has entered into eight (8) independent Concession Agreements with the NHAI for concessions of each of the Toll Roads. We have satisfied all conditions precedent and commenced our Concessions on December 16, 2021 in accordance with the terms of the Concession Agreements for the Initial Toll Roads and expect to satisfy all conditions precedent and commence our Concessions for the Target Toll Roads in accordance with the terms of the Concession Agreements for the Target Toll Roads. For further details, please see the section entitled "*Summary of the Concession Agreements*", "*Management's Discussion and Analysis of Financial Position and Results of Operations*" and "*Use of Proceeds*" on pages 145, 191 and 188, respectively.

The Concession Agreements provide the Project SPV the right to collect tolls for a period of 20 years or 30 years (as applicable under the relevant Concession Agreement) from users of each Toll Road, with certain overlay activities and the construction of additional toll lanes in respect of certain of the Toll Roads (the "**Initial Improvement Works**") to be completed by the Project SPV within 12 to 18 months from the Appointed Date (as defined in the section entitled "*Summary of the Concession Agreements*"). Responsibility for the supervision of the operations and maintenance of the Toll Roads also vests with us. In return, the Project SPV is required to pay the concession fee to the NHAI prior to the commencement of the Concession, as set out in the respective Concession Agreements. For further information on the provisions of the Concession Agreements, see "*Summary of the Concession Agreements".*

Pursuant to the Formation Transactions and the Proposed Transfer, the Trust has acquired 100% of the equity shares of the Project SPV from the Sponsor. For additional information about the Proposed Transfer, please see the section headed "*Formation Transactions in Relation to the Trust"*.

The Project SPV has the right to toll, operate and maintains the following toll road assets (the "**Initial Toll Roads**")::

- Palanpur/Khemana – Abu Road Project ("**Asset 1**"): Abu Road section of NH 27 with a total length of 45 kms, connecting the states of Gujarat and Rajasthan;
- Abu Road – Swaroopganj Project ("**Asset 2**"): Swaroopganj section of NH 27 with a total length of 31 kms, in the state of Rajasthan;
- Maharashtra/ Karnataka Border (Kagal) – Belgaum Project ("**Asset 3**"): Belgaum – Kagal section of NH 48 with a total length of 77.7 kms, connecting the states of Karnataka and Maharashtra;
- Chittorgarh – Kota & Chittorgarh Bypass Project ("**Asset 4**"): Chittorgarh – Kota section of NH 27 with a total length of 160.5 kms, in the state of Rajasthan; and
- Kothakota Bypass – Kurnool Project ("**Asset 5**"): Kothakota bypass – Kurnool section of NH 44 with a total length of 74.6 kms, connecting the states of Telangana to Andhra Pradesh.

From the Appointed Date, the Project SPV shall have the right to toll, operate and maintain the following toll road assets (the "**Target Toll Roads**", together with the Initial Toll Roads, the "**Toll Roads**"):

- Agra Bypass Project ("**Asset 6**"): Agra Bypass section with a total length of 32.80 kms, connecting NH19 (old NH2) to NH44 (old NH7) in Uttar Pradesh;
- Borkhedi - Kelapur Project ("**Asset 7**"): Borkhedi-Kelapur-Maharashtra/Telangana border section of NH44 (old NH7) with a total length of 138.15 kms, in the state of Maharashtra; and
- Shivpuri – Jhansi Project ("**Asset 8**"): Jhansi-Shivpuri section of NH 27 with a total length of 75.30 kms, connecting the districts of Jhansi in the state of Uttar Pradesh and Shivpuri in the state of Madhya Pradesh.

The following map depicts locations of the Toll Roads:

Note:

(1) This map is for illustrative purposes only, is not to scale and is subject to change at any time.

Strengths of the Trust

The strengths of the Trust are:

- Experienced Sponsor with consistent track record in operating and maintaining projects in the roads and highways sector in India;
- Sizeable portfolio of diversified long-term revenue generating Toll Road assets;
- Presence in strategic regions/ Strategic geographic location of portfolio assets;
- Experienced management team with industry experience;
- Growth opportunities and access to Sponsor's portfolio; and
- Favourable Concession Agreement terms with Low Counterparty Risk and Inflation Passthrough.

Strategies of Our Trust

The strategies of our Trust are:

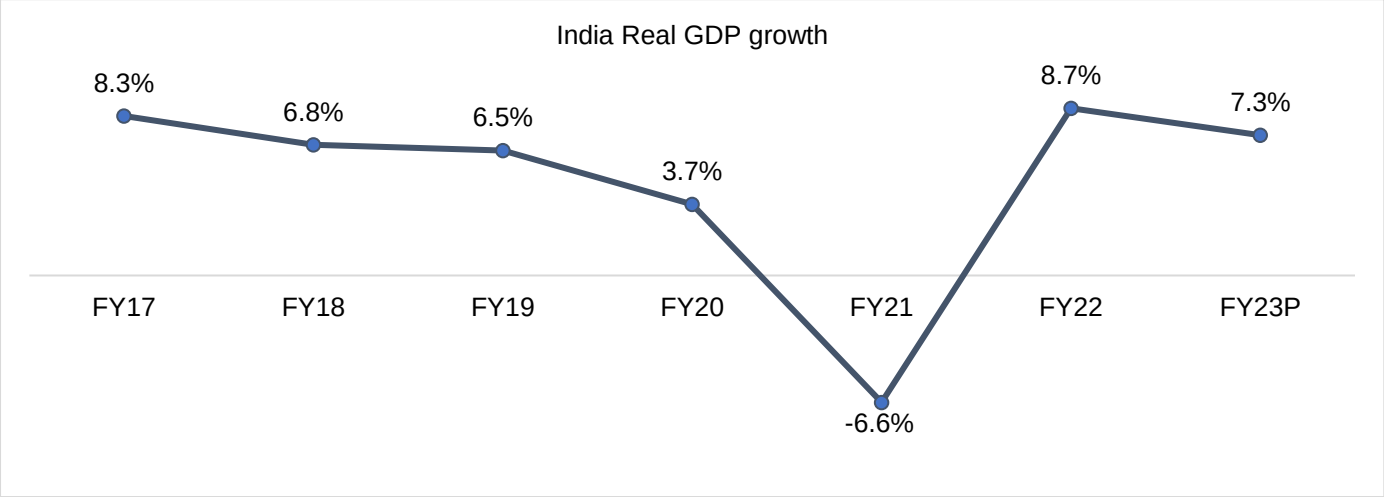
- Organic growth through proactive management;
- Acquisition of toll road projects;
- Optimization of capital structure;
- Seamlessly transition all aspects of the Toll Roads upon acquisition; and
- Improve toll collection efficiencies across the Toll Roads.

SUMMARY OF INDUSTRY

*The information contained in this section is derived from various government, other industry sources and reports including the report by CRISIL Research on Roads and Highways, dated September 2022 ("CRISIL Report"). Neither we nor any other person connected with the Offer has independently verified this information. 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 financial years ("**FY**") are to the one-year period ending March 31 of the named year.*

Overview of the Indian Economy

Recent RBI surveys indicate improving consumer sentiments which bode well for consumption demand and the first quarter GDP print does corroborate that. Rise in capacity utilisation rates in the manufacturing sector is favourable for private capex in pockets. This is especially true in case of infrastructure linked sectors such as steel and cement and some Production Linked Incentive scheme-linked sectors. CRISIL also expects the growing momentum in contact-intensive services to be broad based and support growth. That said, slower-than-expected growth in the first quarter has increased the downward bias to our real GDP growth projection of 7.3% for fiscal 2023. (Source: CRISIL Report)

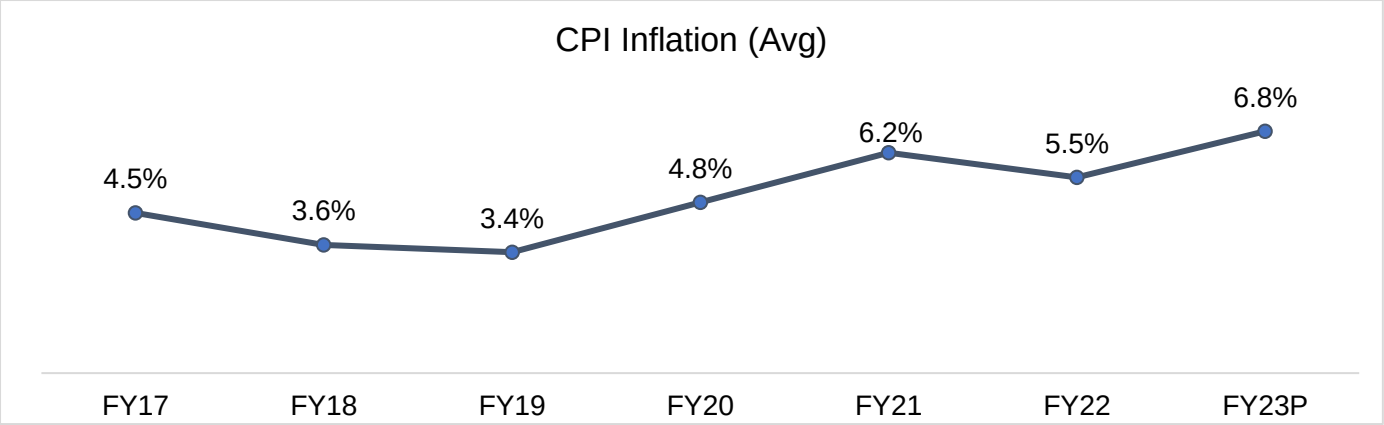


Source: NSO, CRISIL Research

In terms of the RBI Monetary Policy Statement 2022-23, dated August 5, 2022, the CPI inflation eased to 7.0 per cent (year-on-year, y-o-y) during May-June 2022 from 7.8 per cent in April, although it persists above the upper tolerance band. Spillovers from geopolitical shocks are imparting considerable uncertainty to the inflation trajectory. More recently, food and metal prices have come off their peaks. International crude oil prices have eased in recent weeks but remain elevated and volatile on supply concerns even as the global demand outlook is weakening. The appreciation of the US dollar can feed into imported inflation pressures. As per the latest RBI estimates, the inflation projection is retained at 6.7 per cent in 2022-23. (Source: *RBI Monetary Policy Statement 2022-23, dated August 5, 2022)*

Further, CRISIL expects CPI inflation to rise to 6.8% on average this fiscal, from 5.5% previous fiscal. This would be the highest level in 9 years, and above the RBI's target range of 2-6%. The impact of this year's heatwave on domestic food production, coupled with persisting high international commodity prices and input costs, will cause a broad-based rise.

CPI rose to 7% on-year in the month of Aug 2022 vs 6.7% in July and was largely driven by surging food inflation and the fading base effect of last year, even as non-food inflation moderated slightly. Core inflation will remain sticky as producers are expected to pass through cost increases to consumers amid demand recovery (especially in contact-based services). Although international energy prices have declined from 2022 highs, renewed fears of natural gas and coal supply disruption pose fuel inflation risks. (Source: CRISIL Report)



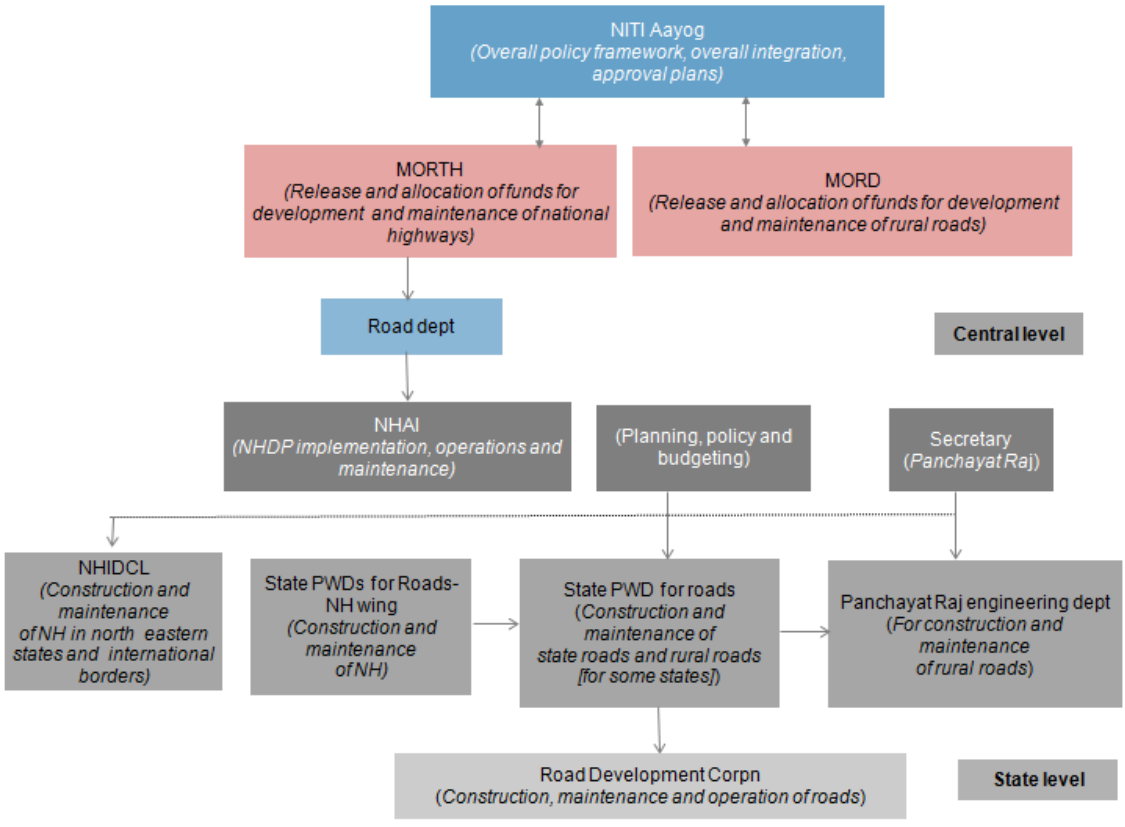
Source: NSO, CRISIL Research

Overview of the Road Sector in India

Road transport is the dominant mode of transport in India, both in terms of traffic share and contribution to the national economy. Apart from facilitating the movement of goods and passengers, road transport plays a key role in promoting equitable socio-economic development across regions of the country. It also plays a vital role in social and economic integration and development of the country. Easy accessibility, flexibility of operations, door-to-door service and reliability have earned road transport a greater significance in both passenger and freight traffic vis-à-vis other modes of transport.

Road Transport is a critical infrastructure for the economic development of a country. It impacts the pace, structure and pattern of development. The tasks and responsibilities of the Ministry of Road Transport and Highways encompass, inter alia, construction and maintenance of National Highways (NHs), administration of the National Highways Act, 1956, National Highways Authority of India Act, 1988, National Highways Fee (Determination of Rates and Collection) Rules, 2008, Motor Vehicles Act, 1988, and Central Motor Vehicles Rules, 1989, as also formulation of broad policies relating to road transport and automotive norms, besides making arrangements for movement of vehicular traffic with neighbouring countries. The capacity of National Highways in terms of handling traffic (passenger and goods) needs to keep pace with economic growth. (*Source: Annual Report 2021-2022 of the MoRTH available at https://morth.nic.in/*)

Road sector - Institutional arrangement at the Central and State level

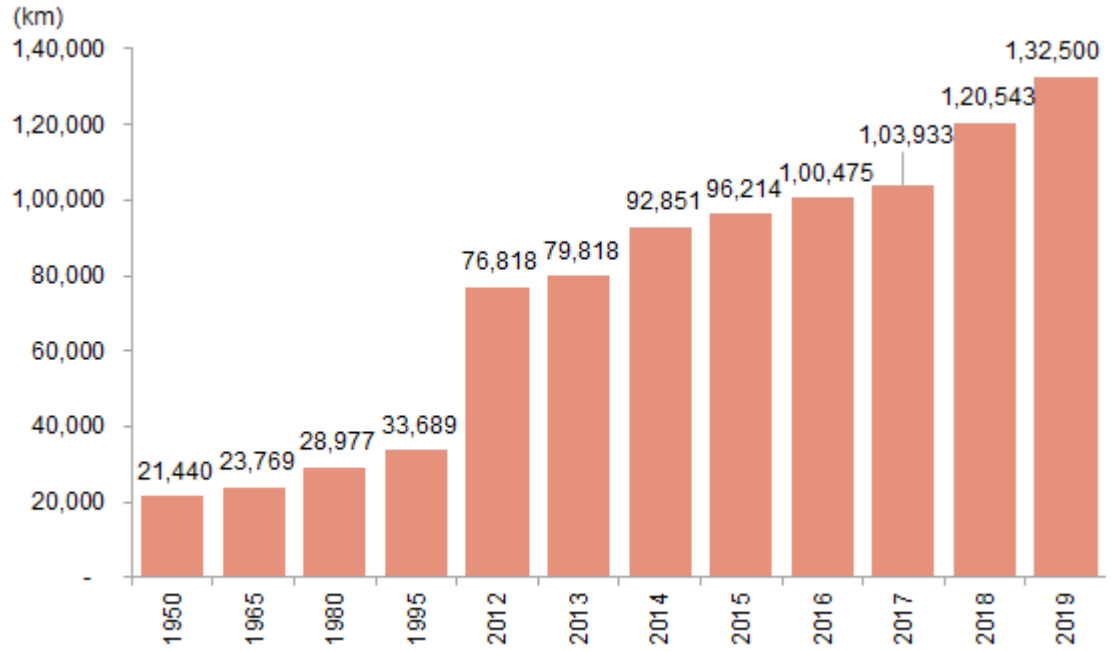


Note: NHIDCL stands for National Highways and Infrastructure Development Corporation
Source: CRISIL Research

Overview – National Highways

As of fiscal 2019, National highways constitute around 2% of the country's road network, but carry about 40% of the total road traffic. The National Highways Authority of India (NHAI), the nodal agency under the Ministry of Road Transport & Highways (MoRTH), is responsible for building, maintaining and upgrading NHs.

National-highway network



Source: Ministry of Road Transport & Highways, CRISIL Report

National Highways Development Project

The NHDP encompasses building, upgradation, rehabilitation and broadening of existing NHs. The project is executed by the NHAI, in coordination with the public works departments of various states. The NHAI also collaborates with the Border Roads Organisation for the development of certain stretches. The NHDP is being implemented in seven phases.

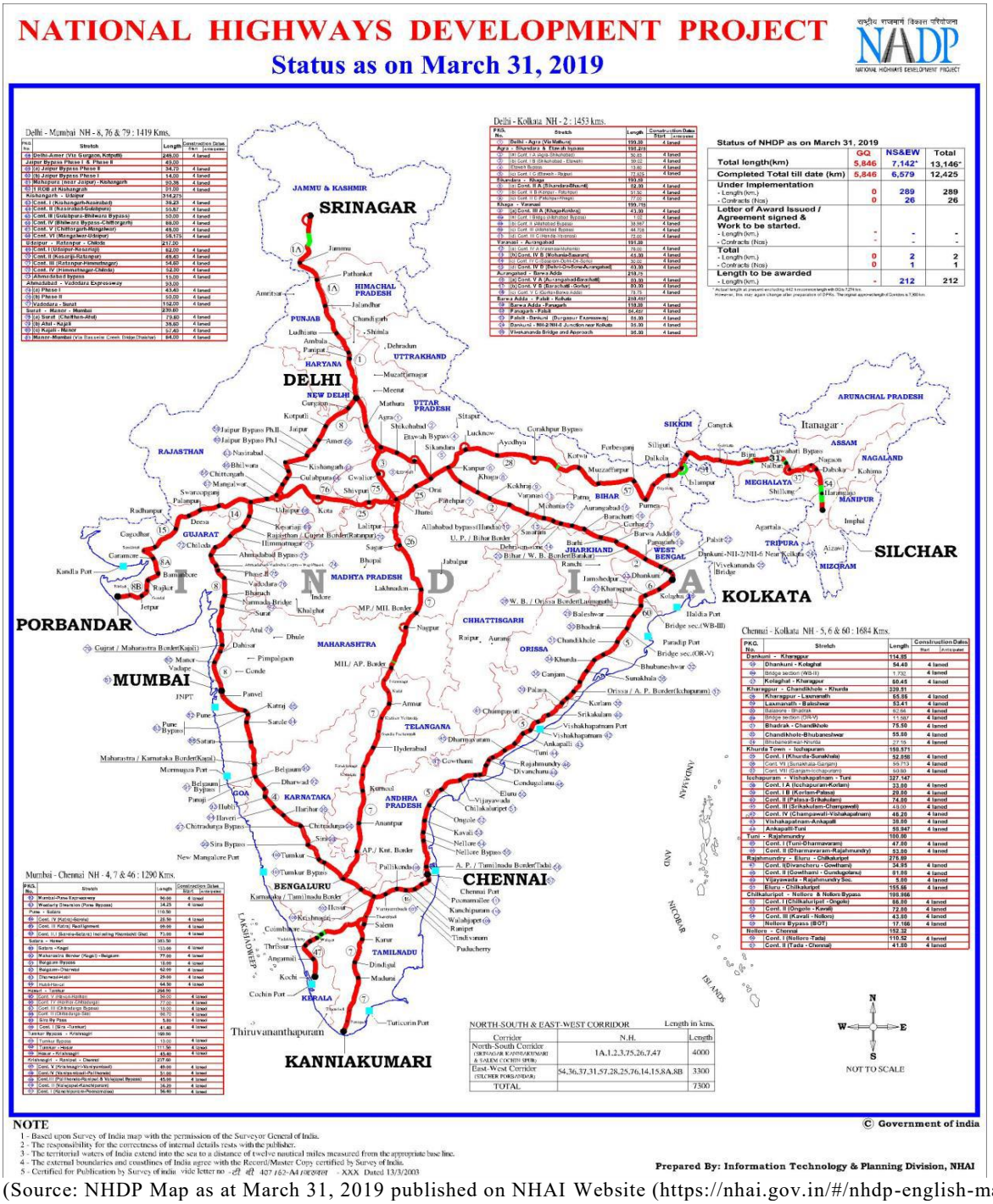
NHDP projects are awarded to private players either on EPC (cash) or build-operate-transfer (BOT) basis, and now on the newly introduced hybrid annuity model (HAM). NHDP cash contracts are mainly financed through budgetary allocations from the Central Road Fund, negative grants/premium received, and toll revenue. Loans and grants are also received from the World Bank and the Asian Development Bank. (Source: CRISIL Report)

Projects under existing the NHDP phases of 5,000-5,500 km to be awarded completely by fiscal 2021. These residual projects would dominate 50% of investments over the next five years.

The status of completion of various phases of NHDP, which have been subsumed under the umbrella programme of Bharatmala Pariyojana, Phase-I, are as under:

NHDP Phases	Length completed up to December 31, 2020 in kms
I+II+III+IV: GQ, Port connection & Up-gradation with 2/4/6-laning / NorthSouth & East West Corridor	38,685
V: 6-laning of GQ and High density corridor	4,088
VI: Expressways	219
VII: Ring Roads, Bypasses and flyovers and other structures	181

(Source: Annual Report 2021-2022 of the MoRTH available at https://morth.nic.in/)



(Source: NHDP Map as at March 31, 2019 published on NHAI Website (https://nhai.gov.in/#/nhdp-english-map)

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, the Parties to the Trust, the Project SPV 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 the risks and uncertainties described below and the information contained elsewhere in this Preliminary Placement Document before making an investment in the Units. In making an investment decision, each investor must rely on its own examination of us and the terms of the offering of the Units. The risks and uncertainties described in this section may not be the only risks and uncertainties the Trust currently faces. 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, financial condition, cash flows and results of operations. If any of the following risks, or other risks that are not currently known or are now deemed immaterial, actually occur, our business prospects, results of operations, cash flows and financial condition could suffer, the price of the Units could decline and prospective investors may lose all or part of their investments. 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.

The financial and other related implications of the risk factors, wherever quantifiable, have been disclosed in the risk factors mentioned below. However, there are certain risk factors where the financial impact is not quantifiable and, therefore, cannot be disclosed in such risk factors. Unless specified or quantified in the relevant risk factors below, we are not in a position to quantify the financial or other implication of any of the risks described in this section.

Investors should be aware that the price of the Units, and the income from them, may be subject to volatility. If any of the risks described below occurs, our business and prospects could be materially and adversely affected, the trading price of the Units could decrease, and investors could lose all or part of their original investment.

This Preliminary Placement Document also contains forward-looking statements (including Projections of Revenue from Operations and Cash Flow from Operating Activities) that involve risks, assumptions, estimates and uncertainties. Our actual results could differ materially from those anticipated in such forward-looking statements as a result of certain factors including the considerations described below and elsewhere in this Preliminary Placement Document.

In making an investment decision, prospective investors must rely upon your own examination and the terms of the Offer, including the merits and the risks involved. You should consult your tax, financial and legal advisors about the particular consequences of investing in the Offer.

In this section, unless specified otherwise, a reference to "we", "us" and "our" refers to the Trust and the Project SPV on a consolidated basis.

Risks Related to the Structure of the Trust

1. ***The monies received from the Offer proceeds shall be retained in the Cash Escrow Account until the completion of the allotment of units to the Sponsor pursuant to the proposed preferential issue to Sponsor and will be refunded to the Bidders in case the proposed issue of Units on a preferential basis to the Sponsor is not completed prior to the Allotment of Units.***

The IM Board by way of its resolution dated August 30, 2022 and September 27, 2022 and the unitholders of the Trust by way of their resolution dated September 23, 2022, have approved the Issue of 131,205,200 Units at or above the base price of ₹ 107.12 per Unit. The IM Board by way of its resolution dated September 27, 2022 have approved the Floor Price of ₹ 109.00 per Unit. Of the 131,205,200 Units, the Trust proposes to undertake the issue of up to 26,241,040 Units to the Sponsor, on a preferential basis ("**Preferential Issue**"), in accordance with the SEBI Institutional Placement Guidelines and the InvIT Regulations. The IM Board by way of its resolution dated September 17, 2022 has approved the Preferential Issue.

The Sponsor, by way of its letter dated September 29, 2022 has confirmed its willingness to subscribe to at-least 19,602,600 Units being offered pursuant to the Preferential Issue and such number of Units as may be approved by the Unitholders, in their meeting scheduled on October 10, 2022, at or above the Floor Price. The Trust has sent a notice dated September 18, 2022, calling for an extraordinary general meeting of the Unitholders on October 10, 2022, to seek approval of the Unitholders for the Preferential Issue. The Offer Closing Date for the Issue is October 3, 2022 and Allotment pursuant to the Offer may be delayed until the completion of the Preferential Issue. There can be no assurance that the Unitholders will approve the Preferential Issue or that the Preferential Issue will be completed in a timely manner or at all. In the event the Preferential Issue is not completed pursuant to the meeting of the Unitholders or for any reasons, the Allotment of Units pursuant to the Offer may be delayed and if completed, the Allotment may lead to the unitholding of certain Unitholders of the Trust exceeding the limits prescribed under the extant provisions of the InvIT Regulations. Accordingly, Bidders may not be allocated or Allotted Units, despite making valid Bids. Further, non-completion of the Preferential Issue would lead to the unitholding of the Sponsor getting diluted below 15%. Accordingly, the monies received from the Offer proceeds are proposed to be retained in the Cash Escrow Account till the completion of the Preferential Issue and will be refunded to the Bidders in case the Preferential Issue is not completed prior to the Allotment of Units.

2. ***We have no operating history for Target Toll Roads and limited historical financial information and, as such, there are limited financial statements and revenue data presented in this Preliminary Placement Document.***

The Project SPV was incorporated on July 23, 2020 to acquire tolling rights from the Sponsor for undertaking tolling, operation, and maintenance of national highways in India. We do not currently have any operations for Target Toll Roads. Furthermore, the Sponsor requested SEBI for an exemption dated August 25, 2022 to allow for the relaxation of strict application of financial disclosure rules per the InvIT Regulations for the Sponsor and the Investment Manager ("**SEBI Exemption Request"**). The SEBI Exemption Request was made on the basis that (i) the Sponsor was incorporated under the NHAI Act and limited historical consolidated financials are available for presentation in the Preliminary Placement Document; and (ii) the Investment Manager has only recently been incorporated by the Sponsor and hence limited historical financial information is available in respect of the Investment Manager. SEBI has acceded to the request and granted exemption through its letter dated September 23, 2022 ("**SEBI Exemption**"). Accordingly, limited financial information with respect to the Sponsor and the Investment Manager and limited financial statements has been disclosed in this Preliminary Placement Document.

Further, SEBI has also acceded to our request in relation to Asset Revenue Information to be disclosed for each InvIT Asset. The Trust has disclosed the revenue data for Target Toll Roads for preceding three complete financial years, until the completed month before the Offer (i.e. August 31, 2022), on the basis of the information provided by the Sponsor by way of its letter dated September 21, 2022. For further details, see "*Asset Revenue Information*" on page 244 of this Preliminary Placement Document. The absence of meaningful historical operating data in respect of Target Toll Roads or financial statements may make it difficult for investors to evaluate our ability to operate, manage and maintain the Target Toll Roads and assess our financial position or future prospects or results of operations. Our inability to successfully operate and manage the Target Toll Roads or to operate and manage the Target Toll Roads in an efficient and cost-effective manner could have an adverse effect on our results of operations and our ability to meet our payment obligations under the Units.

3. ***We must maintain certain investment ratios, which may present additional risks to us.***

Pursuant to the InvIT Regulations, we are required to invest not less than 80% of the value of our assets in eligible infrastructure projects as defined under the InvIT Regulations, such as the Project SPV. In addition, we must not invest more than 20% of the value of our assets in certain financial instruments prescribed under the InvIT Regulations. If these conditions are breached on account of market movements of the price of the underlying assets or securities, the Investment Manager must inform the Trustee and ensure that these conditions are satisfied within six months of such breach (or within one year with Unitholders' approval). Failure to comply with these conditions may present additional risks to us, including divestment of certain assets, delisting and other penalties, which could have a material, adverse effect on our business, financial condition and results of operations.

4. ***We may not be able to make distributions to Unitholders or the level of distributions may fall.***

The Trust's distributions are based on the cash flows generated from the operations undertaken by the underlying Project SPV held by the Trust and not on whether the Trust makes an accounting profit or loss. The InvIT Regulations provide that not less than 90% of net distributable cash flows of the Project SPV are required to be distributed to the Trust in proportion of its holding in the Project SPV subject to applicable provisions of the Companies Act. Not less than 90% of distributable cash flows of the Trust shall be distributed to the Unitholders. Such distributions are required to be declared and made not less than once in every year and shall be made not later than fifteen days from the date of such declaration. The Trust has made distributions of ₹ 1.75 per unit for the three months period ended June 30, 2022. For more details, see the section headed "*Distribution*" on page 199 of this Preliminary Placement Document.

The Trust substantially relies on the receipt of interest, dividends, and principal repayments (net of applicable taxes and expenses) from the Project SPV in order to make distributions to Unitholders. The distributions to Unitholders are in the form of dividends, interest and any other means permitted by law. There can be no assurance or guarantee that the Trust will have sufficient distributable or realised profits or surplus in any future period to make distributions every year in any amount or at all. The ability of the Project SPV to pay dividends, make interest payments and repay shareholder loans may be affected by a number of factors including, among other things:

- business and financial position of the Project SPV;
- insufficient cash flows received from the Project SPV;
- applicable laws and regulations, which may restrict the payment of dividends by the Project SPV;
- ability of the Project SPV to borrow funds and access capital markets;
- operating losses incurred by the Project SPV in any financial year;
- fluctuations in the working capital needs of the Project SPV;
- changes in accounting standards, taxation laws and regulations, laws and regulations in respect of foreign exchange repatriation of funds, corporation laws and regulations relating thereto; and
- the terms of agreements, including the Concession Agreements or financing agreements, to which the Project SPV is, or may become, a party.

Further, the method of calculation of the net distributable cash flows may change subsequently due to regulatory changes. Any change in applicable laws in India or elsewhere (including, for example, tax laws and foreign exchange controls) may limit our

ability to pay or maintain distributions to our Unitholders. Furthermore, no assurance can be given that we will be able to pay or maintain the levels of distributions at all, or that the level of distributions will increase over time, or that future acquisitions will increase our distributable cash flow to our Unitholders. Any reduction in, or delay/default in payments of distributions could materially and adversely affect the market price of our Units.

In addition, the financing agreements entered into by Project SPV with banks, financial institutions and/or other lenders contains certain restrictive covenants, including, but not limited to, requirements that they obtain consent from the lenders prior to making any dividend payments to the Trust. Any failure to obtain such consents in a timely manner or at all would impede our ability to make distributions to Unitholders on a regular basis or at all, which could materially and adversely affect the market price of the Units. Additionally, following a default under our financing agreements, lenders may take coercive actions as per the rights available to them under applicable law, which may restrict our ability to conduct business and operations.

5. ***The Trust is proposing to undertake a public issue of secured, rated, listed, redeemable, non-convertible debentures and bank debt to fund initial improvement works of Target Toll Roads. We cannot assure that that Trust will be able to successfully raise the debt and any failure to raise capital may have an adverse effect on our results of operations or successful completion of the Offer..***

The Trust had entered into an agreement with lenders for availing ₹ 20,000.00 million on September 29, 2021 for acquisition of Initial Toll Roads. The Trust had drawn down Facility A amount equivalent to ₹ 14,800.00 million as of the date of this Preliminary Placement Document. The Trust also proposes to undertake a public issue of secured, rated, listed, redeemable, non-convertible debentures ("**NCDs**") within the borrowing limits stipulated under its authorizations including as authorized by the unitholders ("**NCDs**") in terms of the InvIT Regulations and Securities and Exchange Board of India (Issue and Listing of Non-Convertible Securities) Regulations, 2021 ("**SEBI ILNCS Regulations**") and the SEBI circular SEBI/HO/DDHS/DDHS/CIR/P/2018/71 on "Guidelines for issuance of debt securities by Real Estate Investment Trusts (REITs) and Infrastructure Investment Trusts (InvITs)" dated April 13, 2018, as amended from time to time and the SEBI circular SEBI/HO/DDHS/P/CIR/2021/613 entitled "Operational Circular for issue and listing of Non-convertible Securities, Securitised Debt Instruments, Security Receipts, Municipal Debt Securities and Commercial Paper" dated August 10, 2021, as amended from time to time ("**SEBI Circulars**") (such proposed issuance, the "**NCD Issuance**") for acquisition of Target Toll Roads. The Trust proposes to raise debt of up to ₹ 15,000.00 million through NCD issuance. The NCDs are proposed to be issued under a single series, where the face value of each NCD will be aggregated to ₹ 1000, consisting of 3 (three) separately transferable and redeemable principal parts ("**STRPP**") namely STRPP A, STRPP B and STRPP C, with an option to retain oversubscription up to the limits permitted under applicable law and the corporate authorization obtained by the Investment Manager in relation to borrowings that can be made by the Trust. The Trust proposes to file Draft Prospectus with the Stock Exchanges and proposes to file the Final Prospectus with SEBI and the Stock Exchanges. Any failure to raise capital through the proposed debt issuance could have an adverse effect on our results of operations and our ability to meet our payment obligations in relation to the Units.

Any failure to raise capital through the proposed debt issuance could have an adverse effect on our ability to meet our payment obligations in relation to Target Toll Roads. Further, until the completion of the NCD Issuance, the Trust also proposes to raise a short-term rupee loan for ₹ 1,500 crores as a bridge to the proposed NCD Issuance. However, if the NCD Issuance fails or is delayed, the Trust runs a risk of refinancing of the said short-term rupee loan.

Further, a rupee term loan of ₹ 857 crore (along with bank guarantee of ₹ 20 crore) has been sanctioned by the Bank of Maharashtra on September 19, 2022 in favour of the Trust. The same shall be utilized towards completion of the initial improvement works of the Target Toll Roads in accordance with the Additional Concession Agreements The financing documentation to be entered into in relation to the aforementioned may be subject to certain closing and other conditions that may prevent us from providing debt financing to the Project SPV.

Any inability of the Trust to complete the debt financing transactions in the manner described in this Preliminary Placement Document may adversely impact the ability of the Trust to make distributions to Unitholders in the manner described in this Preliminary Placement Document or at all and the Eligible Investor may be unable to rely on the Projections of Revenue from Operations and Cash Flow from Operating Activities or evaluate the manner in which we propose to invest the Net Proceeds on the economic merits of such investments. Such event may materially and adversely affect the ability of the Trust to make distributions to the Unitholders.

In the event the Project SPV avails debt in the future and intends to refinance a certain portion of their outstanding indebtedness with the Trust, such refinancing would require prior consent of the Authority under the relevant Concession Agreements. The approval of the Authority has to be in conformity with any regulations or guidelines that may be notified by the Government or the Reserve Bank of India, as the case may be. Further, the utilisation of the Net Proceeds by the Trust is not subject to monitoring by any independent agency.

6. ***The regulatory framework governing infrastructure investment trusts in India is evolving and the interpretation and enforcement thereof involve uncertainties, which may have a material, adverse effect on the ability of certain categories of investors to invest in the Units, our business, financial condition and results of operations and our ability to make distributions to Unitholders.***

The SEBI issued the InvIT Regulations with effect from September 26, 2014. The regulations have been amended and supplemented with additional guidelines and circulars.

As the regulatory framework governing infrastructure investment trusts in India comprises a separate set of regulations, interpretation and enforcement by regulators and courts involves uncertainties. Furthermore, regulations and processes with respect to certain aspects of infrastructure investment trusts, including, but not limited to, follow-on public offers and bonus issues, the liabilities of the Unitholders, and the procedure for dissolution and delisting of infrastructure investment trusts have not yet been issued. For example, infrastructure investment trusts are not "companies" or "bodies corporate" within the meaning of the Companies Act, 2013 and various SEBI regulations, including the Securities and Exchange Board of India (Buy-back of Securities) Regulations, 2018 and the Securities and Exchange Board of India (Substantial Acquisition of Shares and Takeovers) Regulations, 2011.

In addition, new costs may arise from audit, certification and/or self-assessment standards required to maintain compliance with the InvIT Regulations. Such changes in regulation, interpretation and enforcement may have a material, adverse effect on our business, financial condition and results of operations.

As we will be operating in a new and relatively unclear regulatory environment, it is difficult to forecast how any new laws, regulations or standards or future amendments to the InvIT Regulations will affect infrastructure investment trusts and this could have any consequential impact on the infrastructure sector in India, and no assurance can be given that the regulatory system will not change in a way that will impair our ability to comply with the regulations, conduct our business, compete effectively or make distributions.

Further, the Finance Act, 2021 ("**Finance Act**") has introduced various amendments to taxation laws in India. The Finance Act has included definition of 'pooled investment vehicle' under the Securities Contracts (Regulation) Act, 1956, which shall comprise business trusts as defined under the IT Act. The IT Act defines business trusts to include trusts registered with SEBI as an InvIT under the InvIT Regulations. The Finance Act and the amendments in the Securities Contracts (Regulation) Act, 1956 which have come into effect from April 1, 2021 have also recognised units, debentures and other instruments issued by InvITs as 'securities' which may have further implications under various regulations issued by SEBI governing securities, including under the Securities and Exchange Board of India (Listing Obligations and Disclosure Requirements) Regulations, 2015, as amended and the Securities and Exchange Board of India (Prohibition of Insider Trading) Regulations, 2015, as amended.

Further, the dividend distribution tax regime has been abolished and replaced with dividend withholding tax regime. However, the procedural provisions regarding exemption of withholding tax in relation to dividend distribution by Special Purpose Vehicles (SPVs, as defined under IT Act) to InvIT were absent. In this regard, the Finance Act has exempted withholding of taxes on dividend distributions by SPVs to InvITs..

As such, there is no certainty on the impact that the Finance Act, may have on our business and operations or on the industry in which we operate. We cannot predict whether any tax laws or other regulations impacting it will be enacted or predict the nature and impact of any such laws or regulations or whether, if at all, any laws or regulations would have a material adverse effect on our business, financial condition and results of operations.

Failure to comply with changes in laws, regulations and standards may have a material, adverse effect on our business, financial condition, results of operations and prospects.

7. ***Our Project SPV may not be able to claim depreciation in relation to toll collection rights acquired from the Sponsor.***

The Initial Toll Roads acquired by the Project SPV were based on BOT model and are eligible to claim expenditure incurred on development and construction of infrastructural facilities in terms of the CBDT circular no. 09/2014 dated April 23, 2014 ("**Circular**"). The Circular provides that cost of construction on development of infrastructure facility of roads/highways under BOT projects may be amortized evenly over the concessionaire period (excluding time take for creation of such facility).

The Target Toll Roads are TOT projects wherein the Concessionaire shall not undertake construction and shall only collect toll and operate and maintain the highway. We believe that upfront concessional payment made by the Project SPV for acquisition of toll right may be considered akin to acquisition of business or commercial rights and Project SPV shall be eligible to claim depreciation under section 32 of the IT Act under the head of 'intangible assets'. However, tax authorities may interpret and take a contrary view in relation to the above which may adversely affect our business and profitability.

Risks Relating to Our Business and the Concession Agreements

8. ***Any payment by the Project SPV, including in the event of the termination of the Concession Agreements, is subject to a mandatory escrow arrangement which restricts its flexibility to utilise the available funds.***

The escrow arrangement mandated under the Concession Agreements requires all monies that are received by the Project SPV, including funds constituting the financial package, the fees and any other revenues collected from or in respect of the Project Highway (including the proceeds of any rentals, deposits, capital receipts or insurance claims) and all payments by the Sponsor

(including, if any, in relation to the change of scope), to be deposited in an escrow account and utilised only in accordance with the order prescribed under the escrow agreement. The consent of NHAI, in its capacity as the concessioning authority (the "**Authority**"), and lenders, is required to amend the order of outflow of payments from such escrow account.

The escrow arrangements prioritise the payment of all taxes due, followed by payment of the concession fee to the Authority, expenses in connection with the construction of the project, operation and maintenance expenses, other costs and expenses incurred by the Sponsor, debt service payments, any payments and damages due and payable to the Sponsor, and balance, if any, in accordance with the instructions of the concessionaire. For details of the escrow arrangement, please see the section headed "*Summary of the Concession Agreements*" on page 145 of this Preliminary Placement Document.

The debt financing provided by the Trust to the Project SPV and any future debt financing proposed to be provided comprises of certain secured or unsecured interest-bearing loans (collectively, the "**Trust Financing**") which will be classified as senior debt under the Concession Agreements. In accordance with the escrow arrangement, the amounts payable to the Trust in respect of the Trust Financing, will be subordinated to the amounts payable in respect of taxes due, concession fees, construction expenses, operation, maintenance and other costs and expenses. Further, any reduction in the cash flows of the Project SPV and/or an unanticipated increase in any of the abovementioned payments to be made by the Project SPV from the escrow accounts may result in decreased and/or delayed payment to the Trust, materially and adversely impacting the ability of the Project SPV to meet their payment obligations to the Trust. Any inability on the part of the Project SPV to meet their payment obligations to the Trust may adversely impact the ability of the Trust to make distributions to the Unitholders in the manner described in this Preliminary Placement Document or at all.

In case of withdrawals from the escrow account on termination, the escrow arrangement prioritises the payment of all taxes due and payable, followed by the payment due to senior lenders (which includes the Trust), any payments and damages due and payable to the Sponsor, retentions and payments arising out of liability for any defects and deficiencies, incurred or accrued operation and maintenance expenses and any other payments under the Concession Agreements, after which the balance may be withdrawn by the Project SPV for its own purposes. Therefore, in case of termination, the amounts payable to the Trust in respect of the Trust Financing may be recovered only after payment of all taxes.

9. ***The Sponsor, whose interests may be different from the other Unitholders, will be able to exercise significant influence over certain activities of the Trust, and under the InvIT Regulations, it has the ability to divest its holdings in the Units three years following the Offer.***

As on date of this Preliminary Placement Document, the Sponsor holds 16.06% of the Units. After the completion of the Offer, i.e. on a post-Offer basis, the Sponsor will own an aggregate of not less than 15% of the issued and outstanding Units and will be entitled to vote as a Unitholder on all matters other than matters where it is a related party and not permitted to vote under the InvIT Regulations. Thus, the Sponsor may be in a position to exercise significant influence in matters which require the approval of Unitholders by virtue of its ownership of Units in the Trust. The interests of the Sponsor may conflict with the interests of our other Unitholders and the Sponsor may, for business considerations or otherwise, seek to benefit itself instead of the Trust or the interests of the other Unitholders. The Sponsor will also exercise significant influence over the Project Manager, which is a wholly owned subsidiary of the Sponsor. Accordingly, the Project Manager may also be subject to conflicts of interest with respect to the Trust.

In addition, under the InvIT Regulations, the Sponsor will be able to divest its holding in the Units at any time three years subsequent to the Initial Offer after completion of the lock-in period prescribed under the InvIT Regulations. Given the influence that the Sponsor exerts on the Investment Manager and the Project Manager, and consequently the operations and credibility of the Trust, any material divestiture by the Sponsor in the Units, or any conflict of interest that it has compared to that of other Unitholders, could have a material adverse impact on our business, financial condition and results of operations.

10. ***The cost of implementing new technologies for collection of tolls and monitoring our projects could materially and adversely affect our business, financial condition and results of operations.***

Our future success will depend in part on our ability to respond to technological advances and emerging standards and practices on a cost-effective and timely basis. In addition, rapid and frequent technology and market-demand changes can often render existing technologies and equipment obsolete, requiring substantial new capital expenditures or write-downs of assets. Any failure by us to successfully adopt such technologies in a cost-effective and timely manner could increase our costs. Additionally, governmental authorities may require adherence with certain technologies in the execution of projects, tolling, operations and maintenance etc. and there can be no assurance that we would be able to implement the same in a timely manner, or at all. For example, the GoI recently introduced FASTag lanes on toll plazas as a policy initiative wherein there is an exclusive lane in the toll 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 proper functioning of such technology infrastructure is essential to the conduct of our business. There can be no assurance that we would be able to replace or refurbish such equipment and further such replacement or refurbishment might not be undertaken in a cost-effective manner and any increased costs to us as a result of such replacement or refurbishment will adversely affect our profit margins and cash flows.

11. ***We may face limitations and risks associated with debt financing and refinancing.***

We are subject to regulatory restrictions in relation to our debt financing and refinancing. We may from time to time require debt financing and refinancing to carry out the Investment Manager's investment strategy and to cover maintenance costs. In the event that we undertake debt financing or refinancing, we may be limited by Indian law as to the form of financing or refinancing that we may undertake. As an InvIT, we may be unable to access certain debt capital available to companies.

In the event that we undertake debt financing or refinancing, we may also be subject to risks associated with debt financing and refinancing, including the risk that our cash flow may be insufficient to meet required payments of principal and interest under such financing and to make distributions to Unitholders. Our ability to generate sufficient cash to satisfy our debt obligations will depend on our future operating performance, which may be affected by prevailing economic conditions and financial, business and other factors beyond our control. There is no assurance that we will be able to generate sufficient cash flow to meet all of our debt obligations. If we are unable to make payments due under our debt facilities, the lenders may be able to declare an event of default and initiate enforcement proceedings relating to any security provided in respect of the loan facilities, and/or call upon any guarantees, and this may materially and adversely affect our ability to make distributions to Unitholders. Such default may also result in the termination of the Concession Agreements by the Sponsor.

12. ***Certain actions of the Project SPV require the prior approval of NHAI, and no assurance can be given that NHAI will approve such actions in a timely manner or at all.***

Certain terms and conditions in the Project SPV's Concession Agreements, financing agreements, and our other approvals require the Authority's prior written approval to be obtained for one or more of the following actions, among others, such as:

- assignment of the Concession Agreements to any persons, the creation of any encumbrance over, or transfer or disposal of rights and benefits of the Project SPV under the Concession Agreements or any project agreements;
- the selection or replacement of any operation and maintenance contractor and execution of the operation and maintenance agreements;
- securing refinancing; andany change in ownership of the Project SPV.

Furthermore, the Concession Agreements with NHAI typically require the submission to NHAI, for its review and comments, all project agreements to which the Project SPV is a party prior to entry, amendment or replacement of such agreements. In terms of the Additional Concession Agreements, in the event NHAI does not provide any comments within 15 days of such submission, the project agreement may be executed and submitted to NHAI within 7 days of such execution.

The restrictions described above may impose constraints on our flexibility to conduct our business. Furthermore, if as a result of these restrictions, we are unable to pursue a favourable course of action or to respond to an unfavourable event, condition or circumstance, then our business, financial condition and results of operations may be materially and adversely affected. For further details on the terms of the Concession Agreements, section headed "*Summary of the Concession Agreements*" on page 145 of this Preliminary Placement Document.

13. ***Any delay in determination of Appointed Date (as defined in the Additional Concession Agreements) by the Authority may adversely impact our cashflows and revenue.***

The rights, privileges, liberties and obligations of the Concessionaire, shall commence from the date on which all conditions precedents, as stipulated in the Additional Concession Agreements, would have been satisfied. The Concessionaire shall enter into commercial service on the Appointed Date whereupon the Concessionaire shall be entitled to demand and collect fee and perform its O&M obligations, subject to and in accordance with the provisions of the Additional Concession Agreement. The determination of the Appointed Date by the Authority shall be final, conclusive and binding on the Concessionaire. Any delay in such determination of the Appointed Date may adversely affect our revenue generation, toll collection and cash flows and would have a material impact on our business and operations.

14. ***The Project SPV's toll-road concessions may be terminated prematurely under certain circumstances.***

The Toll Roads concessions of the Project SPV are our principal assets. We will be unable to continue the operation of a particular road concession without a continuing concession right from the Sponsor, in its capacity as Authority. A concession may be terminated by the Sponsor for certain reasons set forth in the Concession Agreements, including, but not limited to, one or more of the following:

- any failure by the Project SPV to comply with the change of ownership requirements;
- any failure by the Project SPV to make any payments, including negative grants, to the Sponsor in a timely manner;
- any failure by the Project SPV to comply with maintenance requirements;
- in the event the Project SPV abandons or manifests intention to abandon the operation and maintenance of the Project Highway;
- any occurrence of an event of default under any financing document;
- any continuation of a force majeure event, such as an act of God, act of war, expropriation or compulsory acquisition of any project assets by the government, strikes, civil commotions, boycotts and political agitations, beyond a specified time; and

- any failure by the Project SPV to comply with the Concession Agreements if such default causes a material adverse effect on the Sponsor.

If the Concession Agreements are terminated by the NHAI due to a default by the Project SPV, or by the Project SPV due to a default by the NHAI, the Project SPV is entitled to termination payments or otherwise from the NHAI in accordance with the terms of the relevant Concession Agreements. If the Concession Agreements are terminated prematurely, our business, financial condition and results of operations may be materially and adversely affected. For further details on the termination of the relevant Concession Agreements, the termination payments, and the definition of "default" as contemplated under the Concession Agreements, see the section headed "*Summary of the Concession Agreements*" on page 145, of this Preliminary Placement Document.

15. ***Toll collections and Toll Road traffic volumes may be affected by existing or new competing roads and bridges and other modes of transportation, and any improvements to, or construction of, such roads, bridges and other modes of transportation.***

Upon commencement of the concessions, our principal source of revenue will be the collection of toll fees from users of the Toll Roads. The level of toll collections may be affected by existing or new competing routes and alternative modes of transportation, such as adjacent free roads, new or existing toll roads including national highways or state toll roads, railways or air transport. Although the Concession Agreements contain certain restrictions on the ability of the Sponsor to construct or cause to be constructed any competing roads within 15 kilometers of the Toll Roads, the Sponsor is not prohibited from constructing such competing free or toll roads if the average traffic on the Toll Road exceeds 90 per cent. of its stipulated designed capacity for three consecutive years. Furthermore, the Sponsor is not restricted under the Concession Agreements from constructing alternative modes of travel which service the same areas as are serviced by the Toll Roads.

In particular, the Sponsor has entrusted the Project SPV with the role of development, operation, maintenance and management of the Toll Roads mentioned hereinbelow.

Toll Road	Length of Toll Road (in kms)	Connecting States
Abu road - Swaroopganj	31.000	Rajasthan to Gujarat
Chittorgarh – Kota & Chittorgarh Bypass	160.500	Madhya Pradesh -Rajasthan
Kothakota Bypass – Kurnool Highway	74.622	Telangana – Andhra Pradesh
Palanpur/Khemana – Abu Road	45.000	Gujarat - Rajasthan
Maharashtra Border – Belgaum	77.705	Maharashtra -Karnataka
Agra Bypass	32.800	Uttar Pradesh-Madhya Pradesh
Borkhedi Kelapur Project Highway	138.150	Maharashtra – Telanagna
Shivpuri Jhansi Project Highway	75.300	Madhya Pradesh – Uttar Pradesh

Additionally, given the renewed focus of the GoI, at the national, state and local levels, on the development and strengthening of the highway network across India, subject to the aforementioned restriction, 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 transportation, 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 meet our payment obligations under the Units.

16. ***Our business will be subject to seasonal fluctuations that may affect our cash flows.***

Our cash flows will be affected by seasonal factors, 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 Toll Roads. This may result in delays in periodic maintenance and reduce productivity, thereby materially and adversely affecting our business, financial condition and results of operations.

17. ***Toll rates and collections and Toll Road traffic volumes are dependent on factors beyond our control and are subject to significant fluctuations.***

Revenue from toll receipts is affected by traffic volume and toll rates, both of which are beyond our control. The toll rate structure is laid down under National Highways Fee (Determination of Rates and Collection) Rules, 2008, as amended from time to time (the "**Fee Rules**"). The Fee Rules specify that the applicable toll rates specified thereunder shall be increased by three per cent. each year along with an adjustment based on an increase in the wholesale price index (the "**WPI**"). We are not provided with any flexibility to adjust the toll rates as the rates are explicitly changed by the GOI in accordance with the Fee Rules. See "*—Toll collections are affected by applicable toll rates and revisions to such rates and the number of road users subject to such rates.*"

Traffic volumes on the Toll Roads and toll collections are directly and indirectly affected by a number of other factors beyond our control, including but not limited to:

- the growth of the Indian economy and the economic development of the states in which the Toll Roads are located as well as neighbouring states (the "**Project Influence Area**");
- restrictions on mining, or a decline in manufacturing or exports of commodities plying on the Toll Roads due to regulatory clampdowns or other reasons;
- the number and type of motor vehicles in operation and the cost of purchasing and operating motor vehicles, including financing costs, environmental law compliance costs, exchange rate fluctuations and fuel prices, in the Project Influence Areas;
- weather conditions, such as floods or torrential rain, acts of God, strikes or any other force majeure event, including epidemics, such as COVID-19, that could impair the safe operation of, restrict traffic access to, or prevent use of the Toll Roads;
- traffic on the roads providing access to and from the Toll Roads, or the physical condition of such roads, which hampers the ability of road users to gain access to and from the Toll Roads;
- the capacity and physical condition of the Toll Roads, or any structure forming part of the Toll Roads, such as bridges, bypasses or tunnels, and the need for maintenance and repair 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;
- overall security of the Toll Roads as managed by the relevant security contractors, including the possible threat of terrorist attacks on the Toll Roads or any of their free-standing structures;
- a change in the applicable toll policies or other applicable laws which affects any category of vehicle or fuel;
- changes to axle load norms in order to further increase the permissible axle load limits in India, which may adversely impact traffic growth along Indian national and state highways and cause accelerated deterioration of the condition of the pavement of the Toll Roads;
- the reactions of the public or other national or state government institutions to toll rate increases; and
- seasonal holidays.

In the event there is a significant decrease in traffic volume or change in toll rates on the Toll Roads, there may be a corresponding decrease in toll collections which could have a material adverse effect on our ability to meet our payment obligations under the Units.

18. ***We are subject to environmental, social and safety risks associated with the operation of the Toll Roads which could adversely affect our business, cashflows and our results of operations.***

We are subject to laws and government regulations, including in relation to safety, health, and environmental protection. Environmental laws and regulations in India are becoming more stringent, and their effect on our operations, cannot be predicted with any certainty. Any failure on our part to comply with any existing applicable to us may result in legal proceedings being commenced against us, third party claims, or the levy of regulatory fines. For instance, a small portion of Shivpuri Jhansi Project and Borkhedi Kelapur Project passes through an 'eco-sensitive zone', as declared by the Ministry of Environment, Forest, and Climate Change. It may be required by the jurisdictional forest management or any relevant authority, in creating a biodiversity management plan and manage the same during the entire operating period of the Shivpuri Jhansi Concession Agreement. Our Project SPV will require specialised resources and consequently additional costs for creation and management of biodiversity plan and we cannot assure that this will not have an adverse effect on revenue generation.

Further, we might have to incur additional costs to comply with the rules and regulations applicable to us. The classification of small portion of Shivpuri Jhansi Project and Borkhedi Kelapur Project as 'eco-sensitive zone', has resulted in limitation of permissible land use between the carriageway and the right of way and may cause spatial limitations of usage of areas adjoining the right of way for undertaking maintenance activities. Such restraints may result in additional costs for undertaking routine maintenance or repairs in such sections of project highway.

There might be certain safety risks associated with the operation of the Toll Roads. For example, the Agra Bypass Project Highway passes largely through farm land and the animals may intrude on the relevant project highway which may result into accidents causing loss of lives or damage to the property. We may have to incur additional costs to prevent such damage. If we fail to prevent any such incident, our potential exposure may include fines and civil or criminal sanctions, third-party property damage or personal injury claims and clean-up costs. The amount and timing of costs under environmental laws are difficult to predict.

19. ***We are subject to risks associated with outbreaks of diseases or similar pandemics or public health threats, such as the novel coronavirus ("COVID-19"), which could have a material adverse impact on our business and our results of operations and financial condition.***

In the past, various contagious diseases have spread throughout the world, including India where the entire operations of Sponsor or the Toll Roads are located. Most recently, beginning in late 2019 and continuing in 2020, 2021 and 2022, the global spread of COVID-19 has created significant economic and political volatility and uncertainty and business disruption. The

spread of COVID-19 has led to governments around the world to take various measures such as the implementation of incoming and outgoing travel restrictions, voluntary and mandatory cessations of business operations, mandatory quarantines and work-from-home and other alternative working arrangements, curfews, limitations on social and public gatherings and partial lockdowns of cities or regions in order to limit the virus' spread. The spread of COVID-19 and governmental responses have resulted in worker absences, reduced business productivity, other business disruptions, reduced demand and stagnated economic activity in India and around the world. The ultimate extent of COVID-19 on our business, financial condition and results of operations will depend on future developments, which are highly uncertain and cannot be predicted. More generally, any epidemic, pandemic or other health crisis, whether similar to COVID-19, SARS, H1N1, MERS or other past global diseases, could materially and adversely affect our business, financial condition and results of our operations.

20. ***Leakage of the tolls collected on the Toll Roads may adversely affect toll collections.***

Toll collections are dependent on the integrity of our toll collection system. Upon commencement of the concessions, the Toll Roads will be operated on an "open" toll collection system with different toll rates applicable to certain classes of vehicles; each motorist using a particular class of vehicle is charged a flat rate at the point of entry to the toll road regardless of the actual distance travelled.

The level of toll collections may be reduced by leakage through toll evasion, fraudulent acts on the part of road users or our toll collection operators, theft, technical faults in our toll collection systems, or unlawful roadway entries or exits by road users to avoid paying the required toll. To the extent we become aware of any routes available to road users to bypass the toll plazas, we may face delays in obtaining approval from the Sponsor to implement additional toll plazas to prevent such unauthorized entry or exit to the Toll Roads, which may adversely affect our revenue and our ability to meet our payment obligations under the Units. If toll collection is not adequately monitored, leakage may reduce toll collections. Although we expect to put in place systems and software, as well as deploy a number of toll plaza supervisors and security manpower, to minimize leakage through fraud and theft, if there is any significant failure in the efficiency or effectiveness of our collection practices or of the installed system software or any significant failure by us or our contractors to control leakage in toll collection, there could be a material adverse effect on our toll collections.

Furthermore, there may be situations where toll collection is disrupted or stopped, for example, due to public disturbances, or strikes or work stoppages as a result of disputes with local labour unions. Any such disruption or other stoppage of toll collection may interfere with our collection practices, resulting in increased leakage and reduced toll collections by us, which may adversely affect our revenue and our ability to meet our payment obligations under the Units.

21. ***The termination payment due to us upon termination of the Concession Agreements may not adequately compensate us for the actual costs and investments associated with the Toll Roads in a timely manner or at all and thus may not provide us with sufficient funds to repay the Units.***

The Concession Agreements may be terminated by us or the NHAI prior to their expiration for a number of reasons. For details, see "*—The Project SPVs Toll-Road Concession may be terminated prematurely under certain circumstances.*" on page 66. In the event that the early termination of the Concession Agreements is due to a breach by us, we are entitled to receive a termination payment equal to 70 per cent of the Unexpired Cash Flow (*as defined in the Concession Agreements*) in addition to remaining liable for costs and liabilities in relation to the Toll Roads. In the event that the early termination of the Concession Agreements is due to a breach by the NHAI, we are entitled to receive a contractually agreed termination amount equal to 105% of the the Unexpired Cash Flow (*as defined in the Concession Agreements*). As the termination payment payable to us in the event of a breach by us would be lower than what we would have otherwise been entitled to receive in the event that the Concession Agreements had not been terminated, we may not be adequately compensated for the actual costs and investments associated with the Toll Roads and, therefore, may not be able to meet our payment obligations in relation to the Units or proposed debt issuance.

There is no assurance that any termination payment due to us will be paid in a timely manner or at all. Further, there are no precedents of termination payments being triggered in respect any other TOT projects in India. In the event of a delay in the disbursement of a termination payment by the Sponsor, in particular, if any dispute arises in respect of such payment, or in the event the Sponsor fails to make the termination payment at all, there may be insufficient funds available for us to meet our payment obligations under the Units.

22. ***Toll collections are affected by applicable toll rates and revisions to such rates and the number of road users subject to such rates.***

Under the terms of the Concession Agreements, the toll rates applicable to the Toll Roads are determined in accordance with the Fee Rules. The applicable toll rates shall be increased by 3 per cent. each year and are subject to an adjustment in accordance with the Fee Rules on April 1 of each year based on the difference in the WPI between the week ending on January 6, 2007 and the week ending on or immediately after January 1 of such year of adjustment (the "**WPI Adjustment**"). The WPI Adjustment shall be restricted to 40 per cent of the increase in the WPI. In recent years, there has been little correlation between changes in the consumer price index (the "**CPI**") and the WPI, or between increases in the minimum wage and the WPI. As such, in the event of high CPI 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. Furthermore, an increase in the applicable toll rates may result in a reduction in overall toll collections if the higher toll rates cause a reduction in the traffic flow on the Toll Roads.

Our toll collections may also be affected by the level of exemptions, i.e. the number of road users required to pay the applicable toll rates when using the Toll Roads. 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.

Any inability to introduce or any delay in introducing adjusted toll rates to address, among other things, changes to the economic environment, higher operating and maintenance costs, decreased revenue due to a decrease in traffic volume, or changes in exchange rates or consumer preferences, any increase in the toll rates causing a reduction in traffic volume, or any increase in the number of road users who are exempt from payment of user fees or entitled to discounted fees in respect of the Toll Roads, would have a material adverse effect on our toll collections and, therefore, our ability to meet our payment obligations under the Units.

23. ***Our revenues under the Transitional Support Agreement are dependent on successful continuation of underlying tolling contracts.***

The Sponsor, Project Manager and the Project SPV have entered into a transitional support agreement dated September 26, 2022 for the purpose of the Sponsor providing transitional support to (i) the Project SPV in respect of its O&M obligations and tolling obligations in relation to the Additional Concession Agreements; and (ii) the Project Manager in respect of its obligations under the Project Implementation and Management Agreement. As a result, the Sponsor is obligated, during the term of the Transitional Support Agreement, to undertake the tolling obligations/ tolling related responsibilities under and in compliance with the Additional Concession Agreement(s) on behalf of the Concessionaire. In furtherance of this, the Sponsor has entered into tolling contracts with certain third-party contractors in respect of the project highways under which these contractors pay the Sponsor a fixed contracted fee on a regular basis irrespective of the actual quantum of fee collected in respect of the project highway.

The Sponsor shall continue to operate tolling contracts on "as is basis" during the transition period from appointed date. Further, the remittance (which would be due to the Sponsor) under such tolling contracts would be credited directly to the Project SPV on consummation of the transaction. All these tolling contracts have a defined period and have set expiry dates. Furthermore, some of these tolling contracts may expire during the period of transition. Additionally, the tolling contracts have a clause related to pre-mature termination in case of default by the third-party contractors. In either of these scenarios, the Sponsor could be required to enter into new contracts or extend such contracts, and the remittance amount from those renewed tolling contracts might be lesser than the current contracted amount. This could have a material adverse effect on our business, financial condition and prospects.

24. ***The operation of the Toll Roads and the revenues generated from them may be impacted as a result of any capacity augmentation or other works required to be carried out in accordance with the terms of the Concession Agreements or any RFPs floated by the Sponsor.***

The Sponsor has the right under the terms of the Concession Agreements to undertake, through a contractor, at its own cost, capacity augmentation of the Toll Roads. In connection with any capacity augmentation work in respect of the Toll Roads, the toll fees shall be reduced to 75% during the period of construction in terms of the applicable fee rules. There can be no assurance that construction work will be completed in the expected time frames, and if they are not, this would adversely impact the revenue of the relevant Project SPV.

In exercise of its rights relating to capacity augmentation under the Initial Concession Agreements, the Sponsor may from time to time release Request for Proposals ("**RFPs**") for construction activities on the Toll Roads. For example, in August 2021, the Sponsor had released RFPs inviting bids for construction works on certain sections of the Belgaum Kagal Project. The RFPs contain the timeframe within which the construction must be completed and details of works to be completed during augmentation including the proposed structures like flyovers and bridges. There can be no assurance that the capacity augmentation or construction under these RFPs would be completed within the expected time frames. Further, the length of these structures would determine the permitted increase in Toll Fees that the concerned Project SPV would be entitled to charge upon successful completion of the construction. The actual increase in length of the structures and in turn, permitted increase in Toll Fees is dependent on several factors beyond our control, such as, the final length of the structures constructed under the RFPs.

Moreover, there can be no assurance that the criteria for capacity augmentation of any stretch shall be strictly in accordance with the Concession Agreements. In addition to the criteria stipulated in the Concession Agreements, capacity augmentation may also be carried out by the government of India based on economic and strategic requirements. As such, the capacity augmentation may be commenced prior to the stipulated time period as per the Concession Agreements. For instance, the capacity augmentation for a stretch of road that forms part of Kotha Kurnool Project Highway is proposed prior to the stipulated time period as per the Kotha Kurnool Concession Agreement by the Government of India as part of its strategic initiative of Bharatmala Pariyojana and preparation of Detailed Project Report (*as defined in the Kotha Kurnool Concession Agreement*)

for completion of the same has already been initiated. Accordingly, the Concessionaire will have to bear the additional cost of operation and maintenance of the widened road and the same may or may not be reimbursed by the Authority. Further, in terms of Kotha Kurnool Concession Agreement, the Concessionaire is required to complete certain initial improvement works within a timeframe of 24 months from the Appointed Date. However, since capacity augmentation is being carried out for the Kotha Kurnool Project by the Authority, the Authority has instructed the Concessionaire to hold off on initial improvement works as the same may lead to duplicity and wastage of resources. Accordingly, the Authority may issue the Concessionaire a negative change of scope and may seek compensation for the same which shall have an adverse implication on our business and financial condition..

Further, in terms of the Additional Concession Agreements, the detailed project report for capacity augmentation may be commenced immediately once the average daily traffic has met the target traffic. Additionally, any increase in revenue due to increase in Equivalent Tollable Length (*as defined in the Additional Concession Agreements*) of the Project Highway shall be paid to NHAI on a quarterly basis. Additionally, the detailed project report for capacity augmentation may be commenced immediately once the average daily traffic has met the target traffic. For further details in relation to the differences in the terms of Initial Concession Agreements and Additional Concession Agreements, see "*Summary of Concession Agreements – Differences between the Initial Concession Agreements and Additional Concession Agreements*" on page 184.

25. ***Changes in the policies adopted by governmental entities or in the relationships of any member of the Trust with the Government or State Governments could materially and adversely affect our business, financial performance and results of operations.***

The Project SPV would be deriving almost all of its revenue from the Concession Agreements with the NHAI and must maintain good relationships and strategic alliances with the Sponsor, the Government and State Governments. We expect that we will continue to depend on, and benefit from, policies relating to the terms of the concessions in respect of the Project SPV's existing projects and any future projects. In addition, we expect to benefit from, and depend on, the Sponsor and various Government and State Government entities in terms of policies, incentives, budgetary allocations and other resources provided by these entities for the road industry in general. Any adverse change in any existing governmental policies, incentives, allocations or resources, or any change in our relationships with governmental entities, could materially and adversely affect our business, financial condition and results of operations.

Additionally, the Toll Roads may be subject to delays, extensive internal processes, policy changes, changes due to local, national and internal political pressures and changes in governmental or external budgetary allocation and insufficiency of funds. Since governmental entities are responsible for awarding concessions and are a party to the development and operation of the awarded projects, our business will be directly and significantly dependent on their support. Any withdrawal of support or adverse changes in their policies, even if not quantifiable monetarily, may lead to the Project SPV's agreements being restructured or renegotiated or the concession period being decreased, which could materially and adversely affect the Project SPV's financing, capital expenditure, revenues, development or operations.

26. ***The Valuation Report, and any underlying reports, are not opinions on the commercial merits of the Trust or the Project SPV, 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 Project SPV's assets.***

RBSA Valuation Advisors LLP has been appointed as the independent valuers (the "**Valuers**") to undertake independent appraisals of the Toll Roads. The Valuers have issued the Valuation Report in relation to the Initial Toll Roads and Target Toll Roads as at July 31, 2022, included in **Annexure A** to this Preliminary Placement Document, which sets out their opinion as to the fair enterprise value of the Initial Toll Roads and Target Toll Roads as on July 31, 2022. In order to issue their Valuation Report, the Valuers based their assumptions regarding the traffic volume, toll rates, operation and maintenance costs, amortization, debt repayments and non-cash net working capital projections amongst other things, on information provided by and discussions with or on behalf of the Investment Manager, and which reflects current expectations and views regarding future events and, therefore, necessarily involves known and unknown risks and uncertainties. Please see the Valuation Report included in Annexure A to this Preliminary Placement Document for a more detailed description of all assumptions relied upon in the preparation thereof. The Valuation Report contains forecasts, projections and other "forward-looking" statements that relate to future events, which are, by their nature, subject to significant risks and uncertainties. The future events referred to in these forward-looking statements involve risks, uncertainties and other factors which may cause the actual results or performance to be materially different from any future results or performance expressed or implied by the forward-looking statements.

The Valuation Report is not an opinion on the commercial merits and structure of the Trust or the Project SPV, nor is it an opinion, expressed or implied, as to the future trading price of the Units in or the financial condition of the Trust upon listing. The Valuation Report does not purport to contain all the information that may be necessary or desirable to fully evaluate the Trust or the Project SPV or an investment in the Trust or the Units. The Valuation Report is not based on a comprehensive review of the business, operational or financial condition of the Project SPV and, accordingly, 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 Project Manager, the Trust, or the Lead Managers. Further, we cannot assure you that the valuation prepared by the Valuers reflects the true value of the net future revenues of the Project SPV 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 Project SPV's assets. The Valuation Report has been issued as at July 31, 2022, but does not take into account any subsequent developments and should not be considered as a recommendation by the Investment Manager, 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. Accordingly, investors should not completely place on reliance on the Valuation Report in making an investment decision to purchase Units in the Trust.

27. ***We have referred to the data derived from (i) Technical Consultant Report commissioned from the Technical Consultants, (ii) Traffic Reports commissioned from the Traffic Consultants and (ii) CRISIL Report which are based on certain bases, estimates and assumptions that are subjective in nature and may not be accurate.***

We had appointed Técnica Y Proyectos, S.A. (TYPSA) in a joint venture with Avanza Engineering Pvt. Ltd. ("**TYPSA-AVANZA JV**"), an independent third-party research agency, as our technical consultant for Initial Toll Roads set out in Annexure B to the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html. Further, we have appointed Consulting Engineers Group Limited (for Agra Bypass and Shivpuri Jhansi Project) and Samarth Infraengg Technocrats Private Limited (for Borkhedi Kelapur Project), independent, third-party research agencies, for undertaking technical due diligence of Target Toll Roads, as our technical consultants (the "**Technical Consultants**"). The Technical Consultants have prepared technical reports on the Target Toll Roads, which are set out in **Annexure B** to this Preliminary Placement Document (the "**Technical Consultant Reports**").

We had appointed Ramboll India Private Limited and Steer Davies Gleave India Private Limited for preparing detailed traffic reports of Initial Toll Roads.We have also appointed CRISIL Limited (for Shivpuri Jhansi project) and Steer Davies Gleave India Private Limited (for Agra Bypass and Borkhedi Kelapur Project) as our traffic consultants ("**Traffic Consultants**") to prepare the detailed Traffic Consultant Reports and provide their analysis and forecast of traffic volumes for the Target Toll Roads. The traffic reports are set out in **Annexure C** to this Preliminary Placement Document (the "**Traffic Consultants Reports**").

Furthermore, we have also commissioned a report titled "*Roads and Highways*" dated September 2022, prepared by CRISIL Research ("**CRISIL Report**'). All of the Technical Consultant Reports, the Traffic Reports and the CRISIL Report (together referred to as "**Industry Expert Reports**") are subject to various limitations and are based upon certain bases, estimates and assumptions that are subjective in nature and that are based, in part, on information provided by and discussions with or on behalf of the Investment Manager. In particular, certain of the information we have provided the Traffic Consultants for the purposes of the Traffic Reports has been aggregated from data collected by third-party service providers. Although we believe such data to be accurate, we have not verified the information and cannot assure you that it is free from error. The Industry Expert Reports reflect current expectations and views regarding future events, and therefore, necessarily involve known and unknown risks and uncertainties. The Industry Expert 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 population growth, gross domestic product growth, vehicle ownership rates, per capita income, agricultural output and fuel consumption. The future events referred to in the Industry Expert Reports involve risks, uncertainties and other factors which may cause the actual traffic volumes to be materially different from any future traffic volumes expressed or implied by the Industry Expert Reports. There can be no assurance that the bases, estimates and assumptions adopted by the Technical Consultants, CRISIL or the Traffic Consultants for the purposes of preparing their respective reports will prove to be accurate. If any of these traffic assumptions are incorrect, future traffic volumes for the Target Toll Roads could be materially different from those that are set forth in these reports and this Preliminary Placement Document.

28. ***Certain provisions of the standard form of Concession Agreements may be untested, and the Concession Agreements may contain certain restrictive terms and conditions which may be subject to varying interpretations.***

The Concession Agreements that we have entered into is substantially based on a model concession agreement prescribed by the Sponsor. For example, the toll fees under the Concession Agreements is fixed, subject to annual adjustments to account for inflation as specified in the Concession Agreements. In addition, the operation and maintenance standards and specifications require the Project SPV to incur operation and maintenance costs on a regular and periodic basis. The Concession Agreements also provide for a fixed term concession and, although our Concession Agreements provide for an extension or reduction of the concession period based on certain factors, including actual average toll collection on specified target dates, the Concession Agreements do not provide for renewal of the Concession Agreements after the expiry of the term.

The form of the Concession Agreements has evolved within the last decade and there is limited guidance available on the interpretation of a number of terms and conditions of the Concession Agreements. In addition, certain terms of the Concession Agreements, such as those related to an augmentation in the capacity of the toll roads, substitution of the Sponsor in any or all of the project agreements, termination payments by the Sponsor, construction of additional competing roads by the Sponsor, the Government or State Governments and payment of compensation by the Sponsor for changes in law are untested. Accordingly, the interpretation of certain terms and conditions in the Concession Agreements of the Project SPV by the Sponsor, the courts or regulators may be different from our interpretation of such terms and conditions.

The terms and conditions of the Concession Agreements contain restrictive terms and conditions. For example, the Concession Agreements contain provisions that mandate substitution clauses in the project agreements. Such substitution clauses allow the Sponsor to step into project agreements in place of the Project SPV in the event of suspension of the Project SPV or termination of the Concession Agreements due to a breach or default by the Project SPV. The Concession Agreements also provides that the lenders to a Project SPV may substitute the Project SPV with new entities approved by the Sponsor in the event of a default by the Project SPV under the relevant Concession Agreements or financing agreements. The terms of the Project SPV's Concession Agreements requires the Project SPV to indemnify the Sponsor for losses arising out of breach of the obligations of the Project SPV under the Concession Agreements.

In the event the Sponsor or a lender invokes any restrictive term or condition in the Concession Agreements, or the Sponsor, 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 and results of operations.

29. ***We may be subject to increases in costs, including operation and maintenance costs, which we cannot recover by increasing toll fees under the Concession Agreements.***

The terms and conditions of the Concession Agreements are fixed and are not negotiable during the concession period. The costs of operating and maintaining the InvIT Assets may increase due to factors beyond the Project SPV's control, including, among other things:

- increase in the cost of labour, materials and insurance;
- the Project SPV being required to install intelligent toll-collection systems at their own costs;
- the Project SPV 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;
- increase in electricity tariff rates or other fuel costs resulting in an increase in the cost of energy;
- adverse weather conditions;
- unforeseen legal, tax and accounting liabilities relating to acquired assets; and
- other unforeseen operational and maintenance costs.

In the event that our costs increase, we may be unable to offset such increases with higher revenues by increasing toll fees due to the restrictions of the Concession Agreements.

Any significant increase in operation and maintenance costs beyond the amounts budgeted for by us, or any failure to meet quality standards, may reduce our profits, could expose us to penalties imposed by the concessioning authorities and could have a material, adverse effect on our business, financial condition and results of operations. Such events may also impact the ability of the Project SPV to service the debt obtained from the Trust and our ability to make distributions to 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.

30. ***Leakage of the toll fees on the Project SPV's roads may materially and adversely affect our revenues and financial condition.***

The Project SPV's toll receipts are primarily dependent on the integrity of toll-collection systems and the willingness of road users to pay toll fees. While the Project SPV has an integrated toll-collection system in place, the level of revenues derived from collection of tolls may be reduced by leakage through toll evasion, theft, fraud or technical defaults in the Project SPV's toll systems or forced violations by users of the Toll Roads. Furthermore, the Project SPV may also, at times, need to allow users of the Toll Roads to pass through without paying applicable tolls due to heavy traffic build-up, or may be unable to collect tolls due to political protests or other agitations relating to tolling. In addition, in certain circumstances, the governmental authorities or Indian courts could seek to suspend toll-collection for or during certain periods, in full or in part, on the Toll Roads, which suspension would result in a reduction in our revenues. For example, in November 2016, the Government ordered the suspension of toll collection at all national highways for a particular period of time on account of the demonetization of certain high-value currency denominations. Further, toll-collection errors may amount to a loss of revenue as there is an inherent risk of under-collection of toll fees given that some users of toll roads continue to pay in cash. Any significant failure by us to monitor and control leakage in toll-collection systems could have a material, adverse effect on our business, prospects, financial condition and results of operations and our ability to make distributions.

31. ***We will depend on certain directors, executive officers and key employees of the Investment Manager, the Project Manager and the Project SPV, and such entities may be unable to appoint, retain such personnel or to replace them with similarly qualified personnel, which could have a material, adverse effect on the business, financial condition, results of operations and prospects of the Trust.***

Our performance will depend, in part, upon the continued service and performance of certain directors, executive officers and key personnel of the Investment Manager, the Project Manager and the Project SPV. The continued operations and growth of our business will be dependent upon the Investment Manager, the Project Manager and the Project SPV being able to attract and retain personnel who have the necessary and required experience and expertise. Competition for qualified personnel with relevant industry expertise in India is intense due to the scarcity of qualified individuals in the toll-road business, and the

aforesaid entities may not be able to retain their executive officers and key employees or attract and retain fresh talent in the future. Any inability by the Investment Manager, the Project Manager and the Project SPV to retain their directors, executive officers and key employees, or the inability to replace such individuals with similarly qualified personnel, could have a material, adverse effect on the business, financial condition, results of operations and prospects of the Trust.

32. ***There can be no assurance that we will be able to successfully undertake future acquisitions of road assets or efficiently manage the infrastructure road assets we have acquired or may acquire in the future.***

Our growth strategy in the future may involve strategic acquisitions of toll roads and other road assets. We may not be able to identify or conclude appropriate or viable acquisitions in a timely manner. The success of our past acquisitions and any future acquisitions will depend upon several factors, including:

- our ability to identify, finance and acquire operational toll roads and other road assets on a cost-effective basis;
- our ability to integrate acquired personnel, operations, products and technologies into our organisation effectively;
- unanticipated problems or legal liabilities of the acquired businesses; and
- tax or accounting issues relating to the acquired businesses.

There can be no assurance that we will be able to achieve the strategic purpose of such acquisitions or operational integration or an acceptable return on such investments, which may materially and adversely affect our profits, financial condition and distributions.

Furthermore, Concession Agreements for future toll-road projects may also contain terms and conditions that are more restrictive than those under the current Project SPV's Concession Agreements for the Toll Roads. These restrictions may restrict our flexibility in managing our business or projects and could in turn materially and adversely affect our business prospects, financial condition and results of operations.

33. ***The Project SPV may not be able to comply with its maintenance obligations under the Concession Agreements, which may result in the termination of the Concession Agreements, the suspension of the Project SPV's rights to collect tolls or the requirement that the Project SPV pay compensation or damages to the Sponsor.***

The Project SPV is required to undertake operation and maintenance of the Toll Roads within periods and in the manner as specified in the Concession Agreements. There can be no assurance that the Project SPV will not breach the maintenance obligations under the Concession Agreements on account of the Project Manager's failure to undertake the stipulated maintenance work in a timely manner, or at all.

If the Project SPV is in breach or default of its obligations, then the NHAI has the right to (a) suspend the right of the Project SPV, including the right to collect tolls and other fees, (b) claim compensation for all direct, additional costs suffered or incurred by the Sponsor arising out of such default, or (c) terminate the Concession Agreements.

If the Concession Agreements are terminated, the right to collect tolls is suspended or the Project SPV is required to pay compensation or damages, our business, financial condition and results of operations may be materially and adversely affected. For further details of the maintenance obligations, suspension and termination events under the Concession Agreements, see the section headed "*Summary of the Concession Agreements*" on page 145 of this Preliminary Placement Document.

34. ***The insurance policies for the Target Toll Roads are not currently in place for any protection against various risks associated with our Operations in relation to Target Toll Roads and any future insurance coverage obtained may be inadequate.***

The Investment Manager, on behalf of the Trust, has obtained insurance policies for Initial Toll Roads in relation to risks related to fire, act of burglary or theft, earthquake, an act of theft or terrorism or interruption of business due to petrochemical or non-petrochemical risks. However, we cannot assure that the policies that have been obtained shall adequately cover the loss. We also cannot assure that we will be able to renew the policies from time to time.

In relation to the Target Toll Roads, the insurance policies are currently not in place. Under the terms of the Additional Concession Agreements entered into for the tolling rights for the Target Toll Roads, such tolling rights would be granted as on and with effect from the appointed date which shall occur upon the conditions specified in the Concession Agreements which would be subsequent to the allotment of the Units pursuant to the Offer. As such, obtaining adequate insurance would only be undertaken on or after the appointed date under the Concession Agreements and we have currently not obtained insurance for the Target Toll Roads.

There can be no assurance that all risks in relation to Target Toll Roads shall be adequately insured against or that we will be able to procure adequate insurance coverage at commercially reasonable rates in the future.

Further the Toll Roads/InvIT Assets 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;
- terrorism and acts of war;
- inclement weather and natural disasters;
- environmental hazards, including earthquakes, flooding, tsunamis and landslides; and
- adverse developments in the overall economic environment in India.

Further, we are subject to various risks in the operation of the Toll Roads, including on account of accidents on the Toll Roads. Any insurance obtained for Target Toll Roads may not provide adequate coverage in certain circumstances and is subject to certain deductibles, exclusions and limits on coverage. To the extent we suffer damage or loss which is not covered by insurance, or exceed our insurance coverage, such damage or loss would have to be borne by us. We can make no assurance that material losses in excess of insurance proceeds (if any at all) will not occur in the future, which could materially and adversely affect our financial condition, business and results of operations.

35. ***The Sponsor and the Trustee are involved in certain legal and other proceedings, which may not be decided in their favour.***

The Sponsor, certain of its Associates 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. For details of certain material outstanding legal proceedings, see the section headed "*Legal and Other Information"* on page 204 of this Preliminary Placement Document. There is no assurance that these legal proceedings and regulatory matters will be decided in favour of the respective entities. Decisions in any of the aforesaid proceedings adverse to our interests may have a material adverse effect on our or their business, future financial performance and results of operations. If the courts or tribunals rule against the Sponsor or its Associates or the Trustee, we or the Sponsor may face monetary and/or reputational losses and may have to make provisions in our financial statements, which could increase expenses and liabilities.

36. ***We do not own the "NHAI" trademark and logo. Our license to use the "NHAI" trademark and logo may be terminated under certain circumstances and our ability to use the trademark and logo may be impaired.***

We do not own the "NHAI" trademark and "NHAI" logo, which is a trademark currently applied for by the Sponsor and which has been accepted and advertised by the Trademark Registry, Government of India. However, pursuant to a separate trademark license agreement dated September 26, 2022, the Sponsor has granted to the Trust, the non-transferable and non-assignable right to use the name of NHAI as part of the trade name of the Trust, as well as the Sponsor's trademarks ("**Trademarks**") in connection with the business of the Trust, on a non-exclusive basis, for the use in the Republic of India and globally. The license granted to the Trust in terms of the Trademark License Agreement shall be for a term of 1 (one) year from March 31, 2022. The Trust's right to use the Trademarks shall stand terminated with immediate effect if any of the terms of the license are breached. The Trust is using the Sponsor's logo pursuant to the terms of the aforesaid trademark license agreement, and does not separately hold any trademarks in its name. The termination or failure to register its logo as a trademark in a timely manner may have a material, adverse effect on the operations of the Trust and require management's time and attention.

37. ***We will depend on NHAI and various third parties to undertake certain activities in relation to the operation and maintenance of the InvIT Assets. Any delay, default or unsatisfactory performance by these third parties could materially and adversely affect our ability to effectively operate or maintain the InvIT Assets.***

We will depend on the availability and skills of NHAI and third-party employees and contractors pertaining to the operation and maintenance of the InvIT Assets. Under the Transitional Support Agreement, NHAI will provide support pertaining to the operation and maintenance of the Target Toll Roads. When the Transitional Support Agreement expires, i.e. after a period of three months commencing from the appointed date as per the respective Concession Agreements, we will need to appoint third-party entities to undertake operations and maintenance and tolling, and the terms of these future contracts may not be favourable to us. We can also make no assurance that the services of such third parties will continue to be available at reasonable rates in the areas in which we conduct our operations. We may also be exposed to risks relating to the ability of such third parties to obtain requisite approvals for the operation and maintenance activities, as well as the quality of their services, equipment and supplies. In particular, failure to ensure the reliability and sustainability of toll collectors who are required to man the toll booths continuously may materially and adversely affect our overall level of net revenue. We may also be exposed to civil and criminal liability in relation to the actions of other third parties, including our employees and contractors.

Further, if we undertake limited development, while we may sub-contract our construction work, we may still be liable for accidents on our projects due to defects in design and quality of construction of our projects during their construction and operation. In addition, we can make no assurance that such contractors or their sub- contractors will continue to hold or renew valid registrations under the relevant labour laws in India or be able to obtain the requisite approvals for undertaking such construction and operation. Any delay, default or unsatisfactory performance by these third parties could materially and adversely affect our ability to manage the operation and maintenance of the InvIT Assets under the Concession Agreements in

a timely manner or at all. Any of the foregoing factors could have a material, adverse effect on our business, financial condition, reputation and results of operations.

38. ***The completion certificate and provisional completion certificate in respect of one of the Initial Toll Roads are not traceable and accordingly, alternate documents have been relied upon in relation to certain disclosures made in this Preliminary Placement Document.***

We are unable to the trace the completion certificate and provisional completion certificate in respect of one of the Initial Toll Roads. Under these circumstances, we have relied on alternative documents such as the defects liability certificate dated May 17, 2010, issued by M/s Stanley Consultants Inc. in joint venture with M/s RITES Limited, certifying completion of all works on April 27, 2010, and the Technical Reports in respect of Chittorgarh to Kota section in Rajasthan for upgrading of NH-76 of east west corridors undertaken by NHAI ("**Chittorgarh – Kota Project Highway**"). We cannot assure you that the information relating to completion of the works in connection with the Chittorgarh – Kota Project Highway included in "*Regulatory Approvals*", as disclosed on page 262 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html are true and accurate.

39. ***We are subject to government regulation and if we fail to obtain, maintain or renew our statutory and regulatory licenses, permits, and approvals required to operate our business, results of operations and cash flows may be adversely affected.***

We may be required to obtain and maintain a number of statutory and regulatory licenses, permits and approvals for carrying out our business including consents to establish and operate under environmental laws, which are granted for a limited duration and require renewal. We cannot assure you that such approvals will be issued or granted to us in a timely manner, or will be granted at all. The Target Toll Roads to be acquired by the Trust are completed and revenue generating assets. The Sponsor, by way of its (i) letter dated September 27, 2022 in relation to Agra Bypass; (ii) letters dated September 28, 2020 and September 26, 2022 in relation to Borkhedi Kelapur Project; and (iii) letter dated September 29, 2022 in relation to Shivpuri Jhansi Project has confirmed that it had obtained all the necessary approvals and clearances required during the construction stage of the Target Toll Roads.

Further, we shall obtain all other material permits, registrations, licenses, approvals, consents and other authorizations as may be required upon acquisition of the Target Toll Roads. For details, see "*Regulatory Approvals*" on page 203. If we do not receive such approvals or are not able to renew the approvals in a timely manner, our business and operations may be materially adversely affected.

It has also bene observed that documentary evidence with respect to the statutory compliances of the agencies engaged by NHAI in relation to Target Toll Roads are not being maintained at respective site locations. For further details, see ESDD Report as set out in **Annexure D** to this Preliminary Placement Document. In the event that the agencies are non-compliant with applicable law, we might have to bear the additional costs of substitution of such agencies.

40. ***Significant differences exist between Indian GAAS used to prepare the Sponsor's Audited Financial Information and other accounting principles, such as Ind-As and IFRS, with which investors may be more familiar.***

The Sponsor has prepared its Audited Financial Information in accordance with Indian GAAS in accordance with the NHAI Act and the rules thereunder. The Sponsor has not attempted to quantify the impact of Ind-As or International Financial Reporting Standards ("**IFRS**") on the Audited Financial Information, nor will the Sponsor provide a reconciliation of our financial statements to those of IFRS or Ind-As. If we were to prepare our Audited Financial Information in accordance with such other accounting principles, our results of operations, financial condition and cash flows may be substantially different. Accordingly, the degree to which the Sponsor's Audited Financial Information will provide meaningful information is entirely dependent on your level of familiarity with Indian accounting practices under Indian GAAS. Any reliance by persons not familiar with such accounting practice on our financial disclosures presented in this Preliminary Placement Document should accordingly be limited. Persons not familiar with Indian accounting practices should, accordingly, consult their own professional advisors before relying on the financial disclosures presented in this Preliminary Placement Document.

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

41. ***The Sponsor, whose interests may be different from the other Unitholders, will be able to exercise significant influence over certain activities of the Trust.***

After the completion of the Offer, the Sponsor will continue to own an aggregate of not less than 15.00% of the issued and outstanding Units and will be entitled to vote as a Unitholder on all matters other than matters where it is a related party and not permitted to vote under the InvIT Regulations. Although the Investment Manager has and will continue to have the requisite number of independent directors on its board of directors, the Sponsor will nonetheless be in a position to exercise significant influence in matters which require the approval of Unitholders by virtue of its ownership of Units in the Trust. The interests of the Sponsor may conflict with the interests of our other Unitholders and the Sponsor may, for business considerations or otherwise, seek to benefit itself instead of the Trust or the interests of the other Unitholders. The Sponsor will also exercise significant influence over the Project Manager, which is a wholly owned subsidiary of the Sponsor. Accordingly, the Project

Manager may also be subject to conflicts of interest with respect to the Trust. These conflicts may be harmful to our interests or the interests of our other Unitholders, which may impact our business, financial condition and results of operations.

42. ***The Investment Manager may not be able to implement its investment or corporate strategies and the fees payable to the Project Manager are dependent on various factors.***

The Investment Manager's strategies focus on three main areas:

- managing the underlying assets of the Trust;
- managing the Trust's acquisitions and disposals; and
- managing the Trust's capital structure to maximize distributions.

The Investment Manager is a newly incorporated entity and has limited 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. The Investment Manager may not be able to make acquisitions or investments on favourable terms or within a desired time frame, and it may not be able to manage the operations of its underlying assets in a profitable manner. Factors that may affect this risk may include, but are not limited to, changes in the regulatory framework in India, competition for assets, partial award of concessions or licenses favouring local or other competitors of the Trust, changes in the Indian regulatory or legal environment or macro-economic conditions. If the Investment Manager is unable to implement these strategies successfully or expand our portfolio, we will nonetheless be required to pay the Investment Manager an annual management fee, exclusive of taxes, in accordance with the terms of appointment of the Investment Manager.

Even if the Investment Manager is able to successfully grow the operating business of the underlying assets and to acquire toll roads and other eligible infrastructure projects in India as desired, there can be no assurance that the Investment Manager will achieve its intended return on such acquisitions or capital investments. Furthermore, the Investment Manager's investment mandate involves a higher level of risk as compared to a portfolio which has a more diverse range of investments. The Investment Manager may only be removed by a resolution of Unitholders (excluding the Sponsor) such that the votes cast in favour of the resolution are not less than one-and-a-half times the votes cast against the resolution.

Further, the fees payable to the Project Manager may vary each year based upon the operating and maintenance work that is actually required to be undertaken by the Project Manager with respect to the Project SPV, and accordingly, cannot be a flat rate or decided upfront for all periods. Additionally, any such payment of fees will be in the nature of a related party transaction and the approval of Unitholders will be required prior to making such a payment to the Project Manager. For further information, please see "*Overview of the Trust*" on page 24 of this Preliminary Placement Document.

43. ***While the Sponsor had communicated its intention of transferring around 1500 km of roads, the Trust may be unable to bid effectively for them.***

In accordance with the approval granted by the Chairman of NHAI, by way of communication dated March 29, 2021, the Sponsor will offer around 1,500 km of roads in three years to the Trust. The Sponsor has transferred 247 km of roads by way of Additional Concession Agreements dated September 26, 2022. Further, by way of communication dated September 1, 2022. NHAI has identified the following five assets ("**Future Assets**") for potential acquisition by the Trust under the Assets Monetization Plan for financial year 2022-23:

(i) Gwalior-Shivpuri (Madhya Pradesh);
(ii) Vadodara-Surat (bridge across River Narmada);
(iii) Kota Bypass and cable stayed bridge across river Chambal on Kota Bypass approaches;
(iv) Chennai Bypass; and
(v) Rewa-Katni-Jabalpur-Lakhnadon (Madhya Pradesh).

There can be no assurance that the Trust will be able to accurately or effectively assess the Future Assets on the basis of the information to it or in the time available, and its bids may provide to be uncompetitive. Furthermore, the Sponsor may accept or reject any binding offer made by the Trust, based on various factors regarding which the Trust may have no influence.

Access to future toll road assets sourced by the Sponsor or its existing or future subsidiaries will be an important source of growth in the future for the Trust, and any inability to bid competitively for Future Assets or the inability to win contracts from the Sponsor for their operation for any reason could have a material adverse effect on the Trust's operations, financial condition or prospects.

44. ***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, the Investment Manager, the Project 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 Rs. 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 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.

Further, in terms of Regulation 4(2)(e)(v) of the InvIT Regulations, the Investment Manager should, inter-alia, have not less than half of its directors as independent directors. As on the date of this Preliminary Placement Document, the IM Board consists of nine directors out which four are independent directors. For details, please see "*Parties to the Trust – The IM Board*" on page 93. While we are in the process of determining suitable independent director who shall improve corporate credibility and governance standard of the Investment Manager, we cannot assure that the delay in such appointment shall not entail any action from SEBI or any other authority.

45. ***The Investment Manager is required to comply with certain ongoing reporting and management obligations in relation to the Trust. There can be no assurance that the Investment Manager will be able to comply with such 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. There can be no assurance 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 Intermediaries Regulations and/or the SEBI Act. Any such failure to comply or the imposition of any penalty could have a material adverse effect on our business, financial condition and results of operations. Under the InvIT Regulations, the SEBI also has the right to inspect documents, accounts and records relating to the activity of the Trust, Project SPV or parties to the InvIT 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.

46. ***Our Investment Manager is wholly-owned and controlled by the GoI, which makes us susceptible to changes to its policies.***

The Investment Manager is currently wholly-owned and controlled by the President of India acting through the Ministry of Road Transport and Highways ("**MORTH**"). Accordingly, the GoI will be able to exercise significant influence over the Investment Manager, its policies and affairs. Although, by way of its letter dated July 12, 2022, MORTH has communicated that the Investment Manager can manage its affairs as per its corporate governance framework and may recruit, compensate and remove the human resources as per the policies approved by the Nomination and Remuneration Committee of the IM Board, we cannot assure that the GoI will not change its policies in the times to come. Further, the GoI may require the Investment Manager to take actions aimed at serving the public interest, which may not be aligned with the commercial objectives of the unitholders.

47. ***The InvIT Regulations allow for sponsors of listed InvITs to be declassified from the status of sponsors subject to certain conditions. There can be no assurance that our Sponsor will not exercise its ability to be declassified as the Sponsor of the Trust.***

The InvIT Regulations, pursuant to amendments made in June 2020, permit sponsors of listed infrastructure investment trusts to be declassified from the status of sponsors subject to compliance with the following conditions:

(i) The units of the relevant InvIT should have been listed on the stock exchanges for a period of three years;
(ii) The unitholding of such sponsor and its associates taken together should not exceed 10.00% of the outstanding units of the relevant InvIT;
(iii) The investment manager of the relevant InvIT is not an entity controlled by such sponsor or its associates; and
(iv) approval of unitholders has been obtained in accordance with the InvIT Regulations.

There can be no assurance that in the future, our Sponsor, upon fulfilment of the aforementioned conditions or any other conditions that SEBI prescribes for declassifications of sponsors, will not exercise its ability to declassify itself from the status of our Sponsor.

Risks related to India

48. ***Changing laws, rules and regulations and legal uncertainties may materially and adversely affect our business, financial condition and results of operations.***

Our business, financial condition and results of operations could be materially and adversely affected by any change in laws or interpretations of existing, or the promulgation of new, laws, rules and regulations applicable to us and our business. There can be no assurance that the Government or State Governments will not implement new regulations and policies which will require the Trust Group 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.

49. ***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 SPV and the Indian economy in general, including the infrastructure sector.***

India imports a significant majority of its requirements of crude oil. Crude oil prices are volatile and are subject to a 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. The recent invasion of Russia into Ukraine might disrupt crude supplies globally, thus affecting its' price. Any significant increase in the bitumen price or shortages in the supply of crude oil could materially and adversely affect the volume of traffic at the projects operated by the Project SPV and materially and adversely affect the Indian economy in general, including the infrastructure sector, which could have a material, adverse effect on our business, financial condition and results of operations.

50. ***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. Further, 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.

On March 4, 2011, the Government issued and brought into force the combination regulation (merger control) provisions under the Competition Act with effect from June 1, 2011. These provisions require acquisitions of shares, voting rights, assets or control or mergers or amalgamations that cross the prescribed asset-and turnover-based thresholds to be mandatorily notified to and pre-approved by the Competition Commission of India (the "**CCI**"). Additionally, on May 11, 2011, the CCI issued the Competition Commission of India (Procedure in regard to the transaction of business relating to combinations) Regulations, 2011, as amended, which set out the mechanism for implementation of the merger control regime in India. The Competition Act aims to, among other things, prohibit all agreements and transactions which may have an appreciable adverse effect on competition in India. Further, 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.

The Government of India has also introduced the Competition (Amendment) Bill, 2022 in the Lok Sabha in August 2022, which has proposed several amendments to the Competition Act, such as introduction of deal value thresholds for assessing whether a merger or acquisition qualifies as a "combination", expedited merger review timelines, codification of the lowest standard of "control" and enhanced penalties for providing false information or a failure to provide material information. As these are draft amendments, we cannot ascertain at this stage as to whether the proposed amendments will come into force in the form suggested or at all, their applicability in respect of our operations, partially or at all once they come into force, or the extent to which the amendments, if and when they come into force, will result in additional costs for compliance, which in turn may adversely affect our business.

In the event, the Project SPV 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 and results of operations. Any adverse impact on our financial condition or operations due to the Competition Act may have a material adverse impact on our business, financial condition, results of operations and prospects and our ability to make distributions to the Unitholders.

51. ***Any downgrading of India's debt rating by rating agencies could have a negative impact on our business.***

India's sovereign rating is Baa3 with a "stable" outlook (Moody's), BBB- with a "stable" outlook (S&P) and BBB- with a "negative" outlook (Fitch). India's sovereign 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 our control. Any adverse revisions to India's credit ratings by rating agencies may adversely affect our ability to raise additional financing, and the interest rates and other terms at which such additional financing is available. This could materially and adversely affect our ability to obtain financing for capital expenditure, which could in turn materially and adversely affect our business, prospects, financial condition, results of operations and cash flows. 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 resources, which are outside our control.

52. ***Compliance with the European Union Directive on Alternative Investment Fund Managers may increase administrative and regulatory burdens on the Investment Manager and the Trust.***

As used herein, the "AIFMD" refers to Directive 2011/61/EU of the European Parliament and of the Council of June 8, 2011 on Alternative Investment Fund Managers, together with EU Commission delegated Regulation (EU) No. 231/2013 of December 19, 2012, supplementary Directive 2011/61/EU of the European Parliament and of the Council, and the national laws transposing Directive 2011/61/EU in any EEA Member State in which the Trust is marketed.

Among other things, the AIFMD regulates and imposes regulatory obligations in respect of the active marketing in the EEA by AIFMs (irrespective of whether they have their registered office in an EEA Member State or elsewhere) of AIFs (whether established in an EEA Member State or elsewhere). The Investment Manager is a Non-EEA AIFM for the purposes of the AIFMD. Non-EEA AIFMs are currently not able to become authorised under the AIFMD. In order to market to investors resident, domiciled or with a registered office in the EEA, non-EEA AIFMs must market AIFs in accordance with the applicable national private placement regimes of the EEA member states in which they wish to market and comply with a sub-set of requirements under the AIFMD (which are much more limited in scope than those applicable to AIFMs that are established in the EEA). Such limited requirements are: (i) "point-of-sale" disclosures (as disclosed elsewhere), (ii) ongoing investor disclosures required pursuant to Articles 23(4) and (5) of the AIFMD (as to which, please see below), (iv) provision of information relating to the Trust's investments and its assets under management to the regulators of any EEA Member State into which Units in the Trust are actively marketed, and (v) the "asset-stripping" rules (in the event that the Trust acquires control of an EEA based portfolio company.

The information in respect of the Trust required to be disclosed pursuant to Articles 23(4) and (5) of the AIFMD will be made available to each Unitholder, as follows: (a) the percentage of the Trust's assets which are subject to special arrangements arising from their illiquid nature will be notified to the Unitholders; (b) any new arrangements for managing the liquidity of the Trust will be provided without undue delay in a disclosure notice delivered to each Unitholder; (c) the current risk profile of the Trust and the risk management systems employed by the Investment Manager to manage those risks may be provided in each annual report of the Trust; (d) any changes to the maximum level of leverage which the Investment Manager may employ on behalf of the Trust, as well as any right of the reuse of collateral or any guarantee granted under the leveraging arrangement, will be provided without undue delay in a disclosure notice delivered to each Unitholder; and (e) the total amount of leverage employed by the Trust may be provided in each annual report of the Trust.

In addition, it is possible that some EEA member states will elect in the future to restrict or prohibit the marketing of non-EEA AIFs to investors based in those jurisdictions. Any such restrictions or prohibitions may make it more difficult for the Trust to raise its targeted amount of commitments.

In light of the foregoing, the AIFMD could have an adverse effect on the Investment Manager or the Trust by, among other things, increasing the regulatory burden and costs of doing business in the EEA members states, imposing extensive disclosure obligations on companies located in EEA member states, if any, in which the Trust invests, and potentially disadvantaging the Trust as an investor in portfolio companies located in EEA member states as compared to competitors (e.g., those not in the alternative investment space) that may not be in scope of the AIFMD. ESMA has recently also consulted on the possible extension of the passport for marketing and managing under AIFMD to non-EEA based managers (the marketing and managing passports under AIFMD are currently only available to certain types of EEA based managers).

ESMA provided advice to the European Commission in July 2015 and July 2016 on whether, amongst other things, the passporting regime should be extended to the management and/or marketing of AIFs by non-EEA AIFMs. The European Commission is currently considering whether the passport should be extended. It is currently not clear what the impact would be for the Investment Manager or the Trust of any decision by the European Commission to extend the passporting regime. If the AIFMD national private placement regimes (where implemented) continue to exist in parallel with an extension of the passporting regime, then the Investment Manager may continue to market under AIFMD national private placement regimes, or choose to "opt-in" to rely on the passporting regime (which would likely mean an increase in regulatory and compliance costs to comply with the conditions of the passporting regime). If the AIFMD national private placement regimes are removed, then the Investment Manager would likely need to "opt-in" to the passporting regime for any AIFMD marketing of the Trust (which would likely mean an increase in regulatory and compliance costs for the Trust).

53. ***Unitholders may not be able to enforce a judgment of a foreign court against the Trust or the Investment Manager.***

The enforcement of civil liabilities by overseas investors in the Units, including the ability to effect service of process and to

enforce judgments obtained in courts outside of India, may be adversely affected by the fact that (i) the Trust is constituted under the laws of the Republic of India, (ii) the Investment Manager is a limited liability company incorporated under the laws of the Republic of India, (iii) the directors and key personnel of the Investment Manager reside in India and (iv) all of the assets of the Trust and the Investment Manager are located in India. All of the assets of the Trust and the assets of the Directors are also located in India. As a result, it may be difficult to serve process upon the Trust, the Investment Manager or any of these persons outside of India or to enforce in India judgments obtained against such persons in courts outside of India.

India is not a party to any international treaty in relation to the recognition or enforcement of foreign judgments. Recognition and enforcement of foreign judgments are provided for under Section 13, Section 14 and Section 44A of the Civil Procedure Code. The GoI has, under Section 44A of the Civil Procedure Code, notified certain countries as reciprocating countries. Section 13 of the Civil Procedure Code provides that a foreign judgment will be conclusive regarding any matter directly adjudicated upon, between the same parties or between the parties whom they or any of them claim are litigating under the same title, except: (i) where the judgment has not been pronounced by a court of competent jurisdiction; (ii) where the judgment has not been given on the merits of the case; (iii) where it appears on the face of the proceedings that the judgment is founded on an incorrect view of international law or a refusal to recognise the law of India in cases in which such law is applicable; (iv) where the proceedings in which the judgment was obtained were opposed to natural justice; (v) where the judgment has been obtained by fraud; or (vi) where the judgment sustains a claim founded on a breach of any law in force then in India. Section 44A of the Civil Procedure Code provides that where a foreign judgment has been rendered by a superior court in any country or territory outside India, which the GoI has, by notification, declared to be a reciprocating territory, it may be enforced in India by proceedings in execution as if the judgment had been rendered by the relevant court in India. However, Section 44A of the Civil Procedure Code is applicable only to monetary decrees not being in the nature of any amounts payable in respect of taxes or other charges of a similar nature or in respect of a fine or other penalties and does not include arbitration awards. The United Kingdom and some other countries have been declared by the GoI to be a reciprocating territory for the purposes of Section 44A. However, the United States has not been declared by the GoI to be reciprocating territories for the purposes of Section 44A. A judgment of a court in the United States may be enforced in India only by a suit upon the judgment, subject to Section 13 of the Civil Procedure Code and not by proceedings in execution.

There may be considerable delays in the disposal of suits by Indian courts. It may be unlikely that a court in India would award damages on the same basis as a foreign court if an action is brought in India. Furthermore, it may be unlikely that an Indian court would enforce foreign judgments if it viewed the amount of damages awarded as excessive or inconsistent with the public policy in India. A party seeking to enforce a foreign judgment in India is required to obtain prior approval from the RBI to repatriate any amount recovered pursuant to execution and any such amount may be subject to income tax in accordance with applicable laws. Any judgment or award in a foreign currency would be converted into Indian Rupees on the date of the judgment or award and not on the date of the payment which could be subject to foreign exchange risk. Generally, there are considerable delays in the processing of legal actions to enforce a civil liability in India, and therefore it is uncertain whether a suit brought in an Indian court will be disposed of in a timely manner or subject to considerable delays.

Risks Related to Ownership of the Units

54. ***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 Registration Act 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) on the written recommendation of the Investment Manager and upon obtaining the prior written consent of such number of the Unitholders as is required under the InvIT Regulations; (iii) if the Units of the Trust are delisted from the Stock Exchanges; (iv) if the SEBI passes a direction for the winding up of the Trust or the delisting of the Units; or (v) in the event the Trust becomes illegal. Under the Trust Deed, in the event of dissolution, the net assets of the Trust, remaining after settlement of all liabilities, and the retention of any reserves which the Trustee deems to be necessary to discharge contingent or unforeseen liabilities, shall be paid to the Unitholders. Should the Trust be dissolved, depending on the circumstances and the terms upon which assets of the Trust are disposed of, there is no assurance that a Unitholder will recover all or any part of his investment.

55. ***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 Unitholders may be more limited than those made to or available to the shareholders of a company that has listed its equity shares upon a recognized stock exchange in India.***

The InvIT Regulations, along with the guidelines and circulars issued by the SEBI from time to time, govern the affairs of infrastructure investment trusts in India. However, as compared to the statutory and regulatory framework governing companies that have listed their equity shares upon a recognized stock exchanges in India, the regulatory framework applicable to infrastructure investment trusts is relatively nascent and thus, still evolving. Pursuant to a circular dated November 29, 2016, the SEBI has prescribed certain continuous disclosure requirements that will be applicable to an InvIT after listing of its units.

Accordingly, the ongoing disclosures made to Unitholders under the InvIT Regulations may differ from those made to the shareholders of a company that has listed its equity shares upon a recognized stock exchange in India in accordance with the Securities and Exchange Board of India (Listing Obligations and Disclosure Requirements) Regulations, 2015. Further, the

rights of the Unitholders may not be as extensive as the rights of the shareholders of a company that has listed its equity shares upon a recognized stock exchange in India, and accordingly, the protection available to the Unitholders may be more limited than those available to such shareholders.

56. ***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. 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.

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

Due to the nature of its structure, the Trust may be unable to dispose of its non-performing assets in a timely manner, or at all. 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 or more traditional corporate entities in general. Any ability to dispose of non-performing assets may in turn adversely affect the financial condition, business and prospects of the Trust, as well as distributions that the holders of the Units may receive from the Trust.

58. ***Fluctuations in the exchange rate of the Indian Rupee with respect to the U.S. Dollar or 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.

59. ***Unitholders are unable to require the redemption of their Units.***

Unitholders will not have the right to redeem Units or request or require the redemption of Units by the Investment Manager while the Units are listed on the Stock Exchanges, although the Trust Deed provides that the Investment Manager may repurchase Units at its sole discretion if it has obtained the prior approval of Unitholders in a general meeting by passing an ordinary resolution in accordance with the Trust Deed but subject to other requirements of the relevant laws, regulations and guidelines imposed by authorities in India.

60. ***The units of the Trust have a limited history of being publicly traded and the listing of the Units, pursuant to this Offer, on the Stock Exchanges may not result in an active or liquid market for the Units.***

The Units of the Trust are currently not frequently traded. There is a limited public market for the Units prior to the Offer and an active public market for the Units may not develop or be sustained after the Listing Date. Listing and quotation does not guarantee that a trading market for the Units will develop or, if a market does develop, that there will be liquidity of that market for the Units. Accordingly, prospective Unitholders should view the Units as illiquid and must be prepared to hold their Units for an indefinite length of time.

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

The Trust proposes to undertake the issue of up to 26,241,040 Units to the Sponsor, on a preferential basis ("**Preferential Issue**"), in accordance with the SEBI Institutional Placement Guidelines and the InvIT Regulations. The IM Board by way of its resolution dated August 30, 2022 and September 27, 2022 and the unitholders of the Trust by way of their resolution dated September 23, 2022, have approved the Issue of 131,205,200 Units at or above the base price of ₹ 107.12 per Unit. The IM Board by way of its resolution dated September 27, 2022 have approved the Floor Price of ₹ 109.00 per Unit. Of the 131,205,200 Units, the Trust proposes to undertake the issue of up to 26,241,040 Units to the Sponsor, on a preferential basis ("**Preferential Issue**"), in accordance with the SEBI Institutional Placement Guidelines and the InvIT Regulations. The IM Board by way of its resolution dated September 17, 2022 has approved the Preferential Issue. The Sponsor, by way of its letter dated September 29, 2022, has confirmed its willingness to subscribe to at least 19,602,600 Units being offered pursuant to the Preferential Issue and such number of Units as may be approved by the Unitholders, subject to receipt of the approval of the Unitholders, at or above the Floor Price, in its meeting proposed to be scheduled on October 10, 2022.

The Preferential Issue 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.

Further, the Units are tradable on the Stock Exchanges. If the Sponsor (following the lapse of its lock-up arrangements or pursuant to any applicable waivers), 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 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.

62. ***Our rights and the rights of the Unitholders to recover claims against the Investment Manager or the Trustee are limited.***

Under the Investment Management Agreement, the Investment Manager is not liable for, among other things, any action or omission, if it has carried out its duties and exercised its powers with reasonable skill and care expected of an investment manager (except in the case of fraud, negligence or wilful misconduct). Pursuant to the Trust Deed, the Trustee is not liable for anything done or omitted to be done or suffered by the Trustee in good faith. Further, the Trustee is not liable for any action or omission that results in any depletion in the value of the trust fund and consequent losses of the Unitholder, except in situations where such depletion is a result of the gross negligence or wilful default on the part of the Trustee. The Investment Management Agreement provides that the Investment Manager is entitled to be indemnified out of the Trust Fund against all taxes and other liabilities, claims, costs, losses, damages and expenses (including reasonable attorney's fees and costs) ("**Losses**") incurred in connection with the Trust, unless arising out of gross negligence, dishonest acts or commissions or omissions, wilful misfeasance, reckless disregard of duty or breach of duties under the Investment Management Agreement. As a result, the Trust's rights and the rights of the Unitholders to recover claims against the Investment Manager are limited. Furthermore, recourse to the Trustee may be limited under the Trust Deed. The Trust Deed provides for the indemnification of the Trustee and the Investment Manager for all Losses, except Losses incurred due to any gross negligence, default, breach of duty or trust, or a failure to show a requisite degree of diligence and care. Accordingly, the liability of the Investment Manager and the Trustee are limited under the terms of these agreements and the Unitholders may not be able to recover claims against the Trustee or the Investment Manager, including claims with respect to any offer documents relating to the Offer.

Further, pursuant to the Trust Deed, the Trustee is not under any obligation to institute, acknowledge the service of, appear in, prosecute or defend any action, suit, proceeding or claim, which in its opinion might involve it in expense or liability that exceeds the value of the fund. The Trust (acting through the Trustee) and the Investment Manager intend to apply the proceeds of the Offer towards the objects set out in this Preliminary Placement Document. Accordingly, the Net Proceeds may not be sufficient to recover claims, including claims with respect to any offer documents in relation to the Offer.

63. ***Information and the other rights of Unitholders under Indian law may differ from such rights available to equity shareholders of an Indian company or under the laws of other jurisdictions.***

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. See the section headed "*Rights of Unitholders*" on page 219 of this Preliminary Placement Document.

64. ***The price of the Units may decline after the Listing Date.***

The Offer Price has been determined by the Investment Manager in consultation with the Lead Managers. The Offer Price may not be indicative of the market price of the Units upon completion of the Listing. 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. There can be no assurance that the market price of the Units will not 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 toll 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 toll roads and other 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 Total 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 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, Unitholders who do not, or are not able to, participate in the new issuance of Units may experience a dilution of their interest in the Trust. In addition, the Units are not capital-safe products and there is no guarantee that 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.

Risks Related to Tax

65. ***Unitholders should consider the impact of U.S. Foreign Account Tax Compliance Act withholding.***

Pursuant to certain provisions of the U.S. Internal Revenue Code of 1986, commonly known as FATCA, a "foreign financial institution" may be required to withhold on certain payments it makes ("foreign passthru payments") to persons that fail to meet certain certification, reporting, or related requirements. A number of jurisdictions, including India, have entered into, or have agreed in substance to, intergovernmental agreements with the United States to implement FATCA ("**IGAs**"), which modify the way in which FATCA applies in their jurisdictions. Certain aspects of the application of the FATCA provisions and IGAs to instruments such as the Units, including whether withholding would ever be required pursuant to FATCA or an IGA with respect to payments on instruments such as the Units, are uncertain and may be subject to change. Even if withholding would be required pursuant to FATCA or an IGA with respect to payments on instruments such as the Units, proposed regulations have been issued that provide that such withholding would not apply prior to the date that is two years after the date on which final regulations defining "foreign passthru payments" are published in the U.S. Federal Register. In the preamble to the proposed regulations, the U.S. Treasury Department indicated that taxpayers may rely on these proposed regulations until the issuance of final regulations. Holders should consult their own tax advisors regarding how these rules may apply to their investment in the Units.

66. ***The Trust may be classified as a passive foreign investment company for U.S. federal income tax purposes, which could subject U.S. holders of Units to significant adverse tax consequences.***

The Trust may be classified as a passive foreign investment company ("**PFIC**") for a particular taxable year if, after the application of certain "look-through" rules, either (i) 75% or more of its gross income is "passive income" as that term is defined in the relevant Code provisions or (ii) 50% or more of the value (determined on the basis of a quarterly average) of its assets are considered "passive assets" (generally, assets that generate "passive income" or are held for the production of "passive income"). The determination of PFIC status is an annual determination, cannot be made until the close of a taxable year, involves extensive factual investigation, including ascertaining the fair market value of all assets on a quarterly basis and the character of each item of income earned, and is subject to uncertainty in several respects. The Trust has not made, and does not expect to make, any determination as to its potential classification as a PFIC during any taxable year. If the Trust were to be treated as a PFIC, material adverse tax consequences could result for U.S. Holders (as defined below under "Tax Considerations—United States"), including with respect to any gain realized on the sale, exchange or disposition of the Units and on the receipt of certain "excess distributions" received with respect to the Units, and certain additional reporting requirements may apply. U.S. Holders should consult their own tax advisers regarding the potential application of the PFIC rules and should read the discussion below under "Tax Considerations—United States".

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

The current tax laws and regulations in India provide certain exemptions to interest income earned by business trusts from a special purpose vehicle as a result of which the InvIT and subsequently the Unitholders would be subject to relatively lower tax liabilities. These exemptions could be modified or removed at any time or clarified in a manner adverse to Unitholders, which could adversely affect our profitability and the amount available for distribution to Unitholders.

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 by the governmental or tax authorities, may result in tax risks in the jurisdictions in which we operate being significantly higher than expected. For instance, while the Investment Manager intends to take measures to ensure that it is in compliance with all relevant tax laws, there is no assurance that the tax authorities will not take a position that differs from the position taken by us with regard to our tax treatment of various items. Any of the above events may result in a material, adverse effect on our business, financial condition, results of operations and/or prospects and our ability to make distributions to the Unitholders. Tax authorities in India may also introduce additional or new regulations applicable to our business which could adversely affect our business and profitability.

Further, the tax authorities in India may not agree with the positions adopted by the Project SPV or by the Trust, and may take a divergent view with respect to allowability of any expense (including interest payment) or in relation to taxability of any income during the assessment proceedings, if any. This may adversely affect the profitability of Project SPV and Trust, and may affect the ability to make distributions to the Unitholders.

68. ***Changes in legislation or the rules relating to such tax regimes and surcharges could materially and adversely affect our business, prospects and results of operations.***

The Finance Act, 2020 amended the definition of 'business trusts', and also abolished the dividend distribution tax regime as applicable to companies and shifted the incidence of taxation of dividend on the shareholder or unitholders.

There had been two key reforms in Indian tax laws, namely the introduction of the Goods and Services Tax ("**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.

Additionally, there is limited clarity on the availability of input tax credit, and any unfavourable orders in this regard may have a material adverse impact on our financial position and cash flows. Further, any application of existing law or future amendments may affect our overall tax efficiency, and may result in significant additional taxes becoming payable.

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 by the governmental or tax authorities, may result in tax risks being significantly higher than expected.

The GAAR regime came into effect on April 1, 2017. The GAAR regime is a broad set of provisions which grant powers to India tax authorities to invalidate any arrangement for tax purposes in the event, the main purpose of entering into the transaction by the taxpayer is to obtain a tax benefit. Besides the "tax benefit", the transaction should meet any one of the following specified additional tests: (i) creates rights, or obligations, which are not ordinarily created between persons dealing at arm's length; (ii) results, directly or indirectly, in the misuse, or abuse, of the provisions of the IT Act; (iii) lacks commercial substance or is deemed to lack commercial substance as prescribed under the IT Act in whole or in part; and (iv) is entered into, or carried out, by means which are, or in a manner which is, not ordinarily employed for bona fide purposes.
on the Trust..

Such transactions are declared as impermissible avoidance arrangements and the consequence in relation to tax arising from such arrangements, including denial of a tax benefit or a benefit under a tax treaty, shall be determined according to the circumstances of the case. The rules notified with respect to GAAR prescribe that these shall not be applicable to FIIs in accordance with the SEBI (Foreign Institutional Investors) Regulations, 1995 subject to the fulfilment of certain conditions. In the absence of any precedents on the subject, the application of these provisions is uncertain. GAAR may have a material adverse tax impact on the Trust, the Sponsor and the Unitholders.

In respect of non-residents, the tax rates and the consequent taxation mentioned under Statement of Tax Benefits shall be further subject to any benefits available under the applicable DTAA, if any, between India and the country in which the non-resident has fiscal domicile. Further, it is pertinent to meet the terms and condition viz. Principal purpose test, beneficial ownership test etc. as enacted in DTAAs entered into by India with various countries based on Multilateral Convention to implement tax treaty related measures to prevent Base Erosion and Profit Shifting ('MLI').

Further, pursuant to amendments introduced by Finance Act, 2022, the applicability of section 94(7) of the IT Act has been extended to the units of business trust (with effect from Financial Year 2022-23), which provides 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 Finance Act, 2022 has also extended the applicability of section 94(8) of the IT Act (commonly known as bonus stripping) to the units of business trusts (with effect from Financial Year 2022-23), which 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 such additional units referred to in clause (ii) above as are held on the date of such sale or transfer.

The Investment Manager has not determined the impact of such existing or proposed legislations 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.

69. ***The Ministry of Finance, GoI, has constituted a task force to draft new direct tax legislation, the provisions of which may have an unfavourable implication for us.***

The Ministry of Finance, GoI, has set up a panel to review the Income Tax Act and to draft a new direct tax legislation ("**Panel**"). The Panel has been tasked with drafting appropriate direct tax legislation aimed at (i) aligning India's domestic direct tax regime in line with international best practices; and (ii) ensuring and encouraging compliance. The impact of the report by the Panel, including findings and recommendations in their report and the provisions of the proposed direct tax legislation could have an unfavourable implication on us. Since the Panel and its report, including their recommendations and the draft of the new direct tax legislation has not been released yet, the possible impact on us is cannot be determined at this point in time.

70. ***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, units of a business trust held for more than 36 months are considered as long term capital assets. In case of sale of such units through a recognised stock exchange in India and payment of securities transaction tax ("**STT**"), any gain arising in excess of ₹ 0.10 million is subject to long term capital gains tax at a concessional rate of 10% (plus applicable surcharge and cess). However, if the said units are sold in any other manner, the entire gain shall be subject to long term capital gains tax at the rate of 20% with indexation benefit (plus applicable surcharge and cess).

In case the units are held for less than or up to 36 months, the same shall be regarded as short term capital asset. 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 15% (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 applicable tax rates of the holder (plus applicable surcharge and cess).

The aforesaid taxability in India is subject to tax treaty benefits in the case of a non-resident holder.

The Finance Act, 2020 amended the Income Tax Act to abolish the dividend distribution tax regime and shift the incidence of taxation of dividend (declared or distributed on or after April 1, 2020) to shareholder. Under the Finance Act, 2020, 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 115BAA of the Income Tax 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 115BAA of the Income Tax Act. However, where the special purpose vehicle opts to pay tax under Section 115BAA of the Income Tax 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 and at the ordinary rate for a resident unitholder. Further, 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 Project SPV.

It may also be noted that in terms of Section 194LBA (1) of the IT Act, any distributable income in the nature of interest income and dividend income (where the Project SPV has opted to pay corporate tax under the beneficial regime introduced under Section 115BAA of the IT Act) in the hands of a resident investor is subject to deduction of tax at the rate of 10%. Similarly, in terms of Section 194LBA (2) of the IT Act, 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 115BAA 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. The ultimate tax liability in the hands of the Unitholder may depend on various factors/ considerations.

Further, the Government of India has notified the Finance Act, 2021 ("**Finance Act**") which has introduced various amendments to taxation laws in India. Further, as announced in the previous budget, the dividend distribution tax regime was abolished and replaced with dividend withholding tax regime. However, the procedural provisions regarding exemption of withholding tax in relation to dividend distribution by Special Purpose Vehicles (SPVs, as defined under IT Act) to InvIT were absent. In this regard, the Finance Act has exempted withholding of taxes on dividend distributions by SPVs to InvITs. Please note that such amendment is proposed to take effect retrospectively from April 1, 2020.

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.

71. ***The income of the Trust in relation to which pass through status is not granted under the IT Act may be chargeable to Indian taxes.***

Under the provisions of the IT Act, the total income of the Trust other than capital gains, interest and dividend income from the Project SPVs would be taxable at the maximum marginal rate ("**MMR**"). MMR is defined under the provisions of the IT Act to mean the rate of income-tax (including surcharge on income-tax, if any) applicable in relation to the highest slab of income.

In accordance with Section 115UA of the IT Act, the MMR applicable to the Trust, a separately assessable resident entity, is 30.0% (plus applicable surcharge and cess). However, the tax authorities may view the Trust as a "pass through" entity and the applicable tax rate will be the MMR applicable to its beneficiaries. If any beneficiary is chargeable to MMR at a rate higher than the rate applicable to other beneficiaries, the income of the Trust attributable to the share of such beneficiary will be taxed at a higher applicable rate. For example, if any Unitholder is a non-resident, the MMR of 40.0% (plus applicable surcharge and cess) would apply. As there are divergent views, there is a possibility that the matter may be litigated if the tax authorities subscribe to the latter view.

GENERAL INFORMATION

National Highways Infra Trust

National Highways Infra Trust ("**Trust**") was settled on October 19, 2020, in New Delhi pursuant to the Trust Deed as a contributory irrevocable trust in accordance with the Indian Trusts Act, 1882. The Trust was registered with SEBI on October 28, 2020, under Regulation 3(1) of the InvIT Regulations and has obtained a certificate of registration from SEBI bearing number IN/InvIT/20-21/0014. The principal place of business of the Trust is situated at G - 5 & 6, Sector 10, Dwarka, New Delhi – 110 075.

The Trust is an infrastructure investment trust established for making investments in special purpose vehicles as defined under Regulation 2(1)(zy) of the InvIT Regulations, or infrastructure projects or securities of Indian companies engaged in the infrastructure sector, as may be permitted in terms of Regulation 18(5) of the InvIT Regulations. For information on the background of the Trust and the description of the InvIT Assets, please see the sections entitled "*Overview of the Trust*" and "*Our Business*" on pages 24 and 107, respectively.

Compliance Officer of the Trust

The Compliance Officer is Gunjan Singh. Her contact details are as follows:

Gunjan Singh
Address: G-5 & 6
Sector – 10, Dwarka
New Delhi 110 075
Tel: +91 11 2507 4100 Extn: 1671
Fax: +91 11 2507 6536
E-mail: cs.nhim@nhai.org

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

The Sponsor – National Highways Authority of India

Head office and address for correspondence:

G-5 & 6
Sector – 10, Dwarka
New Delhi 110 075

Contact Person of the Sponsor

NRVVMK Rajendra Kumar is the contact person of the Sponsor. His contact details are as follows:

NRVVMK Rajendra Kumar
Address: G-5 & 6
Sector – 10, Dwarka
New Delhi 110 075
Tel: + 91 11 2507 4100/1619
Fax: N.A.
Email: memberfinance@nhai.org
Website: www.nhai.gov.in

The Investment Manager - National Highways Infra Investment Managers Private Limited

Registered office and address for correspondence:

G - 5 & 6,
Sector 10, Dwarka,
New Delhi – 110075
Tel: +91 11 2507 6536
Fax: +91 11 2507 6536
Email: nhiimpl@nhai.org
Contact Person: Suresh Goyal

The Project Manager – National Highways InvIT Project Managers Private Limited

Registered office and address for correspondence

G - 5 & 6,
Sector 10, Dwarka,
New Delhi – 110075
Tel: +91 11 2507 4100 Ext: 1641
Contact Person: Shri Bugatha Muralidhara Rao

The Trustee – IDBI Trusteeship Services Limited

Registered Office address

Asian Building, Ground Floor
17, R. Kamani Marg
Ballard Estate
Mumbai 400 001

Correspondence Office address
1009, 10th Floor,
Ansal Bhawan, KG Marg,
New Delhi – 110 001
Tel: +91 11 4513 8885
E-mail: delhiitsl@idbitrustee.com
Contact Person: Deepak Kumar / Mahendra Singh Chouhan
Website: www.idbitrustee.com

Other Parties involved in the Trust

Auditors

A.R. & Co.
A-403, Gayatri Apartment
Airlines Group Housing Society
Plot No 27, Sector -10, Dwarka
New Delhi 110 075
Tel: +91 9810195084 / 9810444051
Email: ar_co1981@yahoo.co.in, pawankgoel1@gmail.com
Contact Person: Pawan K Goel
Firm Registration Number: 002744C
Peer Review Certificate Number: 011988

Valuer

RBSA Valuation Advisors LLP
Unit No. 1121, 2nd Floor
Building No. 11, Solitaire Corporate Park
Guru Hargovindji Road, Chakala
Andheri East, Mumbai 400 093
Maharashtra, India
Contact Person: Ravishu Vinod Shah
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Technical Consultants

M/s Consulting Engineer Group Ltd.
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#6-3-1100/5. 2nd Floor
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Website: www.Samarth-infraengg.com
E-mail: Sridhar@Samarth-infraengg.com
Contact person: D V Sridhar Murthy

Contact person: Dharmendra Kumar Mishra

Traffic Consultants

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Tel: +91 12444 18650
Fax: +44 20791 05001
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E-mail: vaibhav.gupta@steergroup.com
Contact person: Vaibhav Gupta

Ramboll India Private Limited
Floor-17, The Epitome
Building No. 5, Tower-B
DLF Cyber Terrace Phase-III
Gurgaon, Haryana 122 002
Tel: +91 12446 11999
Fax: +91 12446 11998
Website: www.ramboll.com
E-mail: srch@ramboll.com
Contact person: Srinivas Chekuri

Lead Managers to this Offer

ICICI Securities Limited
ICICI Venture House,
Appasaheb Marathe Marg,
Prabhadevi, Mumbai 400 025
Maharashtra, India
Tel: +91 22 6807 7100
Email: nhitinvit@icicisecurities.com
Website: www.icicisecurities.com
Investor Grievance Email: customercare@icicisecurities.com
Contact person: Sumit Singh/ Rupesh Khant
SEBI Registration No: INM000011179

SBI Capital Markets Limited
202, Maker Tower 'E'
Cuffe Parade, Mumbai 400 005
Maharashtra, India
Tel: +91 22 2217 8300
Email: nhaiinvit@sbicaps.com
Website: www.sbicaps.com
Investor Grievance Email: investor.relations@sbicaps.com
Contact person: Mandeep Singh
SEBI Registration No: INM000003531

Escrow Collection Bank

ICICI Bank Limited
Capital Market Division
5th Floor, HT Parekh Marg
Churchgate
Mumbai 400 020
Tel.: 022 6805 2182
Fax: N.A
Email: sagar.welekar@icicibank.com/ipocmg@icicibank.com
Website: www.icicibank.com
Contact Person: Sagar Welekar
SEBI Registration No.: INBI00000004

Legal counsel to the Trust as to Indian law

Cyril Amarchand Mangaldas
5th Floor, Peninsula Chambers
Peninsula Corporate Park
Ganpatrao Kadam Marg
Lower Parel
Mumbai 400 013
Tel: +91 22 2496 4455

Indian legal counsel to the Lead Managers

J. Sagar Associates
Vakils House, 18 Sprott Road
Ballard Estate, Mumbai 400 001
Tel: +91 22 4341 8600

International Legal counsel to the Trust and the Sponsor as to United States Federal Securities law

Linklaters Singapore Pte. Ltd.
One George Street #17-01,
Singapore 049145
Tel: +65 6692 5700

Registrar and Transfer Agent

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Nanakramguda, Serilingampally
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Telangana, India
Tel: 040 6716 2222
E-mail: einward.ris@kfintech.com
Investor Grievance E-mail: einward.ris@kfintech.com
Website: www.kfintech.com
Contact Person: M. Murali Krishna
SEBI Registration No.: INR000000221

Credit Rating Agencies

CARE Ratings Limited
32, Titanium
Prahaldanagar Corporate Road
Satellite
Ahmedabad 380 015
Tel: 079 4026 5656 / +91 99251 39180
Fax: 079 4026 5657
Website: www.ramboll.com
E-mail: Maulesh.desai@careedge.in
Contact person: Maulesh Desai
Website: www.careratings.com
SEBI Registration No.:

India Ratings and Research Private Limited
Wockhardt Towers, 4th Floor
West Wing, Bandra Kurla Complex
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Tel: 022 4000 1700
Fax: 022 4000 1701
Website: www.indiaratings.co.in
E-mail: infogrp@indiaratings.co.in
Contact person: Arunima Basu
Website: www.indiaratings.com
SEBI Registration No.: IN/CRA/002/1999

Details of credit ratings

The Trust has been given a rating of

(iii) Provisional Care AAA/Stable by Care Ratings Limited on August 25, 2022, as revalidated on September 23, 2022, for proposed long-term non-convertible debenture issue aggregating up to ₹ 1,500 crore, the rationale for which is available at its website www.careedge.in;

(iv) (a) Provisional IND AAA/Stable for proposed public issue of non-convertible debentures aggregating up to ₹ 1,500 crore, (b) IND AAA/Stable as long-term issue rating; (c) Provisional IND AAA/Stable for proposed rupee term loan of ₹ 8,500 crore; and (d) IND AAA/Stable for proposed rupee term loan of ₹ 20,000 crore, by India Ratings and Research on September 20, 2022 the rationale for which is available at its website, www.indiaratings.co.in.

It is clarified that the details available on these websites do not form a part of this Preliminary Placement Document.

PARTIES TO THE TRUST

Except as provided otherwise stated herein below, for an overview of the parties to the Trust, please see the section entitled "*Parties to the Trust*" on page 94 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html.

The details of the background of the Sponsor as disclosed in the section entitled "*Parties to the Trust – The Sponsor – National Highways Authority of India – Background of the Sponsor*" on page 94 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html shall be replaced as follows:

"***Background of the Sponsor***

NHAI is an autonomous body under Ministry of Road, Transport and Highways. It is established and governed by the NHAI Act. NHAI is not a company in terms of the Companies Act, 2013 (or in terms of the Companies Act, 1956), and accordingly, does not have a share capital.

Pursuant to Section 17 of the NHAI Act, NHAI may receive additional capital and grants from the Central Government to discharge its functions. Additionally, NHAI has not issued any shares against such capital or grants invested by the Central Government.

As per Section 3(3) of the NHAI Act, NHAI shall consist of: (i) a chairman; (ii) not more than six full-time members; and (iii) not more than six part-time members, and each of the above shall be appointed by the Central Government by notification in the official gazette.

In accordance with the eligibility criteria specified under the InvIT Regulations, NHAI had a shareholders' fund of not less than ₹ 1,000 million as on March 31, 2021.

Further, none of the members of the Sponsor are fugitive economic offenders as declared under section 12 of the Fugitive Economic Offenders Act, 2018."

The details of the Board of Directors of the Trustee as disclosed in the section entitled "*Parties to the Trust – The Trustee – IDBI Trusteeship Services Limited – Board of Directors of the Trustee*" on page 95 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html shall be replaced as follows:

"*The board of directors of the Trustee is 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***
1.	*Samuel Joseph Jebaraj*	*02262530*
2.	*Pradeep Kumar Jain*	*07829987*
3.	*Madhuri Jayant Kulkarni*	*07787126*
4.	*Jayashree Vijay Ranade*	*09320683*
5.	*Padma Vinod Betai*	*00937921*

"

The details of the IM Board as disclosed in the section entitled "*Parties to the Trust – The Investment Manager – National Highways Infra Investment Managers Private Limited – The IM Board*" on page 105 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html shall be replaced as follows:

"***The IM Board***

The IM Board is entrusted with the responsibility for the overall management of the Investment Manager. The Sponsor, acting together with MoRTH, have the right to nominate up to two directors on the Board of the IM. Please see below the details in relation of the IM Board:

Sr. No.	***Name***	***DIN***
1.	*Balasubramanyam Sriram*	*02993708*
2.	*Suresh Goyal*	*02721580*
3.	*N.R.V.V.M.K. Rajendra Kumar*	*09494456*
4.	*Mahavir Parsad Sharma*	*03158413*
5.	*Shailendra Narain Roy*	*02144836*
6.	*Amit Kumar Ghosh*	*01092172*
7.	*Kavita Saha*	*03313543*

Sr. No.	*Name*	*DIN*
8.	*Bruce Ross Crane*	*08403603*
9.	*Pradeep Singh Kharola*	*05347746*

The details of the brief biography of the directors of the investment manager as disclosed in the section entitled "*Parties to the Trust – The Investment Manager – National Highways Infra Investment Managers Private Limited – Brief Biography of the Directors of the Investment Manager*" on page 105 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html shall be replaced as follows:

"***Balasubramanyam Sriram****, is the chairman and an independent director of the Investment Manager. He has a bachelor's and a master's degree in science from University of Delhi, and is a certificated associate of the Indian Institute of Banking and Finance (formerly known as the Indian Institute of Bankers). He holds a diploma in management from All India Management Association, New Delhi, and a diploma in international law and diplomacy from the Indian Academy of International Law and Diplomacy. He has over 37 years of experience in the field of banking and finance, and is an independent director on the boards of ICICI Bank Limited, TVS Credit Services Limited, Nippon Life India Asset Management Limited and Indiaideas.com Limited. He is a part time member on the governing board of the Insolvency and Bankruptcy Board of India. He was also a former managing director and chief executive officer of IDBI Bank Limited, and a former managing director of State Bank of India.*

Suresh Goyal *is managing director and chief executive officer of the Investment Manager. He has a bachelor's degree in electrical engineering from Shri Govindram Seksaria Institute of Technology and Science, Indore, and a post-graduate diploma in management from the Indian Institute of Management, Lucknow. He has over several years of experience in the corporate and asset management sector. He was employed with the Macquarie group for over ten years wherein he was involved in various infrastructure investment management projects. At Macquarie, he spent over five years in managing investments in the toll road sector. He was previously associated with Macquarie Infrastructure & Real Assets, Singapore, and has served as Executive Director within Macquarie Asset Management.*

N.R.V.V.M.K. Rajendra Kumar *is a nominee director of the Investment Manager. He holds a doctorate degree in Economics from Hyderabad Central University. He also has a master's in public management from Harvard Kennedy School and Lee Kuan Yew School of Public Policy. He has been the Chief General Manager of the Internal Debt Management Department, Mumbai at the Reserve Bank of India since 2021. He is also the member (finance) of NHAI since 2022.*

Mahavir Parsad Sharma *is an independent director of the Investment Manager. He has a bachelor's degree in law from the University of Delhi, and has passed the institution examinations of the Institution of Engineers, India. He also worked as Chief Engineer and Additional Director General in the Ministry of Road transport and Highways. He has previously served as a technical advisor in the Ministry of Road Transport and Highways, Government of India.*

Shailendra Narain Roy *is an independent director of the Investment Manager. He has a bachelor's degree in engineering from the Indian Institute of Technology (BHU), and is a graduate of the Wharton Advanced Management Program. He has previously served as a whole-time director of Larsen & Toubro Limited for over eight years, and was on the board of several and associate companies of the L&T Group. He was also a former chief executive officer and managing director of L&T Power Limited. He was associated with the setting up India's first ultra-supercritical thermal power plant at Khargone for NTPC, the first supercritical power plant, Nabha Power Ltd. and five supercritical power plants across the country.*

Amit Kumar Ghosh *is the MoRTH nominee director on the Board of the Investment Manager. He is an IAS officer of the Uttar Pradesh cadre. He has a bachelor's degree in electrical and electronics engineering from the Andhra University, and a master's degree in arts in defence studies from the Chaudhary Charan Singh University, Meerut. He is the additional secretary, MoRTH, and is responsible for highway division and land acquisitions.*

Kavita Saha *is a non-Sponsor director of the Investment Manager. She has previously been associated with Barclays Bank PLC, IL&FS Investsmart Limited and asset and wealth management department of JP Morgan India Private Limited. She is currently a Managing Director, Infrastructure and Sustainable Energies in the real assets department of CPPIB India Advisors Private Limited.*

Bruce Ross Crane *is a non-Sponsor director of the Investment Manager. He has a bachelor's degree in civil engineering from Lehigh University and a master's degree in business administration from the Columbia Business School. He is currently a Senior Managing Director, Infrastructure and Natural Resources (Asia Pacific) at Ontario Teachers' Pension Plan.*

Pradeep Singh Kharola *is an additional director (non-executive and independent) of the Investment Manager. He has a bachelor's degree in mechanical engineering from Shri Govindram Seksaria Institute of Technology and Science, Indore and holds a master's degree in technology (industrial engineering) from Indian Institute of Technology, Delhi. He also holds a doctorate basis his thesis titled "Systems approach to estimate the optimal modal mix of passenger transport" from Indian Institute of Technology, Delhi. He is an Indian Administrative Officer of the Karnataka cadre. He has previously served as the Principal Secretary to the Chief Minister of Karnataka, and Commissioner of Commercial Taxes, Karnataka. He has also served as Secretary, Civil Aviation, government of India and as the managing director of Air India. He has won the Prime Minister's Award for Excellence in Public Administration for transforming the tax regime in Karnataka.*

CORPORATE GOVERNANCE

Except as provided herein, for an overview of the corporate governance, please see the section entitled "*Corporate Governance*" on page 122 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html.

The details of the Nomination and Remuneration Committee as disclosed in the section entitled "*Corporate Governance – Investment Manager – Committees of the board of directors – Nomination and Remuneration Committee - Quorum*" on page 125 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html shall be replaced as follows:

"*Quorum*

The quorum shall be at least 50% of the members of the committee, of which at least 50% of the members present, shall be independent directors."

The details of the policy on unpublished price-sensitive information and dealing in units by the parties to the Trust as disclosed in the section entitled "*Corporate Governance – Investment Manager – Policies to be adopted by the Board of Directors of the Investment Manager – Policy on unpublished price-sensitive information and dealing in units by the parties to the Trust*" on page 135 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html shall be replaced as follows:

"***Policy on unpublished price-sensitive information and dealing in units by the parties to the Trust***

*The Investment Manager has adopted the UPSI Policy pursuant to a resolution of the IM Board on February 3, 2021. The UPSI Policy was subsequently amended pursuant to resolutions of the IM Board dated September 27, 2021 and March 30, 2022. The purpose of the policy is, inter alia, to ensure that the Trust complies with applicable law, including the InvIT Regulations or such other Indian laws, regulations, rules or guidelines prohibiting insider trading and governing disclosure of material, unpublished price sensitive information ("**UPSI**").*

The key principles of the UPSI Policy are set out below:

a) The Investment Manager shall promptly disclose to the relevant stock exchanges all UPSI that would impact price discovery no sooner than credible and concrete information comes into being in order to make such information generally available;

b) The Investment Manager shall follow uniform and universal dissemination of UPSI to avoid selective disclosure;

c) The Company Secretary and Compliance officer shall be designated as a Chief Investor Relations Officer who shall be responsible for dissemination of information and disclosure of UPSI. The Chief Investor Relations Officer shall oversee and co-ordinate disclosure and dissemination of UPSI in a timely, adequate, uniform and universal manner to avoid selective disclosure, and shall educate employees on disclosure policies and procedures.

d) The Investment Manager shall promptly disseminate UPSI that gets disclosed out of accidental omission, selectively, inadvertently or otherwise to make such information generally available.

e) The Compliance Officer shall be responsible for deciding whether a public announcement is necessary for verifying or denying rumours and then making the disclosure, in accordance with the procedure specified in the Policy for Determining Materiality of Information for Periodic Disclosures and applicable law;

f) The Compliance Officer shall also make an appropriate and fair response to the queries, rumours or requests by the regulatory authorities, in accordance with the procedure specified in the Policy for Determining Materiality of Information for Periodic Disclosures. The Chief Investor Relations Officer should not comment on market rumours except when requested by regulatory authorities to verify such rumours;

g) The Compliance Officer shall make transcripts or records of proceedings of meetings with analysts and other investor relations conferences on the official website to ensure official confirmation and documentation of disclosures made; and

h) The Investment Manager shall handle all UPSI on a "need to know basis", provided that UPSI may be disclosed to persons who need such information for furtherance of legitimate purposes, performance of duties or discharge of legal obligations in relation to the Trust.

Further, the UPSI Policy also provides the process and procedures for closure of the trading window for dealing in Units, pre-clearance of dealing in units and approval requirements, disclosure by insiders, inquiry into leak of any UPSI and handling and investigation into complaints by whistleblowers."

OTHER PARTIES INVOLVED IN THE TRUST

Except as disclosed herein, for an overview of the other parties involved in the Trust, please see the section entitled "*Other Parties Involved in the Trust*" on page 142 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html.

The details of the background and terms of appointment of the auditor as disclosed in the section entitled "*Other Parties Involved in the Trust – The Auditor – Background and terms of appointment*" on page 142 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html shall be replaced as follows:

*"**The Auditor***

Background and terms of appointment

The Investment Manager, in consultation with the Trustee, has appointed A.R. & Co., Chartered Accountants (Firm Registration No. 002744C), as the statutory auditors of the Trust for a period of three years commencing from Fiscal financial year 2022-23 till financial year 2024-25. The Auditors have prepared the audited consolidated financial statements of the Trust and the Project SPV, for the period from the date of its settlement, that is October 19, 2020, till March 31, 2022 and limited review standalone interim financial information of the Trust for the quarter ended June 30, 2022, and the aforesaid reports have been included in this Preliminary Placement Document."

The details of the background and terms of appointment of the valuer as disclosed in the section entitled "*Other Parties Involved in the Trust – The Valuer – Background and terms of appointment*" on page 142 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html shall be replaced as follows:

"***The Valuer***

Background and terms of appointment

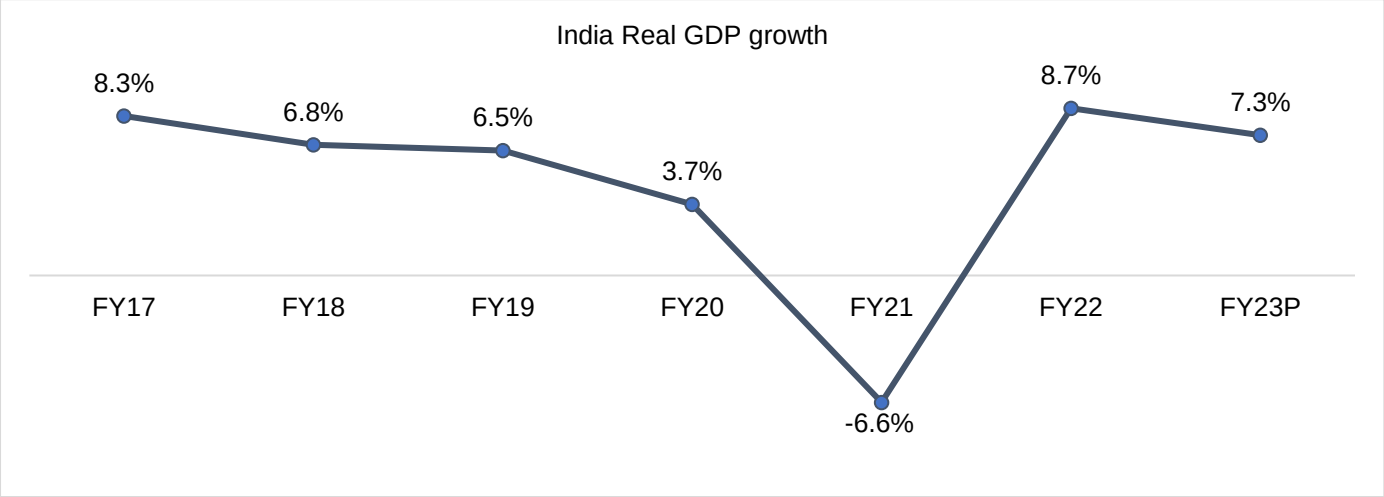
The Investment Manager, in consultation with the Trustee, has appointed RBSA Valuation Advisors LLP with effect from December 29, 2020, as the valuers of the Trust for a period up to the first financial year after the date of listing of the Units. In accordance with the InvIT Regulations, the Valuers have undertaken a full valuation of the Target Toll Roads as at July 31, 2022 which is proposed to be acquired by the Trust, and their report in relation to such valuation dated August 30, 2022, has been included in this Preliminary Placement Document."

INDUSTRY OVERVIEW

*The information contained in this section is derived from various government, other industry sources and reports including the report by CRISIL Research on Roads and Highways, dated September 2022 ("CRISIL Report"). Neither we nor any other person connected with the Offer has independently verified this information. 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 financial years ("**FY**") are to the one-year period ending March 31 of the named year.*

Overview of the Indian Economy

Recent RBI surveys indicate improving consumer sentiments which bode well for consumption demand and the first quarter GDP print does corroborate that. Rise in capacity utilisation rates in the manufacturing sector is favourable for private capex in pockets. This is especially true in case of infrastructure linked sectors such as steel and cement and some Production Linked Incentive scheme-linked sectors. CRISIL also expects the growing momentum in contact-intensive services to be broad based and support growth. That said, slower-than-expected growth in the first quarter has increased the downward bias to our real GDP growth projection of 7.3% for fiscal 2023. (Source: CRISIL Report)

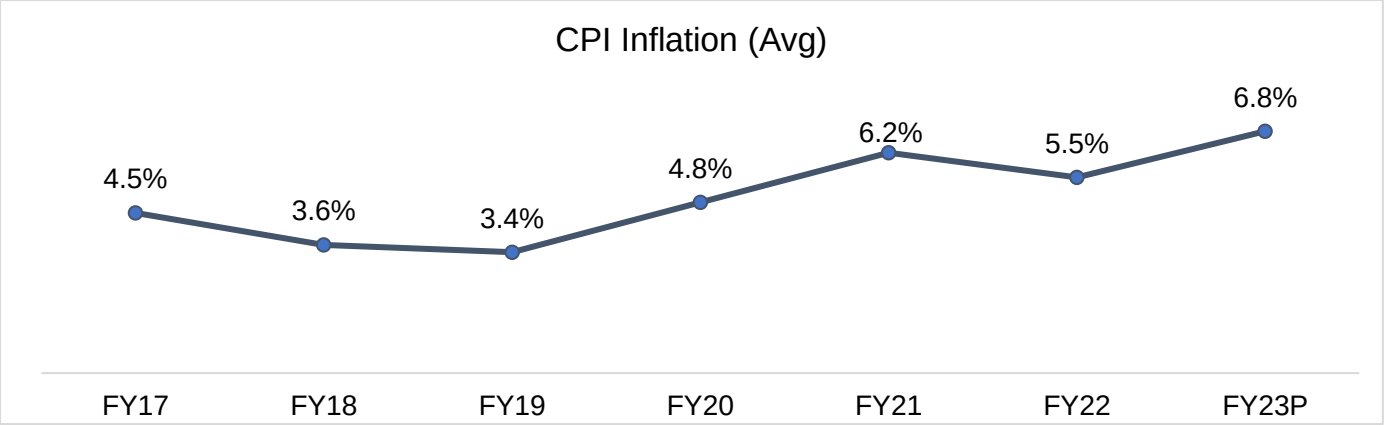


Source: NSO, CRISIL Research

In terms of the RBI Monetary Policy Statement 2022-23, dated August 5, 2022, the CPI inflation eased to 7.0 per cent (year-on-year, y-o-y) during May-June 2022 from 7.8 per cent in April, although it persists above the upper tolerance band. Spillovers from geopolitical shocks are imparting considerable uncertainty to the inflation trajectory. More recently, food and metal prices have come off their peaks. International crude oil prices have eased in recent weeks but remain elevated and volatile on supply concerns even as the global demand outlook is weakening. The appreciation of the US dollar can feed into imported inflation pressures. As per the latest RBI estimates, the inflation projection is retained at 6.7 per cent in 2022-23. (Source: *RBI Monetary Policy Statement 2022-23, dated August 5, 2022)*

Further, CRISIL expects CPI inflation to rise to 6.8% on average this fiscal, from 5.5% previous fiscal. This would be the highest level in 9 years, and above the RBI's target range of 2-6%. The impact of this year's heatwave on domestic food production, coupled with persisting high international commodity prices and input costs, will cause a broad-based rise.

CPI rose to 7% on-year in the month of Aug 2022 vs 6.7% in July and was largely driven by surging food inflation and the fading base effect of last year, even as non-food inflation moderated slightly. Core inflation will remain sticky as producers are expected to pass through cost increases to consumers amid demand recovery (especially in contact-based services). Although international energy prices have declined from 2022 highs, renewed fears of natural gas and coal supply disruption pose fuel inflation risks. (Source: CRISIL Report)



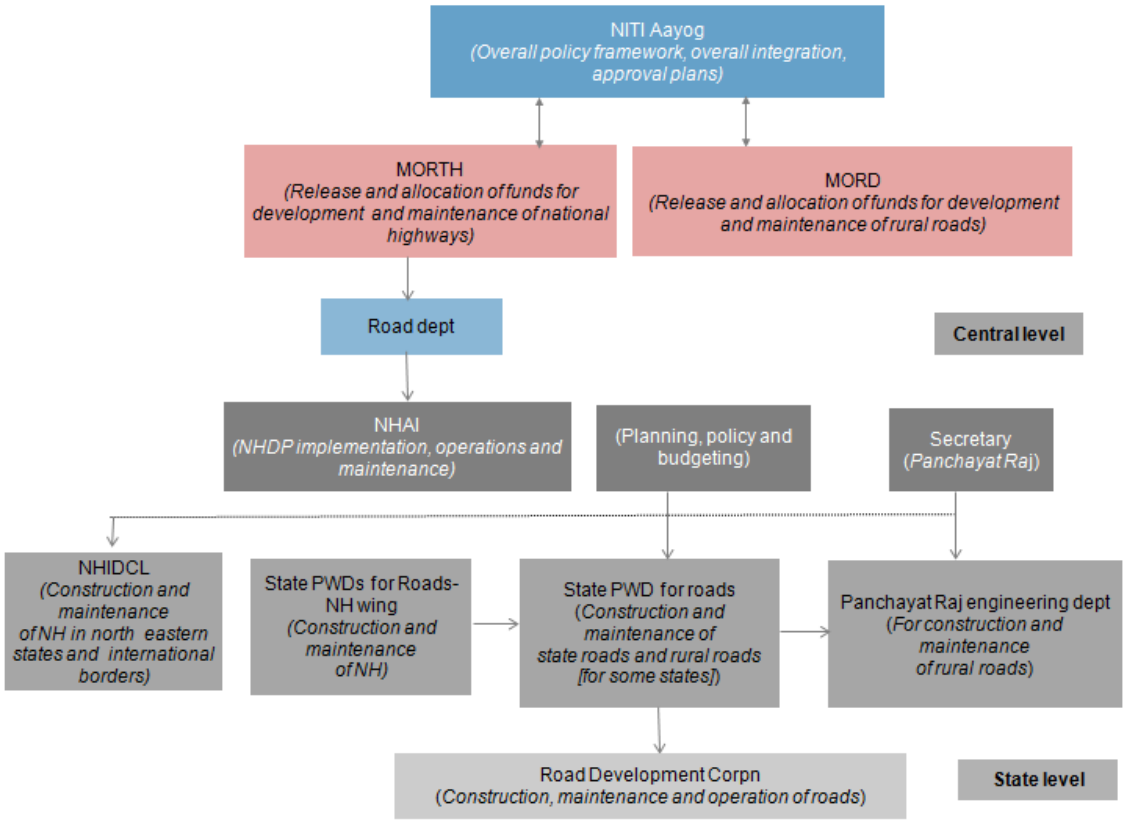
Source: NSO, CRISIL Research

Overview of the Road Sector in India

Road transport is the dominant mode of transport in India, both in terms of traffic share and contribution to the national economy. Apart from facilitating the movement of goods and passengers, road transport plays a key role in promoting equitable socio-economic development across regions of the country. It also plays a vital role in social and economic integration and development of the country. Easy accessibility, flexibility of operations, door-to-door service and reliability have earned road transport a greater significance in both passenger and freight traffic vis-à-vis other modes of transport.

Road Transport is a critical infrastructure for the economic development of a country. It impacts the pace, structure and pattern of development. The tasks and responsibilities of the Ministry of Road Transport and Highways encompass, inter alia, construction and maintenance of National Highways (NHs), administration of the National Highways Act, 1956, National Highways Authority of India Act, 1988, National Highways Fee (Determination of Rates and Collection) Rules, 2008, Motor Vehicles Act, 1988, and Central Motor Vehicles Rules, 1989, as also formulation of broad policies relating to road transport and automotive norms, besides making arrangements for movement of vehicular traffic with neighbouring countries. The capacity of National Highways in terms of handling traffic (passenger and goods) needs to keep pace with economic growth. (*Source: Annual Report 2021-2022 of the MoRTH available at https://morth.nic.in/*)

Road sector - Institutional arrangement at the Central and State level



Note: NHIDCL stands for National Highways and Infrastructure Development Corporation
Source: CRISIL Research

India has the second largest road network in the world, aggregating 6.2 million km. Roads are the most common mode of transportation and account for about 86% of passenger traffic and close to 67% of freight traffic. In India, national highways, with a length of close to 136,440 km, constitute a negligible percentage of the road network but carry about 40% of the total road traffic. On the other hand, state roads and major district roads are the secondary system of roads; they carry another 60% of traffic and account for nearly the entire road length. The road network in India can be divided into the following categories:

Road network in India as in fiscal 2021

Road network	Length (km)	Percentage of total		Connectivity to
		Length	Traffic	
National highway	136,440	0	40	Union capital, state capitals, major ports, foreign highways
State highway	176,818	0	60	Major centres within the states, national highways
Other roads	5,902,539	100		Main roads, rural roads, production centres, markets
Total	6,215,797	100.0	100.0	

Source: MoRTH Annual report 2020-2021, CRISIL Research

Overview of State Roads:

State roads come under the jurisdiction of the respective state governments. However, the Central government may provide financial assistance to state governments through various schemes for the development of the road network. The responsibility of awarding contracts for road development is entrusted with two state government divisions, namely the public works department (PWD) and road development corporation (RDC).

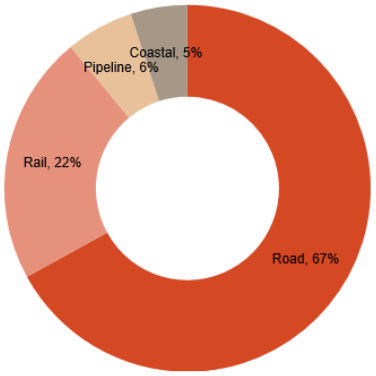
Further, the Central government has set up the Central Road Fund (CRF) to provide financial assistance to state governments for road development and railway safety works within the states. The CRF is funded from the cess collected on the sale of petrol and high-speed diesel (HSD). The fund provides assistance to states for the development and maintenance of state roads, rural roads, national highways, under- and over-bridges and safety works at unmanned railway crossings. Funds allocated for 2014-15, 2015-16 and 2016-17 (revised estimates) were Rs 26.5 billion, Rs. 28.8 billion and Rs 71.8 billion. About 476 projects, amounting to Rs 98.6 billion, were sanctioned under the scheme in 2017-18, compared with 1093 projects costing Rs 123 billion in 2016-17. (Source: CRISIL Report)

Roads account for 67% of total freight traffic

Road transport is the most frequently used mode of transport for both freight and passengers. For fiscal 2021, it is estimated that ~67% of total freight (in terms of BTKM) will be carried by roads when compared with railways. In 2009-10, roads accounted for approximately 58% of the total freight traffic.

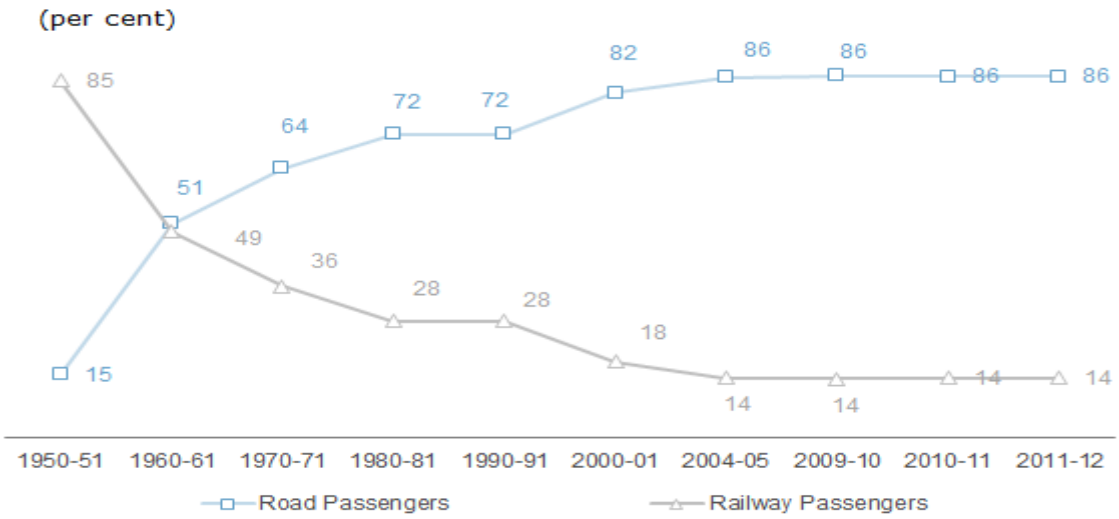
Proportion of freight traffic across modes of transport - Fiscal 2021

Source: CRISIL Research



Higher passenger traffic on roads than railways

Passenger traffic - Roads v/s railways



Note: FY12 is the latest available data
Source: Working Group Report on Road Transport for Eleventh Five-Year Plan, Industry

Since 1950-51, passenger traffic for railways has come down from 85% to 14% while passenger traffic for roads has consistently grown from 15% in 1950 -51 to 86% in 2011-12. Preference for road transport for freight movement is primarily on account of large capacity expansions carried out by fleet operators, flexibility and door-to-door movement. Further, there are many players in road transport while Indian Railways is the only player in railways.

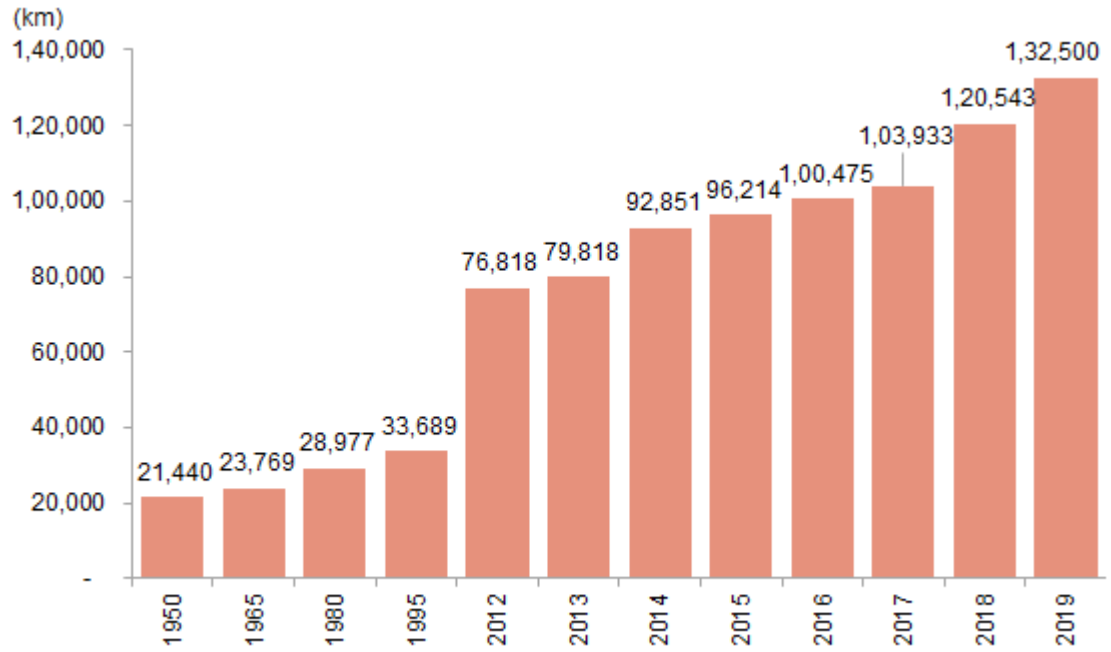
Upgradation of highways from two lane to four lanes

There has been an upgradation in terms of lanes in national highways, which has gone from being one lane and two lanes to four lanes. Single lane roads decreased from 32% in 2014-15 to 21% in 2015-16. Two lane roads increased from 47% to 56%, while four lane roads increased from 12% to 25% during the same period.

Overview – National Highways

As of fiscal 2019, National highways constitute around 2% of the country's road network, but carry about 40% of the total road traffic. The National Highways Authority of India (NHAI), the nodal agency under the Ministry of Road Transport & Highways (MoRTH), is responsible for building, maintaining and upgrading NHs.

National-highway network



Source: Ministry of Road Transport & Highways, CRISIL Report

National Highways Development Project

The NHDP encompasses building, upgradation, rehabilitation and broadening of existing NHs. The project is executed by the NHAI, in coordination with the public works departments of various states. The NHAI also collaborates with the Border Roads Organisation for the development of certain stretches. The NHDP is being implemented in seven phases.

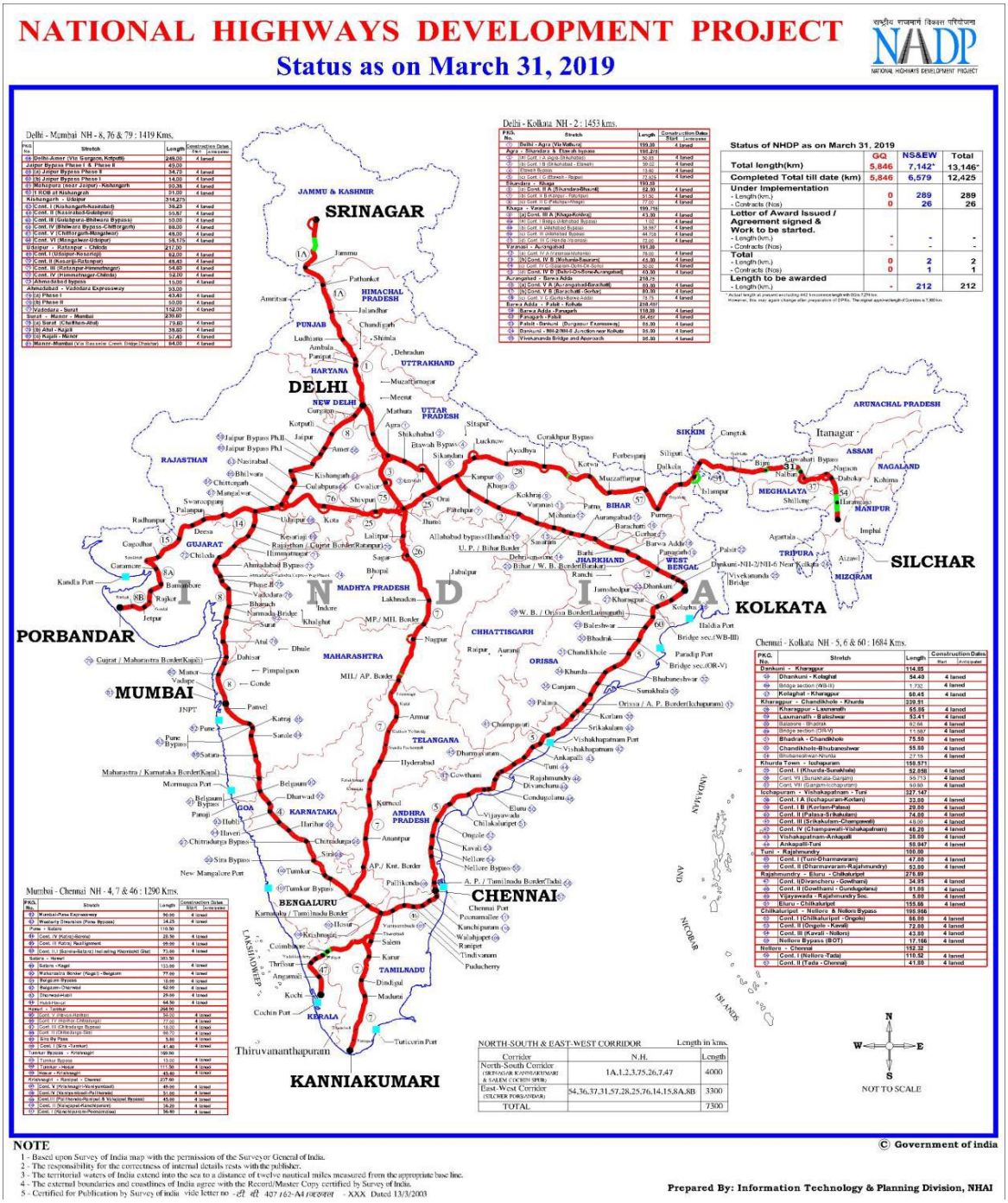
NHDP projects are awarded to private players either on EPC (cash) or build-operate-transfer (BOT) basis, and now on the newly introduced hybrid annuity model (HAM). NHDP cash contracts are mainly financed through budgetary allocations from the Central Road Fund, negative grants/premium received, and toll revenue. Loans and grants are also received from the World Bank and the Asian Development Bank. (Source: CRISIL Report)

Projects under existing the NHDP phases of 5,000-5,500 km to be awarded completely by fiscal 2021. These residual projects would dominate 50% of investments over the next five years.

The status of completion of various phases of NHDP, which have been subsumed under the umbrella programme of Bharatmala Pariyojana, Phase-I, are as under:

NHDP Phases	Length completed up to December 31, 2020 in kms
I+II+III+IV: GQ, Port connection & Up-gradation with 2/4/6-laning / NorthSouth & East West Corridor	38,685
V: 6-laning of GQ and High density corridor	4,088
VI: Expressways	219
VII: Ring Roads, Bypasses and flyovers and other structures	181

(Source: Annual Report 2021-2022 of the MoRTH available at https://morth.nic.in/)



(Source: NHDP Map as at March 31, 2019 published on NHAI Website (https://nhai.gov.in/#/nhdp-english-map)

Bharatmala Pariyojana

Bharatmala Pariyojana (BMP) is the new umbrella scheme, which supersedes the existing National Highways Development Programme (NHDP). The programme envisages to construct about 65,000 km of highways, under the following categories: National Corridor (North-South, East-West and Golden Quadrilateral), Economic Corridors, Inter corridor roads, Feeder roads, International connectivity, Border roads, Coastal roads, Port connectivity roads and Expressways. This will include existing NHDP programme as well. Some projects awarded in FY18 and YTD FY19 under Bharatmala are actually part of NHDP.

The Government of India had approved Bharatmala Pariyojana Phase-I in October, 2017 with an aggregate length of about 34,800 km (including 10,000 km residual NHDP stretches) at an estimated outlay of Rs. 5,35,000 crore for development of about 9,000 km length of Economic corridors, about 6,000 km length of Inter-corridor and feeder roads, about 5,000 km length of National Corridors Efficiency improvements, about 2,000 km length of Border and International connectivity roads, about 2,000 km length of Coastal and port connectivity roads, and about 800 km length of Expressways. Total of 255 road projects with an aggregate length of about 10,699 km have been approved till October, 2019 under Bharatmala Pariyojana with total Cost of Rs. 2,64,916 crore approximately. Bharatmala Pariyojana Phase-I is targeted for completion by 2021-22.

Components of Bharatmala Pariyojana (Phase -I)

Category	Description	Total Length (Km)	Upgrade Proposed in Phase I (Km)
National Corridor Efficiency Improvement	Lane expansion, De-congestion of existing National corridor	13,100	5,000
Economic Corridors Development	Connecting of economically important production & Consumption centres	26,200	9,000
Inter-corridor and feeder routes development	Inter-connection between economic corridors, first mile & Last mine connectivity	15,500	6,000
Border and International Roads	Connectivity to border areas and boosting trades with neighbouring countries	5,300	2,000
Coastal and port connectivity Roads	Connectivity to coastal areas to enable port-led economic development	4,100	2,000
Expressways	Greenfield expressways	1,900	800
TOTAL		66,100	24,800

Source: NHAI, CRISIL Research

Award of Projects under Bharatmala Pariyojana

Out of the 24,800 km approved under Bharatmala Pariyojana Phase-I, a total of 76 projects of length 4,003 km have been awarded by NHAI, post the approval of Bharatmala Pariyojana in the FY 17-18. Similarly, out of the 10,000 km approved under residual NHDP in Bharatmala Phase-I, a total of 39 projects of length 1,755 km have been awarded post the approval of Bharatmala Pariyojana in FY 17-18.

SR No.	Types of Corridor	No. of Projects	Awarded Length(km)
1	Economic Corridor	34	1,548
2	Inter Corridor Routes	2	98
3	Feeder Routes	3	96
4	National Corridor	23	1,073
5	Border Roads	6	973
6	Port Connectivity Roads	3	90
7	Expressways	5	124
	Bharat Mala Total	76	4,003
	Residual NHDP	39	1,755
	Grand Total	115	5,758

Source: NHAI, CRISIL Research

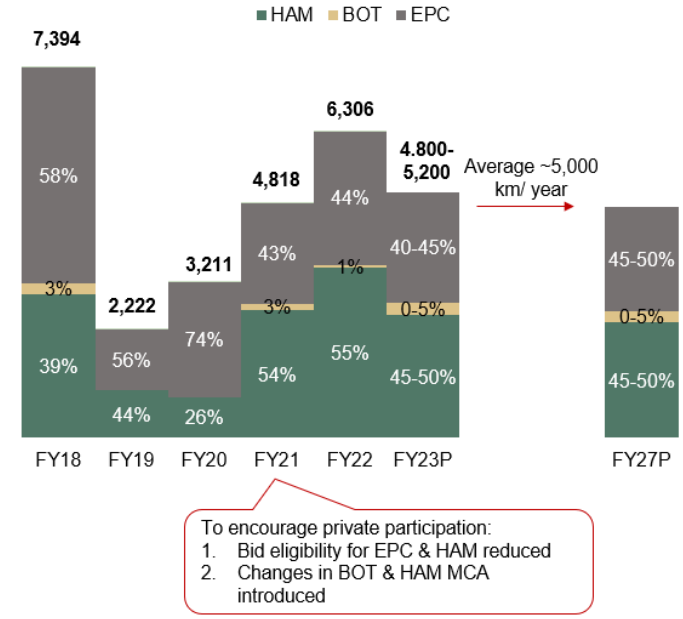
According to CRISIL estimates, Bharatmala awarding was ~5,500-6,000 km over fiscals 2018 and 2019. Investments under Bharatmala would be slow to pick up and contribute ~30% of total investments. As projects awarded under Bharatmala are 60% EPC and 40% HAM, NHAI's ability to raise funds to execute these projects would be a key monitorable. (Source: CRISIL Report)

Investments

National Highways Authority of India (NHAI) awarding has witnessed a sequential rise from merely 2,222 km in fiscal 2019 to 6,306 km in fiscal 2022. Fiscal 2021 was a pivotal year since despite the COVID-induced disruptions, there was a healthy growth in awarding. The NHAI awarded 4,818 kms in the fiscal 2021 which was a three fiscal high back then. Of these, 54% were awarded under the Hybrid Annuity Model (HAM), 3% under the Build-Operate-Toll (BOT) mode and rest under the Engineering, Procurement and Construction (EPC) mode.

Additionally, favorable changes in the BOT and HAM agreements, and relaxation of bidder eligibility criteria not only indicated a clear policy shift to improve private-sector participation but also aided the spurt in the HAM awards. In fiscal 2022, the awarding momentum continued unabated as the NHAI awarded 6,306 kms in the fiscal year. The share of HAM and EPC in the awarding increased marginally to 55% and 44% respectively while projects under the BOT model accounted for only a paltry 1%.

55% of projects awarded under HAM in FY22, share to remain similar



Source: NHAI, CRISIL Research

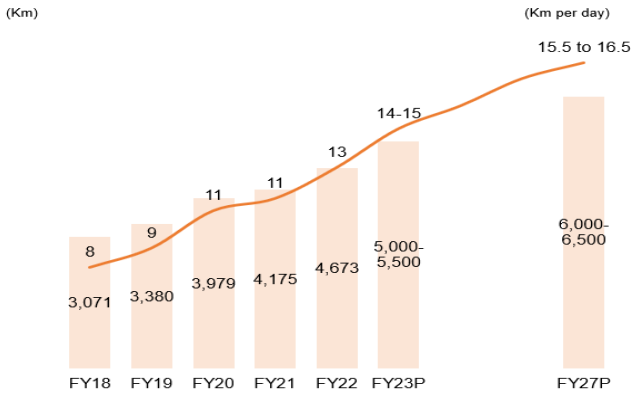
The higher awarding is also reflected in key players' orderbook, which has grown by 25% on-year in Q1 of fiscal 2023. This is a key positive for the sector as it provides good revenue visibility for the incumbent developers.

National Highway construction is also rising steadily with focus on swifter execution

Despite the lockdowns and labour-related issues, developers made up for lost time and construction at NHAI projects rose 5% on-year to 4,175 kms in fiscal 2021. Acceleration in project awards, sharper focus on resolving land acquisition issues, and the 'Atmanirbhar Bharat' initiatives to ease liquidity (monthly milestone payments, release of rentention money, reduction in performance secuirty & extension of 3-6 months in milestones & SCODs) for EPC road players augured well for the pace of construction. In fiscal 2022, NHAI's focus on swifter execution of projects paid dividends as 4,673 kms were constructed in the fiscal which translated into a 12% growth compared to the last fiscal.

CRISIL Research expects fiscal 2023 NHAI construction to be in the range of 5,000-5,500 kms on the back of higher awarding witnessed in the previous fiscal. Over the medium term, the pace of construction is expected to rise steadily to reach ~16 km per day by fiscal 2027.

NHAI's pace of construction rising steadily with continued focus on swifter execution



Source: NHAI, CRISIL Research

Bharatmala phase-1 awarding focused on expressways; likely to stretch till fiscal 2025

Bharatmala Pariyojana is an umberalla project of the the central government since 2015, that aims to improve efficiency in the roads sector. As per the ministry, Bharatmala, along with the schemes currently undertaken, could require a total outlay of Rs 6.9 trillion.

Phase-I of the scheme envisages development of about 24,800 km length of national highways/roads, plus residual 10,000 km of NHDP between fiscals 2018 and 2022. Awarding under Bharatmala has begun from fiscal 2018 and we believe it will stretch till fiscal 2025 for Phase 1.

Asset monetisation critical to meet ambitious Bharatmala targets

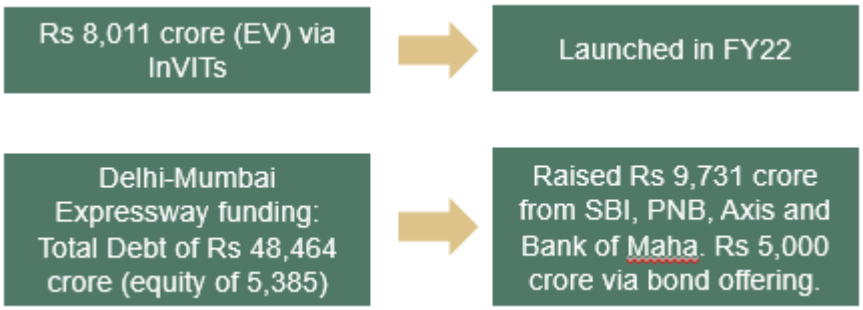
CRISIL Research estimates Rs 17-19 trillion will be invested in national highways between fiscals 2023 and 2027, with public funds dominating the overall spending. With the National Highways Authority of India (NHAI) awarding more projects under the hybrid annuity model (HAM) and on cash-contract basis, it is now relying more on external borrowings and asset monetisation. While asset monetisation via TOT and now the InVIT route is challenging in itself, raising external funds is increasing the debt to equity of the authority and repayments now form a large outflow for NHAI. Timely asset monetisation is critical for NHAI to meet its ambitious Bharatmala targets.

Other modes of funding such as TOT have seen only limited success. Over the past 4 years, NHAI has been able to successfully monetise ~14,000 kms and raise ~Rs 17,000 crore and another Rs 8,000 crore via InVITs. With the implementation of Fastags, TOT becomes more attractive as its able to eliminate cash handling and plug leakaged in the system. However, of late, the awarding of TOT bundles have encountered impediments with certain TOT bundles like TOT-6 and TOT-8 getting cancelled due to low bids. Therefore, the convergence of the expectations of the government authorities and the private bidders remain a key monitorable as well as a major requirement for this mode of funding to become truly successful.

InvITs, as envisaged in Union Budget 2014-15, will own and manage income-generating infrastructure projects. As per regulations, these trusts will be allowed to make only 20% of their investments in under-construction projects. The rest will have to be invested in completed, revenue-generating infrastructure projects. Such trusts are expected to help unlock tied-up capital of developers and attract foreign capital. In Union Budget 2015-16, the finance minister exempted the capital gains tax on sponsors at the time of listing of units of InvITs. In Union Budget 2016-17, distributions made from special purpose vehicles to InvITs were exempt from the dividend distribution tax.

Additionally, the authority has also tied up debt via SPV level funding for the Delhi-Mumbai expressway where it has already raised Rs 9,731 crores.

InvITs & SPV level financing



(Source: NHAI, CRISIL Research)

Key Policy Initiatives:

E-Initiatives

BhoomiRashi - Land Acquisition portal

The Ministry of Road Transport and Highways has launched BhoomiRashi portal to digitize the land acquisition notification process and avoid parking of public funds with the Competent Authority for Land Acquisition (CALA). The portal has been made mandatory for processing all the LA proposals w.e.f. April 1, 2018. Since the operationalization of the portal, land acquisition process has been expedited significantly, it has become error-free and more transparent and the notifications at every stage are being processed on a real time basis. During the year 2021, a total of 2,505 land acquisition notifications have been issued and nearly 20,454 hectares of land have been notified for acquisition, for National Highway projects. Also, following new modules have been added in the portal in the year 2021, to further streamline the land acquisition process and monitor land acquisition progress across the country:

- Offline Data Entry of Survey Numbers and Land Parties;

- Interface for appointment of arbitrator and login credentials to Arbitrator;
- Module for monitoring Court Cases and arbitral cases;
- Module for generating CALA performance report and average time taken in publication of notification;
- Module for Grievance Redressal System;
- Land Acquisition pipeline module for Project monitoring;
- Use of REAT payment module of PFMS for payment of compensation through BhoomiRashi so that requisite TDS may be deducted from compensation amount.

Further, a key objective of the Ministry was to avoid parking of funds in bank accounts and also ensuring transparent real time deposit of funds in the account of the individuals whose land/ property were acquired. The same has successfully been achieved by integrating the payment of compensation with the BhoomiRashi portal via Public Finance Management System (PFMS). Already, payments in nearly 17 States, amounting to more than 900 crores (in ₹) have been processed through PFMS, for the Projects executed by MORTH through State PWDs. This initiative of MoRTH has resulted in a more robust and efficient land acquisition for road construction in the country. (*Source: Annual Report 2021-2022 of the MoRTH available at https://morth.nic.in/*)

E-tolling

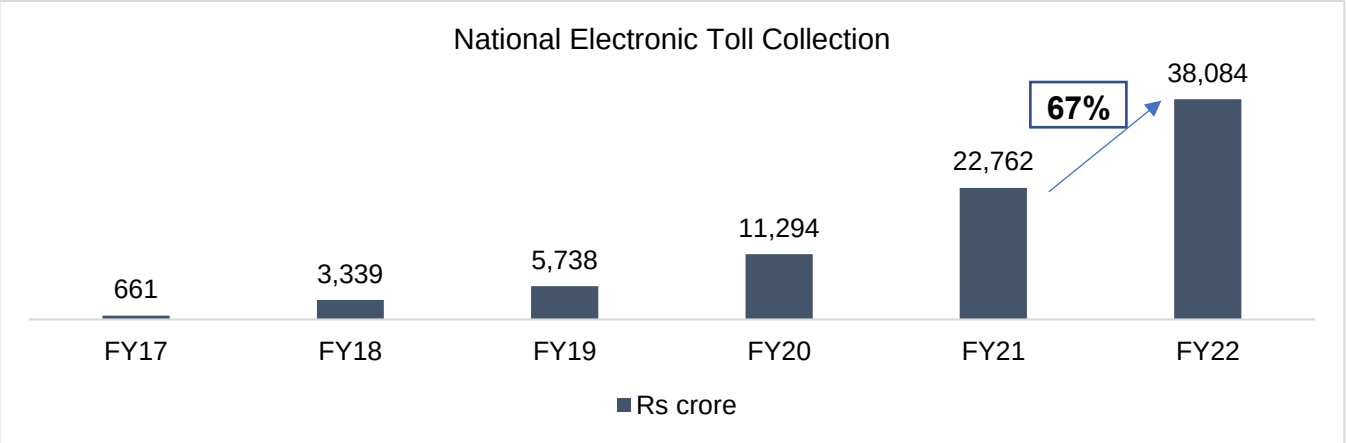
In order to ensure seamless movement of traffic through fee plazas and increase transparency in collection of user fee using FASTag, the National Electronic Toll Collection (NETC) programme, the flagship initiative of Ministry of Road Transport and Highways, has been implemented on pan-India basis. The National Payment Corporation of India (NPCI) is the Central Clearing House (CCH). There are thirty-six (36) banks (including Public and Private sector banks) engaged as issuer banks for FASTag issuance to road users and fourteen (14) acquirer banks to process the transactions at fee plazas.

The Ministry had mandated fitment of FASTag in M&N categories of motor vehicles with effect from 1st January 2021. Category 'M' stands for a motor vehicle with at least four wheels used for carrying passengers. Category 'N' stands for a motor vehicle with at least four wheels used for carrying goods, which may also carry persons in addition to goods. In order to further promote fee payment through digital mode, reduce waiting time and fuel consumption, and provide for seamless passage through fee plazas, Government has declared all lanes of the fee plazas on National Highways to be "FASTag lane of the fee plaza" w.e.f. the midnight of 15th/16th February 2021. (*Source: Annual Report 2021-2022 of the MoRTH available at https://morth.nic.in/*)

To ensure seamless traffic movement through toll plazas and increase transparency in collection of user fees using FASTag, the National Electronic Toll Collection (NETC) programme has been implemented on a pan-India basis. FASTags are simple to use reloadable tags to enable automatic deduction of toll charges from a pre-paid account without having to stop at toll plazas for cash transactions.

FASTag was started as a pilot project in 2014 on the stretch of Golden Quadrilateral between Mumbai and Ahmedabad. It was later extended to other toll plazas, with the FASTag use made mandatory across the country in February 2021. To ease the process of getting a FASTag for citizens, the Ministry also mandated that all vehicles manufactured after December 2017 should be pre-fitted with a FASTag. This reform has been immensely beneficial for citizens and toll plaza operators.

Transition to 100% FASTag was implemented w.e.f 15th February, 2021 and thereafter, significant increase in toll collection through FASTag has been observed.



. (Source: CRISIL Report)

OUR BUSINESS

Overview

We are a registered infrastructure investment trust under the InvIT Regulations. We currently have a right to toll, operate and maintain a portfolio of five Initial Toll Roads (*defined below*) in the Indian states of Gujarat, Rajasthan, Telangana and Karnataka, and intend to toll, operate and maintain a portfolio of three Target Toll Roads (*defined below*) in the Indian states of, Telangana, Maharashtra, Uttar Pradesh and Madhya Pradesh under the Toll Operate Transfer ("**TOT**") model conceived by NHAI. These Toll Roads (*defined below*) are operated and maintained pursuant to concessions granted by the NHAI. The Initial Toll Roads comprise five stretches spanning a total length of approximately 389 kms and the Target Toll Roads comprise three stretches spanning a total length of approximately 246 kms.

Our Sponsor is NHAI, an autonomous authority of the GoI under the MoRTH constituted on June 15, 1989 by an Act of the Indian Parliament titled - The National Highways Authority of India Act, 1988 (the "**NHAI Act**"). NHAI was operationalised in February 1995 with the appointment of a full-time Chairman and other members of the board. The functioning of NHAI is governed by the NHAI Act and the rules, and regulations framed thereunder.

The Project SPV has entered into eight (8) independent Concession Agreements with the NHAI for concessions of each of the Toll Roads. We have satisfied all conditions precedent and commenced our Concessions on December 16, 2021 in accordance with the terms of the Concession Agreements for the Initial Toll Roads and expect to satisfy all conditions precedent and commence our Concessions for the Target Toll Roads in accordance with the terms of the Concession Agreements for the Target Toll Roads. For further details, please see the section entitled "*Summary of the Concession Agreements*", "*Management's Discussion and Analysis of Financial Position and Results of Operations*" and "*Use of Proceeds*" on pages 145, 191 and 188, respectively.

The Concession Agreements provide the Project SPV the right to collect tolls for a period of 20 years or 30 years (as applicable under the relevant Concession Agreement) from users of each Toll Road, with certain overlay activities and the construction of additional toll lanes in respect of certain of the Toll Roads (the "**Initial Improvement Works**") to be completed by the Project SPV within 12 to 18 months from the Appointed Date (as defined in the section entitled "*Summary of the Concession Agreements*"). Responsibility for the supervision of the operations and maintenance of the Toll Roads also vests with us. In return, the Project SPV is required to pay the concession fee to the NHAI prior to the commencement of the Concession, as set out in the respective Concession Agreements. For further information on the provisions of the Concession Agreements, see "*Summary of the Concession Agreements".*

Pursuant to the Formation Transactions and the Proposed Transfer, the Trust has acquired 100% of the equity shares of the Project SPV from the Sponsor. For additional information about the Proposed Transfer, please see the section headed "*Formation Transactions in Relation to the Trust"*.

The Project SPV has a right to toll, operate and maintain the following toll road assets (the "**Initial Toll Roads**"):

- Palanpur/Khemana – Abu Road Project ("**Asset 1**"): Abu Road section of NH 27 with a total length of 45 kms, connecting the states of Gujarat and Rajasthan;
- Abu Road – Swaroopganj Project ("**Asset 2**"): Swaroopganj section of NH 27 with a total length of 31 kms, in the state of Rajasthan;
- Maharashtra/ Karnataka Border (Kagal) – Belgaum Project ("**Asset 3**"): Belgaum – Kagal section of NH 48 with a total length of 77.7 kms, connecting the states of Karnataka and Maharashtra;
- Chittorgarh – Kota & Chittorgarh Bypass Project ("**Asset 4**"): Chittorgarh – Kota section of NH 27 with a total length of 160.5 kms, in the state of Rajasthan; and
- Kothakota Bypass – Kurnool Project ("**Asset 5**"): Kothakota bypass – Kurnool section of NH 44 with a total length of 74.6 kms, connecting the states of Telangana to Andhra Pradesh.

From the Appointed Date, the Project SPV will have the right to toll, operate and maintain the following toll road assets (the "**Target Toll Roads**", together with the Initial Toll Roads, the "**Toll Roads**"):

- Agra Bypass Project ("**Asset 6**"): Agra Bypass section with a total length of 32.80 kms, connecting NH19 (old NH2) to NH44 (old NH7) in Uttar Pradesh;
- Borkhedi - Kelapur Project ("**Asset 7**"): Borkhedi-Kelapur-Maharashtra/Telangana border section of NH44 (old NH7) with a total length of 138.15 kms, in the state of Maharashtra; and
- Shivpuri – Jhansi Project ("**Asset 8**"): Jhansi-Shivpuri section of NH 27 with a total length of 75.30 kms, connecting the districts of Jhansi in the state of Uttar Pradesh and Shivpuri in the state of Madhya Pradesh.

The following map depicts locations of the Toll Roads:

Note:
(1) This map is for illustrative purposes only, is not to scale and is subject to change at any time.

Strengths of the Trust

Experienced Sponsor with consistent track record in operating and maintaining projects in the roads and highways sector in India

Our Sponsor, NHAI is India's national agency responsible for the development, maintenance and management of India's national highways network. Our Sponsor has a consistent track record of growth and operational performance. Our Sponsor has been entrusted with National Highways Development Project ("**NHDP**"), which along with other minor projects, has vested in it 50,329 kms of national highways for development, maintenance and management. As part of the NHDP, our Sponsor infuses funds into immediate areas of development and enables private sector participation bringing about a healthy participatory economy.

Our Sponsor is also involved in the *Bharatmala Pariyojana* project *(more information available in the Industry Overview section)* and envisages development of 50 economic corridors, that would provide connectivity to 550 districts through national highway linkages and improve average road travel speed. Out of the total 34,800 kms of approval granted by the Cabinet Committee on Economic Affairs ("**CCEA**") to our Sponsor for Phase-1 of *Bharatmala Pariyojana*, our Sponsor has already completed construction of 27,500 kms of national highways as part of the *Bharatmala Pariyojana,* Phase-1. A further 12,413 kilometers have been awarded and 2,921 kilometers have been constructed as of August 2020. *(Source: NHAI Annual Report 2018-2019)*

Our Sponsor's awarding of new projects has witnessed a sequential rise from merely 2,222 km in FY 19 to 6,306 km in FY 22. FY 21 was a pivotal year since despite the COVID-induced disruptions, there was a healthy growth in awarding of new projects with the award of 4,818 kms. Of these, 54% were awarded under the Hybrid Annuity Model (HAM), 3% under the Build-Operate-Toll (BOT) mode and rest under the Engineering, Procurement and Construction (EPC) mode. In FY 22, the awarding momentum continued unabated as our Sponsor awarded 6,306 kms. Despite the lockdowns and labour-related issues, developers made up for the lost time and construction as NHAI projects rose 5% year-on-year to 4,175 kms in FY 21. In FY

22, our Sponsor's focus on swifter execution of projects paid dividends as 4,673 kms were constructed which translated into a 12% growth as compared to the last fiscal. (*Source: CRISIL Research*)

Having NHAI as our Sponsor, we believe we are well positioned to drive new initiatives in the road sector in India. For more details about our Sponsor and the projects, please see *"Industry Overview"* on page 97 of this Preliminary Placement Document.

Sizeable portfolio of diversified long-term revenue generating Toll Road assets

We own 100% of the Project SPV. The Project SPV toll, operates and maintains the Initial Toll Roads and will toll, operate and maintain the Target Toll Roads. The Concession Agreements provide the Project SPV the right to collect toll for the respective concession periods. The Initial Toll Roads have concession periods of 30 years and the Target Toll Roads have concession periods of 20 years. We believe the Toll Roads currently have a healthy mix of passenger and commercial traffic. For details of the project traffic for each of the Toll Roads, please see Annexure C. We also believe that the Toll Roads possess a good mix of captive short distance traffic and long-distance traffic. In addition, the range of commodities transported by commercial traffic across the Toll Roads varies from agricultural products and other perishable goods to steel, cement and multiple industrial products, representing a broad cross-section of the Indian economy. Each Toll Road has a distinct set of users based on its local economy, which results in significant independence of traffic across the Toll Roads. As a result, we expect the geographical diversification of the Toll Roads to reduce our reliance on the local economy of any single state or district. The diversified composition of traffic along the Toll Roads is expected to provide us with stable cash flows.

We believe that the Toll Roads have revenue growth potential due to expected growth in traffic volumes as a result of regional and national growth and expected increases in toll fees as a result of inflation adjustments.

Presence in strategic regions/ Strategic geographic location of portfolio assets

The Toll Roads comprise eight stretches of toll roads located in the Indian states of Gujarat, Rajasthan, Telangana, Karnataka, Uttar Pradesh, Maharashtra and Madhya Pradesh. Two (2) Toll Roads are located in southern India, four (4) are located in central – western India, one (1) in western India and one (1) in northern India. According to the Traffic Consultants, these corridors are among the primary corridors for long distance commercial traffic movement and have witnessed high traffic growth rates in the past few years.

- ***Asset 1 – Palanpur/Khemana – Abu Road Project***: This project stretch starts at Palanpur in the State of Gujarat and ends at Abu Road in the state of Rajasthan.

- ***Asset 2 – Abu Road – Swaroopganj Project***: This project stretch starts at the end of Asset 1 and mainly falls in the state of Rajasthan, India. As per the Traffic Consultant, this project is one of the main highway corridors connecting Gujarat with an important tourist destination of Mount Abu. Palanpur, Ahmedabad, Mount Abu and Udaipur are some of the important cities in the vicinity of this stretch.

- ***Asset 3 – Maharashtra/ Karnataka Border (Kagal) – Belgaum Project***: This project stretch starts at Belgaum in the State of Karnataka and ends at the Maharashtra/ Karnataka Border, and is a part of the corridor between Mumbai-Pune and Bengaluru.

- ***Asset 4 – Chittorgarh – Kota & Chittorgarh Bypass Project***: This project stretch starts from Chittorgarh and ends at Kota Bypass about 10 km short of Chambal River Hanging Bridge. This project is divided into three sections based on toll plaza junctions. The project road is short in length and reduces travel time between Kota and Chittorgarh, providing congestion free services.

- ***Asset 5 – Kothakota Bypass – Kurnool Highway Project***: This project stretch connects the state of Telangana with Andhra Pradesh. The project road offers the shortest itinerary, in length and travel time between Kothakota and Kurnool, and is a part of the corridor between Hyderabad and Bengaluru.

- ***Asset 6 – Agra Bypass*:** This project stretch is a 32.80 km four-lane road, forming part of the section connecting NH19 (old NH2) to NH44 (old NH7) in Uttar Pradesh, branches out to NH52 (old NH3) and NH44 (old NH7) at Gwalior.

- ***Asset 7 - Borkhedi – Kelapur Stretch*:** This project is located on NH44 and is about 138.15 kms long section between Borkhedi and Maharashtra/ Telangana Border (at Penganga River bridge) traversing through the districts of Nagpur, Wardha and Yavatmal in the state of Maharashtra. This stretch is a part of the corridor between Nagpur and Hyderabad.

- ***Asset 8 - Jhansi – Shivpuri Project***: This project is a 4-lane, 75.3 kms long stretch, on national highways (NH) 27 which connects the districts of Jhansi and Shivpuri in the state of Uttar Pradesh and Madhya Pradesh, respectively.

We believe that future development of highways along the Toll Roads as highlighted by the Traffic Consultant in their Traffic Reports and the increased government initiatives such as *Bharatmala Pariyojana* to improve efficiency across roads in India, will provide an impetus to the growth in traffic on the Toll Roads. Furthermore, each of the Toll Roads lie upon significant

inter-city connection routes within the populous states of Maharashtra, Madhya Pradesh, Uttar Pradesh, Karnataka, Rajasthan, Telangana and Andhra Pradesh, with captive passenger and commercial traffic.

Experienced management team with industry experience

We are managed by qualified personnel of the Investment Manager who have management and operational experience in the roads and highways sector. In addition, qualified personnel of the Project Manager manage our projects. For further details, see the section entitled "*Parties to the Trust*" on page 93 of this Preliminary Placement Document. We believe that the experience and leadership of these teams will contribute to our growth and success and will position the Toll Road assets to be operated and managed in an efficient manner.

Growth opportunities and access to Sponsor's portfolio

Through our relationship with the Sponsor, and in accordance with the approval granted by the Chairman of NHAI, by way of communication dated March 29, 2021, our Sponsor will offer to us around 1,500 km of roads in three (3) years ("**Future Assets**") of which the Target Toll Roads have been offered for acquisition by the Sponsor. The process of identification of Future Assets, offer of Future Assets to Trust and completion of transfer of Future Assets to the Trust including valuation mechanism may be refined and/or modified in line with the internal policies of NHAI.

We believe that this access to future toll road assets of the Sponsor or its existing or future subsidiaries will be an important source of growth in the future

Favourable Concession Agreements terms with Low Counterparty Risk and Inflation Passthrough

We believe that we have balanced Concession Agreements terms with low counterparty risk due to the creditworthiness of our Sponsor. We believe this, along with the following factors, provide for promising prospects for our business:

- *Long Concession Life with the possibility for an extension.* Our Concession Agreements are for a period of 20 years and/or 30 years (as applicable) from the relevant Appointed Date. We believe this is a sufficiently long period that provides us with ample opportunity to refinance the assets on a fully amortized basis. For details, see "*Summary of the Concession Agreements*".

- *Termination Payments.* Furthermore, our Concession Agreements provide for termination payments under various default scenarios such as NHAI events of default or *force majeure* events. Under the Concession Agreements, NHAI is obligated to make termination payments in the case of a concessionaire event of default. NHAI's strong track record of meeting its obligations when they become due gives us confidence that any termination payments will be made in a timely manner. Such termination payments may be used to compensate our creditors. For details, see "*Summary of the Concession Agreements*".

- *Minimal Price Risk.* The toll rates for all Toll Roads are determined with reference to 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 measured in December of the preceding year plus a fixed 3% as per NHAI Fee Rules. Given India's long track record of relatively higher inflation rates as well as the 3% fixed portion of the increase, we anticipate a continuing increase in toll rates over the life of the concession. We expect that this formula will minimize any risk of increasing operating costs over time.

- *Prohibition Against Additional Tollways.* Subject to certain exemptions, NHAI is prohibited from constructing, or permitting the construction of, any competing expressway or other toll road ("**Additional Tollway**") between specified stretches of each Toll Road at any time during the relevant Concession Period. We will be compensated in line with the terms of the Concession Agreement if our toll collection activities are impacted by the Additional Tollway. NHAI is also obligated to use its best efforts to ensure that the tolls to be levied on vehicles using the Additional Tollway are at least 25% higher than the toll rates of the impacted Toll Road.

- *Prohibition Against Competing Roads.* Subject to certain exemptions, NHAI is prohibited from constructing a Competing Road (as such term is defined in the Concession Agreements) of each of the Toll Roads during the respective Concession Periods.

- *Compensation for reduced toll rates.* In terms of the Concession Agreements for the Target Toll Roads, if the Project SPV suffers a loss in revenue owing to reduction in the Equitable Tollable Length (*as defined in the relevant Concession Agreement*) pursuant to Capacity Augmentation (*as defined in the relevant Concession Agreement*), NHAI shall compensate the Project SPV for such loss incurred by the Project SPV, on a quarterly basis.

- *Installation of Additional Check Plazas.* Under the Concession Agreements, subject to certain restrictions we are permitted to install temporary or permanent fee collection booths to prevent fee evasion by users of the Toll Roads. We believe the installation of these check plazas will significantly decrease leakage in the Toll Roads, increasing cash collections and performance.

Strategies of Our Trust

Organic growth through proactive management

Our principal investment strategy is to proactively manage the Toll Road assets to support growth. In particular, the Investment Manager will seek to maintain or improve the Project SPV's net incomes by, among other initiatives, curbing leakages, conducting proper due diligence, formulating and adopting policies and procedures and structuring investments to address tax or regulatory considerations. The Project Manager will assist the Investment Manager by carrying out the operations, management and maintenance of the project in accordance with the Concession Agreement and the Project Implementation Agreement and by procuring, operating and maintaining the project's toll management systems, including but not limited to, employing staff for toll collection, monitoring toll collection and providing security arrangements at toll plazas.

The Investment Manager will also focus on minimizing project operating expenses. The roads and highways sector are a highly competitive sector that is capital intensive and requires significant expenditure. Our ability to efficiently manage the costs associated with the Toll Road assets is critical to maintaining the Project SPV's profit margins. The Investment Manager also intends to focus on increasing the margins of the Project SPV by strengthening internal processes and systems so as to improve utilization of resources and reduce costs. As part of our operations and maintenance systems and processes, the Investment Manager intends to work closely with the Project Manager to promote best practices, to minimize downtime or defects with respect to the Toll Road assets and to monitor performance of toll booth operators and maintenance contractors. The Investment Manager also intends to work with the Project Manager and the Project SPV to upgrade technology as needed, to manage any leakages in toll collections and to streamline collection, route and maintenance operations. With this focus on proactive asset management and operating expense minimization, the Investment Manager hopes to increase our profit margins and achieve long-term growth.

Acquisition of toll road projects

The Investment Manager intends to expand our initial portfolio by identifying and selectively acquiring additional toll road projects that meet our investment criteria described below. The Investment Manager intends to capitalize on opportunities to acquire road projects that provide attractive cash flows and yields. While evaluating acquisition opportunities, the Investment Manager intends to focus on, among other things, the following investment criteria in order to make asset selections:

- *Yield thresholds.* The Investment Manager will seek to acquire assets with returns that are estimated to be above our cost of capital so as to maintain or enhance returns to the Unitholders;
- *Traffic characteristics*. The Investment Manager will seek to acquire assets with potential for traffic growth;
- *Residual concession period*. The Investment Manager will actively seek projects with residual concession periods of sufficient duration to meet the investment objectives of the Trust to generate stable returns and ensure long-term growth;
- *Geographic diversity*. The Investment Manager will seek projects in a variety of geographical locations in India to mitigate concentration risk and to take advantage of regional growth; and
- *Other*. In addition, the Investment Manager will also take into account factors such as estimated *maintenance* costs based on technical assessments of projects under evaluation, the impact of acquisitions on our expected distributions, and the requirements under the InvIT Regulations to propel our portfolio of completed and revenue generating projects and under-construction projects.

Optimization of capital structure

The Investment Manager will seek to employ appropriate financing policies and diversify its sources of financing with the objective of minimizing our overall cost of capital. The Investment Manager shall ensure that the Trust operates within the InvIT Regulations for borrowing, whereby the maximum level of external debt in the Trust Group will not exceed 70% (or such other percentage as may, from time to time, be prescribed in the InvIT Regulations) of the value of the assets of the Trust. If it is in the interests of the Unitholders, the Investment Manager may also consider pursuing growth opportunities that require raising additional capital through the issuance of new Units, in accordance with the process laid down by SEBI.

Seamlessly transition all aspects of the Toll Roads upon acquisition

Each of the Toll Roads are publicly funded toll roads which have been operated, pursuant to an annual toll contract, by sub-contractors of NHAI. Upon acquisition of the Toll Roads pursuant to our Concession Agreements, we expect to seamlessly transition the O&M of each of the Toll Roads in a timely and efficient manner to ensure a smooth transition of operation of the Toll Roads and in order to minimize disruption to toll collection or road usage.

The O&M of the Chittorgarh - Kota & Chittorgarh Bypass Project and Maharashtra/ Karnataka Border (Kagal) - Belgaum Project is being handled by us. However, with respect to the (i) Abu Road – Swaroopganj Project (ii) Palanpur/Khemana – Abu Road Project, and (iii) Kothakota Bypass – Kurnool Highway Project, we will take over the operations and maintenance of these Toll Roads upon expiration of their existing BOT concessions on March 25, 2024, March 25, 2024, September 16, 2026, and the Appointed Date(s) respectively. The operations of Target Toll Roads shall be taken over from the Appointed Date, in accordance with the Additional Concession Agreements.

Furthermore, the Sponsor, Project Manager and the Project SPV had entered into a transitional support agreement in relation to the Initial Toll Roads for the purpose of the Sponsor providing the transitional support to (i) the Project Manager in respect of its obligations under the Project Implementation and Management Agreement, and (ii) the Project SPV in respect of its O&M obligations and tolling obligations (*as provided under the Concession Agreements*). The terms and conditions of the transitional support agreement were, in respect of each Concession Agreement and the Project Implementation and Management Agreement, effective and binding on the Parties for a period of 6 (six) months commencing from the appointed date of the respective Concession Agreements, and has expired as of the date of this Preliminary Placement Document. Additionally, the Sponsor, Project Manager and the Project SPV have entered into a transitional support agreement in relation to the Target Toll Roads for the purpose of the Sponsor providing the transitional support to (i) the Project Manager in respect of its obligations under the Project Implementation and Management Agreement, and (ii) the Project SPV in respect of its O&M obligations and tolling obligations (*as provided under the Additional Concession Agreements*). The terms and conditions of the transitional support agreement shall, in respect of each Concession Agreement and the Project Implementation and Management Agreement, be effective and binding on the Parties for a period of 3 (three) months commencing from the appointed date of the respective Concession Agreements, unless terminated earlier by mutual consent.

Improve toll collection efficiencies across the Toll Roads

We intend to transition from the existing semi-automatic and hybrid ETC toll collection methods currently employed at the Toll Roads to automated toll collection system which we expect will improve efficiency, reduce leakage and decongest toll plazas. The adoption of automated toll collection system involves, among other things, the upgradation of toll management software to record vehicles crossing toll plazas, the usage of robust two-fold toll monitoring (including an automated traffic counter and vehicle classifiers to be installed at each toll lane and a remote video monitoring center to be established at our head office) and strict implementation of ETC at the toll lanes. This strategy is in line with the GoI's recent initiatives to increase digitization, including the adoption of FASTags for all toll collections across India. Hitherto, the Toll Roads have seen an increasing share of ETC/FASTag-based toll collection, and according to the Traffic Consultants, this share is expected to grow further. For more details, please see the **Annexure C** of this Preliminary Placement Document.

Further, we intend the Project SPVs to engage with local communities around the Toll Roads to improve our relationship with users. We intend to adopt practices such as, conducting community consultation, supporting road safety, installing rainwater harvesting systems and planting trees. We believe these practices will improve our reputation with our key stakeholders including communities and road users.

Summary of Our Toll Roads

	AP	**AS**	**KK**	**MH-B**	**CK**	**BWK**	**AB**	**SJ**
Highway	NH27	NH27	NH44	NH48	NH27	NH 44	Connecting NH 19 and NH44	NH 27
State	Gujarat /Rajasthan	Rajasthan	Telangana	Karnataka	Rajasthan	Maharashtra/ Telangana	Uttar Pradesh	Uttar Pradesh – Madhya Pradesh
Original COD	Mar-09	Mar-09	Dec-09	Jul-04	Mar-09	Apr-11	Mar-17	Jul-09
Length (km)	45.0	31.0	74.6	77.7	160.5	138.4	32.8	75.3
No. of Lanes	4	4	4	4	4	4	4	4
Km Chainage (km)	601-646	646 – 677	135.5 - 211	515 – 592.240	891.9 – 1052.4	36.6-175	0 – 32.8	1305.08 – 1380.38
Toll Plaza (Kilometric point location)	Khemana (602.75)	Undvaria (670.75)	Pullur (200.95)	Hattargi (537.77), Kognoli (591.24)	Bassi (929.63), Aroli (986.63), Dhaneshwar (1032.63)	Darodha (92.50) Kelapur (150.45)	Raibha (10.80)	Raksha (1374.65)
Pavement Type	Flexible	Flexible	Flexible	Rigid/ Flexible	Rigid/ Flexible	Flexible	Flexible	Flexible
Initial Development Model	Annuity	Annuity	Annuity	Annuity	EPC	EPC	EPC	EPC
Annuity Concession End	Mar-24	Mar-24	Sep-26	Dec-19	-	-	-	-
Current Concessionaire[(1)]	L&T IDPL*	L&T IDPL*	APEL^	-	-	-	-	-
Tolling Handover date[(2)]	16-Dec-21	16-Dec-21	16-Dec-21	16-Dec-21	16-Dec-21	Appointed date	Appointed date	Appointed date
O&M Handover date	Mar-24	Mar-24	Sep-26	Dec-16-21	Dec-16-21	Appointed date	Appointed date	Appointed date
InvIT - Concession period	30 Years	30 Years	30 Years	30 Years	30 Years	20 Years	20 Years	20 Years
FasTag enablement date	16-Feb-21	16-Feb-21	16-Feb-21	16-Feb-21	16-Feb-21	16-Feb-21	16-Feb-21	16-Feb-21

Source: Traffic reports, National Highways Infra Trust

**L&T Interstate Road Corridor Limited*
^Andhra Pradesh Expressway Limited

Notes:

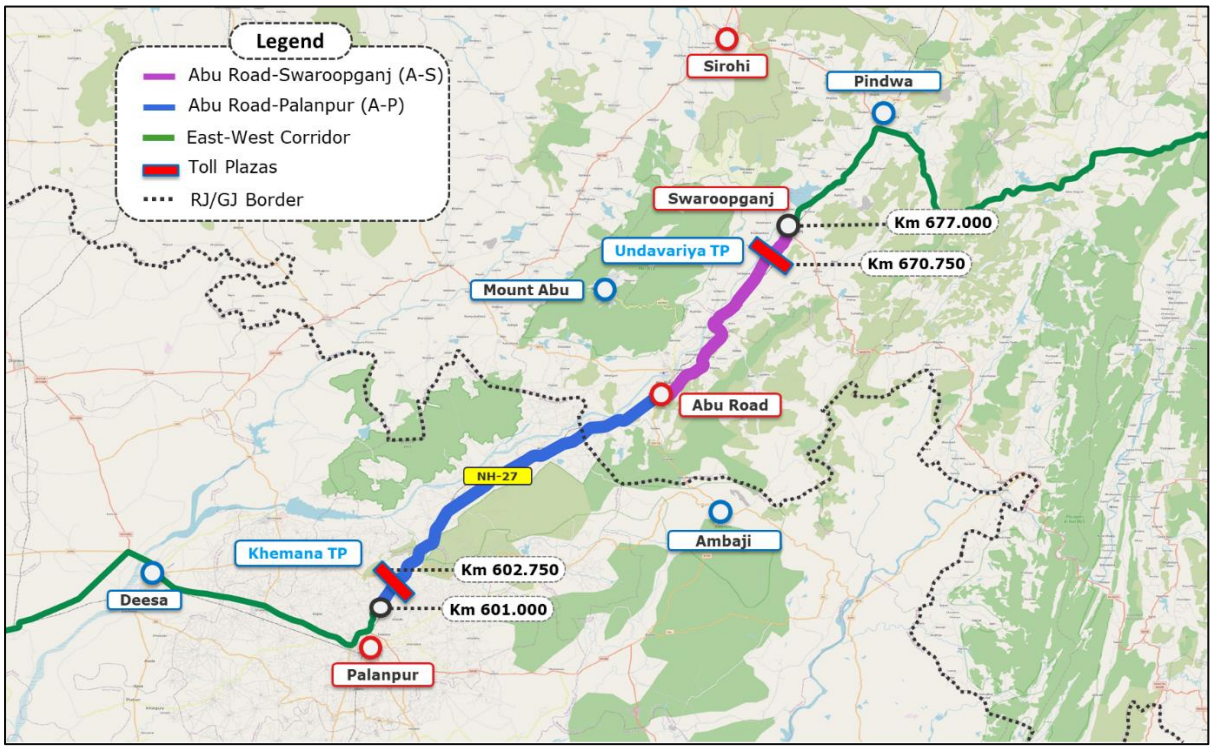
(1) Maintenance for project stretches to continue under scope of existing concessionaire until end of current concession.
(2) Appointed date as per the relevant Concession Agreements. Transitional support agreement has been entered into between NHAI and the Trust to manage tolling and O&M for the first 6 months for the Initial Toll Roads and for the first 3 months for the Target Toll Roads.

Description of Our Toll Roads

1. *Palanpur/Khemana – Abu Road Project (“Asset 1”) and Abu Road –Swaroopganj Project (“Asset 2”)*

Project overview

According to the Traffic Consultant, the four-lane Asset 1, starts at Abu Road (KM 646.000) and ends at Palanpur (KM 601.000) in Banaskantha district in the state of Gujarat and Sirohi district in the state of Rajasthan. Asset 2 is also four-laned and starts at Abu Road (KM 646.000) and ends at Swaroopganj (KM 677.000) in Sirohi district in the state of Rajasthan. Both Asset 1 and Asset 2 are a part of NH27, which is the second-longest highway in India, catering to the north-west movement between Haryana, Punjab, Delhi, and the different business centres of Gujarat, and east-west movement between Silchar and Porbandar, connecting major centres of economic activity such as Guwahati, Silguri, Lucknow and Udaipur. Asset 1 and Asset 2 project roads in wider context serves long-distance traffic which is majorly plying between and northern/eastern region of India and Palanpur/Rajkot/Morbi/Kandla/Mundra/ Gandhidham of western region of Gujarat. Apart from long distance traffic, it also serves the short distance traffic which is mainly generated between Abu Road/Swaroopganj/Sirohi/Pindwara and Palanpur/Deesa/ Mehsana.



Source: Traffic Report

Salient growth features and traffic generators

According to the Traffic Consultant, the project sections of Asset 1 and Asset 2 fall under the jurisdiction of Sirohi district in the state of Rajasthan and Banaskantha district in the state of Gujarat, respectively.

Sirohi district is located on the south-western part of the state of Rajasthan and shares borders with the state of Gujarat in the south. It is bounded by Pali district in the north-east, Udaipur district in the east, Jalore in the west and Banaskantha district of Gujarat in the south. The economy of the Sirohi district is based on agriculture and mineral based industries. Major crops in the district include millets, pulses, sesame, and red chillies. The district is also rich in mineral deposits of limestone, marble, granite, calcite, quartz, tungsten, flourite etc. Major mineral based industries which are involved in production of portland cement, cement slabs, tiles, granite, and mineral powder. The district is also known for Mount Abu, a popular hill station and houses the highest peak viz., Guru Shikhar of the Aravalli ranges.

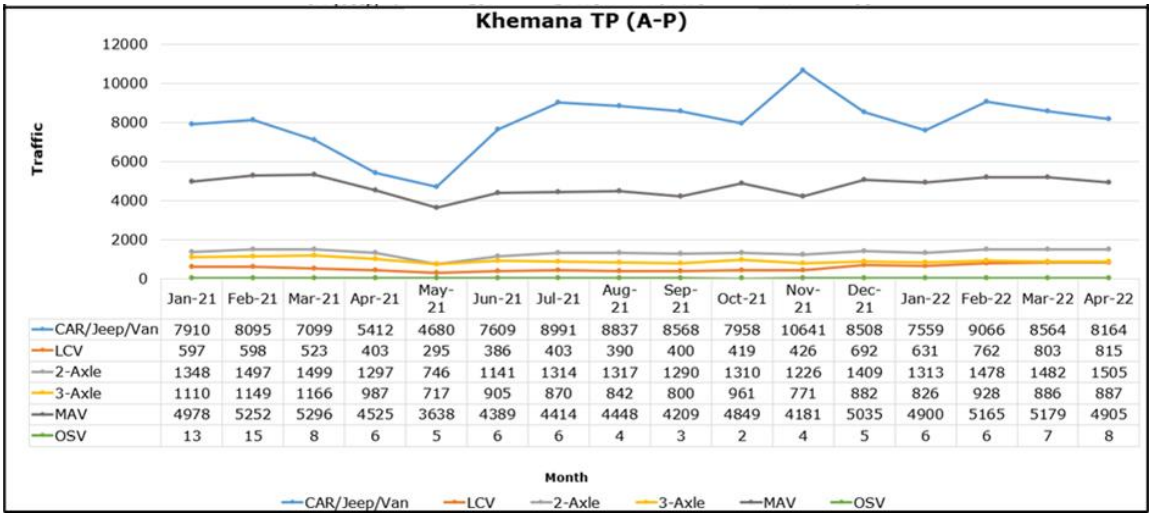
Banaskantha district is located on the north-eastern part of the state of Gujarat, shares borders with the state of Rajasthan in the north. The district is surrounded by Marwad and Sirohi regions of the state of Rajasthan in the north, Sabarkantha district in the

east, Mehshana district in the south and Patan district in the west. The economy of the district is based on agro & food processing, tourism, textile and mineral based industries (ceramics). It is the largest producer of potatoes in the state. Other major crops include bajri, maize, tobacco, castor oil, jowar, psyllium etc. The district is also rich in mineral resources which contribute in its economy to a great extent. Limestone, marble, granite, building stone, china clay. etc are the available mineral resources in the district. Food processing and textile industries are also found in the district. The district ranks first in the country in milk production and houses one of the biggest milk production dairies of Gujarat viz., Banas dairy at Palanpur.

Traffic volume and composite of vehicles

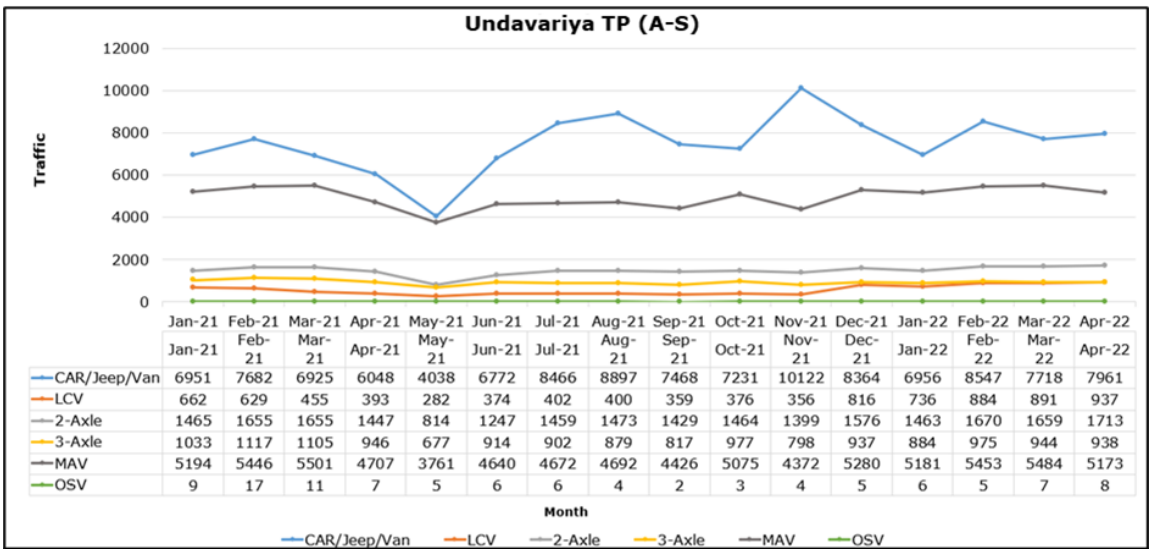
Historical traffic data

The following table shows the historical traffic data of Asset 1 and Assets 2, as provided in the Traffic Report annexed as Annexure C:



	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22
CAR/Jeep/Van	7910	8095	7099	5412	4680	7609	8991	8837	8568	7958	10641	8508	7559	9066	8564	8164
LCV	597	598	523	403	295	386	403	390	400	419	426	692	631	762	803	815
2-Axle	1348	1497	1499	1297	746	1141	1314	1317	1290	1310	1226	1409	1313	1478	1482	1505
3-Axle	1110	1149	1166	987	717	905	870	842	800	961	771	882	826	928	886	887
MAV	4978	5252	5296	4525	3638	4389	4414	4448	4209	4849	4181	5035	4900	5165	5179	4905
OSV	13	15	8	6	5	6	6	4	3	2	4	5	6	6	7	8

Source: Traffic Report



	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22
CAR/Jeep/Van	6951	7682	6925	6048	4038	6772	8466	8897	7468	7231	10122	8364	6956	8547	7718	7961
LCV	662	629	455	393	282	374	402	400	359	376	356	816	736	884	891	937
2-Axle	1465	1655	1655	1447	814	1247	1459	1473	1429	1464	1399	1576	1463	1670	1659	1713
3-Axle	1033	1117	1105	946	677	914	902	879	817	977	798	937	884	975	944	938
MAV	5194	5446	5501	4707	3761	4640	4672	4692	4426	5075	4372	5280	5181	5453	5484	5173
OSV	9	17	11	7	5	6	6	4	2	3	4	5	6	5	7	8

Source: Traffic Report

The onset of the second wave of Covid-19 and the lockdowns announced by the state government during April-June 2021 was a setback to the continuous recovery of traffic to normal levels. With that in mind, an average of July 2021 to April 2022 has been considered as the AADT for FY 22, by the Traffic Consultant, as provided below:

Location/Mode	Car/Jeep/ Van/Taxi	LCV	2A	3A	MAV	OSV
Undavariya TP (A-S)	8,187	602	1,530	905	4,981	5
Khemana TP (A-P)	8,583	677	1,364	865	4,728	5

Source: Traffic Report

Toll Segmentation

The tolling stream distribution in the present study has been derived from the toll data taking an average of ticket wise traffic from July 2021 to April 2022 and the same has been adopted for all the modes except cars. The level of exemptions in cars has been found to be high due to which a tapering has been considered in the future years. The table below presents the proposed segmentation for Toll Plaza Khemana and Toll Plaza Undavariya.

Ticket Type/Modes	Car			LCV	Bus/ 2-axle Truck	3-axle Truck	MAV	Oversized
	FY22	FY23	FY24 onwards					
Asset 1 (Khemana TP)								
Single	33.6	33.6	33.6	51.1	68.2	86.6	90.3	94.0
Return	16.1	25.1	32.9	38.3	30.7	10.7	8.5	4.5
Monthly	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Local personal	1.4	7.3	12.5	0.0	0.0	0.0	0.0	0.0
Local commercial	0.0	0.0	0.0	0.4	0.2	0.0	0.4	0.0
Exempt	48.9	34.0	21.0	10.3	0.9	2.7	0.7	1.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Asset 2 (Undavariya TP)								
Single	37.0	37.0	37.0	47.3	64.4	88.3	86.9	91.6
Return	25.5	36.6	43.2	45.3	34.3	10.1	11.6	3.2
Monthly	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
Local personal	0.9	8.3	12.7	0.0	0.0	0.0	0.0	0.0
Local commercial	0.1	0.1	0.1	1.4	0.4	0.9	1.0	0.0
Exempt	36.5	18.0	7.0	5.8	0.9	0.7	0.4	5.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Traffic Report

Projected Traffic Data: Growth Passenger Car Unit (PCU)

The Traffic Consultant projected that there will be continued sustained growth in PCU of Asset 1 and Asset 2 across all vehicle types until FY2052. The below table shows the expected PCU by financial year for the Toll Plaza of Khemana and Toll Plaza of Undvariya:

Khemana	**FY23**	**FY27**	**FY32**	**FY37**	**FY42**	**FY47**	**FY52**
PCU.....	40,009	48,200	61,156	76,583	93,096	110,313	128,397

Undvariya	**FY23**	**FY27**	**FY32**	**FY37**	**FY42**	**FY47**	**FY52**
PCU.....	41,210	48,919	61,335	76,189	92,105	108,708	126,082

Source: Traffic Report

Operations and maintenance

The Palanpur/Khemana – Abu Road Project (Asset 1) is currently operated under the BOT (Annuity) model, whereby the concessionnaire is responsible for construction, operations and maintenance of the toll road while the relevant authority collects tolls and makes annuity payments to the concessionnaire. The concessionnaire is L&T Interstate Road Corridor Limited. We expect the current concessionaire to undertake routine and major maintenance works, as per the requirement of its current concession obligations, up to the termination of its concession period. Our O&M Handover Date for the Palanpur/Khemana – Abu Road Project is March 25, 2024. Following our takeover of O&M on March 25, 2024, we plan to perform ongoing major maintenance works on a regular basis to maintain in good condition.

Pursuant to the completion of Transitional Support Agreement, the Project SPV has taken over the toll operations with effect from June 21, 2022 and have engaged a third party for undertaking user fee collection services for the same for a period of one year.

Further, the Project SPV has engaged an EPC Contractor for undertaking initial improvement works as stipulated in the Concession Agreement, who is expected to complete the same on or before December 15, 2023, i.e. time line stipulated in the Concession Agreement.

The Abu Road – Swaroopganj Project (Asset 2) is currently operated under the BOT (Annuity) model, whereby the concessionnaire is responsible for construction, operations and maintenance of the toll road while the relevant authority collects

tolls and makes annuity payments to the concessionnaire. The current concessionnaire is L&T Interstate Road Corridor Limited. We expect the current concessionnaire to undertake routine and major maintenance works, as per the requirement of its current concession obligations, up to the termination of its concession period and our O&M Handover Date for the Abu Road – Swaroopganj Project on March 25, 2024. Following our takeover of O&M on March 25, 2024, we plan to perform ongoing major maintenance works on a regular basis to maintain in good condition.

Pursuant to the completion of Transitional Support Agreement, the Project SPV has taken over the toll operations with effect from June 21, 2022 and have engaged a third party for undertaking user fee collection services for the same for a period of one year.

Further, the Project SPV has engaged an EPC Contractor for undertaking initial improvement works as stipulated in the Concession Agreement, who is expected to complete the same on or before December 15, 2023, i.e. time line stipulated in the Concession Agreement.

Tollable Length and Toll Rates

In terms of tollable length, the Palanpur/Khemana – Abu Road Project comprises 50.92 kms of roads and Abu Road – Swaroopganj Project comprises 32.59 kms of roads. 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%.

According to the NHAI's toll notification dated March 25, 2022, the toll rates at the Khemana toll plaza for the Palanpur/Khemana – Abu Road Project for FY2023 are as follows:

Vehicle Type	**Single Journey**	**Multiple Journey**	**Monthly Pass**	**Fee for Commercial Vehicle Registered within the district of the Toll Plaza**
		(Rs.)		
Car/Jeep/Van or LMV	70	105	2310	35
LCV, LGV or Minibus	110	170	3730	55
Bus/Truck (2 axles)	235	350	7820	115
Vehicles with up to 3 axles.....	255	385	8530	130
HCM/EME or MAV with 4 to 6 axles.....	370	550	12265	185
Oversized vehicles with 7 or more axles	450	670	14930	225

Source: NHAI

According to the NHAI's toll notification dated March 23, 2022, the toll rates at the Undavariya toll plaza for the Abu Road – Swaroopganj Project for FY2023 are as follows:

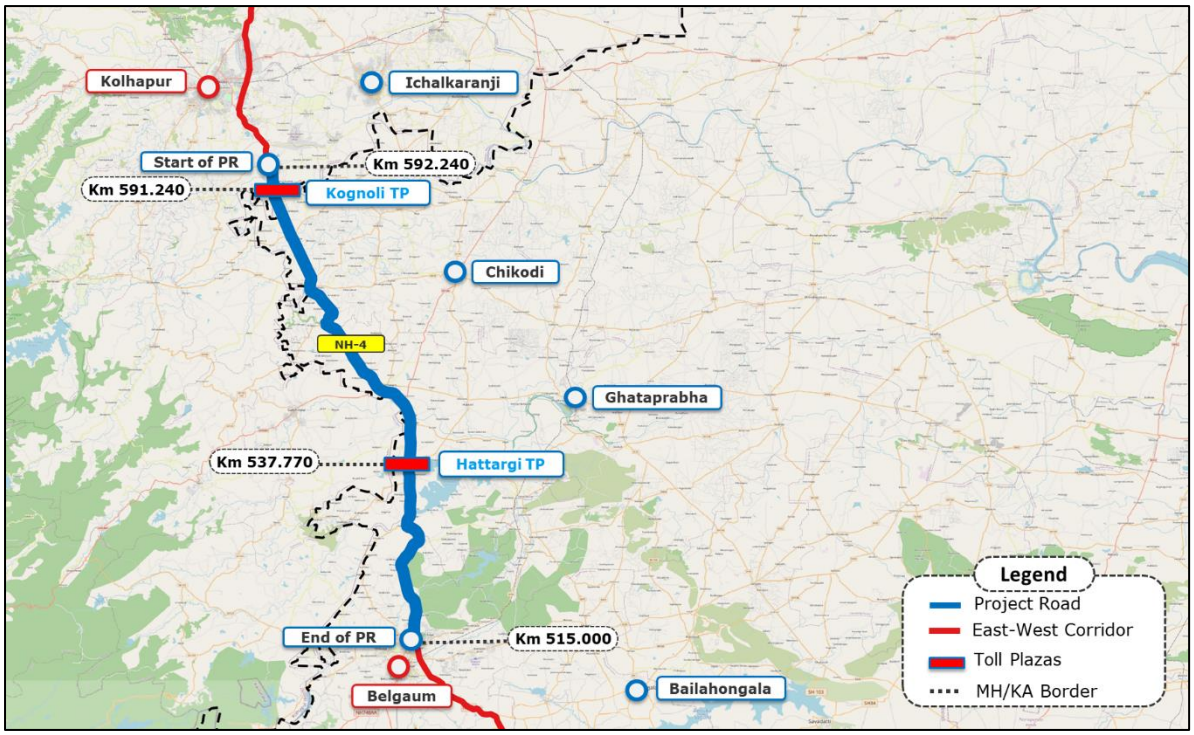
Vehicle Type	**Single Journey**	**Multiple Journey**	**Monthly Pass**	**Fee for Commercial Vehicle Registered within the district of the Toll Plaza**
		(Rs.)		
Car/Jeep/Van or LMV	45	65	1,480	20
LCV, LGV or Minibus	70	105	2,390	35
Bus/Truck (2 axles)	150	225	5,005	75
Vehicles with up to 3 axles.....	165	245	5,460	80
HCM/EME or MAV with 4 to 6 axles.....	235	355	7,850	120
Oversized vehicles with 7 or more axles	285	430	9,555	145

Source: NHAI

2. *Maharashtra Border – Belgaum Project ("Asset 3")*

Project overview

According to the Traffic Consultant, the four-lane Asset 3 is part of the NH-4 in the state of Maharashtra/Karnataka, starts at KM 592.705 of NH-4 near Kagal and ends at KM 515.000 of NH-4 near Belgaum with a length of about 77.24 km. The project road falls under the jurisdiction of Kolhapur district of Maharashtra and Belgaum district of Karnataka passing through settlements of Kagal, Kognoli, Nippani, Sankeshwar, Hattargi and Belgaum. There are two operational toll plazas on the project road, one near Kognoli (KM 591.240) and other near Hattargi (KM 537.770).



Source: Traffic Report

Salient growth features and traffic generators

According to the Traffic Consultant, Asset 3 serves the long-distance traffic for freight vehicles, which are majorly plying between Mumbai/Pune/Delhi and Goa/Bangalore/Chennai/Vellore. Apart from long distance traffic, it also serves the short distance traffic for both passenger and freight which is mainly generated between Kolhapur/Sangli/Goa/Belgaum/Khanapur/Hubbali/Dharwad and nearby places.

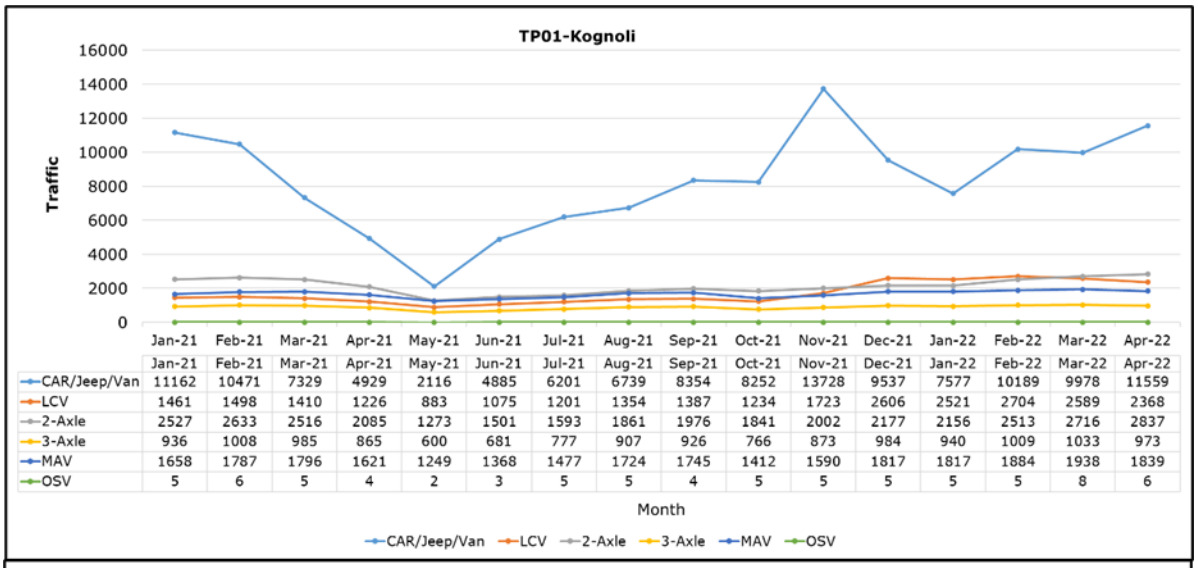
Kolhapur district is situated in the southern side of the state of Maharashtra, bounded by Sindhudurg district in the west, Sangli district in the north, Bijapur district of Karnataka in the east and Belgaum district of Karnataka in the south. It is one of the industrialised districts in Maharashtra. Due to the presence of abundant water and fertile soil, the district is prominent in cultivation of sugarcane, paddy, banana, soyabean and several vegetables. It is the major producer of jaggery and sugar. The district also houses many dairy and poultry farms. It is one of the prime centres of the textile industry, cotton mills and arts and handicrafts industry. The district also has the highest number of sugar refineries in the country and is also known as the sugar bowl of India.

Belgaum district is situated in northwest of the state of Karnataka, sharing borders with Goa and Maharashtra. Belgaum district is surrounded by Dharwad and Uttara Kannada districts on the south, Bagalkot and Bijapur districts in the east, and Kolhapur district of Maharashtra in the north. The district with different agro climatic conditions and soil types has vast agricultural potential. Major crops grown in the district are paddy, maize, jowar, oil seeds, cotton, onion, tomato and sugarcane. Belgaum has 16 industrial estates, six industrial areas and one SEZ. Belgaum district is important centre for manufacturing of valves, pumps, and its accessories, heavy machine tools and high-pressure oil hydraulics. It has 58 export-oriented units and 22 sugar industries in different parts of district. Rich deposits of natural resources like bauxite, uranium, silica sand, aluminium, laterite, limestone, dolomite, quartzite and china clay are also found in the district.

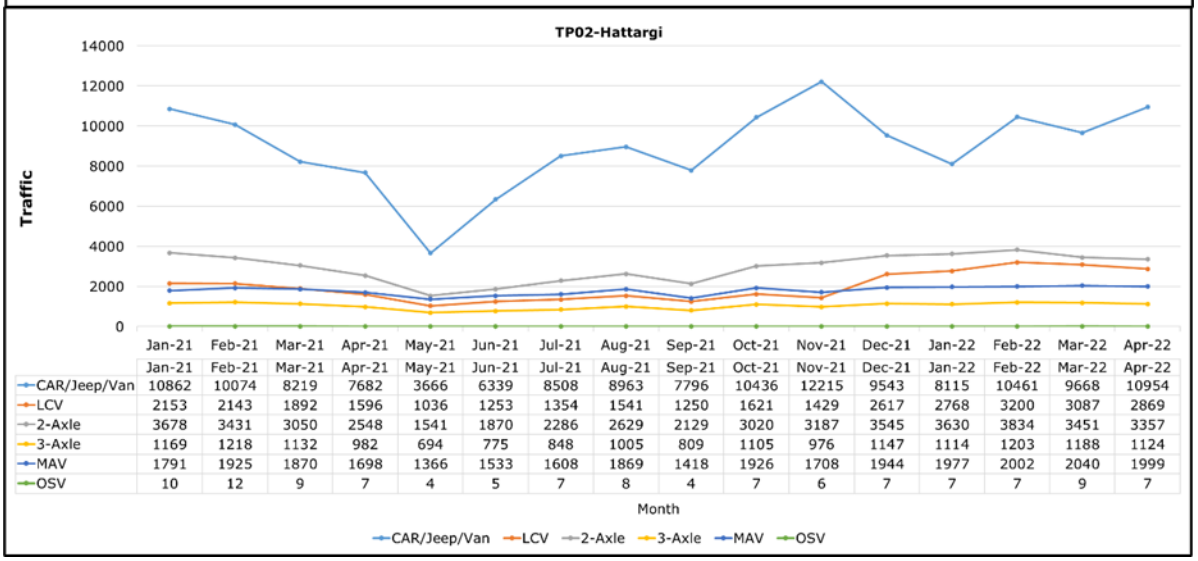
Traffic volume and composite of vehicles

Historical traffic data

The following table shows the historical traffic data of Asset 3, according to the Traffic Report annexed as Annexure C:



	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22
CAR/Jeep/Van	11162	10471	7329	4929	2116	4885	6201	6739	8354	8252	13728	9537	7577	10189	9978	11559
LCV	1461	1498	1410	1226	883	1075	1201	1354	1387	1234	1723	2606	2521	2704	2589	2368
2-Axle	2527	2633	2516	2085	1273	1501	1593	1861	1976	1841	2002	2177	2156	2513	2716	2837
3-Axle	936	1008	985	865	600	681	777	907	926	766	873	984	940	1009	1033	973
MAV	1658	1787	1796	1621	1249	1368	1477	1724	1745	1412	1590	1817	1817	1884	1938	1839
OSV	5	6	5	4	2	3	5	5	4	5	5	5	5	5	8	6



	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22
CAR/Jeep/Van	10862	10074	8219	7682	3666	6339	8508	8963	7796	10436	12215	9543	8115	10461	9668	10954
LCV	2153	2143	1892	1596	1036	1253	1354	1541	1250	1621	1429	2617	2768	3200	3087	2869
2-Axle	3678	3431	3050	2548	1541	1870	2286	2629	2129	3020	3187	3545	3630	3834	3451	3357
3-Axle	1169	1218	1132	982	694	775	848	1005	809	1105	976	1147	1114	1203	1188	1124
MAV	1791	1925	1870	1698	1366	1533	1608	1869	1418	1926	1708	1944	1977	2002	2040	1999
OSV	10	12	9	7	4	5	7	8	4	7	6	7	7	7	9	7

Source: Traffic Report

The onset of the second wave of Covid-19 and the lockdowns announced by the state government during April-June 2021 was a setback to the continuous recovery of traffic to normal levels. With that in mind, an average of July 2021 to April 2022 is taken as FY22 AADT by the Traffic Consultant, as provided below:

Location/ Mode	Car/Jeep/ Van/Taxi	LCV	2A	3A	MAV	OSV
TP01	9,839	1,341	2,167	919	1,724	5
TP02	10,154	1,685	3,107	1,052	1,849	7

Source: Traffic Report

Toll Segmentation

The tolling stream distribution under the present study has been derived from the toll data taking an average of ticket wise traffic from July 2021 to April 2022. The table below presents the proposed segmentation for Toll Plaza Kognoli and Toll Plaza Hattargi.

Ticket Type/ Modes	Car	LCV	Bus/ 2A Truck	3 A Truck	4-6 A Truck	OSV
TP01 - Kognoli						
Single	50.7	57.8	74.7	89.6	91.3	98.1
Return	38.2	29.7	21.7	10.0	8.4	0.5
Monthly	0.0	0.0	0.0	0.0	0.0	0.0
Local personal	2.5	0.0	0.0	0.0	0.0	0.0
Local commercial	0.0	0.0	2.8	0.0	0.0	0.0
Exempt	8.5	12.6	0.9	0.3	0.3	1.4
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
TP01 – Hattargi						
Single	40.4	57.0	56.3	84.5	88.2	93.3
Return	50.0	35.9	29.3	14.6	11.2	0.8
Monthly	0.0	0.0	0.1	0.0	0.0	0.0
Local personal	0.7	0.0	0.0	0.0	0.0	0.0
Local commercial	0.3	1.4	13.5	0.4	0.1	0.0
Exempt	8.6	5.7	0.7	0.5	0.5	5.9
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: Traffic Report

Projected Traffic Data: Growth Passenger Car Unit (PCU)

The Traffic Consultant projects that there will be continued sustained growth in PCU of Asset 3 across all vehicle types until FY2052. The below table shows the expected PCU by financial year for the Toll Plaza of Kognoli and Hattargi:

Kognoli	**FY23**	**FY27**	**FY32**	**FY37**	**FY42**	**FY47**	**FY52**
PCU.....	30,588	36,983	39,716	48,889	58,720	69,278	80,412

Hattargi	**FY23**	**FY27**	**FY32**	**FY37**	**FY42**	**FY47**	**FY52**
PCU.....	35,384	42,418	45,342	55,332	66,008	77,427	89,430

Source: Traffic Report

Operations and maintenance

The Maharashtra/Karnataka Border (Kagal) - Belgaum Toll Road was under the operations and maintenance contract of the Authority until the appointed date in the relevant Concession Agreement, being, December 16, 2021.

Pursuant to the completion of Transitional Support Agreement, the Project SPV has taken over the toll operations with effect from June 21, 2022 and have engaged a third party for undertaking user fee collection services for the same for a period of one year.

In relation to the routine maintenance and incident management activities of Asset 3, the same being undertaken by an agency appointed by NHAI and which shall continue to do so until the appointed date of the relevant EPC contract. The EPC contractor shall be responsible for the scope till the completion of the defects liability period of the relevant EPC agreement.

The Authority has appointed two EPC Contractors for undertaking the 4-6 laning works of this section. The Appointed date of the EPC Contractor is likely to declared on or before October 2022. The time for completion of the six laning works is 2.5 years from the Appointed Date.

Tollable Length and Toll Rates

In terms of tollable length, the Maharashtra/Karnataka Border (Kagal) - Belgaum Toll Road comprises 60.73 kms for Kognoli Toll Plaza and 23.74 kms for Hattargi Toll Plaza. 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%.

According to the NHAI's toll notification dated March 24, 2022, the toll rates at the Kognoli toll plaza of the Maharashtra Border - Belgaum Project for FY2023 are as follow:

Vehicle Type	Single Journey	Multiple Journey	Monthly Pass	Fee for Commercial Vehicle Registered within the district of the Kognoli Toll Plaza
		(Rs.)		
Car/Jeep/Van	85	125	2755	40
LCV	135	200	4450	65
Bus/Truck	280	420	9325	140
Vehicles with up to 3 axles	305	460	10175	155
HCM/EME (3 to 6 axles).....	440	660	14625	220
Oversized vehicles (Vehicles with 7 or more axles)	535	800	17805	265

Source: NHAI

According to the NHAI's toll notification dated March 24, 2022, the toll rates at the Hattargi toll plaza of the Maharashtra Border - Belgaum Project for FY2023 are as follows:
Source: NHAI

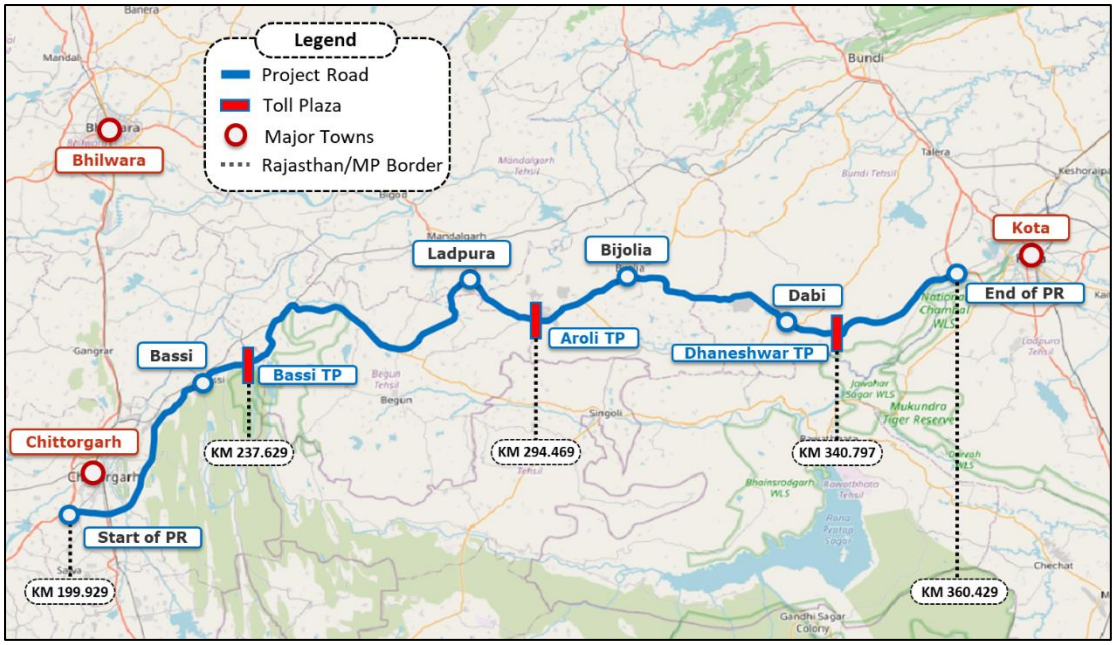
Vehicle Type	Single Journey	Multiple Journey	Monthly Pass	Fee for Commercial Vehicle Registered within the district of the Hattargi Toll Plaza
		(Rs.)		
Car/Jeep/Van	30	50	1075	15
LCV	50	80	1740	25
Bus/Truck	110	165	3645	55
Vehicles with up to 3 axles	120	180	3975	60
HCM/EME (3 to 6 axles).....	170	255	5715	85
Oversized vehicles (Vehicles with 7 or more axles)	210	315	6960	105

Source: NHAI

3. *Chittorgarh – Kota & Chittorgarh Bypass Project ("Asset 4")*

Project overview

According to the Traffic Consultant, Asset 4 is a 4-lane, 160.5 km long stretch, on national highway (NH) 27, with three (3) toll plazas at Airoli, Bassi and Dhaneshwar. The project highway, NH-27, is part of the East – West corridor envisaged under National Highway Development Program (Phase – II). The total length of NH-27 is roughly 3,530 km starting from Porbandar in the state of Gujarat and ending at Silchar in the state of Assam while passing through the states of Rajasthan, Madhya Pradesh, Uttar Pradesh, Bihar and West Bengal. NH–27 connects important tourist and industrial cities and towns like Porbandar (port city), Rajkot, Palanpur, Udaipur, Chittorgarh, Jhansi, Kanpur, Lucknow, Muzaffarpur, Purnea, Siliguri, Jalpaiguri. The project road section, Chittorgarh-Kota, part of the NH-27 in the state of Rajasthan, starts at KM 891.929 of NH-27 near Chittorgarh and ends at KM 1,052.429 of NH-27 at Kota with a length of about 160.5 km. The project road falls under the jurisdiction of Chittorgarh, Bhilwara, Bundi and Kota districts passing through settlements of Chittorgarh, Bassi, Aroli, Ladpura, Bijolia, Dhaneshwar, Dabi and Kota. There are three operational toll plazas on the project road, near Bassi (KM 929.629), near Aroli (KM 986.629), and near Dhaneshwar (KM 1,032.629).



Source: Traffic Report

Salient growth features and traffic generators

According to the Traffic Consultant, the project stretch mostly falls in four districts, namely Chittorgarh, Bhilwara, Bundi and Kota.

The Chittorgarh district is situated in south-east part of Rajasthan. The economy of the district is predominated by agriculture with about 72% of the workers being involved in agriculture or as agricultural labourers. The major crops grown in the district are maize, soybean, groundnut, sorghum, cotton and black gram in kharif season and wheat, mustard, gram, barley and opium in rabi season. Also, cultivation of fruits and vegetables is done in limited portions of land. The district is rich in mineral resources like barytes, china clay, limestone, sandstone and ochre. Several industries like cement, fabric processing units, chemical and fertilizer manufacturing units, polypropylene, HDPE woven sacks and fabric manufacturing units are present in the district. The cement plants include Birla Corporation Limited, Wonder Cement Limited, Aditya Cement Limited, Lafarge India Private Ltd. and J K Cement Works. Hindustan Zinc Limited has various plants spread across the district which produce sulphuric acid, refined zinc, refined lead. There is an atomic power plant and a heavy water plant located at Rawatbhata beside Rana Pratap Sagar dam. In addition to this, the presence of Chittorgarh fort and palaces makes it a famous tourist destination.

The Bhilwara district is located in the south-eastern part of Rajasthan and its economy driven by agriculture with 62.6% of the total workers involved in the primary sector. The major crops grown in the district include maize, oil seeds, wheat, pulses, jowar, barley and fibres with small quantities of different spices, bajra and some fruits and vegetables. The major agro-based industries here are oil mills, flour mills, ice candy manufacturing units, dal mills and units producing biscuits, confectionary items, khandsari, masala and cattle feed. The district is also well established in textile industry and known as Vastra Nagari and Manchester of Rajasthan. It is famous for manufacturing of synthetics and cotton mix fabric and synthetic yarn. The mineral resources available in the district include lead, zinc, soap stone, china clay, feldspar, quartz, mica, marble, granite, asbestos and garnet. It is one of the largest producers of raw material required for ceramic industry –quartz feldspar, china clay.

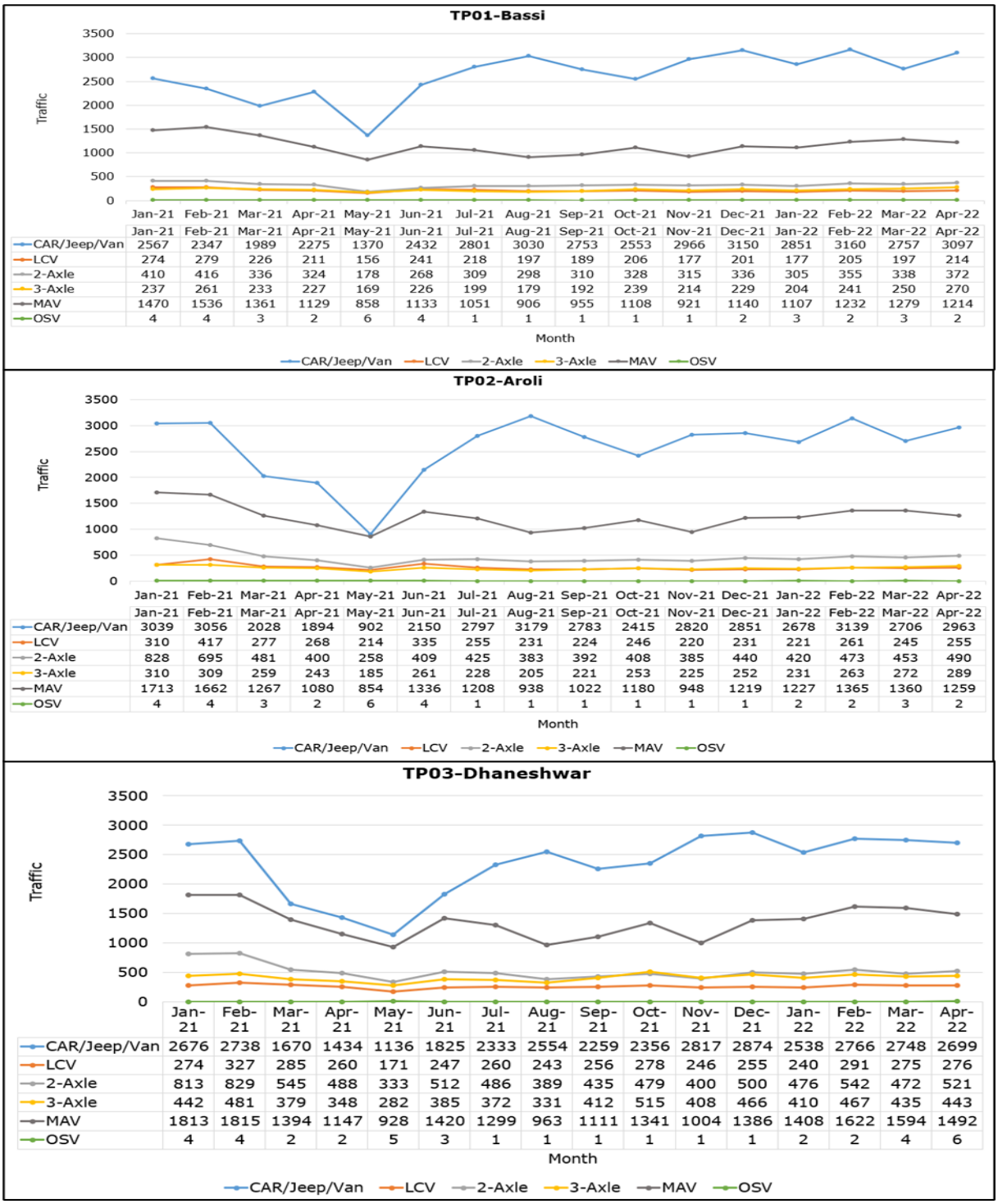
The Bundi district is famous for its contribution to agriculture. Major agricultural crops include pulses, wheat, gram, barley, cotton, tobacco and oil seeds. Among oil seeds, mustard and rapeseed are the mostly produced. Important fruit trees in Bundi include orange, pomegranate, lemon, guava and mango. Textile, tourism, handicrafts and small-scale industries play a pivotal role in the economic prosperity of Bundi in Rajasthan. Polyster fiber is the major produce as a part of textiles. The district is famous for its beautiful forts and palaces which have been converted into heritage hotels and step-well reservoirs to attract more tourists.

The Kota district is the trade centre for cotton, millet, wheat, coriander and oilseeds. Major cultivated crops include soybean, paddy and maize in kharif season while rapeseed & mustard, wheat, coriander and gram in rabi season. Ramganj mandi in Kota is famous for the stone and coriander market. It is the largest market for coriander in India. The industries prevalent in the district include cotton and oilseed milling, textile weaving, distilling, dairying, and the manufacture of metal handcrafts. Kota city is also known as the "Education hub of India" with the presence of a number of coaching institutes for engineering and medical entrance exams.

Traffic volume and composite of vehicles

Historical traffic data

The following table shows the historical traffic data of Asset 4 according to the Traffic Report annexed as Annexure C:



TP01-Bassi	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22
CAR/Jeep/Van	2567	2347	1989	2275	1370	2432	2801	3030	2753	2553	2966	3150	2851	3160	2757	3097
LCV	274	279	226	211	156	241	218	197	189	206	177	201	177	205	197	214
2-Axle	410	416	336	324	178	268	309	298	310	328	315	336	305	355	338	372
3-Axle	237	261	233	227	169	226	199	179	192	239	214	229	204	241	250	270
MAV	1470	1536	1361	1129	858	1133	1051	906	955	1108	921	1140	1107	1232	1279	1214
OSV	4	4	3	2	6	4	1	1	1	1	1	2	3	2	3	2

TP02-Aroli	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22
CAR/Jeep/Van	3039	3056	2028	1894	902	2150	2797	3179	2783	2415	2820	2851	2678	3139	2706	2963
LCV	310	417	277	268	214	335	255	231	224	246	220	231	221	261	245	255
2-Axle	828	695	481	400	258	409	425	383	392	408	385	440	420	473	453	490
3-Axle	310	309	259	243	185	261	228	205	221	253	225	252	231	263	272	289
MAV	1713	1662	1267	1080	854	1336	1208	938	1022	1180	948	1219	1227	1365	1360	1259
OSV	4	4	3	2	6	4	1	1	1	1	1	1	2	2	3	2

TP03-Dhaneshwar	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22
CAR/Jeep/Van	2676	2738	1670	1434	1136	1825	2333	2554	2259	2356	2817	2874	2538	2766	2748	2699
LCV	274	327	285	260	171	247	260	243	256	278	246	255	240	291	275	276
2-Axle	813	829	545	488	333	512	486	389	435	479	400	500	476	542	472	521
3-Axle	442	481	379	348	282	385	372	331	412	515	408	466	410	467	435	443
MAV	1813	1815	1394	1147	928	1420	1299	963	1111	1341	1004	1386	1408	1622	1594	1492
OSV	4	4	2	2	5	3	1	1	1	1	1	1	2	2	4	6

Source: Traffic Report

The onset of the second wave of Covid-19 and the lockdowns announced by the state government during April-June 2021 was a setback to the continuous recovery of traffic to normal levels. With that in mind, an average of July 2021 to April 2022 is taken as FY 22 AADT by the Traffic Consultant, as provided below:

Location/Mode	Car/Jeep/ Van/Taxi	LCV	2A	3A	MAV	OSV
TP01	2,974	136	326	222	1,091	2
TP02	2,939	133	427	244	1,173	1
TP03	2,736	125	470	426	1,322	2

Source: Traffic Report

Toll Segmentation

The tolling stream distribution under the present study has been derived from the toll data taking an average of ticket wise traffic from July 2021 to April 2022 and the same has been adopted for all the modes except cars. The level of exemptions in

cars has been found to be high due to which a tapering has been considered in the future years by the Traffic Consultant. The table below presents proposed segmentation for the three (3) toll plazas of Asset 4:

Ticket Type/Modes	Car			LCV	Bus/ 2A Truck	3A Truck	MAV	OSV
	FY22	FY23	FY24 onwards					
TP01-Bassi								
Single	28.9	28.9	28.9	45.1	44.4	60.5	73.4	88.1
Return	28.9	39.2	48.2	51.7	49.0	38.5	16.3	7.8
Monthly	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
Local personal	0.0	6.9	12.9					
Local commercial	0.0	0.0	0.0	1.5	6.3	0.8	10.2	1.0
Exempt	42.2	25.0	10.0	1.4	0.2	0.2	0.2	3.2
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
TP02-Aroli								
Single	34.8	34.8	34.8	41.3	40.2	58.7	67.2	89.1
Return	37.9	45.3	48.3	57.0	59.7	41.2	32.7	8.9
Monthly	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Local personal	0.0	4.9	6.9					
Local commercial	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0
Exempt	27.3	15.0	10.0	0.6	0.1	0.1	0.0	2.0
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
TP03-Dhaneshwar								
Single	31.9	31.9	31.9	36.2	34.7	33.8	51.7	62.1
Return	36.4	40.4	49.4	63.5	62.6	64.0	47.8	37.6
Monthly	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Local personal	0.0	2.7	8.7					
Local commercial	0.0	0.0	0.0	0.2	2.7	2.1	0.5	0.0
Exempt	31.7	25.0	10.0	0.1	0.0	0.0	0.0	0.4
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: Traffic Report

Projected Traffic Data: Growth Passenger Car Unit (PCU)

The Traffic Consultant project that there will be continued sustained growth in PCU of Asset 4 across all vehicle types until FY2052. The below table shows the expected PCU by financial year:

Bassi	**FY23**	**FY27**	**FY32**	**FY37**	**FY42**	**FY47**	**FY52**
PCU.....	10,406	13,328	17,250	21,780	26,896	32,475	38,433

Airoli	**FY23**	**FY27**	**FY32**	**FY37**	**FY42**	**FY47**	**FY52**
PCU.....	11,139	14,211	18,346	23,118	28,502	34,365	40,622

Dhaneshwar	**FY23**	**FY27**	**FY32**	**FY37**	**FY42**	**FY47**	**FY52**
PCU.....	12,340	15,667	20,167	25,356	31,198	37,551	44,319

Source: Traffic Report

Operations and maintenance

Upon completion of the Transitional Support Agreement, the Project SPV has taken over the toll operations with effect from June 21, 2022, and have appointed a third party for undertaking user fee collection services for the same, for a period of one year.

In relation to the routine maintenance and incident management the same is being managed through the agency M/s Kalthia Engineering and Construction Limited.

Further, the Project SPV is in the process of engaging an EPC Contractor for undertaking initial improvement works of Chittorgarh – Kota & Chittorgarh Bypass Project, as stipulated in the Concession Agreement, which is expected to complete on or before December 15, 2023.

Tollable Length and Toll Rates

In terms of tollable length, the Chittorgarh – Kota & Chittorgarh Bypass Project comprises 64.18 kms for Bassi Toll Plaza, 54.82 kms for Aroli Toll Plaza and 53.50 kms for Dhaneshwar Toll Plaza. 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%.

According to the NHAI's toll notification dated March 23, 2022, the toll rates at the Aroli toll plaza for the Chittorgarh – Kota & Chittorgarh Bypass Toll Road for FY2023 are as follows:

Vehicle Type	**Single Journey**	**Multiple Journey**	**Monthly Pass**	**Fee for Commercial Vehicle Registered within the district of the Aroli Toll Plaza**
		(Rs.)		
Car/Jeep/Van	75	110	2485	35
LCV	120	180	4020	60
Bus/Truck	255	380	8420	125
Vehicles with up to 3 axles	275	415	9185	140
HCM/EME	395	595	13200	200
Vehicles with 7 or more axles	480	725	16070	240

Source: NHAI

According to the NHAI's toll notification dated March 23, 2022, the toll rates at the Bassi toll plaza for the Chittorgarh – Kota & Chittorgarh Bypass Toll Road for FY2023 are as follows:

Vehicle Type	**Single Journey**	**Multiple Journey**	**Monthly Pass**	**Fee for Commercial Vehicle Registered within the district of the Bassi Toll Plaza**
		(Rs.)		
Car/Jeep/Van	85	130	2910	45
LCV	140	210	4705	70
Bus/Truck	295	445	9855	150
Vehicles with up to 3 axles	325	485	10750	160
HCM/EME	465	695	15455	230
Vehicles with 7 or more axles	565	845	18815	280

Source: NHAI

Vehicle Type	**Single Journey**	**Multiple Journey**	**Monthly Pass**	**Fee for Commercial Vehicle Registered within the district of the Dhaneshwar Toll Plaza**
		(Rs.)		
Car/Jeep/Van	75	110	2425	35
LCV	120	175	3920	60
Bus/Truck	245	370	8215	125
Vehicles with up to 3 axles	270	405	8965	135

HCM/EME	385	580	12885	195
Vehicles with 7 or more axles.....	470	705	15685	235

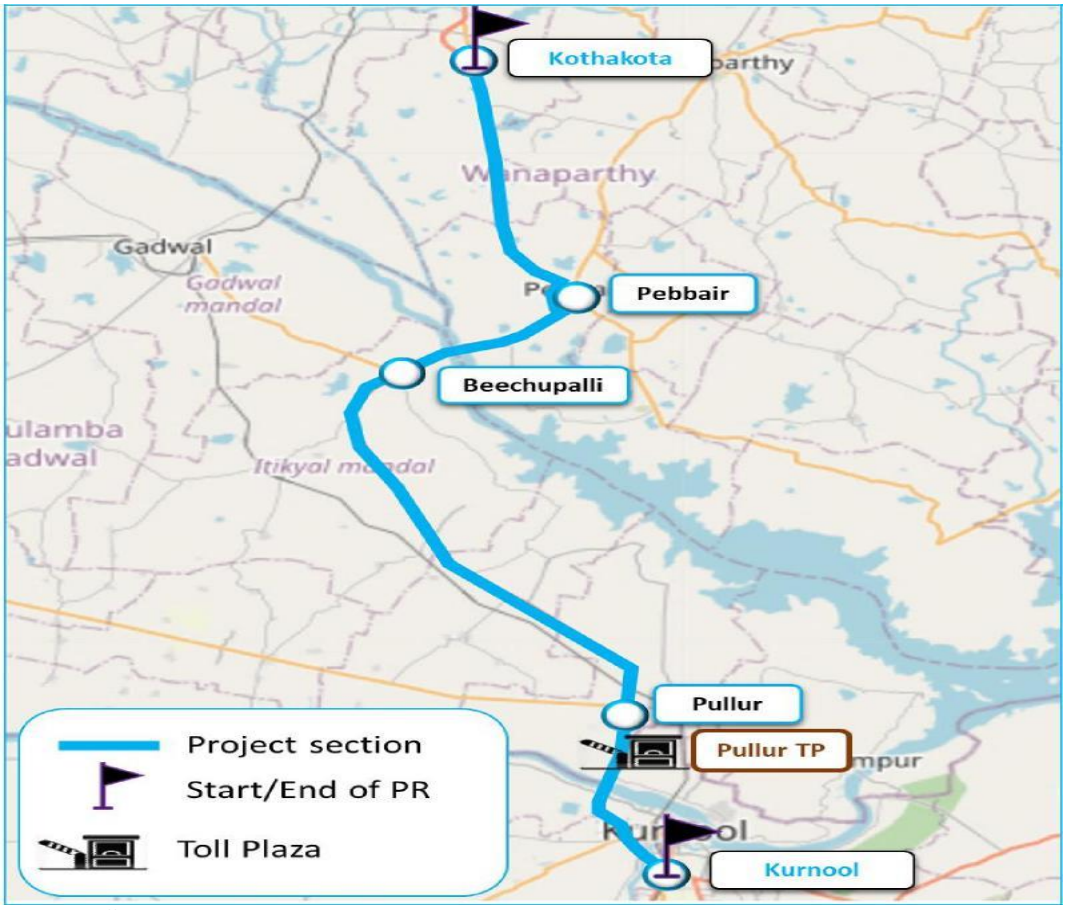
According to the NHAI's toll notification dated March 23, 2022, the toll rates at the Dhaneshwar toll plaza for the Chittorgarh – Kota & Chittorgarh Bypass Toll Road for FY2023 are as follows:

Source: NHAI

4. *Kothakota Bypass – Kurnool Highway Project ("Asset 5")*

Project overview

According to the Traffic Consultant, Asset 5 is a 4-lane, 74.6 kms long stretch, on national highways (NH) 44 which starts in Telangana State and ends at Kurnool in the state of Andhra Pradesh, with one toll plaza at Pullur. The project road serves for long distance traffic which is majorly plying between Hyderabad/Nagpur/northern region and Bengaluru/Mysuru/southern region. Apart from long distance traffic, it also serves the short distance traffic which is mainly generated between Mahbubnagar/ Kothakota/ Wannaparthy/ Pebbair and Kurnool/Ananthpur areas. NH-44, which is the project highway for Asset 5 is the longest highway in India connecting Srinagar with Kanyakumari and is part of North-South corridor envisaged under National Highway Development Program (Phase – II). NH-44 passes through the cities of Jammu, Jalandhar, Delhi, Faridabad, Agra, Gwalior, Jhansi, Sagar, Nagpur, Hyderabad, Bengaluru and Salem.



Source: Traffic Report

Salient growth features and traffic generators

According to the Traffic Consultant, the project stretch mostly passes through the districts of Wanaparthy and Jogulamba Gadwal in the state of Telangana and Kurnool in the state of Andhra Pradesh.

The Wanaparthy district is situated in south-east part of Telangana State, sharing border with the state of Andhra Pradesh. Wanaparthy district is surrounded by Mahabubnagar district in north, Nagarkurnol district in east, the state of Andhra Pradesh in south and Jogulamba Gadwal district in west. Agriculture is the main livelihood of the people in Wanaparthy district with 75% total workers engaged in agro-based labour. Red sandy soil and sandy loam soil covers 89% of the area. Paddy, groundnut, jowar, maize, red gram, castor, cotton and chili are the major crops cultivated within the district. Wanaparthy district, being one of the newly formed districts finds its place in backward districts of the state. Sri Ranganayaka Temple, Ghanpur Fort, Pangal Fort, Wanaparthy Palace, Saralasagar Project are few tourist attractions present in the district.

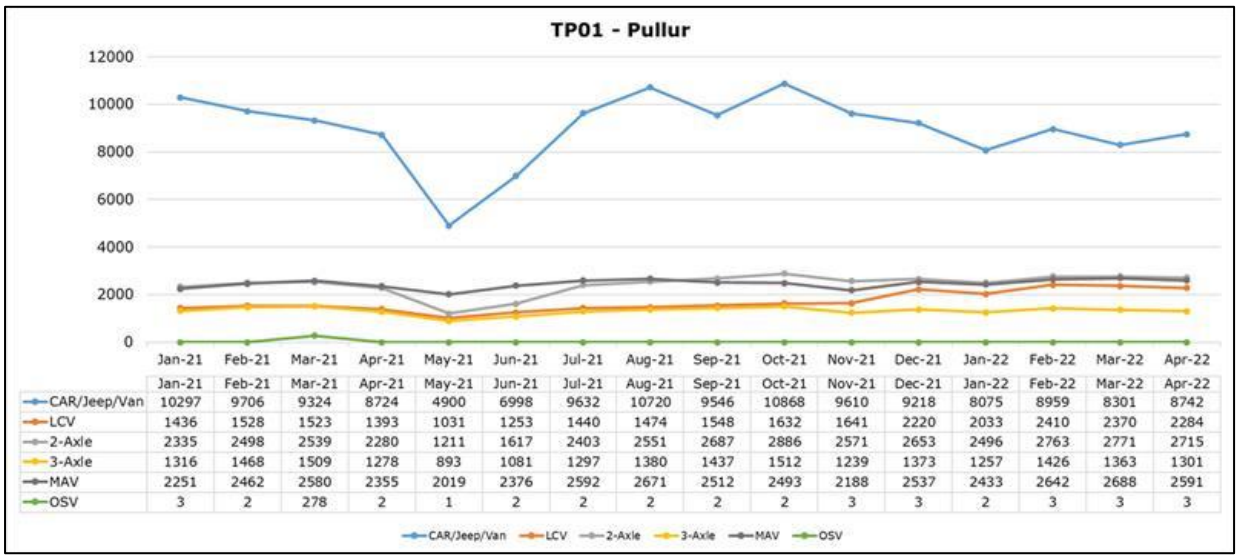
The Kurnool District is situated in Western part of Andhra Pradesh. It is surrounded by Nagarkurnool, Wanaparthy districts of Telangana state in north, Kadapa and Anantapur Districts in south, the Bellary district of Karnataka state in west and Prakasam District in east. Almost half of the geographical area is under agriculture use. Paddy, cotton, tomato and onion are the major

crops grown in the district. Mining/quarrying is the prevailing industry in the district. District has deposits of limestone, iron ore, barites and shale within its geographical area. Belum Caves, Mahanandi, Manthralayam, Srisailam and Rollapadu sanctuary are the main tourist attractions in the district.

Traffic volume and composite of vehicles

Historical traffic data

The following table shows the historical traffic data of Asset 5 according to the Traffic Report annexed as Annexure C:



	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22
CAR/Jeep/Van	10297	9706	9324	8724	4900	6998	9632	10720	9546	10868	9610	9218	8075	8959	8301	8742
LCV	1436	1528	1523	1393	1031	1253	1440	1474	1548	1632	1641	2220	2033	2410	2370	2284
2-Axle	2335	2498	2539	2280	1211	1617	2403	2551	2687	2886	2571	2653	2496	2763	2771	2715
3-Axle	1316	1468	1509	1278	893	1081	1297	1380	1437	1512	1239	1373	1257	1426	1363	1301
MAV	2251	2462	2580	2355	2019	2376	2592	2671	2512	2493	2188	2537	2433	2642	2688	2591
OSV	3	2	278	2	1	2	2	2	2	2	3	3	2	3	3	3

Source: Traffic Report

The onset of the second wave of Covid-19 and the lockdowns announced by the state government during April-June 2021 was a setback to the continuous recovery of traffic to normal levels. With that in mind, an average of July 2021 to April 2022 is taken by Traffic Consultant as FY22 AADT, as provided below:

Location/Mode	Car/Jeep/ Van/Taxi	LCV	2A	3A	MAV	OSV
TP01	9,745	1,527	2,650	1,358	2,535	2

Source: Traffic Report

Toll Segmentation

The tolling stream distribution under the present study has been derived from the toll data taking an average of ticket wise traffic from July 2021 to April 2022. The table below presents proposed segmentation of total traffic assessed from the toll data for the toll plaza of Asset 5:

Ticket Type/Modes	Car	LCV	Bus/ 2A Truck	3A Truck	MAV	OSV
Single	49.9	58.5	56.5	86.1	90.7	97.9
Return	40.6	40.9	42.0	13.3	8.7	1.3
Monthly Pass	0.0	0.0	0.9	0.0	0.0	0.0
Local personal	0.0	0.0	0.0	0.0	0.0	0.0
Local commercial	4.3	0.0	0.0	0.0	0.0	0.0
Exempt	5.2	0.7	0.6	0.6	0.6	0.8
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: Traffic Report

Projected Traffic Data: Growth Passenger Car Unit (PCU)

The Traffic Consultant projects that there will be continued sustained growth in PCU of Asset 5 across all vehicle types until FY2052. The below table shows the expected PCU by financial year:

Pullur	FY23	FY27	FY32	FY37	FY42	FY47	FY52
PCU.....	37,594	42,984	50,677	63,089	77,277	92,949	109,912

Source: Traffic Report

Operations and maintenance

The Kothakota Bypass – Kurnool Highway Toll Road is currently operated under the BOT (Annuity) model, whereby the concessionaire is responsible for construction, operations and maintenance of the toll road while the relevant authority collects tolls and makes annuity payments to the Concessionaire. The current concessionaire is Andhra Pradesh Expressway Limited. We expect the current concessionaire to undertake routine and major maintenance works, as per the requirement of its current concession obligations, up to the termination of its concession period and our O&M Handover Date for the Kothakota Bypass – Kurnool Highway Toll Road on September 16, 2026. Following our takeover of O&M on September 16, 2026, we plan to perform ongoing major maintenance works on a regular basis to maintain in good condition the Kothakota Bypass – Kurnool Highway Toll Road.

Upon completion of the Transitional Support Agreement, the Project SPV has taken over the toll operations with effect from June 21, 2022 and have appointed a third party for undertaking user fee collection services for the same, for a period of one year.

NHAI by way of its letter bearing reference NHAI/PIU-HYD/NH-44/AP- 5/InvIT/2022/939 dated June 10, 2022, has informed that it proposes to undertake six-laning of NH-44 from KM 22.300 to KM 210.369 which includes the stretch of Asset 5 from KM 135.469 to KM 211.00. Accordingly, NHAI has advised the Project SPV (being the Concessionaire) to keep the proposed initial improvement works on Asset 5 on hold until the completion of the proposed six-laning of of NH-44 from KM 22.300 to KM 210.369 is completed.

Tollable Length and Toll Rates

In terms of tollable length, the Kothakota Bypass – Kurnool Highway Toll Road comprises 92.43 kms of roads. 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%.

According to the NHAI's toll notification dated March 17, 2022, the toll rates at the Pullur toll plaza for the Kothakota Bypass – Kurnool Highway Toll Road for FY2023 are as follows:

Vehicle Type	**Single Journey**	**Multiple Journey**	**Monthly Pass**	**Fee for Commercial Vehicle Registered within the district of the Pullur Toll Plaza**
		(Rs.)		
Car/Jeep/Van	125	190	4195	65
LCV	205	305	6775	100
Bus/Truck	425	640	14195	215
Vehicles with up to 3 axles	465	695	15485	230
HCM/EME (Vehicles with 4 to 6 axles)	670	1,000	22260	335
Vehicles with 7 or more axles	815	1,220	27100	405

Source: NHAI

5. *Agra Bypass ("Asset 6")*

Project overview

According to the Traffic Consultant, Asset 6 is a 32.80 km four-lane road, forming part of the section connecting NH19 (old NH2) to NH44 (old NH7) in Uttar Pradesh, branches out to NH52 (old NH3) and NH44 (old NH7) at Gwalior. Asset 6 is in operations since March 2017. Asset 6 acts as a bypass to the city of Agra, a majority of approach roads and structures on the Asset 6 are already six lanes as this was required as per the construction requirements when Asset 6's construction was completed by the NHAI's contractors. Asset 6 lies on the outskirts of Agra, bypassing the city and acting as a key connection between Delhi to the regions of Gwalior and south. It further connects the traffic originating from west from areas such as Gujarat and Jaipur to the cities in the East (Kanpur, Lucknow and beyond), thereby supporting the east-west movement. A small section of Agra Bypass is currently incomplete due to land acquisition issues and financing hurdles. However, according to the Traffic Consultant, this link will get completed in the due course of time, as pressure on local government and NHAI increases, due to growing urban settlements within Agra.

Source: Steer cartography using OpenStreetMap data

Salient growth features and traffic generators

According to the Traffic Consultant, Asset 6 serves:

- NH19/NH2 – North to Central/Eastern movements originating from Delhi and northern parts of the country (Punjab, Haryana, Himachal Pradesh, Jammu and Kashmir) to the central (UP, Bihar) and eastern (West Bengal, Jharkhand, Chhattisgarh, North-Eastern region) of the country.
- NH2/19 – NH52 and NH44 connection. This is the traditional north south movement between Delhi (and northern states) to destination such as Indore (Madhya Pradesh), Maharashtra, and all southern states. The traffic having origin destinations to south of Asset 6 split at Gwalior to use NH52 and NH44 depending on the destination.
    - NH52 (old NH3): predominantly serves the Indore, Nashik, Mumbai movement in addition to movements between Delhi-Bangalore, Goa, and other destinations;
    - NH44 (old NH7): serves the Karnataka, Telangana, Andhra Pradesh, Tamil Nadu and Kerala movements.
- East-West movements NH21 traffic between Gujarat, Rajasthan, and Kanpur/Lucknow in addition to the Gujarat – Delhi (and north) movements.

The traffic profile is predominantly goods vehicles undertaking long distance movements between the locations discussed above. The commodity mix carried by the vehicles observed at the toll plaza during site visit was mix of manufacturing, courier/parcel, automobile, and agriculture confirming the long-distance nature of the traffic.

Asset 6 forms part of the section connecting NH2 to NH44, later branching out to NH52 and NH44 at Gwalior. The Asset caters to the demands generated by the states connected through the above-mentioned highways. NH2 runs over 1,465 kms completing the east – west movement and connects some of the major states and industrial centres of Delhi, Haryana, Uttar Pradesh with the eastern states of Bihar, Jharkhand, and West Bengal. On the contrary, NH44 completes the north-south movement of the country as it connects the northern states/UTs of Jammu and Kashmir, Punjab, Haryana, Delhi, Uttar Pradesh, Rajasthan, Madhya Pradesh, Maharashtra with the southern states of Telangana, Andhra Pradesh, Karnataka, and Tamil Nadu. Following a parallel route with NH44, NH52 starts in Punjab and ends in Karnataka. The Asset acts as a key connection between Delhi NCR and cities in Madhya Pradesh such as Gwalior and Indore, a city in south of the Asset in the state of Madhya Pradesh. Gwalior has an existing industrial area where the economy is driven by textile mills, artificial silk manufacturing plants, handicraft, and hand loom industries, tanning industries, and chemical industries. The city is also home to Gwalior Chemical Industries Limited. The group is primarily into the business of manufacturing and marketing of specialty chemicals, catering to

both the domestic and exports customers in the agrochemical, paints and coatings, dyes, and flavour & fragrance industries. Indore has large industrial cluster for automobile and other ancillary industries. Pithampur industrial area is one of the biggest industrial clusters in the country and support large industrial activity.

The Asset lies on the outskirts of Agra which has several medium and small-scale industries and is one of the prime centres of the handloom, plastic pallets, and automotive spares, in addition to being a key tourist destination because of the Taj Mahal. Numerous major tourist attractions also exist in the vicinity of the Asset. Agra, Mathura, Fatehpur Sikri and other towns in the region are home to several historical monuments, places of worship and heritage sites.

Traffic volume and composite of vehicles

Historical traffic data

The following table shows the historical traffic data of Asset 6, according to the Traffic Consultant:

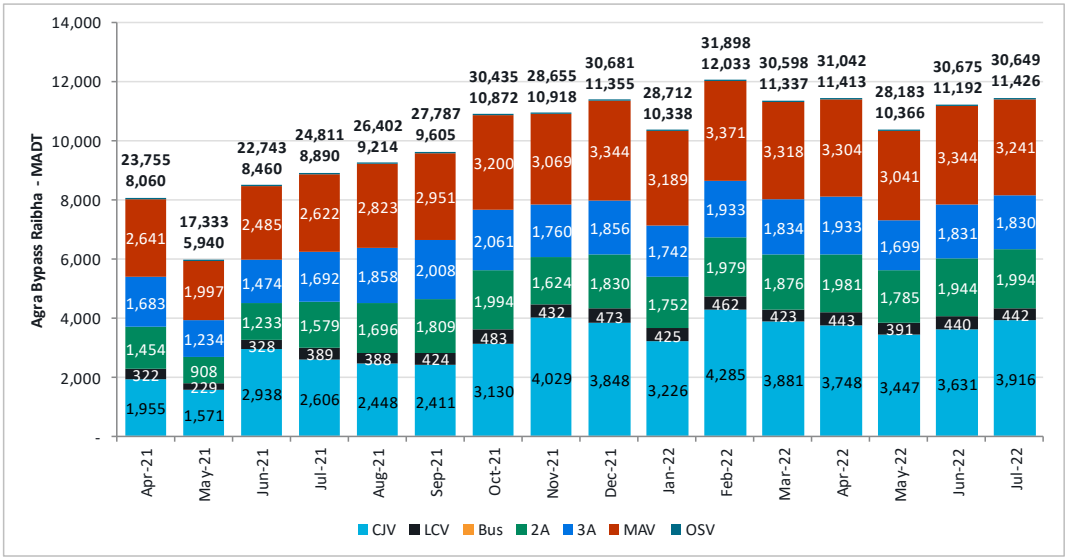
Indian Highway Management Company Limited ("**IHMCL**") seven day traffic counts are available on Asset 6 - **Raibha toll plaza** starting in December 2016 (FY17) and ending in September 2020 (FY21).

Vehicle type	December 2016	May 2017	September 2017	March 2018	April 2019	September 2020
CJV	5,617	4,364	3,422	3,925	5,479	3,873
LCV	519	424	387	303	443	357
2A/bus	492	433	507	666	549	353
3A	411	313	320	303	318	227
MAV	329	263	307	252	352	317
Total	**7,368**	**5,797**	**4,943**	**5,449**	**7,141**	**5,127**
PCU	**10,585**	**8,422**	**7,865**	**8,421**	**10,329**	**7,575**

Source: Traffic Report, Steer analysis of data

Monthly Average Daily Traffic

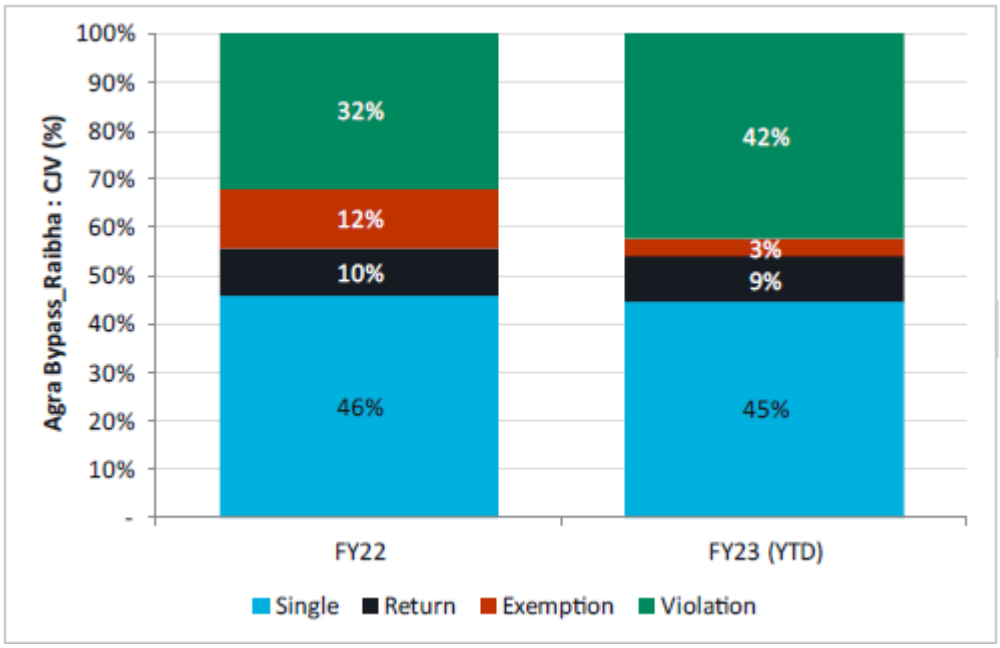
The chart below presents the reported traffic volume for toll plaza Raibha on Asset 6, in terms of monthly average daily traffic (MADT) from April 2021 to July 31, 2022.



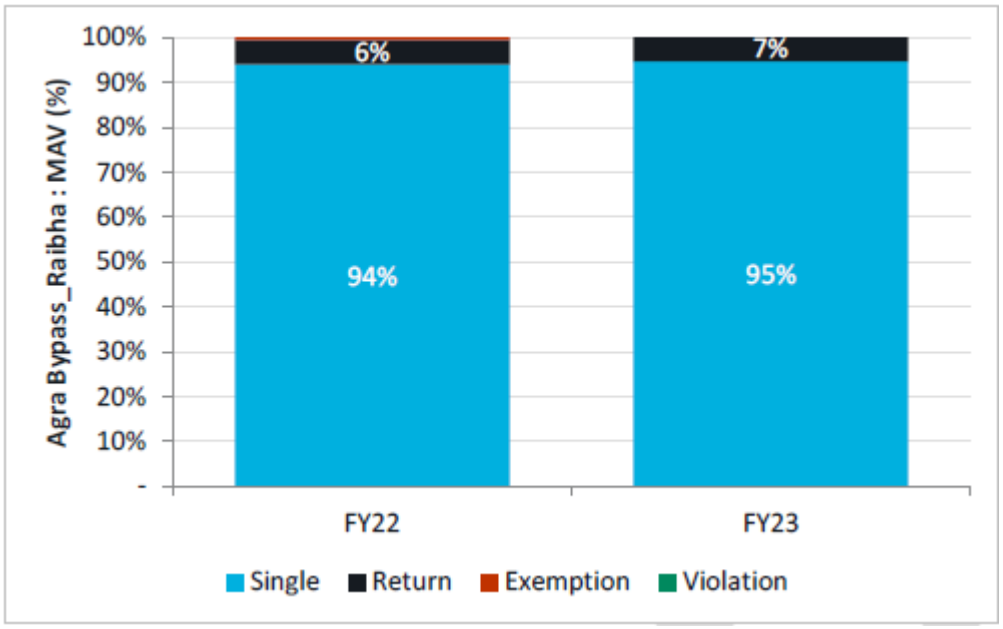
Source: Steer analysis of client toll plaza data

Toll Segmentation

The chart below presents the estimated segmentation based on traffic data from FY22 for Toll Plaza Raibha.

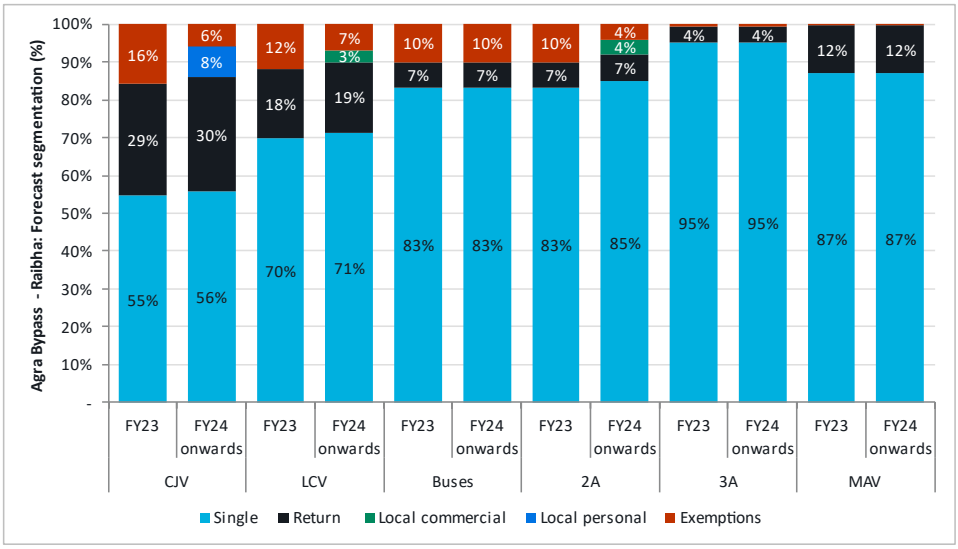


Source: Traffic Report, Steer analysis of traffic data.



Source: Traffic Report, Steer analysis of traffic data.

In addition, the Traffic Consultant has also forecasted toll segmentation for FY23.



Source: Steer analysis

The table below provides the final (background plus impacts) AADT CAGR % for the toll plaza at Raibha, as provided by the Traffic Consultant:

Vehicle Type	FY23-FY25	FY25-FY30	FY30-FY35	FY35-FY40	FY40-FY43	FY23-FY43
CJV	6.1%	6.3%	5.9%	5.4%	4.9%	5.7%
Mini LCV	2.4%	2.5%	2.4%	2.1%	2.0%	2.3%
Bus	43.6%	1.6%	1.5%	1.3%	1.2%	5.0%
LCV	(1.0%)	2.4%	2.4%	2.1%	2.0%	1.9%
2A	(0.6%)	4.5%	3.4%	3.1%	2.9%	3.1%
3A	0.3%	5.3%	4.6%	4.2%	3.8%	4.1%
MAV	(0.6%)	6.9%	5.7%	5.2%	4.8%	5.1%
OSV	5.3%	5.5%	5.2%	4.7%	4.3%	5.0%
AADT	**1.3%**	**5.7%**	**5.0%**	**4.6%**	**4.2%**	**4.6%**
PCU's	**0.3%**	**5.9%**	**5.0%**	**4.6%**	**4.3%**	**4.5%**

Source: Steer analysis

Projected Traffic Data: Growth in Passenger Car Unit (PCU)

Vehicle Type	FY23	FY25	FY30	FY35	FY40	FY43
CJV	2,263	2,548	3,455	4,601	5,977	6,897
Mini LCV	194	203	230	259	288	305
Bus	32	66	71	77	82	85
LCV	480	471	529	594	661	700
2A	2,116	2,089	2,606	3,086	3,603	3,923
3A	1,927	1,938	2,504	3,133	3,847	4,307
MAV	3,342	3,303	4,621	6,106	7,883	9,071
OSV	3	4	5	6	7	8
AADT	**10,357**	**10,622**	**14,020**	**17,861**	**22,347**	**25,296**
PCU's	**30,455**	**30,617**	**40,834**	**52,140**	**65,356**	**74,055**

Source: Steer analysis

Tollable Length and Toll Rates

In terms of tollable length, the Agra Bypass Toll Road currently comprises 56.04 kms of roads. 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%.

According to the NHAI's toll notification dated March 24, 2022, the toll rates at the Raibha toll plaza for Asset 6 for FY2023 are as follows:

Vehicle Type	Single Journey	Multiple Journey	Monthly Pass	Fee for Commercial Vehicle Registered within the district of the Raibha Toll Plaza
		(Rs.)		
Car/Jeep/Van	75	115	2545	40
LCV	125	185	4105	60
Bus/Truck	260	385	8605	130
Vehicles with up to 3 axles	280	420	9390	140
HCM/EME (Vehicles with 4 to 6 axles)	405	605	13495	200
Vehicles with 7 or more axles	495	740	16430	245

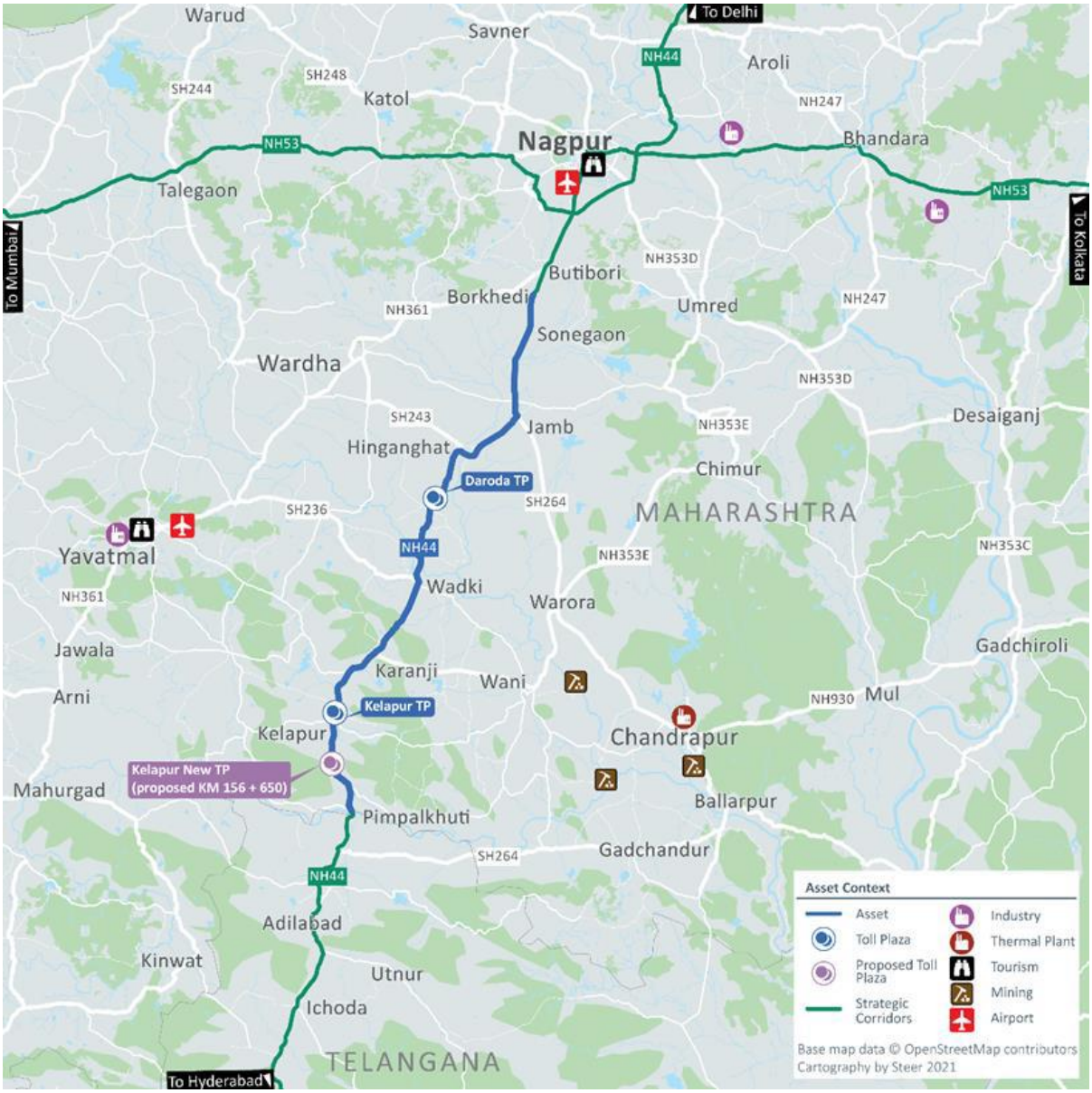
Source: NHAI

For further details in relation to Asset 6, please refer to **Annexure C** of this Preliminary Placement Document.

6. *Borkhedi – Kelapur Project ("Asset 7")*

Project overview

According to the Traffic Consultant, Asset 7 is located on NH44 and is about 138.15 kms long section between Borkhedi and Maharashtra/ Telangana Border (at Penganga River bridge) traversing through the districts of Nagpur, Wardha and Yavatmal in the state of Maharashtra. The two toll plazas on Asset 7 are located at Darodha (KM 92.500) and Kelapur (KM 150.450, to be shifted to KM 156.650). Kelapur toll plaza is proposed to be relocated to a new location, approximately 6 km south of the existing location in absence of adequate land to construct proper toll plaza at the present location. This is named as Kelapur New TP (KM 156 +250) in the map below.



Source: Traffic Report

Salient growth features and traffic generators

According to the Traffic Consultant, Asset 7 is in vicinity of Nagpur, which is home to several manufacturing hubs, food processing units, and CONCOR's multi modal logistics logistic hub. Yavatmal (textile/cotton), Butibori (MIDC), and Chandrapur (coal) are some of key traffic generators for the Asset. Asset 7 forms part of NH19/NH7 (new NH44) north-south long-distance strategic corridor connecting Srinagar in Kashmir (northernmost state) to Kanyakumari in Tamil Nadu (southernmost state). It directly connects national capital Delhi and northern states with state capitals of Hyderabad (Telangana), Bengaluru (Karnataka) including other major cities/industrial nodes/ junctions along the way like Agra (Uttar Pradesh), Gwalior and Jhansi (Madhya Pradesh), Nagpur (Maharashtra), Selam, Madurai, Tirunelveli (Tamil Nadu). The Asset also provides strategic linkage between Delhi and Chennai via Hyderabad- Kadapa and Hyderabad-Ongole routes. In addition to its role as national connector, the Asset provides important regional connectivity between neighbouring states i.e., Maharashtra and Telangana. Nagpur, being centrally located in the country, acts as a strategic junction within immediate influence area in Maharashtra. The Asset provides fair condition round the year connectivity to various urban/ semi-urban centres of eastern Maharashtra i.e., Chandrapur, Wadner, Padharkawada, Yavatmal among each other and with regional commercial centre of Nagpur. The major commodities observed during surveys are manufacturing, courier/parcel, agricultural products, and groceries. The traffic profile is predominantly goods vehicles undertaking long distance movements between the locations discussed above. The commodity mix carried by the vehicles observed at the toll plaza during site visit was mix of manufacturing, courier/parcel, automobile, and agriculture confirming the long-distance nature of the traffic. The Asset has seen an increase in proportion of the long-distance goods traffic in recent years as compared to past performance which may be attributed to shift of long-distance traffic from other corridors to NH44 (old NH7) corridor as NH44 observed continuous Level of Service (LoS) upgrades. Being the shortest route between Delhi and Hyderabad/Bengaluru, the increased LoS on the corridor attracted traffic on NH44 post improvement.

The Asset lies on the outskirts of Nagpur which is the third largest city in Maharashtra. It is known for medium to large scale industries alongside agriculture, being, manufacturing and food processing. Manufacturing segment includes products ranging

from agriculture equipment, aluminum products, castings, cement, chemicals, paper and packaging, electrical equipment and fittings, textile engineering goods, tools manufacturing, fabrication and machining, ferro alloys, paints, furniture, plastic and moulding products, etc. Food processing giants having presence at Nagpur includes Haldiram, Dinshaw, Patanjali and other medium scales orange and spices processing units, etc. Government of Maharashtra has set-up Multi-Modal International Passenger and Cargo Hub Airport at Nagpur (MIHAN). That will upgrade existing domestic airport along with a Special Economic Zone which is abutting to the boundary of the airport. MIHAN houses plant of Tata Aeronautics which manufactures parts for Boeing and Air India and Dassault's assembly plants. Container Corporations of India Limited (CONCOR) constructed Multi Modal Logistic Park along with a rail terminal connecting MIHAN with different ports in country. Butibori industrial area established by Maharashtra Industrial Development Corporation (MIDC), north of the Asset, is one of the country's largest industrial hubs. It houses textile, machine and metal fabrication and manufacturing units and is home to industrial giants like KEC, Hyundai, and Unitech. Koradi Thermal Power Station and Khaparkheda Thermal Power Station are the two major thermal power stations located in vicinity of the hub. Yavatmal industrial area, in west of the Asset, has textile and cotton processing industries including Raymond India's garment plant. The industrial hub is also home to export units of machineries, cement, medicines, limestones, and clothes. Chandrapur is key coal mining centre in close vicinity of the Asset and has thermal plant, cement, paper and ferro alloy manufacturing industries.

The agricultural stretches present along the Asset as well as in Nagpur generate a considerable share of traffic on the Asset. Nagpur, also known as Orange City, is famous for the production of oranges in addition to being home to large number of Paddy, Jowar, Cotton, Tur and Soyabean fields. The same is observed in our 'commodity analysis', a part of survey results, as well as ~13% of the MAVs were found to carry agricultural products.

Traffic volume and composite of vehicles

Historical traffic data

The following table shows the historical traffic counts of Asset 7 according to the Traffic Consultant:

IHMCL weekly counts are available on Asset 7 - **Darodha toll plaza** starting in September 2015 and ending in September 2020 (not adjusted for seasonality).

Vehicle type	September 2015	May 2016	October 2016	June 2017	March 2018	September 2018	February 2019	January 2020	September 2020
CJV	732	1,167	904	851	1,112	899	1,470	1,295	1,830
LCV	249	402	346	390	562	557	612	590	709
2A/bus	415	367	439	427	544	582	616	725	871
3A	910	799	773	843	1,057	1,205	1,221	1,367	1,508
MAV	444	447	700	657	1,028	1,221	1,032	1,323	1,241
Total	**2,750**	**3,182**	**3,162**	**3,168**	**4,303**	**4,464**	**4,951**	**5,300**	**6,159**
PCU	**7,079**	**7,280**	**8,209**	**8,203**	**11,384**	**12,590**	**12,543**	**14,410**	**15,615**

Source: Traffic Report, Steer analysis of data

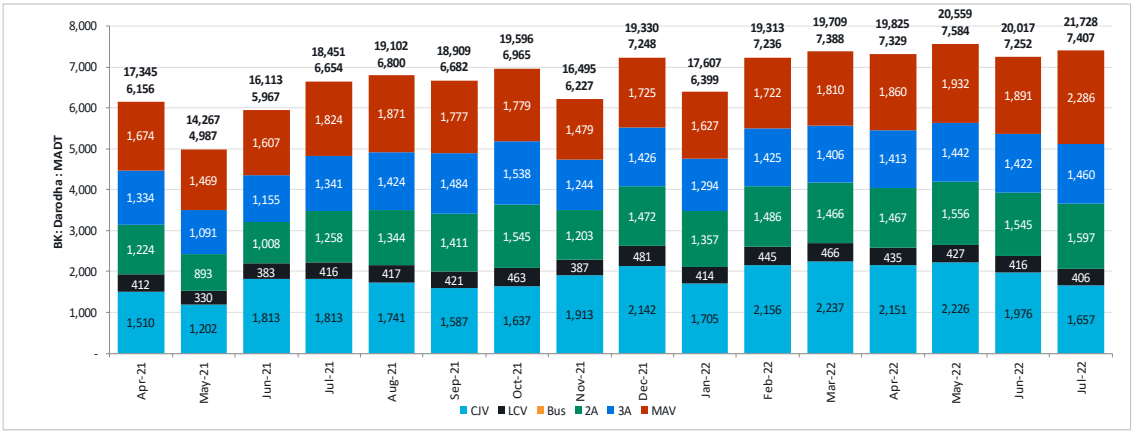
IHMCL weekly counts are available on Asset 7 - **Kelapur toll plaza** starting in March 2015 and ending in November 2020 (not adjusted for seasonality).

Vehicle type	March 2015	January 2017	October 2016	June 2017	February 2018	August 2018	February 2019	November 2020
CJV	1,169	1,670	1,144	1,608	1,488	1,267	1,924	1,855
LCV	399	560	405	294	551	531	695	881
2A/bus	594	764	627	522	673	653	834	1,386
3A	1,145	1,171	889	613	1,117	1,286	1,187	1,638
MAV	460	739	691	379	924	1,330	1,079	1,692
Total	**3,767**	**4,904**	**3,756**	**3,416**	**4,753**	**5,067**	**5,719**	**7,452**
PCU	**9,055**	**11,641**	**9,409**	**7,160**	**11,843**	**13,866**	**13,885**	**19,863**

Source: Traffic Report

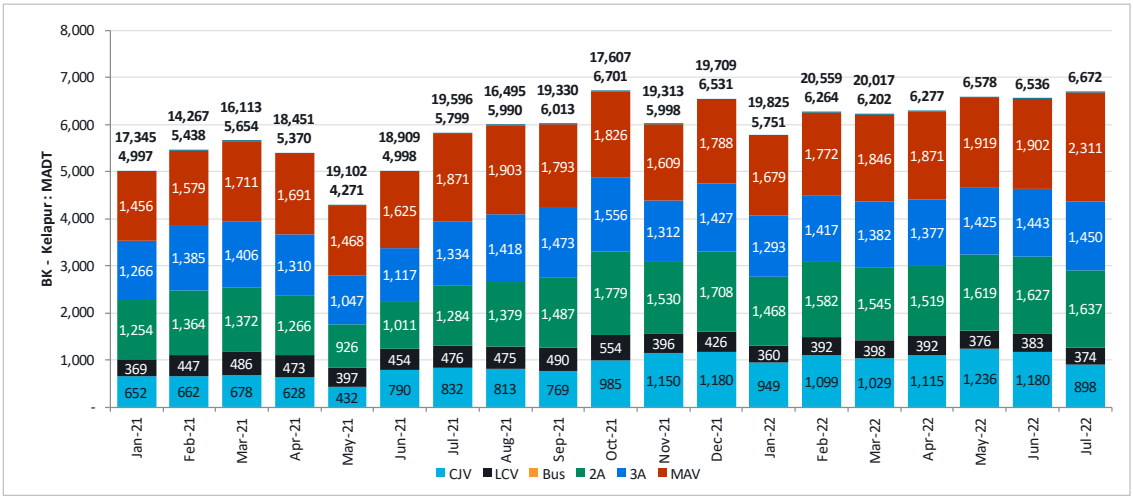
Monthly Average Daily Traffic

The chart below presents the reported traffic volume for toll plaza Darodha on Asset 7, in terms of monthly average daily traffic (MADT) from April 2021 to July 20, 2022.



Source: Steer analysis

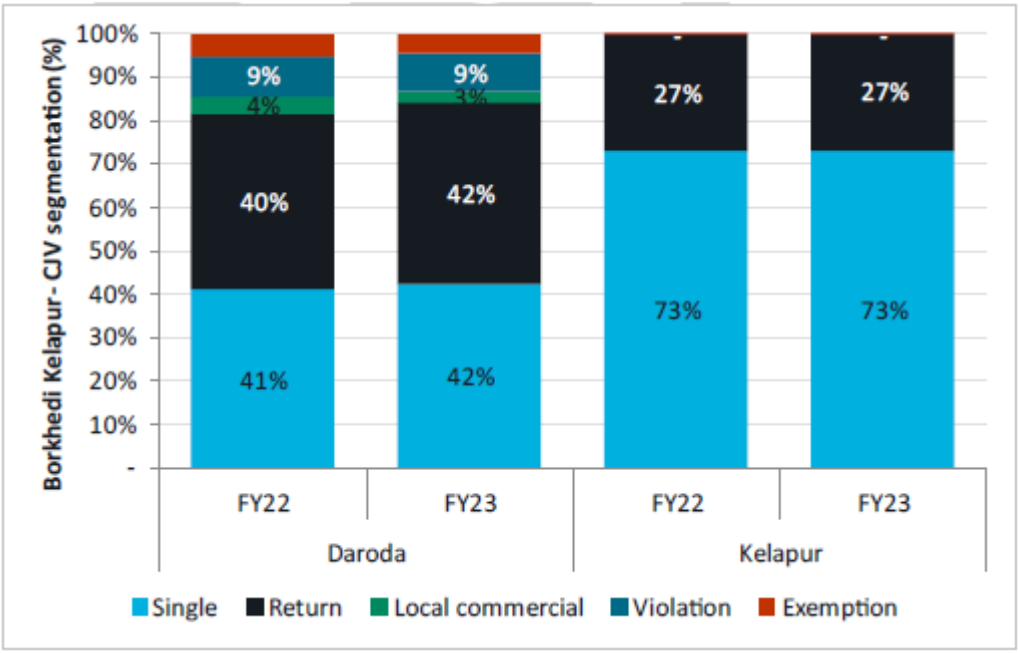
The chart below presents the reported traffic volume for toll plaza Kelapur on Asset 7, in terms of monthly average daily traffic (MADT) from April 2021 to July 20, 2022.



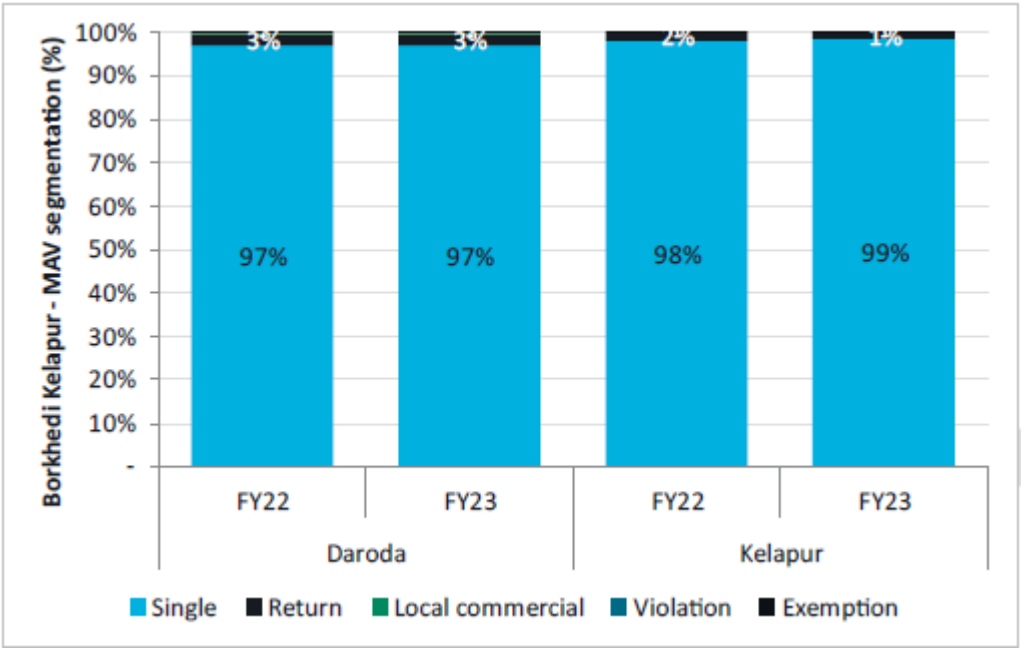
Source: Steer analysis

Toll Segmentation

The charts below present the estimated segmentation based on traffic data from FY22 and FY23 (until July 31, 2022) for Toll Plaza Darodha and Kelapur.

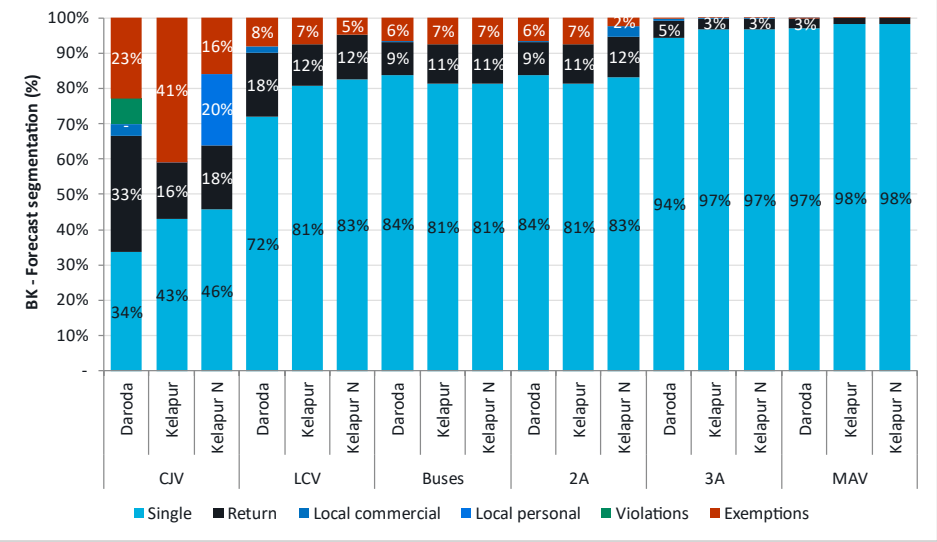


Source: Steer analysis



Source: Steer analysis

In addition, the Traffic Consultant has also forecasted toll segmentation for FY23.



Source: Steer analysis

The table below provides the final (background plus impacts) AADT CAGR (%) for the Darodha toll plaza, as provided by the Traffic Consultant:

Vehicle Type	FY23-FY25	FY25-FY30	FY30-FY35	FY35-FY40	FY40-FY43	FY23-FY43
CJV	5.9%	6.1%	5.7%	5.2%	4.8%	5.6%
Mini LCV	3.2%	3.3%	3.0%	2.7%	2.4%	2.9%
Bus	3.2%	2.5%	3.0%	2.7%	2.4%	2.7%
LCV	1.9%	2.0%	1.8%	1.6%	1.5%	1.8%
2A	3.5%	1.4%	3.4%	3.1%	2.9%	2.8%
3A	4.1%	3.0%	4.0%	3.7%	3.4%	3.6%
MAV	5.8%	4.3%	5.7%	5.2%	4.8%	5.1%
OSV	5.3%	5.5%	5.2%	4.7%	4.3%	5.0%
AADT	**4.7%**	**3.8%**	**4.7%**	**4.4%**	**4.0%**	**4.3%**
PCU's	**4.8%**	**3.5%**	**4.8%**	**4.4%**	**4.1%**	**4.2%**

Source: Traffic Report

The table below provides the final (background plus impacts) AADT CAGR (%) for the Kelapur toll plaza, as provided by the Traffic Consultant:

Vehicle Type	FY23-FY25	FY25-FY30	FY30-FY35	FY35-FY40	FY40-FY43	FY23-FY43
CJV	5.9%	6.1%	5.7%	5.2%	4.8%	5.6%
Mini LCV	3.2%	3.3%	3.0%	2.7%	2.4%	2.9%
Bus	3.2%	2.4%	3.0%	2.7%	2.4%	2.7%
LCV	1.9%	2.0%	1.8%	1.6%	1.5%	1.8%
2A	3.5%	1.5%	3.4%	3.1%	2.9%	2.8%
3A	4.1%	3.0%	4.0%	3.7%	3.4%	3.6%
MAV	**5.8%**	**4.3%**	**5.7%**	**5.2%**	**4.8%**	5.1%
OSV	**5.3%**	**5.5%**	**5.2%**	**4.7%**	**4.3%**	5.0%
AADT	**4.6%**	**3.7%**	**4.6%**	**4.3%**	**3.9%**	**4.2%**
PCU's	**4.7%**	**3.4%**	**4.7%**	**4.4%**	**4.0%**	**4.2%**

Source: Traffic Report

The table below provides the final (background plus impacts) AADT CAGR (%) for the new location of the Kelapur toll plaza, as provided by the Traffic Consultant:

Vehicle Type	FY23-FY25	FY25-FY30	FY30-FY35	FY35-FY40	FY40-FY43	FY23-FY43
CJV	5.9%	6.1%	5.7%	5.2%	4.8%	5.6%
Mini LCV	3.2%	3.3%	3.0%	2.7%	2.4%	2.9%
Bus	3.2%	2.4%	3.0%	2.7%	2.4%	2.7%
LCV	1.9%	2.0%	1.8%	1.6%	1.5%	1.8%
2A	3.5%	1.5%	3.4%	3.1%	2.9%	2.8%
3A	4.1%	3.0%	4.0%	3.7%	3.4%	3.6%
MAV	5.8%	4.3%	5.7%	5.2%	4.8%	5.1%
OSV	5.3%	5.5%	5.2%	4.7%	4.3%	5.0%
AADT	**4.6%**	**3.6%**	**4.6%**	**4.3%**	**3.9%**	**4.2%**
PCU's	**4.7%**	**3.4%**	**4.7%**	**4.4%**	**4.0%**	**4.2%**

Source: Traffic Report

Projected Traffic Data: Growth in Passenger Car Unit (PCU)

The table below provides the final (background plus impacts) AADT forecast at the Darodha toll plaza, as provided by the Traffic Consultant:

Vehicle Type	FY23	FY25	FY30	FY35	FY40	FY43
CJV	1,970	2,207	2,966	3,920	5,061	5,824
Mini LCV	466	497	584	678	774	832
Bus	442	471	531	616	703	755
LCV	194	201	222	243	263	275
2A	1,434	1,536	1,646	1,949	2,276	2,478
3A	1,450	1,572	1,820	2,216	2,653	2,929
MAV	1,892	2,120	2,611	3,450	4,454	5,126
OSV	1	2	2	3	3	4
AADT	**7,850**	**8,605**	**10,382**	**13,074**	**16,187**	**18,223**
PCU	**20,855**	**22,883**	**27,169**	**34,282**	**42,523**	**47,918**

Source: Traffic Report

The table below provides the final (background plus impacts) AADT forecast at the Kelapur toll plaza, as provided by the Traffic Consultant:

Vehicle Type	FY23	FY25	FY30	FY35	FY40	FY43
CJV	1,404	1,573	2,114	2,794	3,607	4,151
Mini LCV	457	487	573	665	759	816
Bus	408	434	489	566	646	695
LCV	246	256	282	308	334	349
2A	1,470	1,575	1,698	2,011	2,348	2,557
3A	1,454	1,576	1,826	2,223	2,661	2,938
MAV	1,941	2,174	2,681	3,542	4,573	5,263
OSV	1	2	2	3	3	4
AADT	**7,382**	**8,077**	**9,664**	**12,112**	**14,933**	**16,773**
PCU	**20,725**	**22,722**	**26,910**	**33,888**	**41,962**	**47,242**

Source: Traffic Report

The table below provides the final (background plus impacts) AADT forecast at the Kelapur toll plaza (new location), as provided by the Traffic Consultant:

Vehicle Type	FY23	FY25	FY30	FY35	FY40	FY43
CJV	1,366	1,530	2,056	2,717	3,508	4,037
Mini LCV	496	528	621	721	823	885
Bus	408	434	489	566	646	695
LCV	246	256	282	308	334	349
2A	1,470	1,575	1,698	2,011	2,348	2,557
3A	1,435	1,555	1,801	2,193	2,626	2,899
MAV	1,882	2,108	2,600	3,435	4,435	5,104
OSV	1	2	2	3	3	4
AADT	**7,304**	**7,988**	**9,549**	**11,955**	**14,724**	**16,529**
PCU	**20,402**	**22,361**	**26,462**	**33,296**	**41,197**	**46,362**

Source: Traffic Report

Tollable Length and Toll Rates

In terms of tollable length, the Borkhedi – Kelapur Project currently comprises 80.08 kms of roads at the Darodha toll plaza and 75.16 kms of roads at the Kelapur toll plaza. 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%.

According to the NHAI's toll notification dated March 25, 2022, the toll rates at the Darodha toll plaza for Asset 7 for FY2023 are as follows:

Vehicle Type	Single Journey	Multiple Journey	Monthly Pass	Fee for Commercial Vehicle Registered within the district of the Darodha Toll Plaza
		(Rs.)		
Car/Jeep/Van	100	150	3370	50
LCV	165	245	5445	80
Bus/Truck	340	515	11410	170
Vehicles with up to 3 axles	375	560	12445	185
HCM/EME (Vehicles with 4 to 6 axles)	535	805	17890	270
Vehicles with 7 or more axles.....	655	980	21780	325

Source: NHAI

According to the NHAI's toll notification dated March 25, 2022, the toll rates at the Kelapur toll plaza for Asset 7 for FY2023 are as follows:

Vehicle Type	Single Journey	Multiple Journey	Monthly Pass	Fee for Commercial Vehicle Registered within the district of the Kelapur Toll Plaza
		(Rs.)		
Car/Jeep/Van	100	150	3370	50
LCV	165	245	5445	80
Bus/Truck	340	515	11410	170
Vehicles with up to 3 axles	375	560	12445	185
HCM/EME (Vehicles with 4 to 6 axles)	535	805	17890	270
Vehicles with 7 or more axles	655	980	21780	325

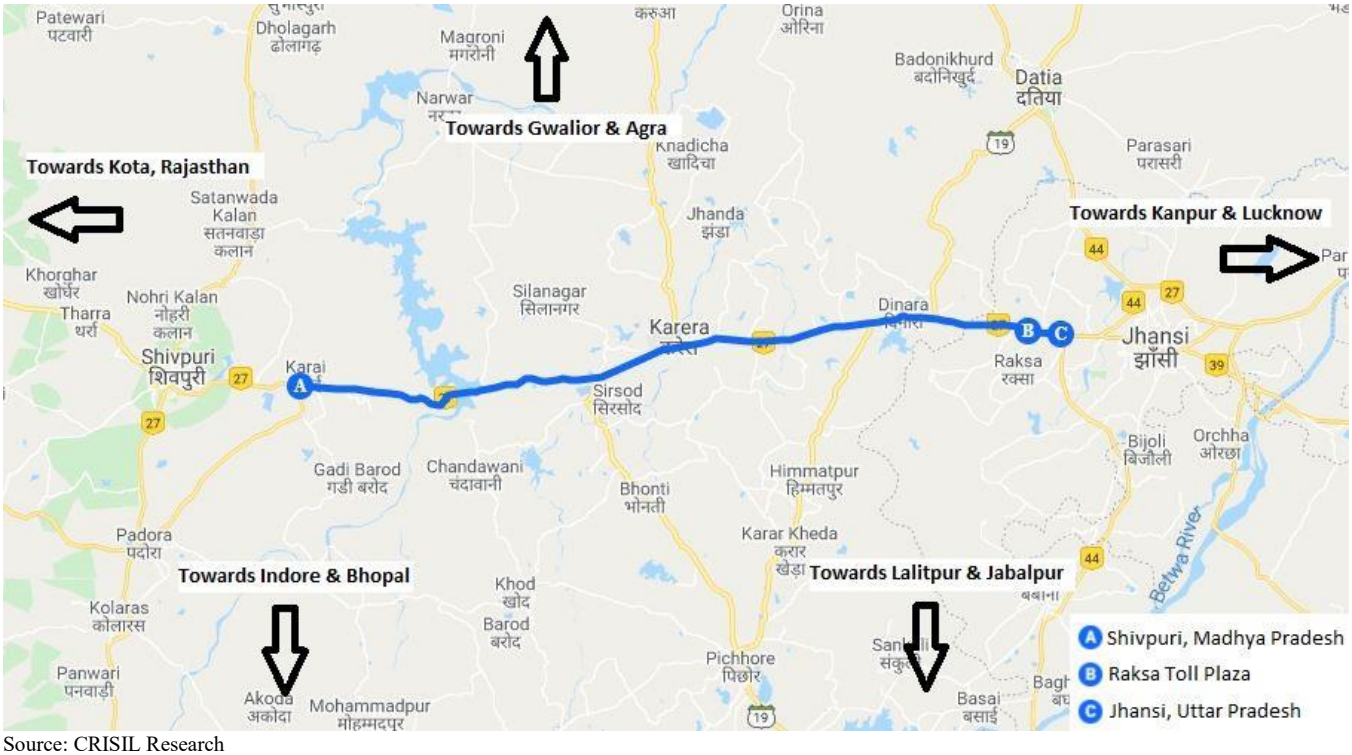
Source: NHAI

For further details in relation to Asset 7, please refer to **Annexure C** of this Preliminary Placement Document.

7. *Jhansi – Shivpuri Project ("Asset 8")*

Project overview

According to the Traffic Consultant, Asset 8 is a 4-lane, 75.3 kms long stretch, on national highways (NH) 27 which connects the districts of Jhansi and Shivpuri in the state of Uttar Pradesh and Madhya Pradesh, respectively. The two states Uttar Pradesh and Madhya Pradesh form the two key project stretch influence states. The project stretch has one toll plaza by the name of Raksha toll plaza which lies at the chainage of km 1374+650 near Jhansi. In the larger road network, the project stretch is a part of East-West corridor (NH-27) which connects Porbandar in Gujarat to Silchar in Assam. Hence, the project stretch witnesses higher proportion of long route traffic between the eastern and western regions.



Source: CRISIL Research

Salient growth features and traffic generators

According to the Traffic Consultant, the project stretch is used by the traffic originating and destined in regions such as Kanpur-Lucknow cluster, Indore cluster, Maharashtra and Gujarat. Lucknow and Indore are the key regions where the east-west traffic converges. Currently, the traffic between Indore-Lucknow uses the project stretch which takes them 13-14 hours and travels

~793 km. There exists an alternate route between Lucknow and Indore which passes through Chhatarpur and Sagar. This route takes 16-17 hours and the distance is 801 km. The key reason for this longer travel time is that the alternate route is a mix of 2 lane and 4 lanes. Kanpur to Bhopal section of the alternate route which is nearly 527 km is 2 lanes. Under the Bharatmala program, the section from Lucknow to Sagar and Sagar to Kandla are proposed for augmentation. Hence, the Traffic Consultant has assumed FY33 to be start year for the alternate road stretch.

Further, there is a greenfield expressway coming up in the region. The 4-lane access controlled Atal progress-way (Chambal expressway) will connect Etawah (UP) to Kota (Rajasthan). The connection point is likely to be the Agra-Lucknow expressway on one end and the Delhi-Mumbai expressway on the Kota side. Thus, the traffic from eastern region converging at Lucknow will have an alternative to the project stretch. The traffic can travel on the Agra-Lucknow expressway and Atal progress-way to reach Rajasthan. They also have Delhi-Mumbai expressway connectivity to Gujarat and Maharashtra. The Delhi-Mumbai expressway is expected to begin operations in mid-2024 and for the Atal progress-way, the Traffic Consultant has assumed FY29 to be start year for the road stretch.

Agri produce forms the key commodity travelling on the project stretch, followed by courier & parcels, construction material, consumer items, and iron and steel. Kanpur, Lucknow, Jhansi, Indore, Mumbai and Rajkot are the major contributors to the goods traffic on the project stretch. Project stretch and its vicinity regions such as Kanpur, Lucknow, Indore etc. are the key origin-destination for the passenger traffic.

The Shivpuri-Jhansi Project is a part of the East-West Corridor, which includes industrialised districts such as Kanpur and Lucknow. These districts form the origination and destination points of the traffic. Other key consumption/industrial centres include Indore, Jhansi, Ahmedabad, Mumbai, and Pune. These are also catered by the stretch. Shivpuri and Jhansi districts, immediately adjacent to the stretch, have witnessed an economic growth greater than the national average (8.4% vs 7.1%).

Traffic volume and composite of vehicles

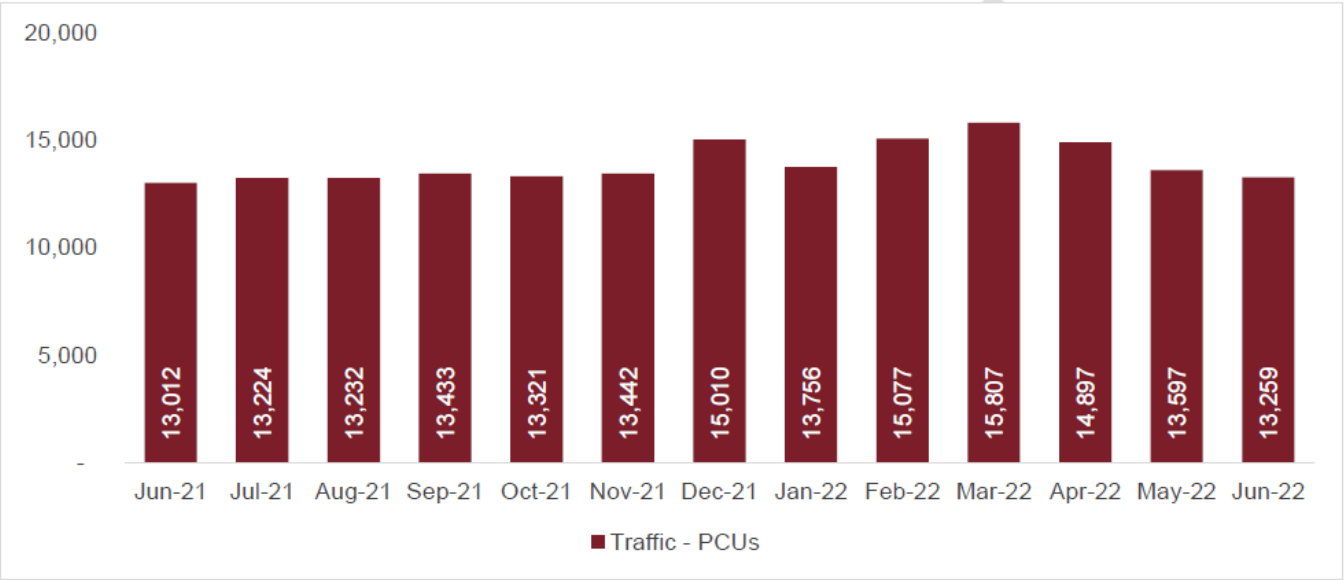
Historical traffic data

The following table shows the IHMCL seven-day historical traffic counts of Asset 8 according to the Traffic Consultant:

From	Sep 26, 2015	Apr 5, 2016	Oct 2, 2016	Jan 27, 2017	Jul 22, 2017	Feb 9, 2018	May 26, 2019
To	Oct 2, 2015	Apr 11, 2016	Oct 8, 2016	Feb 2, 2017	Jul 28, 2017	Feb 15, 2018	Jun 1, 2019
Cars/ Jeep/ Van	1,249	1,413	1,406	1,325	1,289	1,861	2,028
LCV	188	228	246	186	255	305	296
2-Axle	275	332	298	270	281	373	410
3-Axle	400	667	466	423	402	533	554
MAV	726	1,059	1,012	981	1,217	1,632	1,619
OSV	0	1	0	0	2	1	1
Total	2,838	3,701	3,428	3,184	3,447	4,704	4,907
Total (PCUs)	6,823	9,524	8,622	8,097	9,208	12,382	12,648

Source: IMHCL, CRISIL Research

The chart below shows the average daily traffic on Asset 8 over June 2021 to June 2022:



Source: CRISIL Research

Toll Segmentation

The table below presents a segmentation of total traffic assessed from the toll data June 2021 to May 2022 for the toll plaza of Asset 8. The trip segmentation has been assumed to remain constant throughout the projection period i.e., over fiscals 2023 to 2043 as follows:

Vehicle category	Single journey	Return journey	Monthly pass	Exemption
Car, Jeep, Van or Light Motor Vehicle	61.0%	25.9%	7.0% (local category)	6.1%
Light Commercial Vehicle, Light Goods Vehicle or Mini Bus	90.0%	7.5%	0.5%	2.0%
Bus or Truck (Two Axles)	90.7%	7.5%	0.0%	1.8%
Three- axle commercial vehicles	94.7%	4.0%	0.0%	1.3%
Heavy Construction Machinery (HCM) or Earth Moving Equipment (EME) or Multi Axle Vehicle (MAV) (four to six axles)	97.2%	2.1%	0.0%	0.7%

Source: CRISIL Research

The table below provides the traffic growth rates considering diversions to expressway and other alternative routes, as provided by the Traffic Consultant:

CAGR	FY23-25	FY25-30	FY30-35	FY35-42	FY23-42
Car	7.8%	6.5%	5.1%	3.7%	5.2%
Bus	3.9%	3.3%	2.5%	1.9%	2.6%
Minibus	3.9%	3.3%	2.5%	1.9%	2.6%
LCV	5.3%	2.4%	2.0%	4.2%	3.3%
2-axle	4.6%	2.9%	2.9%	4.9%	3.8%
3-axle	4.6%	3.2%	2.8%	4.8%	3.8%
MAV	5.0%	3.1%	2.2%	4.4%	3.5%
Total PCU	**5.3%**	**3.7%**	**2.9%**	**4.3%**	**3.9%**
Revenue growth	**9.8%**	**7.4%**	**6.3%**	**7.6%**	**7.4%**

Source: CRISIL Research

Projected Traffic Data: Growth in Passenger Car Unit (PCU)

Vehicle Type	FY23	FY25	FY30	FY35	FY40	FY43
Car	2,339	2,718	3,730	4,772	5,782	6,351
Bus	120	130	153	173	191	200

Vehicle Type	FY23	FY25	FY30	FY35	FY40	FY43
LCV + Minibus	185	205	231	256	313	354
2-axle	865	946	1,092	1,260	1,603	1,855
3-axle	531	581	681	781	989	1,139
MAV	1,723	1,901	2,213	2,468	3,056	3,471
Total	**5,763**	**6,481**	**8,099**	**9,711**	**11,934**	**13,370**
Total PCU	**14,919**	**16,550**	**19,810**	**22,904**	**28,353**	**32,084**

Source: CRISIL Research

Tollable Length and Toll Rates

In terms of tollable length, the Jhansi – Shivpuri Project comprises 89.66 kms of roads. 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%.

Single toll rates in INR at the Raksha toll plaza, applicable from April 2022 until March 2023 are as provided below:

Type of Vehicle	SJ: Raksha
CJV	120
LCV	195
Bus/Truck	415
3A	450
MAV/ HCM/EME	650
OSV	790

Source: CRISIL Research

For further details in relation to Asset 8, please refer to **Annexure C** of this Preliminary Placement Document.

8. *Revalidation of Traffic and Revenue Estimates Based on Recent Data*

Ramboll was engaged to carry out a review of the earlier traffic and revenue forecasts pertaining to the Traffic Report submitted by Traffic Consultant in relation to the Initial Toll Roads in the month of May 2022, based on the actual traffic/ revenue data from May 2022 to July 2022 ("**Revalidation Note**"). In the Revalidation Note, Ramboll has confirmed that the previous estimates of traffic and revenue for the Initial Toll Roads provided in the Trafiic Reports for FY23 and beyond can still be considered as valid. The detailed revalidation note is annexed as **Annexure C**.

Operations

Toll collection system

Toll is collected for each journey through each of the toll plazas. Signs setting out the toll rates for the Toll Road assets are displayed at the toll booths and tolls can be paid or tendered by the driver of any vehicle in the following manners:

Cash

Tolls paid by means of cash are collected by toll collectors at the manual toll booths.

Electronic toll collection

To ensure seamless traffic movement through toll plazas and increase transparency in collection of user fees using FASTag, the National Electronic Toll Collection (NETC) programme has been implemented on a pan-India basis. FASTags are simple to use reloadable tags to enable automatic deduction of toll charges from a pre-paid account without having to stop at toll plazas for cash transactions.

FASTag was started as a pilot project in 2014 on the stretch of Golden Quadrilateral between Mumbai and Ahmedabad. It was later extended to other toll plazas, with the FASTag use made mandatory across the country in February 2021. To ease the process of getting a FASTag for citizens, the Ministry also mandated that all vehicles manufactured after December 2017 should be pre-fitted with a FASTag. This reform has been immensely beneficial for citizens and toll plaza operators.

Transition to 100% FASTag was implemented w.e.f 15th February, 2021 and thereafter, significant increase in toll collection through FASTag has been observed**.** (*Source: CRISIL Report*)

Monitoring

Toll collection

Payments at the toll plazas, both electronic as well as cash payments, are processed through a semi-automated or a fully automated toll collection system, depending on complexity of the project. Both these systems collect and store traffic and payment data, thereby reducing the need for manual operation. A semi-automated system consists of a revenue collection software desktop, a barrier gate, smart cards and monitoring cameras and a fully automated system includes equipment such as vehicle counting classifier, vehicle audit system, communication channels and traffic control equipment in addition to all the components of a semi-automated system.

For the purpose of identifying categories of vehicles and to charge an appropriate toll rate, the automatic vehicle identification based in-road/infrared sensors are also used. The Project SPV would use weigh-in-motion technology for projects where weight-based toll collection is mandated. The weight based tolling systems are integrated with the fully automatic toll collection system for enhanced revenue controls.

There are cameras installed particularly for capturing and recording any toll evasion incidents by vehicles. There is also a back-up power supply system to ensure that there is no interruption to power supply at the toll plazas in order to maintain a stable power supply for the sub-systems and equipment. Servers used in the toll collection systems at the toll plazas are capable of real time uploading of transaction data from toll lane equipment and performing an automatic daily backup to prevent any toll data loss and to enable quick system recovery, which would allow the Project SPV to collect variable amounts of tolls depending on the class of motor vehicles and serves as a traffic information system.

Only certain authorised persons have access to the toll collection systems and the activities are recorded for security purposes. The Project SPV is responsible for operating the toll collection system at its toll plaza and taking regular preventive and corrective measures to maintain such systems at the highest levels of security and reliability.

Traffic control

There are helpline numbers displayed along the national highways for communication between the road users and the control room in case of any emergency. This provides a reliable communication channel for the road users in cases of an exigency where they need to communicate with staff at the Control Room. The Project SPV would take regular preventive and corrective measures to maintain the emergency telephone system at the highest levels of reliability and safety. The Project SPV is required to carry out regular patrolling and regulate and maintain traffic order within the projects. Emergency telephone systems and emergency helpline numbers are provided at all projects where such systems and numbers are required by the Concession Agreement. There are also patrol vehicles that continuously move on the section of the project that it is assigned to, which will intervene to regulate traffic and carry out surveillance activities.

Traffic and motorway assistance services

Traffic assistance

The Project SPV would provide emergency assistance to motorists using the toll roads. They station patrol/light recovery vehicles on each toll road, which are deployed to patrol the toll roads on a continuous basis.

In the case of a vehicle breakdown or traffic accident, the Control Room will announce the occurrence via mobile phones or handsets to instruct a mobile supervisor and a recovery supervisor to proceed to the scene immediately, and file relevant reports with the police if personal injury is involved. At the scene of a traffic accident or vehicle breakdown, the mobile supervisor will report to the Control Room on the situation of the incident, ensure safety of the scene and apply first aid to injured persons, if any. The recovery supervisor will determine whether the vehicle can be recovered on site or deploy recovery vehicles for towing. The traffic officer will stop the traffic, close the affected lane where necessary and direct trapped vehicles away to other unaffected lanes.

Safety Measures

Under the Concession Agreement, the concessionaire is 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 concessionaire must abide by among others, applicable laws and applicable permits, the Manual for Safety in Road Design as issued by the Ministry of Shipping, Road Transport and Highways, relevant standards and guidelines of the Indian Roads Congress and good industry practice. NHAI also carries out safety audits of the projects by appointing a safety consultant employing a team comprising of, among others, one road safety expert and one traffic planner. These safety requirements apply to all phases of construction, operations and maintenance with emphasis on identification of factors associated with accidents and implementation of appropriate remedial measures.

Management

We are managed by qualified personnel of the Investment Manager and Investment Committee, with members who have management and operational experience in the roads and highways sector. For further details about the Investment Manager, please see the sections headed "*Parties to the Trust*" on page 93 of this Preliminary Placement Document.

The Investment Manager, in consultation with the Trustee, has appointed a majority of the directors on the board of the Project SPV in accordance with the InvIT Regulations, and such directors form part of the quorum. The Project SPV's board of directors have also formed committees, as applicable and required, under the Companies Act, 2013 and rules made thereunder.

Seasonality

Traffic volume tends to decrease during the monsoon season and conversely tends to increase during holiday seasons. While the northern parts of India experience monsoon rains during the period from June or July until September or October every year, the southern parts of India, especially coastal parts of Andhra Pradesh, experience monsoon rains even during the months of October to December. The monsoon season may also restrict the Trust's ability to carry on activities related to its operations and maintenance of toll roads. For further details on risk associated with seasonality, please see the section headed "*Risk Factors*" on page 61 of this Preliminary Placement Document. Conversely, traffic volume tends to increase during holiday seasons.

Property

The Investment Manager's corporate offices are located in G - 5 & 6, Sector 10, Dwarka, New Delhi – 110075 from which all its administrative and reporting activities are conducted.

Insurance

The Trust's operations are subject to hazards inherent in providing operations and maintenance services, such as risk of equipment failure, work accidents, fire, earthquake, flood and other force majeure events. This includes hazards that may cause injury and loss of life, damage and destruction of property, equipment and environmental damage. The Project SPV, in relation to itself and the Initial Toll Roads, has obtained insurance coverages, including, but not limited to, fire and special perils, loss of profit, fidelity guarantee and burglary. The Project SPV shall obtain insurance with respect to the Target Toll Roads, in accordance with the relevant Concession Agreements.

Legal Proceedings

The Project SPV, the Sponsor, the Investment Manager, the Project Manager and the Trustee may be involved in legal proceedings or claims from time to time. As on date of the Preliminary Placement Document, certain proceedings or claims involving the Sponsor and certain of its Associates and the Trustee, are currently pending at different levels of adjudication before various courts, tribunals and regulatory authorities. For a description of the material legal proceedings that are outstanding, please see the section entitled "*Legal and other Information*" on page 204 of this Preliminary Placement Document.

SUMMARY OF THE CONCESSION AGREEMENTS

The following are summaries of the concession agreements entered into by the National Highways Infra Projects Private Limited in relation to Toll Roads. The descriptions and summaries of the agreements below are not, 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 them in the respective concession agreements. Copies of these concession agreements are also available for inspection at the registered office of the Trust. For details, refer to "Material Contracts and Documents for Inspection" on page 306.

1. *Concession Agreement between Concessionaire and NHAI dated March 30, 2021 in respect of the Kotha Kota Kurnool Project*

The Concessionaire has entered into a concession agreement for operation, maintenance, and management of the Kotha Kota Kurnool Project Highway (as defined below) on toll, operate and transfer (TOT) basis (the "**Kotha Kota Kurnool Concession Agreement**"), for a period of 30 years from the Appointed Date (i.e. December 16, 2021) or such date on which the Kotha Kota Kurnool Concession Agreement is terminated by a termination notice ("**Kotha Kota Kurnool Concession Period**").

Certain Definitions

"**Kotha Kota Kurnool Project"** means the operation and maintenance of the Kotha Kota Kurnool Project Highway in accordance with the provisions of the Kotha Kota Kurnool Concession Agreement and includes all works, services and equipment relating to or in respect of the scope of the Kotha Kota Kurnool Project as set forth in the Kotha Kota Kurnool Concession Agreement;

"**Kotha Kota Kurnool Project Assets**" means all physical and other assets relating to and forming part of the Site including (a) rights over the Site in the form of licence, Right of Way or otherwise; (b) tangible assets such as civil works and equipment including foundations, embankments, pavements, road surface, interchanges, bridges, culverts, road overbridges, drainage works, traffic signals, sign boards, kilometre- stones, toll plazas, electrical systems, communication systems, rest areas, relief centers, maintenance depots and administrative offices; (d) all rights of the Concessionaire under the project agreements; (e) security deposits; (f) insurance proceeds; and (g) Applicable Permits and authorisations relating to or in respect of the Kotha Kota Kurnool Project Highway, but does not include Additional Facilities; and

"**Kotha Kota Kurnool Project Highway"** means the Site comprising the existing road comprising:

Stretch	State	Start (Km)	End (Km)	Length
Kothakota Bypass-Kurnool	Telangana	135.469	211.000	74.622

and all Kotha Kota Kurnool Project Assets.

Grant of Concession

Subject to and in accordance with the terms and conditions set forth in the Kotha Kota Kurnool Concession Agreement, NHAI has granted to the Concessionaire, and the Concessionaire has accepted the concession for a period of 30 years, including the exclusive right, license and authority during the subsistence of the Kotha Kota Kurnool Concession Agreement to operate, manage and maintain the Kotha Kota Kurnool Project Highway.

Subject to and in accordance with the terms and conditions set forth in the Kotha Kota Kurnool Concession Agreement, the Concessionaire is entitled to undertake the following in accordance with the terms of the Kotha Kota Kurnool Concession Agreement, applicable laws and applicable permits:

i. Right of Way, access and license to the Site for the purpose of and to the extent conferred by the provisions of the Kotha Kota Kurnool Concession Agreement;

ii. manage, operate and maintain the Kotha Kota Kurnool Project Highway and regulate the use thereof by third parties in accordance the terms of Kotha Kota Kurnool Concession Agreement;

iii. demand, collect and appropriate the fees from vehicles and persons liable for payment of fees for using the Kotha Kota Kurnool Project Highway or any part thereof and refuse entry of any vehicle to the Kotha Kota Kurnool Project Highway if the fee due is not paid;

iv. perform and fulfill all of the Concessionaire's obligations under and in accordance with the Kotha Kota Kurnool Concession Agreement;

v. bear and pay all costs, expenses and charges in connection with or incidental to the performance of the obligations of

the Concessionaire under the Kotha Kota Kurnool Concession Agreement; and

vi. neither assign, transfer or sublet or create any lien or encumbrance on the Kotha Kota Kurnool Concession Agreement, or the concession granted thereby, or on the whole or any part of the Kotha Kota Kurnool Project Highway nor transfer, lease or part possession thereof, save and except as expressly permitted by the Kotha Kota Kurnool Concession Agreement.

Fees

The Concessionaire is entitled to, during the Kotha Kota Kurnool Concession Period, levy, collect and appropriate fees from users ("**User Fee**") of the Kotha Kota Kurnool Project Highway pursuant to and in accordance with the provisions in the Kotha Kota Kurnool Concession Agreement and National Highways Fee (Determination of Rates and Collection) Rules, 2008 as amended (the "**Fee Rules**") and to appropriate the same. In accordance with the terms of the Kotha Kota Kurnool Concession Agreement, the Concessionaire shall not collect any fees in relation to exempted vehicles.The fees collected by Concessionaire are being deposited in the escrow account and appropriated in accordance with the relevant provisions of the Kotha Kota Kurnool Concession Agreement.

Sub Rule 6(6) of the above-mentioned Fee Rules states,

"*(a) The fee shall be collected by the Central Government or the executing Authority as the case may be and for a specified period in accordance with the terms of agreement entered by the Concessionaire.*
(b) The fee as notified as per Concession Agreement shall be leviable till the end of the concession period and after the Concession Agreement is over, the fee shall be collected by the Central Government executing authority at a reduced rate of 40% of the fee on the date of transfer of such section of National Highways, bridge, tunnel or bypass, as the case may be, to be revised annually in accordance with these rules:

Provided that after the recovery of capital cost through user fee realised, in respect of a public funded project, the fee leviable would be reduced to 40% of the user fee for such section of National Highways, bridge, tunnel or bypass as the case may be, to be revised annually in accordance with these rules."

In respect of the above, NHAI has clarified that Rule 6 of the Fee Rules provides that the user fee to be notified by Government as per the format of Schedule M of Concession Agreement shall be leviable till the end of the concession period. Hence, the rate of User Fee shall only be reduced after the concession period is over.

Concession Fees

As consideration for the grant of the Concession, the Concessionaire has paid a concession fee to NHAI equivalent to ₹ 19,401.0 million as a Condition Precedent.

For the purposes of stamp duty payment, concession agreements are generally considered to be agreements which are not lease deeds and stamp duty of ₹ 100.00 is typically paid for such concession agreements. However, stamp duty authorities 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 NHAI. The stamp authorities allege 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 1.0% and 11.0% of the annual rent or premium payable or the market value of the property. Furthermore, stamp duty authorities may impose penalties for payment of inadequate stamp duty, which could extend up to ten (10) times the amount of the stamp duty payable. Accordingly, concession agreements that have not been stamped as such could be considered to be inadequately stamped. The High Courts of Allahabad and Maharashtra have also held that a concession agreement ought to be stamped as a lease agreement and have upheld the imposition of a higher stamp duty on such agreements.

While we have paid stamp duty of ₹ 100.00 on each of our Concession Agreements in accordance with usual practice, if any demand for payment of a higher stamp duty or penalty is imposed, it would increase the costs of the Toll Roads.

In respect of above, NHAI has clarified that:

(i) As on the date of Kotha Kota Kurnool Concession Agreement, GST is not applicable on Concession Fee. However, if it becomes applicable at a later stage, this shall be considered as change in law.
(ii) There is no requirement of stamp duty in case of Concession Agreements since Fee Rules provided for levy and collection of user fee and not toll tax. In case, in future any such demand arises, it shall be treated as change in law.

Escrow Account

The provisions in relation to the escrow account in the Kotha Kota Kurnool Concession Agreement are only applicable if the obligations of the Concessionaire under the Kotha Kota Kurnool Concession Agreement are financed by the Lenders.

The Concessionaire has opened and established the escrow account with the escrow bank and all funds constituting the financing package related to the Kotha Kota Kurnool Project are being credited to such escrow account. During the Kotha Kota Kurnool Concession Period, all fees and any other revenues including the proceeds of any rentals, deposits, capital receipts or insurance claims from or in respect of the Kotha Kota Kurnool Project Highway are being deposited therein. In addition, all disbursements or payments by NHAI pursuant to the Kotha Kota Kurnool Concession Agreement, including, if any, in relation to the change of scope in the Kotha Kota Kurnool Project are being deposited by NHAI in the escrow account.

Disbursements from Escrow Account

The Concessionaire had given, at the time of the opening of the escrow account, irrevocable instructions by way of an escrow agreement substantially in form set forth in the Kotha Kota Kurnool Concession Agreement to the escrow bank instructing, *inter alia*, that the deposits into the escrow account shall subject to the provisions of the Kotha Kota Kurnool Concession Agreement, be appropriated in the following order every month and if not due in a month then appropriated proportionately in such month and retained in the escrow account and paid out therefrom in the month when due unless otherwise expressly provided in the instruction letter:

i. all taxes due and payable by the Concessionaire for and in respect of the Kotha Kota Kurnool Project Highway;

ii. concession fee;

iii. all payments relating to construction of the Kotha Kota Kurnool Project Highway, subject to and in accordance with the conditions, if any, set forth in the financing agreements;

iv. operation and maintenance expenses;

v. operation and maintenance expenses and other costs and expenses incurred by NHAI in accordance with the provisions of the Kotha Kota Kurnool Concession Agreement, and certified by NHAI as due and payable to it;

vi. monthly proportionate provision of debt service payment due in an accounting year;

vii. all payments and damages certified by NHAI as due and payable to it by the Concessionaire; and

vii. balance, if any, in accordance with the instructions of the Concessionaire.

Disbursements upon Termination

Notwithstanding anything to the contrary contained in the escrow agreement and subject to the provisions of the Kotha Kota Kurnool Concession Agreement, in the case of termination, the amounts standing to the credit of the escrow account shall be disbursed towards:

i. all taxes due and payable by the Concessionaire for and in respect of the Kotha Kota Kurnool Project Highway;

ii. payment due to the lenders;

iii. all payments and damages certified by NHAI as due and payable to it by the Concessionaire;

iv. retention and payments relating to the liability for defects and deficiencies;

v. incurred or accrued operation and maintenance expenses;

vi. any other payments required to be made under the Kotha Kota Kurnool Concession Agreement; and

vii. balance, if any, in accordance with the instructions of the Concessionaire.

Change of Scope

NHAI may, notwithstanding anything to the contrary contained in the Kotha Kota Kurnool Concession Agreement, require the Concessionaire to make alterations/ modifications in the scope of the Kotha Kota Kurnool Project as contemplated by the Kotha Kota Kurnool Concession Agreement. If the cumulative costs relating to all the change of scope orders exceed 5% of the concession fee in any continuous period of 3 years immediately preceding the date of such change of scope order or if such cumulative costs exceed 25% of the concession fee at any time during the Kotha Kota Kurnool Concession Period, NHAI may award any works or services, to any person on the basis of open competitive bidding and the Concessionaire shall be entitled to take part in such competitive bidding with a right to match the first-ranked bid. All such changes shall be made by NHAI by an order issued in accordance with the procedure set forth in the Kotha Kota Kurnool Concession Agreement.

Termination of the Kotha Kota Kurnool Concession Agreement

Termination by either party

Either Party may in its discretion terminate the Kotha Kota Kurnool Concession Agreement by giving a termination notice to the other party if a force majeure event subsists for a period of 120 days or more within a continuous period of 365 days. Before issuing such termination notice, the party intending to issue the termination notice shall inform the other party of such intention and grant 15 days' time to make a representation, and may after the expiry of such 15 days period, whether or not it is in receipt of such representation, in its sole discretion issue the termination notice.

Termination by the NHAI

In the event of any of the defaults specified below have occurred, and if the Concessionaire has failed to cure such breach or default within the period provided for the same in the Kotha Kota Kurnool Concession Agreement, then NHAI shall be entitled to issue a notice of its intention to terminate the Kotha Kota Kurnool Concession Agreement, with a copy to the lenders. The following events shall constitute an event of default by the Concessionaire (a "**Concessionaire Default**") unless they have occurred as a result of any breach of the Kotha Kota Kurnool Concession Agreement by NHAI or due to force majeure:

i. the performance security has been encashed and appropriated in accordance with the Kotha Kota Kurnool Concession Agreement and the Concessionaire has failed to replenish or provide fresh performance security within a cure period of 15 days;

ii. subsequent to the replenishment or furnishing of fresh performance security in accordance with the Kotha Kota Kurnool Concession Agreement, the Concessionaire fails to cure, within a cure period of 60 days, the Concessionaire Default for which whole or part of the performance security was appropriated;

iii. the Concessionaire abandons or manifests intention to abandon the operation and maintenance of the Kotha Kota Kurnool Project Highway without the prior written consent of NHAI;

iv. the Concessionaire fails to roll over, renew and furnish new bank guarantee performance security subject to and in accordance with terms of the Kotha Kota Kurnool Concession Agreement, at least 3 months prior to expiry of subsisting bank guarantee;

v. the Concessionaire is in breach of the Maintenance Requirements or the Safety Requirements;

vi the Concessionaire has failed to make any payment to NHAI within the period specified in the Kotha Kota Kurnool Concession Agreement;

vii. upon occurrence of a financial default, the lenders' representative has by notice required NHAI to undertake suspension or termination, as the case may be, in accordance with the substitution agreement and the Concessionaire fails to cure the default within the specified cure period;

viii. a breach of any of the project agreements by the Concessionaire causes a material adverse effect;

ix. the Concessionaire creates any encumbrance in breach of the Kotha Kota Kurnool Concession Agreement;

x. the Concessionaire repudiates the Kotha Kota Kurnool Concession Agreement or otherwise takes any action or evidences or conveys an intention not to be bound by the Kotha Kota Kurnool Concession Agreement;

xi. a change in ownership occurs in breach of the provisions of the Kotha Kota Kurnool Concession Agreement;

xii. there is a transfer, pursuant to law either of the rights and/or obligations of the Concessionaire under any of the project agreements, or of all or part of the assets or undertaking of the Concessionaire, and such transfer causes a material adverse effect;

xiii. an execution levied on any of the assets of the Concessionaire has caused a material adverse effect;

xiv. the Concessionaire is adjudged bankrupt or insolvent, or if a trustee or receiver is appointed for the Concessionaire or for the whole or material part of its assets that has a material bearing on the Kotha Kota Kurnool Project;

xv. the Concessionaire has been, or is in the process of being liquidated, dissolved, wound-up, amalgamated or reconstituted in a manner that would cause, in the reasonable opinion of NHAI, a material adverse effect;

xvi. a resolution for winding up of the Concessionaire is passed or any petition for winding up of the Concessionaire is admitted by a court of competent jurisdiction and a provisional liquidator or receiver is appointed and such order has not been set aside within 90 days of the date thereof or the Concessionaire is ordered to be wound up by Court except for the purpose of amalgamation or reconstruction; provided that, as part of such amalgamation or reconstruction, the

entire property, assets and undertaking of the Concessionaire are transferred to the amalgamated or reconstructed entity and that the amalgamated or reconstructed entity has unconditionally assumed the obligations of the Concessionaire under the Kotha Kota Kurnool Concession Agreement and the project agreements; and provided that:

a. the amalgamated or reconstructed entity has the capability and operating experience necessary for the performance of its obligations under the Kotha Kota Kurnool Concession Agreement and the project agreements;

b. the amalgamated or reconstructed entity has the financial standing to perform its obligations under the Kotha Kota Kurnool Concession Agreement and the project agreements and has a credit worthiness at least as good as that of the Concessionaire as at Appointed Date; and

c. each of the project agreements remains in full force and effect;

xvii. any representation or warranty of the Concessionaire herein contained which is, as of the date of Kotha Kota Kurnool Concession Agreement, found to be materially false, incorrect or misleading;

xviii. the Concessionaire submits to NHAI any statement, notice or other document, in written or electronic form, which has a material effect on NHAI's rights, obligations or interests and which is false in material particulars;

xix. the Concessionaire has failed to fulfil any obligation, for which failure termination has been specified in the Kotha Kota Kurnool Concession Agreement;

xx. the Concessionaire commits a default in complying with any other provision of the Kotha Kota Kurnool Concession Agreement if such default causes a material adverse effect on NHAI;

xxi. an escrow default occurs and the Concessionaire fails to cure the default within a cure period of 15 days;

Termination by Concessionaire

If any of the defaults specified below shall have occurred, and NHAI fails to cure such default within a cure period of 90 days or such longer period as has been expressly provided in the Kotha Kota Kurnool Concession Agreement, NHAI shall be deemed to be in default of the Kotha Kota Kurnool Concession Agreement, unless the default has occurred as a result of any breach of the Kotha Kota Kurnool Concession Agreement by the Concessionaire or due to force majeure:

i. NHAI commits a material default in complying with any of the provisions of the Kotha Kota Kurnool Concession Agreement and such default has a material adverse effect on the Concessionaire; or

ii. NHAI repudiates the Kotha Kota Kurnool Concession Agreement or otherwise takes any action that amounts to or manifests an irrevocable intention not to be bound by the Kotha Kota Kurnool Concession Agreement.

Termination Payments

The termination payment pursuant to the Kotha Kota Kurnool Concession Agreement becomes due and payable to the Concessionaire by NHAI within 15 days of the Concessionaire furnishing to NHAI an NOC issued by the lenders/ lenders' representative recording/ effecting release/ vacation/ discharge of the charge on Kotha Kota Kurnool Project receivables (if any) created by Concessionaire for securing repayment of the debt. If NHAI fails to disburse the full termination payment within 15 days, NHAI shall pay interest at a rate equal to 3% above the bank rate on the amount of termination payment remaining unpaid.

Upon termination of the Kotha Kota Kurnool Concession Agreement by the NHAI on account of occurrence of a Concessionaire Default, the NHAI shall pay the Concessionaire by way of termination payment 70% of the Unexpired Cash Flow.

Upon termination of the Kotha Kota Kurnool Concession Agreement by the Concessionaire on account of occurrence of an NHAI Default, the Concessionaire shall be entitled to receive from NHAI by way of termination payment a sum equal to 105% of the Unexpired Cash Flow.

Technical Clarifications on the Concession Agreements

For details in relation to the technical clarifications received from NHAI in relation to the Initial Concession Agreements, please refer to "*Annexure D - Technical clarifications on the Concession Agreements*" on page 6670 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html.

2. *Concession Agreement between Concessionaire and NHAI dated March 30, 2021 in respect of the Chittorgarh Kota Project*

The Concessionaire has entered into a concession agreement for operation, maintenance, and management of Chittorgarh Kota Project Highway (as defined below) on toll, operate and transfer (TOT) basis (the "**Chittorgarh Kota Concession Agreement**"), for a period of 30 years from the Appointed Date (i.e., December 16, 2021) or such date on which the Chittorgarh Kota Concession Agreement is terminated by a termination notice ("**Chittorgarh Kota Concession Period**").

Certain Definitions

"**Chittorgarh Kota Project"** means the operation and maintenance of the Chittorgarh Kota Project Highway in accordance with the provisions of the Chittorgarh Kota Concession Agreement and includes all works, services and equipment relating to or in respect of the scope of the Chittorgarh Kota Project as set forth in the Chittorgarh Kota Concession Agreement;

"**Chittorgarh Kota Project Assets**" means all physical and other assets relating to and forming part of the Site including (a) rights over the Site in the form of licence, Right of Way or otherwise; (b) tangible assets such as civil works and equipment including foundations, embankments, pavements, road surface, interchanges, bridges, culverts, road overbridges, drainage works, traffic signals, sign boards, kilometre- stones, toll plazas, electrical systems, communication systems, rest areas, relief centers, maintenance depots and administrative offices; (d) all rights of the Concessionaire under the project agreements; (e) security deposits; (f) insurance proceeds; and (g) Applicable Permits and authorisations relating to or in respect of the Chittorgarh Kota Project Highway, but does not include Additional Facilities; and

"**Chittorgarh Kota Project Highway"** means the Site comprising the existing road comprising:

Stretch	State	Start (Km)	End (Km)	Length
Chittorgarh-Kota and Chittorgarh Bypass	Rajasthan	891.29	1052.429	160.500

and all Chittorgarh Kota Project Assets.

Grant of Concession

Subject to and in accordance with the terms and conditions set forth in the Chittorgarh Kota Concession Agreement, NHAI has granted to the Concessionaire, and the Concessionaire has accepted the concession for a period of 30 years, including the exclusive right, license and authority during the subsistence of the Chittorgarh Kota Concession Agreement to operate, manage and maintain the Chittorgarh Kota Project Highway.

Subject to and in accordance with the terms and conditions set forth in the Chittorgarh Kota Concession Agreement, the Concessionaire is entitled to undertake the following in accordance with the terms of the Chittorgarh Kota Concession Agreement, applicable laws and applicable permits:

i. Right of Way, access and license to the Site for the purpose of and to the extent conferred by the provisions of the Chittorgarh Kota Concession Agreement;

ii. manage, operate and maintain the Chittorgarh Kota Project Highway and regulate the use thereof by third parties in accordance with the terms of Chittorgarh Kota Concession Agreement;

iii. demand, collect and appropriate the fees from vehicles and persons liable for payment of fees for using the Chittorgarh Kota Project Highway or any part thereof and refuse entry of any vehicle to the Chittorgarh Kota Project Highway if the fee due is not paid;

iv. perform and fulfill all of the Concessionaire's obligations under and in accordance with the Chittorgarh Kota Concession Agreement;

v. bear and pay all costs, expenses and charges in connection with or incidental to the performance of the obligations of the Concessionaire under the Chittorgarh Kota Concession Agreement; and

vi. neither assign, transfer or sublet or create any lien or encumbrance on the Chittorgarh Kota Concession Agreement, or the concession granted thereby, or on the whole or any part of the Chittorgarh Kota Project Highway nor transfer, lease or part possession thereof, save and except as expressly permitted by the Chittorgarh Kota Concession Agreement.

Fees

The Concessionaire is entitled to, during the Chittorgarh Kota Concession Period, levy, collect and appropriate fees from users ("**User Fee**") of the Chittorgarh Kota Project Highway pursuant to and in accordance with the provisions in the Chittorgarh Kota Concession Agreement and the Fee Rules and to appropriate the same. In accordance with the terms of the Chittorgarh Kota Concession Agreement, the Concessionaire shall not collect any fees in relation to exempted vehicles.The fees collected by Concessionaire are being deposited in the escrow account and appropriated in accordance with the relevant provisions of the Chittorgarh Kota Concession Agreement.

Sub Rule 6(6) of the above-mentioned Fee Rules states,

"
(a) The fee shall be collected by the Central Government or the executing Authority as the case may be and for a specified period in accordance with the terms of agreement entered by the Concessionaire.
(b) The fee as notified as per Concession Agreement shall be leviable till the end of the concession period and after the Concession Agreement is over, the fee shall be collected by the Central Government executing authority at a reduced rate of 40% of the fee on the date of transfer of such section of National Highways, bridge, tunnel or bypass, as the case may be, to be revised annually in accordance with these rules:

Provided that after the recovery of capital cost through user fee realised, in respect of a public funded project, the fee leviable would be reduced to 40% of the user fee for such section of National Highways, bridge, tunnel or bypass as the case may be, to be revised annually in accordance with these rules."

In respect of the above, NHAI has clarified that Rule 6 of the Fee Rules provides that the user fee to be notified by Government as per the format of Schedule M of Concession Agreement shall be leviable till the end of the concession period. Hence, the rate of User Fee shall only be reduced after the concession period is over.

Concession Fees

As consideration for the grant of the Concession, the Concessionaire has paid a concession fee to NHAI equivalent to ₹ 11,934.00 million as a Condition Precedent.

For the purposes of stamp duty payment, concession agreements are generally considered to be agreements which are not lease deeds and stamp duty of ₹ 100.00 is typically paid for such concession agreements. However, stamp duty authorities 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 NHAI. The stamp authorities allege 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 1.0% and 11.0% of the annual rent or premium payable or the market value of the property. Furthermore, stamp duty authorities may impose penalties for payment of inadequate stamp duty, which could extend up to ten (10) times the amount of the stamp duty payable. Accordingly, concession agreements that have not been stamped as such could be considered to be inadequately stamped. The High Courts of Allahabad and Maharashtra have also held that a concession agreement ought to be stamped as a lease agreement and have upheld the imposition of a higher stamp duty on such agreements.

While we have paid stamp duty of ₹ 100.00 on each of our Concession Agreements in accordance with usual practice, if any demand for payment of a higher stamp duty or penalty is imposed, it would increase the costs of the Toll Roads.

In respect of above, NHAI has clarified that:

(i) As on the date of Chittorgarh Kota Concession Agreement, GST is not applicable on Concession Fee. However, if it becomes applicable at a later stage, this shall be considered as change in law.
(ii) There is no requirement of stamp duty in case of Concession Agreements since Fee Rules provided for levy and collection of user fee and not toll tax. In case, in future any such demand arises, it shall be treated as change in law.

Escrow Account

The provisions in relation to the escrow account in the Chittorgarh Kota Concession Agreement are only applicable if the obligations of the Concessionaire under the Chittorgarh Kota Concession Agreement are financed by the Lenders.

The Concessionaire has opened and established the escrow account with the escrow bank and all funds constituting the financing package related to the Chittorgarh Kota Project are being credited to such escrow account. During the Chittorgarh Kota Concession Period all fees and any other revenues including the proceeds of any rentals, deposits, capital receipts or insurance claims from or in respect of the Chittorgarh Kota Project Highway are being deposited therein. In addition, all disbursements or payments by NHAI pursuant to the Chittorgarh Kota Concession Agreement, including, if any, in relation to the change of scope in the Chittorgarh Kota Project are being deposited by NHAI in the escrow account.

Disbursements from Escrow Account

The Concessionaire had given, at the time of the opening of the escrow account, irrevocable instructions by way of an escrow agreement substantially in form set forth in the Chittorgarh Kota Concession Agreement to the escrow bank instructing, *inter alia*, that the deposits into the escrow account shall subject to the provisions of the Chittorgarh Kota Concession Agreement, be appropriated in the following order every month and if not due in a month then appropriated proportionately in such month and retained in the escrow account and paid out therefrom in the month when due unless otherwise expressly provided in the instruction letter:

i. all taxes due and payable by the Concessionaire for and in respect of the Chittorgarh Kota Project Highway;

ii. concession fee;

iii. all payments relating to construction of the Chittorgarh Kota Project Highway, subject to and in accordance with the conditions, if any, set forth in the financing agreements;

iv. operation and maintenance expenses;

v. operation and maintenance expenses and other costs and expenses incurred by NHAI in accordance with the provisions of the Chittorgarh Kota Concession Agreement, and certified by NHAI as due and payable to it;

vi. monthly proportionate provision of debt service payment due in an accounting year;

vii. all payments and damages certified by NHAI as due and payable to it by the Concessionaire; and

vii. balance, if any, in accordance with the instructions of the Concessionaire.

Disbursements upon Termination

Notwithstanding anything to the contrary contained in the escrow agreement and subject to the provisions of the Chittorgarh Kota Concession Agreement, in the case of termination, the amounts standing to the credit of the escrow account shall be disbursed towards:

i. all taxes due and payable by the Concessionaire for and in respect of the Chittorgarh Kota Project Highway;

ii. payment due to the lenders;

iii. all payments and damages certified by NHAI as due and payable to it by the Concessionaire;

iv. retention and payments relating to the liability for defects and deficiencies;

v. incurred or accrued operation and maintenance expenses;

vi. any other payments required to be made under the Chittorgarh Kota Concession Agreement; and

vii. balance, if any, in accordance with the instructions of the Concessionaire.

Change of Scope

NHAI may, notwithstanding anything to the contrary contained in the Chittorgarh Kota Concession Agreement, require the Concessionaire to make alterations/ modifications in the scope of the Chittorgarh Kota Project as contemplated by the Chittorgarh Kota Concession Agreement. If the cumulative costs relating to all the change of scope orders exceed 5% of the concession fee in any continuous period of 3 years immediately preceding the date of such change of scope order or if such cumulative costs exceed 25% of the concession fee at any time during the Chittorgarh Kota Concession Period, NHAI may award any works or services, to any person on the basis of open competitive bidding and the Concessionaire shall be entitled to take part in such competitive bidding with a right to match the first-ranked bid. All such changes shall be made by NHAI by an order issued in accordance with the procedure set forth in the Chittorgarh Kota Concession Agreement.

Termination of the Chittorgarh Kota Concession Agreement

Termination by either party

Either Party may in its discretion terminate the Chittorgarh Kota Concession Agreement by giving a termination notice to the other party if a force majeure event subsists for a period of 120 days or more within a continuous period of 365 days. Before issuing such termination notice, the party intending to issue the termination notice shall inform the other party of such intention and grant 15 days' time to make a representation, and may after the expiry of such 15 days period, whether or not it is in receipt of such representation, in its sole discretion issue the termination notice.

Termination by the NHAI

In the event of any of the defaults specified below have occurred, and if the Concessionaire has failed to cure such breach or default within the period provided for the same in the Chittorgarh Kota Concession Agreement, then NHAI shall be entitled to issue a notice of its intention to terminate the Chittorgarh Kota Concession Agreement, with a copy to the lenders. The following events shall constitute an event of default by the Concessionaire (a "**Concessionaire Default**") unless they have occurred as a

result of any breach of the Chittorgarh Kota Concession Agreement by NHAI or due to force majeure:

i. the performance security has been encashed and appropriated in accordance with the Chittorgarh Kota Concession Agreement and the Concessionaire has failed to replenish or provide fresh performance security within a cure period of 15 days;

ii. subsequent to the replenishment or furnishing of fresh performance security in accordance with the Chittorgarh Kota Concession Agreement, the Concessionaire fails to cure, within a cure period of 60 days, the Concessionaire Default for which whole or part of the performance security was appropriated;

iii. the Concessionaire abandons or manifests intention to abandon the operation and maintenance of the Chittorgarh Kota Project Highway without the prior written consent of NHAI;

iv. the Concessionaire fails to roll over, renew and furnish new bank guarantee performance security subject to and in accordance with terms of the Chittorgarh Kota Concession Agreement, at least 3 months prior to expiry of subsisting bank guarantee;

v. the Concessionaire is in breach of the Maintenance Requirements or the Safety Requirements;

vi the Concessionaire has failed to make any payment to NHAI within the period specified in the Chittorgarh Kota Concession Agreement;

vii. upon occurrence of a financial default, the lenders' representative has by notice required NHAI to undertake suspension or termination, as the case may be, in accordance with the substitution agreement and the Concessionaire fails to cure the default within the specified cure period;

viii. a breach of any of the project agreements by the Concessionaire causes a material adverse effect;

ix. the Concessionaire creates any encumbrance in breach of the Chittorgarh Kota Concession Agreement;

x. the Concessionaire repudiates the Chittorgarh Kota Concession Agreement or otherwise takes any action or evidences or conveys an intention not to be bound by the Chittorgarh Kota Concession Agreement;

xi. a change in ownership occurs in breach of the provisions of the Chittorgarh Kota Concession Agreement;

xii. there is a transfer, pursuant to law either of the rights and/or obligations of the Concessionaire under any of the project agreements, or of all or part of the assets or undertaking of the Concessionaire, and such transfer causes a material adverse effect;

xiii. an execution levied on any of the assets of the Concessionaire has caused a material adverse effect;

xiv. the Concessionaire is adjudged bankrupt or insolvent, or if a trustee or receiver is appointed for the Concessionaire or for the whole or material part of its assets that has a material bearing on the Chittorgarh Kota Project;

xv. the Concessionaire has been, or is in the process of being liquidated, dissolved, wound-up, amalgamated or reconstituted in a manner that would cause, in the reasonable opinion of NHAI, a material adverse effect;

xvi. a resolution for winding up of the Concessionaire is passed or any petition for winding up of the Concessionaire is admitted by a court of competent jurisdiction and a provisional liquidator or receiver is appointed and such order has not been set aside within 90 days of the date thereof or the Concessionaire is ordered to be wound up by Court except for the purpose of amalgamation or reconstruction; provided that, as part of such amalgamation or reconstruction, the entire property, assets and undertaking of the Concessionaire are transferred to the amalgamated or reconstructed entity and that the amalgamated or reconstructed entity has unconditionally assumed the obligations of the Concessionaire under the Chittorgarh Kota Concession Agreement and the project agreements; and provided that:

   a. the amalgamated or reconstructed entity has the capability and operating experience necessary for the performance of its obligations under the Chittorgarh Kota Concession Agreement and the project agreements;

   b. the amalgamated or reconstructed entity has the financial standing to perform its obligations under the Chittorgarh Kota Concession Agreement and the project agreements and has a credit worthiness at least as good as that of the Concessionaire as at Appointed Date; and

   c. each of the project agreements remains in full force and effect;

xvii. any representation or warranty of the Concessionaire herein contained which is, as of the date of Chittorgarh Kota Concession Agreement, found to be materially false, incorrect or misleading;

xviii. the Concessionaire submits to NHAI any statement, notice or other document, in written or electronic form, which has a material effect on NHAI's rights, obligations or interests and which is false in material particulars;

xix. the Concessionaire has failed to fulfil any obligation, for which failure termination has been specified in the Chittorgarh Kota Concession Agreement;

xx. the Concessionaire commits a default in complying with any other provision of the Chittorgarh Kota Concession Agreement if such default causes a material adverse effect on NHAI;

xxi. an escrow default occurs and the Concessionaire fails to cure the default within a cure period of 15 days;

Termination by Concessionaire

If any of the defaults specified below shall have occurred, and NHAI fails to cure such default within a cure period of 90 days or such longer period as has been expressly provided in the Chittorgarh Kota Concession Agreement, NHAI shall be deemed to be in default of the Chittorgarh Kota Concession Agreement, unless the default has occurred as a result of any breach of the Chittorgarh Kota Concession Agreement by the Concessionaire or due to force majeure:

i. NHAI commits a material default in complying with any of the provisions of the Chittorgarh Kota Concession Agreement and such default has a material adverse effect on the Concessionaire; or

ii. NHAI repudiates the Chittorgarh Kota Concession Agreement or otherwise takes any action that amounts to or manifests an irrevocable intention not to be bound by the Chittorgarh Kota Concession Agreement.

Termination Payments

The termination payment pursuant to the Chittorgarh Kota Concession Agreement becomes due and payable to the Concessionaire by NHAI within 15 days of the Concessionaire furnishing to NHAI an NOC issued by the lenders/ lenders' representative recording/ effecting release/ vacation/ discharge of the charge on Chittorgarh Kota Project receivables (if any) created by Concessionaire for securing repayment of the debt. If NHAI fails to disburse the full termination payment within 15 days, NHAI shall pay interest at a rate equal to 3% above the bank rate on the amount of termination payment remaining unpaid.

Upon termination of the Chittorgarh Kota Concession Agreement by the NHAI on account of occurrence of a Concessionaire Default, the NHAI shall pay the Concessionaire by way of termination payment 70% of the Unexpired Cash Flow.

Upon termination of the Chittorgarh Kota Concession Agreement by the Concessionaire on account of occurrence of an NHAI Default, the Concessionaire shall be entitled to receive from NHAI by way of termination payment a sum equal to 105% of the Unexpired Cash Flow.

Technical Clarifications on the Concession Agreements

For details in relation to the technical clarifications received from NHAI in relation to the Concession Agreements, please refer to "*Annexure D - Technical clarifications on the Concession Agreements*" on page 6670 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html .

3. *Concession Agreement between Concessionaire and NHAI dated March 30, 2021 in respect of the Maharashtra Belgaum Project*

The Concessionaire has entered into a concession agreement for operation, maintenance, and management of Maharashtra Belgaum Project Highway (as defined below) on toll, operate and transfer (TOT) basis (the "**Maharashtra Belgaum Concession Agreement**"), for a period of 30 years from the Appointed Date (i.e., December 16, 2021) or such date on which the Maharashtra Belgaum Concession Agreement is terminated by a termination notice ("**Maharashtra Belgaum Concession Period**").

Certain Definitions

"**Maharashtra Belgaum Project"** means the operation and maintenance of the Maharashtra Belgaum Project Highway in accordance with the provisions of the Maharashtra Belgaum Concession Agreement and includes all works, services and equipment relating to or in respect of the scope of the Maharashtra Belgaum Project as set forth in the Maharashtra Belgaum Concession Agreement;

"**Maharashtra Belgaum Project Assets**" means all physical and other assets relating to and forming part of the Site including (a) rights over the Site in the form of licence, Right of Way or otherwise; (b) tangible assets such as civil works and equipment including foundations, embankments, pavements, road surface, interchanges, bridges, culverts, road overbridges, drainage works, traffic signals, sign boards, kilometre- stones, toll plazas, electrical systems, communication systems, rest areas, relief

centers, maintenance depots and administrative offices; (d) all rights of the Concessionaire under the project agreements; (e) security deposits; (f) insurance proceeds; and (g) Applicable Permits and authorisations relating to or in respect of the Maharashtra Belgaum Project Highway, but does not include Additional Facilities; and

"**Maharashtra Belgaum Project Highway"** means the Site comprising the existing road comprising:

Stretch	State	Start (Km)	End (Km)	Length
Maharashtra/Karnataka Border (Kagal)- Belgaum	Karnataka and Maharashtra	515.00	592.705	77.705

and all Maharashtra Belgaum Project Assets.

Grant of Concession

Subject to and in accordance with the terms and conditions set forth in the Maharashtra Belgaum Concession Agreement, NHAI has granted to the Concessionaire, and the Concessionaire has accepted the concession for a period of 30 years, including the exclusive right, license and authority during the subsistence of the Maharashtra Belgaum Concession Agreement to operate, manage and maintain the Maharashtra Belgaum Project Highway.

Subject to and in accordance with the terms and conditions set forth in the Maharashtra Belgaum Concession Agreement, the Concessionaire is entitled to undertake the following in accordance with the terms of the Maharashtra Belgaum Concession Agreement, applicable laws and applicable permits:

i. Right of Way, access and license to the Site for the purpose of and to the extent conferred by the provisions of the Maharashtra Belgaum Concession Agreement;

ii. manage, operate and maintain the Maharashtra Belgaum Project Highway and regulate the use thereof by third parties in accordance with terms hereof;

iii. demand, collect and appropriate the fees from vehicles and persons liable for payment of fees for using the Maharashtra Belgaum Project Highway or any part thereof and refuse entry of any vehicle to the Maharashtra Belgaum Project Highway if the fee due is not paid;

iv. perform and fulfill all of the Concessionaire's obligations under and in accordance with the Maharashtra Belgaum Concession Agreement;

v. bear and pay all costs, expenses and charges in connection with or incidental to the performance of the obligations of the Concessionaire under the Maharashtra Belgaum Concession Agreement; and

vi. neither assign, transfer or sublet or create any lien or encumbrance on the Maharashtra Belgaum Concession Agreement, or the concession granted thereby, or on the whole or any part of the Maharashtra Belgaum Project Highway nor transfer, lease or part possession thereof, save and except as expressly permitted by the Maharashtra Belgaum Concession Agreement.

Fees

The Concessionaire is entitled to, during the Maharashtra Belgaum Concession Period, levy, collect and appropriate fees from users ("**User Fee**") of the Maharashtra Belgaum Project Highway pursuant to and in accordance with the provisions in the Maharashtra Belgaum Concession Agreement and Fee Rules and to appropriate the same. In accordance with the terms of the Maharashtra Belgaum Concession Agreement, the Concessionaire shall not collect any fees in relation to exempted vehicles.The fees collected by Concessionaire are being deposited in the escrow account and appropriated in accordance with the relevant provisions of the Maharashtra Belgaum Concession Agreement.

Sub Rule 6(6) of the above-mentioned Fee Rules states,

"*(a) The fee shall be collected by the Central Government or the executing Authority as the case may be and for a specified period in accordance with the terms of agreement entered by the Concessionaire.*
(b) The fee as notified as per Concession Agreement shall be leviable till the end of the concession period and after the Concession Agreement is over, the fee shall be collected by the Central Government executing authority at a reduced rate of 40% of the fee on the date of transfer of such section of National Highways, bridge, tunnel or bypass, as the case may be, to be revised annually in accordance with these rules:

Provided that after the recovery of capital cost through user fee realised, in respect of a public funded project, the fee leviable would be reduced to 40% of the user fee for such section of National Highways, bridge, tunnel or bypass as the case may be, to be revised annually in accordance with these rules."

In respect of the above, NHAI has clarified that Rule 6 of the Fee Rules provides that the user fee to be notified by Government as per the format of Schedule M of Concession Agreement shall be leviable till the end of the concession period. Hence, the rate of User Fee shall only be reduced after the concession period is over.

Concession Fees

As consideration for the grant of the Concession, the Concessionaire has paid a concession fee to NHAI equivalent to ₹ 23,287.00 million as a Condition Precedent.

For the purposes of stamp duty payment, concession agreements are generally considered to be agreements which are not lease deeds and stamp duty of ₹ 100.00 is typically paid for such concession agreements. However, stamp duty authorities 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 NHAI. The stamp authorities allege 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 1.0% and 11.0% of the annual rent or premium payable or the market value of the property. Furthermore, stamp duty authorities may impose penalties for payment of inadequate stamp duty, which could extend up to ten (10) times the amount of the stamp duty payable. Accordingly, concession agreements that have not been stamped as such could be considered to be inadequately stamped. The High Courts of Allahabad and Maharashtra have also held that a concession agreement ought to be stamped as a lease agreement and have upheld the imposition of a higher stamp duty on such agreements.

While we have paid stamp duty of ₹ 100.00 on each of our Concession Agreements in accordance with usual practice, if any demand for payment of a higher stamp duty or penalty is imposed, it would increase the costs of the Toll Roads.

In respect of above, NHAI has clarified that:

(i) As on the date of Maharashtra Belgaum Concession Agreement, GST is not applicable on Concession Fee. However, if it becomes applicable at a later stage, this shall be considered as change in law.
(ii) There is no requirement of stamp duty in case of Concession Agreements since Fee Rules provided for levy and collection of user fee and not toll tax. In case, in future any such demand arises, it shall be treated as change in law.

Escrow Account

The provisions in relation to the escrow account in the Maharashtra Belgaum Concession Agreement are only applicable if the obligations of the Concessionaire under the Maharashtra Belgaum Concession Agreement are financed by the Lenders.

The Concessionaire has opened and established the escrow account with the escrow bank and all funds constituting the financing package related to the Maharashtra Belgaum Project are being credited to such escrow account. During the Maharashtra Belgaum Concession Period all fees and any other revenues including the proceeds of any rentals, deposits, capital receipts or insurance claims from or in respect of the Maharashtra Belgaum Project Highway are being deposited therein. In addition, all disbursements or payments by NHAI pursuant to the Maharashtra Belgaum Concession Agreement, including, if any, in relation to the change of scope in the Maharashtra Belgaum Project are being deposited by NHAI in the escrow account.

Disbursements from Escrow Account

The Concessionaire had given, at the time of the opening of the escrow account, irrevocable instructions by way of an escrow agreement substantially in form set forth in the Maharashtra Belgaum Concession Agreement to the escrow bank instructing, *inter alia*, that the deposits into the escrow account shall subject to the provisions of the Maharashtra Belgaum Concession Agreement, be appropriated in the following order every month and if not due in a month then appropriated proportionately in such month and retained in the escrow account and paid out therefrom in the month when due unless otherwise expressly provided in the instruction letter:

i. all taxes due and payable by the Concessionaire for and in respect of the Maharashtra Belgaum Project Highway;

ii. concession fee;

iii. all payments relating to construction of the Maharashtra Belgaum Project Highway, subject to and in accordance with the conditions, if any, set forth in the financing agreements;

iv. operation and maintenance expenses;

v. operation and maintenance expenses and other costs and expenses incurred by NHAI in accordance with the provisions of the Maharashtra Belgaum Concession Agreement, and certified by NHAI as due and payable to it;

vi. monthly proportionate provision of debt service payment due in an accounting year;

vii. all payments and damages certified by NHAI as due and payable to it by the Concessionaire; and

vii. balance, if any, in accordance with the instructions of the Concessionaire.

Disbursements upon Termination

Notwithstanding anything to the contrary contained in the escrow agreement and subject to the provisions of the Maharashtra Belgaum Concession Agreement, in the case of termination, the amounts standing to the credit of the escrow account shall be disbursed towards:

i. all taxes due and payable by the Concessionaire for and in respect of the Maharashtra Belgaum Project Highway;

ii. payment due to the lenders;

iii. all payments and damages certified by NHAI as due and payable to it by the Concessionaire;

iv. retention and payments relating to the liability for defects and deficiencies;

v. incurred or accrued operation and maintenance expenses;

vi. any other payments required to be made under the Maharashtra Belgaum Concession Agreement; and

vii. balance, if any, in accordance with the instructions of the Concessionaire.

Change of Scope

NHAI may, notwithstanding anything to the contrary contained in the Maharashtra Belgaum Concession Agreement, require the Concessionaire to make alterations/ modifications in the scope of the Maharashtra Belgaum Project as contemplated by the Maharashtra Belgaum Concession Agreement. If the cumulative costs relating to all the change of scope orders exceed 5% of the concession fee in any continuous period of 3 years immediately preceding the date of such change of scope order or if such cumulative costs exceed 25% of the concession fee at any time during the Maharashtra Belgaum Concession Period, NHAI may award any works or services, to any person on the basis of open competitive bidding and the Concessionaire shall be entitled to take part in such competitive bidding with a right to match the first-ranked bid. All such changes shall be made by NHAI by an order issued in accordance with the procedure set forth in the Maharashtra Belgaum Concession Agreement.

Termination of the Maharashtra Belgaum Concession Agreement

Termination by either party

Either Party may in its discretion terminate the Maharashtra Belgaum Concession Agreement by giving a termination notice to the other party if a force majeure event subsists for a period of 120 days or more within a continuous period of 365 days. Before issuing such termination notice, the party intending to issue the termination notice shall inform the other party of such intention and grant 15 days' time to make a representation, and may after the expiry of such 15 days period, whether or not it is in receipt of such representation, in its sole discretion issue the termination notice.

Termination by the NHAI

In the event of any of the defaults specified below have occurred, and if the Concessionaire has failed to cure such breach or default within the period provided for the same in the Maharashtra Belgaum Concession Agreement, then NHAI shall be entitled to issue a notice of its intention to terminate the Maharashtra Belgaum Concession Agreement, with a copy to the lenders. The following events shall constitute an event of default by the Concessionaire (a "**Concessionaire Default**") unless they have occurred as a result of any breach of the Maharashtra Belgaum Concession Agreement by NHAI or due to force majeure:

i. the performance security has been encashed and appropriated in accordance with the Maharashtra Belgaum Concession Agreement and the Concessionaire has failed to replenish or provide fresh performance security within a cure period of 15 days;

ii. subsequent to the replenishment or furnishing of fresh performance security in accordance with the Maharashtra Belgaum Concession Agreement, the Concessionaire fails to cure, within a cure period of 60 days, the Concessionaire Default for which whole or part of the performance security was appropriated;

iii. the Concessionaire abandons or manifests intention to abandon the operation and maintenance of the Maharashtra Belgaum Project Highway without the prior written consent of NHAI;

iv. the Concessionaire fails to roll over, renew and furnish new bank guarantee performance security subject to and in

accordance with terms of the Maharashtra Belgaum Concession Agreement, at least 3 months prior to expiry of subsisting bank guarantee;

v. the Concessionaire is in breach of the Maintenance Requirements or the Safety Requirements;

vi the Concessionaire has failed to make any payment to NHAI within the period specified in the Maharashtra Belgaum Concession Agreement;

vii. upon occurrence of a financial default, the lenders' representative has by notice required NHAI to undertake suspension or termination, as the case may be, in accordance with the substitution agreement and the Concessionaire fails to cure the default within the specified cure period;

viii. a breach of any of the project agreements by the Concessionaire causes a material adverse effect;

ix. the Concessionaire creates any encumbrance in breach of the Maharashtra Belgaum Concession Agreement;

x. the Concessionaire repudiates the Maharashtra Belgaum Concession Agreement or otherwise takes any action or evidences or conveys an intention not to be bound by the Maharashtra Belgaum Concession Agreement;

xi. a change in ownership occurs in breach of the provisions of the Maharashtra Belgaum Concession Agreement;

xii. there is a transfer, pursuant to law either of the rights and/or obligations of the Concessionaire under any of the project agreements, or of all or part of the assets or undertaking of the Concessionaire, and such transfer causes a material adverse effect;

xiii. an execution levied on any of the assets of the Concessionaire has caused a material adverse effect;

xiv. the Concessionaire is adjudged bankrupt or insolvent, or if a trustee or receiver is appointed for the Concessionaire or for the whole or material part of its assets that has a material bearing on the Maharashtra Belgaum Project;

xv. the Concessionaire has been, or is in the process of being liquidated, dissolved, wound-up, amalgamated or reconstituted in a manner that would cause, in the reasonable opinion of NHAI, a material adverse effect;

xvi. a resolution for winding up of the Concessionaire is passed or any petition for winding up of the Concessionaire is admitted by a court of competent jurisdiction and a provisional liquidator or receiver is appointed and such order has not been set aside within 90 days of the date thereof or the Concessionaire is ordered to be wound up by Court except for the purpose of amalgamation or reconstruction; provided that, as part of such amalgamation or reconstruction, the entire property, assets and undertaking of the Concessionaire are transferred to the amalgamated or reconstructed entity and that the amalgamated or reconstructed entity has unconditionally assumed the obligations of the Concessionaire under the Maharashtra Belgaum Concession Agreement and the project agreements; and provided that:

a. the amalgamated or reconstructed entity has the capability and operating experience necessary for the performance of its obligations under the Maharashtra Belgaum Concession Agreement and the project agreements;

b. the amalgamated or reconstructed entity has the financial standing to perform its obligations under the Maharashtra Belgaum Concession Agreement and the project agreements and has a credit worthiness at least as good as that of the Concessionaire as at Appointed Date; and

c. each of the project agreements remains in full force and effect;

xvii. any representation or warranty of the Concessionaire herein contained which is, as of the date of Maharashtra Belgaum Concession Agreement, found to be materially false, incorrect or misleading;

xviii. the Concessionaire submits to NHAI any statement, notice or other document, in written or electronic form, which has a material effect on NHAI's rights, obligations or interests and which is false in material particulars;

xix. the Concessionaire has failed to fulfil any obligation, for which failure termination has been specified in the Maharashtra Belgaum Concession Agreement;

xx. the Concessionaire commits a default in complying with any other provision of the Maharashtra Belgaum Concession Agreement if such default causes a material adverse effect on NHAI;

xxi. an escrow default occurs and the Concessionaire fails to cure the default within a cure period of 15 days;

Termination by Concessionaire

If any of the defaults specified below shall have occurred, and NHAI fails to cure such default within a cure period of 90 days or such longer period as has been expressly provided in the Maharashtra Belgaum Concession Agreement, NHAI shall be deemed to be in default of the Maharashtra Belgaum Concession Agreement, unless the default has occurred as a result of any breach of the Maharashtra Belgaum Concession Agreement by the Concessionaire or due to force majeure:

i. NHAI commits a material default in complying with any of the provisions of the Maharashtra Belgaum Concession Agreement and such default has a material adverse effect on the Concessionaire; or

ii. NHAI repudiates the Maharashtra Belgaum Concession Agreement or otherwise takes any action that amounts to or manifests an irrevocable intention not to be bound by the Maharashtra Belgaum Concession Agreement.

Termination Payments

The termination payment pursuant to the Maharashtra Belgaum Concession Agreement becomes due and payable to the Concessionaire by NHAI within 15 days of the Concessionaire furnishing to NHAI an NOC issued by the lenders/ lenders' representative recording/ effecting release/ vacation/ discharge of the charge on Maharashtra Belgaum Project receivables (if any) created by Concessionaire for securing repayment of the debt. If NHAI fails to disburse the full termination payment within 15 days, NHAI shall pay interest at a rate equal to 3% above the bank rate on the amount of termination payment remaining unpaid.

Upon termination of the Maharashtra Belgaum Concession Agreement by the NHAI on account of occurrence of a Concessionaire Default, the NHAI shall pay the Concessionaire by way of termination payment 70% of the Unexpired Cash Flow.

Upon termination of the Maharashtra Belgaum Concession Agreement by the Concessionaire on account of occurrence of an NHAI Default, the Concessionaire shall be entitled to receive from NHAI by way of termination payment a sum equal to 105% of the Unexpired Cash Flow.

Technical Clarifications on the Concession Agreements

For details in relation to the technical clarifications received from NHAI in relation to the Concession Agreements, please refer to "*Annexure D - Technical clarifications on the Concession Agreements*" on page 6670 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html .

4. *Concession Agreement between Concessionaire and NHAI dated March 30, 2021 in respect of the Abu Road – Swaroopganj Project*

The Concessionaire has entered into a concession agreement for operation, maintenance, and management of Abu Road – Swaroopganj Project Highway (as defined below) on toll, operate and transfer (TOT) basis (the "**Abu Road – Swaroopganj Concession Agreement**"), for a period of 30 years from the Appointed Date (i.e., December 16, 2021) or such date on which the Abu Road – Swaroopganj Concession Agreement is terminated by a termination notice ("**Abu Road – Swaroopganj Concession Period**").

Certain Definitions

"**Abu Road – Swaroopganj Project"** means the operation and maintenance of the Abu Road – Swaroopganj Project Highway in accordance with the provisions of the Abu Road – Swaroopganj Concession Agreement and includes all works, services and equipment relating to or in respect of the scope of the Abu Road – Swaroopganj Project as set forth in the Abu Road – Swaroopganj Concession Agreement;

"**Abu Road – Swaroopganj Project Assets**" means all physical and other assets relating to and forming part of the Site including (a) rights over the Site in the form of licence, Right of Way or otherwise; (b) tangible assets such as civil works and equipment including foundations, embankments, pavements, road surface, interchanges, bridges, culverts, road overbridges, drainage works, traffic signals, sign boards, kilometre- stones, toll plazas, electrical systems, communication systems, rest areas, relief centers, maintenance depots and administrative offices; (d) all rights of the Concessionaire under the project agreements; (e) security deposits; (f) insurance proceeds; and (g) Applicable Permits and authorisations relating to or in respect of the Abu Road – Swaroopganj Project Highway, but does not include Additional Facilities; and

"**Abu Road – Swaroopganj Project Highway"** means the Site comprising the existing road comprising:

Stretch	State	Start (Km)	End (Km)	Length
Abu Road-Swaroopganj	Rajasthan	646.000	677.000	31.000

and all Abu Road – Swaroopganj Project Assets.

Grant of Concession

Subject to and in accordance with the terms and conditions set forth in the Abu Road – Swaroopganj Concession Agreement, NHAI has granted to the Concessionaire, and the Concessionaire has accepted the concession for a period of 30 years, including the exclusive right, license and authority during the subsistence of the Abu Road – Swaroopganj Concession Agreement to operate, manage and maintain the Abu Road – Swaroopganj Project Highway.

Subject to and in accordance with the terms and conditions set forth in the Abu Road – Swaroopganj Concession Agreement, the Concessionaire is entitled to undertake the following in accordance with the terms of the Abu Road – Swaroopganj Concession Agreement, applicable laws and applicable permits:

i. Right of Way, access and license to the Site for the purpose of and to the extent conferred by the provisions of the Abu Road – Swaroopganj Concession Agreement;

ii. manage, operate and maintain the Abu Road – Swaroopganj Project Highway and regulate the use thereof by third parties in accordance with terms Abu Road – Swaroopganj Concession Agreement;

iii. demand, collect and appropriate the fees from vehicles and persons liable for payment of fees for using the Abu Road – Swaroopganj Project Highway or any part thereof and refuse entry of any vehicle to the Abu Road – Swaroopganj Project Highway if the fee due is not paid;

iv. perform and fulfill all of the Concessionaire's obligations under and in accordance with the Abu Road – Swaroopganj Concession Agreement;

v. bear and pay all costs, expenses and charges in connection with or incidental to the performance of the obligations of the Concessionaire under the Abu Road – Swaroopganj Concession Agreement; and

vi. neither assign, transfer or sublet or create any lien or encumbrance on the Abu Road – Swaroopganj Concession Agreement, or the concession granted thereby, or on the whole or any part of the Abu Road – Swaroopganj Project Highway nor transfer, lease or part possession thereof, save and except as expressly permitted by the Abu Road – Swaroopganj Concession Agreement.

Fees

The Concessionaire is entitled to, during the Abu Road – Swaroopganj Concession Period, levy, collect and appropriate fees from users ("**User Fee**") of the Abu Road – Swaroopganj Project Highway pursuant to and in accordance with the provisions in the Abu Road – Swaroopganj Concession Agreement and the Fee Rules and to appropriate the same. In accordance with the terms of the Abu Road – Swaroopganj Concession Agreement, the Concessionaire shall not collect any fees in relation to exempted vehicles.The fees collected by Concessionaire are being deposited in the escrow account and appropriated in accordance with the relevant provisions of the Abu Road – Swaroopganj Concession Agreement.

Sub Rule 6(6) of the above-mentioned Fee Rules states,

"*(a) The fee shall be collected by the Central Government or the executing Authority as the case may be and for a specified period in accordance with the terms of agreement entered by the Concessionaire.*
(b) The fee as notified as per Concession Agreement shall be leviable till the end of the concession period and after the Concession Agreement is over, the fee shall be collected by the Central Government executing authority at a reduced rate of 40% of the fee on the date of transfer of such section of National Highways, bridge, tunnel or bypass, as the case may be, to be revised annually in accordance with these rules:

Provided that after the recovery of capital cost through user fee realised, in respect of a public funded project, the fee leviable would be reduced to 40% of the user fee for such section of National Highways, bridge, tunnel or bypass as the case may be, to be revised annually in accordance with these rules."

In respect of the above, NHAI has clarified that Rule 6 of the Fee Rules provides that the user fee to be notified by Government as per the format of Schedule M of Concession Agreement shall be leviable till the end of the concession period. Hence, the user fee rate shall only be reduced after the concession period is over.

Concession Fees

As consideration for the grant of the Concession, the Concessionaire has paid a concession fee to NHAI equivalent to ₹ 7,417.00 million as a Condition Precedent.

For the purposes of stamp duty payment, concession agreements are generally considered to be agreements which are not lease deeds and stamp duty of ₹ 100.00 is typically paid for such concession agreements. However, stamp duty authorities 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 NHAI. The stamp authorities allege 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 1.0% and 11.0% of the annual rent or premium payable or the market value of the property. Furthermore, stamp duty authorities may impose penalties for payment of inadequate stamp duty, which could extend up to ten (10) times the amount of the stamp duty payable. Accordingly, concession agreements that have not been stamped as such could be considered to be inadequately stamped. The High Courts of Allahabad and Maharashtra have also held that a concession agreement ought to be stamped as a lease agreement and have upheld the imposition of a higher stamp duty on such agreements.

While we have paid stamp duty of ₹ 100.00 on each of our Concession Agreements in accordance with usual practice, if any demand for payment of a higher stamp duty or penalty is imposed, it would increase the costs of the Toll Roads.

In respect of above, NHAI has clarified that:

(i) As on the date of Abu Road – Swaroopganj Concession Agreement, GST is not applicable on Concession Fee. However, if it becomes applicable at a later stage, this shall be considered as change in law.
(ii) There is no requirement of stamp duty in case of Concession Agreements since Fee Rules provided for levy and collection of user fee and not toll tax. In case, in future any such demand arises, it shall be treated as change in law.

Escrow Account

The provisions in relation to the escrow account in the Abu Road – Swaroopganj Concession Agreement are only applicable if the obligations of the Concessionaire under the Abu Road – Swaroopganj Concession Agreement are financed by the Lenders.

The Concessionaire has opened and established the escrow account with the escrow bank and all funds constituting the financing package related to the Abu Road – Swaroopganj Project are being credited to such escrow account. During the Abu Road – Swaroopganj Concession Period all fees and any other revenues including the proceeds of any rentals, deposits, capital receipts or insurance claims from or in respect of the Abu Road – Swaroopganj Project Highway are being deposited therein. In addition, all disbursements or payments by NHAI pursuant to the Abu Road – Swaroopganj Concession Agreement, including, if any, in relation to the change of scope in the Abu Road – Swaroopganj Project are being deposited by NHAI in the escrow account.

Disbursements from Escrow Account

The Concessionaire had given, at the time of the opening of the escrow account, irrevocable instructions by way of an escrow agreement substantially in form set forth in the Abu Road – Swaroopganj Concession Agreement to the escrow bank instructing, *inter alia*, that the deposits into the escrow account shall subject to the provisions of the Abu Road – Swaroopganj Concession Agreement, be appropriated in the following order every month and if not due in a month then appropriated proportionately in such month and retained in the escrow account and paid out therefrom in the month when due unless otherwise expressly provided in the instruction letter:

i. all taxes due and payable by the Concessionaire for and in respect of the Abu Road – Swaroopganj Project Highway;

ii. concession fee;

iii. all payments relating to construction of the Abu Road – Swaroopganj Project Highway, subject to and in accordance with the conditions, if any, set forth in the financing agreements;

iv. operation and maintenance expenses;

v. operation and maintenance expenses and other costs and expenses incurred by NHAI in accordance with the provisions of the Abu Road – Swaroopganj Concession Agreement, and certified by NHAI as due and payable to it;

vi. monthly proportionate provision of debt service payment due in an accounting year;

vii. all payments and damages certified by NHAI as due and payable to it by the Concessionaire; and

vii. balance, if any, in accordance with the instructions of the Concessionaire.

Disbursements upon Termination

Notwithstanding anything to the contrary contained in the escrow agreement and subject to the provisions of the Abu Road – Swaroopganj Concession Agreement, in the case of termination, the amounts standing to the credit of the escrow account shall be disbursed towards:

i. all taxes due and payable by the Concessionaire for and in respect of the Abu Road – Swaroopganj Project Highway;

ii. payment due to the lenders;

iii. all payments and damages certified by NHAI as due and payable to it by the Concessionaire;

iv. retention and payments relating to the liability for defects and deficiencies;

v. incurred or accrued operation and maintenance expenses;

vi. any other payments required to be made under the Abu Road – Swaroopganj Concession Agreement; and

vii. balance, if any, in accordance with the instructions of the Concessionaire.

Change of Scope

NHAI may, notwithstanding anything to the contrary contained in the Abu Road – Swaroopganj Concession Agreement, require the Concessionaire to make alterations/ modifications in the scope of the Abu Road – Swaroopganj Project as contemplated by the Abu Road – Swaroopganj Concession Agreement. If the cumulative costs relating to all the change of scope orders exceed 5% of the concession fee in any continuous period of 3 years immediately preceding the date of such change of scope order or if such cumulative costs exceed 25% of the concession fee at any time during the Abu Road – Swaroopganj Concession Period, NHAI may award any works or services, to any person on the basis of open competitive bidding and the Concessionaire shall be entitled to take part in such competitive bidding with a right to match the first-ranked bid. All such changes shall be made by NHAI by an order issued in accordance with the procedure set forth in the Abu Road – Swaroopganj Concession Agreement.

Termination of the Abu Road – Swaroopganj Concession Agreement

Termination by either party

Either Party may in its discretion terminate the Abu Road – Swaroopganj Concession Agreement by giving a termination notice to the other party if a force majeure event subsists for a period of 120 days or more within a continuous period of 365 days. Before issuing such termination notice, the party intending to issue the termination notice shall inform the other party of such intention and grant 15 days' time to make a representation, and may after the expiry of such 15 days period, whether or not it is in receipt of such representation, in its sole discretion issue the termination notice.

Termination by the NHAI

In the event of any of the defaults specified below have occurred, and if the Concessionaire has failed to cure such breach or default within the period provided for the same in the Abu Road – Swaroopganj Concession Agreement, then NHAI shall be entitled to issue a notice of its intention to terminate the Abu Road – Swaroopganj Concession Agreement, with a copy to the lenders. The following events shall constitute an event of default by the Concessionaire (a "**Concessionaire Default**") unless they have occurred as a result of any breach of the Abu Road – Swaroopganj Concession Agreement by NHAI or due to force majeure:

i. the performance security has been encashed and appropriated in accordance with the Abu Road – Swaroopganj Concession Agreement and the Concessionaire has failed to replenish or provide fresh performance security within a cure period of 15 days;

ii. subsequent to the replenishment or furnishing of fresh performance security in accordance with the Abu Road – Swaroopganj Concession Agreement, the Concessionaire fails to cure, within a cure period of 60 days, the Concessionaire Default for which whole or part of the performance security was appropriated;

iii. the Concessionaire abandons or manifests intention to abandon the operation and maintenance of the Abu Road – Swaroopganj Project Highway without the prior written consent of NHAI;

iv. the Concessionaire fails to roll over, renew and furnish new bank guarantee performance security subject to and in accordance with terms of the Abu Road – Swaroopganj Concession Agreement, at least 3 months prior to expiry of subsisting bank guarantee;

v. the Concessionaire is in breach of the Maintenance Requirements or the Safety Requirements;

vi the Concessionaire has failed to make any payment to NHAI within the period specified in the Abu Road – Swaroopganj Concession Agreement;

vii. upon occurrence of a financial default, the lenders' representative has by notice required NHAI to undertake suspension or termination, as the case may be, in accordance with the substitution agreement and the Concessionaire fails to cure the default within the specified cure period;

viii. a breach of any of the project agreements by the Concessionaire causes a material adverse effect;

ix. the Concessionaire creates any encumbrance in breach of the Abu Road – Swaroopganj Concession Agreement;

x. the Concessionaire repudiates the Abu Road – Swaroopganj Concession Agreement or otherwise takes any action or evidences or conveys an intention not to be bound by the Abu Road – Swaroopganj Concession Agreement;

xi. a change in ownership occurs in breach of the provisions of the Abu Road – Swaroopganj Concession Agreement;

xii. there is a transfer, pursuant to law either of the rights and/or obligations of the Concessionaire under any of the project agreements, or of all or part of the assets or undertaking of the Concessionaire, and such transfer causes a material adverse effect;

xiii. an execution levied on any of the assets of the Concessionaire has caused a material adverse effect;

xiv. the Concessionaire is adjudged bankrupt or insolvent, or if a trustee or receiver is appointed for the Concessionaire or for the whole or material part of its assets that has a material bearing on the Abu Road – Swaroopganj Project;

xv. the Concessionaire has been, or is in the process of being liquidated, dissolved, wound-up, amalgamated or reconstituted in a manner that would cause, in the reasonable opinion of NHAI, a material adverse effect;

xvi. a resolution for winding up of the Concessionaire is passed or any petition for winding up of the Concessionaire is admitted by a court of competent jurisdiction and a provisional liquidator or receiver is appointed and such order has not been set aside within 90 days of the date thereof or the Concessionaire is ordered to be wound up by Court except for the purpose of amalgamation or reconstruction; provided that, as part of such amalgamation or reconstruction, the entire property, assets and undertaking of the Concessionaire are transferred to the amalgamated or reconstructed entity and that the amalgamated or reconstructed entity has unconditionally assumed the obligations of the Concessionaire under the Abu Road – Swaroopganj Concession Agreement and the project agreements; and provided that:

    a. the amalgamated or reconstructed entity has the capability and operating experience necessary for the performance of its obligations under the Abu Road – Swaroopganj Concession Agreement and the project agreements;

    b. the amalgamated or reconstructed entity has the financial standing to perform its obligations under the Abu Road – Swaroopganj Concession Agreement and the project agreements and has a credit worthiness at least as good as that of the Concessionaire as at Appointed Date; and

    c. each of the project agreements remains in full force and effect;

xvii. any representation or warranty of the Concessionaire herein contained which is, as of the date of Abu Road – Swaroopganj Concession Agreement, found to be materially false, incorrect or misleading;

xviii. the Concessionaire submits to NHAI any statement, notice or other document, in written or electronic form, which has a material effect on NHAI's rights, obligations or interests and which is false in material particulars;

xix. the Concessionaire has failed to fulfil any obligation, for which failure termination has been specified in the Abu Road – Swaroopganj Concession Agreement;

xx. the Concessionaire commits a default in complying with any other provision of the Abu Road – Swaroopganj Concession Agreement if such default causes a material adverse effect on NHAI;

xxi. an escrow default occurs and the Concessionaire fails to cure the default within a cure period of 15 days;

Termination by Concessionaire

If any of the defaults specified below shall have occurred, and NHAI fails to cure such default within a cure period of 90 days or such longer period as has been expressly provided in the Abu Road – Swaroopganj Concession Agreement, NHAI shall be deemed to be in default of the Abu Road – Swaroopganj Concession Agreement, unless the default has occurred as a result of any breach of the Abu Road – Swaroopganj Concession Agreement by the Concessionaire or due to force majeure:

i. NHAI commits a material default in complying with any of the provisions of the Abu Road – Swaroopganj Concession Agreement and such default has a material adverse effect on the Concessionaire; or

ii. NHAI repudiates the Abu Road – Swaroopganj Concession Agreement or otherwise takes any action that amounts to or manifests an irrevocable intention not to be bound by the Abu Road – Swaroopganj Concession Agreement.

Termination Payments

The termination payment pursuant to the Abu Road – Swaroopganj Concession Agreement becomes due and payable to the Concessionaire by NHAI within 15 days of the Concessionaire furnishing to NHAI an NOC issued by the lenders/ lenders' representative recording/ effecting release/ vacation/ discharge of the charge on Abu Road – Swaroopganj Project receivables (if any) created by Concessionaire for securing repayment of the debt. If NHAI fails to disburse the full termination payment within 15 days, NHAI shall pay interest at a rate equal to 3% above the bank rate on the amount of termination payment remaining unpaid.

Upon termination of the Abu Road – Swaroopganj Concession Agreement by the NHAI on account of occurrence of a Concessionaire Default, the NHAI shall pay the Concessionaire by way of termination payment 70% of the Unexpired Cash Flow.

Upon termination of the Abu Road – Swaroopganj Concession Agreement by the Concessionaire on account of occurrence of an NHAI Default, the Concessionaire shall be entitled to receive from NHAI by way of termination payment a sum equal to 105% of the Unexpired Cash Flow.

Technical Clarifications on the Concession Agreements

For details in relation to the technical clarifications received from NHAI in relation to the Concession Agreements, please refer to "*Annexure D - Technical clarifications on the Concession Agreements*" on page 6670 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html .

5. *Concession Agreement between Concessionaire and NHAI dated March 30, 2021 in respect of the Palanpur Abu Road Project*

The Concessionaire has entered into a concession agreement for operation, maintenance, and management of the Palanpur Abu Road Project Highway (as defined below) on toll, operate and transfer (TOT) basis (the "**Palanpur Abu Road Concession Agreement**"), for a period of 30 years from the Appointed Date (i.e., December 16, 2021) or such date on which the Palanpur Abu Road Concession Agreement is terminated by a termination notice ("**Palanpur Abu Road Concession Period**").

Certain Definitions

"**Palanpur Abu Road Project"** means the operation and maintenance of the Palanpur Abu Road Project Highway in accordance with the provisions of the Palanpur Abu Road Concession Agreement and includes all works, services and equipment relating to or in respect of the scope of the Palanpur Abu Road Project as set forth in the Palanpur Abu Road Concession Agreement;

"**Palanpur Abu Road Project Assets**" means all physical and other assets relating to and forming part of the Site including (a) rights over the Site in the form of licence, Right of Way or otherwise; (b) tangible assets such as civil works and equipment including foundations, embankments, pavements, road surface, interchanges, bridges, culverts, road overbridges, drainage works, traffic signals, sign boards, kilometre- stones, toll plazas, electrical systems, communication systems, rest areas, relief centers, maintenance depots and administrative offices; (d) all rights of the Concessionaire under the project agreements; (e) security deposits; (f) insurance proceeds; and (g) Applicable Permits and authorisations relating to or in respect of the Palanpur Abu Road Project Highway, but does not include Additional Facilities; and

"**Palanpur Abu Road Project Highway"** means the Site comprising the existing road comprising:

Stretch	State	Start (Km)	End (Km)	Length
Palanpur/Khemana- Abu Road	Gujarat and Rajasthan	601.000	646.000	45.000

and all Palanpur Abu Road Project Assets.

Grant of Concession

Subject to and in accordance with the terms and conditions set forth in the Palanpur Abu Road Concession Agreement, NHAI has granted to the Concessionaire, and the Concessionaire has accepted the concession for a period of 30 years, including the exclusive right, license and authority during the subsistence of the Palanpur Abu Road Concession Agreement to operate, manage and maintain the Palanpur Abu Road Project Highway.

Subject to and in accordance with the terms and conditions set forth in the Palanpur Abu Road Concession Agreement, the Concessionaire is entitled to undertake the following in accordance with the terms of the Palanpur Abu Road Concession Agreement, applicable laws and applicable permits:

i. Right of Way, access and license to the Site for the purpose of and to the extent conferred by the provisions of the Palanpur Abu Road Concession Agreement;

ii. manage, operate and maintain the Palanpur Abu Road Project Highway and regulate the use thereof by third parties in accordance with the terms of Palanpur Abu Road Concession Agreement;

iii. demand, collect and appropriate the fees from vehicles and persons liable for payment of fees for using the Palanpur Abu Road Project Highway or any part thereof and refuse entry of any vehicle to the Palanpur Abu Road Project Highway if the fee due is not paid;

iv. perform and fulfill all of the Concessionaire's obligations under and in accordance with the Palanpur Abu Road Concession Agreement;

v. bear and pay all costs, expenses and charges in connection with or incidental to the performance of the obligations of the Concessionaire under the Palanpur Abu Road Concession Agreement; and

vi. neither assign, transfer or sublet or create any lien or encumbrance on the Palanpur Abu Road Concession Agreement, or the concession granted thereby, or on the whole or any part of the Palanpur Abu Road Project Highway nor transfer, lease or part possession thereof, save and except as expressly permitted by the Palanpur Abu Road Concession Agreement.

Fees

The Concessionaire is entitled to, during the Palanpur Abu Road Concession Period, levy, collect and appropriate fees from users ("**User Fee**") of the Palanpur Abu Road Project Highway pursuant to and in accordance with the provisions in the Palanpur Abu Road Concession Agreement and the Fee Rules and to appropriate the same. In accordance with the terms of the Palanpur Abu Road Concession Agreement, the Concessionaire shall not collect any fees in relation to exempted vehicles.The fees collected by Concessionaire are being deposited in the escrow account and appropriated in accordance with the relevant provisions of the Palanpur Abu Road Concession Agreement.

Sub Rule 6(6) of the above-mentioned Fee Rules states,

"*(a) The fee shall be collected by the Central Government or the executing Authority as the case may be and for a specified period in accordance with the terms of agreement entered by the Concessionaire.*
(b) The fee as notified as per Concession Agreement shall be leviable till the end of the concession period and after the Concession Agreement is over, the fee shall be collected by the Central Government executing authority at a reduced rate of 40% of the fee on the date of transfer of such section of National Highways, bridge, tunnel or bypass, as the case may be, to be revised annually in accordance with these rules:

Provided that after the recovery of capital cost through user fee realised, in respect of a public funded project, the fee leviable would be reduced to 40% of the user fee for such section of National Highways, bridge, tunnel or bypass as the case may be, to be revised annually in accordance with these rules."

In respect of the above, NHAI has clarified that Rule 6 of the Fee Rules provides that the user fee to be notified by Government as per the format of Schedule M of Concession Agreement shall be leviable till the end of the concession period. Hence, the rate of User Fee shall only be reduced after the concession period is over.

Concession Fees

As consideration for the grant of the Concession, the Concessionaire has paid a concession fee to NHAI equivalent to ₹ 11,465.00 million, as a Condition Precedent.

For the purposes of stamp duty payment, concession agreements are generally considered to be agreements which are not lease deeds and stamp duty of ₹ 100.00 is typically paid for such concession agreements. However, stamp duty authorities 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 NHAI. The stamp authorities allege 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 1.0% and 11.0% of the annual rent or premium payable or the market value of the property. Furthermore, stamp duty authorities may impose penalties for payment of inadequate stamp duty, which could extend up to ten (10) times the amount of the stamp duty payable. Accordingly, concession agreements that have not been stamped as such could be considered to be inadequately stamped. The High Courts of Allahabad and Maharashtra have also held that a concession agreement ought to be stamped as a lease agreement and have upheld the imposition of a higher stamp duty on such agreements.

While we have paid stamp duty of ₹ 100.00 on each of our Concession Agreements in accordance with usual practice, if any demand for payment of a higher stamp duty or penalty is imposed, it would increase the costs of the Toll Roads.

In respect of above, NHAI has clarified that:

(i) As on the date of Palanpur Abu Road Concession Agreement, GST is not applicable on Concession Fee. However, if it becomes applicable at a later stage, this shall be considered as change in law.
(ii) There is no requirement of stamp duty in case of Concession Agreements since Fee Rules provided for levy and collection of user fee and not toll tax. In case, in future any such demand arises, it shall be treated as change in law.

Escrow Account

The provisions in relation to the escrow account in the Palanpur Abu Road Concession Agreement are only applicable if the obligations of the Concessionaire under the Palanpur Abu Road Concession Agreement are financed by the Lenders.

The Concessionaire has opened and established the escrow account with the escrow bank and all funds constituting the financing package related to the Palanpur Abu Road Project are being credited to such escrow account. During the Palanpur Abu Road Concession Period all fees and any other revenues including the proceeds of any rentals, deposits, capital receipts or insurance claims from or in respect of the Palanpur Abu Road Project Highway are being deposited therein. In addition, all disbursements or payments by NHAI pursuant to the Palanpur Abu Road Concession Agreement, including, if any, in relation to the change of scope in the Palanpur Abu Road Project are being deposited by NHAI in the escrow account.

Disbursements from Escrow Account

The Concessionaire had given, at the time of the opening of the escrow account, irrevocable instructions by way of an escrow agreement substantially in form set forth in the Palanpur Abu Road Concession Agreement to the escrow bank instructing, *inter alia*, that the deposits into the escrow account shall subject to the provisions of the Palanpur Abu Road Concession Agreement, be appropriated in the following order every month and if not due in a month then appropriated proportionately in such month and retained in the escrow account and paid out therefrom in the month when due unless otherwise expressly provided in the instruction letter:

i. all taxes due and payable by the Concessionaire for and in respect of the Palanpur Abu Road Project Highway;

ii. concession fee;

iii. all payments relating to construction of the Palanpur Abu Road Project Highway, subject to and in accordance with the conditions, if any, set forth in the financing agreements;

iv. operation and maintenance expenses;

v. operation and maintenance expenses and other costs and expenses incurred by NHAI in accordance with the provisions of the Palanpur Abu Road Concession Agreement, and certified by NHAI as due and payable to it;

vi. monthly proportionate provision of debt service payment due in an accounting year;

vii. all payments and damages certified by NHAI as due and payable to it by the Concessionaire; and

vii. balance, if any, in accordance with the instructions of the Concessionaire.

Disbursements upon Termination

Notwithstanding anything to the contrary contained in the escrow agreement and subject to the provisions of the Palanpur Abu Road Concession Agreement, in the case of termination, the amounts standing to the credit of the escrow account shall be disbursed towards:

i. all taxes due and payable by the Concessionaire for and in respect of the Palanpur Abu Road Project Highway;

ii. payment due to the lenders;

iii. all payments and damages certified by NHAI as due and payable to it by the Concessionaire;

iv. retention and payments relating to the liability for defects and deficiencies;

v. incurred or accrued operation and maintenance expenses;

vi. any other payments required to be made under the Palanpur Abu Road Concession Agreement; and

vii. balance, if any, in accordance with the instructions of the Concessionaire.

Change of Scope

NHAI may, notwithstanding anything to the contrary contained in the Palanpur Abu Road Concession Agreement, require the Concessionaire to make alterations/ modifications in the scope of the Palanpur Abu Road Project as contemplated by the Palanpur Abu Road Concession Agreement. If the cumulative costs relating to all the change of scope orders exceed 5% of the concession fee in any continuous period of 3 years immediately preceding the date of such change of scope order or if such cumulative costs exceed 25% of the concession fee at any time during the Palanpur Abu Road Concession Period, NHAI may award any works or services, to any person on the basis of open competitive bidding and the Concessionaire shall be entitled to take part in such competitive bidding with a right to match the first-ranked bid. All such changes shall be made by NHAI by an order issued in accordance with the procedure set forth in the Palanpur Abu Road Concession Agreement.

Termination of the Palanpur Abu Road Concession Agreement

Termination by either party

Either Party may in its discretion terminate the Palanpur Abu Road Concession Agreement by giving a termination notice to the other party if a force majeure event subsists for a period of 120 days or more within a continuous period of 365 days. Before issuing such termination notice, the party intending to issue the termination notice shall inform the other party of such intention and grant 15 days' time to make a representation, and may after the expiry of such 15 days period, whether or not it is in receipt of such representation, in its sole discretion issue the termination notice.

Termination by the NHAI

In the event of any of the defaults specified below have occurred, and if the Concessionaire has failed to cure such breach or default within the period provided for the same in the Palanpur Abu Road Concession Agreement, then NHAI shall be entitled to issue a notice of its intention to terminate the Palanpur Abu Road Concession Agreement, with a copy to the lenders. The following events shall constitute an event of default by the Concessionaire (a "**Concessionaire Default**") unless they have occurred as a result of any breach of the Palanpur Abu Road Concession Agreement by NHAI or due to force majeure:

i. the performance security has been encashed and appropriated in accordance with the Palanpur Abu Road Concession Agreement and the Concessionaire has failed to replenish or provide fresh performance security within a cure period of 15 days;

ii. subsequent to the replenishment or furnishing of fresh performance security in accordance with the Palanpur Abu Road Concession Agreement, the Concessionaire fails to cure, within a cure period of 60 days, the Concessionaire Default for which whole or part of the performance security was appropriated;

iii. the Concessionaire abandons or manifests intention to abandon the operation and maintenance of the Palanpur Abu Road Project Highway without the prior written consent of NHAI;

iv. the Concessionaire fails to roll over, renew and furnish new bank guarantee performance security subject to and in accordance with terms of the Palanpur Abu Road Concession Agreement, at least 3 months prior to expiry of subsisting bank guarantee;

v. the Concessionaire is in breach of the Maintenance Requirements or the Safety Requirements;

vi the Concessionaire has failed to make any payment to NHAI within the period specified in the Palanpur Abu Road Concession Agreement;

vii. upon occurrence of a financial default, the lenders' representative has by notice required NHAI to undertake suspension or termination, as the case may be, in accordance with the substitution agreement and the Concessionaire fails to cure the default within the specified cure period;

viii. a breach of any of the project agreements by the Concessionaire causes a material adverse effect;

ix. the Concessionaire creates any encumbrance in breach of the Palanpur Abu Road Concession Agreement;

x. the Concessionaire repudiates the Palanpur Abu Road Concession Agreement or otherwise takes any action or evidences or conveys an intention not to be bound by the Palanpur Abu Road Concession Agreement;

xi. a change in ownership occurs in breach of the provisions of the Palanpur Abu Road Concession Agreement;

xii. there is a transfer, pursuant to law either of the rights and/or obligations of the Concessionaire under any of the project agreements, or of all or part of the assets or undertaking of the Concessionaire, and such transfer causes a material

adverse effect;

xiii. an execution levied on any of the assets of the Concessionaire has caused a material adverse effect;

xiv. the Concessionaire is adjudged bankrupt or insolvent, or if a trustee or receiver is appointed for the Concessionaire or for the whole or material part of its assets that has a material bearing on the Palanpur Abu Road Project;

xv. the Concessionaire has been, or is in the process of being liquidated, dissolved, wound-up, amalgamated or reconstituted in a manner that would cause, in the reasonable opinion of NHAI, a material adverse effect;

xvi. a resolution for winding up of the Concessionaire is passed or any petition for winding up of the Concessionaire is admitted by a court of competent jurisdiction and a provisional liquidator or receiver is appointed and such order has not been set aside within 90 days of the date thereof or the Concessionaire is ordered to be wound up by Court except for the purpose of amalgamation or reconstruction; provided that, as part of such amalgamation or reconstruction, the entire property, assets and undertaking of the Concessionaire are transferred to the amalgamated or reconstructed entity and that the amalgamated or reconstructed entity has unconditionally assumed the obligations of the Concessionaire under the Palanpur Abu Road Concession Agreement and the project agreements; and provided that:

a. the amalgamated or reconstructed entity has the capability and operating experience necessary for the performance of its obligations under the Palanpur Abu Road Concession Agreement and the project agreements;

b. the amalgamated or reconstructed entity has the financial standing to perform its obligations under the Palanpur Abu Road Concession Agreement and the project agreements and has a credit worthiness at least as good as that of the Concessionaire as at Appointed Date; and

c. each of the project agreements remains in full force and effect;

xvii. any representation or warranty of the Concessionaire herein contained which is, as of the date of Palanpur Abu Road Concession Agreement, found to be materially false, incorrect or misleading;

xviii. the Concessionaire submits to NHAI any statement, notice or other document, in written or electronic form, which has a material effect on NHAI's rights, obligations or interests and which is false in material particulars;

xix. the Concessionaire has failed to fulfil any obligation, for which failure termination has been specified in the Palanpur Abu Road Concession Agreement;

xx. the Concessionaire commits a default in complying with any other provision of the Palanpur Abu Road Concession Agreement if such default causes a material adverse effect on NHAI;

xxi. an escrow default occurs and the Concessionaire fails to cure the default within a cure period of 15 days;

Termination by Concessionaire

If any of the defaults specified below shall have occurred, and NHAI fails to cure such default within a cure period of 90 days or such longer period as has been expressly provided in the Palanpur Abu Road Concession Agreement, NHAI shall be deemed to be in default of the Palanpur Abu Road Concession Agreement, unless the default has occurred as a result of any breach of the Palanpur Abu Road Concession Agreement by the Concessionaire or due to force majeure:

i. NHAI commits a material default in complying with any of the provisions of the Palanpur Abu Road Concession Agreement and such default has a material adverse effect on the Concessionaire; or

ii. NHAI repudiates the Palanpur Abu Road Concession Agreement or otherwise takes any action that amounts to or manifests an irrevocable intention not to be bound by the Palanpur Abu Road Concession Agreement.

Termination Payments

The termination payment pursuant to the Palanpur Abu Road Concession Agreement becomes due and payable to the Concessionaire by NHAI within 15 days of the Concessionaire furnishing to NHAI an NOC issued by the lenders/ lenders' representative recording/ effecting release/ vacation/ discharge of the charge on Palanpur Abu Road Project receivables (if any) created by Concessionaire for securing repayment of the debt. If NHAI fails to disburse the full termination payment within 15 days, NHAI shall pay interest at a rate equal to 3% above the bank rate on the amount of termination payment remaining unpaid.

Upon termination of the Palanpur Abu Road Concession Agreement by the NHAI on account of occurrence of a Concessionaire Default, the NHAI shall pay the Concessionaire by way of termination payment 70% of the Unexpired Cash Flow.

Upon termination of the Palanpur Abu Road Concession Agreement by the Concessionaire on account of occurrence of an

NHAI Default, the Concessionaire shall be entitled to receive from NHAI by way of termination payment a sum equal to 105% of the Unexpired Cash Flow.

Technical Clarifications on the Concession Agreements

For details in relation to the technical clarifications received from NHAI in relation to the Concession Agreements, please refer to "*Annexure D - Technical clarifications on the Concession Agreements*" on page 6670 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html .

6. *Concession Agreement between Concessionaire and NHAI dated September 26, 2022 in respect of the Agra Bypass*

The Concessionaire has entered into a concession agreement for tolling, operation, maintenance and transfer of Agra Bypass Project Highway (as defined below) on toll, operate and transfer (TOT) basis (the "**Agra Bypass Concession Agreement**"), for a period of 20 years from the Appointed Date (i.e., the date on which all Conditions Precedent have been satisfied) or such date on which the Agra Bypass Concession Agreement is terminated by a termination notice ("**Agra Bypass Concession Period**").

Certain Definitions

"**Agra Bypass Project**" means the operation and maintenance of the Agra Bypass Project Highway in accordance with the provisions of the Agra Bypass Concession Agreement and includes all works, services and equipment relating to or in respect of the scope of the Agra Bypass Project as set forth in the Agra Bypass Concession Agreement;

"**Agra Bypass Project Assets**" means all physical and other assets relating to and forming part of the Site including (a) rights over the Site in the form of licence, Right of Way or otherwise; (b) tangible assets such as civil works and equipment including foundations, embankments, pavements, road surface, interchanges, bridges, culverts, road overbridges, drainage works, traffic signals, sign boards, kilometre- stones, toll plazas, electrical systems, communication systems, rest areas, relief centers, maintenance depots and administrative offices; (d) all rights of the Concessionaire under the project agreements; (e) security deposits; (f) insurance proceeds; and (g) Applicable Permits and authorisations relating to or in respect of the Agra Bypass Project Highway, but does not include Additional Facilities; and

"**Agra Bypass Project Highway**" means the Site comprising the existing road comprising:

Stretch	State	Start (Km)	End (Km)	Length
Agra Bypass	Uttar Pradesh	0.000	32.800	32.800

and all Agra Bypass Project Assets."

Grant of Concession

Subject to and in accordance with the terms and conditions set forth in the Agra Bypass Concession Agreement, NHAI has granted to the Concessionaire, and the Concessionaire has accepted the concession for a period of 20 years, including the exclusive right, license and authority during the subsistence of the Agra Bypass Concession Agreement to operate, manage and maintain the Agra Bypass. Notwithstanding anything to the contrary in the Agra Bypass Concession Agreement, the parties have expressly agreed that the Concession Period shall not be reduced by more than five years, or shall not be increased by more than ten years on any account or for any reason whatsoever.

Subject to and in accordance with the terms and conditions set forth in the Agra Bypass Concession Agreement, the Concessionaire is entitled to undertake the following in accordance with the terms of the Agra Bypass Concession Agreement, applicable laws and applicable permits:

i. Right of Way, access and license to the Site for the purpose of and to the extent conferred by the provisions of the Agra Bypass Concession Agreement;

ii. manage, operate and maintain the Agra Bypass and regulate the use thereof by third parties in accordance with the terms of Agra Bypass Concession Agreement;

iii. demand, collect and appropriate the fees from vehicles and persons liable for payment of fees for using the Agra Bypass or any part thereof and refuse entry of any vehicle to the Agra Bypass if the fee due is not paid;

iv. perform and fulfill all of the Concessionaire's obligations under and in accordance with the Agra Bypass Concession Agreement;

v. bear and pay all costs, expenses and charges in connection with or incidental to the performance of the obligations of the Concessionaire under the Agra Bypass Concession Agreement; and

vi. neither assign, transfer or sublet or create any lien or encumbrance on the Agra Bypass Concession Agreement, or the concession granted thereby, or on the whole or any part of the Agra Bypass nor transfer, lease or part possession thereof, save and except as expressly permitted by the Agra Bypass Concession Agreement.

Fees

The Concessionaire is entitled to, during the Agra Bypass Concession Period, levy, collect and appropriate fees from users ("**User Fee**") of the Agra Bypass pursuant to and in accordance with the provisions in the Agra Bypass Concession Agreement and National Highways Fee (Determination of Rates and Collection) Rules, 2008 as amended (the "**Fee Rules**") and to appropriate the same. In accordance with the terms of the Agra Bypass Concession Agreement, the Concessionaire shall not collect any fees in relation to exempted vehicles. The fees collected by Concessionaire shall be deposited in the escrow account and appropriated in accordance with the relevant provisions of the Agra Bypass Concession Agreement.

Sub Rule 6(6) of the above-mentioned Fee Rules states,

"*(a) The fee shall be collected by the Central Government or the executing Authority as the case may be and for a specified period in accordance with the terms of agreement entered by the Concessionaire.*
(b) The fee as notified as per Concession Agreement shall be leviable till the end of the concession period and after the Concession Agreement is over, the fee shall be collected by the Central Government executing authority at a reduced rate of 40% of the fee on the date of transfer of such section of National Highways, bridge, tunnel or bypass, as the case may be, to be revised annually in accordance with these rules:

Provided that after the recovery of capital cost through user fee realised, in respect of a public funded project, the fee leviable would be reduced to 40% of the user fee for such section of National Highways, bridge, tunnel or bypass as the case may be, to be revised annually in accordance with these rules."

In respect of the above, NHAI has clarified that Rule 6 of the Fee Rules provides that the user fee to be notified by Government as per the format of Schedule M of Concession Agreement shall be leviable till the end of the concession period. Hence, the rate of User Fee rate shall only be reduced after the concession period is over.

Concession Fees

As consideration for the grant of the Concession, the Concessionaire is required to pay a minimum concession fee to NHAI equivalent to ₹ 10,210,00 million, within 120 days of the date of execution of the concession agreement or any extended date as agreed by NHAI prior to the Appointed Date, as a Condition Precedent. The Concessionaire agrees that payment of the concession fee constitutes essential condition of the Concession Agreement. Further, as communicated by the Authority by way of a letter dated September 21, 2021, any amount raised from the proceeds of the Offer in excess of the base concession fee (being the aggregate of Concession Fees payable to NHAI in terms of the Additional Concession Agreements) shall be paid to the Authority. For further details, see the section titled "*Use of Proceeds – Details of Utilisation of Offer Proceeds - Infusion of debt/equity into to the Project SPV*" on page 188."

For the purposes of stamp duty payment, concession agreements are generally considered to be agreements which are not lease deeds and stamp duty of ₹ 100.00 is typically paid for such concession agreements. However, stamp duty authorities 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 NHAI. The stamp authorities allege 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 1.0% and 11.0% of the annual rent or premium payable or the market value of the property. Furthermore, stamp duty authorities may impose penalties for payment of inadequate stamp duty, which could extend up to ten (10) times the amount of the stamp duty payable. Accordingly, concession agreements that have not been stamped as such could be considered to be inadequately stamped. The High Courts of Allahabad and Maharashtra have also held that a concession agreement ought to be stamped as a lease agreement and have upheld the imposition of a higher stamp duty on such agreements.

While we have paid stamp duty of ₹ 100.00 on each of our Concession Agreements in accordance with usual practice, if any demand for payment of a higher stamp duty or penalty is imposed, it would increase the costs of the Toll Roads.

In respect of above, NHAI has clarified that:

(i) As on the date of Agra Bypass Concession Agreement, GST is not applicable on Concession Fee. However, if it becomes applicable at a later stage, this shall be considered as change in law.
(ii) There is no requirement of stamp duty in case of Concession Agreements since Fee Rules provided for levy and collection of user fee and not toll tax. In case, in future any such demand arises, it shall be treated as change in law.

Escrow Account

The provisions in relation to the escrow account in the Agra Bypass Concession Agreement are only applicable if the obligations of the Concessionaire under the Agra Bypass Concession Agreement are financed by the Lenders.

The Concessionaire shall, prior to the Appointed Date, open and establish the escrow account with the escrow bank and all funds constituting the financing package related to the Agra Bypass shall be credited to such escrow account. During the Agra Bypass Concession Period all fees and any other revenues including the proceeds of any rentals, deposits, capital receipts or insurance claims from or in respect of the Agra Bypass Project Highway shall be deposited therein. In addition, all payments by NHAI pursuant to the Agra Bypass Concession Agreement, including, if any, in relation to the change of scope in the Agra Bypass shall be deposited by NHAI in the escrow account.

Withdrawals from Escrow Account

The Concessionaire shall give, at the time of the opening of the escrow account, irrevocable instructions by way of an escrow agreement substantially in form set forth in the Agra Bypass Concession Agreement to the escrow bank instructing, *inter alia*, that the deposits into the escrow account shall subject to the provisions of the Agra Bypass Concession Agreement, be appropriated in the following order every month and if not due in a month then appropriated proportionately in such month and retained in the escrow account and paid out therefrom in the month when due unless otherwise expressly provided in the instruction letter:

i. all taxes due and payable by the Concessionaire for and in respect of the Agra Bypass;

ii. concession fee;

iii. all payments relating to construction of the Agra Bypass, subject to and in accordance with the conditions, if any, set forth in the financing agreements;

iv. operation and maintenance expenses;

v. operation and maintenance expenses and other costs and expenses incurred by NHAI in accordance with the provisions of the Agra Bypass Concession Agreement, and certified by NHAI as due and payable to it;

vi. monthly proportionate provision of debt service payment due in an accounting year;

vii. all payments and damages certified by NHAI as due and payable to it by the Concessionaire; and

vii. balance, if any, in accordance with the instructions of the Concessionaire.

Withdrawals upon Termination

Notwithstanding anything to the contrary contained in the escrow agreement and subject to the provisions of the Agra Bypass Concession Agreement, in the case of termination, the amounts standing to the credit of the escrow account shall be appropriated in the following order:

i. all taxes due and payable by the Concessionaire for and in respect of the Agra Bypass;

ii. payment due to the lenders;

iii. all payments and damages certified by NHAI as due and payable to it by the Concessionaire;

iv. retention and payments relating to the liability for defects and deficiencies;

v. incurred or accrued operation and maintenance expenses;

vi. any other payments required to be made under the Agra Bypass Concession Agreement; and

vii. balance, if any, in accordance with the instructions of the Concessionaire.

Change of Scope

NHAI may, notwithstanding anything to the contrary contained in the Agra Bypass Concession Agreement, require the Concessionaire to make alterations/ modifications in the scope of Agra Bypass as contemplated by the Agra Bypass Concession Agreement. If the cumulative costs relating to all the change of scope orders exceed 5% of the concession fee in any continuous period of three years immediately preceding the date of such change of scope order or if such cumulative costs exceed 25% of the concession fee at any time during the Agra Bypass Concession Period, NHAI may award any works or services, to any person on the basis of open competitive bidding and the Concessionaire shall be entitled to take part in such competitive bidding

with a right to match the first-ranked bid in terms of the selection criteria, either by itself where such work requires tolling, operation and maintenance, or through another company where such work requires construction on any part of the Project Highway, subject to payment of 2% (two per cent) of the bid amount to the Authority, and thereupon securing the award of such works or services. For the avoidance of doubt, it is agreed that the Concessionaire shall be entitled to exercise such option only if the Concessionaire has participated in the bidding process either individually or as a consortium or joint venture with another company and fulfils the eligibility criteria to undertake such work without compromising with its overall liability. All such changes shall be made by NHAI by an order issued in accordance with the procedure set forth in the Agra Bypass Concession Agreement.

Termination of the Agra Bypass Concession Agreement

Termination by either party

Either Party may in its discretion terminate the Agra Bypass Concession Agreement by giving a termination notice to the other party if a force majeure event subsists for a period of 120 days or more within a continuous period of 365 days. Before issuing such termination notice, the party intending to issue the termination notice shall inform the other party of such intention and grant 15 days' time to make a representation, and may after the expiry of such 15 days period, whether or not it is in receipt of such representation, in its sole discretion issue the termination notice.

Termination by the NHAI

In the event of any of the defaults specified below have occurred, and if the Concessionaire has failed to cure such breach or default within the period provided for the same in the Agra Bypass Concession Agreement, then NHAI shall be entitled to issue a notice of its intention to terminate the Agra Bypass Concession Agreement, with a copy to the lenders. The following events shall constitute an event of default by the Concessionaire (a "**Concessionaire Default**") unless they have occurred as a result of any breach of the Agra Bypass Concession Agreement by NHAI or due to force majeure:

i. the performance security has been encashed and appropriated in accordance with the Agra Bypass Concession Agreement and the Concessionaire has failed to replenish or provide fresh performance security within a cure period of 15 days;

ii. subsequent to the replenishment or furnishing of fresh performance security in accordance with the Agra Bypass Concession Agreement, the Concessionaire fails to cure, within a cure period of 60 days, the Concessionaire Default for which whole or part of the performance security was appropriated;

iii. the Concessionaire abandons or manifests intention to abandon the operation and maintenance of the Agra Bypass without the prior written consent of NHAI;

iv. the Concessionaire fails to roll over, renew and furnish new bank guarantee performance security subject to and in accordance with terms of the Agra Bypass Concession Agreement, at least three months prior to expiry of subsisting bank guarantee;

v. the Concessionaire is in breach of the Maintenance Requirements or the Safety Requirements, as the case may be;

vi the Concessionaire has failed to make any payment to NHAI within the period specified in the Agra Bypass Concession Agreement;

vii. upon occurrence of a financial default, the lenders' representative has by notice required NHAI to undertake suspension or termination, as the case may be, in accordance with the substitution agreement and the Concessionaire fails to cure the default within the specified cure period;

viii. a breach of any of the project agreements by the Concessionaire causes a material adverse effect;

ix. the Concessionaire creates any encumbrance in breach of the Agra Bypass Concession Agreement;

x. the Concessionaire repudiates the Agra Bypass Concession Agreement or otherwise takes any action or evidences or conveys an intention not to be bound by the Agra Bypass Concession Agreement;

xi. a change in ownership occurs in breach of the provisions of the Agra Bypass Concession Agreement;

xii. there is a transfer, pursuant to law either of the rights and/or obligations of the Concessionaire under any of the project agreements, or of all or part of the assets or undertaking of the Concessionaire, and such transfer causes a material adverse effect;

xiii. an execution levied on any of the assets of the Concessionaire has caused a material adverse effect;

xiv. the Concessionaire is adjudged bankrupt or insolvent, or if a trustee or receiver is appointed for the Concessionaire or for the whole or material part of its assets that has a material bearing on the Agra Bypass;

xv. the Concessionaire has been, or is in the process of being liquidated, dissolved, wound-up, amalgamated or reconstituted in a manner that would cause, in the reasonable opinion of NHAI, a material adverse effect;

xvi. a resolution for winding up of the Concessionaire is passed or any petition for winding up of the Concessionaire is admitted by a court of competent jurisdiction and a provisional liquidator or receiver is appointed and such order has not been set aside within 90 days of the date thereof or the Concessionaire is ordered to be wound up by Court except for the purpose of amalgamation or reconstruction; provided that, as part of such amalgamation or reconstruction, the entire property, assets and undertaking of the Concessionaire are transferred to the amalgamated or reconstructed entity and that the amalgamated or reconstructed entity has unconditionally assumed the obligations of the Concessionaire under the Agra Bypass Concession Agreement and the project agreements; and provided that:

a. the amalgamated or reconstructed entity has the capability and operating experience necessary for the performance of its obligations under the Agra Bypass Concession Agreement and the project agreements;

b. the amalgamated or reconstructed entity has the financial standing to perform its obligations under the Agra Bypass Concession Agreement and the project agreements and has a credit worthiness at least as good as that of the Concessionaire as at Appointed Date; and

c. each of the project agreements remains in full force and effect;

xvii. any representation or warranty of the Concessionaire herein contained which is, as of the date of Agra Bypass Concession Agreement, found to be materially false, incorrect or misleading;

xviii. the Concessionaire submits to NHAI any statement, notice or other document, in written or electronic form, which has a material effect on NHAI's rights, obligations or interests and which is false in material particulars;

xix. the Concessionaire has failed to fulfil any obligation, for which failure termination has been specified in the Agra Bypass Concession Agreement;

xx. the Concessionaire commits a default in complying with any other provision of the Agra Bypass Concession Agreement if such default causes a material adverse effect on NHAI;

xxi. an escrow default occurs and the Concessionaire fails to cure the default within a cure period of 15 days;

Termination by Concessionaire

If any of the defaults specified below shall have occurred, and NHAI fails to cure such default within a cure period of 90 days or such longer period as has been expressly provided in the Agra Bypass Concession Agreement, NHAI shall be deemed to be in default of the Agra Bypass Concession Agreement, unless the default has occurred as a result of any breach of the Agra Bypass Concession Agreement by the Concessionaire or due to force majeure:

i. NHAI commits a material default in complying with any of the provisions of the Agra Bypass Concession Agreement and such default has a material adverse effect on the Concessionaire; or
ii. NHAI repudiates the Agra Bypass Concession Agreement or otherwise takes any action that amounts to or manifests an irrevocable intention not to be bound by the Agra Bypass Concession Agreement; or
iii. the State commits a material default in complying with the provisions of the State Support Agreement if such default has a Material Adverse Effect on the Concessionaire and the breach continues for a period of 90 (ninety) days from the date of notice given in this behalf by the Concessionaire to the Authority.

Termination Payments

The termination payment pursuant to the Agra Bypass Concession Agreement becomes due and payable to the Concessionaire by NHAI within 15 days of the Concessionaire furnishing to NHAI an NOC, with the necessary particulars, issued by the lenders/ lenders' representative recording/ effecting release/ vacation/ discharge of the charge on Agra Bypass receivables (if any) created by Concessionaire for securing repayment of the debt. If NHAI fails to disburse the full termination payment within 15 days, NHAI shall pay interest at a rate equal to 3% above the bank rate on the amount of termination payment remaining unpaid, provided that such delay shall not exceed 90 days.

Upon termination of the Agra Bypass Concession Agreement by the NHAI on account of occurrence of a Concessionaire Default and in addition to NHAI forfeiting the performance security, the NHAI shall pay the Concessionaire by way of termination payment 70% of the Unexpired Cash Flow.

Upon termination of the Agra Bypass Concession Agreement by the Concessionaire on account of occurrence of an NHAI

Default as provided for in the Agra Bypass Concession Agreement, the Concessionaire shall be entitled to receive from NHAI by way of termination payment a sum equal to 105% of the Unexpired Cash Flow.

Technical Clarifications on the Concession Agreements

For details in relation to the technical clarifications received from NHAI in relation to the Concession Agreements, please refer to Annexure 1 of the Agra Bypass Concession Agreement.

7. *Concession Agreement between Concessionaire and NHAI dated September 26, 2022 in respect of the Borkhedi Kelapur Project*

The Concessionaire has entered into a concession agreement for tolling, operation, maintenance and transfer of Borkhedi Kelpaur Project Highway (as defined below) on toll, operate and transfer (TOT) basis (the "**Borkhedi Kelapur Concession Agreement**"), for a period of 20 years from the the Appointed Date (i.e., the date on which all Conditions Precedent have been satisfied) or such date on which the Borkhedi Kelapur Concession Agreement is terminated by a termination notice ("**Borkhedi Kelapur Concession Period**").

Certain Definitions

"**Borkhedi Kelapur Project**" means the operation and maintenance of the Borkhedi Kelapur Project Highway in accordance with the provisions of the Borkhedi Kelapur Concession Agreement and includes all works, services and equipment relating to or in respect of the scope of the Borkhedi Kelapur Project as set forth in the Borkhedi Kelapur Concession Agreement;

"**Borkhedi Kelapur Project Assets**" means all physical and other assets relating to and forming part of the Site including (a) rights over the Site in the form of licence, Right of Way or otherwise; (b) tangible assets such as civil works and equipment including foundations, embankments, pavements, road surface, interchanges, bridges, culverts, road overbridges, drainage works, traffic signals, sign boards, kilometre- stones, toll plazas, electrical systems, communication systems, rest areas, relief centers, maintenance depots and administrative offices; (d) all rights of the Concessionaire under the project agreements; (e) security deposits; (f) insurance proceeds; and (g) Applicable Permits and authorisations relating to or in respect of the Borkhedi Kelapur Project Highway, but does not include Additional Facilities; and

"**Borkhedi Kelapur Project Highway**" means the Site comprising the existing road comprising:

Stretch	State	Start (Km)	End (Km)	Length
Borkhedi-Wadner-Deodhari-Kelapur	Maharashtra	36.600	175.000	138.150

and all Borkhedi Kelapur Project Assets."

Grant of Concession

Subject to and in accordance with the terms and conditions set forth in the Borkhedi Kelapur Concession Agreement, NHAI has granted to the Concessionaire, and the Concessionaire has accepted the concession for a period of 20 years, including the exclusive right, license and authority during the subsistence of the Borkhedi Kelapur Agreement to operate, manage and maintain the Borkhedi Kelapur Project Highway. Notwithstanding anything to the contrary in the Borkhedi Kelapur Concession Agreement, the parties have expressly agreed that the Concession Period shall not be reduced by more than five years, or shall not be increased by more than ten years on any account or for any reason whatsoever.

Subject to and in accordance with the terms and conditions set forth in the Borkhedi Kelapur Concession Agreement, the Concessionaire is entitled to undertake the following in accordance with the terms of the Borkhedi Kelapur Concession Agreement, applicable laws and applicable permits:

i. Right of Way, access and license to the Site for the purpose of and to the extent conferred by the provisions of the Borkhedi Kelapur Concession Agreement;

ii. manage, operate and maintain the Borkhedi Kelapur Project Highway and regulate the use thereof by third parties in accordance with the terms of Borkhedi Kelapur Concession Agreement;

iii. demand, collect and appropriate the fees from vehicles and persons liable for payment of fees for using the Borkhedi Kelapur Project Highway or any part thereof and refuse entry of any vehicle to the Borkhedi Kelapur Project Highway if the fee due is not paid;

iv. perform and fulfill all of the Concessionaire's obligations under and in accordance with the Borkhedi Kelapur Concession Agreement;

v. bear and pay all costs, expenses and charges in connection with or incidental to the performance of the obligations of the Concessionaire under the Borkhedi Kelapur Concession Agreement; and

vi. neither assign, transfer or sublet or create any lien or encumbrance on the Borkhedi Kelapur Concession Agreement, or the concession granted thereby, or on the whole or any part of the Borkhedi Kelapur Project Highway nor transfer, lease or part possession thereof, save and except as expressly permitted by the Borkhedi Kelapur Concession Agreement.

Fees

The Concessionaire is entitled to, during the Borkhedi Kelapur Concession Period, levy, collect and appropriate fees from users ("**User Fee**") of the Borkhedi Kelapur Project Highway pursuant to and in accordance with the provisions in the Borkhedi Kelapur Concession Agreement and the Fee Rules and to appropriate the same. In accordance with the terms of the Borkhedi Kelapur Concession Agreement, the Concessionaire shall not collect any fees in relation to exempted vehicles. The fees collected by Concessionaire shall be deposited in the escrow account and appropriated in accordance with the relevant provisions of the Borkhedi Kelapur Concession Agreement.

Sub Rule 6(6) of the above-mentioned Fee Rules states,

"*(a) The fee shall be collected by the Central Government or the executing Authority as the case may be and for a specified period in accordance with the terms of agreement entered by the Concessionaire.*
(b) The fee as notified as per Concession Agreement shall be leviable till the end of the concession period and after the Concession Agreement is over, the fee shall be collected by the Central Government executing authority at a reduced rate of 40% of the fee on the date of transfer of such section of National Highways, bridge, tunnel or bypass, as the case may be, to be revised annually in accordance with these rules:

Provided that after the recovery of capital cost through user fee realised, in respect of a public funded project, the fee leviable would be reduced to 40% of the user fee for such section of National Highways, bridge, tunnel or bypass as the case may be, to be revised annually in accordance with these rules."

In respect of the above, NHAI has clarified that Rule 6 of the Fee Rules provides that the user fee to be notified by Government as per the format of Schedule M of Concession Agreement shall be leviable till the end of the concession period. Hence, the rate of User Fee rate shall only be reduced after the concession period is over.

Concession Fees

As consideration for the grant of the Concession, the Concessionaire is required to pay a concession fee to NHAI equivalent to ₹ 13,540.00 million, within 120 days of the date of execution of the concession agreement or any extended date as agreed by NHAI prior to the Appointed Date as a Condition Precedent. The Concessionaire agrees that payment of the concession fee constitutes essential condition of the Concession Agreement. Further, as communicated by the Authority by way of a letter dated September 21, 2021, any amount raised from the proceeds of the Offer in excess of the base concession fee (being the aggregate of Concession Fees payable to NHAI in terms of the Additional Concession Agreements) shall be paid to the Authority. For further details, see the section titled "*Use of Proceeds – Details of Utilisation of Offer Proceeds - Infusion of debt/equity into to the Project SPV*" on page 188.

For the purposes of stamp duty payment, concession agreements are generally considered to be agreements which are not lease deeds and stamp duty of ₹ 100.00 is typically paid for such concession agreements. However, stamp duty authorities 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 NHAI. The stamp authorities allege 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 1.0% and 11.0% of the annual rent or premium payable or the market value of the property. Furthermore, stamp duty authorities may impose penalties for payment of inadequate stamp duty, which could extend up to ten (10) times the amount of the stamp duty payable. Accordingly, concession agreements that have not been stamped as such could be considered to be inadequately stamped. The High Courts of Allahabad and Maharashtra have also held that a concession agreement ought to be stamped as a lease agreement and have upheld the imposition of a higher stamp duty on such agreements.

While we have paid stamp duty of ₹ 100.00 on each of our Concession Agreements in accordance with usual practice, if any demand for payment of a higher stamp duty or penalty is imposed, it would increase the costs of the Toll Roads.

In respect of above, NHAI has clarified that:

(i) As on the date of Borkhedi Kelapur Concession Agreement, GST is not applicable on Concession Fee. However, if it becomes applicable at a later stage, this shall be considered as change in law.
(ii) There is no requirement of stamp duty in case of Concession Agreements since Fee Rules provided for levy and collection of user fee and not toll tax. In case, in future any such demand arises, it shall be treated as change in law.

Escrow Account

The provisions in relation to the escrow account in the Borkhedi Kelapur Concession Agreement are only applicable if the obligations of the Concessionaire under the Borkhedi Kelapur Concession Agreement are financed by the Lenders.

The Concessionaire shall, prior to the Appointed Date, open and establish the escrow account with the escrow bank and all funds constituting the financing package related to the Borkhedi Kelapur Project shall be credited to such escrow account. During the Borkhedi Kelapur Concession Period all fees and any other revenues including the proceeds of any rentals, deposits, capital receipts or insurance claims from or in respect of the Borkhedi Kelapur Project Highway shall be deposited therein. In addition, all payments by NHAI pursuant to the Borkhedi Kelapur Concession Agreement, including, if any, in relation to the change of scope in the Borkhedi Kelapur Project shall be deposited by NHAI in the escrow account.

Withdrawals from Escrow Account

The Concessionaire shall give, at the time of the opening of the escrow account, irrevocable instructions by way of an escrow agreement substantially in form set forth in the Borkhedi Kelapur Concession Agreement to the escrow bank instructing, *inter alia*, that the deposits into the escrow account shall subject to the provisions of the Borkhedi Kelapur Concession Agreement, be appropriated in the following order every month and if not due in a month then appropriated proportionately in such month and retained in the escrow account and paid out therefrom in the month when due unless otherwise expressly provided in the instruction letter:

i. all taxes due and payable by the Concessionaire for and in respect of the Borkhedi Kelapur Project Highway;

ii. concession fee;

iii. all payments relating to construction of the Borkhedi Kelapur Project Highway, subject to and in accordance with the conditions, if any, set forth in the financing agreements;

iv. operation and maintenance expenses;

v. operation and maintenance expenses and other costs and expenses incurred by NHAI in accordance with the provisions of the Borkhedi Kelapur Concession Agreement, and certified by NHAI as due and payable to it;

vi. monthly proportionate provision of debt service payment due in an accounting year;

vii. all payments and damages certified by NHAI as due and payable to it by the Concessionaire; and

vii. balance, if any, in accordance with the instructions of the Concessionaire.

Withdrawals upon Termination

Notwithstanding anything to the contrary contained in the escrow agreement and subject to the provisions of the Borkhedi Kelapur Concession Agreement, in the case of termination, the amounts standing to the credit of the escrow account shall be appropriated in the following order:

i. all taxes due and payable by the Concessionaire for and in respect of the Borkhedi Kelapur Project Highway;

ii. payment due to the lenders;

iii. all payments and damages certified by NHAI as due and payable to it by the Concessionaire;

iv. retention and payments relating to the liability for defects and deficiencies;

v. incurred or accrued operation and maintenance expenses;

vi. any other payments required to be made under the Borkhedi Kelapur Concession Agreement; and

vii. balance, if any, in accordance with the instructions of the Concessionaire.

Change of Scope

NHAI may, notwithstanding anything to the contrary contained in the Borkhedi Kelapur Concession Agreement, require the Concessionaire to make alterations/ modifications in the scope of the Borkhedi Kelapur Project as contemplated by the Borkhedi Kelapur Concession Agreement. If the cumulative costs relating to all the change of scope orders exceed 5% of the concession fee in any continuous period of 3 years immediately preceding the date of such change of scope order or if such cumulative

costs exceed 25% of the concession fee at any time during the Borkhedi Kelapur Concession Period, NHAI may award any works or services, to any person on the basis of open competitive bidding and the Concessionaire shall be entitled to take part in such competitive bidding with a right to match the first-ranked bid in terms of the selection criteria, either by itself where such work requires tolling, operation and maintenance, or through another company where such work requires construction on any part of the Project Highway, subject to payment of 2% (two per cent) of the bid amount to the Authority, and thereupon securing the award of such works or services. For the avoidance of doubt, it is agreed that the Concessionaire shall be entitled to exercise such option only if the Concessionaire has participated in the bidding process either individually or as a consortium or JV with another company and fulfils the eligibility criteria to undertake such work without compromising with its overall liability. All such changes shall be made by NHAI by an order issued in accordance with the procedure set forth in the Borkhedi Kelapur Concession Agreement.

Termination of the Borkhedi Kelapur Concession Agreement

Termination by either party

Either Party may in its discretion terminate the Borkhedi Kelapur Concession Agreement by giving a termination notice to the other party if a force majeure event subsists for a period of 120 days or more within a continuous period of 365 days. Before issuing such termination notice, the party intending to issue the termination notice shall inform the other party of such intention and grant 15 days' time to make a representation and may after the expiry of such 15 days period, whether or not it is in receipt of such representation, in its sole discretion issue the termination notice.

Termination by the NHAI

In the event of any of the defaults specified below have occurred, and if the Concessionaire has failed to cure such breach or default within the period provided for the same in the Borkhedi Kelapur Concession Agreement, then NHAI shall be entitled to issue a notice of its intention to terminate the Borkhedi Kelapur Concession Agreement, with a copy to the lenders. The following events shall constitute an event of default by the Concessionaire (a "**Concessionaire Default**") unless they have occurred as a result of any breach of the Borkhedi Kelapur Concession Agreement by NHAI or due to force majeure:

i. the performance security has been encashed and appropriated in accordance with the Borkhedi Kelapur Concession Agreement and the Concessionaire has failed to replenish or provide fresh performance security within a cure period of 15 days;

ii. subsequent to the replenishment or furnishing of fresh performance security in accordance with the Borkhedi Kelapur Concession Agreement, the Concessionaire fails to cure, within a cure period of 60 days, the Concessionaire Default for which whole or part of the performance security was appropriated;

iii. the Concessionaire abandons or manifests intention to abandon the operation and maintenance of the Borkhedi Kelapur Project Highway without the prior written consent of NHAI;

iv. the Concessionaire fails to roll over, renew and furnish new bank guarantee performance security subject to and in accordance with terms of the Borkhedi Kelapur Concession Agreement, at least three months prior to expiry of subsisting bank guarantee;

v. the Concessionaire is in breach of the Maintenance Requirements or the Safety Requirements, as the case may be;

vi the Concessionaire has failed to make any payment to NHAI within the period specified in the Borkhedi Kelapur Concession Agreement;

vii. upon occurrence of a financial default, the lenders' representative has by notice required NHAI to undertake suspension or termination, as the case may be, in accordance with the substitution agreement and the Concessionaire fails to cure the default within the specified cure period;

viii. a breach of any of the project agreements by the Concessionaire causes a material adverse effect;

ix. the Concessionaire creates any encumbrance in breach of the Borkhedi Kelapur Concession Agreement;

x. the Concessionaire repudiates the Borkhedi Kelapur Concession Agreement or otherwise takes any action or evidences or conveys an intention not to be bound by the Borkhedi Kelapur Concession Agreement;

xi. a change in ownership occurs in breach of the provisions of the Borkhedi Kelapur Concession Agreement;

xii. there is a transfer, pursuant to law either of the rights and/or obligations of the Concessionaire under any of the project agreements, or of all or part of the assets or undertaking of the Concessionaire, and such transfer causes a material adverse effect;

xiii. an execution levied on any of the assets of the Concessionaire has caused a material adverse effect;

xiv. the Concessionaire is adjudged bankrupt or insolvent, or if a trustee or receiver is appointed for the Concessionaire or for the whole or material part of its assets that has a material bearing on the Borkhedi Kelapur Project;

xv. the Concessionaire has been, or is in the process of being liquidated, dissolved, wound-up, amalgamated or reconstituted in a manner that would cause, in the reasonable opinion of NHAI, a material adverse effect;

xvi. a resolution for winding up of the Concessionaire is passed or any petition for winding up of the Concessionaire is admitted by a court of competent jurisdiction and a provisional liquidator or receiver is appointed and such order has not been set aside within 90 days of the date thereof or the Concessionaire is ordered to be wound up by Court except for the purpose of amalgamation or reconstruction; provided that, as part of such amalgamation or reconstruction, the entire property, assets and undertaking of the Concessionaire are transferred to the amalgamated or reconstructed entity and that the amalgamated or reconstructed entity has unconditionally assumed the obligations of the Concessionaire under the Borkhedi Kelapur Concession Agreement and the project agreements; and provided that:

a. the amalgamated or reconstructed entity has the capability and operating experience necessary for the performance of its obligations under the Borkhedi Kelapur Concession Agreement and the project agreements;

b. the amalgamated or reconstructed entity has the financial standing to perform its obligations under the Borkhedi Kelapur Concession Agreement and the project agreements and has a credit worthiness at least as good as that of the Concessionaire as at Appointed Date; and

c. each of the project agreements remains in full force and effect;

xvii. any representation or warranty of the Concessionaire herein contained which is, as of the date of Borkhedi Kelapur Concession Agreement, found to be materially false, incorrect or misleading;

xviii. the Concessionaire submits to NHAI any statement, notice or other document, in written or electronic form, which has a material effect on NHAI's rights, obligations or interests and which is false in material particulars;

xix. the Concessionaire has failed to fulfil any obligation, for which failure termination has been specified in the Borkhedi Kelapur Concession Agreement;

xx. the Concessionaire commits a default in complying with any other provision of the Borkhedi Kelapur Concession Agreement if such default causes a material adverse effect on NHAI;

xxi. an escrow default occurs and the Concessionaire fails to cure the default within a cure period of 15 days;

Termination by Concessionaire

If any of the defaults specified below shall have occurred, and NHAI fails to cure such default within a cure period of 90 days or such longer period as has been expressly provided in the Borkhedi Kelapur Concession Agreement, NHAI shall be deemed to be in default of the Borkhedi Kelapur Concession Agreement, unless the default has occurred as a result of any breach of the Borkhedi Kelapur Concession Agreement by the Concessionaire or due to force majeure:

i. NHAI commits a material default in complying with any of the provisions of the Borkhedi Kelapur Concession Agreement and such default has a material adverse effect on the Concessionaire; or
ii. NHAI repudiates the Borkhedi Kelapur Concession Agreement or otherwise takes any action that amounts to or manifests an irrevocable intention not to be bound by the Borkhedi Kelapur Concession Agreement; or
iii. the State commits a material default in complying with the provisions of the State Support Agreement if such default has a Material Adverse Effect on the Concessionaire and the breach continues for a period of 90 (ninety) days from the date of notice given in this behalf by the Concessionaire to the Authority.

Termination Payments

The termination payment pursuant to the Borkhedi Kelapur Concession Agreement becomes due and payable to the Concessionaire by NHAI within 15 days of the Concessionaire furnishing to NHAI an NOC issued by the lenders/ lenders' representative recording/ effecting release/ vacation/ discharge of the charge on Borkhedi Kelapur Project receivables (if any) created by Concessionaire for securing repayment of the debt. If NHAI fails to disburse the full termination payment within 15 days, NHAI shall pay interest at a rate equal to 3% above the bank rate on the amount of termination payment remaining unpaid.

Upon termination of the Borkhedi Kelapur Concession Agreement by the NHAI on account of occurrence of a Concessionaire Default, the NHAI shall pay the Concessionaire by way of termination payment 70% of the Unexpired Cash Flow.

Upon termination of the Borkhedi Kelapur Concession Agreement by the Concessionaire on account of occurrence of an

NHAI Default, the Concessionaire shall be entitled to receive from NHAI by way of termination payment a sum equal to 105% of the Unexpired Cash Flow.

Technical Clarifications on the Concession Agreements

For details in relation to the technical clarifications received from NHAI in relation to the Concession Agreements, please refer to Annexure 1 of the Borkhedi Kelapur Concession Agreement.

8. ***Concession Agreement between Concessionaire and NHAI dated September 26, 2022 in respect of the Shivpuri Jhansi Project***

The Concessionaire has entered into a concession agreement for tolling, operation, maintenance and transfer of Shivpuri Jhansi Project Highway (as defined below) on toll, operate and transfer (TOT) basis (the "**Shivpuri Jhansi Concession Agreement**"), for a period of 20 years from the Appointed Date (i.e., the date on which all Conditions Precedent have been satisfied) or such date on which the Shivpuri Jhansi Concession Agreement is terminated by a termination notice ("**Shivpuri Jhansi Concession Period**").

Certain Definitions

"**Shivpuri Jhansi Project**" means the operation and maintenance of the Shivpuri Jhansi Project Highway in accordance with the provisions of the Shivpuri Jhansi Concession Agreement and includes all works, services and equipment relating to or in respect of the scope of the Shivpuri Jhansi Project as set forth in the Shivpuri Jhansi Concession Agreement;

"**Shivpuri Jhansi Project Assets**" means all physical and other assets relating to and forming part of the Site including (a) rights over the Site in the form of licence, Right of Way or otherwise; (b) tangible assets such as civil works and equipment including foundations, embankments, pavements, road surface, interchanges, bridges, culverts, road overbridges, drainage works, traffic signals, sign boards, kilometre- stones, toll plazas, electrical systems, communication systems, rest areas, relief centers, maintenance depots and administrative offices; (d) all rights of the Concessionaire under the project agreements; (e) security deposits; (f) insurance proceeds; and (g) Applicable Permits and authorisations relating to or in respect of the Shivpuri Jhansi Project Highway, but does not include Additional Facilities; and

"**Shivpuri Jhansi Project Highway**" means the Site comprising the existing road comprising:

Stretch	State	Start (Km)	End (Km)	Length
Shivpuri Jhansi	Madhya Pradesh	1305.087	1380.387	75.300

and all Shivpuri Jhansi Project Assets."

Grant of Concession

Subject to and in accordance with the terms and conditions set forth in the Shivpuri Jhansi Concession Agreement, NHAI has granted to the Concessionaire, and the Concessionaire has accepted the concession for a period of 20 years, including the exclusive right, license and authority during the subsistence of the Shivpuri Jhansi Concession Agreement to operate, manage and maintain the Shivpuri Jhansi Project Highway. Notwithstanding anything to the contrary in the Shivpuri Jhansi Concession Agreement, the Parties expressly agree that the Concession Period shall not be reduced by more than five years or shall not be increased by more than ten years on any account or for any reason whatsoever.

Subject to and in accordance with the terms and conditions set forth in the Shivpuri Jhansi Concession Agreement, the Concessionaire is entitled to undertake the following in accordance with the terms of the Shivpuri Jhansi Concession Agreement, applicable laws and applicable permits:

i. Right of Way, access and license to the Site for the purpose of and to the extent conferred by the provisions of the Shivpuri Jhansi Concession Agreement;

ii. manage, operate and maintain the Shivpuri Jhansi Project Highway and regulate the use thereof by third parties in accordance with the terms of Shivpuri Jhansi Concession Agreement;

iii. demand, collect and appropriate the fees from vehicles and persons liable for payment of fees for using the Shivpuri Jhansi Project Highway or any part thereof and refuse entry of any vehicle to the Shivpuri Jhansi Project Highway if the fee due is not paid;

iv. perform and fulfill all of the Concessionaire's obligations under and in accordance with the Shivpuri Jhansi Concession Agreement;

v. bear and pay all costs, expenses and charges in connection with or incidental to the performance of the obligations of

the Concessionaire under the Shivpuri Jhansi Concession Agreement; and

vi. neither assign, transfer or sublet or create any lien or encumbrance on the Shivpuri Jhansi Concession Agreement, or the concession granted thereby, or on the whole or any part of the Shivpuri Jhansi Project Highway nor transfer, lease or part possession thereof, save and except as expressly permitted by the Shivpuri Jhansi Concession Agreement.

Fees

The Concessionaire is entitled to, during the Shivpuri Jhansi Concession Period, levy, collect and appropriate fees from users ("**User Fee**") of the Shivpuri Jhansi Project Highway pursuant to and in accordance with the provisions in the Shivpuri Jhansi Concession Agreement and Fee Rules and to appropriate the same. In accordance with the terms of the Shivpuri Jhansi Concession Agreement, the Concessionaire shall not collect any fees in relation to exempted vehicles. The fees collected by Concessionaire shall be deposited in the escrow account and appropriated in accordance with the relevant provisions of the Shivpuri Jhansi Concession Agreement.

Sub Rule 6(6) of the above-mentioned Fee Rules states,
"*(a) The fee shall be collected by the Central Government or the executing Authority as the case may be and for a specified period in accordance with the terms of agreement entered by the Concessionaire.*
(b) The fee as notified as per Concession Agreement shall be leviable till the end of the concession period and after the Concession Agreement is over, the fee shall be collected by the Central Government executing authority at a reduced rate of 40% of the fee on the date of transfer of such section of National Highways, bridge, tunnel or bypass, as the case may be, to be revised annually in accordance with these rules:

Provided that after the recovery of capital cost through user fee realised, in respect of a public funded project, the fee leviable would be reduced to 40% of the user fee for such section of National Highways, bridge, tunnel or bypass as the case may be, to be revised annually in accordance with these rules."

In respect of the above, NHAI has clarified that Rule 6 of the Fee Rules provides that the user fee to be notified by Government as per the format of Schedule M of Concession Agreement shall be leviable till the end of the concession period. Hence, the rate of User Fee rate shall only be reduced after the concession period is over.

Concession Fees

As consideration for the grant of the Concession, the Concessionaire is required to pay a concession fee to NHAI equivalent to ₹ 4,500.00 million, within 120 days of the date of execution of the concession agreement or any extended date as agreed by NHAI prior to the Appointed Date as a Condition Precedent. The Concessionaire agrees that payment of the concession fee constitutes essential condition of the Concession Agreement. Further, as communicated by the Authority by way of a letter dated September 21, 2021, any amount raised from the proceeds of the Offer in excess of the base concession fee (being the aggregate of Concession Fees payable to NHAI in terms of the Additional Concession Agreements) shall be paid to the Authority. For further details, see the section titled "*Use of Proceeds – Details of Utilisation of Offer Proceeds - Infusion of debt/equity into to the Project SPV*" on page 188.

For the purposes of stamp duty payment, concession agreements are generally considered to be agreements which are not lease deeds and stamp duty of ₹ 100.00 is typically paid for such concession agreements. However, stamp duty authorities 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 NHAI. The stamp authorities allege 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 1.0% and 11.0% of the annual rent or premium payable or the market value of the property. Furthermore, stamp duty authorities may impose penalties for payment of inadequate stamp duty, which could extend up to ten (10) times the amount of the stamp duty payable. Accordingly, concession agreements that have not been stamped as such could be considered to be inadequately stamped. The High Courts of Allahabad and Maharashtra have also held that a concession agreement ought to be stamped as a lease agreement and have upheld the imposition of a higher stamp duty on such agreements.

While we have paid stamp duty of ₹ 100.00 on each of our Concession Agreements in accordance with usual practice, if any demand for payment of a higher stamp duty or penalty is imposed, it would increase the costs of the Toll Roads.

In respect of above, NHAI has clarified that:

(i) As on the date of Shivpuri Jhansi Concession Agreement, GST is not applicable on Concession Fee. However, if it becomes applicable at a later stage, this shall be considered as change in law.
(ii) There is no requirement of stamp duty in case of Concession Agreements since Fee Rules provided for levy and collection of user fee and not toll tax. In case, in future any such demand arises, it shall be treated as change in law.

Escrow Account

The provisions in relation to the escrow account in the Shivpuri Jhansi Concession Agreement are only applicable if the obligations of the Concessionaire under the Shivpuri Jhansi Concession Agreement are financed by the Lenders.

The Concessionaire shall, prior to the Appointed Date, open and establish the escrow account with the escrow bank and all funds constituting the financing package related to the Shivpuri Jhansi Project shall be credited to such escrow account. During the Shivpuri Jhansi Concession Period all fees and any other revenues including the proceeds of any rentals, deposits, capital receipts or insurance claims from or in respect of the Shivpuri Jhansi Project Highway shall be deposited therein. In addition, all payments by NHAI pursuant to the Shivpuri Jhansi Concession Agreement, including, if any, in relation to the change of scope in the Shivpuri Jhansi Project shall be deposited by NHAI in the escrow account.

Withdrawals from Escrow Account

The Concessionaire shall give, at the time of the opening of the escrow account, irrevocable instructions by way of an escrow agreement substantially in form set forth in the Shivpuri Jhansi Concession Agreement to the escrow bank instructing, *inter alia*, that the deposits into the escrow account shall subject to the provisions of the Shivpuri Jhansi Concession Agreement, be appropriated in the following order every month and if not due in a month then appropriated proportionately in such month and retained in the escrow account and paid out therefrom in the month when due unless otherwise expressly provided in the instruction letter:

i. all taxes due and payable by the Concessionaire for and in respect of the Shivpuri Jhansi Project Highway;

ii. concession fee;

iii. all payments relating to construction of the Shivpuri Jhansi Project Highway, subject to and in accordance with the conditions, if any, set forth in the financing agreements;

iv. operation and maintenance expenses;

v. operation and maintenance expenses and other costs and expenses incurred by NHAI in accordance with the provisions of the Shivpuri Jhansi Concession Agreement, and certified by NHAI as due and payable to it;

vi. monthly proportionate provision of debt service payment due in an accounting year;

vii. all payments and damages certified by NHAI as due and payable to it by the Concessionaire; and

vii. balance, if any, in accordance with the instructions of the Concessionaire.

Withdrawals upon Termination

Notwithstanding anything to the contrary contained in the escrow agreement and subject to the provisions of the Shivpuri Jhansi Concession Agreement, in the case of termination, the amounts standing to the credit of the escrow account shall be appropriated in the following order:

i. all taxes due and payable by the Concessionaire for and in respect of the Shivpuri Jhansi Project Highway;

ii. payment due to the lenders;

iii. all payments and damages certified by NHAI as due and payable to it by the Concessionaire;

iv. retention and payments relating to the liability for defects and deficiencies;

v. incurred or accrued operation and maintenance expenses;

vi. any other payments required to be made under the Shivpuri Jhansi Concession Agreement; and

vii. balance, if any, in accordance with the instructions of the Concessionaire.

Change of Scope

NHAI may, notwithstanding anything to the contrary contained in the Shivpuri Jhansi Concession Agreement, require the Concessionaire to make alterations/ modifications in the scope of the Shivpuri Jhansi Project as contemplated by the Shivpuri Jhansi Concession Agreement. If the cumulative costs relating to all the change of scope orders exceed 5% of the concession fee in any continuous period of three years immediately preceding the date of such change of scope order or if such cumulative costs exceed 25% of the concession fee at any time during the Shivpuri Jhansi Concession Period, NHAI may award any works

or services, to any person on the basis of open competitive bidding and the Concessionaire shall be entitled to take part in such competitive bidding with a right to match the first-ranked bid in terms of the selection criteria, either by itself where such work requires tolling, operation and maintenance, or through another company where such work requires construction on any part of the Project Highway, subject to payment of 2% (two per cent) of the bid amount to the Authority, and thereupon securing the award of such works or services. For the avoidance of doubt, it is agreed that the Concessionaire shall be entitled to exercise such option only if the Concessionaire has participated in the bidding process either individually or as a consortium or joint venture with another company and fulfils the eligibility criteria to undertake such work without compromising with its overall liability. All such changes shall be made by NHAI by an order issued in accordance with the procedure set forth in the Shivpuri Jhansi Concession Agreement.

Termination of the Shivpuri Jhansi Concession Agreement

Termination by either party

Either Party may in its discretion terminate the Shivpuri Jhansi Concession Agreement by giving a termination notice to the other party if a force majeure event subsists for a period of 120 days or more within a continuous period of 365 days. Before issuing such termination notice, the party intending to issue the termination notice shall inform the other party of such intention and grant 15 days' time to make a representation, and may after the expiry of such 15 days period, whether or not it is in receipt of such representation, in its sole discretion issue the termination notice.

Termination by the NHAI

In the event of any of the defaults specified below have occurred, and if the Concessionaire has failed to cure such breach or default within the period provided for the same in the Shivpuri Jhansi Concession Agreement, then NHAI shall be entitled to issue a notice of its intention to terminate the Shivpuri Jhansi Concession Agreement, with a copy to the lenders. The following events shall constitute an event of default by the Concessionaire (a "**Concessionaire Default**") unless they have occurred as a result of any breach of the Shivpuri Jhansi Concession Agreement by NHAI or due to force majeure:

i. the performance security has been encashed and appropriated in accordance with the Shivpuri Jhansi Concession Agreement and the Concessionaire has failed to replenish or provide fresh performance security within a cure period of 15 days;

ii. subsequent to the replenishment or furnishing of fresh performance security in accordance with the Shivpuri Jhansi Concession Agreement, the Concessionaire fails to cure, within a cure period of 60 days, the Concessionaire Default for which whole or part of the performance security was appropriated;

iii. the Concessionaire abandons or manifests intention to abandon the operation and maintenance of the Shivpuri Jhansi Project Highway without the prior written consent of NHAI;

iv. the Concessionaire fails to roll over, renew and furnish new bank guarantee performance security subject to and in accordance with terms of the Shivpuri Jhansi Concession Agreement, at least three months prior to expiry of subsisting bank guarantee;

v. the Concessionaire is in breach of the Maintenance Requirements or the Safety Requirements;

vi the Concessionaire has failed to make any payment to NHAI within the period specified in the Shivpuri Jhansi Concession Agreement;

vii. upon occurrence of a financial default, the lenders' representative has by notice required NHAI to undertake suspension or termination, as the case may be, in accordance with the substitution agreement and the Concessionaire fails to cure the default within the specified cure period;

viii. a breach of any of the project agreements by the Concessionaire causes a material adverse effect;

ix. the Concessionaire creates any encumbrance in breach of the Shivpuri Jhansi Concession Agreement;

x. the Concessionaire repudiates the Shivpuri Jhansi Concession Agreement or otherwise takes any action or evidences or conveys an intention not to be bound by the Shivpuri Jhansi Concession Agreement;

xi. a change in ownership occurs in breach of the provisions of the Shivpuri Jhansi Concession Agreement;

xii. there is a transfer, pursuant to law either of the rights and/or obligations of the Concessionaire under any of the project agreements, or of all or part of the assets or undertaking of the Concessionaire, and such transfer causes a material adverse effect;

xiii. an execution levied on any of the assets of the Concessionaire has caused a material adverse effect;

xiv. the Concessionaire is adjudged bankrupt or insolvent, or if a trustee or receiver is appointed for the Concessionaire or for the whole or material part of its assets that has a material bearing on the Shivpuri Jhansi Project;

xv. the Concessionaire has been, or is in the process of being liquidated, dissolved, wound-up, amalgamated or reconstituted in a manner that would cause, in the reasonable opinion of NHAI, a material adverse effect;

xvi. a resolution for winding up of the Concessionaire is passed or any petition for winding up of the Concessionaire is admitted by a court of competent jurisdiction and a provisional liquidator or receiver is appointed and such order has not been set aside within 90 days of the date thereof or the Concessionaire is ordered to be wound up by Court except for the purpose of amalgamation or reconstruction; provided that, as part of such amalgamation or reconstruction, the entire property, assets and undertaking of the Concessionaire are transferred to the amalgamated or reconstructed entity and that the amalgamated or reconstructed entity has unconditionally assumed the obligations of the Concessionaire under the Shivpuri Jhansi Concession Agreement and the project agreements; and provided that:

a. the amalgamated or reconstructed entity has the capability and operating experience necessary for the performance of its obligations under the Shivpuri Jhansi Concession Agreement and the project agreements;

b. the amalgamated or reconstructed entity has the financial standing to perform its obligations under the Shivpuri Jhansi Concession Agreement and the project agreements and has a credit worthiness at least as good as that of the Concessionaire as at Appointed Date; and

c. each of the project agreements remains in full force and effect;

xvii. any representation or warranty of the Concessionaire herein contained which is, as of the date of Shivpuri Jhansi Concession Agreement, found to be materially false, incorrect or misleading;

xviii. the Concessionaire submits to NHAI any statement, notice or other document, in written or electronic form, which has a material effect on NHAI's rights, obligations or interests and which is false in material particulars;

xix. the Concessionaire has failed to fulfil any obligation, for which failure termination has been specified in the Shivpuri Jhansi Concession Agreement;

xx. the Concessionaire commits a default in complying with any other provision of the Shivpuri Jhansi Concession Agreement if such default causes a material adverse effect on NHAI;

xxi. an escrow default occurs and the Concessionaire fails to cure the default within a cure period of 15 days;

Termination by Concessionaire

If any of the defaults specified below shall have occurred, and NHAI fails to cure such default within a cure period of 90 days or such longer period as has been expressly provided in the Shivpuri Jhansi Concession Agreement, NHAI shall be deemed to be in default of the Shivpuri Jhansi Concession Agreement, unless the default has occurred as a result of any breach of the Shivpuri Jhansi Concession Agreement by the Concessionaire or due to force majeure:

i. NHAI commits a material default in complying with any of the provisions of the Shivpuri Jhansi Concession Agreement and such default has a material adverse effect on the Concessionaire; or
ii. NHAI repudiates the Shivpuri Jhansi Concession Agreement or otherwise takes any action that amounts to or manifests an irrevocable intention not to be bound by the Shivpuri Jhansi Concession Agreement; or
iii. the State commits a material default in complying with the provisions of the State Support Agreement if such default has a Material Adverse Effect on the Concessionaire and the breach continues for a period of 90 days from the date of notice given in this behalf by the Concessionaire to the Authority.

Termination Payments

The termination payment pursuant to the Shivpuri Jhansi Concession Agreement becomes due and payable to the Concessionaire by NHAI within 15 days of the Concessionaire furnishing to NHAI an NOC with the necessary particulars issued by the lenders/ lenders' representative recording/ effecting release/ vacation/ discharge of the charge on Shivpuri Jhansi Project receivables (if any) created by Concessionaire for securing repayment of the debt. If NHAI fails to disburse the full termination payment within 15 days, NHAI shall pay interest at a rate equal to 3% above the bank rate on the amount of termination payment remaining unpaid, provided that such delay shall not exceed 90 days.

Upon termination of the Shivpuri Jhansi Concession Agreement by the NHAI on account of occurrence of a Concessionaire Default and in addition to the Authority forfeiting the Performance Security, the NHAI shall pay the Concessionaire by way of termination payment 70% of the Unexpired Cash Flow.

Upon termination of the Shivpuri Jhansi Concession Agreement by the Concessionaire on account of occurrence of an NHAI Default, the Concessionaire shall be entitled to receive from NHAI by way of termination payment a sum equal to 105% of the Unexpired Cash Flow.

Technical Clarifications on the Concession Agreements

For details in relation to the technical clarifications received from NHAI in relation to the Concession Agreements, please refer to Annexure 1 of the Shivpuri Jhansi Concession Agreement.

Differences between the Initial Concession Agreements and Additional Concession Agreements

The significant differences between the Initial Concession Agreements and Additional Concession Agreements are provided below:

Category	**Initial Concession Agreements**	**Additional Concession Agreements**
Concession Period	30 years	20 years
Capacity Augmentation	The Sponsor shall not compensate the relevant Concessionaire on a quarterly basis for any reduction in toll rates due to capacity augmentation.	The Sponsor shall compensate the relevant Concessionaire on a quarterly basis for any reduction in toll rates due to capacity augmentation.
	The EPC contractor, undertaking capacity augmentation, shall be liable for all the defects and deficiencies for the Defect Liability Period (*as defined in the relevant Concession Agreements*).	The EPC contractor, undertaking capacity augmentation, shall additionally be liable for maintenance and other operational responsibilities such as incident management, traffic management, routine maintenance etc. for the Defect Liability Period.
	The Detailed Project Report (*as defined in the relevant Concession Agreements*) may be commenced once the average daily traffic exceeds the target traffic and continues to exceed the designed capacity for three consecutive accounting years following thereafter.	The Detailed Project Report (*as defined in the relevant Concession Agreements*) may be commenced immediately once the average daily traffic has met the target traffic.

INFORMATION CONCERNING THE UNITS

Details of Unitholding of the Trust as on the last quarter ended June 30, 2022

All units are held in dematerialised form.

Category	Category of Unit holder	No. of Units held	As a % of total outstanding Units	No. of Units mandatorily held		Number of Units pledged or otherwise encumbered	
				No. of Units	As a % of total Units held	No. of Units	As a % of total Units held
(A)	**Sponsor(s) / Investment Manager / Project Manager(s) and their Associates / related parties**						
(1)	**Indian**						
(a)	Individuals / HUF	-	0	-	0	-	0
(b)	Central/State Govt.	9,56,00,000	16.06	9,56,00,000	16.06	-	0
(c)	Financial Institutions/Banks	-	0	-	0	-	0
(d)	Any other	-	0	-	0	-	0
	Bodies Corporates	-	0	-	0	-	0
	Sub-Total (A) (1)	**9,56,00,000**	**16.06**	**9,56,00,000**	**16.06**	**-**	**0**
(2)	**Foreign**						
(a)	Individuals (Non Resident Indians / Foreign Individuals)		0	-	0	-	0
(b)	Foreign government	-	0	-	0	-	0
(c)	Institutions	-	0	-	0	-	0
(d)	Foreign Portfolio Investors	-	0	-	0	-	0
(e)	Any Other (Bodies Corporates)	-	0	-	0	-	0
	Sub-Total (A) (2)	**-**	**0**	**-**	**0**	**-**	**0**
	Total Unitholding of Sponsor and Sponsor Group (A) = (A)(1)+(A)(2)	**9,56,00,000**	**16.06**	**9,56,00,000**	**16.06**	**-**	**-**
(B)	**Public Holding**						
(1)	**Institutions**						
(a)	Mutual Funds	5,92,00,000	9.95				
(b)	Financial Institutions/Banks	74,00,000	1.24				
(c)	Central/State Govt.	-	0				
(d)	Venture Capital Funds	-	0				
(e)	Insurance Companies	1,80,00,000	3.02				
(f)	Provident/pension funds	3,22,78,557	5.42				
(g)	Foreign Portfolio Investors	-	0				
(h)	Foreign Venture Capital investors	-	0				
(i)	Any Other (specify)		0				
	Bodies Corporates	29,76,00,000	50				
	Alternative Investment Fund	4,00,000	0.07				
	Sub-Total (B) (1)	**414,878,557**	**69.7**				
(2)	**Non-Institutions**						
(a)	Central Government / State Governments(s) / President of India						
(b)	Individuals	1,28,13,340	2.15				

Category	Category of Unit holder	No. of Units held	As a % of total outstanding Units	No. of Units mandatorily held		Number of Units pledged or otherwise encumbered	
				No. of Units	As a % of total Units held	No. of Units	As a % of total Units held
(c)	NBFCs registered with RBI	-	0				
(d)	Any Other (specify)	-	0				
	TRUSTS	1,00,000	0.02				
	Non Resident Indians	8,620	0				
	Clearing Members	-	0				
	Bodies Corporates	7,17,99,483	12.06				
			0				
	Sub-Total (B) (2)	**8,47,21,443**	**14.23**				
	Total Public Unit holding (B) = (B)(1)+(B)(2)	**499,600,000**	**83.94**				
	Total Units Outstanding (C) = (A) + (B)	**595,200,000**	**100**				

Details of Unitholding pre and post-Offer

Particulars	Number of Units
Units issued and outstanding prior to this Offer	595,200,000
Units issued and outstanding after this Offer	[●]*

** The IM Board by way of its resolution dated August 30, 2022 and September 27, 2022 and the unitholders of the Trust by way of their resolution dated September 23, 2022, have approved the Issue of 131,205,200 Units at or above the base price of ₹ 107.12 per Unit. The IM Board by way of its resolution dated September 27, 2022 have approved the Floor Price of ₹ 109.00 per Unit. Of the 131,205,200 Units, the Trust proposes to undertake the issue of up to 26,241,040 Units to the Sponsor, on a preferential basis ("**Preferential Issue**"), in accordance with the SEBI Institutional Placement Guidelines and the InvIT Regulations. The IM Board by way of its resolution dated September 17, 2022 has approved the Preferential Issue. The Sponsor, by way of its letter dated September 29, 2022, has confirmed its willingness to subscribe to at least 19,602,600 Units being offered pursuant to the Preferential Issue and such number of Units as may be approved by the Unitholders, in their meeting scheduled on October 10, 2022, at or above the Floor Price.*

Unitholders holding more than 5% of the Units as on June 30, 2022

Sr. No.	Name of Unit Holders	Pre-Offer		Post-Offer	
		Number of Units	Percentage of holding (%)	Number of Units*	Percentage of holding (%)*
1.	Canada Pension Plan Investment Board	148,800,000	25.00	[●]	[●]
2.	Ontario Teachers' Pension Plan Board	148,800,000	25.00		
3.	National Highways Authority of India (Sponsor)	95,600,000	16.06	[●]	[●]
4.	SBI Balanced Advantage Fund	56,800,000	9.54	[●]	[●]

** The IM Board by way of its resolution dated August 30, 2022 and September 27, 2022 and the unitholders of the Trust by way of their resolution dated September 23, 2022, have approved the Issue of 131,205,200 Units at or above the base price of ₹ 107.12 per Unit. The IM Board by way of its resolution dated September 27, 2022 have approved the Floor Price of ₹ 109.00 per Unit. Of the 131,205,200 Units, the Trust proposes to undertake the issue of up to 26,241,040 Units to the Sponsor, on a preferential basis ("**Preferential Issue**"), in accordance with the SEBI Institutional Placement Guidelines and the InvIT Regulations. The IM Board by way of its resolution dated September 17, 2022 has approved the Preferential Issue. The Sponsor, by way of its letter dated September 29, 2022, has confirmed its willingness to subscribe to at least 19,602,600 Units being offered pursuant to the Preferential Issue and such number of Units as may be approved by the Unitholders, in their meeting scheduled on October 10, 2022, at or above the Floor Price.*

Unitholding of the Sponsor, Investment Manager, Project Manager and Trustee

The Sponsor holds 95,600,000 Units as on June 30, 2022, as disclosed above. The Trustee, Project Manager and the Investment Manager do not hold any Units and shall not acquire any Units in this Offer.

Unitholding of the directors of the Investment Manager

As on the date of this Preliminary Placement Document, none of the directors of the Investment Manager hold any Units or propose to hold any Units.

Sponsor lock-in

In terms of the InvIT Regulations, the Sponsor holds at least 15% of Units which are locked-in for a period of three years from the date of allotment of the Units in the initial offer of units.

USE OF PROCEEDS

The gross proceeds of the Offer will be ₹ [●] million ("**Offer Proceeds**"). The Net Proceeds will be utilised towards the following objects:

- Infusion of debt/equity into the Project SPV: The proceeds of the debt/equity infused into the Project SPV shall be utilized by the Project SPV for: (a) part payment of (i) initial estimated concession value to the Sponsor, in terms of the Concession Agreements; (ii) initial improvement cost; (iii) major maintenance cost; (iv) upfront fees to various agencies, as applicable; (b) creation and maintenance of debt service reserve account, if any; and/or (c) creation and maintenance of major maintenance reserve, if any; and

- General corporate purposes.

The details of the Net Proceeds are set forth in the following table:

(In ₹ million)

Particulars	Estimated Amount
Gross proceeds of the Offer	[●]
Less: Offer related and other expenses to be borne by the Trust	[●]
Net Proceeds	[●]

Requirements of Funds

The Net Offer Proceeds are proposed to be used in accordance with the details provided in the following table:

(In ₹ million)

Sr. No.	Particulars	Amount
1.	Infusion of debt/equity into the Project SPV: The proceeds of the debt/equity infused into the Project SPV shall be utilized by the Project SPV for: (a) part payment of (i) initial estimated concession value to the Sponsor; (ii) initial improvement cost; (iii) major maintenance cost; (iv) upfront fees to various agencies, as applicable; (b) creation and maintenance of debt service reserve account, if any; and/or (c) creation and maintenance of major maintenance reserve, if any	[●]
2.	General corporate purposes	[●]
	Total	[●]

We believe that the infusion of the funds into the Project SPV, in order to meet its obligations under the Concession Agreements, will enable the Project SPV to acquire the necessary rights under the Concession Agreements. Accordingly, we believe that the proposed infusion of funds will be beneficial to the Trust and to Unitholders.

The fund requirements mentioned 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 due to factors beyond the Investment Manager's control, such as market conditions and competitive environment. Consequently, the fund requirements are subject to revisions in the future at the discretion of the Investment Manager. In the event of any shortfall of funds for the activities proposed to be financed out of the Offer Proceeds as stated above, the Investment Manager may re-allocate the Offer Proceeds to the activities where such shortfall has arisen, subject to compliance with applicable law.

Details of Utilisation of Offer Proceeds

The details of utilisation of the Offer Proceeds are set forth herein below:

Infusion of debt/equity into to the Project SPV

The Trust proposes to utilise an estimated aggregate amount of ₹ [●] million from the Offer Proceeds to provide loans ("**Project SPV Facilities**") to the Project SPV in terms of the Project SPV Facility Agreements. In accordance with applicable law, and the authorization of the Board of Directors of the Investment Manager, the Trust may additionally utilise a portion of the Issue Proceeds towards infusion of equity or equity like investments into the Project SPV. The actual amount to be invested into the Project SPV by way of equity infusion, if any, may be decided by the IM Board in their discretion.

Additionally, the Trust has also entered into a loan agreement dated September 29, 2021, with certain lenders for availing loans amounting to approximately ₹ 2,000 million ("**Trust Loans**"). For details in relation to the terms of the Trust Loans, including its purpose, please see the section entitled "*Financial Indebtedness and Deferred Payments*" on page 190.

The Project SPV has utilized and will continue to utilize the funds raised through the Project SPV Facilities towards (a) payment of (i) initial estimated concession value to the Sponsor, in terms of the Additional Concession Agreements; (ii) initial improvement cost; (iii) upfront fees to various agencies, as applicable; (b) creation and maintenance of debt service reserve account, if any; and/or (c) creation and maintenance of major maintenance reserve, if any, and/or (d) any general corporate purposes. The Target Toll Roads have been valued at a base value of ₹ 28,250.00 million by RBSA Valuation Advisors LLP, the independent valuer appointed by the Investment Manager on behalf of the Trust. The Unitholders have approved the base valuation for the Target Toll Roads by way of a resolution passed at the meeting held on September 23, 2022. It may be noted that the baseline valuation for the Target Toll Roads is for the purpose of establishing a price discovery mechanism for the Target Toll Roads and that the final amounts paid as concession fees to the Sponsor under the Additional Concession Agreements for the Target Toll Roads may be higher than the base valuation. The concession fee for the Target Toll Roads shall be paid through a combination of the proceeds of the Issue and debt financing to be obtained by the Trust / Project SPV. The base valuation range for the Target Toll Roads, has been accepted by NHAI, subject to payment of additional amounts to be raised pursuant to the Offer.

The IM Board by way of its resolution dated August 30, 2022 and September 27, 2022 and the unitholders of the Trust by way of their resolution dated September 23, 2022, have approved the Issue of 131,205,200 Units at or above the base price of ₹ 107.12 per Unit. The IM Board by way of its resolution dated September 27, 2022 have approved the Floor Price of ₹ 109.00 per Unit. Of the 131,205,200 Units, the Trust proposes to undertake the issue of up to 26,241,040 Units to the Sponsor, on a preferential basis ("**Preferential Issue**"), in accordance with the SEBI Institutional Placement Guidelines and the InvIT Regulations. The IM Board by way of its resolution dated September 17, 2022 has approved the Preferential Issue. The Sponsor, by way of its letter dated September 29, 2022, has confirmed its willingness to subscribe to at least 19,602,600 Units being offered pursuant to the Preferential Issue and such number of Units as may be approved by the Unitholders, in their meeting scheduled on October 10, 2022, at or above the Floor Price. For risks associated with the utilization of Net Proceeds raised pursuant to the Issue, please see "*Risk Factors – The monies received from the Offer proceeds shall be retained in the Cash Escrow Account until the completion of the allotment of units to the Sponsor pursuant to the proposed preferential issue to Sponsor and will be refunded to the Bidders in case the proposed issue of Units on a preferential basis to the Sponsor is not completed prior to the Allotment of Units*" on page 61.

General Corporate Purposes

In terms of the InvIT Regulations, the Investment Manager shall, at its discretion, deploy the balance Net Proceeds aggregating 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 Offer Proceeds include meeting exigencies and expenses incurred, by way of the Trust in the ordinary course of business. In addition, the Trust may utilize the Offer 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 utilising the Trust's internal accruals or availing facilities from lenders. The Investment Manager will have flexibility in utilizing the proceeds earmarked for general purposes. The Investment Manager, in accordance with the investment objectives of the Trust, policies of its board of directors and the InvIT Regulations, will have flexibility in utilising any surplus amounts.

Offer Expenses

The total expenses of this Offer are estimated to be approximately ₹ [●] million. The Offer expenses consist of fee and commissions payable to the Lead Managers, fee payable to legal counsels, fee payable to Escrow Collection Bank and Registrar to the Offer, printing and stationery expenses, and all other incidental and miscellaneous expenses for listing the Units on the Stock Exchanges. The Offer Expenses shall be met from distributions received by the Trust and/ or other sources available to the Trust.

FINANCIAL INDEBTEDNESS AND DEFERRED PAYMENTS

Except as provided otherwise stated herein below, for an overview of the financial indebtedness and deferred payments, please see the section entitled "*Financial Indebtedness and Deferred Payments*" on page 226 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html.

The details of the status of lender consents as disclosed in the section entitled "*Financial Indebtedness and Deferred Payments – Status of lender consents*" on page 226 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html shall be replaced as follows:

"***Status of lender consents***

The requirement of lender consent is not being triggered in terms of the facilities availed by the Trust and accordingly, the Trust has not obtained any consents from its lenders in relation to this Offer."

MANAGEMENT'S DISCUSSION AND ANALYSIS OF FACTORS BY THE DIRECTORS OF THE INVESTMENT MANAGER AFFECTING THE FINANCIAL CONDITION, RESULTS OF OPERATIONS AND CASH FLOWS

Due to the nature of the Project SPV and the Target Toll Roads, there is limited financial information available in respect of us which can be presented in this Preliminary Placement Document. The following discussion of our financial condition and results of operations should be read in conjunction with our audited standalone financial information of the Trust, for the period from its date of settlement, i.e. October 19, 2020, up to March 31, 2021 and audited consolidated financial information as on March 31, 2022 and limited review unaudited interim financials statements of the Trust for the three months period ended June 30, 2022, prepared in accordance with Ind AS, on page 247. No separate financial information, including actual revenue data for the Target Toll Roads, are currently available, which could be used to clearly assess financial information, including revenue and expenses, in respect of each of the Target Toll Roads. Accordingly, in lieu of financial statements of the Trust, the Target Toll Roads and/or Project SPV, the revenue data that NHAI has historically collected through toll collection and maintenance contracts has been included in the section entitled "Asset Revenue Information" on page 244.

Furthermore, this limited historical revenue data available in respect of the Target Toll Roads may not reflect their operation in the future and are not indicative of our expected future financial condition, results of operations or cash flows. Investors are cautioned that the lack of financial information in this Preliminary Placement Document may make it difficult to assess our financial position or future prospects or results of operations.

The following discussion is intended to convey management's perspective on our expected financial condition and results of operations.

This discussion contains forward-looking statements and reflects our current views with respect to future events and financial performance that involve risks and uncertainties. Actual results may differ materially from those discussed in or implied by any of the forward-looking statements as a result of various factors, including those listed under "Risk Factors" and "Forward-Looking Statements".

Overview

We are a registered infrastructure investment trust under the InvIT Regulations. We currently toll, operate and maintain a portfolio of five Initial Toll Roads (*defined below*) in the Indian states of Gujarat, Rajasthan, Telangana and Karnataka, and intend to toll, operate and maintain a portfolio of three Target Toll Roads (*defined below*) in the Indian states of, Telangana, Maharashtra, Uttar Pradesh and Madhya Pradesh under the Toll Operate Transfer ("**TOT**") model conceived by NHAI. These Toll Roads (*defined below*) are operated and maintained pursuant to concessions granted by the NHAI. The Initial Toll Roads comprise five stretches spanning a total length of approximately 389 kms and the Target Toll Roads comprise three stretches spanning a total length of approximately 246 kms.

Our Sponsor is NHAI, an autonomous authority of the GoI under the MoRTH constituted on June 15, 1989 by an Act of the Indian Parliament titled - The National Highways Authority of India Act, 1988 (the "**NHAI Act**"). NHAI was operationalised in February 1995 with the appointment of a full-time Chairman and other members of the board. The functioning of NHAI is governed by the NHAI Act and the rules, and regulations framed thereunder.

The Project SPV has entered into eight (8) independent Concession Agreements with the NHAI for concessions of each of the Toll Roads. We have satisfied all conditions precedent and commenced our Concessions on December 16, 2021 in accordance with the terms of the Concession Agreements for the Initial Toll Roads and expect to satisfy all conditions precedent and commence our Concessions for the Target Toll Roads in accordance with the terms of the Concession Agreements for the Target Toll Roads. For further details, please see the section entitled "*Summary of the Concession Agreements*", "*Management's Discussion and Analysis of Financial Position and Results of Operations*" and "*Use of Proceeds*" on pages 145, 191 and 188, respectively.

The Concession Agreements provide the Project SPV the right to collect tolls for a period of 20 years or 30 years (as applicable under the relevant Concession Agreement) from users of each Toll Road, with certain overlay activities and the construction of additional toll lanes in respect of certain of the Toll Roads (the "**Initial Improvement Works**") to be completed by the Project SPV within 12 to 18 months from the Appointed Date (as defined in the section entitled "*Summary of the Concession Agreements*"). Responsibility for the supervision of the operations and maintenance of the Toll Roads also vests with us. In return, the Project SPV is required to pay the concession fee to the NHAI prior to the commencement of the Concession, as set out in the respective Concession Agreements. For further information on the provisions of the Concession Agreements, see "*Summary of the Concession Agreements".*

Pursuant to the Formation Transactions and the Proposed Transfer, the Trust has acquired 100% of the equity shares of the Project SPV from the Sponsor. For additional information about the Proposed Transfer, please see the section headed "*Formation Transactions in Relation to the Trust"*.

The Project SPV has the right to toll, operate and maintains the following toll road assets (the "**Initial Toll Roads**")::

- Palanpur/Khemana – Abu Road Project ("**Asset 1**"): Abu Road section of NH 27 with a total length of 45 kms, connecting the states of Gujarat and Rajasthan;
- Abu Road – Swaroopganj Project ("**Asset 2**"): Swaroopganj section of NH 27 with a total length of 31 kms, in the state of Rajasthan;
- Maharashtra/ Karnataka Border (Kagal) – Belgaum Project ("**Asset 3**"): Belgaum – Kagal section of NH 48 with a total length of 77.7 kms, connecting the states of Karnataka and Maharashtra;
- Chittorgarh – Kota & Chittorgarh Bypass Project ("**Asset 4**"): Chittorgarh – Kota section of NH 27 with a total length of 160.5 kms, in the state of Rajasthan; and
- Kothakota Bypass – Kurnool Project ("**Asset 5**"): Kothakota bypass – Kurnool section of NH 44 with a total length of 74.6 kms, connecting the states of Telangana to Andhra Pradesh.

From the Appointed Date, the Project SPV shall have the right to toll, operate and maintain the following toll road assets (the "**Target Toll Roads**", together with the Initial Toll Roads, the "**Toll Roads**"):

- Agra Bypass Project ("**Asset 6**"): Agra Bypass section with a total length of 32.80 kms, connecting NH19 (old NH2) to NH44 (old NH7) in Uttar Pradesh;
- Borkhedi - Kelapur Project ("**Asset 7**"): Borkhedi-Kelapur-Maharashtra/Telangana border section of NH44 (old NH7) with a total length of 138.15 kms, in the state of Maharashtra; and
- Shivpuri – Jhansi Project ("**Asset 8**"): Jhansi-Shivpuri section of NH 27 with a total length of 75.30 kms, connecting the districts of Jhansi in the state of Uttar Pradesh and Shivpuri in the state of Madhya Pradesh.

The following map depicts locations of the Toll Roads:

Note:

(1) This map is for illustrative purposes only, is not to scale and is subject to change at any time.

SEBI Exemptions

For the purposes of the Offer, the Investment Manager requested SEBI for an exemption dated August 25, 2022 to allow for the relaxation of strict application of financial disclosure rules per the InvIT Regulations for the Sponsor and the Investment Manager ("**SEBI Exemption Request**"). The SEBI Exemption Request was made on the basis that (i) the Sponsor is incorporated under the NHAI Act and no historical consolidated financials are available for presentation in the Preliminary Placement Document and (ii) the Investment Manager has only recently been incorporated and limited historical financial information is available in respect of the Investment Manager. SEBI accepted the request and granted an exemption through its letter dated September 23, 2022.

Accordingly, only the following information is presented in this Preliminary Placement Document:

- The Audited Consolidated Financial Information of the Trust for the period from its date of settlement, i.e. October 19, 2020, up to March 31, 2022, and Limited Review Financial Information for the three months period ended June 30, 2022;

- Summary financial information of the Sponsor, as of and for the financial years ended March 31, 2020, March 31, 2019 and March 31, 2018, derived from the audited standalone financial statements of the Sponsor for the respective years. Further, the unaudited limited review standalone financial results of the Sponsor for the half year ended March 31, 2021 has been included. For further details, please see the sections entitled *"Summary Financial Information of the Sponsor"* on page 34;

- Summary financial information of the Investment Manager, as of and for the financial year ended March 31, 2021 and March 31, 2022, and

- In lieu of the combined financial statements, of the Trust along with the InvIT Assets and/or SPV, the revenue data that NHAI has historically been collecting through toll collection and maintenance contracts, has been included in the section entitled "*Asset Revenue Information*" on page 244. This revenue data has been provided based on fixed contractual amount upto June 21, 2022 from 07:59:59 hrs and actual toll collected by the Project SPV from June 21, 2022 from 08:00:00 hrs. The said amounts being collected are at times intermittent on account of gaps in tolling contract periods and would not be a true reflection of the revenue that these Target Toll Roads are actually generating. Please refer to "*Risk Factors – We have no operating history for Target Toll Roads and limited historical financial information and, as such, there are limited financial statements and revenue data presented in this Preliminary Placement Document*." on page 62 in this regard.

The absence of meaningful historical operating data or financial statements may make it difficult for investors to evaluate our ability to operate, manage and maintain the Toll Roads and assess our financial position or future prospects or results of operations.

Significant Factors Affecting Our Results of Operations

We expect our results of operations, financial condition and liquidity to be influenced by the following events, facts, developments and market characteristics.

The terms of the Concession Agreements and traffic volumes

Toll fees are typically pre-determined with the relevant government entity and cannot be modified to reflect prevailing circumstances, other than annual adjustments to account for inflation as specified in the Concession Agreements. Accordingly, our profitability is largely a function of how effectively we manage costs during the concession period. Significant costs during the concession period include operating and maintenance expenses such as periodic maintenance which is required to be performed as specified in the Concession Agreement. Periodic maintenance involves the repair of wear and tear of the roads and highways, including overlaying the surface of the roads and highways, if required. For further details on the maintenance requirements for each of our projects, see the section headed "*Our Business"* in this Preliminary Placement Document. Our inability to effectively manage such operating and maintenance expenses during the concession period may have a material adverse effect on our profitability, financial condition and results of operations.

We are substantially dependent on the accuracy of the traffic volume forecasts for the respective Toll Road projects. Projects undertaken on a TOT basis involve Concession Agreements that are long-term in nature, usually between 20 to 30 years. The agreed consideration for the Toll Road projects is based on, amongst other factors, forecasts of traffic volumes and expected revenues over the concession period. Any material shortfall between the actual traffic volume and the forecast traffic volume for a project could have a material adverse effect on our cash flows, results of operations and financial condition.

Our projects involve agreements that are long-term in nature. All long-term projects have inherent risks associated with them and involve variables that may not necessarily be within our control. Accordingly, we may be exposed to a variety of operation and maintenance and other risks, including unanticipated cost increases and overruns, inability to negotiate satisfactory arrangements with third parties, and disagreements with third parties. In addition, the long-term nature of our contracts may expose us to increased risk of unforeseen business and industry changes and developments which could have a material adverse

effect on their business, financial condition and results of operations.

Toll revenues

The operation of toll roads principally involves collection of tolls and maintenance. Revenues from the Toll Roads will substantially comprise receipts collected at toll plazas from vehicles passing through the Toll Roads. Toll revenues generated by each of the Toll Roads will be subject to a number of factors, including traffic volume by vehicle categories, weight of the vehicle, applicable toll rates and distance travelled. The volume can vary with the location of the asset and the period of operation, as well as seasonal effects. Meanwhile, toll rates are ultimately determined by the Indian government in accordance with certain national laws and regulations. We anticipate a continuing increase in toll rates for the Toll Roads given the annual inflation-linked adjustment.

Operation and maintenance costs

We will be responsible for the operation and maintenance of the Toll Roads upon commencement of the respective concession. Pursuant to each of the Concession Agreements, we will be required to ensure that the relevant Toll Road conforms to the maintenance requirements set forth in the Concession Agreements. For each Toll Road, we will be required to prepare an annual program of preventive, urgent and other scheduled maintenance to comply with the standards and requirements set out in the Concession Agreements.

Local state economies

We expect our financial results from the Toll Road to be dependent upon growth in the local state economies in which they are operated, namely Rajasthan, Gujarat, Telangana and Karnataka. We expect trends in the economic development and population growth of each of these states to have a direct impact on the traffic utilizing the Toll Road.

Access to and cost of financing

Our ability to obtain financing, as well as the cost of such financing, affects our business. Our ability to access such additional financing is subject to a variety of factors, including interest rates and other funding costs and market conditions. Any lack of access or higher costs in relation to additional financing that may be required by us could negatively impact our results of operations.

Arrangement with respect to future assets

We plan to make significant investments in toll road assets so as to expand our portfolio over the next several years. In accordance with the approval granted by the Chairman of NHAI, by way of communication dated March 29, 2021, the Sponsor will offer around 1,500 km of roads in three years to the Trust ("**Future Assets**").

The process of identification of Future Assets, offer of Future Assets to Trust and completion of transfer of Future Assets to the Trust including valuation mechanism may be refined and/or modified in line with the internal policies of NHAI. Furthermore, the success of our portfolio expansion is limited by the availability of, and competition for, suitable projects, by our financial resources, including our available cash and borrowing capacity, by our ability to integrate such acquired projects into our business and by other factors, some of which may be beyond our control. For more details, please see the section headed "*Risk Factors—The Sponsor is under no obligation to provide the Trust with access to future assets, and the Trust may be unable to bid effectively for them"* in this Preliminary Placement Document.

Competition

We operate in a competitive environment. The competition for toll road and other infrastructure 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 of our competitors have greater financial resources, economies of scale and operating efficiencies than we do. There can be no assurance that we can effectively compete with its competitors in the future, and this failure to compete effectively may have a material adverse effect on our financial condition and results of operations.

Exchange rate fluctuations

Financial information disclosed in this Preliminary Placement Document and the Asset Revenue Information will be presented in Rupees, and our functional currency is Rupees. However, while we generate revenue in Rupees, we may purchase our equipment in both Rupees and foreign currency, including U.S. dollars. Additionally, if we incur external borrowings in currencies other than Rupees, we will be exposed to foreign currency exchange risk and, depending on the cross-currency issues of these foreign currencies and the Rupee, our combined financial statements may include distorted figures of expenses and, consequentially, profits or loss. Accordingly, our results of operations will be impacted by the strength of the U.S. dollar and other currencies as measured against the Rupee due to translational effect. To the extent that the Rupee strengthens or weakens against the U.S. dollar, or other currencies in which we interact, our combined results of operations will be affected.

Results of Operations

The following table sets forth certain information with respect to our results of operations based on the Audited Financial Information and Limited Review Financial Information:

National Highways Infra Trust

Unaudited Consolidated Interim Statement of Profit & Loss for the quarter ended June 30, 2022

(₹ in lakh)

Particulars	For the quarter ended (Unaudited)
	June 30, 2022
Income	
Revenue from operations	13,737.41
Other income	111.72
Total income	**13,849.13**
Expenses	
Investment Manager fees	301.67
Trustee fees	2.39
Operating expenses	1,213.57
Project management fees	247.80
Employee benefits expenses	11.70
Finance charges	2,653.10
Depreciation and amortization expense	3,440.45
Other expenses	216.71
Total expenses	**8,087.39**
Profit / (Loss) before exceptional items and tax	**5,761.74**
Exceptional items (net)	-
Profit / (Loss) before tax	**5,761.74**
Tax expense	
Current tax	39.78
Deferred tax expense/(credit)	(558.38)
Total tax	**(518.60)**
Profit / (Loss) for the period	**6,280.34**
Other comprehensive income	
Items that will not be reclassified to Profit and Loss	-
Items that will be reclassified to Profit and Loss	-
Total comprehensive income for the period	**6,280.34**

Consolidated Results of Operations for the quarter ended June 30, 2022

Income

The total income for the quarter ended June 30, 2022 was ₹ 13,849.13 lakh, which primarily consisted of revenue from operations.

Revenue from operations

Revenue from operations for the quarter ended June 30, 2022 was ₹ 13,737.41 lakh, which was on the account of revenue from toll collection.

Other income

Revenue from other income for the quarter ended June 30, 2022 was ₹ 111.72 lakh, which was on the account of interest income on fixed deposit receipt, gain on sale of mutual funds and other miscellaneous income.

Expenses

The total expenses for the quarter ended June 30, 2022 was ₹ 8,087.39 lakh, which primarily consisted of depreciation and amortization expense, finance charges and operating expenses.

Investment Manager fees

The total Investment Manager fees for the quarter ended June 30, 2022 was ₹ 301.67 lakh, which was on the account of fee paid to the Investment Manager pursuant to the Investment Management Agreement.

Trustee fees

The total Trustee fees for the quarter ended June 30, 2022 was ₹ 2.39 lakh, which was on the account of fee paid to the Trustee pursuant to the Trust Deed.

Operating expenses

The total operating expenses for the quarter ended June 30, 2022 was ₹ 1,213.57 lakh, which was on the account of provision for major maintenance obligation and operation and maintenance expenses.

Project management fees

The total project management fees for the quarter ended June 30, 2022 was ₹ 247.80 lakh, which was on the account of fee paid to the Project Manager pursuant to Project Implementation and Management Agreement.

Employee benefits expenses

The total employee benefit expenses for the quarter ended June 30, 2022 was ₹ 11.70 lakh, which was on the account of salary and wage expenses.

Finance charges

The total finance charges for the quarter ended June 30, 2022 was ₹ 2,653.10 lakh, which was on the account of interest paid to senior lenders.

Depreciation and amortization expense

The total depreciation and amortization expense for the quarter ended June 30, 2022 was ₹ 3,440.45 lakh, which was on the account of amortization of the intangible assets toll rights.

Other expenses

The total other expenses for the quarter ended June 30, 2022 was ₹ 216.71 lakh, which was on the account of legal and professional fees, insurance, independent consultant fees and auditor remuneration, etc.

Consolidated Results of Operations for the Financial Year ended March 31, 2022

Particulars	For the Financial Year ended (Audited) (in lakhs)
	March 31, 2022
Income	
Revenue from operations	13,960.55
Other income	1,014.53
Total income	**14,975.08**
Expenses	
Investment Manager fees	1,931.71
Trustee fees	3.73
Operating expenses	849.77
Project management fees	290.43
Employee benefits expenses	2.12
Finance charges	3,154.43
Depreciation and amortization expense	1,055.65
Other expenses	676.86
Total expenses	**7,964.71**
Profit / (Loss) before exceptional items and tax	**7,010.37**
Exceptional items (net)	-
Profit / (Loss) before tax	**7,010.37**
Tax expense	
Current tax	436.36
Deferred tax expense/(credit)	(262.32)
Total tax	**174.04**
Profit / (Loss) for the period	**6,836.33**
Other comprehensive income	

Particulars	For the Financial Year ended (Audited) (in lakhs)
	March 31, 2022
Items that will not be reclassified to Profit and Loss	-
Items that will be reclassified to Profit and Loss	-
Total comprehensive income for the period	**6 ,836.33**

Income

The total income for the Financial Year ended March 31, 2022 was ₹ 14,975.08 lakh, which primarily consisted of revenue from operations.

Revenue from operations

Revenue from operations for the Financial Year ended March 31, 2022 was ₹ 13,960.55 lakh, which was on the account of revenue from toll collection

Other income

Revenue from other income for the Financial Year ended March 31, 2022 was ₹ 1,014.53 lakh, which was on the account of interest income on fixed deposit receipts, gain on sale of mutual funds, gain and fair valuation on mutual funds and other miscellaneous income.

Expenses

The total expenses for the Financial Year ended March 31, 2022 was ₹ 7,964.71 lakh, which primarily consisted of depreciation and amortization expense, finance charges and Investment Manager fees.

Investment Manager fees

The total Investment Manager fees for the Financial Year ended March 31, 2022 was ₹ 1,931.71 lakh, which was on the account of fee paid to the Investment Manager pursuant to Investment Management Agreement.

Trustee fees

The total Trustee fees for the Financial Year ended March 31, 2022 was ₹ 3.73 lakh, which was on the account of [fee paid to the Trustee pursuant to Trust Deed

Operating expenses

The total operating expenses for the Financial Year ended March 31, 2022 was ₹ 849.77 lakh, which was on the account of provision for major maintenance obligation and operation and maintenance expenses.

Project management fees

The total project management fees for the Financial Year ended March 31, 2022 was ₹ 290.43 lakh, which was on the account of fee paid to the Project Manager pursuant to Project Implementation and Management Agreement

Employee benefits expenses

The total employee benefit expenses for the Financial Year ended March 31, 2022 was ₹ 2.12 lakh, which was on the account of salary and wage expenses.

Finance charges

The total finance charges for the Financial Year ended March 31, 2022 was ₹ 3,154.43 lakh, which was on the account of interest paid to senior lenders

Depreciation and amortization expense

The total depreciation and amortization expense for the Financial Year ended March 31, 2022 was ₹ 1,055.65 lakh, which was on the account of amortization of the intangible assets toll rights

Other expenses

The total other expenses for the Financial Year ended March 31, 2022 was ₹ 676.86 lakh, which was on the account of legal and professional fees, insurance, fees and taxes and auditor remuneration, etc.

Impact of COVID-19 on Toll Road projects

Following the lockdown as per Ministry of Home Affairs (MHA) guidelines, the Ministry of Road Transportation and Highways (MORTH) had suspended tolling on all national highways for a 21-day period that ended on April 14, 2020. The constrained vehicular movement in the run up to the lockdown due to Covid-19 followed by suspension of tolling pushed the toll collections into negative territory for financial year ended 2020. As India might face subsequent waves of the pandemic, and the impact is not yet fully ascertainable, potential lockdowns across states in India, may constrain vehicular movements that will negatively impact toll collections at the Toll Roads.

Liquidity and Capital Resources

Pursuant to the Concession Agreements, we are required to pay certain concession fees and make certain improvement works to each of the Toll Road relating to overlay activities and construction of additional toll lanes, among other things. We expect to finance our operations for the next 12 months primarily from cash flow from the operation of the Toll Roads and debt financing. We may also from time to time seek additional sources of funding, which may include debt or equity financings, depending on our financing needs and market conditions.

Qualitative Disclosures About Market Risk

Market risk is the risk of loss arising from adverse changes in market rates and prices, such as foreign currency exchange rates and commodity prices. We do not hold or issue financial instruments for trading purposes and does not enter into derivative transactions that would be considered speculative positions. We intend to minimize our exposure to currency risk by minimizing our non-Rupee borrowings.

Interest Rate Risk

As the infrastructure development and construction business is capital intensive, we are exposed to interest rate risk. We expect the bulk of our borrowings to be at fixed rates of interest. Our borrowings are exposed to market risk relating to changes in interest rates upon any refinancing or additional financing. The debt financing provided by the Trust to the Project SPV is classified as senior debt under the Concession Agreements. This exposure to debt by the Project SPV could further lead to an increase in interest expense and could have an adverse effect on the results of operations and financial condition. Although from time to time, we may exercise any rights available to us under these financing arrangements to terminate the existing debt financing arrangement on the respective reset dates and enter into new financing arrangements, there can be no assurance that we will be able to do so on commercially reasonable terms, that our counterparties will perform their obligations, or that these agreements, if entered into, will protect us adequately against interest rate risks.

Foreign currency exchange rate risk

Our foreign exchange risk primarily arises from movements of the Rupee against the U.S. dollar. Approximately 100% of our capital expenditures are denominated in Rupees. In addition, 100% of our borrowings are denominated in Rupees. Accordingly, our operating and financial results would be negatively affected when the Rupee depreciates against the U.S. dollar and interest rates in U.S. dollar increase. In addition, we may in the future enter into financing arrangements for foreign currency borrowings. We cannot assure you that we will be able to effectively mitigate the adverse impact of currency fluctuations and increases in international interest rates on our results of operation.

Liquidity Risk

We may not have sufficient cash flows to meet our operation and maintenance expense requirements and our financing obligations when they come due. We manage liquidity risks by forecasting projected cash flows. Management closely monitors our future and contingent obligations and set up required cash reserves as necessary in accordance with internal requirements.

DISTRIBUTION

[Except as stated herein below, for an overview of the Distribution Policy of the Trust, please see the section entitled "*Distribution*" page 248 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html.

Distributions made by the Trust

The table below provides the Distributions made by the Trust, in accordance with the Distribution Policy from the date of the listing of the units of the Trust till March 31, 2022 and for the three-months period ended June 30, 2022:

S. No.	Period	Distribution made per Unit (in ₹)	Nature of Distribution
1.	FY ended March 31, 2022*	0.79**	₹ 0.71 as return on capital and ₹ 0.08 as other income on surplus funds
2.	Three-months period ended June 30, 2022	1.75***	₹ 1.74 as return on capital and ₹ 0.01 as other income on surplus funds

**From the date of listing of the Trust on the Stock Exchanges, i.e. November 10, 2021.*
*** The distribution of ₹ 0.79 per unit comprises of ₹ 0.71 per unit as return on capital, ₹ 0.08 per unit as other income on surplus funds at Trust.*
**** The distribution of ₹ 1.75 per unit comprises ₹ 1.74 per unit as return on capital, ₹ 0.01 per unit as other income on surplus funds at Trust.*

***Note** – The Trust has also declared distribution to be paid to Unitholders of ₹ 1.61 per unit for the period from July 1, 2022 to September 26, 2022.*

RELATED PARTY TRANSACTIONS

Except as otherwise provided herein below, for details in relation to the related party transactions in relation to the Trust, please see the section entitled "*Related Party Transactions*" on page 251 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html.

1. The first paragraph including the details of the procedure for dealing with related party transactions as disclosed in the section entitled "*Related Party Transactions – Procedure for dealing with Related Party Transactions*" on page 251 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html shall be replaced as follows:

   "***Procedure for dealing with Related Party Transactions***

   The details of the share purchase agreement as disclosed in the section entitled "*Related Party Transactions – Present and Ongoing Related Party Transactions – Related Party Transactions of the Trust in relation to the setting up of the Trust* " on page 253 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html shall be deleted.

2. The details of the trademark license agreement as disclosed in the section entitled "*Related Party Transactions – Present and Ongoing Related Party Transactions – Related Party Transactions of the Trust in relation to the setting up of the Trust* " on page 253 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html shall be replaced as follows:

   "***F. Trademark license Agreement***

   *Our Trustee (on our behalf) has entered into a trademark license agreement dated September 26, 2022 with our Sponsor (the "**Trademark License Agreement**"). As per the terms of the Trademark License Agreement, our Sponsor has granted us a non-exclusive, non-transferable, royalty-free and non – assignable license (without the right of sub-license) to use the trademarks of the Sponsor in relation to our business throughout India and the rest of the world, including for the purposes of our logos. The license granted to the Trust in terms of the Trademark License Agreement shall be for a term of 1 (one) year from March 31, 2022, the effective date of the Trademark License Agreeement or such shorter period as may be mutually agreed to between the parties.*"

3. The details of the transitional support agreement as disclosed in the section entitled "*Related Party Transactions – Present and Ongoing Related Party Transactions – Related Party Transactions of the Trust in relation to the setting up of the Trust* " on page 253 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html shall be replaced as follows:

   "***G. Transitional Support Agreement***

   The Sponsor, Project Manager and the Project SPV have entered into a transitional support agreement dated September 26, 2022, for the purpose of the Sponsor providing the transitional support to (i) the Project Manager in respect of its obligations under the Project Implementation and Management Agreement, and (ii) the Target Toll Roads in respect of its O&M obligations and tolling obligations (as provided under the Additional Concession Agreements). The terms and conditions of the transitional support agreement shall, in respect of each Additional Concession Agreement and the Project Implementation and Management Agreement, be effective and binding on the Parties for a period of three months commencing from the appointed date of the respective Additional Concession Agreements, unless terminated earlier by mutual consent. As per the transitional support agreement, the Sponsor's fee for the services provided under the transitional support agreement shall be such amount as may be mutually agreed amongst Sponsor, Project Manager and the Project SPV."

4. The details of the acquisition of the Project SPV by the Trust as disclosed in the section entitled "*Related Party Transactions – Acquisition of the Project SPV by the Trust*" on page 254 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html shall be deleted.

5. The details of the arrangement with respect to future assets as disclosed in the section entitled "*Related Party Transactions – Arrangement with respect to future assets*" on page 255 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html shall be deleted.

6. The details of the borrowing from related parties as disclosed in the section entitled "*Related Party Transactions – Borrowing from Related Parties*" on page 255 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html shall be replaced

as follows:

Details of Related Party Transactions as at March 31, 2022

(*₹ in lakhs*)

S. No.	Name of Entity	Particulars	For the period ended March 31, 2022	For the period ended March 31, 2021
1.	National Highways Infra Investment Managers Private Limited (NHIIMPL)	Payment of Investment Manager Fee	1,931.71	-
		Reimbursement of Pre-Issue expenses of NHIT by NHIIMPL	214.80	-
2.	National Highways Authority of India (NHAI)	Reimbursement of Pre-Issue expenses of NHIT by NHAI	578.02	67.03
		Purchase of equity shares of Project SPV (NHIPPL) by the Trust from NHAI	10,153.52	-
		Issue of units of Trust to NHAI	96,556.00	-
3.	IDBI Trusteeship Services Limited	Payment of Trustee Fee	12.15	-
		Initial Settlement Amount	-	0.10

REGULATIONS AND POLICIES

For an overview of the regulations and policies applicable to us, please see the section entitled "*Regulations and Policies*" on page 257 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html.

REGULATORY APPROVALS

Except as otherwise provided herein below, for an overview of the consents, licenses, registrations, permissions and approvals required by the Trust for the registration as an infrastructure investment trust and for carrying out its present business, please see the section entitled "*Regulatory Approvals*" on page 262 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html.

I. Approvals in relation to the Offer

1. In-principle approval from the NSE dated September 29, 2022; and

2. In-principle approval from the BSE dated September 29, 2022.

II. Approvals received in respect of the Target Toll Roads

The Sponsor, by way of its (i) letter dated September 27, 2022 in relation to Agra Bypass; (ii) letters dated September 28, 2020 and September 26, 2022 in relation to Borkhedi Kelapur Project; and (iii) letter dated September 29, 2022 in relation to Shivpuri Jhansi Project has confirmed that it had obtained all the necessary approvals and clearances required during the construction stage of the Target Toll Roads.

In terms of the Additional Concession Agreements, the Project SPV shall make necessary applications to the relevant governmental authorities for all clearances, licences, permits, authorisations, no objection certificates, consents, approvals and exemptions required to be obtained or maintained under applicable laws in connection with the operation and maintenance of the Project Highway (*as defined in the relevant Additional Concession Agreement*) during the subsistence of the Additional Concession Agreements. For further details, please see the section entitled "*Risk Factors - We are subject to government regulation and if we fail to obtain, maintain or renew our statutory and regulatory licenses, permits, and approvals required to operate our business, results of operations and cash flows may be adversely affected*" on page 76.

III. Approvals applied for but not yet received

As on the date of the Preliminary Placement Document, there are no approvals required to be obtained by National Highways Infra Trust and the Project SPV, for which applications have been made, but approvals have not been received.

IV. Approvals for which applications are yet to be made

As on the date of the Preliminary Placement Document, there are no approvals required to be obtained by National Highways Infra Trust and the Project SPV, for which applications are yet to be made.

LEGAL AND OTHER INFORMATION

Except as stated in this section, there are no material litigations and actions by regulatory authorities, in each case against the Trust, the Project SPV, the Sponsor, the Investment Manager, the Project Manager and the Trustee as on the date of the Preliminary Placement Document. Further, since (i) the Sponsor is a body corporate whose capital is funded by the Central Government and members are appointed and executive decisions taken by the President of India (acting through the Department of Personnel and Training and MoRTH), and (ii) the President of India is the Promoter of the Investment Manager, persons or entities that may be classified as "associates" of the Sponsor and Investment Manager in terms of Regulation 2(1)(b)(ii) and Regulation 2(1)(b)(iii) of the InvIT Regulations, it has not been identified as 'associates' of the Sponsor and the Investment Manager. Additionally, since the Project Manager is a is a wholly-owned subsidiary of the Sponsor, it has not been identified as 'associates' of the Sponsor and the Investment Manager.

For the purpose of this section, details of all regulatory actions and criminal matters involving the Trust, the Project SPV, the Sponsor, the Investment Manager, the Project Manager, and the Trustee, that are currently pending, have been disclosed. Further, any matter involving an amount equivalent to, or more than, the amount as disclosed below, in respect of the Trust, the Sponsor, the Investment Manager, the Project Manager and each of their Associates, and the Trustee has been disclosed.

In respect of the Sponsor, all outstanding civil matters which involve an amount exceeding ₹ 5,000 million, have been considered material. All cases where the amount is not ascertainable, but considered material, have been disclosed.

For the Investment Manager, all outstanding civil matters which involve an amount exceeding ₹ 10 million, have been considered material. However, the Investment Manager does not have any outstanding litigation.

For the Project Manager, all outstanding civil matters which involve an amount exceeding ₹ 1 million, have been considered material. However, the Project Manager does not have any outstanding litigation.

In relation to the Project SPV, all outstanding civil matters which involve an amount equal to, or more than one per cent of the net worth of the Trust as of March 31, 2022, has been considered material for disclosure. However, the Project SPV does not have any outstanding litigation.

For the Trustee, all outstanding cases involving the Trustee have been disclosed.

The Trust does not have any outstanding litigation.

Further, all pending cases, where the amount is not ascertainable but considered material by the Trust, the Sponsor, the Investment Manager, the Project Manager or any of their Associates and the Trustee as on the date of the Final Placement Memorandum have been disclosed. Also, in cases where outcome of one litigation impacts one or more other litigations, which individually are below materiality threshold, but collective above, such cases have also been disclosed.

Except as provided herein below, for an overview of the material litigations and actions by regulatory authorities, in each case against the Trust, the Project SPV, the Sponsor, the Investment Manager, the Project Manager or any of their respective Associates and the Trustee, that are currently outstanding, please see the section entitled "*Legal and Other Information*" on page 264 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html.

The summary of the material civil cases as initiated by Contractors/Concessionaires (hereinafter mentioned as the ("**Claimant"**) against the Sponsor in relation to various projects across India appearing in the section entitled "*Legal and Other Information – Litigation involving the Sponsor – Material civil matters*" on page 265 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html shall be replaced with the following:

"*Arbitrations*

1. *Abhijeet Angul Sambalpur Toll Road Limited has initiated arbitration proceedings against the Sponsor in relation to the rehabilitation and up-gradation of four laning of the Angul-Sambalpur section of NH-42 in the State of Odisha. The claims raised relate to the compensation for losses suffered by the Claimant on account of delay in procurement of site and necessary approvals, wrongful termination of the concession agreement and debarment from participation in bidding for future projects of the Sponsor. The claims raised by the Claimant amount to ₹ 20,000 million. The Sponsor has also filed counter claim for ₹ 1,282,720 million. The matter is currently pending.*

2. *M/s Bhubaneshwar Expressway Private Limited has initiated arbitration proceedings against the Sponsor in relation to 4-laning of Bhubaneswar-Puri Section of NH-203 (Km 0.00 to Km 59.00) in the State of Odisha to be executed as BOT (Toll) basis on DBFOT pattern under NHDP- III. The claims were filed by the Claimant for termination payment, pre-reference interest on termination payment, pendente lite and future interest on termination payment: at 18% per annum and arbitration cost on actual basis. The Claimant has raised a claim for ₹ 7421.10 million. The Sponsor has also filed counter claims against the Claimant for ₹ 757.10 million. The matter is currently pending.*

3. *Madhucon Projects Ltd. (Barasat Krishnagar Expressway Limited) has initiated arbitration proceedings against the Sponsor in relation to Barasat-Krishnagar Section BOT (Annuity) in the State of West Bengal. The claims filed by the Claimant for loss due to interest on debt, loss due to interest on equity infused into the project, losses due to idling/underutilisation of machinery and equipment, losses due to idling/underutilisation of manpower, losses due to miscellaneous expenditure incurred at site, compensation due to delay in handing over of site, losses due to price escalation on the works already executed, losses due to expenses incurred on the works executed, loss of overheads and profit and total termination payment. The Claimant has raised a claim for ₹ 2,1398.90 million. The Sponsor has also filed counter claims against the Claimant for ₹ 10,606.80 million. The matter is currently pending.*

4. *M/s Raipur Expressway Limited has initiated arbitration proceedings against the Sponsor in relation to improvement, operation, maintenance and strengthening of the existing 2-lane road and widening it to 4-lane divided highway from Km 239.000 to Km 281.000 of NH-6 (Raipur- Aurung Section) in the state of Chhattisgarh on BOT basis. The claims were filed by the Claimant for compensation due to delay in declaration of appointed date, compensation due to extension of time for project completion, damages for delay in providing right of way, claim on account of change of scope, claim for interest on delayed payments by the respondent, claim for loss of bonus due to arbitrary withdrawal of provisional completion certificate, claim on account of delay in releasing bank guarantees for retention money and claim for expenses and loss of profit due to delay in release of performance security. The Claimant has raised a claim for ₹ 10,121.00 million. The Sponsor has also filed counter claims against the Claimant for ₹ 4,231.70 million. The matter is currently pending.*

5. *M/s Ashoka Highway (Durg) Limited has initiated arbitration proceedings against the Sponsor in relation to design, engineering, finance, construction, operation & maintenance of end of Durg Bypass- Chhattisgarh/Maharashtra Border from Km 324.400 to Km 405.000 of NH-6 under NHDP. The Claimant has raised a claim for ₹ 5660.80 million. The matter is currently pending before arbitral tribunal. However, as both the parties want to settle the disputes, the matter has now been referred to conciliation committee (CCIE), with the consent of the parties, in terms of the policy circular dated June 2, 2017.*

6. *M/s L&T Samakhiali Gandhidham Tollway Limited has initiated arbitration proceedings against the Sponsor in relation to 6-laning of Samakhiyali-Gandhidham Section of NH-8A from Km 306.00 to Km 362.160 in the state of Gujarat to be executed as BOT (toll) on Design, Build, Finance, Operate and Transfer (DBFOT) under NHDP Phase-V. The claims filed by the Claimant for cost claim arising on account of change in law in terms of the relevant concession agreement, amount claimed under the relevant state support agreement ("**SSA**") for breach of obligations by us Government of Gujarat under the SSA, non-payment of compensation for absence of state support from the Sponsor from COD up to February 11, 2016, and cost claim due to delay in COD. The Claimant has raised a claim for ₹ 6,290.00 million. The Sponsor has also filed counter claims against the Claimant for ₹ 18,324.70 million. The matter is currently pending.*

7. *M/s IRB Ahmedabad Vadodara Super Express Tollway Private Limited has initiated arbitration proceedings against the Sponsor in relation to six laning of Ahmedabad to Vadodara Section of NH-8 from Km 6.400 to Km 108.700 (length 102.300) in the State of Gujarat and improvement of Ahmedabad-Vadodara Expressway from Km 0.000 to Km 93.302 in the State of Gujarat (Length DBFOT) toll basis. The claims filed by the Claimant for competing road and premium not being payable, Illegal Demand of Additional Premium and Interest By The Respondent, Illegal Retention of Performance Bank Guarantee by the Respondent, Wrongful retention of Bank Guarantees and compensation towards loss of interest and bank commission charge and Cost of Arbitration. The Claimant has raised a claim for ₹ 12,659.40 million. The Sponsor has also filed counter claims against the Claimant for ₹ 5,900.00 million. The matter is currently pending.*

8. *Gwalior Jhansi Expressways Limited has initiated an arbitration proceeding against the Sponsor in relation to the designing, development and maintenance of certain sections of NH-75 in the States of Uttar Pradesh and Madhya Pradesh. The claims relate to compensation for non-payment of annuities and interest, for additional direct costs incurred by the Claimant due to material breach of the concession agreement and additional costs incurred by the Claimant in respect of interest payments during the construction period beyond the scheduled project completion date. The claims raised by the Claimant amount to ₹ 20,611.5 million. The Sponsor has also filed a counter claim against the Claimant for the failure relating to compliance of the maintenance obligation, reimbursement of one-half of remuneration, costs and expenses of the independent consultant, delayed cost due to time overrun and also on account of loss of toll revenue due to delay. The counter claim is for an amount of ₹ 13,980.00 million. The said matter is currently pending.*

9. *M/s Indore Dewas Tollways Limited. has initiated arbitration proceedings against the Sponsor in relation to 6-laning of Indore-Dewas Section of Nh-3 from Km 577.550 to Km 610.000 and Km 0.000 to Km 12.600 (approx. length 45.05Km) in the State of Madhya Pradesh under NHDP Phase-V to be executed as BOT(toll) project on DBFOT pattern. The claims filed by the Claimant for claim for utilization of resources beyond the scheduled 6-laning date, as envisaged in the respective concession agreement, compensation for Claimant's loss towards additional interest during construction, compensation towards Claimants loss of toll revenue attributable to respondents misrepresentation and subsequent default in maintaining feeder roads, refund of additional concession fee/premium paid by the Claimant, compensation/indemnification towards loss of profit claimants EPC contractor. The Claimant has raised a claim for ₹*

10,709.60 million. The Sponsor has also filed counter claims against the Claimant for ₹ 5,353.40 million. The matter is currently pending.

10. *M/s GVK Deoli Kota Expressway Private Limited has initiated arbitration proceedings against the Sponsor in relation to design, construction, development, finance, operation and maintenance of four laning of Deoli- Kota Section of NH-12 from Km 165.000 to Junction of NH-76 on Kota bypass (approx. length 83.04 Kms) in the State of Rajasthan on BOT(toll) project on DBFOT pattern under NHDP phase–II. The claims filed by the Claimant for claim on account of prolongation costs and extended stay at the site, loss suffered on account of additional overhead and loss of profit, loss of toll revenue, claim on account of increase in cost of the project due additional works done by the Claimant owing to the change of scope, claim on account of additional expenses incurred by the Claimant towards tunnel work, claim on account of excessive repair and prolonged maintenance duration of existing road, claim on account of the Respondent in making the termination payment and claim on account of future loss to Claimant. The Claimant has raised a claim for ₹ 60,130.00 million. The Sponsor has also filed counter claims against the Claimant for ₹ 5,657.60 million. The matter is currently pending.*

11. *Soma Isolux Kishangarh-Beawar Tollway Private Limited has initiated arbitration proceedings against the Sponsor in relation to the improvement, operation and maintenance, rehabilitation and strengthening of the existing 2 lane road and widening it to six-lane divided highway from km 364.125 to km 58.245 (approximately 93.56 km) on the Krishangarh-Ajmer-Beawer section of National Highway. The claim relates to compensation for increase in overheads due to extended construction period, for additional cost due to loss of productivity, idling and under-utilization of plant & equipment during the extended period and for costs incurred towards interest payments on debt during the extended construction period. The claims raised by Claimant amounts to ₹ 11,968.00 million. The Sponsor has also filed counter claims against Claimant for ₹ 3,109.5 million. The matter is currently pending.*

12. *Panipat Jalandhar NH One Tollway Private Limited has initiated arbitration proceedings against the Sponsor in relation to six laning of Panipat-Jalandhar section of NH-I (km 96.00 to km 387.100) in the state of Haryana and Punjab. The claims filed by the Claimant were in relation to delay in finalization of toll plaza and commencement of toll operations at approved locations, loss of fee revenue on account of defaults, extension of project completion schedule and change in scope and other claims. The Claimant has raised a claim for ₹ 70,359.00 million. The Sponsor has also filed counter claims against Claimant for ₹ 32,847.00 million. The matter is currently pending.*

13. *M/s Bareilly Highways Project Limited has initiated arbitration proceedings against the Sponsor in relation to four laning of Bareilly-Sitapur section of NH-24 from Km 262.000 to Km 413.200 (approx. 151.200 km) in the State of Uttar Pradesh under NHDP Phase-III of DBFOT basis. The claims filed by the Claimant were in relation to claim for additional interest on debt beyond SPCD (i.e. between August 23, 2013 to January 31, 2019), interest for additional interest on debt beyond SPCD, claim for interest due on additional promoters contribution infused in the project, claim for interest due on delay in release of grant, claim for expenses incurred by SPV company beyond SPCD, claim for interest for cost of land compensation, claim for net revenue loss from SPCD till January 31, 2019, interest for net revenue loss from SPCD till January 31, 2019, claim for interest on excess 50% independent engineering cost debit by the Sponsor, claim for reimbursement of GST on regular EPC invoices-change of law, claim for interest on claim of GST on change of scope & utility shifting, claim for direct expenses incurred by EPC contractor beyond SPCD, claim for plant and machinery rental/rehandling for extended period, claim for interest for plant and machinery/rental/rehandling for extended period, claim for price escalation during the extended period, claim for interest for price escalation during the extended period, claim for expenses incurred on change of scope/variation items, claim for interest for change of scope/variation items, claim for additional transportation cost due to ban in local mining at sites, claim for interest for additional transportation cost due to ban in local mining at sites. The Claimant has raised a claim for ₹ 37,211.40 million. The Sponsor has also filed counter claims against the Claimant for ₹ 17,049.80 million. The matter is currently pending.*

14. *M/s Lucknow-Sitapur Expressways Limited has initiated arbitration proceedings against the Sponsor in relation to improvement, operation and maintenance including strengthening and widening of existing two lane road to four lane dual carriageway from km 488.270 – Km. 413.200 of NH -24 (Lucknow Sitapur Section) in the State of Uttar Pradesh on BOT basis. The claims filed by the Claimant for revenue loss, including due to delay in COD, from start of toll collection, EPC escalation, EPC additional overhead, EPC overstay of plant and equipment, additional maintenance cost of EPC, loss of profit earning capacity, extra cost IDC, due to overloading and claims for underpasses. The Claimant has raised a claim for ₹ 7,470 million. The Sponsor has also filed counter claims against the Claimant for ₹ 3,370.00 million. The matter is currently pending.*

15. *M/s PNC Kanpur Highways Limited has initiated arbitration proceedings against the Sponsor in relation to two-laning with paved shoulder of Kanpur to Kabrai Section of NH-86 from Km 7.430 to Km 130.100 in the State of Uttar Pradesh on DBFOT basis. The claims filed by the Claimant were in relation to demand for increased overheads due to delay in appointed date, demand against additional cost suffered due to idling of plants and equipment due to delayed appointed date, damages for delay in handing over site as per provisions of the relevant concession agreement, demand against additional costs suffered on account of inflation/price escalation on cost of major inputs/resources due to delayed appointed date and extended construction period, demand for compensation against overheads due to extended stay than planned stay, demand for additional cost suffered due to extended stay of plants and equipment than planned duration,*

demand for additional interest liability suffered during construction period on account of extended construction period, demand for loss of revenue suffered due to non-realization of user fee collection from July 14, 2014 to May 5, 2015, demand for loss of revenue suffered due to suspension of collection of user fee at toll plazas on NHs due to demonetization of ₹ 500 and ₹1,000 currency notes, demand for loss of earning capacity and profit suffered due to extension of construction period, demand for loss suffered on equity due to delayed return on investment on account of delayed realization of toll revenues due to delay in declaration of appointed date, extended construction period and delay in PCOD, demand in lieu of interest on amounts raised under the various claims as above in accordance with the respective due dates of payment, the contractual provisions and the law. The Claimant had raised a claim for ₹ 6,180.00 million. An award of ₹ 2,503.90 million in the matter has been passed on April 23. 2021 in favour of the Claimant. The matter is currently pending.

16. *M/s Tantia Raxaul Private Limited has initiated arbitration proceedings against the Sponsor in relation to two laning with paved shoulder of Pioprakothi to Raxaul Section of NH-28A from Km 0.600 to Km 62.064 in the state of Bihar. The claims filed by the Claimant were in relation to claim for termination payment for default of respondent , claim for non-finalisation of location and correct notification for toll plaza (along with interest at the rate of 18%) , claim for delay in handover for land/ right of way/ site (along with interest at the rate of 18%) , claim for additional interest during construction on account of extended construction period, claim for increased distance/lead for stone aggregate, claim for inflation/ price escalation (along with interest at the rate of 18%), claim for additional cost of maintenance, claim for increased overheads of concessionaire (along with interest at the rate of 18%), claim for increased overheads of EPC contractor (along with interest at the rate of 18%), claim for idling/underutilisation of plant, machinery & equipment, and claim for loss of profits of EPC contractor. The Claimant has raised a claim for ₹ 9,010.00 million. The Sponsor has also filed counter claims against the Claimant for ₹ 2,873.60 million. The matter is currently pending.*

17. *M/s Haridwar Highways Project Limited has initiated arbitration proceedings against the Sponsor in relation to the four laning of Muzaffarnagar-Haridwar Section from Km 131.00 to Km 211.000 of NH-28 in the state of UP and Uttarakhand under NHDP Phase-II as BOT (toll) on DBFOT pattern. The claims filed by the Claimant were in relation to financial expenses incurred by the Claimant beyond the scheduled commercial operation date till February 2019, interest payable on compensation for delay in handing over of the land form from appointed date till February, 2019, interest due on delay towards release of grant from February 7, 2013, up to February, 2019, claim for reimbursement of GST on regular bills/invoices of the Claimant from July, 2016, claims for expenses incurred by the Claimant on rentals of plants and machinery beyond SCOD, claims for expenses incurred by the Claimant on rentals of plants and machinery beyond SCOD till February 2019, claim for expenses incurred by the Claimant due to price escalation beyond the SCOD up to February 2019, additional transportation cost due to ban on mining at sites, claim for direct expenses incurred beyond SCOD up to February 2019, expenses incurred on existing road maintenance beyond SCOD and claim on account of amount recovered for Dehradun Highway Project Limited. The Claimant has raised a claim for ₹ 22,060.00 million. The Sponsor has also filed counter claims against the Claimant for ₹ 22,260.00 million. The matter is currently pending.*

18. *Madhucon (Madurai-Tuticorin Expressways Limited) has initiated arbitration proceedings against the Sponsor in relation to the "design, engineering, finance, construction, operation and maintenance of Madurai-Tuticorn Section from km 138.800 to km 264.50 of NH-45B in the State of Tamil Nadu under NHDP Phase IIIA". The claims relate to compensation payable due to prolongation of the project, refund of liquidated damages, change of scope of work, loss of business opportunity, loss on account of shortfall in revenue from the project and amount payable on account of price escalation during the extended period of construction. The claim raised by Claimant amounts to ₹ 81,993.10 million. The Sponsor has also filed counter claims against the Claimant for ₹ 2,902.60 million. The said matter is currently pending.*

19. *Trichy Thanjavur Expressways Limited has initiated arbitration proceedings against the Sponsor in relation to the "design engineering, financing, construction, operation and maintenance of Thanjavur-Trichy Section from km 80.000 to km 135.750 of NH-67 in the State of Tamil Nadu". The claims relate to the compensation payable on account of losses due to prolongation of the project, change in scope, losses on account of shortfall in revenue and loss of business opportunity and profit. The claims raised by the Claimant amounts to ₹ 29,906.70 million. The matter is currently pending.*

20. *M/s T K Toll Road Private Limited. has initiated arbitration proceedings against the Sponsor in relation to design, engineering, finance, construction, operation and maintenance of Trichy to Karur Section of NH-67 from Km 135.800 to Km 218.028 (excluding Lalaper ROB) in the state of Tamil Nadu under NHDP Phase-IIIA on BOT basis. The claims filed by the Claimant were in relation to extended stay of plant and equipment from July 15, 2010 to February 23, 2014, increase in cost of input materials, fuel and labour expenses incurred in the extended period from July 15, 2010 to February 23, 2014, loss of revenue due to delay in provisional completion certificate from July 15, 2010, to February 23, 2014, overhead cost for the extended in the extended construction period, reimbursement of cost incurred for works executed in Trichy bypass (Km 135.800 to 154.400) on account of deletion of stretch from the purview of the relevant concession agreement, compensation for delay in payment of grant by the respondent, additional cost incurred on account of interest paid at higher rate of interest to lenders due to extended construction period from July 15, 2010 to February 23, 2014. The Claimant has raised a claim for ₹ 11,177.00 million. The Sponsor has also filed counter claims against the Claimant for ₹ 210.00 million. The matter is currently pending.*

21. *M/s MEP Chennai Bypass Toll Road Private Limited has initiated arbitration proceedings against the Sponsor in relation to operation and maintenance of Chennai Bypass section from Km 0.000 to Km 32.600 of NH-4 & 5 in the State of Tamil Nadu on OMT basis. The claims filed by the Claimant were in relation to amount due towards concession fee (up to April 8, 2016), damages for non-completion of project facilities calculated up to April 8, 2016, amount due towards non-fulfilment of condition precedent and damages for non-maintenance of project highway calculated up to April 8, 2016. The Claimant has raised a claim for ₹ 5,033.00 million. The Sponsor has also filed counter claims against the Claimant for ₹ 8,704.30 million. The matter is currently pending.*

22. *M/s Suncon-Soma (JV) has initiated arbitration proceedings against the Sponsor in relation to four lane national highway connectivity to ICTT at Vallarpadam, Cochin, in the State of Kerala (17.200 km). The claims filed by the Claimant were in relation to compensation for additional expenditure incurred for transporting materials through extra distance to the construction sites due to non-handing over of land, payment of price variation/adjustment for utility shifting works, compensation of price variation/adjustment for utility shifting works, compensation payable consequent to prolongation of the contract and for costs of arbitration. The Claimant has raised a claim for ₹ 5,312.00 million. The Sponsor has also filed counter claims against Claimant for ₹ 1,027.30 million. The matter is currently pending.*

23. *M/s Kurukshetra Expressway Private Limited has initiated arbitration proceedings against the Sponsor in relation to four laning of Rohtak-Bawal section of NH-352 (Old NH-71) from Km 363.300 (Design Km. 363.300) to Km 450.800 (design Km 445.553) under NHDP-III in the State of Haryana on DBFOT basis. The claims were raised under the terms of the relevant concession agreement. The Claimant has raised a claim for ₹ 9,150.00 million. The matter is currently pending.*

24. *M/s JSR Mulbagal Tollways Private Limited has initiated arbitration proceedings against the Sponsor in relation to 4-laning of Mulbagal-AP/Karnataka Border Section of NH-75 (Old NH-4) from Km 216.912 to Km 239.100 in the state of Karnataka to be executed on design, build, finance, operate and transfer (DBFOT/BOT) basis in BOT (toll) mode under NHDP Phase-III. The claims filed by the Claimant are in relation to the amount payable to the Claimant in the event of termination by concessionaire and / or by the authority, the interest on the capital/equity of the concessionaire, loss for underutilization / idle of resources deployed in the way of man power, towards machineries, plant and equipment beyond the date of completion for about 29 months, loss of profit, loss of return envisaged by the concessionaire as a result of default of the authority, amount spent towards the short fall of subsistence revenue, losses due to price escalation, revenue that might have generated by the Claimant through advertisements and loss due COVID-19. The Claimant has raised a claim for ₹ 21,332.50 million. The Sponsor has also filed counter claims against the Claimant for ₹ 119.30 million. The matter is currently pending.*

25. *The Sponsor has initiated arbitration proceedings against M/s Transstroy Hoskote-Dobbaspet Tollway Private Limited in relation to the four laning of Hoskote-Dobbaspet section of NH-207 from Km 58.300 to Km 138.320 in the State of Karnataka under NHDP, Phase-IV to be executed on DBFOT (Toll) basis. The claims filed by the Sponsor were in relation to damages on account of non-achievement of prescribed milestones, claim and recovery towards escalation in price and additional cost of the project, compensation for loss of goodwill and reputation, special repair to damaged portion of bypass portion of existing road of Hoskote-Dobbaspet section of NH-207 from Km 58+300 to Km 138+320 by a third party, routine maintenance and special repair to existing road of Hoskote – Dobbaspet section of NH-207 other than the bypass portion by M/s. Nikhil Infra Projects Private Limited. The Sponsor has raised a claim for ₹ 35,410.00 million. The right of the Concessionaire/ Respondent to file counter claims against the Sponsor has been forefeited. The matter is currently pending.*

26. *M/s Rohtak Panipat Tollway Private Limited has initiated arbitration proceedings against the Sponsor in relation to the four laning of Rohtak-Panipat Section of NH-71A from Km 0.00 (Km 63.300) of NH-10 to Km 80.58 (Km 83.500 of NH-1) in the State of Haryana on DBFOT basis under NHDP Phase-III. The claims filed by the Claimant were raised in terms of the relevant concession agreement. The Claimant has raised a claim for ₹ 11,509.30 million. The matter is currently pending and is under conciliation.*

27. *M/s Ranchi Expressway Limited has initiated arbitration proceedings against the Sponsor in relation to the four laning of Ranchi- Rargaon-Jamshedpur Section from Km 114.00 to Km 277.500 of NH-33 in the State of Jharkhand on BOT(annuity) basis under NHDP Phase-II. The claims filed by the Claimant were in relation to payment towards value of work done, amount payable towards maintenance of existing road, refund of amount expended on interest during construction, compensation payable due to delay in handing over of land, extra expenditure due to escalation of cost of work done, loss incurred due to idling of machinery due to prolongation of project, loss of overheads due to prolongation of project, loss of overheads and profits on value of work done due to illegal termination and claim for amount of revenue loss (loss of annuity). The Claimant has raised a claim for ₹ 89,402.50 million. The Sponsor has also filed counter claims against the Claimant for ₹ 26,281.80 million. The matter is currently pending.*

28. *M/s Navayuga Bangalooru Tollways Pvt. Ltd. has initiated arbitration proceedings against the Sponsor in relation to the designing, engineering, finance, construction, operation and maintenance of access controlled highway project namely, the development and the capacity improvement of the existing carriageways from km 10.000 to 29.500, on the*

Bangalore Nelamangala section of the National Highway No. 4 (NH-4) in the state of Karnataka on BOT basis. The claims filed by the Claimant were in relation to loss of toll revenue, force free run, change in law, loss of toll revenue-non-revision of toll rates, termination payment & compensation, BG charges, Covid. The Claimant has raised a claims for ₹ 15,000.00 million. The Sponsor is yet to file its counter claims against the Claimant. The matter is currently pending.

29. *M/s Millennium City Expressways Pvt. Ltd. has initiated arbitration proceedings against the Sponsor in relation to the 8/6 lane highway from km 14.300 to km 42.000 at Delhi-Gurgaon section of NH-8 on BOT basis. The claims filed by the Claimant were in relation to the loss of profit on account of closure of the km 24 toll plaza (such amount calculated until June 24, 2021), loss of profit on account of commissioning of the competing/ alternate road facilities alternatively, extend concession period by a period of ninety four months, loss of profit suffered due to failure to provide requisite security at the main toll plaza, thereby resulted in loss of toll revenue from the residents of nearby 31 villages. Various works carried out by the Claimant as change of scope, which were over and above the project agreements, payment for which remains pending despite the Claimant having already completed such additional works, compensation/extension due to demonetization, compensation/extension due to pandemic/covid, on account of additional compliance with the joint action plan that was over and above the project agreements. The Claimant has raised a claim for ₹ 24,160.00 million. The Sponsor has also filed counter claims against the Claimant for ₹ 10,440.00 million. The matter is currently pending.*

30. *M/s EMAS Expressway Private Ltd. has initiated arbitration proceedings against the Sponsor in relation to the four-laning including strengthening of existing two lane pavement from Palsit (km 581.457) to Dhankuni (km 646.000) section of NH-2 in the state of West Bengal. The request for reference to arbitration is in respect of disputes arising out of the contract relating to change in law for the financial years 2017-18, 2018-19 and 2019-20. The claimant has raised a claim for ₹ 138.5 million. The Sponsor is yet to file the counter-claim against the claimant.*

31. *M/s AE Tollway Ltd. has initiated arbitration proceedings against the Sponsor in relation to the six laning of Agra-Etawah Bypass section of NH-2 from km 199.660 to km 323.525 under NHDP Phase-V in the state of Uttar Pradesh on BOT (Toll) basis. The claims filed by the Claimant were in relation to the additional cost incurred towards interest during construction (IDC) for the delayed period, additional direct cost incurred during the delayed period, fixed overhead payable to EPC contractor, escalation cost. The Claimant has raised a claim for ₹ 13,179.80 million. The Sponsor is yet to file the counter claims against the Claimant.*

Material civil matters filed by the Sponsor

1. *The Sponsor has initiated arbitration proceedings against M/s Transstroy Hoskote-Dobbaspet Tollway Private Limited in relation to the four laning of Hoskote-Dobbaspet section of NH-207 from Km 58.300 to Km 138.320 in the State of Karnataka under NHDP, Phase-IV to be executed on DBFOT (Toll) basis. The claims filed by the Sponsor were in relation to damages on account of non-achievement of prescribed milestones, claim and recovery towards escalation in price and additional cost of the project, compensation for loss of goodwill and reputation, special repair to damaged portion of bypass portion of existing road of Hoskote-Dobbaspet section of NH-207 from Km 58+300 to Km 138+320 by a third party, routine maintenance and special repair to existing road of Hoskote – Dobbaspet section of NH-207 other than the bypass portion by M/s. Nikhil Infra Projects Private Limited. The Sponsor has raised a claim for ₹ 35,410.00 million. M/s Transstroy Hoskote-Dobbaspet Tollway Private Limited has also filed counter claims against the Claimant for ₹ 4,231.70 million. The right of the Concessionaire/Respondent to file counter claims against the Sponsor has been forfeited. The matter is currently pending.*
2.
3. *Essel Walajahpet Poonamalle Toll Road Private Limited has filed a petition before the High Court of Delhi (challenging the award of the arbitral tribunal). The claims challenged are for compensation for adjusted equity as termination payments, compensation for repayment of the debt borrowed from the lenders/creditors, compensation for loss of profit payable to EPC contractor, compensation for internal rate of return and mobilisation and de-mobilisation. The amount challenged before the High Court of Delhi is ₹ 6,532.90 million. The matter is currently pending.*

4. *The Sponsor has filed a petition before the High Court of Delhi (challenging the award of the arbitral tribunal) against Oriental Nagpur Betul Highways Limited. The claims challenged are for date of PCOD to be declared as January 7, 2014, and grant bonus of additional 91 days including 9th instalment of annuity payment. The amount challenged before the High Court of Delhi is ₹ 8,220.70 million. The matter is currently pending.*

5. *The Sponsor has filed a petition before the High Court of Delhi (challenging the award of the arbitral tribunal) against West Haryana Highway Private Limited. The claims challenged are interest due on additional promoter contribution infused in the project, price escalation during the extended period, plant and machinery idling/rental/rehandling for extended period and interest on plant and machinery idling/rental. The amount challenged before the High Court of Delhi is ₹ 5,478.90 million. The matter is currently pending.*

6. *The Sponsor has filed a petition before the High Court of Delhi (challenging the award of the arbitral tribunal) against Gwalior Bypass Project Limited. The claims challenged are claim for interest on delayed release of annuity amount*

along with interest due to delayed payment of regular annuity, claim for interest on debt after COD till December 31, 2016 and interest incurred on price escalation form PCOD till October 31, 2016. The amount challenged before the High Court of Delhi is ₹ 5,328.10 million. The matter is currently pending.

7. *The Sponsor has filed a petition before the High Court of Delhi (challenging the award of the arbitral tribunal) against Pune Solapur Expressways Private Limited. The Sponsor has challenged the entire award with respect to extension of concession period by 928 days. The amount challenged before the High Court of Delhi is ₹ 224.60 million. The matter is currently pending.*

8. *The Sponsor has filed a petition before the High Court of Delhi (challenging the award of the arbitral tribunal) against M/s GMR. The Sponsor has challenged the final report released by sole arbitrator on February 28, 2022 which has determined the loss in terms of Article 41 amounting to ₹ 16,722.00 million in favour of the Concessionaire. The matter is currently pending.*

9. *The Sponsor has filed a petition before the High Court of Delhi (challenging the award of the arbitral tribunal) against M/s BSCPL Aurang Tollway Ltd. The Sponsor has challenged the entire award including claims with respect to right of way, payment for idealing of plant and machinery. The amount challenged before the High Court of Delhi is ₹ 2,819.40 million. The matter is currently pending.*

10. *The Sponsor has filed a petition before the High Court of Delhi (challenging the award of the arbitral tribunal) against M/s L&T Ltd. The Sponsor has challenged the entire award. The amount challenged before the High Court of Delhi is ₹ 294.60 million. The matter is currently pending.*

Other material litigation

Considering the business and purpose of the Sponsor, it is imperative for the Sponsor to have an effective mechanism for the acquisition of land for building roads. Taking this need of the Sponsor into account, the parliament has enacted the NH Act, a special enactment which overrides the Land Acquisition Act, 1894 in cases where the land is acquired for the purposes of building National Highways. The Parliament has enacted the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013, which is applicable to land acquisitions under NH Act with effect from January 1, 2015 (i.e. one year from the date of commencement of the Act, subject to notification by Central Government). The process of acquiring land is a very cumbersome process and it leads to a large number of disputes. At present there are approximately 72,000 land acquisition cases pending before various Courts/Tribunals/Competent Authorities for adjudication.

Litigations involving the Associates of the Sponsor

Except as disclosed below, as on the date of the Preliminary Placement Document, there are no pending criminal or material litigations or regulatory actions involving the Associates of the Sponsor.

Sr. No	***Name of Associate***	***Number of proceedings outstanding***	***Amount involved (₹ in million)***
		Direct Tax	
1.	*Paradip Port Road Company Limited*	*5*	*7.74*
2.	*Tuticorin Port Road Company Limited*	*3*	*1.97*
3.	*Vishakhapatnam Port Road Company Limited*	*3*	*1.73*
4.	*Calcatta Haldia Port Road Company Limited*	*3*	*-*
5.	*Mumbai JNPT Port Road Company Limited*	*2*	*-*
6.	*New Mangalore Port Road Company Limited*	*2*	*-*
7.	*Chennai Ennore Port Road Company Limited*	*1*	*-*
8.	*Ahmedabad Vadodara Expressway Company Limited*	*7*	*112.14*

Litigations involving the Trustee

1. *Hubtown Limited (the "**Plaintiff**") had filed a case before the High Court of Bombay against the Trustee and its directors (the "**Defendants**") for having informed the bankers of the Plaintiff regarding the defaults committed by the Plaintiff. The Trustee has stated that the Plaintiff is a guarantor for the debt for which the Trustee is acting as a debenture trustee and in case of defaults, the relevant documents authorize the Trustee to share information about such default to CIBIL/RBI and other creditors. The aggregate amount claimed is ₹ 3,000 million. The matter is currently pending in the Court for settlement.*

2. *SBI Cap Trustee (the "**Plaintiff**") had filed a suit before the City Civil Court, Bangalore against the Trustee and others (the "**Defendants**") requiring sale of pledged shares for a particular price by SREI Fund/Investors, for whom the Trustee was acting as the share pledge trustee. The Plaintiff was acting for a consortium of lenders and has residual interest. The aggregate claim amount is Rs. 1,550.3 million. The Branch Manager of SBI along with their counsel submitted to the Court that they are willing to explore settlement. The Court referred the matter for pre-conciliation efforts. The Plaintiff informed the Conciliator that if certain details of the loan transaction and a statement of accounts in relation to the same were provided, the dispute could be resolved quickly. The matter is pending.*

3. *Balmer Lawrie and Company Limited and another (the "**Plaintiffs**") had filed a petition before the Calcutta High Court against the Trustee and certain others (the "**Defendants**") challenging the validity of the sale transaction of 1,48,20,000 shares in Transafe Services Limited by the Defendant to the Plaintiff. The Plaintiffs have inter alia sought (a) the recovery of consideration received by the Defendants for the allegedly void contract being ₹ 237.12 million and (b) interest at the rate of 18% per annum on the decretal amount. The matter is currently pending.*

4. *Loancore Servicing Solutions Private Limited (the "**Petitioner**") had filed a Company petition no. 293/59/ND/2019 before the National Company Law Tribunal ("**NCLT**"), Principal Bench at New Delhi against the Religare Enterprise Limited and others including the Trustee (the "**Respondents**") alleging that the Respondents sold the shares of the Religare Enterprise Limited under the dominion and control of the Petitioners to Respondent no. 3-5. It is further alleged that the Trustee appropriated the shares and had transferred them to the Respondents nos. 3 to 5. It is furthermore alleged that the pledged shares had been sold to consciously deprive the Petitioner of its rights and to facilitate an illegal takeover of Respondent no. 1 by the Trustee through Respondent no.5 acting in concert. The alleged damages claim amount is ₹ 700 million is against the Respondent nos. 2 to 5. The NCLT has refused to pass any interim orders as asked by the Petitioner. The Petitioners has failed to produce any evidence or otherwise establish that it has any form of contractual privity or other relationship of any manner with the Trustee and therefore has absolutely no locus to make any claims against the Trustee. The success of the Petitioner against the Trustee in the instant petition being agitated is remote. However, the petition is pending before the NCLT, Delhi.*

5. *Future Corporate Resources Limited (FCRL) In the matter of FCRL ESOP Trust, SEBI Adjudicating Officer has passed an order dated the February 3, 2021, on the ground of insider trading against eight persons including FCRL Employees Trust of which ITSL is a trustee. FCRL along with FCRL Employee Welfare Trust has been jointly and severally directed to disgorge an amount of ₹ 2, 75, 68,650/-. ITSL has submitted that ITSL as a trustee has acted on the instructions of the committee and not liable for insider trading and has not gained or received any amount. ITSL and FCRL Employee Welfare Trust are separate. All the said persons have filed an appeal before SAT against the said SEBI Order dated the February 3, 2021. SAT has given the next date of hearing in the month of November on November 10, 2022. The matter is sub-judice.*

6. *Muthoot Finance Limited has initiated a case against the Trustee before Competition Commission of India ("**CCI**") for alleged contravention of Sections 3(3) and 4 of the Competition Act, 2002 ("**Competition Act**") for entering into anti-competitive agreement and formation of cartel. CCI. The CCI has passed an order under Section 26(1) of the Competition Act directing the Director General to investigate the conduct of inter alia, the Trustee and its office bearers for dealing in anti-competitive horizontal agreement. The Trustee has filed a writ petition before Bombay High Court challenging the jurisdiction of CCI as SEBI as sectoral regulator has jurisdiction to decide the matter. The matter has been adjourned to November 10, 2022.*

7. *R.K. Mohata Family Trust has filed commercial suit against the Trustee before Bombay High Court praying for holding of meeting of debenture holders of Reliance Home Finance Limited and seeking damages of ₹ 1,05,50,902 against the Trustee. The Bombay High Court directed the Trustee to hold the meeting of debenture holders. The Trustee convened a meeting of the debenture holders as directed by the Bombay High Court and the results of the voting of meeting have been placed before the Bombay High Court in sealed cover. The matter is currently pending.*

8. *A suit is filed by the investors before the Supreme Court of Mauritius against, inter alia, the Trustee seeking compensation and damages of US$ 103,699,976 for the loss of their investments in Dynamic India Fund III ("**Fund**"). The Trustee has submitted that it is not a Mauritius resident and therefore, the Supreme Court of Mauritius is not the convenient forum to hear the disputes raised and hence lacks the jurisdiction. Further, the Trustee is acting only as a trustee and there cannot be any claim against the Trustee as another entity was the Investment Manager of the Fund who had managed all affairs of the Fund. The matter is currently pending.*

9. *Kalyan Toll Infrastructure Limited has filed a contempt application against the directors of the Trustee for non-issuance of no-objection certificate for satisfaction of mortgage charge created by Lanco Hoskote Highway Limited as a third party mortgagor in favour of the Trustee for the benefit of certain lenders. The matter is currently pending.*"

SECURITIES MARKET OF INDIA

The information in this section has been extracted from documents available on the website of SEBI and the stock Exchange and has not been prepared or independently verified by the Parties to the InvIT or the Lead Managers or any of their respective affiliates or advisors.

The Indian Securities Market

India has a long history of organized securities trading. In 1875, the first stock exchange was established in Mumbai. BSE and 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 SCRA and the SCRR. SEBI, in exercise of its powers under the SCRA and the SEBI Act, notified Securities Contract (Regulation) (Stock Exchanges and clearing Corporations) Regulations, 2018 (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 institutional investors, credit rating agencies and other capital market participants have been notified by the relevant regulatory authority.

Listing and Delisting of Securities

The InvIT Regulations provide for listing and delisting of units of InvITs on and from the stock exchanges.

BSE

Established in 1875, it is the oldest stock exchange in India. In 1956, 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. 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.

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. 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 NSE.

Trading Hours

Trading on both NSE and 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). BSE and NSE 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

This totally automated screen based trading in securities 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. In the year 2004, BSE introduced its new generation trading platform, BOLT Plus.

NSE has introduced a fully automated trading system called National Exchange for Automated Trading ("**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

Except as otherwise stated herein below, for an overview of the restrictions on offer, sale or delivery of the Units of the Trust, please see the section entitled "*Selling and Transfer Restrictions*" on page 277 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html.

Australia

The Preliminary Placement Document:

1. does not constitute a product disclosure document or prospectus under Chapter 6D.2 of the Corporations Act, 2001 (Cth) ("**Australian Corporations Act**");

2. has not been, and will not be, lodged with the Australian Securities and Investments Commission ("**ASIC**"), as a disclosure document for the purposes of the Corporations Act and does not purport to include the information required of a disclosure document under Chapter 6D of the Australian Corporations Act;

3. does not constitute or involve a recommendation to acquire, an offer or invitation for issue or sale, an offer or invitation to arrange the issue or sale, or an issue or sale, of interests to a "retail client" (as defined in section 761G of Australian Corporations Act and applicable regulations) in Australia; and

4. may only be provided in Australia to select investors who are able to demonstrate that they fall within one or more of the categories of investors, or Exempt Investors, available under section 708 of the Australian Corporations Act.

The Units may not be directly or indirectly offered for subscription or purchased or sold, and no invitations to subscribe for or buy the Units may be issued, and no draft or definitive Preliminary Placement Document, advertisement or other offering material relating to any Units may be distributed in Australia, except where disclosure to investors is not required under Chapter 6D of the Australian Corporations Act or is otherwise in compliance with all applicable Australian laws and regulations. By submitting an application for the Units, you represent and warrant to us that you are an Exempt Investor.

As any offer of Units under this Preliminary Placement Document will be made without disclosure in Australia under Chapter 6D.2 of the Australian Corporations Act, the offer of those securities for resale in Australia within 12 months may, under section 707 of the Australian Corporations Act, require disclosure to investors under Chapter 6D.2 if none of the exemptions in section 708 applies to that resale. By applying for the Units you undertake to the Issuer that you will not, for a period of 12 months from the date of issue of the Units, offer, transfer, assign or otherwise alienate those securities to any person in Australia except in circumstances where disclosure to such person is not required under Chapter 6D.2 of the Australian Corporations Act or where a compliant disclosure document is prepared and lodged with ASIC.

Canada

Units may be sold in Canada only to purchasers purchasing, or deemed to be purchasing, as principal that are accredited investors, as defined in National Instrument 45-106 Prospectus Exemptions of the Canadian Securities Administrators or subsection 73.3(1) of the Securities Act (Ontario), and are permitted clients, as defined in National Instrument 31-103 Registration Requirements, Exemptions and Ongoing Registrant Obligations. Any resale of the Units must be made in accordance with an exemption from, or in a transaction not subject to, the prospectus requirements of applicable Canadian securities laws.

Securities legislation in certain provinces or territories of Canada may provide a purchaser with remedies for rescission or damages if this Preliminary Placement Document (including any amendment thereto) contains a misrepresentation, provided that the remedies for rescission or damages are exercised by the purchaser within the time limit prescribed by the securities legislation of the purchaser's province or territory. The purchaser should refer to any applicable provisions of the securities legislation of the purchaser's province or territory for particulars of these rights or consult with a legal advisor.

Pursuant to section 3A.3 of National Instrument 33-105 Underwriting Conflicts ("NI 33-105"), the Placement Agents are not required to comply with the disclosure requirements of NI 33-105 regarding underwriter conflicts of interest in connection with any offer of Units.

Upon receipt of this Preliminary Placement Document, each Canadian purchaser is hereby deemed to confirm that it has expressly requested that all documents evidencing or relating in any way to the sale of the Units described herein (including, for the avoidance of doubt, any purchase confirmation or any notice) be drawn up in the English language only.

Dubai International Financial Centre

The Preliminary Placement Document relates to an Exempt Offer in accordance with the Markets Rules Module of the Dubai

Financial Services Authority ("**DFSA**") Rulebook. The Preliminary Placement 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 the Preliminary Placement Document nor taken steps to verify the information set forth herein and has no responsibility for this Preliminary Placement Document. The securities to which the Preliminary Placement Document relates may be illiquid and/or subject to restrictions on their resale. Prospective purchasers of the securities offered should conduct their own due diligence on the securities. If you do not understand the contents of the Preliminary Placement Document you should consult an authorized financial advisor.

In relation to its use in the Dubai International Financial Centre, the Preliminary Placement 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.

European Economic Area

In relation to each Member State of the European Economic Area (each a "**Relevant State**"), no Units have been offered or will be offered pursuant to the Offer to the public in that Relevant State prior to the publication of a prospectus in relation to the Units which has been approved by the competent authority in that Relevant State or, where appropriate, approved in another Relevant State and notified to the competent authority in that Relevant State, all in accordance with the Prospectus Regulation, except that the Units may be offered to the public in that Relevant State at any time:

a. to any legal entity which is a qualified investor as defined under Article 2 of the Prospectus Regulation;

b. to fewer than 150 natural or legal persons (other than qualified investors as defined under Article 2 of the Prospectus Regulation), subject to obtaining the prior consent of the Placement Agents for any such offer; or

c. in any other circumstances falling within Article 1(4) of the Prospectus Regulation, provided that no such offer of the Units shall require the Cube Highways Trust or any Placement Agents to publish a prospectus pursuant to Article 3 of the Prospectus Regulation or supplement a prospectus pursuant to Article 23 of the Prospectus Regulation.

For the purposes of this provision, the expression an "offer to the public" in relation to the Units in any Relevant State means the communication in any form and by any means of sufficient information on the terms of the offer and any Units to be offered so as to enable an investor to decide to purchase or subscribe for any Units, and the expression "Prospectus Regulation" means Regulation (EU) 2017/1129.

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 the 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.

Mauritius

The Units may not be offered or sold, directly or indirectly, to the public in Mauritius. Neither the Preliminary Placement 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. The Preliminary Placement 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.

Singapore

The Preliminary Placement Document has not been and will not be registered as a prospectus in Singapore with the Monetary Authority of Singapore. Accordingly, the Preliminary Placement 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 Cube Highways 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).

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.

United States of America

Each purchaser or subscriber of Units in the United States will be deemed to have represented and agreed that it has received a copy of this Preliminary Placement Document and such other information as it deems necessary to make an investment decision and that:

i. it understands and agrees that the Units have not been and will not be registered under the Securities Act or with any securities regulatory authority of any state, territory or other jurisdiction of the United States and may not be offered, resold, pledged or otherwise transferred, except (1) in an offshore transaction complying with Rule 903 or Rule 904 of Regulation S, (2) pursuant to an exemption from the registration requirements of the Securities Act, (3) pursuant to an effective registration statement under the Securities Act, and (4) in accordance with all applicable securities laws of any state, territory or other jurisdiction of the United States;

ii. it understands that in the event Units are held in certificated form, such certificated Units will bear a legend substantially to the following effect:

"THE SECURITY EVIDENCED HEREBY HAS NOT BEEN AND WILL NOT BE REGISTERED UNDER THE UNITED STATES SECURITIES ACT OF 1933, AS AMENDED (THE "**SECURITIES ACT**"), ANY STATE SECURITIES LAWS IN THE UNITED STATES OR THE SECURITIES LAWS OF ANY OTHER JURISDICTION AND MAY NOT BE OFFERED, SOLD, PLEDGED OR OTHERWISE TRANSFERRED, EXCEPT: (A) IN AN OFFSHORE TRANSACTION IN ACCORDANCE WITH RULE 903 OR RULE 904 OF REGULATION S UNDER THE SECURITIES ACT; (B) PURSUANT TO AN EXEMPTION FROM THE REGISTRATION REQUIREMENTS OF THE SECURITIES ACT; OR (C) PURSUANT TO AN EFFECTIVE REGISTRATION STATEMENT UNDER THE SECURITIES ACT, IN EACH CASE IN ACCORDANCE WITH ANY APPLICABLE SECURITIES LAWS OF ANY STATE OF THE UNITED STATES. NO REPRESENTATION CAN BE MADE AS TO THE AVAILABILITY OF THE EXEMPTION UNDER THE SECURITIES ACT FOR RESALES OF THIS SECURITY.";

iii. any resale made other than in compliance with the above stated restrictions shall not be recognised by the Trust;

iv. it agrees that it will give to each person to whom it transfers Units notice of any restrictions on transfer of such Units;

v. it agrees that neither it, nor any of its affiliates, nor any person acting on behalf of the purchaser or any of its affiliates, will make any "directed selling efforts" as defined in Regulation S under the Securities Act with respect to the Units; and

vi. it acknowledges that the Trust, the Sponsor and the Lead Managers 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 or agreements deemed to have been made by virtue of its purchase of Units are no longer accurate, it will promptly notify the Trust, the Sponsor and the Lead Managers, and if it is acquiring any 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 each such account.

RIGHTS OF UNITHOLDERS

For an overview of the rights and interest of Unitholders, grievance redressal mechanism and information rights available to the Unitholders, please see the section entitled "*Rights of Unitholders*" on page 284 of the Final Placement Memorandum available at https://www.sebi.gov.in/filings/invit-private-issues/nov-2021/national-highways-infra-trust_53956.html.

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OFFER STRUCTURE

An offer through a private placement of [●]* Units by way of an institutional placement, for cash at price at a Floor Price of ₹ 109.00 per Unit aggregating up to ₹ [●]* million by the Trust. This Offer constitutes at least [●]% of the total outstanding Units on a post-Offer basis.

* *The IM Board by way of its resolution dated August 30, 2022 and September 27, 2022 and the unitholders of the Trust by way of their resolution dated September 23, 2022, have approved the Issue of 131,205,200 Units at or above the base price of ₹ 107.12 per Unit. The IM Board by way of its resolution dated September 27, 2022 have approved the Floor Price of ₹ 109.00 per Unit. Of the 131,205,200 Units, the Trust proposes to undertake the issue of up to 26,241,040 Units to the Sponsor, on a preferential basis ("**Preferential Issue**"), in accordance with the SEBI Institutional Placement Guidelines and the InvIT Regulations. The IM Board by way of its resolution dated September 17, 2022 has approved the Preferential Issue. The Sponsor, by way of its letter dated September 29, 2022, has confirmed its willingness to subscribe to at least 19,602,600 Units being offered pursuant to the Preferential Issue and such number of Units as may be approved by the Unitholders, in their meeting scheduled on October 10, 2022, at or above the Floor Price.*

Particulars	Details
Number of Units available for Allotment/allocation	[●] Units^
Floor Price	₹ 109.00*
Maximum Bid	Such number of Units (in multiples of 200,000 Units) not exceeding the size of this Offer, subject to applicable limits(1)
Mode of Allotment	Compulsorily in dematerialised form
Bid Lot/ Minimum Bid Size	A minimum of 2,400,000 Units, and in multiples of 10 Units thereafter
Allotment Lot	A minimum of 24,00,000 Units, and in multiples of ten Units thereafter
Trading Lot(2)	Upon listing, such number of Units, the value of which is, or exceeds, ₹ 20 million
Who can apply	Institutional Investors
Terms of Payment	Entire Bid Amount shall be payable at the time of submission of the Application Form(1)

* *Bids are required to be made for Units at a price that is at or above the floor price. Please note that Bids below the Floor Price are liable to be rejected.*

^ *The IM Board by way of its resolution dated August 30, 2022 and September 27, 2022 and the unitholders of the Trust by way of their resolution dated September 23, 2022, have approved the Issue of 131,205,200 Units at or above the base price of ₹ 107.12 per Unit. The IM Board by way of its resolution dated September 27, 2022 have approved the Floor Price of ₹ 109.00 per Unit. Of the 131,205,200 Units, the Trust proposes to undertake the issue of up to 26,241,040 Units to the Sponsor, on a preferential basis ("**Preferential Issue**"), in accordance with the SEBI Institutional Placement Guidelines and the InvIT Regulations. The IM Board by way of its resolution dated September 17, 2022 has approved the Preferential Issue. The Sponsor, by way of its letter dated September 29, 2022, has confirmed its willingness to subscribe to at least 19,602,600 Units being offered pursuant to the Preferential Issue and such number of Units as may be approved by the Unitholders, in their meeting scheduled on October 10, 2022, at or above the Floor Price.*

(1) In case of joint Bids, the Application Form was required to 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 Application Form and such First Bidder would be deemed to have signed on behalf of the joint holders. Bidders were 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 Lead Managers that it was eligible to participate in the Offer and be Allotted Units under applicable law.

(2) The trading lot post-listing of the Units may be modified in accordance with the SEBI Institutional Placement Guidelines and the InvIT Regulations and other applicable law.

Indicative Offer Timeline

Event	Indicative Date
Bid/Offer Opening Date	September 30, 2022
Bidders to submit completed Application Forms	Bid/Offer Period
Bid/Offer Closing Date	October 3, 2022
Dispatch of CANs to successful Bidders	October 12, 2022
Closing Date	On or about October 12, 2022
Designated Date	On or about October 13, 2022
Initiation of refunds, if any, in excess of the amount which was required to be paid by such Bidder pursuant to the Units Allocated to such Bidder	On or about October 13, 2022
Listing Date	On or about October 14, 2022

The above timetable is indicative and does not constitute any obligation or liability on the Trust, the Investment Manager, 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 completed within 2 Working Days from the

date of Allotment, the timetable may change due to various factors, such as, any extension of the Bid/Offer Period by the Investment Manager or any delay in receiving the final listing and trading approvals 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 applicable law.

OFFER PROCEDURE

The following is a summary intended to present a general outline of the procedure relating to the application, payment of Application Amount, Allocation and Allotment of the Units. The procedure followed in the Offer may differ from the one mentioned below and investors are assumed to have apprised themselves of the same from the Investment Manager or the Lead Managers. Investors are advised to inform themselves of any restrictions or limitations that may be applicable to them and are required to consult their respective advisors in this regard. Investors that apply in the Offer will be required to confirm, and will be deemed to have represented to us, the Trustee, the Investment Manager, the Lead Managers and their respective directors, officers, agents, advisors, affiliates and representatives, that they are eligible under all applicable law, rules, regulations and guidelines to bid for, acquire and hold the Units in the Offer. For further details please see the section entitled "Selling and Transfer Restrictions" on page 215. The Trust, the Investment Manager, the Trustee, the Lead Managers and their respective directors, officers, agents, advisors, affiliates and representatives accept no responsibility or liability for advising any investor on whether such investor is eligible to bid for, acquire or hold the Units in the Offer. The Trustee or the Investment Manager are acting on behalf of the Trust.

The Trust, the Investment Manager, the Trustee, the Lead Managers and their respective directors, officers, agents, advisors, affiliates and representatives are not liable for any amendment or modification or change to applicable laws or regulations, which may occur after the date of this Preliminary Placement Document. Investors are advised to make their independent investigations and satisfy themselves that they are Eligible Investors and are eligible to apply in the Offer. Eligible Investors are advised to ensure that any single Bid from them does not exceed the investment limits or maximum number of Units that can be held by them under applicable law or regulation or as specified in this Preliminary Placement Document. Further, Eligible Investors shall be solely responsible for compliance with applicable securities laws, including the SEBI Prohibition of Insider Trading Regulations and the Code on unpublished price sensitive information, other applicable law and dealing in securities of the Trust.

Authority for the Offer

THIS PRELIMINARY PLACEMENT DOCUMENT AND THE PLACEMENT DOCUMENT RELATE TO AN OFFER BEING MADE ONLY TO ELIGIBLE INVESTORS AND NO OFFER IS BEING MADE TO THE PUBLIC OR TO ANY OTHER CLASS OF INVESTORS.

This Preliminary Placement Document has not been, and will not be, filed as a prospectus with SEBI and, no Units will be offered in India or overseas to the public or any members of the public or any other class of investors, other than Eligible Investors.

The Offer is being made to Eligible Investors in reliance upon the SEBI Institutional Placement Guidelines and the InvIT Regulations, through the mechanism of institutional placement. The Trust is eligible to undertake the Offer under the SEBI Institutional Placement Guidelines and the InvIT Regulations.

This Preliminary Placement Document and the Placement Document are private documents provided only to select Eligible Investors. Please note that if you do not receive a serially numbered copy of this Preliminary Placement Document addressed to you, you may not rely on this Preliminary Placement Document or the Placement Document uploaded or to be uploaded, as applicable, on the website of the Stock Exchanges or the Trust, with a disclaimer to the effect that it is in connection with an institutional placement and that no offer is being made to the public or to any other category of investors, for making an application to subscribe to Units pursuant to the Offer.

The Offer was authorized and approved by the Board of Directors of the Investment Manager on August 30, 2022 and approved by the Unitholders on September 23, 2022.

Units being Allotted pursuant to the Offer shall not be sold for a period of one year from the date of Allotment, except on a recognized stock exchange.

The Units offered in the Offer have not been, and will not be, registered under the U.S. Securities Act or any other applicable law of 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 U.S. Securities Act and applicable state securities laws. Accordingly, the Units are only being offered and sold outside the United States in an "offshore transaction" as defined in and in compliance with Regulation S under the U.S. Securities Act and the applicable laws of the jurisdiction where those offers and sales occur. For further information, please see the section entitled "*Selling and Transfer Restrictions*" on page 215**.**

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 Investment Manager has filed a copy of this Preliminary Placement Document with each of the Stock Exchanges. The Trust has received in-principle approval from each of the Stock Exchanges under the SEBI Institutional Placement Guidelines.

After the Allotment of Units pursuant to the Offer, the Investment Manager shall make applications to the Stock Exchanges for the listing approvals. Subsequently, after the credit of Units to the beneficiary accounts of the Allottees, the Investment Manager shall make applications to the Stock Exchanges for the final trading approvals.

Offer Procedure

1. On the Issue Opening Date, the Lead Managers shall circulate serially numbered copies of this Preliminary Placement Document and the serially numbered Application Form, either in electronic or physical form, to Eligible Investors and the Application Form will be specifically addressed to each such Eligible Investor. The Lead Managers shall maintain a record of the Eligible Investors to whom a serially numbered Preliminary Placement Document and Application Form has been dispatched. The Lead Managers will make the requisite filings with SEBI within the stipulated time periods as required under the SEBI Institutional Placement Guidelines. The list of Eligible Investors to whom this Preliminary Placement Document and the Application Form is delivered will be determined by the Investment Manager in consultation with the Lead Managers.

2. **Unless a serially numbered Preliminary Placement Document along with the serially numbered Application Form, which includes the details of the bank account where the Application Amount is to be deposited, is addressed to a particular Eligible Investor, no invitation to make an offer to subscribe shall be deemed to have been made to such Eligible Investor.** Even if such documentation were to come into the possession of any person other than the intended recipient, no offer or invitation to offer shall be deemed to have been made to such person and any application that does not comply with this requirement shall be treated as invalid.

3. Eligible Investors may submit the Application Form, including any revisions thereof along with the Application Amount and a copy of the PAN card or PAN allotment letter, during the Offer Period to the Lead Managers.

4. Bidders will be required to indicate the following in the Application Form:

   - full official name of the Bidder to whom Units are to be Allotted, complete address, phone number, PAN, e-mail address and bank account details;
   - number of Units Bid for;
   - category to which they belong to, as indicated in the Application Form;
   - price at which they are agreeable to subscribe for the Units (which shall not be less than the Floor Price) and the aggregate Application Amount for the number of Units Bid for;
   - details of the depository account to which the Units should be credited;
   - it has agreed to certain other representations set forth in the Application Form and this Preliminary Placement Document;
   - Eligible FPIs are required to indicate their SEBI FPI registration number in the Application Form; and
   - a representation that they are either (i) outside the United States and acquiring the Units in an "offshore transaction" as defined in and in compliance with Regulation S and the applicable laws of the jurisdiction where those offers and sales occur, or (ii) within the United States only to persons reasonably believe to be U.S. QIBs in transactions exempt from, or not subject to the registration requirements of the U.S. Securities Act, and they have agreed to certain other representations set forth in the section entitled "*Notice to Investors*" on page 1, and certain other representations made in the Application Form.

5. Each Bidder shall be required to make the entire payment of the Application Amount for the Units Bid for, along with the Application Form, only through electronic transfer to the Escrow Account within the Offer Period as specified in the Application Form sent to the respective Bidders. Please note that any payment of Application Amount for the Units shall be made from the bank accounts of the relevant Bidders and the Investment Manager shall keep a record of the bank account from where such payment has been received. Application Amount payable on Units to be held by joint holders shall be paid from the bank account of the person whose name appears first in the Application Form. Pending Allotment, the Trustee and the Investment Manager shall ensure that the Application Amount received for subscription of the Units is kept in a separate bank account in the name of Trust and shall only be utilized for adjustment against allotment of Units or refund of money to the Bidders till the time such Units are listed. Notwithstanding the above, in the event, among others, a Bidder is not Allocated Units in the Offer, or a Bidder withdraws the Bid prior to the Offer Closing Date or the number of Units Allocated to the Bidder is lower than the number of Units applied for through the Application Form and towards which Application Amount has been paid by such Bidder, or the Application Amount is in excess of the amount equivalent to the product of the Units that have been Allocated to the Bidder and the Offer Price, the excess Application Amount will be refunded to the same bank account from which it was remitted, in the form and manner set out in the section entitled "- *Refunds*" below.

6. Once a duly completed Application Form is submitted by a Bidder and the Application Amount is transferred to the

Escrow Account, such Application Form constitutes an irrevocable offer and the Bid cannot be withdrawn or revised downwards after the Offer Closing Date. In case of an upward revision before the Offer Closing Date, an additional amount shall be required to be deposited towards the Application Amount in the Escrow Account along with the submission of such revised Bid. The Offer Closing Date shall be notified to the Stock Exchanges and the Eligible Investors shall be deemed to have been given notice of such date after receipt of the Application Form.

7. The Bids made by asset management companies or custodians of Mutual Funds shall specifically state the names of the concerned schemes for which the Bids are made. In case of a Mutual Fund, a separate Bid can be made in respect of each scheme of the Mutual Fund registered with SEBI.

8. Each FPI is required to submit a separate Application Form.

9. Upon receipt of the duly completed Application Form and the Application Amount in the Escrow Account, after the Offer Closing Date, the Investment Manager shall, in consultation with the Lead Managers, determine the final terms, including the Offer Price of the Units to be issued pursuant to the Offer and Allocation and the successful Bidders to whom such Units have been Allocated. Upon such determination, the Lead Managers, on behalf of the Trust, will send serially numbered CANs to the successful Bidders who have been Allocated Units in the Offer. The dispatch of a CAN, and the Placement Document (when dispatched) to a successful Bidder shall be deemed a valid, binding and irrevocable contract for successful Bidders to subscribe to the Units Allocated to such Bidders at an aggregate price equal to the product of the Offer Price and Units Allocated to such Bidders. The CAN shall contain details such as the number of Units Allocated to the successful Bidders, Offer Price and the aggregate amount received towards the Units Allocated. Please note that the Allocation will be at the absolute discretion of the Investment Manager in consultation with the Lead Managers.

10. Upon determination of the Offer Price and the issue of CAN and before Allotment of Units to successful Bidders, the Lead Managers, shall, on behalf of the Trust, send a serially numbered Placement Document to each successful Bidder that has been Allocated Units.

11. Upon dispatch of the serially numbered Placement Document, the Investment Manager shall Allot Units as per the details in the CANs sent to successful Bidders. The Investment Manager will inform the Stock Exchanges of the details of the Allotment.

12. After passing the resolution for Allotment and prior to the credit of Units into the beneficiary account of the successful Bidders maintained by the depository participant, the Investment Manager shall apply to the Stock Exchanges for listing approvals in respect of the Units Allotted pursuant to the Offer.

13. After receipt of the listing approvals from the Stock Exchanges, the Investment Manager shall ensure credit of the Units Allotted pursuant to the Offer into the beneficiary accounts of the respective Allottees.

14. The Investment Manager will then apply for the final trading approvals from the Stock Exchanges.

15. The Units that would have been credited to the beneficiary account with the Depository Participant of the successful Bidders shall be eligible for trading on the Stock Exchanges only upon the receipt of final trading and listing approvals from the Stock Exchanges.

16. As per applicable law, the Stock Exchanges will notify the final listing and trading approvals, which are ordinarily available on their websites, and the Investment Manager may communicate the receipt of the listing and trading approvals to the Allottees. The Investment Manager, the Trust, the Trustee and the Lead Managers shall not be responsible for any delay or non-receipt of the communication of the final trading and listing permissions from the Stock Exchanges or any loss arising from such delay or non-receipt. Investors are advised to apprise themselves of the status of the receipt of the permissions from the Stock Exchanges.

Institutional Investors

Only Eligible Investors are eligible to invest in the Units pursuant to the Offer. Currently, Eligible Investors, being '*institutional investors*', are eligible to participate in the Offer. In terms of Regulation 2(1)(ya) of the InvIT Regulations and the SEBI Institutional Placement Guidelines define '*institutional investors*' to mean:

- a qualified institutional buyer; or

- family trust or systematically important NBFCs registered with Reserve Bank of India or intermediaries registered with the SEBI, all with net-worth of more than five hundred crore rupees, as per the last audited financial statements.

Further, Regulation 2(1)(ss) of the SEBI ICDR Regulations define '*qualified institutional buyer*' to mean

- a mutual fund, venture capital fund, alternative investment fund and foreign venture capital investor registered with the SEBI;

- a foreign portfolio investor other than individuals, corporate bodies and family offices;
- a public financial institution;
- a scheduled commercial bank;
- a multilateral and bilateral development financial institution;
- a state industrial development corporation;
- an insurance company registered with the Insurance Regulatory and Development Authority of India;
- a provident fund with minimum corpus of ₹25 crore;
- a pension fund with minimum corpus of ₹25 crore;
- National Investment Fund set up by resolution no. F. No. 2/3/2005-DDII dated November 23, 2005 of the Government of India published in the Gazette of India;
- insurance funds set up and managed by army, navy or air force of the Union of India;
- insurance funds set up and managed by the Department of Posts, India; and
- systemically important non-banking financial companies.

Eligible FPIs are permitted to participate in the Offer in accordance with the FEMA Rules read with applicable provisions of the Foreign Exchange Management (Mode of Payment and Reporting of Non-Debt Instruments) Regulations, 2019 and other applicable foreign exchange laws and such other terms and conditions as may be prescribed by the SEBI from time to time.

Restriction on Allotment

Pursuant to paragraph 7.11.2 of the SEBI Institutional Placement Guidelines, allotment in the Offer shall not be made to an institutional investor who is a "sponsor" or "investment manager", each as defined under the InvIT Regulations, of the Trust or to a person related to, a related party or associate (as defined under the InvIT Regulations) of any of the Sponsor or the Investment Manager, provided that allotment of units can be made to the Sponsor for un-subscribed portion in the institutional placement subject to following conditions:

a. at least ninety percent of the issue size has been subscribed;
b. objects of the issue is acquisition of assets from that sponsor;
c. units allotted to sponsor shall be locked in as per Clause 3 of Annexure I of the SEBI Institutional Placement Guidelines;
d. unitholders approval shall be taken for unsubscribed portion being allotted to sponsor.

No Allotment shall be made pursuant to Bids submitted by Eligible Investors such that the Bid or subscription to the Units by the investor would result in acquisition of Units which, taken together with Units already held by such investor and any person acting in concert with such investor in the Trust, would exceed 25% of the value of the post Offer outstanding units of the Trust.

The Trustee, or the Valuer or an employee of the Valuer involved in the valuation of the Project SPV or the assets proposed to be acquired out of the proceeds of the Offer are not permitted to invest in the Units.

Affiliates or associates of the Lead Managers, who are Eligible Investors, may participate in the Offer in compliance with applicable laws.

Bid Process

Application Form

Eligible Investors shall only use the serially numbered Application Forms (which are addressed to them) supplied by the Lead Managers in either electronic form or by physical delivery for the purpose of making a Bid (including revision of a Bid) in terms of this Preliminary Placement Document.

By making a Bid (including any revision thereof) for Units through Application Forms and pursuant to the terms of this Preliminary Placement Document, the Eligible Investors will be deemed to have made the following representations, warranties, acknowledgements, and undertakings given or made under the sections entitled "*Notice to Investors* and "*Selling and Transfer Restrictions*" on pages 1 and 215, respectively:

- The Eligible Investor confirms that it is an Institutional Investor and is not prohibited under paragraph 7.11.2 of the SEBI Institutional Placement Guidelines from participating in the Offer (except as exempted pursuant to SEBI Exemptions received by the Investment Manager (on behalf of the Trust), in relation to the Offer), has a valid and

existing registration under the applicable law in India (to the extent applicable) and is eligible to participate in the Offer;

- The Eligible Investor acknowledges that it has no right to withdraw or revise its Bid after the Offer Closing Date;
- The Eligible Investor confirms that if Units are Allotted through the Offer, it shall not, for a period of one year from Allotment, sell such Units otherwise than on the Stock Exchanges;
- The Eligible Investor confirms that it is eligible to Bid and hold Units so Allotted together with any Units already held by it prior to the Offer. The Eligible Investor further confirms that its holding of the Units, does not and shall not, exceed the level permissible as per any applicable law applicable to the Eligible Investor;
- The Eligible Investor agrees that although the Application Amount is required to be paid by it along with the Application Form within the Offer Period, the Investment Manager (on behalf of the Trust) reserves the right to Allocate and Allot Units pursuant to the Offer on a discretionary basis in consultation with the Lead Managers. The Eligible Investor further acknowledges and agrees that the payment of Application Amount does not guarantee Allocation and/or Allotment of Units Bid for in full or in part;
- The Eligible Investor confirms that the Bid submitted by it or its subscription to the Units will not result in acquisition of Units which taken together with Units already held by it and any person acting in concert with it in the Trust exceeding 25% of the value of the outstanding units of the Trust;
- The Eligible Investor confirms that it is outside the United States, and is acquiring the Units in an "offshore transaction" as defined in and in compliance with Regulation S and the applicable laws of the jurisdiction where those offers and sales occur, and is not our affiliate or a person acting on behalf of such an affiliate;
- The Eligible Investor acknowledges that no Allocation shall be made to it if the price at which it has Bid for in the Offer is lower than the Floor Price; and
- The Eligible Investor confirms that it shall not undertake any trade in the Units credited to its beneficiary account maintained with the Depository Participant until such time that the final listing and trading approvals for the Units are issued by the Stock Exchanges.

Further, in accordance with Press Note No. 3 (2020 Series), dated April 17, 2020, issued by the Department for Promotion of Industry and Internal Trade, Government of India, investments where the beneficial owner of the Units is situated in or is a citizen of a country which shares land border with India, can only be made through the Government approval route, as prescribed in the FDI Policy.

ELIGIBLE INSTITUTIONAL INVESTORS MUST PROVIDE THEIR NAME, E-MAIL ID, BENEFICIARY ACCOUNT DETAILS, PAN, NATIONALITY, DEPOSITORY PARTICIPANT'S NAME, COMPLETE ADDRESS, DEPOSITORY PARTICIPANT IDENTIFICATION NUMBER AND BENEFICIARY ACCOUNT NUMBER IN THE APPLICATION FORM. ELIGIBLE INVESTORS MUST ENSURE THAT THE NAME GIVEN IN THE APPLICATION FORM IS EXACTLY THE SAME AS THE NAME IN WHICH THEIR BENEFICIARY ACCOUNT IS HELD.

IF SO REQUIRED BY THE LEAD MANAGERS, THE ELIGIBLE INVESTORS SUBMITTING A BID, ALONG WITH THE APPLICATION FORM, WILL ALSO HAVE TO SUBMIT REQUISITE DOCUMENT(S) TO THE LEAD MANAGERS TO EVIDENCE THEIR STATUS AS AN "INSTITUTIONAL INVESTOR" AS SET OUT ABOVE.

IF SO REQUIRED BY THE LEAD MANAGERS, ESCROW AGENT OR ANY STATUTORY OR REGULATORY AUTHORITY IN THIS REGARD, INCLUDING AFTER ISSUE CLOSURE, THE ELIGIBLE INVESTORS SUBMITTING A BID AND/OR BEING ALLOTTED UNITS IN THE ISSUE, WILL ALSO HAVE TO SUBMIT REQUISITE DOCUMENT(S) TO FULFILL THE KNOW YOUR CUSTOMER (KYC) NORMS.

Demographic details such as address and bank account will be obtained from the Depositories as per the Depository Participant account details provided in the Application Form.

The submission of an Application Form and payment of the Application Amount pursuant to the Application Form by a Bidder shall be deemed a valid, binding and irrevocable offer for such Bidder to pay the entire Offer Price for the Units that may be Allotted to such Bidder and shall become a binding contract on a successful Bidder upon issuance of the CAN and the Placement Document (when dispatched) by the Investment Manager in favour of the successful Bidder.

Submission of Application Form

All Application Forms must be duly completed with information including the number of Units applied for along with payment and a copy of the PAN card or PAN allotment letter. Additionally, the Application Form will include details of the relevant Escrow Account into which the Application Amounts will have to be deposited. The Application Amount shall be deposited in the Escrow Account as is specified in the Application Form and the Application Form shall be submitted to the Lead Managers either through electronic form or through physical delivery at any of the following addresses:

ICICI SECURITIES LIMITED
ICICI Venture House, Appasaheb Marathe Marg, Prabhadevi, Mumbai - 400 025
Maharashtra, India
Tel: +91 22 6807 7100
E-mail: nhitinvit@icicisecurities.com
Investor Grievance E-mail: customercare@icicisecurities.com
Contact Person: Rupesh Khant / Sumit Singh
Website: www.icicisecurities.com
SEBI Registration Number: INM000011179

SBI CAPITAL MARKETS LIMITED
202, Maker Tower 'E', Cuffe Parade, Mumbai 400 005, Maharashtra, India
Tel: +91 22 2217 8300
E-mail: nhaiinvit@sbicaps.com
Investor Grievance E-mail: investor.relations@sbicaps.com
Contact Person: Mandeep Singh
Website: www.sbicaps.com
SEBI Registration Number: INM000003531

The Lead Managers, the Trustee and the Investment Manager shall not be required to provide any written acknowledgement of the receipt of the Application Form and the Application Amount.

All Bidders submitting a Bid in the Offer shall pay the entire Application Amount during the Offer Period.

Payment of Application Amount

The Investment Manager has opened the Escrow Account with the Escrow Agent, in terms of the Escrow Agreement. Bidders will be required to deposit the entire Application Amount payable for the Units applied for through the Application Form submitted by it in accordance with the applicable laws.

Payments are to be made only through electronic fund transfer.

Payments through cheque, demand draft or cash shall be rejected.

If the payment is not made favouring the Escrow Account within the Offer Period stipulated in the Application Form, the Bid is liable to be rejected.

Permanent Account Number or PAN

Each Bidder should mention its PAN allotted under the Income Tax Act, 1961 in the Application Form. Applications without this information will be considered incomplete and are liable to be rejected, except from Bidders which are not required to hold a PAN under applicable law. Bidders should not submit the GIR number instead of the PAN as the Application Form is liable to be rejected.

Bank Account Details

Each Bidder shall mention the details of the bank account from which the payment of Application Amount has been made along with confirmation that such payment has been made from such account.

Pricing and Allocation

Build-up of the Book

The Eligible Investors shall submit their Bids (including any revision thereof) through the Application Forms within the Offer Period to the Lead Managers. Such Bids cannot be withdrawn or revised after the Offer Closing Date. The book shall be maintained by the Lead Managers.

Price Determination and Allocation

The Investment Manager, in consultation with the Lead Managers, shall determine the Offer Price, which shall be at or above the Floor Price.

After finalisation of the Offer Price, the Investment Manager shall update this Preliminary Placement Document with the Offer Price details and file the Placement Document with the Stock Exchanges.

Method of Allocation

The Investment Manager shall determine the Allocation in consultation with the Lead Managers on a discretionary basis in accordance with the allocation methodology approved by the board of Directors of the Investment Manager ("the "**Allocation Methodology**") and in compliance with InvIT Regulations and SEBI Institutional Placement Guidelines.

The Allocation Methodology proposed to be followed by the Investment Manager and the Lead Managers is provided below:

1. Allotment of the number of Units to the existing unitholders of the Trust who have bid in the Offer at or above the Offer Price (the "**Existing Unitholders**"), which is lower of:

a. the respective number of bids made by each of the Existing Unitholders; and

b. such number of Units that would result in the post-Offer unitholding (*including the change in unitholding pursuant to the proposed Preferential Issue to the Sponsor*) of the Existing Unitholders not getting diluted below their respective unitholding as of the date of this Preliminary Placement Document.

2. If the number of Units offered in the Offer exceeds the number of Units allocated as per Paragraph 1 above, the Allotment of such remaining Units to the successful bidders would be undertaken in accordance with the parameters set out below:

Step 1 – Tiering the Eligible Investors

a. Tier 1 – Sovereign wealth funds, pension funds and provident funds;

b. Tier 2 – Funds or AIFs or their affiliates holding at least one investment in the infrastructure sector or insurance companies;

c. Tier 3 – Family office or trusts; and

d. Tier 4 – Mutual funds or other Eligible Investors.

Step 2 – Allocation approach within each Tier as specified above:

a. Within each tier, allocation should be ascertained basis following:
   - Bid quantum;
   - openness to participate in future rounds; and
   - Eligible Investor repute (AUM, long term capital commitment, early expression of interest etc.)

b. In case of a tie, discretion shall be used by the Investment Manager

c. The Investment Manager will give priority in Allocation of Units based on tiers i.e. Tier 1 will be given priority first among all four tiers while Tier 4 would have lower priority in determining the Allocation Methodology. Further, Allocation of Units shall be subject to compliance with InvIT Regulations and applicable laws.

Bids received from the Bidders at or above the Offer Price shall be grouped together to determine the total demand. The Allocation to all such Bidders will be made at the Offer Price.

THE DECISION OF THE INVESTMENT MANAGER IN CONSULTATION WITH THE LEAD MANAGERS IN RESPECT OF ALLOCATION SHALL BE FINAL AND BINDING ON ALL ELIGIBLE INVESTORS. ELIGIBLE INVESTORS MAY NOTE THAT ALLOCATION OF UNITS IS AT THE SOLE AND ABSOLUTE DISCRETION OF THE INVESTMENT MANAGER IN CONSULTATION WITH THE LEAD MANAGERS AND ELIGIBLE INVESTORS MAY NOT RECEIVE ANY ALLOCATION EVEN IF THEY HAVE SUBMITTED VALID APPLICATION FORMS AND PAID THE ENTIRE APPLICATION AMOUNT AT OR ABOVE THE OFFER PRICE. NEITHER THE INVESTMENT MANAGER NOR THE LEAD MANAGERS ARE OBLIGED TO ASSIGN ANY REASON FOR ANY NON-ALLOCATION.

CAN

Based on receipt of the Application Forms and Application Amount, the Investment Manager, in consultation with the Lead Managers, in its sole and absolute discretion, shall decide the successful Bidders to whom the serially numbered CAN shall be dispatched, pursuant to which the details of the Units Allocated to them, the Offer Price and the total amount received towards Units Allocated to them shall be notified to such successful Bidders.

The successful Bidders would also be sent a serially numbered Placement Document either in electronic form or by physical delivery.

The dispatch of the serially numbered CAN and the Placement Document (when dispatched), to the Eligible Investors shall be

deemed a valid, binding and irrevocable contract for the Eligible Investors to subscribe to the Units Allocated to such successful Bidders at an aggregate price equivalent to the product of the Offer Price and Units Allocated to such successful Bidders. Subsequently, Board of Directors or the Allotment Committee will approve the Allotment of the Units to the Allottees.

Eligible Investors are advised to instruct their Depository Participant to accept the Units that may be Allotted to them pursuant to the Offer.

By submitting the Application Form, the Eligible Investors would have deemed to have made the representations and warranties as specified in the section entitled "*Notice to Investors*" on page 1 and further that such Eligible Investors shall not undertake any trade on the Units credited to its Depository Participant account pursuant to the Offer until such time as the final listing and trading approval is issued by the Stock Exchanges.

Designated Date and Allotment of Units

The Investment Manager, at its sole discretion, reserves the right to cancel the Offer at any time up to Allotment without assigning any reason whatsoever.

Following the Allotment, the Investment Manager shall apply to the Stock Exchanges for listing approvals and post receipt of the listing approvals from the Stock Exchanges, the Investment Manager shall credit the Units into the beneficiary accounts of the successful Bidders. Following the credit of the Units into the successful Bidders' beneficiary accounts, the Investment Manager will apply for final listing and trading approvals from the Stock Exchanges.

The pre and post-Offer Unitholding pattern of the Trust will be filed by the Investment Manager with the Stock Exchanges and the Investment Manager will also file an allotment report with the SEBI providing details of the Allottees and the Allotment made.

After finalization of the Offer Price, the Investment Manager shall update this Preliminary Placement Document with the Offer details and file the same with the Stock Exchanges as the Placement Document.

Refunds

In the event that the Units are not Allocated to a Bidder for any reason, or the number of Units Allocated to a successful Bidder is lower than the number of Units applied for through the Application Form and towards which Application Amount has been paid by such Bidder, or the Application Amount paid by a successful Bidder is in excess of the amount equivalent to the product of the Units that have been Allocated to such Bidder and the Offer Price, or a Bidder withdraws the Application Form prior to the Offer Closing Date, or the Offer is cancelled prior to Allocation, the excess Application Amount paid by such Bidder will be refunded to the same bank account from which the Application Amount was remitted, in the form and manner set out in the Refund Intimation Letter. The Refund Amount will be transferred to the relevant Bidders within two Working Days from the date of issuance of the CAN.

Post Allotment, the Investment Manager shall make an application for listing of the units to the stock exchange(s) and the Units shall be listed within two working days from the date of Allotment.

If the Units are failed to be listed within the specified time, the monies received shall be refunded through verifiable means within four working days from the date of the allotment, and if any such money is not repaid within such time after the issuer becomes liable to repay it, the Trust and the Investment Manager and its director or partner who is an officer in default shall, on and from the expiry of the fourth working day, be jointly and severally liable to repay that money with interest at the rate of 15% per annum.

Allotment pursuant to the Unitholders' resolution shall be completed within a period of 365 days from the date of passing of the unitholder resolution.

Other Instructions

Right to Reject Applications

The Investment Manager, in consultation with the Lead Managers, may reject Bids, in part or in full, without assigning any reason whatsoever. The decision of the Investment Manager in consultation with the Lead Managers in relation to the rejection of Bids shall be final and binding. In the event the Bid is rejected, the Application Amount paid by the Bidder shall be refunded to the same bank account from which the Application Amount was remitted by such Bidder. For details see – "*Bid Process*" and – "*Refund*" above.

Units in Dematerialized form with NSDL or CDSL

The Allotment of the Units in the Offer shall be only in dematerialized form (i.e., not in physical certificates but be fungible and be represented by the statement issued through the electronic mode).

An Eligible Investor applying for Units to be issued pursuant to the Offer must have at least one beneficiary account with a Depository Participant of either NSDL or CDSL prior to making the Bid. Units Allotted to an Eligible Investor will be credited

in electronic form directly to the specified beneficiary account (with the Depository Participant) of the Eligible Investor.

Units in electronic form can be traded only on the stock exchanges having electronic connectivity with NSDL and CDSL. The Stock Exchanges have electronic connectivity with NSDL and CDSL.

The trading of the Units to be issued pursuant to the Offer would be in dematerialized form only for all Eligible Investors in the demat segment of the respective Stock Exchanges.

The Investment Manager and the Lead Managers will not be responsible or liable for the delay in the credit of Units to be issued pursuant to the Offer due to errors in the Application Form or otherwise on the part of the Eligible Investor.

Release of Funds to Trust

The Escrow Agent shall not release the monies lying to the credit of the Escrow Account to Trust until the receipt of final trading and listing approvals of the Stock Exchanges for Units offered in the Offer and the receipt of the relevant instructions.

TAXATION

STATEMENT OF POSSIBLE TAX BENEFITS AVAILABLE TO THE TRUST AND ITS UNITHOLDERS UNDER THE APPLICABLE LAWS IN INDIA

September 29, 2022

To

National Highways Infra Trust
G-5 & 6, Sector – 10,
Dwarka,
New Delhi - 110075

National Highways Infra Investment Managers Private Limited
G-5 & 6, Sector – 10
Dwarka
New Delhi - 110075

IDBI Trusteeship Services Limited
Asian Building Ground Floor,
17 R Kamani Marg,
Ballard Estate, Mumbai - 400001

Sub: Statement of possible tax benefits available to National Highways Infra Trust and its Unitholders

Dear Sirs,

We refer to the proposed secondary offering of the units of the National Highways Infra Trust ("**the Trust**"). With reference to the captioned subject, given below is a statement and the Annexure herewith, of the applicable sections of the Income Tax Act, 1961, ("**Income Tax Act**") relating to tax benefits available to the Trust and its Unitholders. These benefits are typically dependent on Trust or its unitholders fulfilling the conditions prescribed under the relevant provisions of the Act.

The benefits discussed in the enclosed Annexure are not exhaustive but illustrative. The information contained in the Annexure is only intended to provide general information to the investors and hence is neither designed nor intended to be a substitute for professional tax advice. In view of the individual tax consequences and the changing tax laws, it is advisable to consult a tax consultant with respect to the specific tax implications arising out of the participation in the issue.

Our confirmation is based on the information, explanations and representations obtained from the Investment Manager and on the basis of our understanding of the business activities and operations of Trust.

We do not express an opinion or provide any assurance as to whether:

- Trust or its unitholders will continue to obtain these benefits in future.
- The conditions prescribed for availing the benefits, where applicable have been/would be met with.
- The revenue authorities/courts will concur with the views expressed herein.

Limitations

Our views expressed in the statement and as enclosed in the Annexure are based on the facts and assumptions indicated above. 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 change from time to time. We do not assume responsibility to update the views consequent to such changes.

We hereby give our consent to include this statement and the Annexure attached herewith, regarding possible tax benefits available to the Trust and to its Unitholders in the Preliminary Placement Document and Placement Document ("**Placement Documents**") in connection with the secondary offering of the units of the Trust which is intended to be filed with Securities and Exchange Board of India, relevant stock exchanges and any regulatory authority, as may be required under applicable law.

The below Annexure has been prepared solely in connection with the private placement under the prescribed regulations. Reliance on the Annexure is on the express understanding that we do not assume responsibility towards the investors who may or may not invest in the private placement relying on the Annexure.

For A.R. & Co.,
Chartered Accountants
FRN – 002744C

CA. Rohit Jain
Partner
MRN – 542495
UDIN: 22542495AWSLZA2272
Place: New Delhi

ANNEXURE TO STATEMENT OF POSSIBLE TAX BENEFITS AVAILABLE TO THE TRUST AND ITS UNITHOLDERS UNDER THE APPLICABLE LAWS IN INDIA

The information provided below sets out the possible tax benefits available to the unitholders 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.

The Income-tax Act, 1961 ("**Act**") has set-out a special regime for taxation of income arising to the Trust and its unitholders under Chapter XII FA of the Act.

We have summarised below relevant income-tax provisions as applicable to the Trust and its unitholders, under the Act. The income tax provisions listed below are available to the Trust and its unitholders subject to compliance with the applicable provisions and/or the conditions laid out in the Act and the regulations as prescribed under the Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014, made under the Securities and Exchange Board of India Act, 1992 (15 of 1992) or the International Financial Services Centres Authority under the International Financial Services Centres Authority Act 2019 (50 of 2019) ('InvIT Regulations'), as the case may be.

1. Tax provisions applicable to the Trust

1.1. Definition of business trust under the Act

Prior to Finance Act, 2020, a 'business trust' was defined under section 2(13A) of the Act to mean a trust registered as an infrastructure investment trust ("InvIT") under the InvIT Regulations or a Real Estate Investment Trusts (REIT) under the REIT Regulations, units of which, are required to be listed on a recognised stock exchange in accordance with the InvIT Regulations or REIT Regulations, as the case may be.

The Finance Act 2020 has amended the definition of 'business trust' which earlier recognised only listed InvITs and REITs registered with SEBI to now include unlisted InvITs registered with SEBI as well. This amendment came to effect from 1 April 2020 i.e. PY 2020-21 and onwards.

1.2. Taxability of the Trust

1.2.1. Income received from the Special Purpose Vehicle(s) ('SPVs')

a. Interest and Dividend

Interest received or receivable by the Trust from the Project SPVs (being domestic companies) shall be exempt from tax, subject to satisfaction of conditions given in section 10(23FC) of the Act.

In this regard, please note that as per the explanation to section 10(23FC) of the Act, the expression "special purpose vehicle" means an Indian company in which the business trust holds controlling interest and any specific percentage of shareholding or interest, as may be required by the regulations under which such trust is granted registration.

As per section 194 of the Act, the dividend income distributed to business trust by the SPV is not subject to withholding tax. As per section 194A(3)(xi) of the Act, any income by way of interest (other than 'interest on securities') received/receivable by the Trust from SPV is not subject to withholding tax.

As per the provisions of section 193(ix) of the Act, no withholding tax applicable on interest payable on security issued by a company, where such security is listed on recognized stock exchange.

However, every Indian company shall withhold taxes at rates in force while making payment of any interest on unlisted securities in accordance with the provisions of section 193 of the Act.

Therefore, SPVs will be required to withhold taxes where interest is paid or payable on unlisted securities. Please note that the procedural provisions regarding exemption from TDS in relation to such interest paid or payable by SPV to business trust are absent.

Accordingly, where SPVs withhold taxes on interest on securities paid or payable to the Trust, the Trust shall be eligible to claim a refund for the same.

b. Income from buy-back of share

As per section 115QA of the Act, domestic companies are required to pay additional tax at the rate of 20%[++1] of the distributed income on buy-back of shares ('Buyback Distribution Tax'). Distributed income means the consideration paid by the domestic company on buy back of shares as reduced by the amount received by the company for the issue of such shares, determined as per Rule 40BB of the Income-tax Rules, 1962 ('the Rules').

Further, as per the provisions of Section 10(34A) of the Act, any Income arising from buy-back of shares on which Buyback Distribution Tax has been paid shall not be taxable in the hands of the Trust.

Further, in view of the provisions of section 14A of the Act, any expenditure incurred in relation to earning the exempt income under 1.2.1(a) and 1.2.1(b) above, whether accrued, arisen or received or not, shall not be tax deductible. In case the tax authorities are not satisfied by the disallowance considered by the Trust, the quantum of disallowance shall be computed in accordance with the provisions of section 14A read with Rule 8D of the Rules.

1.2.2. Income other than the income distributed by the SPVs

a. Income by way of dividend/interest

Dividend/interest income received by the Trust from listed securities, liquid funds, etc. shall be subject to tax at the maximum marginal rate in force ('MMR') as per section 115UA of the Act. MMR is defined under the provisions of the Act to mean the rate of income-tax (including surcharge on income-tax, if any) applicable in relation to the highest slab of income as per the relevant Finance Act as increased by cess.

As per proviso to section 57 of the Act, no deduction shall be allowable against dividend income other than deduction on account of interest expense and such interest expense shall not exceed 20% of the gross dividend income included in the total income for that year, without deduction under section 57 of the Act.

b. Income by way of capital gains and other income

In terms of section 115UA(2) of the Act, the total taxable income of the Trust shall be chargeable to tax at MMR except for income arising on transfer of short-term capital assets and long-term capital assets[2] under section 111A and section 112 of the Act.

As per the provisions of section 111A of the Act, 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 a business trust, transacted through a recognized stock exchange and subject to STT, should be taxable at a concessional rate of 15%[++]. However, the condition of subject to STT is not applicable if the transaction is undertaken on a recognized stock exchange located in any International Financial Services Centre ('IFSC') and where the consideration for such transaction is received or receivable in foreign currency.

As per the provisions of section 112 of the Act, gains arising on the transfer of long-term capital assets shall be chargeable to tax in the hands of the Trust at the rate of 20%[++]. However, the tax arising on transfer of long-term capital asset, being listed securities (other than a unit) or zero-coupon bond, shall be lower of the following:

a. 10%[++] without indexation benefit, or
b. 20%[++] with indexation benefit

Section 48 of the Act prescribes the mode of computation of capital gains and provides for deduction of cost of acquisition/ improvement and expenses incurred in connection with the transfer of a capital asset, from the sale consideration to arrive at the amount of capital gains. However, in respect of long-term capital gains, section 48 of the Act provides for substitution of cost of acquisition/improvement with indexed cost of acquisition/improvement, which adjusts the cost of acquisition/improvement by a cost inflation index as prescribed from time to time. Such indexation benefit would not be available on bonds and debentures.

Section 70 read with section 74 of the Act allows short-term capital loss arising during a financial year to be set off against income, if any, from capital gains (short-term or long-term), arising in the same financial year. However, long-term capital loss arising during a financial year is allowed to be set-off only against long-term capital gains. Balance loss, if any, is allowed to be carried forward and set-off against income from capital gains, arising during subsequent eight assessment years, as follows: (i) balance short-term capital loss can be carried forward and set-off against capital gains (short-term or long-term); and (ii) balance long-term capital loss can be carried forward and set-off only against long-term capital gains.

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[1] [++] *excluding applicable surcharge and cess*

[2] *As per section 2(42A), a short-term capital asset means: (i) for unlisted shares – period of holding is less than or equal to 24 months; (ii) for unlisted securities (other than unlisted shares) - period of holding is less than or equal to 36 months; (iii) Immovable property being land and/or building - period of holding is less than or equal to 24 months; (iv) listed equity shares or units of an equity-oriented fund – period of holding less than or equal to 12 months. As per section 2(29A), a capital asset which is not a short-term capital asset is regarded as a long-term capital asset.*

Further, as per Section 71 of the Act, short term/long term capital loss for the year cannot be set-off against income under any other head other than capital gains for the same year.

2. **Taxability of unitholders**

1.1. *Income by way of dividend and interest*

a. As per the provisions of section 115UA(1) of the Act, the income distributed by the Trust is taxable in the hands of the unitholders in the same manner and in the same proportion as the underlying income received by or accrued to the Trust.

b. As per the provisions of section 10(23FD), any income referred to in section 115UA(1) of the Act and distributed by the Trust shall not be included in the total income of the unitholders, except for the following income:
   - Interest income from SPV [referred to in section 10(23FC)(a)];
   - Dividend Income from SPV [referred to in section 10(23FC)(b)], i.e., if the SPV has opted for concessional tax regime under section 115BAA;

   The above income would be taxable in the hands of the unitholders under section 115UA(3) of the Act at the rates applicable to the respective unitholders.

c. Taxability of dividend income distributed by the Trust to unitholders is dependent on the taxation regime adopted by the SPV(s), which distributes the dividend to the Trust. If the SPV(s) has not opted for a concessional corporate tax rate under section 115BAA of the Act ('Qualifying SPV'), dividend distributed by such Qualifying SPV ('Qualified Dividend') and distributed by the Trust is exempt in the hands of the unitholders. Any dividend other than Qualified Dividend distributed by the Trust ('Unqualified Dividend') is taxable in the hands of the unitholders.

d. Further, where the dividend, interest, or any other income received by the Trust is chargeable to tax in the hands of the Trust, such income shall be exempt in the hands of the unitholders on distribution by the Trust under section 10(23FD) of the Act. Further, any expenditure incurred for earning such exempt income shall not be deductible in the hands of the unitholders under the provisions of section 14A of the Act.

e. Deductions from income in the hands of unitholders
   A domestic company is allowed deduction of dividend income received by it from another domestic company or the Trust subject to certain conditions. Therefore, if the unitholder is a domestic company, it should be able to claim the deduction under section 80M where the prescribed conditions mentioned under section 80M have been complied with.

   Further, as per proviso to section 57 of the Act, no deduction shall be allowable against the dividend income other than deduction on account of interest expense and such interest expense shall not exceed 20% of the gross dividend income for that year, without deduction under section 57 of the Act.

1.2. *Income by way of capital gains*

1.2.1. *For resident unitholder*

a. Where the gains arising on the transfer of units of the Trust by the unitholder are included in the business income of an assessee assessable under the head 'Profits and Gains from Business or Profession' and on which STT has been charged, such STT shall be a deductible expense from business income as per the provisions of section 36(1)(xv) of the Act. The characterization of gains/losses, arising from sale of units, as capital gains or business income would depend on the nature of holding in the hands of the unitholder and various other factors.

b. Where the gains on transfer of the units of the Trust are characterized as capital gains, and if such units are long-term capital assets[3] and such transaction is chargeable to STT, income arising on transfer of units of the Trust (over and above INR 0.1 million) will be taxable at a concessional tax rate of 10%[++] subject to conditions as per section 112A. However, the condition of transaction being chargeable to STT is not required if the transaction is undertaken on a recognised stock exchange located in IFSC and where the consideration for such transaction is received or receivable in foreign currency. Further, in case of long-term capital gain on transfer of units of the

[3] *Capital asset being units of a business trust would be classified as long-term capital asset if the period of holding is more than 36 months immediately preceding the date of its transfer..*

Trust, which are not subject to STT, shall be taxable in the hands of the unitholders at the tax rate of 20%[++] under section 112 of the Act.

c. Short-term capital gains arising on transfer of the units of the Trust will be chargeable to tax at the rate of 15%[++] as per the provisions of section 111A of the Act, provided such transaction is subject to STT. The condition of STT is not required to be followed if the transaction is undertaken on a recognised stock exchange located in IFSC and where the consideration for such transaction is received or receivable in foreign currency.

d. 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 proviso to sub-section (1) of section 111A of the Act. Short-term capital gains on transfer of units of the business trust, not transacted through a recognized stock exchange and not subject to STT shall be taxable at the applicable rate of tax for respective unitholders.

e. In case of a unitholder being a resident individual or HUF, where the total taxable income as reduced by long-term capital gains taxable is below the basic exemption limit, such 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 proviso to sub-section (1) of section 112 and proviso to sub-section (2) of section 112A of the Act.

f. In case of determining the period of holding for units allotted pursuant to exchange of shares of special purpose vehicle, as per clause (hc) of explanation 1 to section 2(42A), the period of holding for the units shall include the period for which the shares were held by the promoter in the SPV.

g. In case of unitholder, being a domestic company that are liable to pay MAT under provisions of section 115JB of the Act, the gains arising, if any, on sale of units of the Trust are to be included as part of book profits for the purposes of computing MAT lability. MAT paid by such companies should be available as credit for set off against future tax liability, provided such companies do not opt to be governed by the concessional tax rate under section 115BAA of the Act.

h. In case of unitholders, other than companies, that are liable to Alternate Minimum Tax (AMT) under provisions of Section 115JC of the Act, the gains arising, if any, on sale of units of InvIT are to be included as part of adjusted total income for the purpose of computing AMT liability. AMT paid by such unitholders should be available as credit for set-off against future tax liability, provided they do not opt to be governed by the concessional tax rates u/s 115BAC or 115BAD of the Act.

1.2.2. <u>For non-resident unitholder (other than Foreign Portfolio Investors ('FPIs'):</u>

a. Where the gains arising on the transfer of shares of the unitholder are included in the business income of an assessee assessable under the head 'Profits and Gains from Business or Profession' and on which STT has been charged, such STT shall be a deductible expense from business income as per the provisions of section 36(1)(xv) of the Act. Such business income should not be taxable in India unless the non-resident has a taxable presence in India.

b. Where the gains on transfer of the units are characterized as capital gains, if such units are long-term capital assets and such transaction is chargeable to STT, income arising on transfer of units of the Trust (over and above INR 0.1 million) will be taxable at a concessional tax rate of 10%[++] subject to conditions as per Section 112A. However, the condition of STT is not required to be followed if the transaction is undertaken on a recognised stock exchange located in IFSC and where the consideration for such transaction is received or receivable in foreign currency. Further, in case of long-term capital gain on transfer of units of the Trust, which are not subject to STT, shall be taxable in the hands of the unitholders at the tax rate of 20%[++] with any applicable indexation benefit, under section 112 of the Act.

c. Short-term capital gains arising on transfer of the units of the Trust will be chargeable to tax at the rate of 15%[++] as per the provisions of section 111A of the Act if such transaction is chargeable to STT. However, the condition of STT is not required to be followed if the transaction is undertaken on a recognised stock exchange located in IFSC and where the consideration for such transaction is received or receivable in foreign currency.

d. Short-term capital gains on transfer of units of the business trust, not transacted through a recognized stock exchange and not subject to STT shall be taxable at the applicable rate of tax for respective unitholders.

e. As per section 47 of the Act read with Notification no. 16/2020, any capital gain arising on transfer of capital asset being unit of a business trust listed on a recognised stock exchange located in any IFSC where the consideration is received or receivable in foreign currency, would not be regarded as a transfer and therefore, would not be subject to any capital gain tax implications.

f. In case of unitholders, other than companies, that are liable to Alternate Minimum Tax (AMT) under provisions of Section 115JC of the Act, the gains arising, if any, on sale of units of InvIT are to be included as part of adjusted total income for the purpose of computing AMT liability. AMT paid by such unitholders should be available as credit for set-off against future tax liability, provided they do not opt to be governed by the concessional tax rates u/s 115BAC or 115BAD of the Act.

g. As per explanation 4 to section 115JB(2), the provisions of section 115JB 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 the legislation covering companies in India.

1.2.3. For non-resident unitholders who are FPIs

a. As per section 2(14) of the Act, any securities held by a FPI , which were invested in accordance with the regulations made under the Securities and Exchange Board of India Act, 1992 shall be deemed to be capital assets. Hence the income from the transfer of such securities shall be deemed to be treated as capital gains.

b. If units of the Trust are long-term capital assets and such transaction is chargeable to STT, income arising on their transfer (over and above INR 0.1 million) will be taxable at a concessional tax rate of 10%[++] subject to conditions as per section 112A read with section 115AD. Further, in case of long-term capital gain on transfer of units of the Trust, which are not subject to STT, shall be taxable in the hands of the unitholders at the tax rate of 10%[++], without any indexation benefit as per section 115AD.

c. Short-term capital gains arising on transfer of the units of the Trust will be chargeable to tax at the rate of 15%[++] as per the provisions of section 111A of the Act read with section 115AD, if such transaction is chargeable to STT. Short-term capital gains on transfer of units of the Trust, not transacted through a recognized stock exchange and not subject to STT shall be taxable at 30%[++] under section 115AD of the Act. The condition of payment of STT is not required to be followed if the transaction is undertaken on a recognised stock exchange located in IFSC and where the consideration for such transaction is received or receivable in foreign currency.

1.2.4. For unitholders who are notified Sovereign Wealth Fund and notified Pension Funds:

As per section 10(23FE) of the Act, any income by way of dividend, interest, or long-term capital gain arising from investment made in units of the Trust on or after 1 April 2020 and before 31 March 2024 and held for at least three years shall be exempt for notified Sovereign Wealth Fund, wholly owned subsidiary of Abu Dhabi Investment Authority (ADIA) and notified Pension Funds, subject to satisfaction of stipulated conditions.

In this regard, please note that there are no withholding tax provisions under the Act which provide for exemption from withholding taxes on above mentioned income accruing to the specified persons as defined under section 10(23FE) of the Act.

1.2.5. *For unitholders who are mutual funds:*

Under section 10(23D) 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.

In light with the provisions of section 196 of the Act, no deduction of tax shall be made on any sum payable to a Mutual Fund specified under clause (23D) of section 10. Accordingly, the Trust is not required to withhold tax on any sum payable to Mutual Fund set up under section 10(23D) of the Act.

1.2.6. *For Venture Capital Companies/Funds:*

For VCF/VCC registered prior to 21 May 2012:

Under Section 10(23FB) of the Act, any income of Venture Capital Company to whom the certificate of registration is granted before 21/05/2012 under SEBI (Venture Capital Funds) Regulations, 1996 or as a subcategory I Alternative Investment Fund as is regulated under SEBI (Alternative Investment Funds Regulations) under the SEBI Act, 1992, would be exempt from income tax, subject to conditions specified therein.

As per Section 115U of the Act, any income derived by a person from his investment in Venture Capital Company/Venture Capital Fund would be taxable in the hands of the person making an investment in the same manner as if it were the income accruing or arising to or received by such person had the investments been made directly in the venture capital undertaking.

For VCF/VCC registered post 21 May 2012:

VCF/VCC registered post 21 May 2012 shall be classified as a Category 1 Alternate Investment Fund which shall be governed by the SEBI (AIF) Regulations 2012. For such funds benefit of section 10(23FB) and section 115U shall not be applicable and shall be governed by section 115UB read with section 10(23FBA) and 10(23FBB) which states that business income earned by such fund shall be taxable in the hands of the Fund and exempt in the hands of the unit holders, and other income earned viz. capital gains, income from other sources shall be exempt in the hands of the fund and taxable in the hands of unit holder.

1.2.7. *Benefits under Double taxation avoidance agreement (DTAA)*

Under the provisions of section 90(2) 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 assessee.

However, the non-resident investor will have to furnish a certificate of his being a tax resident in a country outside India and a suitable declaration stating that such non-resident does not have a fixed base/ permanent establishment in India, to obtain the benefit of the applicable DTAA and such other document as may be prescribed as per the provision of section 90(4) of Act. Further, as per Notification No. 3/2022 dated 16th July 2022, Form 10F is required to be furnished electronically for submitting information as required under Rule 21AB, where tax residence certificate does not contain all the prescribed requisite information.

As per the provisions of section 90(2) 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 non-resident.

1.2.8. *Treatment of Loss:*

Section 70 read with section 74 of the Act allows short-term capital loss arising during a financial year to be set off against income, if any, from capital gains (short-term or long-term), arising in the same financial year. However, long-term capital loss arising during a financial year is allowed to be set-off only against long-term capital gains. Balance loss, if any, is allowed to be carried forward and set-off against income from capital gains, arising during subsequent eight assessment years, as follows: (i) balance short-term capital loss can be carried forward and set-off against capital gains (short-term or long-term); and (ii) balance long-term capital loss can be carried forward and set-off only against long-term capital gains.

Further, as per Section 71 of the Act, short term/long term capital loss for the year cannot be set-off against income under any head other than capital gains for the same year.

1.3. Tax deduction at source by the Trust

a. Section 194LBA – Certain income from units of the Trust:- As per section 194LBA of the Act, taxes shall be required to be deducted at source at the time of payment/ credit (whichever is earlier) from following income distributions by the Trust to its unitholders:

Income recipient	Nature of income	Applicable tax rates
• Resident unitholders	Interest income - Section 194LBA(1) Unqualified Dividend income - Section 194LBA(1) Qualified Dividend income - Section 194LBA(2A)	10% 10% Not subject to withholding tax

• Non-resident unitholders[#^]	Interest income - Section 194LBA(2) Unqualified Dividend income^ - Section 194LBA (2) Qualified Dividend income - Section 194LBA(2A)	5%[++] 10%[++] Not subject to withholding tax
• Category I & II Alternative Investment Funds • Mutual Funds	Any distribution	Not subject to withholding tax

^ If the Act provides withholding tax rate for any specific category of non-resident unitholders, then the same needs to be considered.
[#] Non-resident unitholders may seek to avail any beneficial provisions under applicable DTAA that India may have entered into with its country of residence. Rate of TDS for FPI/FII may be governed in accordance with section 196D of the Act.

b. Provisions of section 206AA of the Act

As per section 206AA of the Act, where a tax payer does not possess a Permanent Account Number ('PAN'), taxes have to be withheld on payment of income to the tax payer (where chargeable to tax) at higher of the following:

- at the rate specified in the Act; or
- at the rate or rates in force; or
- at the rate of twenty per cent

The Finance Act, 2016 amended the aforementioned provision to provide an exemption to non-residents, subject to compliance of such conditions as may be prescribed by the CBDT. In furtherance of the amended provision, the CBDT issued a notification prescribing the rules (Rule 37BC of the Rules) for relaxation from withholding of tax at higher rates in the absence of PAN in the case of non-resident deductee and laid down the information and alternative documents required to claim such relaxation.

c. Provisions of section 206AB of the Act:-

Finance Act 2021 has inserted section 206AB which inter alia stipulates that where tax is required to be withheld by a person on payment or credit to a *specified person*, the tax shall be deducted at the higher of the following rates:

(i) at twice the rate specified in the relevant provision of the Act; or
(ii) at twice the rate or rates in force; or
(iii)at the rate of five per cent.

If the provisions of section 206AA is applicable to a specified person, in addition to the provision of section 206AB, the tax shall be deducted at higher of the two rates provided in section 206AB and in section 206AA.

As per the provisions of Section 206AB of the Act, 'Specified person' means is a person who:

(i) has not furnished the return of income for the previous year immediately preceding the previous year in which the tax is required to be deducted, for which time-limit of furnishing the return of income u/s 139(1) has expired; and
(ii) the aggregate of tax deducted at source and tax collected at source is INR 50,000 or more in the said previous year.

d. Applicability of other provisions:

No income tax is deductible at source from income in the nature of capital gains arising to a resident unitholder under the provisions of the Act.

However, as per the provisions of Section 195 read with section 90 of the Act, any income on transfer of units of the Trust by non-residents may be subject to withholding of tax at the rate under the domestic tax laws or under the DTAA, whichever is more beneficial to the Assessee (other than FPIs/ FIIs who are subject to provisions of section 196D(2) of the Act)

Further, section 196D of the Act provide that in case of a payee, being FPIs/ FIIs of country with which India has entered into DTAA, tax shall be deducted at the rate of 20% or the DTAA rates (for the incomes referred in section 115AD(1)(ii) other than capital gains and interest income subject to TDS u/s 196LD of the Act), whichever is

lower, subject to the FPI/ FII furnishing a Tax Residency Certificate (referred to in Section 90(4) of the Act) and a suitable declaration for not having a fixed base/ permanent establishment in India, to the payer.

Further, as per sub-section (2) of section 196D of the Act, no tax is to be deducted from any income, in the nature of capital gains arising to a FPI or FII from the transfer of units, subject to the FPI/ FII furnishing a Tax Residency Certificate (referred to in Section 90(4) of the Act) and a suitable declaration for not having a fixed base/ permanent establishment in India, to the payer.

Buyer and seller of unlisted shares/securities also need to check the applicability of TDS u/s 194Q of the Act read with provision of Tax Collection at Source (TCS) u/s 206C(1H) of the Act. As per the clarification issued by CBDT, the transaction in shares not taken place through recognized stock exchange/ recognised clearing corporations may also fall under the ambit of section 194Q/206C(1H) of the Act since CBDT has clarified that the said provisions of section 194Q/206C(1H) of the Act are not applicable to transactions in securities and commodities transacted through recognised stock exchanges/ recognised clearing corporations, including those located in International Financial Service Centre.

Section 94(7) of the Act (commonly known as dividend stripping)

Vide Finance Act, 2022, applicability of section 94(7) of the Act (commonly known as dividend stripping) has been extended to the units of Trust as well (that with effect from Financial Year 2022-23) which provides that where:

a) any person buys or acquires any securities or unit within a period of three months prior to the record date ;
b) such person sells or transfers such securities within three months after such record date or such units within a period of nine months after such record date;
c) the dividend or income on such securities or unit received or receivable by such person is exempt.

then, the 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.

Record date means a date fixed to entitles the holder of such securities or units to receive dividend, income, or additional securities or unit without consideration, as the case may be.

Section 94(8) of the Act (commonly known as bonus stripping)

Vide Finance Act, 2022, applicability of section 94(8) of the Act (commonly known as bonus stripping) has been extended to the units of Trust as well (that with effect from Financial Year 2022-23) which provides that where:

a) any person buys or acquires any units within a period of three months prior to the record date ;
b) such person is allotted additional units without any payment on the basis of holding of such units on such record date;
c) such person sells or transfers all or any of the units within a period of nine months after the record date, while continuing to hold all or any of the additional units referred in clause (b) above.

then, the 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 Act, the amount of loss so ignored shall be deemed to be the cost of purchase or acquisition of such additional units referred to in clause (b) above as are held on the date of such sale or transfer.

Record date means a date fixed to entitles the holder of such securities or units to receive dividend, income, or additional securities or unit without consideration, as the case may be.

3. The stated benefits will be available only to the sole/ first named holder in case the units are held by joint holders.

4. 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 DTAA, if any, between India and the country in which the non-resident has fiscal domicile. Further, it is pertinent to meet the terms and condition viz. Principal purpose test, beneficial ownership test etc. as enacted in DTAAs entered into by India with various countries based on Multilateral Convention to implement tax treaty related measures to prevent Base Erosion and Profit Shifting ('MLI').

5. This statement 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

6. 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 claims, liabilities or expenses relating to this assignment, except to the extent of fees relating to this assignment, as finally judicially determined to have resulted primarily from bad faith or intentional misconduct. We will not be liable to any other person in respect of this statement.

7. This statement of possible direct tax benefits enumerated above is as per the Act as amended by the Finance Act, 2022 applicable for financial year ending 31 March 2023 relevant to the assessment year 2023-24. The above statement of possible Direct-tax Benefits sets out the possible tax benefits available to the Trust and its unitholders under the current tax laws presently in force in India. Several of these benefits available are dependent on the Trust or its unitholders fulfilling the conditions prescribed under the relevant tax laws.

8. Please note that the tax rates provided in this statement are excluding applicable surcharge and education cess.

9. The information provided above sets out the possible tax benefits available to the unit holders 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 equity shares and units, 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 advisor with respect to the tax implications arising on account of any investment in equity shares or units (including tax implications on account of any distributions by/ receipts from the Trust), 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.

LEGAL MATTERS

Each of Cyril Amarchand Mangaldas, J. Sagar Associates and Linklaters Singapore Pte. Ltd. do not make, or purport to make, any statement in this Preliminary Placement Document and is not aware of any statement in this Preliminary Placement Document which purports to be based on a statement made by any 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 Preliminary Placement Document.

INDEPENDENT ACCOUNTANTS

The Audited Financial Information have been prepared in accordance with the Ind AS and in accordance with the accounting principles generally accepted in India. The Audited Financial Information included in this Preliminary Placement Document have been audited by A.R. & Co., Chartered Accountants, the statutory auditors of the Trust, as stated in their audit reports dated May 23, 2022 and August 12, 2022, included in this Preliminary Placement Document.

ASSET REVENUE INFORMATION

In accordance with the SEBI Exemption, the revenue data for each asset for the financial years ended March 31, 2022, March 31, 2021 and March 31, 2020 and for the months of April 2022 to August 2022 is disclosed below. For further details, please see "R*isk Factors - We have no operating history for Target Toll Roads and limited historical financial information and, as such, there are limited financial statements and revenue data presented in this Preliminary Placement Document*" on page 62.

Initial Toll Roads

The details in relation to the revenue of the Initial Toll Roads for the financial years ended March 31, 2021 and March 31, 2020 and up to the Appointed Date (in terms of Initial Concession Agreements) as provided by the Sponsor by way of its letter dated August 24, 2021 are disclosed below:

Assured remittance details as per Tolling Contracts				
S. No.	**Project Highway**	**Toll Plaza**	**Period**	**Equivalent Annualized Amount (in ₹ million)**
1.	**Abu Road To Swaroopganj**	**Undavariya**	08.05.2021-15.12.2021	601.5
			04.03.2021-04.06.2021 (terminated on 07.05.2021)	590.6
			19.01.2020-19.01.2021 (extended till 04.03.2021)	440.1
			12.12.2018-22.12.2019 (extended till 19.01.2020)	374.5
2.	**Abu Road To Palanpur**	**Khemana**	16.12.2020-15.12.2021	713.5
			05.09.2020-05.12.2020 (extended till 16.12.2020)	663.6
			16.06.2019-16.06.2020 (extended till 05.09.2020)	623.7
			13.04.2018-13.07.2019 (terminated on 16.06.2019)	555.5
3.	**Chittorgarh – Kota & Chittorgarh Bypass**	**Bassi, Aroli, Dhaneswar**	24.04.2021-15.12.2021	870.8
			23.01.2021-23.04.2021	886.5
			22.09.2020-22.12.2020	775.2
			11.08.2020-22.09.2020	705.0
			04.05.2019-04.08.2020	848.7
4.	**Maharashtra Karnataka Border to Belgaum**	**Kognoli**	17.12.2020-15.12.2021	815.4
			22.09.2020-17.12.2020	116.7
			08.08.2020-22.09.2020	50.7
			22.02.2020-08.08.2020	297.4
			23.01.2020-22.02.2020	50.0
			23.10.2019 to 23.01.2020	150.2
			16.06.2019-23.10.2019	43.0
			16.06.2019-16.09.2019	129.1
		Hattargi	18.12.2020-15.12.2021	333.3

			22.09.2020-18.12.2020	65.4
			05.08.2020-22.09.2020	25.3
			05.03.2020-05.08.2020	114.3
			05.12.2019-05.03.2020	68.6
			05.11.2019-05.12.2019	25.6
			05.08.2019-05.11.2019	76.9
			05.05.2019-05.08.2019	79.2
5.	**Kothakota Bypass To Kurnool**	**Pullur**	08.03.2021-15.12.2021	1275.3
			07.12.2019-07.12.2020	1203.3
			07.09.2018-07.12.2019	1173.6

The details of the revenue of the Initial Toll Roads (i) from December 16, 2021 (i.e. the Appointed Date) up to the financial year ended March 31, 2022; (ii) three months period ended June 30, 2022; and (iii) the months of July and August 2022 are as follows:

(in ₹ million)

Period	Aburoad Swaroopganj Project	Palanpur Aburoad Project	Kothakota Kurnool Project	Belgaum Kagal Project	Chittorgarh Kota Project	Total
December 16, 2021 – March 31, 2022*	181.20	221.36	385.76	344.10	261.77	**1,394.19**
April 1, 2022 – June 30, 2022#	169.67	214.82	408.18	332.63	247.65	**1,372.94**
July 1, 2022 – July 31, 2022^	50.94	74.88	150.12	114.56	73.28	**463.78**
August 1, 2022 – August 31, 2022^	49.49	71.82	155.07	118.54	66.31	**461.23**
Total	**451.30**	**582.88**	**1,099.13**	**909.83**	**649.01**	**3,692.15**

***** The data included for the period from December 16, 2021 to March 31, 2022 is derived from Audited Financial Information and the project-wise break-up is based on the representations from the management of the Investment Manager.

The data included for the period from April 1, 2022 to June 30, 2022 is derived from Limited Review Financial Information and the project-wise break-up is based on the representations from the management of the Investment Manager.

^ The data included for the period from July 1, 2022 to July 31, 2022 and from August 1, 2022 to August 31, 2022 is based on the representations from the management of the Investment Manager.

Target Toll Roads

In terms of the SEBI Exemption, the details of the revenue of the Target Toll Roads for the preceding three financial years ended March 31, 2022, March 31, 2021 and March 31, 2020 and for the three months period ended June 30, 2022 as provided by the Sponsor by way of its letter dated September 21, 2022 are disclosed below:

Assured remittance details as per Tolling Contracts				
S. No.	**Project Highway**	**Toll Plaza**	**Period**	**Equivalent Annualized Amount per annum (in ₹ million)***
1.	**Agra Bypass**	**Raibha**	16.10.2021-16.10.2022	770
			16.10.2020-16.10.2021	641
			11.07.2020-16.10.2020	463

			12.04.2019-11.07.2020	370
2.	**Shivpuri-Jhansi**	**Raksha**	18.03.2022-18.03.2023	608.9
			29.01.2021-18.03.2022	587.8
			15.01.2020-29.01.2021	463.5
			15.10.2018-15.01.2020	466.4
3.	**Borkhedi-Wadner**	**Daroda**	24.12.2021-24.12.2022	657.7
			21.12.2020-24.12.2021	605.1
			23.09.2020-23.12.2020	516.8
			17.09.2019-23.09.2020	383.6
			24.05.2019-17.09.2019	332.5
		Kelapur	20.11.2021-20-12-2022	732.5
			11.09.2021-20.11.2021	684.3
			05.08.2021-11.09.2021	648.9
			12.06.2021-05.08.2021	558.4
			09.02.2021-12.06.2021	634.0
			28.01.2020-09.02.2021	496.8
			31.10.2019-28.01.2020	210.9
			11.09.2018-31.10.2019	197.7

**Note: The above assured remittances are as per the contractually agreed terms with the tolling contractors. However, the remittance amount payable by the tolling contractor gets revised every year from April 1 based on the revision of the toll rate revision for the year. Accordingly, the current remittance amounts (with effect from April 1, 2022) payable by the tolling contractor are as under*:

S. No.	Project Stretch	Toll Plaza	Current Equivalent Annualized Amount per annum (in ₹ million)
1	Agra Bypass	Raibha	842
2	Shivpuri-Jhansi	Raksha	670.0
3	Borkhedi-Wadner	Daroda	724.9
	Borkhedi-Wadner	Kelapur	807.4

AUDITED FINANCIAL INFORMATION

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A.R. & CO.
Chartered Accountants

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INDEPENDENT AUDITOR'S REVIEW REPORT ON THE UNAUDITED STANDALONE INTERIM FINANCIAL INFORMATION OF THE TRUST FOR THE QUARTER ENDED ON 30 JUNE, 2022

To,
The Board of Directors
National Highways Infra Investment Managers Private Limited
(Investment Manager of National Highways Infra Trust)
G-5 & 6, Sector-10,
Dwarka, Delhi - 110075

1. We have reviewed the accompanying Statement of Unaudited Standalone Interim financial Information of National Highways Infra Trust (the 'Trust'), consisting of Unaudited Standalone Interim Balance Sheet, Unaudited Standalone Interim Statement of profit and loss (Including Other Comprehensive Income) and other explanatory notes thereto including Net Distributable Cash Flows (NDCFs) for the quarter ended 30.06.2022(hereinafter referred to as "the Statement") attached herewith, being submitted by National Highways Infra Investment Managers Private Limited (the 'Investment Manager') for the purpose of expressing a conclusion that whether anything has come to our notice that causes us to believe that the Statement is not prepared, in all material respects, in accordance with the applicable Indian Accounting Standards ('Ind AS') and other recognized accounting practices and policies, or that it contains any material misstatement.

2. The Statement, which is the responsibility of the Investment Manager and has been approved by the Board of Directors of the Investment Manager, has been prepared in accordance with the recognition and measurement principles laid down in Indian Accounting Standard 34, "Interim Financial Reporting" (Ind AS 34) as prescribed in Rule 2(1)(a) of the Companies (Indian Accounting Standards) Rules, 2015 (as amended) and other accounting principles generally accepted in India, to the extent not inconsistent with the Securities and Exchange Board of lndia (Infrastructure Investment Trusts) Regulations, 2014, as amended,

including any guidelines and circulars issued thereunder ("SEBI lnvlT Regulations"). Our responsibility is to express a conclusion on the Statement based on our review.

3. We conducted our review of the Statement in accordance with the Standard on Review Engagements (SRE) 2410, "Review of interim Financial Information Performed by the Independent Auditor of the Entity" issued by the Institute of Chartered Accountants of India. This standard requires that we plan and perform the review to obtain moderate assurance as to whether the Statement is free of material misstatement. A review of interim financial information consists of making inquiries, primarily of Investment manager personnel responsible for financial and accounting matters, and applying analytical and other review procedures. A review is substantially less in scope than an audit conducted in accordance with Standards on Auditing and consequently does not enable us to obtain assurance that we would become aware of all significant matters that might be identified in an audit. Accordingly, we do not express an audit opinion.

4. Based on our review conducted as above, nothing has come to our attention that causes us to believe that the accompanying Statement is not prepared, in all material respects, in accordance with the recognition and measurement principles laid down in the aforesaid Indian Accounting Standards ('Ind AS') as prescribed in Rule 2(1)(a) of the Companies (Indian Accounting Standards) Rules, 2015 (as amended) and other accounting principles generally accepted in India, or that it contains any material misstatement.

5. The Statement includes Audited Standalone Financial Results of Trust for the year ended 31.03.2022 and for the quarter ended 30.06.2021**.**

For A. R. & Co.
Chartered Accountants
FRN. 002744C

CA Rohit Jain
Partner
Membership No: 542495
UDIN: 22542495AOXIHB9990

Place: New Delhi
Date: 12.08.2022

NATIONAL HIGHWAYS INFRA TRUST

Unaudited Standalone Interim Balance sheet as at 30 June 2022

1. Balance Sheet as at 30 June 2022 and 31 March 2022:

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	AS AT 30th June, 2022	AS AT 31st March, 2022
	(Unaudited)	*(Audited)*
ASSETS		
1) Non - Current Assets		
(a) Financial Assets		
(i) Investments	1,39,553.52	1,39,553.52
(ii) Loans	5,73,843.90	5,78,386.20
(iii) Other Financial Assets	2,875.97	3,170.81
2) Current Assets		
(a) Financial Assets		
(i) Investments	-	992.16
(ii) Cash and Cash Equivalents	11,328.12	4,801.17
(iii) Loans	31,796.10	27,253.80
(iv) Other Financial Assets	16,610.37	10,656.50
(b) Other Current Assets	25.68	12.46
TOTAL ASSETS	**7,76,033.66**	**7,64,826.63**
EQUITY AND LIABILITIES		
EQUITY		
1) Unit Capital	6,01,152.00	6,01,152.00
2) Initial Settlement Amount	0.10	0.10
3) Other Equity	28,282.50	16,415.14
LIABILITIES		
1) Non-Current Liabilities		
(a) Financial Liabilities		
(i) Borrowings	1,45,035.17	1,45,556.94
(b) Deferred Tax liabilites	-	3.16
2) Current Liabilities		
(a) Financial Liabilities		
(i) Borrowings	1,250.00	980.86
(ii) Trade Payables		
(a) Total Outstanding, dues of micro and small enterprises	-	-
(b) Total outstanding, dues of creditors other than micro and small enterprises	1.07	313.29
(iii) Other Financial Liabilities	27.42	143.56
(b) Other Current Liabilities	266.66	99.80
(c) Current Tax Liabilities (Net)	18.74	161.77
TOTAL EQUITY & LIABILITIES	**7,76,033.66**	**7,64,826.63**

NATIONAL HIGHWAYS INFRA TRUST

Unaudited Standalone Interim Statement of Profit and Loss for the quarter ended 30 June 2022

2. Statement of Profit and Loss

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	Quarter ended		Year ended
	30th June 2022	**30th June 2021**	**31st March 2022**
	(Unaudited)	*(Audited)*	*(Audited)*
INCOME			
Revenue from Operations	19,513.63	-	22,843.13
Other Income	85.68	-	993.74
Total Income	**19,599.31**	**-**	**23,836.87**
EXPENSES			
Investment Manger Fees	301.67	-	1,931.71
Trustee Fees	2.39	-	3.73
Finance Charges	2,647.76	-	3,154.43
Other Expenses	23.17	-	115.25
Total Expenses	**2,974.99**	**-**	**5,205.13**
Profit/(Loss) before Exceptional Items and Tax	16,624.32	-	18,631.74
Exceptional Items (net)			-
Profit / (Loss) before Tax	**16,624.32**	**-**	**18,631.74**
Tax Expenses			
Current Tax	39.78	-	436.36
Deferred Tax expense/(credit)	(3.16)	-	3.16
Total Tax	**36.62**	**-**	**439.52**
Profit/ (loss) for the period	**16,587.69**	**-**	**18,192.23**
Other Comprehensive Income			
Items that will not be reclassified to Profit and Loss	-	-	-
Items that will be reclassified to Profit and Loss	-	-	-
	-	-	-
Total Comprehensive Income for the period	**16,587.69**	**-**	**18,192.23**

NATIONAL HIGHWAYS INFRA TRUST

Disclosures pursuant to SEBI circulars (SEBI Master Circular No. CIRSEBI/HO/DDHS_Div3/P/CIR/2021/1673 dated

3. Statement of Net Distributable Cash Flows (All amounts in ₹ lakh unless otherwise stated)

S. No.	PARTICULARS	30 JUNE, 2022	31 MARCH, 2022
1	**Profit after tax as per Statement of profit and loss/income and expenditure (standalone) (A)**	**16,587.69**	**18,192.23**
2	**Add:** Depreciation and amortization as per statement of profit and loss account. Incase of Impairment reversal, same needs to be deducted from profit and loss.	-	-
3	**Add/Less:** Loss/gain on sale of infrastructure assets	-	-
4	**Add:** Proceeds from sale of infrastructure assets adjusted for the following: 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)(a) of the InvIT regulations	-	-
5	**Add:** Proceeds from sale of infrastructure assets not distributed pursuant to an earlier plan to re-invest, if such proceeds are not intended to be invested subsequently, net of any profit/ (loss) recognised in profit and loss account	-	-
6	**Add/ Less:** Any other item of non- cash expense/ non cash income (net of actual cash flows for these items), if deemed necessary by the Investment Manager. For example, any decrease/ increase in carrying amount of an asset or a liability recognised in profit and loss /income and expenditure on measurement of the asset or the liability at fair value; Interest cost as per effective interest rate method, deferred tax lease rents recognised on a straight line basis, etc.	(5,006.24)	(8,233.88)
7	**Less:** Repayment of external debt (principal) / redeemable preference shares /debentures, etc. (excluding refinancing) / net cash set aside to comply with DSRA requirements under loan agreements and other reserves.	(1,131.35)	(5,204.50)
8	**Total Adjustment (B)**	(6,137.58)	(13,438.39)
9	**Net Distributable Cash Flows (C) = (A+B)**	**10,450.11**	**4,753.84**

NATIONAL HIGHWAYS INFRA TRUST

Notes to the Unaudited Standalone Interim Financial Results of National Highways Infra Trust for the quarter ended 30 June 2022

1 The unaudited standalone Interim financial results of National Highways Infra Trust ('Trust') for the quarter ended 30 June 2022 have been reviewed by the Audit Committee of National Highways Infra Investment Managers Private Limited ('Investment Manager' of Trust) at their meeting held on 12th August 2022 and approved by the Board of Directors of the Investment Manager at their meeting held on 12th August 2022**.** The statutory auditors have issued an unmodified review report on these unaudited standalone Interim financial results.

2 The unaudited Standalone Interim Financial results comprise the unaudited Standalone interim Balance Sheet as at 30 June 2022, the unadited Standalone Statement of Profit and Loss, and explanatory notes thereto of the National Highways InfraTrust ('the Trust') for the quarter ended 30 June 2022 ('the Statement'). The Statement has been prepared in accordance with the recognition and measurement principles laid down in Indian Accounting Standard 34, Interim Financial Reporting ('Ind AS 34') read with Indian Accounting Standards (Ind AS) and/or any addendum thereto as defined in Rule 2 (1) (a) of the Companies (Indian Accounting Standards) Rules, 2015 and other accounting principles generally accepted in India. The Statement has been prepared solely for submissions to be made by the Investment Manager with the National Stock Exchange of India as additional information for the unitholders of the Trust and therefore it may not be suitable for another purpose.

3 National Highway Infra Trust ("Trust" or "InvIT") is an irrevocable trust registered under the provisions of the Indian Trusts Act, 1882 on 19th October, 2020. It was registered under the Securities and Exchange Board of India (Infrastructure Investment Trust) Regulations, 2014 on 28th October, 2020 having registration number IN/InvIT/20-21/0014.

4 The Board of Directors of the Investment Manager have declared a distribution of Rs. 1.75 per unit which comprise Rs. 1.74 per unit as return on capital, Rs. 0.01 per unit as other income on surplus funds at Trust in their meeting held on 12th August 2022. Distribution is to be paid on or before 15 days from the date of declaration.

5 The Trust has acquired the entire equity share capital of the National Highways Infra Projects Private Limited (Project SPV's) on 3rd November, 2021 on an equity consideration of Rs. 1,39,553.53 lakhs.

6 As per Ind AS 36 'Impairment of assets', based on management review on expected future cash flows and economic conditions of the assets of the Trust, no indicators of impairment of assets exist as on the reporting date. Hence no provision for impairment has been recognized in the books on the reporting date

7 As per Ind AS 109, Financial Assets that are measured at amortized cost are required to compute the Expected Credit Loss (ECL). As at the reporting period, the Investment Manager of the Trust assessed the credit risk of the financial assets and concluded that no provision for ECL is required.

8 All values are rounded to nearest lakh, unless otherwise indicated. Certain amounts that are required to be disclosed and do not appear due to rounding off are expressed as 0.00.

9 Previous period/year figures have been reclassified/regrouped wherever necessary to confirm to current period.

For and on behalf of the National Highways Infra Investment Managers Private Limited (Investment Manager of National Highways Infra Trust)

Gunjan Singh	**Mathew George**	**Suresh Krishan Goyal**
Compliance Officer	Chief Financial Officer	Director
		DIN: 02721580

Place: New Delhi
Date: 12 August 2022

A.R. & CO.
Chartered Accountants

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INDEPENDENT AUDITOR'S REPORT

To the Unit Holders of National Highways Infra Trust

Report on the Audit of the Consolidated Financial Statements

OPINION

We have audited the accompanying consolidated financial statements of National Highways Infra Trust ("the InvIT" or "the Trust") and its one subsidiary (hereinafter referred to as "National Highways Infra Projects Private Limited" or "NHIPPL") (the Trust and its subsidiary together referred to as "the Group"), which comprising of the consolidated Balance Sheet as at 31 March 2022, the consolidated Statement of Profit and Loss (including Other Comprehensive Income), the consolidated Statement of Changes in Unitholder's Equity and the consolidated Statement of Cash Flows for the year then ended, the consolidated Statement of Net Assets at fair value as at 31 March 2022, the consolidated Statement of Total Returns at fair value, the Statement of Net Distributable Cash Flows of the Trust and its subsidiary for the year then ended and notes to the consolidated financial statements including a summary of significant accounting policies and other explanatory information (hereinafter referred to as "the consolidated 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 report of other auditor on separate financial statements and on the other financial information of the subsidiary, the aforesaid consolidated financial statements give the information required by the Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014 as amended from time to time including any guidelines and circulars issued thereunder (together referred to as the "SEBI InvIT Regulations") in the manner so required and give a true and fair view in conformity with the Indian Accounting Standards as defined in Rule 2(1)(a) of the Companies (Indian Accounting Standards) Rules, 2015, as amended ("Ind AS") and other accounting principles generally accepted in India, to the extent not inconsistent with SEBI InvIT Regulations, of the consolidated state of affairs of the Group as at 31 March 2022, its consolidated profit including other comprehensive income, its consolidated cash flows, its consolidated statement of changes in Unitholders' equity for the year ended 31 March 2022, its consolidated net assets

at fair value as at 31 March 2022, its consolidated total returns at fair value of the Group and the net distributable cash flows of the Trust and its subsidiary for the year ended 31 March 2022.

BASIS FOR OPINION

We conducted our audit of the consolidated financial statements in accordance with the Standards on Auditing ("SAs") issued by the Institute of Chartered Accountants of India. Our responsibilities under those Standards are further described in the auditor's responsibilities for the audit of the consolidated financial statements section of our report. We are independent of the Group in accordance with the Code of Ethics issued by the Institute of Chartered Accountants of India together with the ethical requirements that are relevant to our audit of the consolidated financial statements under the provisions of the SEBI InvIT Regulations, and we have fulfilled our other ethical responsibilities in accordance with these requirements and the Code of Ethics. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion on the consolidated financial statements.

KEY AUDIT MATTERS

Key audit matters are those matters that, in our professional judgment, were of most significance in our audit of the consolidated financial statements for the financial year ended 31 March 2022. These matters were addressed in the context of our audit of the consolidated financial statements as a whole, and in forming our opinion thereon, and we do not provide a separate opinion on these matters. We have determined the matters described below to be the key audit matters to be communicated in our report.

Sr. No.	Key Audit Matter	Auditor's Response
1.	**Assessment of Impairment of Intangible Assets** The Group operates toll assets which is constructed on Toll, Operate and Transfer (TOT) basis. In accordance with its accounting policy and requirements under Ind AS 36 "Impairment of Assets", the Management is required to perform an impairment assessment by comparing the carrying value of the toll collection rights to their recoverable amount. For impairment testing, value in use has to be determined by forecasting and discounting future cash flows. Further, the value in use is highly sensitive to changes in critical variable used for forecasting the future cash flows including traffic	Our Audit Procedures included the following :- • Verifying the appropriateness of the Group's accounting policy on impairment of Intangible Assets. • Study of latest DCF Valuation • Assessing the assumptions around the key drivers of the revenue projections, future cash

	projections and discounting rates. The determination of the recoverable amount of the toll collection right involves significant estimates and judgments and accordingly, the evaluation of impairment of toll collection rights has been determined as a key audit matter.	flow, discount rates / weighted average cost of capital that were used by the management
2.	**Computation and disclosures as prescribed in the SEBI InvIT regulations relating to Consolidated Statement of Net Assets at Fair Value and Consolidated Total Returns at Fair Value** As per SEBI InvIT regulations, the Trust is required to disclose statement of net assets at fair value and statement of total returns at fair value. The fair value is determined by forecasting and discounting future cash flows from the operations of the investee entities which involves management estimates and judgements. These estimates and judgements include discounting rates, Tax rates and inflation rates which are considered for computing the fair value. There is an inherent risk in the computation of fair value due to the use of estimates and judgements mentioned above. Therefore, computation and disclosures of Consolidated statement of net assets at fair value and Consolidated statement of total returns at fair value is considered as a Key Audit Matter. Refer statement of net assets at fair value and Statement of total returns at fair value in the Consolidated financial statements.	Our Audit Procedures included the following :- • Obtained the understanding of the requirements of SEBI InvIT regulations for disclosures relating to Consolidated Statement of Net Assets at Fair Value and Consolidated Statement of Total Returns at Fair Value. • Obtained Management representation in this respect as Management has considered fair value equal to the book value of Net Assets • Tested the arithmetical accuracy of computation in the statement of net assets and total returns at fair value. • Ensured that disclosures is in compliance with SEBI InvIT regulations relating to the statement of net assets at fair value and the statement of total returns at fair value.

INFORMATION OTHER THAN THE CONSOLIDATED FINANCIAL STATEMENTS AND AUDITOR'S REPORT THEREON

The Board of Directors of the Investment Manager is responsible for the other information. The other information comprises the information included in the Management Discussion and Analysis, Report of Investment Manager including annexures to Investment Manager's Report and other information as required to be given by SEBI InvIT Regulations, but does not include the consolidated financial statements and our report thereon.

Our opinion on the consolidated financial statements does not cover the other information and we do not express any form of assurance conclusion thereon.
In connection with our audit of the consolidated financial statements, our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the consolidated financial statements or our knowledge obtained during the course of our audit or otherwise appears to be materially misstated.

If, based on the work we have performed on the other information that we obtained prior to the date of this auditor's report, we conclude that there is a material misstatement of this other information, we are required to report that fact. We have nothing to report in this regard.

RESPONSIBILITIES OF THE BOARD OF DIRECTORS OF INVESTMENT MANAGER FOR THE CONSOLIDATED FINANCIAL STATEMENTS

The Board of Directors of Investment Manager is responsible for the preparation of these consolidated financial statements that give a true and fair view of the consolidated Balance Sheet as at 31 March 2022, consolidated statement of Profit & Loss including other comprehensive income, consolidated cash flows and consolidated statement of changes in Unitholder's equity for the year ended 31 March 2022, the consolidated net assets at fair value as at 31 March 2022, the consolidated total returns at fair value of the Group and the net distributable cash flows of the Trust and its subsidiary for the year ended 31 March 2022 in accordance with the requirements of the SEBI InvIT Regulations, Indian Accounting Standards as defined in Rule 2(1) (a) of Companies (Indian Accounting Standards) Rules, 2015, as amended and other accounting principles generally accepted in India, to the extent not inconsistent with SEBI InvIT Regulations. The respective Board of Directors of the subsidiary company included in the Group are responsible for maintenance of adequate accounting records for safeguarding of the assets of the Group and for preventing and detecting frauds and other irregularities; selection and application of appropriate accounting policies; making judgements and estimates that are reasonable and prudent; and design, implementation and maintenance of adequate internal financial controls for ensuring the accuracy and completeness of accounting records, relevant to the preparation and presentation of the consolidated financial statements that give a true and fair view and are free from material misstatement, whether due to fraud and error, which have been used for the purpose of preparation of the consolidated financial statements by the Board of Directors of Investment

Manager, as aforesaid.

In preparing the consolidated financial statements, the Board of Directors of Investment Manager and respective Board of Directors of the company included in the Group are responsible for assessing the ability of the Group to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the respective Board of Directors either intends to liquidate the Group or to cease operations, or has no realistic alternative but to do so.

The Board of Directors of the Investment Manager and the respective Board of Directors of the subsidiary company included in the Group are also responsible for overseeing the financial reporting process of the Group.

AUDITOR'S RESPONSIBILITY FOR THE AUDIT OF THE CONSOLIDATED FINANCIAL STATEMENTS

Our objectives are to obtain reasonable assurance whether the consolidated financial statements as a whole are 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 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 consolidated 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 Group's internal controls.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the Board of Directors of the Investment Manager.
- Conclude on the appropriateness of the Board of Directors of Investment Manager 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 Group's ability 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 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 Group to cease to continue as a going concern.

- Evaluate the overall presentation, structure and content of the consolidated financial statements, including the disclosures, and whether the consolidated 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 entities or business activities within the Group of which we are the independent auditors, to express an opinion on the consolidated financial statements. We are responsible for the direction, supervision and performance of the audit of financial statements of such entities included in the consolidated financial statements of which we are the independent auditors. For the other entities included in the consolidated financial statements, which have been audited by other auditor, such other auditor remain responsible for the direction, supervision and performance of the audits carried out by them. We remain solely responsible for our audit opinion.

Materiality is the magnitude of misstatements in the consolidated financial statements that, individually or in aggregate, makes it probable that the economic decisions of a reasonably knowledgeable user of the financial statements may be influenced. We consider quantitative materiality and qualitative factors in (i) planning the scope of our audit work and in evaluating the results of our work; and (ii) to evaluate the effect of any identified misstatements in the financial statements.

We communicate with those charged with governance 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 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.

From the matters communicated with those charged with governance, we determine those matters that were of most significance in the audit of the consolidated financial statements of the current period and are therefore the key audit matters. We describe these matters in our auditor's report unless law or regulation precludes public disclosure about the matter or when, in extremely rare circumstances, we determine that a matter should not be communicated in our report because the adverse consequences of doing so would reasonably be expected to outweigh the public interest benefits of such communication.

OTHER MATTERS

We did not audit the financial statements of the subsidiary, whose financial statements reflect total assets of Rs. 7,35,774.44 Lakhs as at 31 March 2022, total revenues of Rs. 13,981.33 Lakhs, losses after taxes including other comprehensive income (net) of Rs. 11,355.90 Lakhs and net cash outflows amounting to Rs. 12,802.25 Lakhs for the period from 01 April 2021 to 31 March 2022, as considered in the consolidated financial statements. These financial statements and other financial information have been audited by other auditor, which financial statements, other financial information and auditor's reports have been furnished to us by the Management of Investment Manager and our opinion on the consolidated financial statements, in so far as it relates to the amounts and disclosures included in respect of that subsidiary is based solely on the report of the other auditor.

Our opinion on the consolidated financial statements, and our report on other legal and regulatory requirements below, are not modified in respect of the above matters with respect to our reliance on the work done by and the report of the other auditor.

REPORT ON OTHER LEGAL AND REGULATORY REQUIREMENTS

Based on our audit and as required by SEBI InvIT Regulations, we report that:

a) We 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 consolidated financial statements.

b) the consolidated Balance Sheet, the consolidated Statement of Profit and Loss, the consolidated Statement of Cash Flows, the consolidated Statement of Changes in Unitholders' Equity, the consolidated Statement of Net Assets at fair value, the consolidated Statement of Total Returns at fair value and the Statement of Net Distributable Cash Flows of the Trust and its subsidiary dealt with by this Report are in agreement with the books of account.

c) In our opinion, the aforesaid financial statements comply with the Indian Accounting Standards as defined in Rule 2(1)(a) of Companies (Indian Accounting Standards) Rules, 2015, as amended, to the extent not inconsistent with SEBI InvIT regulations.

For A. R. & Co.
Chartered Accountants
FRN. 002744C

CA Naresh Kumar Karn
Partner
Membership No: 077887
UDIN:

Place: New Delhi
Date: 23.05.2022

NATIONAL HIGHWAYS INFRA TRUST

CONSOLIDATED BALANCE SHEET AS AT 31st MARCH, 2022

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	NOTE NO.	AS AT 31st March, 2022	AS AT 31st March, 2021
ASSETS			
1) Non - Current Assets			
(a) Property, Plant and Equipment	3	0.46	-
(b) Goodwill	4	10,144.46	-
(c) Intangible assets	5	7,33,984.39	-
(d) Financial Assets			
(i) Other Financial Assets	6	3,170.81	-
(e) Deferred Tax Assets	7	262.53	-
2) Current Assets			
(a) Financial Assets			
(i) Investments	8	992.16	-
(ii) Trade receivables	9	600.47	-
(iii) Cash and Cash Equivalents	10	5,389.78	-
(iv) Other financial assets	11	5.38	0.10
(b) Other current assets	12	347.29	-
TOTAL ASSETS		**7,54,897.72**	**0.10**
EQUITY AND LIABILITIES			
EQUITY			
1) Unit Capital	13	6,01,152.00	-
2) Initial settlement amount		0.10	0.10
3) Other Equity	14	5,059.25	(67.90)
LIABILITIES			
1) Non-Current liabilities			
(a) Financial liabilities			
(i) Borrowings	15	1,45,556.94	-
(b) Provisions	16	403.37	-
2) Current Liabilities			
(a) Financial liabilities			
(i) Borrowings	17	980.86	-
(ii) Trade Payables	18		
(a) Total Outstanding, dues of micro and small enterprises		-	-
(b) Total outstanding, dues of creditors other than micro and small enterprises		1,101.23	-
(iii) Other financial liabilities	19	241.41	67.81
(b) Other current liabilities	20	240.75	0.09
(c) Provisions	21	0.03	-
(d) Current Tax Liabilities (Net)	22	161.77	
TOTAL EQUITY & LIABILITIES		**7,54,897.72**	**0.10**

Significant Accounting Policies 1 - 2

The accompanying notes form an integral part of these consolidated financial statements. 3 - 56

This is the Consolidated Balance Sheet referred to in our report of even date.

For A.R. & Co.
Chartered Accountants
Firm Registration no. 002744C

Sd/-
CA Naresh Kumar Karn
Partner
M.No.077887

Date : 23.05.2022
Place : New Delhi

For and on behalf of the National Highways Infra Investment Managers Private Limited (Investment Manager of National Highways Infra Trust)

Sd/-
Suresh Krishan Goyal
Director
DIN: 02721580

Sd/-
Mahavir Parsad Sharma
Director
DIN: 03158413

Sd/-
Mathew George
Chief Financial Officer

Sd/-
Gunjan Singh
Compliance Officer

NATIONAL HIGHWAYS INFRA TRUST

CONSOLIDATED STATEMENT OF PROFIT AND LOSS FOR THE YEAR ENDED 31ST MARCH, 2022

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	NOTE NO.	YEAR ENDED 31st March, 2022	YEAR ENDED 31st March, 2021
INCOME			
Revenue from Operations	23	13,960.55	-
Other Income	24	1,014.53	-
TOTAL INCOME		**14,975.08**	-
EXPENSES			
Investment Manger Fee		1,931.71	-
Trusteeship Fee		3.73	4.21
Operating Expenses	25	1,140.21	-
Employee Benefits Expenses	26	2.12	-
Finance Charges	27	3,154.43	-
Depreciation & Amortization Expense	28	1,055.65	-
Other Expenses	29	676.86	63.69
TOTAL EXPENSES		**7,964.71**	**67.90**
Profit/(Loss) before Exceptional Items and Tax		**7,010.37**	**(67.90)**
Exceptional Items (net)		-	
Profit / (Loss) before Tax		**7,010.37**	**(67.90)**
Tax Expenses	30		
Current Tax		436.36	-
MAT Credit Utilized / (Entitlement)		-	-
Provision for Tax for Earlier Years		-	-
Deferred Tax expense/(credit)		(262.32)	-
Total Tax		174.04	-
Profit/ (loss) for the period		**6,836.33**	**(67.90)**
Other Comprehensive Income			
Items that will not be reclassified to Profit and Loss		-	-
Items that will be reclassified to Profit and Loss		-	-
		-	-
Total Comprehensive Income for the period		**6,836.33**	**(67.90)**
Earnings per Unit			
Basic	31	1.15	-
Diluted	31	**1.15**	-

Significant Accounting Policies 1 - 2
The accompanying notes form an integral part of these financial statements. 3 - 56

This is the Statement of Profit and Loss referred to in our report of even date.

For A.R. & Co.
Chartered Accountants
Firm Registration no. 002744C

Sd/-
CA Naresh Kumar Karn
Partner
M.No.077887

Date : 23.05.2022
Place : New Delhi

For and on behalf of the National Highways Infra Investment Managers Private Limited (Investment Manager of National Highways Infra Trust)

Sd/-	Sd/-	Sd/-
Suresh Krishan Goyal	**Mahavir Parsad Sharma**	
Director	Director	
DIN: 02721580	DIN: 03158413	
Sd/-	Sd/-	
Mathew George	**Gunjan Singh**	
Chief Financial Officer	Compliance Officer	

NATIONAL HIGHWAYS INFRA TRUST

CONSOLIDATED CASH FLOW STATEMENT FOR THE YEAR ENDED 31ST MARCH, 2022

(All amounts in ₹ lakh unless otherwise stated)

	YEAR ENDED 31st March, 2022	YEAR ENDED 31st March, 2021
A. OPERATING ACTIVITIES		
Net Profit/(Loss) Before Tax	7,010.37	
Adjustments to reconcile profit before tax to net cash flows:		
Depreciation and Amortization	1,055.65	
Loss/ (Gain) on sale of Investments (net)	(682.62)	
Loss / (Gain) on Fair Valuation of Investments	(7.38)	
Interest Accrued on Bank FD	(5.86)	
Finance Cost (net)	3,154.43	
Operating Profit/(Loss) before Working Capital Changes	**10,524.59**	
Working Capital Adjustments:		
Decrease / (Increase) in Trade & Other Receivables	(600.47)	
Decrease / (Increase) in Other Non Current Financial Assets	(3,170.81)	
Decrease / (Increase) in Other Current Financial Assets	0.59	
Decrease / (Increase) in Other Current Assets	(347.29)	
Increase / (Decrease) in Trade & Other Payables	651.07	
Increase / (Decrease) in Other Financial Liabilities	(7,34,867.55)	
Increase / (Decrease) in Provisions	403.40	
Increase / (Decrease) in Other Current Liabilities	238.59	
Increase / (Decrease) in Current Tax Liabilities	(0.59)	
	(7,37,693.06)	
Income Tax paid	(274.00)	
Net Cash Flows from/(used in) Operating Activities	**(7,27,442.47)**	
B. INVESTING ACTIVITIES		
Purchase of Property, Plant & Equipment, including CWIP, capital	(0.50)	
Purchase of Non Current Investments	(1.52)	
Purchase of Current Investments	(5,96,271.00)	
Sale of Current Investments	5,95,968.84	
Net cash flows from (used in) Investing activities	**(304.19)**	
C. FINANCING ACTIVITIES		
Proceeds from Issue of Unit Capital	5,91,000.00	
One Time Expense paid	(1,364.94)	
Proceeds from Long Term Borrowings (net of processing fees)	1,47,646.00	
Repayment of Long Term Borrowings	(1,001.59)	
Finance Costs Paid	(3,143.04)	
Net cash flows from (used in) Financing activities	**7,33,136.43**	
Net Increase/Decrease in Cash and Cash equivalents (A+B+C)	5,389.78	
Cash and cash equivalents at the beginning of the year	-	
Cash and cash equivalents at the end of the year	**5,389.78**	

This is the Cash Flow Statement referred to in our report of even date.

For A.R. & Co.
Chartered Accountants
Firm Registration no. 002744C

For and on behalf of the National Highways Infra Investment Managers Private Limited (Investment Manager of National Highways Infra Trust)

Sd/-
CA Naresh Kumar Karn
Partner
M.No.077887

Date : 23.05.2022

Sd/-
Suresh Krishan Goyal
Director
DIN: 02721580

Sd/-
Mahavir Parsad Sharma
Director
DIN: 03158413

Sd/-
Mathew George
Chief Financial Officer

Sd/-
Gunjan Singh
Compliance Officer

NATIONAL HIGHWAYS INFRA TRUST

CONSOLIDATED STATEMENT OF CHANGES IN EQUITY FOR THE YEAR ENDED 31ST MARCH, 2022

A. INITIAL SETTLEMENT AMOUNT *

(All amounts in ₹ lakh unless otherwise stated)

Balance as at 1st April 2020	Changes in Unit Capital During the year	Changes in Unit Capital due to prior period errors	Balance as at 31st March, 2021	Changes in Unit Capital During the year	Changes in Unit Capital due to prior period errors	Balance as at 31st March, 2022
-	0.10	-	0.10	-	-	0.10
-	**0.10**	**-**	**0.10**	**-**	**-**	**0.10**

B. UNIT CAPITAL *

Balance as at 1st April 2020	Changes in Unit Capital During the year	Changes in Unit Capital due to prior period errors	Balance as at 31st March, 2021	Changes in Unit Capital During the year	Changes in Unit Capital due to prior period errors	Balance as at 31st March, 2022
-	-	-	-	6,01,152.00	-	6,01,152.00
-	**-**	**-**	**-**	**6,01,152.00**	**-**	**6,01,152.00**

C. OTHER EQUITY **

(All amounts in ₹ lakh unless otherwise stated)

Particulars	Reserves and Surplus	Items of Other Comprehensive Income		Total
		Items that will not be reclassified to profit or loss	Items that will be reclassified to profit or	
	Retained Earnings	Remeasurement of Defined Benefit Obligation/ Plan	Fair Value Gain on Preference Shares	
Balance as at 1st April 2020	-	-	-	-
Profit/ (Loss) for the year	**(67.90)**	-	-	**(67.90)**
Balance as at 31st March, 2021	**(67.90)**	-	-	**(67.90)**
Profit/ (Loss) for the year	**6,836.33**	-	-	**6,836.33**
One time unit issue expenses	1,709.18	**-**	**-**	**1,709.18**
	-	**-**	**-**	**-**
Balance as at 31st March, 2022	**5,059.25**	-	-	**5,059.25**

* Refer Note No. 13
** Refer Note No. 14

For A.R. & Co.
Chartered Accountants
Firm Registration no. 002744C

Sd/-
CA Naresh Kumar Karn
Partner
M.No.077887

Date : 23.05.2022

For and on behalf of the National Highways Infra Investment Managers Private Limited
(Investment Manager of National Highways Infra Trust)

Sd/-
Suresh Krishan Goyal
Director
DIN: 02721580

Sd/-
Mahavir Parsad Sharma
Director
DIN: 03158413

Sd/-
Mathew George
Chief Financial Officer

Sd/-
Gunjan Singh
Compliance Officer

NATIONAL HIGHWAYS INFRA TRUST

Disclosures pursuant to SEBI circulars (SEBI Master Circular No. CIRSEBI/HO/DDHS_Div3/P/CIR/2021/1673 dated 29 November 2021 issued under the InvIT

Consolidated Statement of Net Distributable Cash Flows (All amounts in ₹ lakh unless otherwise stated)

S. No.	PARTICULARS	YEAR ENDED 31st March, 2022	YEAR ENDED 31st March, 2021
1	**Profit after tax as per Statement of profit and loss/income and expenditure (Consolidated) (A)**	**18,185.92**	**-**
2	**Add:** Depreciation and amortization as per statement of profit and loss account. Incase of Impairment reversal, same needs to be deducted from profit and loss.	**-**	
3	**Add/Less:** Loss/gain on sale of infrastructure assets	**-**	**-**
4	**Add:** Proceeds from sale of infrastructure assets adjusted for the following: - 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)(a) of the InvIT regulations	**-**	**-**
5	**Add:** Proceeds from sale of infrastructure assets not distributed pursuant to an earlier plan to re-invest, if such proceeds are not intended to be invested subsequently, net of any profit/ (loss) recognised in profit and loss account	**-**	**-**
6	**Add/ Less:** Any other item of non- cash expense/ non cash income (net of actual cash flows for these items), if deemed necessary by the Investment Manager. For example, any decrease/ increase in carrying amount of an asset or a liability recognised in profit and loss /income and expenditure on measurement of the asset or the liability at fair value; Interest cost as per effective interest rate method, deferred tax lease rents recognised on a straight line basis, etc.	(8,227.84)	
7	**Less:** Repayment of external debt (principal) / redeemable preference shares / debentures, etc. (excluding refinancing) / net cash set aside to comply with DSRA requirement under loan agreements	(5,204.50)	**-**
8	**Total Adjustment (B)**	(13,432.34)	**-**
9	**Net Distributable Cash Flows (C) = (A+B)**	**4,753.58**	-

The accompanying notes form an integral part of the Consolidated Financial Statements.

This is the Statement of Net Distributable Cash Flows referred to in our report of even date.

NATIONAL HIGHWAYS INFRA TRUST

Disclosures pursuant to SEBI circulars (SEBI Master Circular No. CIRSEBI/HO/DDHS_Div3/P/CIR/2021/1673 dated 29 November 2021 issued under the InvIT

Statement of Net Distributable Cash Flows

National Highways Infra Projects Private Limited (Project SPV company)

(All amounts in ₹ lakh unless otherwise stated)

S. No.	PARTICULARS	YEAR ENDED 31-03-2022
1	**Profit after tax as per Statement of profit and loss/income and expenditure (standalone) (A)**	**(11,355.90)**
2	**Add:** Depreciation and amortization as per statement of profit and loss account. Incase of Impairment reversal, same needs to be deducted from profit and loss.	1,055.65
3	**Add/Less:** Loss/gain on sale of infrastructure assets	-
4	**Add:** Proceeds from sale of infrastructure assets adjusted for the following: 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)(a) of the InvIT regulations	-
5	**Add:** Proceeds from sale of infrastructure assets not distributed pursuant to an earlier plan to re-invest, if such proceeds are not intended to be invested subsequently, net of any profit/ (loss) recognised in profit and loss account	-
6	**Add/ Less:** Any other item of non- cash expense/ non cash income (net of actual cash flows for these items), if deemed necessary by the Investment Manager. For example, any decrease/ increase in carrying amount of an asset or a liability recognised in profit and loss /income and expenditure on measurement of the asset or the liability at fair value; Interest cost as per effective interest rate method, deferred tax lease rents recognised on a straight line basis, etc.	23,080.85
7	**Less:** Repayment of external debt (principal) / redeemable preference shares / debentures, etc. (excluding refinancing) / net cash set aside to comply with DSRA requirement under loan agreements	-
8	**Total Adjustment (B)**	24,136.50
9	**Net Distributable Cash Flows (C) = (A+B)**	**12,780.61**

Statement of Reconciliation of NDCF with distributions for FY 2021-22

(All amounts in ₹ lakh unless otherwise stated)

S. No.	PARTICULARS	YEAR ENDED 31-03-2022
1	**Net Distributable Cash Flows for the year ended on 31st March, 2022**	12,780.61
2	Amount distributed as Interest on borrowing from NHIT	12,192.00
3	**Cash and Cash Equivalents at the end of the reporting period**	**588.61**

NATIONAL HIGHWAYS INFRA TRUST

Disclosures pursuant to SEBI circulars (SEBI Master Circular No. CIRSEBI/HO/DDHS_Div3/P/CIR/2021/1673 dated 29 November 2021 issued under the InvIT regulations)

Consolidated Statement of Net Assets at Fair Value (All amounts in ₹ lakh unless otherwise stated)

	As at 31st March, 2022		As at 31st March, 2021	
Particulars	**Book value**	**Fair value^**	**Book value**	**Fair value^**
A. Assets	7,54,898	7,54,898	-	-
B. Liabilities (at book value)	1,48,686	1,48,686	-	-
C. Net assets (A-B)	**6,06,211**	**6,06,211**	-	-
D. No of units	59,52,00,000	59,52,00,000	-	-
E. NAV (C/D)	**101.85**	**101.85**	-	-

^Fair values of total assets relating to the Trust as at 31 March, 2022 as disclosed above are based on the best estimates of the management.

Consolidated Statement of Total Return at Fair Value: (All amounts in ₹ lakh unless otherwise stated)

Particulars	**For the period ended 31st March, 2022**	**For the year ended 31st March 2021**
Total comprehensive income for the year/period (As per the Consolidated Statement of Profit and Loss)	6,836.33	(67.90)
Add: Other changes in fair value for the year *	-	-
Total return	**6,836.33**	**(67.90)**

***** In the above statement, other changes in fair value for the year ended 31 March, 2022 have been computed based on best estimates of the management.

The accompanying notes form an integral part of the Consolidated Financial Statements.

This is the Consolidated Statement of Net Assets at Fair Value and Consolidated Statement of Total Return at Fair Value referred to in our report of even date.

NATIONAL HIGHWAYS INFRA TRUST

NOTES FORMING PART OF CONSOLIDATED FINANCIAL STATEMENTS FOR THE YEAR ENDED ON MARCH 31, 2022

1. GROUP INFORMATION AND NATURE OF OPERATIONS

The consolidated financial statements comprise financial statements of NHAI Infra Trust ("the Trust" or "InvIT") and its subsidiary (collectively, the Group).

The Trust is an irrevocable trust registered under the provisions of the Indian Trusts Act, 1882 on October 19, 2020. It is registered under the Securities and Exchange Board of India (Infrastructure Investment Trust) Regulations, 2014 on October 28, 2020 having registration number IN/InvIT/20-21/0014.

The Trust was setup by National Highways Authority of India ("NHAI" or the "Sponsor"), an infrastructure development Trust in India. The Trustee to the Trust is IDBI Trusteeship Services Limited (the "Trustee") and Investment Manager for the Trust is National Highways Infra Investment Managers Private Limited ("Investment Manager").

The Trust has been formed to invest in infrastructure assets primarily being in the road sector in India. The Trust's road projects are implemented and held through special purpose vehicles ("Project SPVs"/ "Subsidiaries"). The units of the Trust were listed in Bombay Stock Exchange and National Stock Exchange on November 10, 2021.

During the year ended March 31, 2022, the Trust acquired 100% equity control in National Highway Infra Projects Private Limited (the "Project SPV") from the Sponsor with effect from November 03, 2021. During the year ended 31.03.2021, the project SPV entered into five Concession Agreements for 30 years with the Sponsor (National Highways Authority of India – NHAI) on Toll, Operate and Transfer ('TOT') basis.

The registered office of the Investment Manager is G-5 & 6, Setor-10, Dwarka, Delhi - 110075.

The consolidated financial statements were authorised for issue in accordance with resolution passed by the board of directors of the Investment Manager on May 23, 2022.

2. SIGNIFICANT ACCOUNTING POLICIES

2.1 Basis of Preparation

The Consolidated financial statements of the Group have been prepared in accordance with Indian Accounting Standards as defined in Rule 2(1)(a) of the Companies (Indian Accounting Standards) Rules, 2015, as amended, prescribed under Section 133 of the Companies Act, 2013 ("Ind AS") read with Securities and Exchange Board of India (Infrastructure Investment Group) Regulations, 2014, as amended and the circulars issued thereunder ("SEBI InvIT Regulations") and other accounting principles generally accepted in India.

Accordingly, the Group has prepared these Consolidated Financial Statements comprising of the Balance Sheet as on March 31, 2022, the Statement of Profit and Loss for the year ended on March 31, 2022, the Statement of Cash Flows for the year ended on March 31, 2022, the Statement of Changes of Equity for the year ended on March 31, 2022 and Notes to Accounts (together hereinafter referred to as "Consolidated Financial Statements").

These Financial Statements have been prepared on accrual basis under the historical cost convention, except certain financial assets and liabilities which have been measured at Fair Value. Accounting policies have been consistently applied, except where a newly issued Accounting Standard is initially adopted or a revision to an existing Accounting Standard requires a change in the accounting policy hitherto in use. Further, these standalone financial statements have been prepared on a going concern basis.

The financial statements are presented in Indian Rupees (INR) which is the Group's functional and presentation currency and all amounts are rounded to the nearest Lakh (` 00,000) and two decimals thereof, except as otherwise stated.

2.2 Basis of Consolidation

The consolidated financial statements incorporate the financial statements of the Trust and it's subsidiary (Project SPV- NHIPPL) from date of acquisition i.e. November 3, 2021.

For the purpose of consolidation, an entity which is, directly or indirectly, controlled by the Group is treated as subsidiary. Control exists when the Group, directly or indirectly, has power over the investee, is exposed to variable returns from its involvement with the investee and has the ability to use its power to affect its returns.

Consolidation of a subsidiary begins when the Group, directly or indirectly, obtains control over the subsidiary and ceases when the Group, directly or indirectly, loses control of the subsidiary. Income and expenses of a subsidiary acquired or disposed of during the period are included in the consolidated statement of profit and loss from the date the Group, directly or indirectly, gains control until the date when the Group, directly or indirectly, ceases to control the subsidiary.

The consolidated financial statements of the Group combine financial statements of the Trust and its subsidiaries on line-by-line basis by adding together the like items of assets, liabilities, income and expenses. All intra-group assets, liabilities, income, expenses and unrealised profits/losses on intra-group transactions are eliminated on consolidation unless the transaction provides evidence of an impairment of transferred asset. The carrying amount of the Group's investment in each subsidiary and the Group's portion of equity of each subsidiary are offset with each other in the consolidated financial statements.

Ind AS 12 'Income Taxes' applies to temporary differences that arise from the elimination of profits and losses resulting from intragroup transactions.

The accounting policies of subsidiaries have been harmonised to ensure the consistency with the policies adopted by the Group. The consolidated financial statements have been presented to the extent possible, in the same manner as Group's standalone financial statements. Profit or loss and each component of other comprehensive income are attributed to the unit holders of the Group and to the non-controlling interests, even if this results in the non-controlling interests having a deficit balance.

Non-controlling interest (if any) represents that part of the total comprehensive income and net assets of subsidiaries attributable to interests which are not owned, directly or indirectly, by the Group and are excluded in the consolidated financial statements from the total comprehensive income and net assets.

2.3 Business Combination/ Goodwill on Acquisition

Business combinations are accounted for using the acquisition method. The cost of an acquisition is measured as the aggregate of the consideration transferred, measured at acquisition date fair value and the amount of any non-controlling interests in the acquiree. For each business combination, the Group elects whether to measure the non-controlling interests in the acquiree at fair value or at the proportionate share of the acquiree's identifiable net assets. Acquisition related costs are recognised in the statement of profit and loss as incurred.
The acquiree's identifiable assets, liabilities and contingent liabilities that meet the condition for recognition are recognised at their fair values at the acquisition date.

Goodwill is initially measured at cost, being the excess of the aggregate of the consideration transferred and the amount recognised for non-controlling interests, and any previous interest held, over the net identifiable assets acquired and liabilities assumed. If the fair value of the net assets acquired is in excess of the aggregate consideration transferred, the Group re-assesses whether it has correctly identified all of the assets acquired and all of the liabilities assumed and reviews the procedures used to measure the amounts to be recognised at the acquisition date. If the reassessment still results in an excess of the fair value of net assets acquired over the aggregate consideration transferred, then the gain is recognised in other comprehensive income and accumulated in equity as capital reserve. However, if there is no clear evidence of gain on bargain purchase, the entity recognises the gain directly in equity as capital reserve, without routing the same through other comprehensive income.

Goodwill arising on consolidation is not amortised, however, it is tested for impairment annually. In the event of cessation of operations of a subsidiary, the unimpaired goodwill is written off fully. For the purpose of impairment testing, goodwill acquired in a business combination is, from the acquisition date, allocated to each of the Group's cash-generating units that are expected to benefit from the combination, irrespective of whether other assets or liabilities of the acquire are assigned to those units. A cash generating unit to which goodwill has been allocated is tested for impairment annually, or more frequently when there is an indication that the unit may be impaired. If the recoverable amount of the cash generating unit is less than it's carrying amount, the impairment loss is allocated first to reduce the carrying amount of any goodwill allocated to the unit and then to the other assets of the unit pro-rata based on the carrying amount of each asset in the unit.

Any impairment loss for goodwill is recognised in the consolidated statement of profit or loss. An impairment loss recognised for goodwill is not reversed in subsequent periods. Where goodwill has been allocated to a cash generating unit and part of the operation within that unit is disposed of, the goodwill associated with the disposed operation is included in the carrying amount of the operation when determining the gain or loss on disposal.
Goodwill disposed in these circumstances is measured based on the relative values of the disposed operation and the portion of the cash-generating unit retained.

2.4 Use of Judgement and Estimates

The preparation of financial statements is in conformity with the generally accepted accounting principles in India, and requires the Investment Manager to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent liabilities at the date of the financial statements and the results of operations during the reporting period end. Although these estimates are based upon Investment Manager's best knowledge of current events and actions, actual results could differ from these estimates.

Current versus non-current classification

Assets and Liabilities in the Consolidated Balance Sheet have been classified as either Current or Non–Current based upon the requirements of Schedule III notified under the Companies Act, 2013.
An asset has been classified as Current if,
(a) it is expected to be realized in, or is intended for sale or consumption in, the Group's normal operating cycle; or
(b) it is held primarily for the purpose of being traded; or
(c) it is expected to be realized within twelve months after the reporting date; or
(d) it is cash or cash equivalent unless it is restricted from being exchanged or used to settle a liability for at least twelve months after the reporting date.
All other assets have been classified as Non–Current.

A liability has been classified as Current when,
(a) it is expected to be settled in the Group's normal operating cycle; or
(b) it is held primarily for the purpose of being traded; or
(c) it is due to be settled within twelve months after the reporting date; or

(d) the Group does not have an unconditional right to defer settlement of the liability for at least twelve months after the reporting date.
All other liabilities have been classified as Non–Current.

The operating cycle is the time between the acquisition of assets for processing and their realisation in cash and cash equivalents. The group has identified twelve months as its operating cycle.

Deferred tax assets and liabilities are classified as non-current assets and liabilities.

2.5 Revenue Recognition

Revenue is recognised to the extent that it is probable that the economic benefits will flow to the Group and the revenue can be reliably measured, regardless of when the payment is being made. Revenue is measured at the fair value of the consideration received or receivable, taking into account contractually defined terms of payment and excluding taxes or duties collected on behalf of the government.
The specific recognition criteria described below must also be met before revenue is recognised:

Toll Revenue - Toll Revenue from users of toll roads held by subsidiary company is recognised in respect of toll revenue accrued for respective toll road projects.
Interest income - Interest is recognised on time proportion basis taking into account the amount outstanding and the rates applicable. For all Debt instruments measured either at Amortized Cost or Fair Value through Other Comprehensive Income, interest income is recorded using EIR method that is the rate that exactly discounts estimated future cash receipts through the expected life of the financial instrument to the net carrying amount of the financial asset.
Dividends - Dividend income is recognised when the Group's right to receive the payment is established, which is generally when shareholders approve the dividend.
Fair value gains on current investments carried at fair value are included in other income.
Claims with National Highways Authority of India ('NHAI') and other government authorities are accounted as and when the money is received from the respective authorities, in cases of monetary compensations.
Other items - Other items of income are recognised as and when the right to receive the income arises.

2.6 Property, plant and equipment

Property, Plant and Equipment (PPE) is recognised when it is probable that future economic benefits associated with the item will flow to the Group and the cost of the item can be measured reliably.

PPE are stated at acquisition cost less accumulated depreciation and cumulative impairment. Such cost includes the cost of replacing part of the plant and equipment and borrowing costs for long-term construction projects if the recognition criteria are met.

Recognition:
The cost of an item of property, plant and equipment shall be recognised as an asset if, and only if:
(a) it is probable that future economic benefits associated with the item will flow to the entity; and
(b) the cost of the item can be measured reliably.

When significant parts of plant and equipment are required to be replaced at intervals, Group depreciates them separately based on their specific useful lives.

Gains or losses arising from de - recognition of Property, plant and equipment are measured as the difference between the net disposable proceeds and the carrying amount of the asset and are recognized in the Consolidated Statement of Profit and Loss when the asset is derecognized.

Depreciation on Property, plant and equipment

Depreciation on Property, plant and equipment ("PPE") is provided on straight line method, up to the cost of the asset (net of residual value), in accordance with the useful lives prescribed under Schedule II to the Companies Act, 2013.

Depreciation on additions is being provided on a pro-rata basis from the date of such additions. Similarly, depreciation on assets sold/disposed off during the year is being provided up to the dates on which such assets are sold/disposed off. Modification or extension to an existing asset, which is of capital nature and which becomes an integral part thereof is depreciated prospectively over the remaining useful life of that asset.

The estimated residual value of the PPE has been taken as 5% in line with the provisions of Schedule II to the Companies Act, 2013.

Fixed assets amounting up to INR 5,000 are recognised in Consolidated Statement of Profit and Loss in entirety in the first year of purchase.

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.

Depreciation charge for impaired assets is adjusted in future periods in such a manner that the revised carrying amount of the asset is allocated over its remaining useful life.

2.7 Intangible assets

In accordance with Ind AS 38 "Intangible Assets", Intangible assets are recognised when it is probable that the future economic benefits that are attributable to the asset will flow to the Group and the cost of the asset can be measured reliably.

Pre-operative expenses including administrative and other general overhead expenses that are specifically attributable to the development or acquisition of intangible assets are allocated and capitalised as a part of the cost of the intangible assets.

Intangible assets not ready for the intended use on the date of the Consolidated Balance Sheet are disclosed as "intangible assets under development". Intangible assets are derecognised when no future economic benefits are expected from use or disposal.

The cost of intangible assets acquired in an amalgamation in the nature of purchase is their fair value as at the date of amalgamation. Following initial recognition, intangible assets are carried at cost less accumulated amortization and accumulated impairment losses, if any.

The useful lives of intangible assets are assessed as either finite or indefinite.

Rights under Service Concession Arrangements – Toll Collection Rights

The Group has acquired rights for Tolling, Operation, Maintenance and Transfer of five toll road projects for a period of 30 years basis Toll Concession agreements with NHAI, and the same have been recognised as Other Intangible Assets in the financial statements.

Extension of concession period by the Authority in compensation for claims made by the Group are capitalised as part of Toll Collection Rights on acceptance of the claim. Where the Group has a contractual right to an extension in the concession period as per the concession agreement, the same is capitalized when the right to extension in the concession period is established at the estimated amount of eligible claims.

Amortisation of Intangible Assets

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 Consolidated Statement of Profit and Loss unless such expenditure forms part of carrying value of another asset.

In accordance with Ind AS 38 "Intangible Assets", Intangible assets should be amortized by a method which reflects the pattern in which the asset's future economic benefits are expected to be consumed by the entity.

Toll Collection Rights shall be amortized basis a Consumption based model (using Passenger Car Unit (PCU) projections) over the tenure of the Concession Agreement i.e. 30 years.

Other intangible assets - Software purchased is amortized over a period of three to six years on straight line basis from the month in which the addition is made.

Gains or losses arising from derecognition of an intangible asset are measured as the difference between the net disposal proceeds and the carrying amount of the asset and are recognised in the statement of profit or loss when the asset is derecognised.

Amortisation on impaired assets is provided by adjusting the amortisation charge in the remaining periods so as to allocate the assets' revised carrying amount over its remaining useful life.

2.8 Employee benefits

Employee benefits include provident fund, gratuity, compensated absences, long service awards and medical benefits.

i. Short term employee benefits

Employee benefits such as salaries, short term compensated absences, expected cost of bonus, ex-gratia and performance linked rewards falling due wholly within twelve months of rendering the service are classified as short-term employee benefits and are expensed in the period in which the employee renders the related service.

ii. Post-Employment Benefits

Defined contribution plan: A defined contribution plan is a post-employment plan under which an entity pays fixed contributions and will have no legal or constructive obligations to pay further amounts. The Group contributes to provident fund and employees deposit linked insurance scheme, and have no further obligations beyond making its contributions. The Group's contribution to the above funds are charged to the Consolidated Statement of Profit and Loss.

Defined benefit plan: The Group has an un-funded benefit plan for post-employment benefits in the form of Gratuity. The value of obligation under the plan is determined by the group based on best estimate of the present value of the estimated future cash flows towards the gratuity obligation. Defined benefit costs comprising current service cost, past service cost and gains or losses on settlements are recognised in the Consolidated Statement of Profit and Loss as employee benefits expense. Gains or losses on the curtailment or settlement of any defined benefit plan are recognised when the curtailment or settlement occurs.

iii. Termination benefits

Termination benefits such as compensation under employee separation schemes (wherever applicable) are recognised as expense in the Consolidated Statement of Profit and Loss. Liability for the same is recognised at the earlier of when the group can no longer withdraw the offer of the termination benefit.

iv. Other long-term employee benefits

The present value of the obligation under long term employee benefit plans such as compensated absences is determined and is recognised in a similar manner as in the case of defined benefit plans.

Long term employee benefit costs comprising current service cost and gains or losses on curtailments and settlements, re-measurements are recognised in the Consolidated Statement of Profit and Loss as employee benefit expenses. Interest cost implicit in long term employee benefit cost is recognised in the Consolidated Statement of Profit and Loss under finance cost.

2.9 Leases

(i) The determination of whether an arrangement is or contains a lease is based on the substance of the arrangement at the inception of the lease.

i.i) Property, plant, and equipment acquired under leases with lease term more than 12 months is long term lease. The lease liability is recognised for the obligation to make the lease payments and a right of use of asset for the underlying property, plant and equipment for the lease term. The lease liability is measured at the present value of the lease payments to be made over the lease term. The right of use property, plant and equipment are initially measured at the amount of the lease liability, adjusted for lease prepayments, lease incentives received and the initial direct costs such as commissions and an estimate cost of restoration, removal and dismantling of property, plant and equipment. Lease liabilities are increased to reflect the interest cost and are reduced with lease payments.

i.ii) Property, plant, and equipment having lease term 12 months or less than 12 months are recognised on a straight-line basis.

(ii) Property, plant and equipment leased out under operating leases are continued to be capitalised by the Group. Rental income is recognised on a straight-line basis over the term of the relevant lease.

2.10 Borrowing costs

Borrowing Cost consist of interest and other ancillary costs incurred in connection with the arrangement of borrowings. Borrowing costs directly attributable to the acquisition, construction or production of an asset that necessarily takes a substantial period of time to get ready for its intended use or sale are capitalized as part of the cost of the respective asset.

All other borrowing costs are charged to the Consolidated Statement of Profit and Loss in the period they occur. In case of significant Long term loans, other costs incurred in connection with the borrowing of funds are amortized over the period of respective Loan. Borrowing cost also includes exchange differences to the extent regarded as an adjustment to the borrowing costs.

2.11 Financial Instruments

Financial assets and/or financial liabilities are recognised when the Group becomes party to a contract embodying the related 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. A financial asset and a financial liability are offset and presented on net basis in the Consolidated Balance Sheet when there is a current legally enforceable right to set-off the recognised amounts and it is intended to either settle on net basis or to realise the asset and settle the liability simultaneously.

Financial assets

Initial recognition and measurement

All financial assets are recognised initially at fair value plus, in the case of financial assets not recorded at fair value through profit or loss, transaction costs that are attributable to the acquisition of the financial asset. Purchases or sales of financial assets that require delivery of assets within a time frame established by regulation or convention in the market place (regular way trades) are recognised on the trade date, i.e., the date that the Group commits to purchase or sell the asset. Trade receivables and trade payables that do not contain a significant financing component are initially measured at their transaction price.

Subsequent measurement

For purposes of subsequent measurement, financial assets are classified in following categories;

- at amortised cost
- at fair value through profit or loss (FVTPL)
- at fair value through other comprehensive income (FVOCI)

Financial Assets at amortised cost

A financial asset is classified and subsequently 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) on the principal amount outstanding.

This category is the most relevant to the Group. All the Loans and other receivables under financial assets (except Investments) are non-derivative financial assets with fixed or determinable payments that are not quoted in an active market.

After initial measurement, such financial assets are subsequently measured at amortised cost using the effective interest rate (EIR) method. 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 losses arising from impairment are recognised in the Consolidated Statement of Profit and Loss.

Investments in equity instruments of Subsidiaries are recognised at original cost in accordance with Ind AS 27. Impairment testing of Investment in subsidiary that are accounted for at cost as per Ind AS 27 are within scope of Ind AS 36 Impairment of Assets. Any impairment in value of investment in equity investments in Subsidiaries is recognised in the Consolidated Statement of Profit and Loss.

Financial Assets at Fair Value through Other Comprehensive Income (FVOCI)

A financial asset is classified and subsequently measured at FVTOCI if both of the following criteria are met:
a) The asset is held within a business model whose objective is achieved both by collecting contractual cash flows and selling the financial assets, and
b) Contractual terms of the asset give rise on specified dates to cash flows that are solely payments of principal and interest (SPPI).

Investment in Debt instruments included within the FVTOCI category are measured initially as well as at each reporting date at fair value. Fair value movements are recognized in the other comprehensive income (OCI). However, the Group recognizes interest income, impairment losses & reversals and foreign exchange gain or loss in the Consolidated Statement of Profit and Loss.

Interest earned whilst holding FVTOCI debt instrument is reported as interest income using the EIR method.

Financial Assets at Fair Value through Profit and Loss (FVTPL)

A financial asset which is not classified in any of the above categories are subsequently fair valued through profit or loss. Financial assets included within the FVTPL category are measured at fair value with all changes recognized in the Consolidated statement of profit and loss. The Group measures its investments which are classified as equity instruments (other than investment in shares of Subsidiaries, Joint Ventures and Associates) at fair value through profit and loss account.

Any debt instrument, which does not meet the criteria for categorization as at amortized cost or as FVTOCI, is classified as at FVTPL. In addition, the Group may elect to designate a debt instrument, which otherwise meets amortized cost or FVTOCI criteria, as at FVTPL. However, such election is allowed only if doing so reduces or eliminates a measurement or recognition inconsistency (referred to as 'accounting mismatch'). The Group has not designated any debt instrument as at FVTPL.

The Group has investment in debt oriented mutual funds which are held for trading, and the same are classified as at FVTPL. The Group makes such election on an instrument by instrument basis. The classification is made on initial recognition and is irrevocable. The gain/ loss on sale of investments are recognised in the Consolidated Statement of Profit and Loss.

Reclassification of Financial Assets

The Group determines classification of financial assets on initial recognition. After initial recognition, no reclassification is made for financial assets which are equity instruments and financial liabilities. 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 Investment Manager of the Group determines change in the business model as a result of external or internal changes which are significant to the Group's operations. Such changes are evident to external parties. A change in the business model occurs when the Group either begins or ceases to perform an activity that is significant to its operations.
If the 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 Group does not restate any previously recognised gains, losses (including impairment gains or losses) or interest.

The following table shows various reclassification and how they are accounted for:

Original Classification	Revised Classification	Accounting Treatment
Amortized Cost	FVTPL	Fair value is measured at reclassification date. Difference between previous amortised cost and fair value is recognised in Consolidated statement of profit and loss.
FTVPL	Amortized Cost	Fair value at reclassification date becomes its new gross carrying amount.
Amortized Cost	FVOCI	Fair value is measured at reclassification date. Difference between previous amortised cost and fair value is recognised in other comprehensive income. No Change in EIR due to reclassification.

FVOCI	Amortized Cost	Fair value at reclassification date becomes its new gross carrying amount. However cumulative gain or loss in other comprehensive income is adjusted against Fair value. Consequently, the asset is measured as if it had always been measured at amortised cost.
FTVPL	FVOCI	Fair value at reclassification date becomes its new carrying amount. No other adjustment is required.
FVOCI	FTVPL	Assets continue to be measured fair value. Cumulative gain or loss previously recognized in other comprehensive income is reclassified to Consolidated statement of profit and loss at the reclassification date.

Derecognition
A financial asset (or, where applicable, a part of a financial asset or part of Group's similar financial assets) is primarily derecognised (i.e. removed from the Consolidated Balance Sheet) when:

- The rights to receive cash flows from the asset have expired, or
- The 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 group has transferred substantially all the risks and rewards of the asset, or (b) the group has neither transferred nor retained substantially all the risks and rewards of the asset, but has transferred control of the asset.

When the 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 group continues to recognise the transferred asset to the extent of the group's continuing involvement. In that case, the 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 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 group could be required to repay.

Financial liabilities

Initial recognition and measurement

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 Group's financial liabilities include trade and other payables, loans and borrowings etc.

Subsequent measurement
Financial liabilities designated upon initial recognition at fair value through profit or loss are designated as such at the initial date of recognition, and 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 Consolidated statement of profit and loss. However, the Group may transfer the cumulative gain or loss within equity. All other changes in fair value of such liability are recognised in the Consolidated statement of profit and loss. The Group has not designated any financial liability as at fair value through profit and loss.

Loans and borrowings
This is the category most relevant to the 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 Statement of 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 Consolidated Statement of Profit and Loss.
This category generally applies to borrowings and security deposits received.

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 or loss.

Offsetting financial instrument

Financial assets and liabilities are offset and the net amount is reported in the Consolidated Balance Sheet where there is a legally enforceable right to offset the recognised amounts and there is an intention to settle financial asset and liability on a net basis or realise the asset and settle the liability simultaneously. The legally enforceable right must not be contingent on future events and must be enforceable in the normal course of business and in the event of default, insolvency or bankruptcy of the Company or the counterparty.

2.12 Fair Value measurement

The Group measures financial instruments at fair value at each financial statement 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:
i) In the principal market for the asset or liability, or
ii) 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 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 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 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 prices (unadjusted) in active markets for identical assets or liabilities
Level 2 — Inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly (i.e. as prices) or indirectly (i.e. derived from prices)
Level 3 — Inputs for the assets or liabilities that are not based on observable market data (unobservable inputs).

For assets and liabilities that are recognised in the financial statements on a recurring basis, the 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.

The Group determines the policies and procedures for both recurring fair value measurement, such as derivative instruments and unquoted financial assets measured at fair value, and for non-recurring measurement, such as assets held for distribution in discontinued operations.

At each reporting date, the Group analyses the movements in the values of assets and liabilities which are required to be remeasured or re-assessed as per the Group's accounting policies. For this analysis, the Group verifies the major inputs applied in the latest valuation by agreeing the information in the valuation computation to contracts and other relevant documents.

The Group also compares the change in the fair value of each asset and liability with relevant external sources to determine whether the change is reasonable.
On an annual basis, the Board of Directors of the Investment Manager presents the valuation results to the Audit Committee and the Group's independent auditors. This includes a discussion of the major assumptions used in the valuations. For the purpose of fair value disclosures, the 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.

2.13 Cash and Cash Equivalents

Cash and cash equivalents in the Consolidated Balance Sheet comprise cash at banks and on hand and short-term deposits with an original maturity of three months or less, which are subject to an insignificant risk of changes in value.
For the purpose of the Consolidated statement of cash flows, cash and cash equivalents consist of cash and short-term deposits, as defined above, net of outstanding bank overdrafts as they are considered an integral part of the Group's cash management.

2.14 Impairment of Assets

Impairment of Financial Assets
All financial assets except for those designated at FVTPL are subject to review for impairment at least each reporting date to identify whether there is any objective evidence that a financial asset or group of financial assets is impaired. In accordance with Ind AS 109, the group applies expected credit loss (ECL) model for measurement and recognition of impairment loss for financial assets carried at amortized cost.

For recognition of impairment loss on other financial assets and risk exposure, the group determines that whether there has been a significant increase in the credit risk since initial recognition. If credit risk has not increased significantly, 12-month ECL is used to provide for impairment loss. However, if credit risk has increased significantly, lifetime ECL is used. If, in a subsequent period, credit quality of the instrument improves such that there is no longer a significant increase in credit risk since initial recognition, then the entity reverts to recognising impairment loss allowance based on 12-month ECL.
Lifetime ECL are the expected credit losses resulting from all possible default events over the expected life of a financial instrument. The 12-month ECL is a portion of the lifetime ECL which results from default events that are possible within 12 months after the reporting date.
ECL is the difference between all contractual cash flows that are due to the group in accordance with the contract and all the cash flows that the entity expects to receive (i.e., all cash shortfalls), discounted at the original EIR. When estimating the cash flows, an entity is required to consider:

- All contractual terms of the financial instrument (including prepayment, extension, call and similar options) over the expected life of the financial instrument. However, in rare cases when the expected life of the financial instrument cannot be estimated reliably, then the entity is required to use the remaining contractual term of the financial instrument
- Cash flows from the sale of collateral held or other credit enhancements that are integral to the contractual terms

ECL impairment loss allowance (or reversal) recognized during the year is recognized as income/ expense in the Consolidated Statement of Profit and Loss (P&L). This amount is reflected under the head ‘other expenses’ in the P&L.

Impairment of Non- Financial Assets
The 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 Group estimates the asset’s recoverable amount. An asset’s recoverable amount is the higher of an asset’s or cash-generating unit’s (CGU) fair value less costs of disposal and its value in use. 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’s 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 net selling price, recent market transactions are taken into account, if available. If no such transactions can be identified, an appropriate valuation model is used. Impairment losses of continuing operations are recognized in the Consolidated statement of profit and loss, except for previously revalued tangible fixed assets, where the revaluation was taken to revaluation reserve. In this case, the impairment is also recognized in the revaluation reserve up to the amount of any previous revaluation. After impairment, depreciation is provided on the revised carrying amount of the asset over its remaining useful life.

An assessment is made at each reporting date as to whether there is any indication that previously recognized impairment losses may no longer exist or may have decreased. If such indication exists, the group estimates the asset’s CGU's recoverable amount. A previously recognized impairment loss is reversed only if there has been a change in the assumptions used to determine the assets recoverable amount since the last impairment loss was recognized. 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, had no impairment loss been recognized for the asset in prior years. Such reversal is recognized in the Consolidated statement of profit and Loss unless the asset is carried at a revalued amount, in which case the reversal is treated as a revaluation increase.

2.15 Foreign currency transactions

The Group's financial statements are presented in INR, which is group’s functional currency.
Foreign currency transactions are recorded at the exchange rate prevailing on the date of the respective transactions between the functional currency and the foreign currency.

Monetary foreign currency assets and liabilities remaining unsettled at the Financial Statement date are translated at the rates of exchange prevailing on that date.

Gains / losses arising on account of realisation / settlement of foreign currency transactions and on translation of foreign currency assets and liabilities are recognized in the Consolidated Statement of Profit and Loss.

Exchange differences arising on the settlement of monetary items at rates different from those at which they were initially recorded during the year, or reported in previous financial statements, are recognized as income or as expenses in the year in which they arise.

Non - Monetary items which are carried in terms of historical cost denominated in a foreign currency are reported using the exchange rate at the date of the transaction; and Non - Monetary items which are carried at fair value or other similar valuation denominated in a foreign currency, are reported using the exchange rates that existed when the values were determined.

The gain or loss arising on translation of Non-Monetary items measured at fair value is treated in line with the recognition of the gain or loss on the change in Fair value of the item (i.e., translation differences on items whose fair value gain or loss is recognised in OCI or profit or loss are also recognised in OCI or profit or loss, respectively).

2.16 Taxes on income

Tax expense comprises of Current and Deferred tax.
Current income tax is measured at the amount expected to be paid to the tax authorities in accordance with the Income Tax Act, 1961.

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. The tax rates and tax laws used to compute the amount are those that are enacted or substantively enacted, at the reporting date.
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.
Investment Manager periodically evaluates positions taken in the tax returns with respect to situations in which applicable tax regulations are subject to interpretation and establishes provisions where appropriate.

Deferred tax is provided using the liability method on temporary differences between the tax bases 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 assets are recognised for all deductible temporary differences, the carry forward of unused tax credits and any unused tax losses. Deferred tax assets are recognised to the extent that it is probable that taxable profit will be available against which the deductible temporary differences, and the carry forward of unused tax credits and unused tax losses can be utilised. The carrying amount of deferred tax assets is reviewed at each reporting date and reduced to the extent that it is no longer probable that sufficient taxable profit will be available to allow all or part of the deferred tax asset to be utilised.

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 assets and deferred tax liabilities are offset if a legally enforceable right exists to set off current tax assets against current tax liabilities and the deferred taxes relate to the same taxable entity and the same taxation authority.

2.17 Provisions, Contingent Liabilities, Contingent Assets and Capital Commitments

Contingent Liabilities
A contingent liability is a possible obligation that arises from past events whose existence will be confirmed by the occurrence or non–occurrence of one or more uncertain future events beyond the control of the Group or a present obligation that is not recognized because it is not probable that an outflow of resources will be required to settle the obligation. A contingent liability also arises in extremely rare cases where there is a liability that cannot be recognized because it cannot be measured reliably. Contingent Liabilities are reviewed at each reporting date. The Group does not recognize a contingent liability but discloses its existence in the financial statements, however discloses its existence in the financial statements in the notes to accounts.

Contingent Assets
Contingent assets usually arise from unplanned or other unexpected events that give rise to the possibility of an inflow of economic benefits to the entity.
Contingent assets are recognized when the realisation of income is virtually certain, in which case the related asset is not a contingent asset and its recognition is appropriate.
Contingent assets are reviewed at each reporting date. A contingent asset is disclosed where an inflow of economic benefits is probable.

Provisions
Provisions are recognised when the Group has a present obligation (legal or constructive) as a result of a 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. When the Group expects some or all of a provision to be reimbursed, for example, under an insurance contract, the reimbursement is recognised as a separate asset, but only when the reimbursement is virtually certain. The expense relating to a provision is presented in the Consolidated 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.

Commitments

Commitments are future liabilities for contractual expenditure, classified and disclosed as follows:

- estimated amount of contracts remaining to be executed on capital account and not provided for;
- funding related commitment to subsidiary companies; and
- other non-cancellable commitments, if any, to the extent they are considered material and relevant in the opinion of management.

Other commitments related to services to be rendered / procurements made in the normal course of business are not disclosed to avoid excessive details.

2.18 Consolidated Statement of Cash Flows

Consolidated Statement of Cash Flows is prepared segregating the cash flows into operating, investing and financing activities. Cash flow from operating activities is reported using indirect method adjusting the net profit for the effects of:

- changes during the period in operating receivables and payables, transactions of a non-cash nature;
- non-cash items such as depreciation, provisions, deferred taxes, unrealised foreign currency gains and losses;
- all other items for which the cash effects are investing or financing cash flows.

Cash and cash equivalents (including bank balances) shown in the Consolidated Statement of Cash Flows exclude items which are not available for general use as at the date of Consolidated Balance Sheet.

2.19 Assets held for sale

Non-current assets or disposal groups comprising of assets and liabilities are classified as 'held for sale' when all of the following criteria's are met: (i) decision has been made to sell. (ii) the assets are available for immediate sale in its present condition. (iii) the assets are being actively marketed and (iv) sale has been agreed or is expected to be concluded within 12 months of the Consolidated Balance Sheet date.

Subsequently, such non-current assets and disposal groups classified as held for sale are measured at the lower of its carrying value and fair value less costs to sell. Non-current assets held for sale are not depreciated or amortised.

2.20 Unit Capital

Units are classified as equity. Incremental costs attributable to the issue of units are directly recorded in Other Equity, net of tax.

2.21 Distribution to unit holders

The Group recognises a liability to make cash distributions to unit holders when the distribution is authorised and a legal obligation has been created. As per the SEBI InvIT Regulations, a distribution is authorised when it is approved by the Board of Directors of the Investment Manager. A corresponding amount is recognised directly in equity.

2.22 Earnings per Unit (EPU)

Basic EPU amounts are calculated by dividing the profit for the period attributable to unitholders by the weighted average number of units outstanding during the period.

Diluted EPU amounts are calculated by dividing the profit/(loss) attributable to unitholders by the weighted average number of units outstanding during the period plus the weighted average number of units that would be issued on conversion of all the dilutive potential units into unit capital.

3. Property, Plant and Equipment

(All amounts in ₹ lakh unless otherwise stated)

Particulars	Computer	Total
Gross Carrying Amount		
Balance as at March 31, 2020	-	-
Additions	**-**	**-**
Less: Disposals	**-**	**-**
Balance as at March 31, 2021	-	-
Additions	0.50	0.50
Less: Disposals	**-**	**-**
Balance as at March 31, 2022	**0.50**	**0.50**
Accumulated Depreciation		
Balance as at March 31, 2020	-	-
Additions	**-**	**-**
Less: Disposals	**-**	**-**
Balance as at March 31, 2021	-	-
Additions	0.04	0.04
Less: Disposals	**-**	**-**
Balance as at March 31, 2022	**0.04**	**0.04**
Net Carrying Amount		
As at March 31, 2020	-	-
As at March 31, 2021	-	-
As at March 31, 2022	**0.46**	**0.46**

4. Goodwill arising on Consolidation

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	AS AT 31st March, 2022	AS AT 31st March, 2021
Gross Carrying Amount		
Balance as at March 31, 2020	-	-
Additions	-	-
Less: Disposals	-	-
Less: Impairment	-	-
Balance as at March 31, 2021	-	-
Additions*	10,144.46	-
Less: Disposals	-	-
Less: Impairment	-	-
Balance as at March 31, 2022	**10,144.46**	-

The carrying amount relates to goodwill arising on acquisition of Project SPV company (NHIPPL) by the Trust and has been tested for impairment against the respective cash generating unit (CGU). The calculation uses cash flow forecast based on approved financial budgets/strategic forecast which cover future periods of 30 years.

Based on a review of the future discounted cash flows of the intangible assets (Toll Collection Rights) held by the subsidiary (NHIPPL), the recoverable amount is higher than the carrying amount of the assets, and accordingly no impairment loss has been recognised in the statement of profit and loss for the year ended March 31, 2022.

*Refer Note 34

NATIONAL HIGHWAYS INFRA TRUST

Consolidated Summary of significant accounting policies and other explanatory information

5. Intangible Assets

(All amounts in ₹ lakh unless otherwise stated)

Particulars	License to charge users of Toll Road					
	Abu Road-Swaroopganj	Abu Road-Palanpur	Belgaum- Kagal	Chittorgarh- Kota	Kolthakota-Kurnool	Total
Gross Carrying Amount:						
Balance as at March 31, 2021	**-**	**-**	**-**	**-**	**-**	**-**
Additions	74,170.00	1,14,650.00	2,32,870.00	1,19,340.00	1,94,010.00	7,35,040.00
Less: Disposals	-	-	-	-	-	-
Balance as at March 31, 2022	**74,170.00**	**1,14,650.00**	**2,32,870.00**	**1,19,340.00**	**1,94,010.00**	**7,35,040.00**
Accumulated Amortization:		-				
Balance as at March 31, 2021	-	-	-	-	-	-
Additions	102.06	156.78	366.53	156.35	273.89	1,055.61
Less: Disposals	-	-				
Balance as at March 31, 2022	**102.06**	**156.78**	**366.53**	**156.35**	**273.89**	**1,055.61**
Net Carrying Amount						
Balance as at March 31, 2021	**-**	**-**	**-**	**-**	**-**	**-**
Balance as at March 31, 2022	**74,067.94**	**1,14,493.22**	**2,32,503.47**	**1,19,183.65**	**1,93,736.11**	**7,33,984.39**

Note:-

The Project SPV (NHIPPL) has acquired rights for Tolling, Operation, Maintenance and Transfer of five toll road projects for a period of 30 years from the appointed date of 16.12.2021 basis Toll Concession agreements with the NHAI, for a consideration of INR 7,350.40 Crore and the same have been recognised as Other Intangible Assets in financial statements.

Toll Collection Rights shall be amortized basis a Consumption based model (using Passenger Car Unit (PCU) projections) over the tenure of the Concession Agreement i.e. 30 years.

6. Other Financial Assets: Non Current

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	AS AT 31st March, 2022	AS AT 31st March, 2021
Investment in Fixed Deposits		
Fixed Deposits with banks*	3,170.81	-
	3,170.81	-

* The Fixed Deposits are earmarked for Debt Servicing Reserve Account (DSRA), to be utilized at the end of tenure of long term borrowings from Senior Lenders, hence classified as Other Financial Assets- Non Current irrespective of date of maturity.

7. Deferred Tax Assets (Net)

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	AS AT 31st March, 2022	AS AT 31st March, 2021
Deferred Tax Assets arising on account of:		
- Expense disallowed as per Income Tax Act, 1961, allowable in future years	0.03	-
- Unabsorbed depreciation & Carried forward tax losses	23,124.38	-
Total (A)	**23,124.41**	-
Deferred Tax Liabilities arising on account of:		
- Difference between book & tax base related to Intangible assets	22,858.70	-
- Difference between book & tax base related to Investments	3.16	
- Expense disallowed earlier as per Income Tax Act, 1961, allowed now	0.03	-
Total (B)	**22,861.88**	-
Net Asset (A) - (B)	**262.53**	-

Reconciliation of Deferred Tax Asset/ (Liabilities)

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	AS AT 31st March, 2022	AS AT 31st March, 2021
Opening Balance - Deferred Tax Asset	-	-
Deferred tax income/ (expense) during the period recognised in profit & loss	262.53	-
Deferred tax income/ (expense) during the period recognised in Other Comprehensive Income	-	-
Closing Balance - Deferred Tax Asset	**262.53**	-

8. Investments: Current

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	AS AT 31st March, 2022	AS AT 31st March, 2021
In Mutual Funds - Quoted at FVTPL		
Overnight Mutual Funds (28,664.02 units @ NAV of Rs. 3,461.3538 per unit)	992.16	-
Total	**992.16**	-

NATIONAL HIGHWAYS INFRA TRUST

Consolidated Summary of significant accounting policies and other explanatory information

9. Trade Receivables: Current

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	AS AT 31st March, 2022	AS AT 31st March, 2021
Outstanding for the following period from the due date of payment:		
Undisputed trade receivables- considered good*	600.47	-
(Outstanding for less than 6 months from the due date of payment)		
Disputed trade receivables- considered good	-	-
	600.47	-

* Undisputed Trade Receivables include unbilled receivables amounting to Rs. 401.12 Lakh

10. Cash and Cash Equivalents

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	AS AT 31st March, 2022	AS AT 31st March, 2021
Cash & Cash Equivalents		
Balances with Banks		
In Current Accounts	1,004.69	-
In Escrow Accounts	35.09	-
Fixed Deposits (having original maturity of less than 3 months)	4,350.00	-
	5,389.78	-

11. Other Financial Assets: Current

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	AS AT 31st March, 2022	AS AT 31st March, 2021
Interest receivable on investment in Fixed Deposits	5.28	-
Other Financial Assets	0.10	-
Total	**5.38**	-

12. Other Current Assets

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	AS AT 31st March, 2022	AS AT 31st March, 2021
Prepaid expenses	347.29	-
Total	**347.29**	-

NATIONAL HIGHWAYS INFRA TRUST

Consolidated Summary of significant accounting policies and other explanatory information

13. Unit Capital*

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	AS AT 31st March, 2022		AS AT 31st March, 2021	
	NO. OF UNITS	AMOUNT	NO. OF UNITS	AMOUNT
Unit Capital	59,52,00,000	6,01,152.00	-	-

Rights/ preferences and restrictions attached to Unit Capital

Subject to the provisions of the InvIT Regulations, the indenture of funds, and applicable rules, regulations and guidelines, the rights of the unit holders include:

a) The beneficial interest of each unitholder shall be equal and limited to the proportion of the numbers of the units held by that unitholder to the total number of the units.
b) Right to receive income or distributions with respect to the units held.
c) Right to attend the annual general meeting and other meetings of the unit holders of the Trust.
d) Right to vote upon any matters/resolutions proposed in relation to the Trust.
e) Right to receive periodic information having a bearing on the operation or performance of the Trust in accordance with the InvIT Regulations; and
f) Right to apply to the Trust to take up certain issues at meetings for unit holders approval.
g) Right to receive additional information, if any, in accordance with InvIT documents filed with Placement Memorandum.
h) The non-sponsor unit holders ("Eligible Persons") of the Trust are entitled to representation on the Board of Directors of the Investment Manager through appointment of up to two (2) directors ("Non-Sponsor Directors"), provided that no Eligible Person shall have the right to nominate more than one Director at a time for appointment on the Board of Directors.

In accordance with the InvIT Regulations, no unit holders shall enjoy superior voting or any other rights over any other unit holders, and there shall not be multiple classes of units. There shall be only one denomination of units. Not withstanding the above, subordinate units may be issued only to the Sponsor and its Associates, where such subordinate units shall carry only inferior voting or any other rights compare to the other units.

Under the provisions of the InvIT Regulations, not less than ninety percent of the net distributable cash flows of the Trust is required to be distributed to the unitholders, and in accordance with such statutory obligation the Trust has formulated a distribution policy to declare and distribute the distributable cash flows to its unitholders once every quarter of a financial year as approved by the Board of Directors of the Investment Manager. The distributions made by Trust to its unitholders are based on the Net Distributable Cash Flows (NDCF) of the Trust under the InvIT Regulations and represent repayment of proportionate capital and share of profit.

Limitation to the Liability of the unit holders

The liability of each unit holders towards the payment of any amount (that may arise in relation to the Trust including any taxes, duties, fines, levies, liabilities, costs or expenses) shall be limited only to the extent of the capital contribution of such unit holders and after such capital contribution shall have been paid in full by the unit holders, the unit holders shall not be obligated to make any further payments.
The unit holders shall not have any personal liability or obligation with respect to the Trust.

DETAILS OF UNITHOLDERS HOLDING MORE THAN 5% SHARES IN THE COMPANY

NAME OF SHAREHOLDER	AS AT 31st March, 2022		AS AT 31st March, 2021	
	NO. OF UNITS	%	NO. OF UNITS	%
Ontario Limited	14,88,00,000	25.00%	-	-
CPP Investment Board Private Holdings Inc.	14,88,00,000	25.00%	-	-
SBI Balanced Advantage Fund	5,68,00,000	9.54%	-	-
National Highways Authority of India (NHAI)	9,56,00,000	16.06%	-	-

As per records of the Trust, including its register of unitholders and other declaration received from unitholders regarding beneficial interest, the above unitholding represent both legal and beneficial ownership of units.
The Trust has issued 1,00,51,485 nos. of units at the rate of Rs. 101 per unit for consideration other than cash to the Sponsor (National Highways Authority of India), as consideration for purchase of 1,00,000 equity shares of Project SPV - NHIPPL.
No units were bought back since inception of the Trust.

THE RECONCILIATION OF THE NUMBER OF SHARES OUTSTANDING IS SET OUT BELOW:

PARTICULARS	AS AT 31st March, 2022		AS AT 31st March, 2021	
	NO. OF SHARES	AMOUNT	NO. OF SHARES	AMOUNT
Number of Units at the Beginning	-	-	-	-
Units issued during the year	59,52,00,000	6,01,152.00	-	-
Number of Units at the End	59,52,00,000	6,01,152.00	-	-

NATIONAL HIGHWAYS INFRA TRUST

Consolidated Summary of significant accounting policies and other explanatory information

14. Other Equity **

(All amounts in ₹ lakh unless otherwise stated)

Particulars	Reserves and Surplus	Items of Other Comprehensive Income		Total
		Items that will not be reclassified to profit or loss	Items that will be reclassified to profit or loss	
	Retained Earnings	Remeasurement of Defined Benefit Obligation/ Plan	Fair Value Gain on Preference Shares	
Balance as at 1st April 2020	-	-	-	-
Profit/ (Loss) for the year	(67.90)	-	-	(67.90)
Balance as at 31st March, 2021	**(67.90)**	-	-	(67.90)
Profit/ (Loss) for the year	6,836.33	-	-	6,836.33
One time units issue expense	1,709.18	-	-	1,709.18
Balance as at 31st March, 2022	**5,059.25**	-	-	**5,059.25**

15. Borrowings: Non Current

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	AS AT 31st March, 2022	AS AT 31st March, 2021
Secured		
Term Loan:		
From Banks	1,46,998.41	-
From other parties	-	-
	1,46,998.41	-
Less: Current Maturities of Long Term borrowings (Refer Note 17)	980.86	-
Less: Unamortized Borrowing Cost	460.61	-
	1,45,556.94	-
Total	**1,45,556.94**	-

*Transaction Cost amounting to Rs. 1.18 Crore was not yet paid as at the end of reporting period to the Senior Lenders, however the same has been considered for the purpose of EIR in the forthcoming periods.

The Trust had availed loan cumulating to INR 1,480 Crore (sanctioned amount Rs. 2,000 Crore) from three banks at the rate of 7.20% p.a. via Facility Agreement dated 29.09.2021 for the purpose of investment of Trusts in Project SPV (NHIPPL).

The loan was disbursed on 14.12.2021 and is repayable on quarterly basis over 78 quarterly instalments of Principal and Interest up to 31st March 2041, and the next instalment due on 30th June 2022.

Security:

The loan is secured by,

- first pari passu charge on all immovable assets (if any), movable assets and receivables of the Trust including but not limited to,

(i) the interest and principal repayments on the loans advanced by the Trust to Project SPV

(ii) dividends to be paid by Project SPV to the Trust

- first pari passu Security Interest on Trust Escrow account and all sub-accounts thereunder, including DSRA.
- first pari Passu charge on the Senior Debt Service Account, Sub-Debt Servicing Account and Surplus/ Dividend Account or any other account of the Project SPV where free cash flows of the Project SPV are credited.
- pledge of 100% equity shares of Project SPV (NHIPPL) held by the Trust.
- assignment of loans advanced by the Trust to Project SPV (NHIPPL) and securities created by the Trust including the assignment of rights of submission, termination and invocation of provision of Escrow agreement in case of default.
- negative lien on immovable assets (including current assets and cash flows) of the Project SPV (NHIPPL) subject to sale of obsolete items or cars/ ambulances, old toll equipment etc., under normal business practice, subject to maximum cumulative value of INR 5 Crore in any financial year.

The senior lenders of the Trust have also been provided with a corporate guarantee from Project SPV (NHIPPL) to guarantee the repayment of senior debt by the Trust. The funds have been raised at Trust level by unitholders and domestic lenders, and the same have been lent to Project SPV (NHIPPL) for payment of concession fee by NHIPPL to NHAI. The cashflows viz., toll collections are lying in NHIPPL. Accordingly, corporate guarantee amounting to INR 2,000 Crore via Corporate Guarantee Deed dated 14.03.2022, valid across the tenure of the loan of the Trust i.e. up to 31.03.2041, has been provided by the Project SPV (NHIPPL) to the senior lenders of the Trust.

There have been no breaches in financial covenants with respect to the borrowings from Senior lenders.

16. Provisions: Non Current

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	AS AT 31st March, 2022	AS AT 31st March, 2021
Provision for employees benefits		
Gratuity	0.05	-
Compensated Absences	0.03	-
Provision for Major Maintenance*		
Abu Road- Swaroopganj	7.45	-
Abu Road- Palanpur	28.39	-
Belgaum- Kagal	30.36	-
Chittorgarh- Kota	264.32	-
Kolthakota- Kurnool	72.78	-
Total	**403.37**	-

Provision for Major Maintenance*

The Company has a contractual obligation to maintain the performance standards of the Project Highways in respect of riding quality and allied measures as per the performance parameters stipulated under the respective Concession Agreements. Cost of such obligation is measured at the best estimate of the expenditure required to settle the obligation at the balance sheet date and recognised over the period at the end of which the overlay is estimated to be carried out using Discounted Cash Flows method with the discount rate taken as the risk free interest rate i.e. GOI 30 yr. Bond Yield. The next major overlay for one of the Project Highways is expected to be carried out in FY 2024-25.

Details of movement in Provisions

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	AS AT 31st March, 2022	AS AT 31st March, 2021
Opening Balance	-	-
Add: Accretion during the year	403.29	-
Less: Utilized during the year	-	-
Closing Balance	**403.29**	**-**

17. Borrowings: Current

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	AS AT 31st March, 2022	AS AT 31st March, 2021
Current Maturities of Long Term borrowings (Refer Note No. 15)	980.86	-
	-	
	980.86	**-**

18. Trade Payables: Current

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	AS AT 31st March, 2022	AS AT 31st March, 2021
Total outstanding, dues of micro and small enterprises	-	-
Total outstanding, dues of creditors other than micro and small enterprises (Outstanding for less than 12 months from the due date of payment)	1,101.23	-
Total	**1,101.23**	**-**

19. Other Financial Liabilities: Current

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	AS AT 31st March, 2022	AS AT 31st March, 2021
Others		
Cash Toll Collection payable to NHAI	97.85	-
Payables towards other expenses	143.56	67.81
Total	**241.41**	**67.81**

20. Other Current Liabilities

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	AS AT 31st March, 2022	AS AT 31st March, 2021
Statutory Liabilities (GST, TDS, TCS and PF)	240.75	0.09
Total	**240.75**	**0.09**

21. Provisions: Current

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	AS AT 31st March, 2022	AS AT 31st March, 2021
Provision for Employee Benefits		
Compensated Absences	0.03	-
Total	**0.03**	**-**

22. Current Tax Liabilities (Net)

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	AS AT 31st March, 2022	AS AT 31st March, 2021
Provision for Income Tax	161.77	-
Total	**161.77**	**-**

Reconciliation of Current Tax Liabilities

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	AS AT 31st March, 2022	AS AT 31st March, 2021
Opening Balance	-	**-**
Add: Income Tax Payable for the year	436.36	-
Less: Taxes Paid	274.59	**-**
Closing Balance	**161.77**	**-**

Consolidated Summary of significant accounting policies and other explanatory information

23. Revenue from operations

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	AS AT 31st March, 2022	AS AT 31st March, 2021
Sale of Services		
Revenue from Toll Collection	13,941.94	-
Other Operative Revenue		
Interest on delay in Toll Remittance	18.61	-
Total	**13,960.55**	-

24. Other Income

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	AS AT 31st March, 2022	AS AT 31st March, 2021
Interest Income		
On fixed deposits with banks	5.86	-
Other non operating income		
Net Gain on fair valuation of investments designated at FVTPL	7.38	-
Gain on sale of investments	682.62	-
Other Income	318.67	-
Total	**1,014.53**	-

25. Operating Expenses

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	AS AT 31st March, 2022	AS AT 31st March, 2021
Project Management Fees	290.43	-
Operation and Maintenance Expenses	446.48	-
Provision for Major Maintenance Obligation	403.29	
Total	**1,140.21**	-

26. Employee Benefit Expenses

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	AS AT 31st March, 2022	AS AT 31st March, 2021
Salaries and wages	1.75	-
Contribution to provident and other funds	0.13	-
Gratuity	0.05	-
Compensated absences	0.06	-
Staff welfare expenses	0.13	-
Total	**2.12**	-

27. Finance Charges

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	AS AT 31st March, 2022	AS AT 31st March, 2021
Interest on Long Term Borrowings	3,149.19	-
Other Financial Charges	5.24	-
Total	**3,154.43**	-

28. Depreciation and Amortization Expenses

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	AS AT 31st March, 2022	AS AT 31st March, 2021
Depreciation on Property, Plant and Equipment	0.04	-
Amortization on Intangible Assets	1,055.61	-
Total	**1,055.65**	-

29. Other Expenses

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	AS AT 31st March, 2022	AS AT 31st March, 2021
Advertisement expenses	8.47	-
Professional fees	203.13	47.55
Fee, subscription & taxes	291.63	15.27
Insurance expenses	166.04	-
Bank charges	0.04	-
Auditors' remuneration:		
Statutory Audit fees	4.57	0.87
Tax Audit fees	0.30	-
Certification and other charges	0.52	-
Data Management Expenses	1.31	-
Miscellaneous expenses	0.87	-
Total	**676.86**	**63.69**

30. Tax Expense

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	AS AT 31st March, 2022	AS AT 31st March, 2021
Current Tax	436.36	-
Provision for Taxation–Earlier years	-	-
	436.36	-
Deferred tax expense/(credit)	(262.32)	-
	174.04	-

Effective tax Reconciliation:

Numerical reconciliation of tax expense applicable to (profit)/ loss before tax at the latest statutory enacted tax rate in India to income tax expense reported is as follows:

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	AS AT 31st March, 2022	AS AT 31st March, 2021
Accounting Profit before Income Taxes	7,010.37	
Tax at India's statutory income tax rate for Companies (25.17%)	(2,925.10)	
Tax at India's statutory income tax rate for Business Trusts - Maximum Marginal Rate (42.744%)	7,963.95	
Increase/ (reduction) in taxes on account of:		
Impact of deferred tax on reversible allowance/ disallowance of business expense and income, as per Indian Income Tax Act, 1961	2,662.78	
Impact of exemption u/s 10(23FC) of the Indian Income Tax Act, 1961 available to the Trust	(7,542.34)	
Provision for interest on delayed deposit of income tax	14.75	
Income tax expense reported in the statement of profit and loss	**174.04**	

31. Earning per Unit

PARTICULARS	AS AT 31st March, 2022	AS AT 31st March, 2021
Basic and diluted EPU		
Net Profit/ loss available for unitholders (in ₹ lakh)	6,836.33	-
Weighted average number of units for EPU computation	59,52,00,000	-
EPU- Basic and diluted	**1.15**	-

32. Contingent Liabilities

(All amounts in ₹ lakh unless otherwise stated)

PARTICULARS	AS AT 31st March, 2022	AS AT 31st March, 2021
Contingent Liabilities:		
Corporate Guarantee issued by the Project SPV company (NHIPPL) to the lenders of NHIT	2,00,000.00	-
Total	**2,00,000.00**	-

The Project SPV company (NHIPPL) has issued a Corporate Guarantee amounting to INR 2,000 Crore on 14.03.2022 in favour of lenders of NHIT as part of debt covenants of the loan received from NHIT, to secure the term loan of INR 2,000 Crore availed by NHIT from external lenders. The Corporate Guarantee is valid across the tenure of the loan till March 31, 2047, till the external loans of the Trust are satisfied.

NATIONAL HIGHWAYS INFRA TRUST

Consolidated Summary of significant accounting policies and other explanatory information

33. Revenue from contracts with customers

(All amounts in ₹ lakh unless otherwise stated)

1 Disaggregation of revenue

Revenue recognised mainly comprises of revenue from toll collections, claims with NHAI, contract revenue. Set out below is the disaggregation of the Trust's revenue from contracts with customers:

Description	For the year ended 31st March, 2022	For the year ended 31st March, 2021
Operating revenue		
(a) Toll income from Expressway	13,941.94	-
(b) Interest on delay in Toll Remittance	18.61	-
Total revenue	**13,960.55**	**-**

The table below presents disaggregated revenues from contracts with customers based on nature, amount and timing for the year ended 31 March 2022 and 31 March 2021:

S.No.	Types of Products by Nature	Types of Services by timing	For the year ended 31st March, 2022	For the year ended 31st March, 2021
1	Toll Income	Over the period of time	13,960.55	-

2 Assets and liabilities related to contracts with customers

The following table provides information about receivables, contract assets and contract liabilities from contract with customers:

Description	As at 31st March, 2022	As at 31st March, 2021
	Current	Current
Contract assets		
Trade receivables:		
Receivables under service concession arrangements	600.47	-
Total	**600.47**	-
Contract liabilities		
Trade Payables	1,101.23	-
Other Payables	241.41	-
Total	**1,342.64**	-

3 Performance obligation

Income from toll collection

The performance obligation in service of toll collection is recorded as per rates notified by NHAI and approved by management and payment is generally due at the time of providing service.

Contract revenue

The performance obligation under service concession agreements ('SCA') is due on completion of work as per terms of SCA.

4 Disclosure under Appendix - C & D to Ind AS 115 - " Service Concession Arrangements"

All the below service concession arrangement have been accounted under intangible asset model

Name of Concessionaire	Start of Concession period under concession agreement (Appointed Date)	End of Concession period under concession agreement	Period of Concession since the appointed date (in days)
National Highways Infra Projects Private Limited	16.12.2021	15.12.2051	106

i) The above TOT projects shall have following rights / obligations in accordance with the Concession Agreement entered into with the respective Government Authorities

a. Right to use the Specified Assets

b. Obligations to provide or rights to except provision of services

c. Obligations to deliver or rights to receive at the end of concession

34. DISCLOSURES PURSUANT TO IND AS 103 "BUSINESS COMBINATIONS"

(All amounts in ₹ lakh unless otherwise stated)

a) Acquisition of subsidiaries

i) Pursuant to the Share Purchase Agreement dated September 30, 2021, the Trust acquired the entire equity share capital of the the Project SPV company (NHIPPL) on December 14, 2021 for an equity consideration of Rs. 1,39,553.52 Lakhs. Accordingly, the financial statements of the subsidiary NHIPPL for the period from December 14, 2021 to March 31,2022 have been considered in the consolidated financial statements of the Trust. Funding for the said acquisition was raised through preferential issue of units of the Trust. The Group has carried out a fair valuation of the net assets of the Project SPV at the time of acquisition and accordingly the goodwill has been recorded in the consolidated financial statements.

ii) **Details of the purchase consideration:**

Particulars	Total
Cash Consideration	1,29,400.00
Unit capital issued	10,153.52
Total purchase consideration	**1,39,553.52**

The fair value of Rs 139,553.52 lakhs paid for acquisition of the above mentioned project SPVs includes consideration in cash amounting to Rs. 1,294 Crore and consideration in form of issuance of 10.05 Lakh units of Trust at the rate of Rs. 101 per unit. Issue costs of Rs 1.52 Lakh directly attributable to the issue of the units have been added to the purchase consideration.

ii) **Assets acquired and liabilities recognised on the date of acquisition are as follows:**

Particulars	Amount
Non - Current Assets:	
Intangible assets	7,35,040.00
Deferred Tax Assets (net)	0.21
Current Assets:	
Financial Assets	
Cash and Cash Equivalents	10.00
Total Assets	**7,35,050.21**
Current Liabilities:	
Financial liabilities	
Other financial liabilities	7,35,041.12
Other current liabilities	0.02
Total Liabilities	**7,35,041.14**
Net assets acquired	**9.07**

iii) **Calculation of Goodwill / (Capital Reserve)**

Particulars	Amount
Purchase Consideration	1,39,553.52
Less: Fair Value of Net Assets acquired	9.07
Less: Acquisition of fresh issue of shares of NHIPPL by the Trust	1,29,400.00
Goodwill	**10,144.46**

iv) Goodwill on acquisiion has been accounted for under Non Current Assets in the Balance Sheet.

v) **Entity wise Revenue and Profit after tax from the date of acquisition till March 31, 2022:**

Particulars	Amount
Revenue	13,960.55
Profit after Tax	**6,836.33**

vi) **Entity wise Revenue and Profit after tax for the financial year 2020-21**

Particulars	Amount
Revenue	-
Profit after Tax	**(67.90)**

35 Related Party Disclosures

A. List of additional related parties as per Regulation 2(1)(zv) of the SEBI InvIT Regulations

Parties to the Trust

- National Highways Infra Investment Managers Private Limited (NHIIMPL) - Investment Manager (IM) of the Trust
- IDBI Trusteeship Services Limited (ITSL) - Trustee of the Trust
- National Highways Authority of India (NHAI)- Sponsor
- National Highways InvIT Project Managers Private Limited (NHIPMPL)- Project Manager

Promoters of the Parties to the Trust specified above

- President of India - Promoter of NHIIMPL
- IDBI Bank Limited (IDBI Bank) - Promoter of ITSL
- President of India - Promoter of NHAI
- National Highways Authority of India (NHAI)- Promoter of NHIPMPL

Directors of the parties to the Trust specified above

- **Directors of NHIIMPL**

  Mr. Suresh Krishan Goyal
  Mr. Vivek Rae
  Mr. Shailendra Narain Roy
  Mr. Balasubramanyam Sriram
  Mr. Mahavir Parsad Sharma
  Mr. Pradeep Singh Kharola
  Mr. Amit Kumar Ghosh
  Mrs. Kavita Saha
  Mr. Bruce Ross Crane
  Mr. N.R.V.V.M.K. Rajendra Kumar

- **Directors of ITSL**

  Mr. Padma Vinod Betai
  Mr. Samuel Joseph Jebaraj
  Ms. Madhuri Jayant Kulkarni
  Mr. Pradeep Kumar Jain
  Ms. Jayashree Ranade

- **Directors of NHIPMPL**

  Mr. Ashish Asati
  Mr. Muralidhara Rao Bugatha

B. Transactions with Related Parties during the period

(Amounts in ₹ lakh)

Name of Entity	Particulars	For the period ended March 31, 2022	For the period ended March 31, 2021
Parties to the Trust as per Regulation 2(1)(zv) of the SEBI InvIT Regulations			
National Highways Infra Investment Managers Private Limited (NHIIMPL)	Payment of Investment Manager Fee	1,931.71	-
	Reimbursement of Pre-Issue expenses of NHIT by NHIIMPL	214.80	-
National Highways Authority of India (NHAI)	Reimbursement of Pre-Issue expenses of NHIT by NHAI	578.02	67.03

	Purchase of equity shares of Project SPV (NHIPPL) by the Trust from NHAI	10,153.52	-
	Issue of units of Trust to NHAI	96,556.00	-
IDBI Trusteeship Services Limited (ITSL)	Payment of Trustee Fee	12.15	-
	Initial Settlement Amount	-	0.10

C. Closing Balance with Related Parties

(Amounts in ₹ lakh)

Name of Entity	Particulars	As on March 31, 2022	As on March 31, 2021
Parties to the Trust as per Regulation 2(1)(zv) of the SEBI InvIT Regulations			
National Highways Authority of India (NHAI)	Issue of units of Trust to NHAI (9,56,00,000 units)	96,556.00	-
IDBI Trusteeship Services Limited	Initial Settlement Amount	0.10	0.10
	Other Payables	2.77	-

36 Capital Management

For the purpose of the Group's capital management, capital includes issued unit capital and all other reserves attributable to the unit holders of the Group.

The primary objective of the 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 unit holder value.

The 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 Group may adjust the dividend payment / income distribution to unit holders (subject to the provisions of SEBI InvIT Regulations which require distribution of at least 90%of the net distributable cash flows of the Group to unit holders), return capital to unit holders or issue new units. The Group monitors capital using a gearing ratio, which is net debt divided by total capital plus net debt. The Group's policy is to keep the gearing ratio optimum.

(Amounts in ₹ lakh)

Particulars	As at March 31, 2022	As at March 31, 2021
Net Debt Components:		
Long Term Borrowings (Non-Current portion)	145,556.94	-
Current Maturities of Long-Term Borrowings	980.86	-
Less: Cash and Cash Equivalents	(5,389.79)	-
Less: Bank Balances other than cash and cash equivalents	(3,170.81)	-
Less: Current Investments	(992.16)	-
Net Debt (i)	**1,36,985.04**	-
Capital Components:		
Unit Capital	6,01,152.00	-
Initial Settlement Amount	0.10	-
Other Equity	5,059.25	-
Total Capital (ii)	**6,06,211.35**	-
Capital and Debt [(iii) = (i) + (ii)]	**7,46,363.55**	-
Gearing Ratio (i)/(iii)	**18.35%**	-

In order to achieve this overall objective, the Board of Directors of Investment Manager, amongst other things, aims to ensure that it meets financial covenants attached to the interest-bearing loans and borrowings that define capital structure requirements. Breaches in meeting the financial covenants would permit the lenders to call loans and borrowings. There have been no breaches in the financial covenants of any interest-bearing loans and borrowing in the current period.

No changes were made in the objectives, policies or processes for managing capital during the years ended March 31, 2022 and March 31, 2021.

37 Financial Risk Management Objectives and Policies

The Group is in the process of formulation of its risk management policies with an objective of identification and analysis of risks faced by the Group, to set appropriate risk limits and controls, and to monitor risks and adherence to limits. Risk management policies shall be reviewed regularly to reflect changes in market conditions and the Group's activities.

The Board of Directors of Investment Manager has overall responsibility for the establishment and oversight of the Group's risk management framework.
In performing its operating, investing and financing activities, the Group is exposed to the Credit risk, Liquidity risk and 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: interest rate risk, currency risk and other price risk. Financial instruments affected by market risk include loans and borrowings, Receivable and Payables and Investments measured at FVTPL.
The sensitivity analyses in the following sections relate to the position as at March 31, 2022 and March 31, 2021.
The sensitivity analyses have been prepared on the basis that the amount of net debt, the ratio of fixed to floating interest rates of the debt are all constant.

The following assumptions have been made in calculating the sensitivity analyses:
The sensitivity of the relevant profit or loss item is the effect of the assumed changes in respective market risks. This is based on the financial assets and financial liabilities held at March 31, 2022 & March 31, 2021.

Foreign Currency Risk
Foreign currency risk is the risk that the fair value or future cash flows of an exposure will fluctuate because of changes in foreign exchange rates. The Group transacts business primarily in Indian Rupees only, and hence, the sensitivity of profit and loss of the Group to a possible change in foreign exchange rates is non-existent as on 31st March, 2022.

Interest Rate Risk
Interest rate risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in market interest rates. Exposure to risk of changes in market interest rates generally relates primarily to long-term debt obligations with floating interest rates.

The following table provides a break-up of the Company's fixed and floating rate borrowings:

(Amounts in ₹ lakh)

Particulars	As at March 31, 2022	As at March 31, 2021
Floating Rate Borrowings	1,46,537.80	-

The Group's exposure to interest rate risk due to variable interest rate borrowings is as follows:

(Amounts in ₹ lakh)

Particulars	As at March 31, 2022	As at March 31, 2021
Term Loan from Bank	11,201.41	-

Sensitivity analysis based on average outstanding Debt:

(Amounts in ₹ lakh)

Particulars	As at March 31, 2022	As at March 31, 2021
Increase or decrease in interest rate by 25 basis points	388.94	-

Price Risk

Price risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in market prices (other than those arising from interest rate risk or currency risk).
The Group is exposed to price risk due to investments in mutual funds and classified as fair value through profit and loss. The Group measures risk through sensitivity analysis.
The Group's risk management policy is to mitigate the risk by investments in mutual funds. The Group has investment in mutual funds amounting Rs 992.16 Lakh as at March 31, 2022 (March 31, 2021: Rs. Nil) and accordingly is expose to price risk.

Sensitivity analysis:

(Amounts in ₹ lakh)

Particulars	Impact on profit / (loss) before tax	
	As at March 31, 2022	As at March 31, 2021
Increase or decrease in NAV by 2%	19.84	-

Credit risk

Credit risk is the risk that counterparty will not meet its obligations under a financial instrument or customer contract, leading to a financial loss. With respect to credit risk arising from other financial assets of the Group, which comprise Balances with banks, Trade Receivables, Loans and Advances and Investments. The Group's exposure to credit risk arises from default of the counterparty, with maximum exposure equal to the carrying amount of these instrument.

The carrying value of financial assets represents the maximum credit risk. The maximum exposure to credit risk was Rs. 10,158.59 Lakh and Rs. 0.10 Lakh as at March 31, 2022 and March 31, 2021 respectively, being the total carrying value of Loans and Advances, Trade receivables, Investments, Balances with bank, bank deposits and other financial assets.

Liquidity Risk

Liquidity risk is the risk that an entity will encounter difficulty in meeting obligations associated with financial liabilities that are settled by delivering cash or another financial assets.

The Group is exposed to liquidity risk due to bank borrowings and trade and other payables.

The Group measures risk by forecasting cash flows.

The Group's approach to managing liquidity is to ensure, as far as possible, that it will always have sufficient liquidity to meet its liabilities when due without incurring unacceptable losses or risking damage to the Group's reputation. The Group ensures that it has sufficient funds to meet expected operational expenses, servicing of financial obligations.

In addition, processes and policies related to such risk are overseen by senior management. Management monitors the Group's net liquidity position through rolling forecast on the basis of expected cash flows.

The table below summarises the maturity profile of the group's financial liabilities based on contractual undiscounted payments.

(Amounts in ₹ lakh)

As at 31-03-2022	**Carrying Amount**	**<1 Yr.**	**1-3 Yrs.**	**>3 Yrs.**
Borrowings	1,46,537.80	1000.00	8,000.00	1,37,537.80
Trade Payables	1,101.23	1,101.23	-	-
Other Financial Liabilities	241.41	241.41	-	-
Total	**1,47,880.44**	**2,342.64**	**8000.00**	**1,37,537.80**

As at 31-03-2021	**Carrying Amount**	**<1 Yr.**	**1-3 Yrs.**	**>3 Yrs.**
Borrowings	-	-	-	-
Trade Payables	-	-	-	-
Other Financial Liabilities	67.81	67.81	-	-
Total	**67.81**	**67.81**	**-**	**-**

38 Disclosure pursuant to IND AS 36 "Impairment of Assets"

Based on management review on expected future cash flows and economic conditions of the assets of the Group, no indicators of impairment of assets exist as on the reporting date. In case of Goodwill, the recoverable amount is higher than the carrying amount as on reporting date. Hence no provision for impairment has been recognised in the books as on the reporting date.

39 Disclosure of Financial Instruments by Category

(Amounts in ₹ lakh)

Particulars	As at March 31, 2022			As at March 31, 2021		
	Amortized Cost	FTVPL		Amortized Cost	FTVPL	
		At Cost	At Fair Value		At Cost	At Fair Value
Assets:						
Cash and Cash Equivalents	5,389.78	-	-	-	-	-
Trade Receivables	600.47					
Other Financial Assets	3,176.18	-	-	-	-	-
Investments in Mutual Funds	-	-	992.16	-	-	-
Total	**9,166.43**	-	**992.16**	-	-	-
Liabilities:						
Borrowings	1,46,537.80	-	-	-	-	-
Trade Payables	1,101.23	-	-	-	-	-
Other Financial Liabilities	241.41	-	-	67.81	-	-
Total	**1,47,880.44**	-	-	**67.81**	-	-

Defaults and Breaches

There are no defaults during the year with respect to repayment of principal and payment of interest and no breaches of the terms and conditions of the borrowings.

There are no breaches during the year which permitted lender to demand accelerated payment.

40 Fair Values of Assets and Liabilities

The carrying amount of all financial assets and liabilities appearing in the financial statements is reasonable approximation of fair values. Fair value of the financial assets and liabilities is 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 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. CIR/IMD/DF/114/2016 dated October 20, 2016 as a part of these financial statements - Refer Statement of Net assets at fair value and Statement of Total Returns at fair value.

41 Fair Value Hierarchy

All financial instruments for which fair value is recognised or disclosed 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 prices (unadjusted) in active markets for identical assets or liabilities.

Level 2 – Inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly (i.e. as prices) or indirectly (i.e. derived from prices).

Level 3 - Inputs for the assets or liabilities that are not based on observable market data (unobservable inputs).

Class wise composition and comparison of carrying amounts and fair values of financial assets and liabilities that are recognised in the financial statements along with Fair Value Hierarchy details are given below:

(Amounts in ₹ lakh)

Particulars	Fair Value Hierarchy Level	Carrying Value		Fair Value	
		As at March 31, 2022	As at March 31, 2021	As at March 31, 2022	As at March 31, 2021
Financial Assets at Amortized Cost:					
Cash and Cash Equivalents	Level 3	5,389.78	-	5,389.78	-
Trade Receivables	Level 3	600.47	-	600.47	-
Other Financial Assets	Level 3	3,176.18	-	3,176.18	-
Financial Assets at FVTPL:					-
Investments in Mutual Funds	Level 1	992.16	-	992.16	-

Total		**10,158.59**	**-**	**10,158.59**	**-**
Financial Liabilities at Amortized Cost:					
Borrowings	Level 3	1,46,537.80	-	1,46,537.80	-
Trade Payables	Level 3	1,101.23	-	1,101.23	-
Other Financial Liabilities	Level 3	241.41	67.81	241.41	67.81
Total		**1,47,880.44**	**67.81**	**1,47,880.44**	**67.81**

There are no transfers between level 1 and level 2 during the year.
The policy of the Group is to recognise transfers into and transfer out of fair values hierarchy levels as at the end of the reporting period.

Valuation technique and inputs used to determine fair value

Financial assets and liabilities	Valuation method	Inputs
Financial assets		
Investment in Mutual Funds	Market Approach	NAV
Investments in equity shares of subsidiaries	Income	Cash Flow
Loans	Income	Effective Rate of Interest
Financial liabilities		
Term loans from Bank	Income	Effective Rate of Borrowings
Non-Convertible Debentures	Income	Effective Rate of Borrowings

42 Disclosure of segment information pursuant to IND AS 108 "Operating Segments"

The activities of the Group mainly include investing in infrastructure assets primarily in the SPVs operating in the road sector to generate cash flows for distribution to unit holders. Based on the guiding principles given in Ind AS - 108 “Operating Segments”, this activity falls within a single operating segment. Further, the entire operations of the Group are only in India and hence, disclosure of secondary / geographical segment information does not arise. Accordingly, requirement of providing disclosures under Ind AS 108 does not arise.

43 Details of dues To Micro and Small Enterprises as per MSMED Act, 2006

There are no Micro and Small Enterprises as defined in the Micro and Small Enterprises Development Act, 2006 to whom the Group owes dues on account of principal amount together with interest and accordingly no additional disclosures have been made. The above information regarding Micro and Small Enterprises has been determined to the extent such parties has been identified on the basis of information available with the Group.

44 Disclosure pursuant to IND AS 19 “Employee Benefits”

Defined contribution plan:
Contributions to Provident Fund scheme and the Employee Deposit Linked Insurance scheme of the government of India, as a specified percentage of monthly payroll costs comprise the only obligations of the Group with respect to defined contribution plans for the employees.
An amount of Rs. 0.13 Lakh for the reporting period (March 31, 2021: Rs. Nil), being contribution made to these funds is recognised as expense under Employee Benefit expense (Note 26) in the Consolidated Statement of Profit and Loss.

Defined Benefit Plan:

Gratuity:
The benefit is governed by Payment of Gratuity Act, 1972, and is calculated as follows:

Components	Particulars
Benefits offered	15/ 26 × Salary × Duration of Service
Salary Definition	Basic Salary including Dearness Allowance (if any)
Vesting Conditions	5 years of continuous service (Not applicable in case of death/disability)
Benefit Eligibility	Upon Death or Resignation / Withdrawal or Retirement
Retirement Age	58 years

45 Disclosure pursuant to IND AS 23 “Borrowing Costs”

Borrowing cost capitalised during the year Rs. Nil [March 31, 2021: Rs. Nil]

46 Details of Project Management Fees and Investment Management Fees

Details of fees paid to project manager and investment manager as required pursuant to SEBI Circular No. CIR/MD/DF/127/2016, dated November 29, 2016 are as under:

Project Management Fees

The Project Manager (NHIPMPL) for managing the initial portfolio of assets is entitled to a Project Management fee which is a percentage of the gross revenue earned by the project SPV (NHIPPL). The same is based on the Project Implementation and Management Agreement (PIMA) signed by both the parties dated 30th March, 2021.

The project SPV (NHIPPL) proposed a fees of Rs. 70.00 Lakh (Rupees Seventy Lakh Only) per month, as project manager's fees against the services offered by the project manager, for a period of 18 months starting from the date of the Concession agreement. The Project Manager's fees for the period after the expiry of 18 months shall be a percentage of gross revenue earned by the project SPV (NHIPPL), which is mutually agreed between the parties in the PIMA.

Investment Management Fees

i) The investment manager's fee will initially be Rs. 1,100 Lakh (Rupees Eleven Hundred Lakh) per annum, exclusive of applicable taxes as per agreement dated 21st October, 2020.

ii) The investment manager's fee set out in above shall be subject to escalation on an annual basis at the rate of 10% of the management fee for the previous year.

iii) Any applicable taxes, cess or charges shall be in addition to the investment manager's fee and shall be payable by National Highways Infra Trust (NHIT) to the Investment Manager (NHIIMPL).

iv) The payment of investment manager's fee shall be made by National Highways Infra Trust (NHIT) to the investment manager (NHIIMPL) in advance on a quarterly basis.

47 Significant accounting judgements, estimates and assumptions

The preparation of the Group's 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.

Judgements

In the process of applying the Group's accounting policies, management has made the following judgments, apart from those involving estimations, which have the most significant effect on the amounts recognised in the financial statements:

Classification of unit holders Funds

Under the provisions of the SEBI InvIT Regulations, the Group is required to distribute to its Unit holders not less than ninety percent of the net distributable cash flows of the Group for each financial year. Accordingly, a portion of the unit holders' funds contain a contractual obligation of the Group to pay to its Unit holders cash distributions.
The Unit holder's funds could therefore have been classified as compound financial instrument which contain both equity and debt components in accordance with Ind AS 32 'Financial Instruments: Presentation'. However, in accordance with SEBI Circulars (Circular no. CIR/IMD/DF/114/2016 dated October 20, 2016 and No. CIR/IMD/ DF/127/2016 dated November 29, 2016) issued under the SEBI InvIT Regulations, the unit holders' funds have been classified as equity in order to comply with the mandatory requirements of Section H of Annexure A to
the SEBI Circular dated October 20, 2016 dealing with the minimum disclosures for key financial statements. In line with the above, the income distribution payable to unit holders is recognized as liability when the same is approved by Board of Directors of the Investment Manager.

Fair valuation and disclosures

SEBI Circulars issued under the SEBI InvIT Regulations requires disclosures relating to net assets at fair value and total returns at fair value. In estimating the fair value of investments in subsidiaries (which constitute substantial portion of the net assets), the Group engages independent qualified external valuers to perform the valuation. The Investment Manager works closely with the valuers to establish the appropriate valuation techniques and inputs to the model. The valuation report and findings are discussed at the meeting of the Board of Directors on yearly basis to understand the changes in the fair value of the subsidiaries. The inputs to the valuation models 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 weighted average cost of capital, tax rates, inflation rates, etc. Changes in assumptions about these factors could affect the fair value.

Taxes

In accordance with section 10 (23FC) of the Income Tax Act, 1961, the income of business groups in the form of interest received or receivable from subsidiaries is exempt from tax. Accordingly, the Group is not required to provide any current tax liability. Further, deferred tax asset on carry forward losses is not created since there is no reasonable certainty of reversal of the same in the near future.

Major Maintenance Expenses / Resurfacing Expenses

As per industry practice, the company is required to carry out resurfacing of the roads under the Concession. 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 and maintenance of service roads. The maintenance cost / bituminous overlay 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 accounts annually.

Expected Credit Loss on financial assets

As per Ind AS 109, Financial Assets that are measured at amortised cost are required to compute the Expected Credit Loss (ECL). As at the reporting period, Investment manager of the Group assessed the credit risk of the financial assets and concluded that no provision for ECL is required.

48 Contingent Liabilities

The Project SPV company (NHIPPL) has issued a Corporate Guarantee amounting to Rs. 2,000 Crore on 14.03.2022 in favour of lenders of the Trust as part of debt covenants of the loan received from the Trust, to secure the term loan of Rs. 2,000 Crore availed by the Trust from external lenders. The Corporate Guarantee is valid till the external loans to the Trust are satisfied.

49 Subsequent Events

On May 23, 2022, the Board of Directors of the Investment Manager approved distribution of Rs. 0.79 per unit (Return on capital of Rs. 0.71 per unit, return of capital of Rs. Nil per unit, Dividend of Rs. Nil per unit and other income on surplus funds at Group of Rs. 0.08 per unit) for the period October 01, 2021 to March 31, 2022 to be paid on or before 15 days from the date of declaration.

50 Capital and Other Commitments

There are no capital and other commitments as at March 31, 2022 (March 31, 2021: Rs. Nil)

51 Distributions Made

(Amounts in ₹ lakh)

Particulars	**FY 2021-22**	**FY 2020-21**
Interest (Return on capital)	4,198.27	-
Return of capital	-	-
Dividend	-	-
Other income on surplus fund at Group	503.81	-
Total	**4,702.08**	**-**

52 Reconciliation of Financing Activities in Cash Flow Statement

Net Debt Recognition

(Amounts in ₹ lakh)

Particulars	**31st March, 2022**	**31st March, 2021**
	(Long Term Borrowing)	**(Long Term Borrowing)**
Carrying amount of debt at the beginning of the year/period	-	-
Additional borrowings during the year/period	1,48,000.00	-
Repayments during the year/period	(1,001.59)	-
Other adjustments/settlements during the year/period	-	-
- Impact in equity	-	-
- Transaction Costs	(472.00)	-
- Unwinding of interest	11.39	
Carrying amount of debt at the end of the year/period	**1,46,537.80**	**-**

53 Additional Regulatory Information

Financial Ratios as on March 21, 2022

S. No.	Particulars	As on March 31, 2022	As on March 31, 2021
1	Current Asset ratio (Current Assets /Current Liability)	2.69	-
2	Debt- Equity ratio (Debt/ Equity)	0.24	-
3	Debt service coverage ratio (Net Operating Cash flow/ Debt Service Obligation)	2.58	-
4	ROE ratio (Net Profit/ Equity)	1.13%	-
5	Inventory turnover ratio	-	-
6	Trade receivable turnover ratio	-	-
7	Trade payable turnover ratio	-	-
8	Net Capital turnover ratio (Total Income / Net Working Capital)	3.25	-
9	Net profit ratio (Net profit / Total Income)	45.65%	-
10	Return on capital employed ratio ((Net Profit plus Finance Cost)/ (Equity + Debt))	1.35%	-
11	Return on investment (Income on Investment / Average Cost of Investment)	15.69%	-

54 Disclosure pursuant to IND AS 33 "Earnings per Unit"

Basic and Diluted Earnings per Unit (EPU) computed in accordance with Ind AS 33 “Earnings per Share”:

(Amounts in ₹ lakh)

Particulars	FY 2021-22	FY 2020-21
Basic and Diluted		
Profit attributable to unit holders of the Fund (A)	6,836.33	-
Weighted average number of units (B)	5,952.00	-
Earnings Per Unit (In Rs.) (A/B)	**1.15**	**-**
Face value per Unit (In Rs.)	**101**	**-**

55 Key sources of estimation

The preparation of financial statements in conformity with Ind AS requires the Group makes estimates and assumptions that affect the reported amounts of income and expenses of the period, the reported balances of assets and liabilities and the disclosures relating to contingent liabilities as of the date of the financial statements. The estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates include allowance for doubtful loans /other receivables, fair value measurement etc. Difference, if any, between the actual results and estimates is recognised in the period in which the results are known.

56 Previous Year Figures

Previous year's numbers have been regrouped / reclassified, wherever necessary to conform to current year's classification.

For A.R. & Co.
Chartered Accountants
Firm Registration no. 002744C

Sd/-
CA Naresh Kumar Karn
Partner
M.No.077887
Date: 23.05.2022
Place: New Delhi

For and on behalf of the National Highways Infra Investment Managers Private Limited (Investment Manager of National Highways Infra Trust)

Sd/-
Suresh Krishan Goyal
Director
DIN: 02721580

Sd/-
Mahavir Parsad Sharma
Director
DIN: 03158413

Sd/-
Mathew George
Chief Financial Officer

Sd/-
Gunjan Singh
Compliance Officer

CAPITALIZATION STATEMENT

For the Trust on a consolidated basis:

Particulars	Pre-Offer as at June 30, 2022^ (in ₹ million)	As Adjusted for the Offer* (in ₹ million)
Unitholders' Funds		
Initial Contribution to the Trust	0.01	[●]
Unit Capital	60,115.20	[●]
Reserve & Surplus	661.92	[●]
Total Unitholders' Funds (A)	60,777.13	[●]
Long Term Borrowings	14,503.52	[●]
Short Term Borrowings	-	[●]
Other Borrowings (Current Maturity of Long Terms Borrowings)	125.00	[●]
Total Debt (B)	14,628.52	[●]
Total Capitalization (A+B)	75,405.65	[●]
Long Term Debt/Equity Ratio	23.86	[●]
Total Debt/ Equity Ratio	24.07	[●]

^As derived from Limited Review Financial Information.

* As adjusted to reflect the number of Units to be issued pursuant to the Offer and the Preferential Issue and proceeds from the Offer and the Preferential Issue.

MATERIAL CONTRACTS AND DOCUMENTS FOR INSPECTION

The following contracts, which are or may be deemed material, have been entered into. These contracts and also the documents 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 the Preliminary Placement Document until the date of listing of the Units pursuant to this Offer. Any of the contracts or documents mentioned in this Preliminary Placement 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 and InvIT Documents.

1. Trust deed dated October 19, 2020, entered between the Sponsor and the Trustee.
2. SEBI registration certificate for the Trust bearing number IN/InvIT/20-21/0014 dated October 28, 2020, to act as an infrastructure investment trust.
3. Investment management agreement dated October 21, 2020, entered between the Trustee and the Investment Manager.
4. Project implementation and management agreement dated March 30, 2021, entered amongst the Trustee, the Investment Manager, the Project Manager and Project SPV, as amended on September 29, 2021 and September 27, 2022.
5. Transitional support agreement dated September 26, 2022, entered into into amongst the Sponsor, Project Manager and the Project SPV in relation to the Target Toll Roads.
6. Placement agreement entered into amongst the Trust (acting through the Trustee), the Investment Manager, and the Lead Managers, dated September 29, 2022.
7. Cash escrow agreement entered into amongst the Trust (acting through the Trustee), the Investment Manager, the Sponsor, the Lead Managers and the Escrow Collection Bank, dated September 29, 2022.
8. The concession agreements, each dated March 30, 2021 and September 26, 2022, entered into by the Project SPV with NHAI.
9. Trademark license agreement dated September 26, 2022, entered into between the Sponsor and the Trustee.
10. Agreement dated March 24, 2021, between NSDL, the Trust (acting through the Investment Manager and its constituted attorneys) and the Registrar to the Offer.
11. Agreement dated March 19, 2021, between CDSL, the Trust (acting through the Investment Manager and its constituted attorneys) and the Registrar to the Offer.
12. The Project SPV Facility Agreements each dated September 30, 2021, entered into amongst the Trust (acting through the Trustee), the Investment Manager and the Project SPV.
13. Loan agreement dated September 29, 2021, entered into amongst the Trust, State Bank of India, Axis Bank Limited and Bank of Maharashtra.
14. Sanction letter dated September 19, 2022 issued by Bank of Maharashtra in favour of the Trust.
15. The Board resolution of the Investment Manager dated August 30, 2022, authorizing this Offer.
16. The Unitholders resolution dated September 23, 2022, authorizing this Offer.
17. Approval of the NHAI dated September 21, 2022, in relation to acceptance of the Concession Fee.
18. Approval of the NHAI dated September 29, 2022, confirming its willingness to subscribe to at-least 19,602,600 Units in the Preferential Issue.
19. Communicated issued by NHAI including (i) letter dated September 27, 2022 in relation to Agra Bypass; (ii) letters dated September 28, 2020 and September 26, 2022 in relation to Borkhedi Kelapur Project; and (iii) letter dated September 29, 2022 in relation to Shivpuri Jhansi Project in relation to the necessary approvals and clearances obtained during the construction stage of the Target Toll Roads
20. Certified copies of the updated Memorandum and Articles of Association of the Investment Manager as amended from time to time.
21. The consents from the (i) Lead Managers; (ii) Legal counsel to the Trust as to Indian law; (iii) Indian legal counsel to the Lead Managers; (v) Trustee, (vi) the Sponsor, (vii) the Investment Manager; (viii) Valuer; (ix) Traffic Consultants, (x) Technical Consultants, (xi) Registrar; (xii) Escrow Collection Bank; (xiii) Compliance Officer; and (xiv) statutory auditors of the Trust.
22. Audited financial statements of the Sponsor for financial years ended March 31, 2021 and March 31, 2020.
23. In principle listing approval dated September 29, 2022, issued by NSE.
24. In principle listing approval dated September 29, 2022, issued by BSE.
25. Corporate governance policies adopted by the Investment Manager.
26. Due diligence certificate dated September 29, 2022 addressed to Stock Exchanges from the Lead Managers.
27. Audited standalone financial statements of the Trust, for the period from the date of its settlement, that is October 19, 2020 till March 31, 2021 and audited consolidated financial statements for the financial year ended March 31, 2022 and limited review financial information for the three months period ended June 30, 2022.
28. Credit rating letters issued by Care Ratings Limited, dated August 25, 2022, as revalidated on September 23, 2022 assigning a rating of "Provisional Care AAA/Stable" in respect of proposed long-term non-convertible debenture issue aggregating up to ₹ 1,500 crore.

29. Credit rating letters issued by India Ratings and Research, dated September 20, 2022, assigning a rating of (a) "Provisional IND AAA/Stable" for proposed public issue of non-convertible debentures aggregating up to ₹ 1,500 crore, (b) "IND AAA/Stable" as long-term issue rating; (c) "Provisional IND AAA/Stable" for proposed rupee term loan of ₹ 8,500 crore; and (d) "IND AAA/Stable" for proposed rupee term loan of ₹ 20,000 crore.
30. Letter dated September 23, 2022, bearing reference number SEBI/HO/DDHS_Div3/OW/P/2022/49489/1 from SEBI granting an exemption in terms of the InvIT Regulations and the SEBI circular CIR/IMD/DF/114/2016 on "*Disclosure of financial information in offer document/placement memorandum for InvITs*" dated October 20, 2016..

DECLARATION

The Investment Manager declares and certifies that all relevant provisions of the InvIT Regulations, the SEBI Institutional Placement Guidelines, SEBI Act and all regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Preliminary Placement Document is contrary to the provisions of the InvIT Regulations, , the SEBI Institutional Placement Guidelines, the SCRA, SEBI Act and all 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 Preliminary Placement Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make a well informed decision.

For National Highways Infra Investment Managers Private Limited

Sd/-
Balasubramanyam Sriram
Chairman and Independent Director

Place: Mumbai
Date: September 29, 2022

DECLARATION

The Investment Manager declares and certifies that all relevant provisions of the InvIT Regulations, the SEBI Institutional Placement Guidelines, SEBI Act and all regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Preliminary Placement Document is contrary to the provisions of the InvIT Regulations, the SEBI Institutional Placement Guidelines, the SCRA, SEBI Act and all 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 Preliminary Placement Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make a well informed decision.

For National Highways Infra Investment Managers Private Limited

Sd/-
Suresh Goyal
Managing Director and Chief Executive Officer

Place: New Delhi
Date: September 29, 2022

DECLARATION

The Investment Manager declares and certifies that all relevant provisions of the InvIT Regulations, the SEBI Institutional Placement Guidelines, SEBI Act and all regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Preliminary Placement Document is contrary to the provisions of the InvIT Regulations, the SEBI Institutional Placement Guidelines, the SCRA, SEBI Act and all 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 Preliminary Placement Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make a well informed decision.

For National Highways Infra Investment Managers Private Limited

Sd/-
N.R.V.V.M.K. Rajendra Kumar
Nominee Director

Place: New Delhi
Date: September 29, 2022

DECLARATION

The Investment Manager declares and certifies that all relevant provisions of the InvIT Regulations, the SEBI Institutional Placement Guidelines, SEBI Act and all regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Preliminary Placement Document is contrary to the provisions of the InvIT Regulations, the SEBI Institutional Placement Guidelines, the SCRA, SEBI Act and all 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 Preliminary Placement Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make a well informed decision.

For National Highways Infra Investment Managers Private Limited

Sd/-
Mahavir Parsad Sharma
Independent Director

Place: New Delhi
Date: September 29, 2022

DECLARATION

The Investment Manager declares and certifies that all relevant provisions of the InvIT Regulations, the SEBI Institutional Placement Guidelines, SEBI Act and all regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Preliminary Placement Document is contrary to the provisions of the InvIT Regulations, the SEBI Institutional Placement Guidelines, the SCRA, SEBI Act and all 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 Preliminary Placement Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make a well informed decision.

For National Highways Infra Investment Managers Private Limited

Sd/-
Shailendra Narain Roy
Independent Director

Place: New Delhi
Date: September 29, 2022

DECLARATION

The Investment Manager declares and certifies that all relevant provisions of the InvIT Regulations, the SEBI Institutional Placement Guidelines, SEBI Act and all regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Preliminary Placement Document is contrary to the provisions of the InvIT Regulations, the SEBI Institutional Placement Guidelines, the SCRA, SEBI Act and all 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 Preliminary Placement Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make a well informed decision.

For National Highways Infra Investment Managers Private Limited

Sd/-
Amit Kumar Ghosh
MoRTH Nominee Director

Place: New Delhi
Date: September 29, 2022

DECLARATION

The Investment Manager declares and certifies that all relevant provisions of the InvIT Regulations, the SEBI Institutional Placement Guidelines, SEBI Act and all regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Preliminary Placement Document is contrary to the provisions of the InvIT Regulations, the SEBI Institutional Placement Guidelines, the SCRA, SEBI Act and all 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 Preliminary Placement Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make a well informed decision.

For National Highways Infra Investment Managers Private Limited

Sd/-
Kavita Saha
Non-sponsor Director

Place: Mumbai
Date: September 29, 2022

DECLARATION

The Investment Manager declares and certifies that all relevant provisions of the InvIT Regulations, the SEBI Institutional Placement Guidelines, SEBI Act and all regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Preliminary Placement Document is contrary to the provisions of the InvIT Regulations, the SEBI Institutional Placement Guidelines, the SCRA, SEBI Act and all 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 Preliminary Placement Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make a well informed decision.

For National Highways Infra Investment Managers Private Limited

Sd/-
Bruce Ross Crane
Non-sponsor Director

Place: Singapore
Date: September 29, 2022

DECLARATION

The Investment Manager declares and certifies that all relevant provisions of the InvIT Regulations, the SEBI Institutional Placement Guidelines, SEBI Act and all regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Preliminary Placement Document is contrary to the provisions of the InvIT Regulations, the SEBI Institutional Placement Guidelines, the SCRA, SEBI Act and all 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 Preliminary Placement Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make a well informed decision.

For National Highways Infra Investment Managers Private Limited

Sd/-
Pradeep Singh Kharola
Independent Director

Place: New Delhi
Date: September 29, 2022

DECLARATION

The Trustee declares and certifies that all relevant provisions of the InvIT Regulations, the SEBI Institutional Placement Guidelines, SEBI Act and all regulations and guidelines issued by the GoI or SEBI (as the case may be) have been complied with and no statement made in this Preliminary Placement Document is contrary to the provisions of the InvIT Regulations, the SEBI Institutional Placement Guidelines, the SCRA, SEBI Act and all 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 Preliminary Placement Document are material, true, correct, not misleading and adequate in order to enable the Bidders to make a well informed decision.

For and on behalf of IDBI Trusteeship Services Limited

Sd/-

Authorised Signatory
Place: New Delhi
Date: September 29, 2022

ANNEXURE A

VALUATION REPORT

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RBSA Valuation Advisors LLP
VALUATION | INVESTMENT BANKING | RESTRUCTURING | TRANSACTION SERVICES
TRANSACTION TAX | ADVISORY SERVICES

RBSA Valuation Advisors LLP

Report on Enterprise and Equity Valuation of National Highways Infra Projects Private Limited as of 31st July 2022

Head Office: 912, Venus Atlantis Corporate Park, Anandnagar Main Road, Prahaladnagar, Ahmedabad – 380015 Tel: +91 79 4050 6000
Corporate Office: 1121, Solitaire Corp. Park, Chakala, Andheri Kurla Road, Andheri (E), Mumbai - 400 093 Tel: +91 22 6130 6000

Private and Confidential

30th August 2022

Report Ref No: RVA2223DELREP024

National Highways Infra Investment Managers Private Limited
G-5 & 6, Sector-10, Dwarka
Delhi 110075

Sub: Valuation of National Highways Infra Projects Private Limited, pursuant to SEBI (Infrastructure Investment Trusts) Regulations, 2014, as amended ("the SEBI InvIT Regulations")

Dear Sir,

We refer to our appointment letter dated 29th December 2020 wherein RBSA Valuation Advisors LLP ("RBSA") was appointed by National Highways Infra Investment Managers Private Limited ("NHIIMPL"/ the "Investment Manager"), as an independent valuer, as per Regulation 2(zzf) of the SEBI (Infrastructure Investment Trust) Regulations, 2014 ("SEBI InvIT Regulations") and our subsequent discussions, for carrying out the valuation of National Highways Infra Projects Private Limited ("NHIPPL" or the "SPV"). NHIPPL is a wholly owned subsidiary of National Highways Infra Trust ("NHIT" or the "Trust" or "InvIT") and has been incorporated as a special purpose vehicle to operate and maintain the road projects. NHIPPL has currently entered into concession agreements with National Highway Authority of India ("NHAI" or "Sponsor") to operate, maintain and transfer 5 Toll road projects under the Toll, Operate and Transfer ("TOT") model (together referred to as the "Specified Projects"). The Specified Projects held by NHIPPL comprise of the following:

1. Abu Road (Rajasthan) to Swaroopganj (Rajasthan) ("ABU-SWA")
2. Chittorgarh (Rajasthan) to Kota (Rajasthan) ("CHT-KOT")
3. Palanpur (Gujarat) to Abu Road (Rajasthan) ("PLN-ABU")
4. Kothakota Bypass (Telangana) to Kurnool (Andhra Pradesh) ("KOT-KUR")
5. Belgaum (Karnataka) to Kagal (Karnataka) ("BEL-KAG")

NHIT is registered with the Securities and Exchange Board of India ("SEBI") as an infrastructure investment trust under the SEBI InvIT Regulations.

NHIIMPL is acting as Investment Manager to the Trust, NHAI is acting as Sponsor to the Trust and IDBI Trusteeship Services Limited ("Trustee") is acting as the Trustee to the Trust, within the meaning of the SEBI InvIT Regulations. NHAI monetized the Specified Projects encompassed in the SPV through the InvIT (Infrastructure Investment Trust) route. We understand that NHAI has offered the Trust additional three Toll road projects to operate, maintain and transfer under the TOT model, which is being evaluated by NHIIMPL.

The Trust intends to undertake the fair valuation of the SPV encompassing the Specified Projects, as on 31st July 2022 ("Valuation Date") as per the SEBI InvIT Regulations.

RBSA VALUATION ADVISORS LLP

In this regard, RBSA Valuation Advisors LLP has been appointed by the Investment Manager, as an independent valuer, as per Regulation 2(zzf) of the SEBI InvIT Regulations, for the purpose of carrying out the Valuation of National Highways Infra Projects Private Limited.

We have analyzed the information provided by/ on behalf of the Investment Manager through broad inquiry, analysis and review but have not carried out a due diligence or audit of such information. We have relied on the explanations and information provided by/ on behalf of the Investment Manager. We have no present or planned future interest in the Sponsor, the SPV or the Investment Manager except to the extent of our appointment as an independent valuer. Our professional fees for the valuation are not contingent upon the values reported herein. Our valuation analysis should not be construed as an investment advice specifically, we do not express any opinion on the suitability or otherwise of entering into any financial or other transaction with the Trust.

We enclose our valuation report (the "Report") providing our opinion on the fair enterprise valuation of the NHIPPL as of 31st July 2022, on a 'going concern value' premise. The attached Report details the valuation approach and methodologies, calculations and conclusions with respect to this valuation.

Our valuation analysis must be considered as a whole. Selecting portions of our analysis or the factors we considered, without considering all factors and analysis together could create a misleading view of the process underlying the valuation conclusions. 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.

Our valuation conclusion included herein, and Report complies with the SEBI InvIT Regulations and guidelines, circular or notification issued by SEBI there under.

Please note that the Report must be read in conjunction with the Assumptions and Limiting Conditions, which are contained in Section 3 of this Report. This letter, the Report and the summary of valuation included herein may be provided to the Trust's advisors, the Securities and Exchange Board of India and other regulatory and supervisory authority, as may be required under the applicable regulations.

This letter should be read in conjunction with the attached Report.

For **RBSA Valuation Advisors LLP,**
(RVE No.: IBBI/RV-E/05/2019/110)

Name: Ravishu Vinod Shah
Designation: Partner
Asset Class: Securities or Financial Assets (RV No.: IBBI/RV/06/2020/12728)
Date: 30th August 2022
Place: Mumbai

RBSA Valuation Advisors LLP

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1. Executive Summary

National Highway Authority of India ("NHAI") was set up by an act of the Indian Parliament, NHAI Act, 1988. NHAI was set up with the primary objective of facilitating development, maintenance and Management of national highways in India. NHAI has been entrusted with National Highways Development Project, along with other minor projects.

National Highways Infra Trust ("NHIT" or the "Trust" or "InvIT") is registered with the Securities and Exchange Board of India ("SEBI") as an infrastructure investment trust under the SEBI InvIT Regulations. National Highways Infra Investment Managers Private Limited ("NHIIMPL" or the "Investment Manager") is acting as Investment Manager to the Trust, National Highway Authority of India ("NHAI" or "Sponsor") is acting as Sponsor to the Trust and IDBI Trusteeship Services Limited ("Trustee") is acting as the Trustee to the Trust, within the meaning of the SEBI InvIT Regulations.

National Highways Infra Projects Private Limited ("NHIPPL" or the "SPV") is a wholly owned subsidiary of the Trust, which has been incorporated as a special purpose vehicle to operate and maintain the road projects. NHIPPL has entered into concession agreements with NHAI to operate, maintain and transfer 5 Toll road projects under the Toll, Operate and Transfer ("TOT") model (together referred to as the "Specified Projects"). We understand that NHAI has offered the Trust additional three Toll road projects to operate, maintain and transfer under the TOT model, which is being evaluated by NHIIMPL.

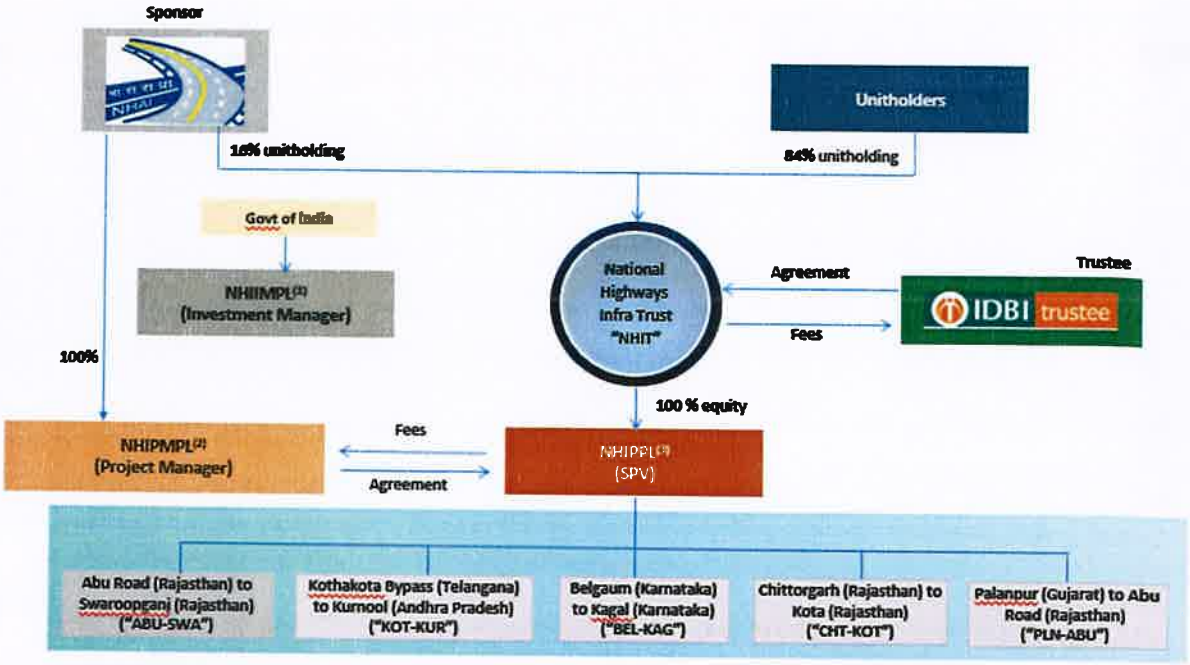
The Trust intends to undertake the fair valuation of the SPV encompassing the Specified Projects, as on 31st July 2022 ("Valuation Date") as per the SEBI InvIT Regulations.

In this regard, RBSA Valuation Advisors LLP has been appointed by the Investment Manager, as an independent valuer, as per Regulation 2(zzf) of the SEBI InvIT Regulations, for the purpose of carrying out the Valuation of National Highways Infra Projects Private Limited.

National Highways Infra Projects Private Limited comprises the following Specified Projects:

Sr. No.	Name of Section	NH	Total Length (Kms)	Toll Plaza	Start Kms	End Kms
1	Abu Road – Swaroopganj	NH-27	31.000	Undavariya	646.000	677.000
2	Chittorgarh – Kota & Chittorgarh Bypass	NH-27	160.500	Bassi, Aroli and Dhaneshwar	891.929	1052.429
3	Palanpur/ Khemana – Abu Road	NH-27	45.000	Khemana	601.000	646.000
4	Kothakota Bypass - Kurnool Highway	NH-44	74.622	Pullur	135.469	211.000
5	Maharashtra / Karnataka Border (Kagal) Highway	NH-48	77.705	Hattargi and Kognoli	515.000	592.705

National Highways Infra Trust Structure



NHIPPL - National Highways Infra Projects Private Limited, NHIIMPL - National Highways Infra Investment Managers Private Limited

Note:- National Highways Infra Trust Structure as on 31st July 2022.

Valuation Analysis

The Discounted Cash Flow ("DCF") method under the Income Approach has been adopted for the Enterprise Valuation of the SPV. Free Cash Flow to Firm method under DCF has been applied based on the projected financial statements of the SPV provided by the Management of NHIIMPL (the "Management"). The Enterprise Value has been computed by discounting the projected free cash flows to the firm (SPV) beginning from 1st August 2022 until the end of the concession period, using an appropriate Weighted Average Cost of Capital ("WACC").

The Investment Manager has appointed independent consultants to carry out Traffic study and estimation of toll revenue and Technical Due Diligence study for estimation of operating and maintenance expenses and major maintenance expenses, for each of the Specified Projects of the SPV over the concession period of 30 years ending on 15th December 2051. We have relied upon the Traffic Study reports and Technical Due Diligence reports provided by independent consultants on the Specified Projects of the SPV for the Enterprise Valuation of NHIPPL.

Valuation of a company/ business is not a precise science and the conclusions arrived at in many cases will be subjective and dependent on the exercise of individual judgment. There is, therefore, no indisputable single value and we normally express our opinion on the value as falling within a likely range. However, considering the nature of the engagement, we have provided a single point value estimate. While we have provided our opinion on the enterprise value of NHIPPL based on the information made available to us and within the scope and constraints of our engagement, others may have a different opinion. Accordingly, we expressly disclaim all liability for any loss or damage of whatever kind which may arise from any person acting on any information and estimates contained in this Report which are contrary to the stated purpose.

While our work has involved an analysis of financial and other information provided by/ on behalf of the Management, our engagement does not include an audit in accordance with generally accepted auditing standards of NHIPPL existing business records. We have not carried out any independent technical evaluation or appraisal or due diligence of the assets or liabilities of the NHIPPL. Accordingly, we assume no responsibility and make no representations with respect to the accuracy or completeness of any information provided by/ on behalf of the Management. Our Report is subject to the scope, assumptions and limitations detailed hereinafter. As such the Report is to be read in totality, and not in parts, in conjunction with the relevant documents referred to herein and in the context of the purpose for which it is made.

The Union Transport and Highway Minister informed the Lok Sabha (the Lower House of the Indian Parliament) on 18th March 2021, that all physical toll booths across the National Highways network will be removed and a GPS-based toll collection system will be rolled out within one year. In light of this announcement made by the Honorable Minister, we have been given to understand by the Management that due to the current lack of clarity on the implementation plan and related financial information, it is too early and difficult to reasonably assess the impact of implementation of GPS-based toll collection system on toll operations and maintenance expenses in future for the Specified Projects and therefore, toll operations and maintenance expenses have been projected considering the existing toll collection system involving physical toll booths and FASTag.

We understand from the Management that the capital expenditure of ~ INR 598 Crore to be incurred over FY2023 and FY2024 shall be borne by the SPV.

Enterprise Valuation of NHIPPL as of 31st July 2022, has been carried out considering *inter-alia* Traffic Study and Technical Due Diligence Reports of independent consultants, Business plan/ Projected financial statements of NHIPPL and other information provided by/ on behalf of the Management, industry analysis and other relevant factors.

The Valuation summary of NHIPPL as of 31st July 2022 is as follows:

SPV	WACC	Enterprise Value (INR Cr)	Equity Value (INR Cr.)
National Highways Infra Projects Private Limited ("NHIPPL")	10.50%	7,757.76	1,524.63

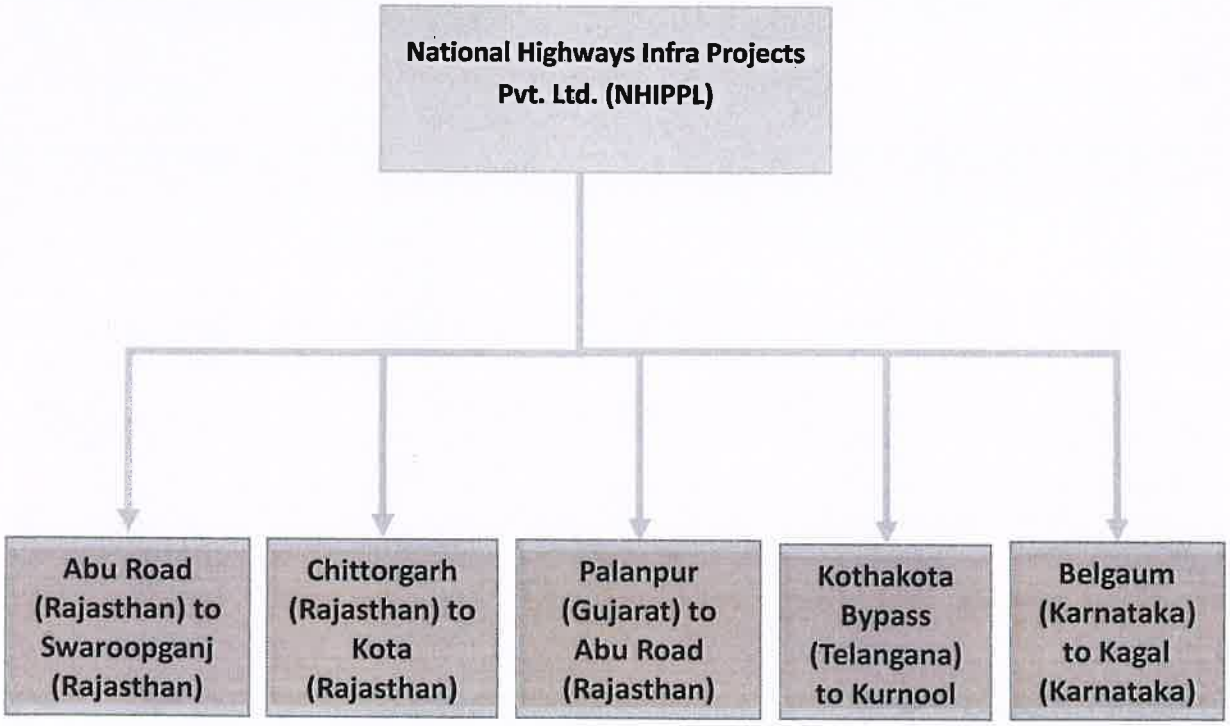
Particulars	In INR cr.
Enterprise Value	**7,757.76**
Less: Debt	-6,276.16
Less: Debt like	-3.52
Add: Cash and cash equivalent	46.56
Equity Value	**1,524.63**

2. Engagement Overview

- National Highway Authority of India was set up by an act of the Indian Parliament, NHAI Act, 1988. NHAI was set up with the primary objective of facilitating development, maintenance, and management of national highways in India. NHAI has been entrusted with National Highways Development Project, along with other minor projects.

- National Highways Infra Projects Private Limited is a wholly owned subsidiary of National Highways Infra Trust ("NHIT") and has been incorporated as a special purpose vehicle to operate and maintain the road projects. NHIPPL has entered into a concession agreement with NHAI to operate, maintain and transfer 5 Toll road projects under the Toll, Operate and Transfer ("TOT") model (together referred to as the "Specified Projects"). We understand that NHAI has offered the Trust additional three Toll road projects to operate, maintain and transfer under the TOT model, which is being evaluated by NHIIMPL.

- National Highways Infra Projects Private Limited holds the following Specified Projects:



- National Highways Infra Trust is registered with the Securities and Exchange Board of India as an infrastructure investment trust under the SEBI InvIT Regulations. National Highway Authority of India is acting as Sponsor to the Trust, NHIIMPL is acting as Investment Manager to the Trust and IDBI Trusteeship Services Limited is acting as the Trustee to the Trust.

- The Trust intends to undertake the fair valuation of the SPV encompassing the Specified Projects, as on 31st July 2022 ("Valuation Date") as per the SEBI InvIT Regulations.

- In this regard, RBSA Valuation Advisors LLP has been appointed by the Investment Manager, as an independent valuer, as per Regulation 2(zzf) of the SEBI InvIT Regulations, for the purpose of carrying out the Enterprise Valuation of National Highways Infra Projects Private Limited.

- RBSA Valuation Advisors LLP is a registered valuer entity under the Section 247 of the Companies Act, 2013 registered with the Insolvency and Bankruptcy Board of India having Registered Valuer Entity No. IBBI/RV-E/05/2019/110.

- We declare that:
  - We are competent to undertake the financial valuation in terms of the SEBI InvIT Regulations;
  - We are an independent registered valuer entity and have prepared the Report on a fair and unbiased basis; and
  - We have at least two partners/ directors having experience of 5 years each in the valuation of infrastructure assets.

- The Valuation Date considered for the Enterprise Valuation of SPV is 31st July 2022. Valuation analysis and results are specific to the Valuation date. A valuation of this nature involves consideration of various factors including the financial position of the SPV as at the Valuation Date, trends in the equity stock market and fixed income security market, macro-economic and industry trends, etc.

- We have carried out additional scope of work as per schedule V of SEBI InvIT Regulations (Refer para 8.2 for further details).

- This Report covers the disclosures required as per the SEBI InvIT Regulations and the Valuation of the SPV is impartial, true and fair and in compliance with the SEBI InvIT Regulations.

3. Assumptions and Limiting Conditions

3.1. This Report, its contents and the results herein are specific to (i) the purpose of valuation agreed as per the terms of our engagement; (ii) the date of this Report; (iii) Traffic Study and Technical Due Diligence Reports for the Specified Projects by independent consultants, and (iv) Business plan/ Projected financial statements of the SPV and other information provided by/ on behalf of the Management and information obtained from public domain/ subscribed databases till 29th August 2022.

3.2. While our work has involved an analysis of financial and other information provided by/ on behalf of the Management, our engagement does not include an audit in accordance with generally accepted auditing standards of the SPV existing business records. We have not carried out any independent technical evaluation or appraisal or due diligence of the assets or liabilities of the SPV. Accordingly, we assume no responsibility and make no representations with respect to the accuracy or completeness of any information provided by/ on behalf of the Management. Our Report is subject to the Scope, Assumptions and Limitations detailed hereinafter. As such the Report is to be read in totality, and not in parts, in conjunction with the relevant documents referred to herein and in the context of the purpose for which it is made.

3.3. The valuation of companies and businesses is not a precise science and the conclusions arrived at in many cases will be subjective and dependent on the exercise of individual judgment. There is, therefore, no indisputable single value and we normally express our opinion on the value as falling within a likely range, considering the purpose and requirement of this engagement, we have provided a single value. While we have provided our opinion on the fair value of the SPV based on the information made available to us and within the scope and constraints of our engagement, others may have a different opinion.

3.4. A valuation of this nature is necessarily based on stock market, financial, economic and other conditions in general and industry trends in particular prevailing as on the Valuation date and the information made available to us as of the date hereof. Events occurring after the Valuation date may affect this Report and the assumptions used in preparing it, and we do not assume any obligation to update, revise or reaffirm this Report.

3.5. In the course of valuation, we were provided with both written and verbal information as mentioned in the Section 4. We have analysed the information provided to us by/ on behalf of the Management through broad inquiry, analysis and review but have not carried out a due diligence or audit of the information provided for the purpose of this engagement. We have assumed that no information has been withheld that could have influenced the purpose of our Report.

3.6. Valuation may be based on estimates of future financial performance or opinions that represent reasonable expectations at a particular point in time. However, we do not provide assurance on the achievability of the results projected by the Management as events and circumstances do not occur as expected and differences between actual and expected results may be material. We express no

opinion as to how closely the actual results will correspond to those projected as the achievement of the projected results is inter-alia dependent on actions, plans and assumptions of the Management and macro-economic and other external factors which are beyond the control of the Management.

3.7. Our valuation is primarily from a business perspective and does not take into account various legal and other corporate structures beyond the limited information provided to us by the Investment Manager. The value conclusion is not intended to represent the value at any time other than the Valuation Date that is specifically stated in the Report.

3.8. We have also relied on the data from external sources to conclude the valuation. These sources are believed to be reliable and therefore, we assume no liability for the truth or accuracy of any data, opinions or estimates furnished by others that have been used in this analysis. Where we have relied on data, opinions or estimates from external sources, reasonable care has been taken to ensure that such data has been correctly extracted from those sources and/ or reproduced in its proper form and context.

3.9. The actual price achieved in case of a transaction may be higher or lower than our estimate of value depending upon the circumstances and timing of the transaction, the nature of the business and other relevant factors. The knowledge, negotiating ability and motivation of the buyers and sellers and the applicability of a discount or premium for control will also affect actual market price achieved. Accordingly, our valuation conclusion will not necessarily be the price at which any agreement proceeds. The final transaction price is something on which the parties themselves have to agree considering *inter-alia* their own assessment of the Transaction and inputs from other advisors.

3.10. This Report has been prepared for the sole use by the Investment Manager / Trust / Sponsor in connection with the purpose stated herein. It is inappropriate to use this Report for any purpose other than the purpose mentioned herein. This restriction does not preclude the Investment Manager from providing a copy of the Report to its third-party advisors whose review would be consistent with the intended use. Our Report may be disclosed in connection with any statutory and regulatory filing in connection with the Transaction and in accordance with the provision of SEBI InvIT Regulations. Further, the Report and summary of valuation included herein can be reproduced and included in the Draft placement memorandum and final placement memorandum, which may be filed with the SEBI. We shall not assume any responsibility to any third party to whom the Report is disclosed or otherwise made available.

3.11. The Report assumes that the SPV complies fully with relevant laws and regulations applicable in its area of operations and usage unless otherwise stated, and that they will be managed in a competent and responsible manner. Further, unless specifically stated to the contrary, this Report has given no consideration to matters of a legal nature, including issues of legal title and compliance with local laws, and litigations and other contingent liabilities that are not recorded/ reflected in the financial statements provided to us.

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3.12. 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, it should be noted that the Report is not a substitute for the third party's own due diligence/ appraisal/ enquiries/ independent advice that the third party should undertake for his purpose.

3.13. In the particular circumstances of this case, our liability (in contract or under statute or otherwise) for any economic loss or damage arising out of or in connection with this engagement, irrespective of the quantum of loss or damage caused, shall be limited to the amount of fees actually received by us from the Investment Manager, as laid out in the engagement letter, for such valuation work.

3.14. In rendering this Report, we have not provided any legal, regulatory, tax, accounting or actuarial advice and accordingly we do not assume any responsibility or liability in respect thereof.

3.15. This Report does not look into the business/ commercial reasons behind the acquisition of the Specified Projects by the SPV nor the likely benefits arising out of the same. Similarly, it does not address the relative merits of investing in an infrastructure trust as compared with any other alternative business transaction, or other alternatives, or whether or not such alternatives could be achieved or are available.

3.16. We are not advisors with respect to legal tax and regulatory matters for the SPV. No investigation of the SPV 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 is closed in the accounts. Therefore, no responsibility is assumed for matters of a legal nature.

3.17. The scope of work has been limited both in terms of the areas of the business and operations which have been reviewed. 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.

3.18. The outbreak of the Novel Coronavirus ("COVID-19"), declared by the World Health Organization as a "Global Pandemic" on 11th March 2020 and second wave of the same in April 2021, has adversely affected the Global and Indian economy. The third wave on account of Omicron hit India in January 2022. Travel restrictions implemented by many countries has affected the economic activities. Governments have announced various measures to combat COVID 19 pandemic and to support the economic and business activities. Though economic recovery is being witnessed in India coupled with the Government's vaccination efforts and fall in covid cases, with many countries declaring the same as common flu. There are still significantly higher uncertainties in the near to medium term. Considering the unprecedented set of circumstances, Value analysis is reported on the basis of 'material valuation uncertainty' and accordingly less certainty and a higher degree of caution should be attached to the Value Analysis than would normally be the case. It may be noted that the estimated value may change significantly and unexpectedly over a relatively short period of time based on the evolving conditions/ uncertainties on account of COVID 19 pandemic.

3.19. RBSA is not aware of any contingent, commitment or material issue, besides the information disclosed in the audited financial statements and additionally provided by the Investment Manager / Management which has been presented in this Report, which could materially affect the SPV economic environment and future performance and therefore, the fair value of their businesses.

3.20. We have no present or planned future interest in the Trustee, Investment Manager, the Sponsor or the SPV and the fee for this Report is not contingent upon the values reported herein. Our valuation analysis should not be construed as investment advice; specifically, we do not express any opinion on the suitability or otherwise of entering into any financial or other transaction.

3.21. We have relied upon the representations of the Management in respect of the information provided by them. We shall not be liable for any loss, damages, cost or expenses arising from fraudulent acts, misrepresentations, or willful default on part of the Investment Manager, the SPV, their directors, employee or agents.

- **Limitation of Liabilities**
  - It is agreed that, having regard to RBSA's interest in limiting the personal liability and exposure to litigation of its personnel, the Investment Manager, the Sponsor, the Trust or the Trustee will not bring any claim in respect of any damage against any of RBSA's personnel.
  - In no circumstances, RBSA 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 RBSA the likelihood of such damages. Any decision to act upon the Report is to be made by the Investment Manager and no communication by RBSA should be treated as an invitation or inducement to engage the Investment Manager to act upon the Report.
  - In the particular circumstances of this case, our liability (in contract or under statute or otherwise) for any loss or damage caused, shall be limited to the amount of fees actually received by us, as laid out in the engagement letter, for such valuation work.
  - It is clarified that the Sponsor and the Trust 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.
  - RBSA will not be liable if any loss arises due to the provision of false, misleading or incomplete information or documentation by the Investment Manager, the Sponsor, the Trust or the Trustee.

4. Sources of Information

For the purpose of undertaking this valuation exercise, we have relied on the following sources of information provided by/ on behalf of the Management:

- Concession Agreements for the Specified Projects entered into between the SPV and NHAI;
- Reports of independent consultants appointed by the Investment Manager for Traffic study and estimation of toll revenue for the duration of the concession period for each of the Specified Projects of the SPV ("Traffic Study Reports");
- Reports of independent consultants appointed by the Investment Manager for Technical Due Diligence study to estimate the operating and maintenance expenses and major maintenance expenses for the duration of the concession period for each of the Specified Projects of the SPV ("Technical Reports");
- Provisional/ unaudited Income Statement and Balance Sheet of the SPV for the period from 1st April 2022 to 31st July 2022;
- Projected financial statements of the SPV for the remaining concession period from 1st August 2022 to 15th December 2051 (FY2023 – FY2052), which the Management expects to be their best estimate of the expected performance of the SPV encompassing the Specified Projects ("Management Projections");
- Discussions with the Management to inter-alia understand expected future performance of the SPV, key value drivers and other factors affecting the business of the SPV;
- Management representation letter with respect to mandatory disclosures required by SEBI; and
- Capital IQ's database of publicly traded companies.

We have also obtained the explanations, information and representations, which we believed were reasonably necessary and relevant for our exercise from the Management.

5. Procedures

We have carried out the Enterprise Valuation of the SPV, to the extent applicable, in accordance with ICAI Valuation Standards, 2018 ("ICAI VS") issued by the Institute of Chartered Accountants of India.

We have adopted the following procedures for carrying out the valuation analysis:

- Considered the key terms of Concession Agreements;
- Analysis of the Management Projections;
- Considered the Traffic Study Reports and Technical Due Diligence Reports;
- Analysis of the key economic and industry factors which may affect the valuation of the SPV;
- Analysis of the financial performance (Profit & Loss Statement) of the SPV over the period from 1st April 2022 to 31st July 2022;
- Analysis of the financial position (balance sheet) of the SPV as of 31st July 2022;
- Analysis of the information available in public domain/ subscribed databases in respect of the comparable companies/ comparable transactions, as considered relevant by us;
- Selection of valuation approach and valuation methodology/(ies), in accordance with ICAI VS, as considered appropriate and relevant by us;
- Analysis of other publicly available information, as considered relevant by us; and
- Determination of Enterprise Value and Equity Value of the SPV.

6. Industry Overview

Road Infrastructure in India

- India has the second largest road network in the world, spanning a total of ~ 6.4 million kilometers ("kms"). This comprises National Highways, Expressways, State Highways, Major District Roads, Other District Roads and Village Roads as under:

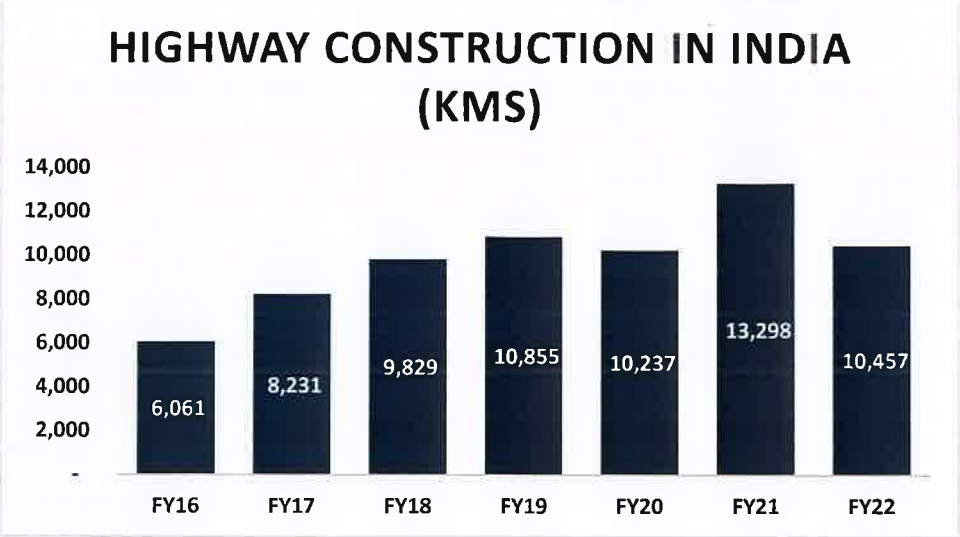
Particulars	In kms	% share
National Highways	140,995	2%
State Highways	171,039	3%
Other Roads	6,059,813	95%
Total	6,371,847	

Source: IBEF March 2022 Report

- This road network transports ~64.5 per cent of all goods in the country and ~90 per cent of India's total passenger traffic uses road network to commute. Road transportation has gradually increased over the years with improvement in connectivity between cities, towns, and villages in the country.

Strong momentum in expansion of roadways

- In FY22, the Ministry of Road Transport and Highways constructed national highways extending ~10,457 kms.
- To transform road infrastructure in Punjab, Haryana and Rajasthan, the Indian government has planned to construct roads for INR 11,000 crore (US$ 1.48 billion).
- The Ministry of Road Transport & Highways extended certain relief measures provided earlier in view of the second COVID-19 wave. The central government sanctioned >INR 600 crore (US$ 81 million), of the Central Road and Infrastructure Fund ("CRIF"), for construction of 42 roads and bridges in Uttarakhand.
- Odisha has completed 62,192 kms of roads under the Pradhan Mantri Gram Sadak Yojana ("PMGSY") programme, making it one of the highest performing states in construction of rural roads.
- GOI aims to construct ~18,000 km of National Highways in FY2022-23 at record speed of ~50km per day.



Source: IBEF March 2022 Report & Make in India portal

Growth Drivers

Growing Demand
- Rise in two and four wheeler population
- Increasing freight traffic
- Strong trade and tourist flows between states

Policy Support
- Greater Government focus on infrastructure
- Standardised processes for bidding and tolling and clear policy framework
- Tax SOPS, FDI,FII Encouragement

Increasing Investment
- In the Union Budget 2022-23, INR 1,99,108 Crore was allocated to MorTH.
- **100% rebate on income tax** for 10 consecutive years, out of the first 20 years of a project Under **Section 80 IA.**
- NHAI is permitted to participate with up to 30% of the equity component in **BOT projects.**
- **NHAI bonds** have been exempted from Capital gains tax.

Source: IBEF March 2022 Report

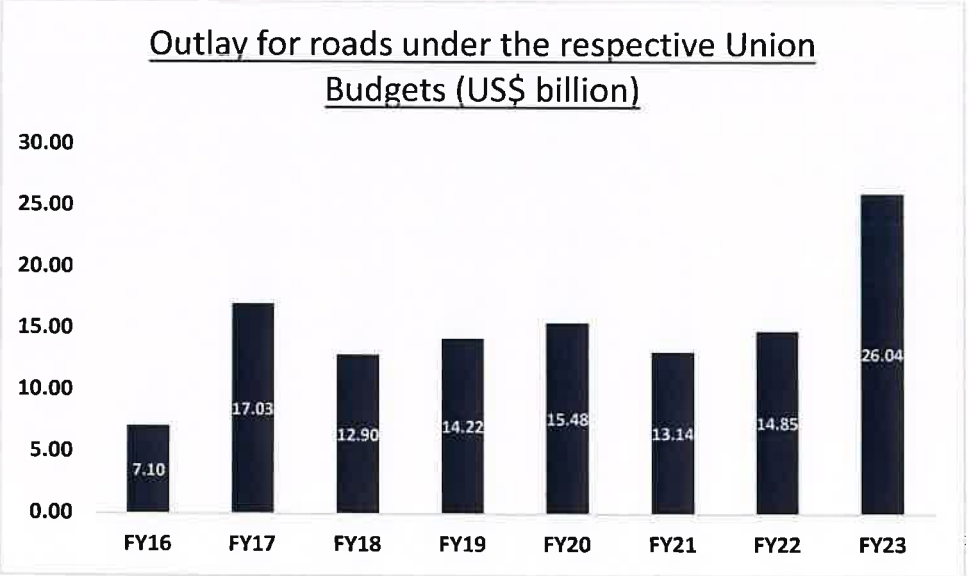
Future growth prospects

- In December 2021, the government set a highway monetization target of INR 2 trillion (US$ 26.20 billion) for the next 3 years.
- In October 2021, the Indian government announced five road projects in Ladakh, measuring 255 kms in length, to boost connectivity in the region.
- In August 2021, Union Minister of Road Transport and Highways, Mr. Nitin Gadkari, announced to launch 1,080-km (road construction) projects worth INR 25,370 crore (US$ 3.4 billion) under the Bharatmala Pariyojana—the ambitious road and highways project that aims to build highways from Maharashtra, Gujarat, Rajasthan, Punjab, Haryana and then cover the entire string of Himalayan territories.

- In 2018, the Indian government announced its plan to construct the Delhi-Mumbai Express Highway (extending 1,380 kms), to improve connectivity from Delhi to Mumbai, covering states such as Haryana, Rajasthan, Gujarat and Madhya Pradesh. As of September 2021, contracts for >1,200 kms have been awarded. The estimated cost to construct the Delhi-Mumbai Express Highway is INR 98,000 crore (US$ 13.08 billion).
- NHAI is planning to raise Rs 40,000 crore (US$ 5.72 billion) to monetize its highway assets through Infrastructure Investment Trust.

Highlights of Union Budget 2022-23

- The Government has allocated INR 1,99,108 crore for Ministry of Road Transport and Highways – which is ~68.0% higher than last year's budget allocation.
- The Government plans to complete 25,000 Kilometers of National Highways.
- In July 2021, the Union Minister for Road Transport and Highways, Mr. Nitin Gadkari, laid the foundation stone for 16 National Highway projects in Manipur. These projects will cost US$ 556.67 million to build and will cover a total distance of 298 kms.
- To transform road infrastructure in Punjab, Haryana and Rajasthan, the Indian government has planned to construct roads extending 313 kms for INR 11,000 crore (US$ 1.48 billion).

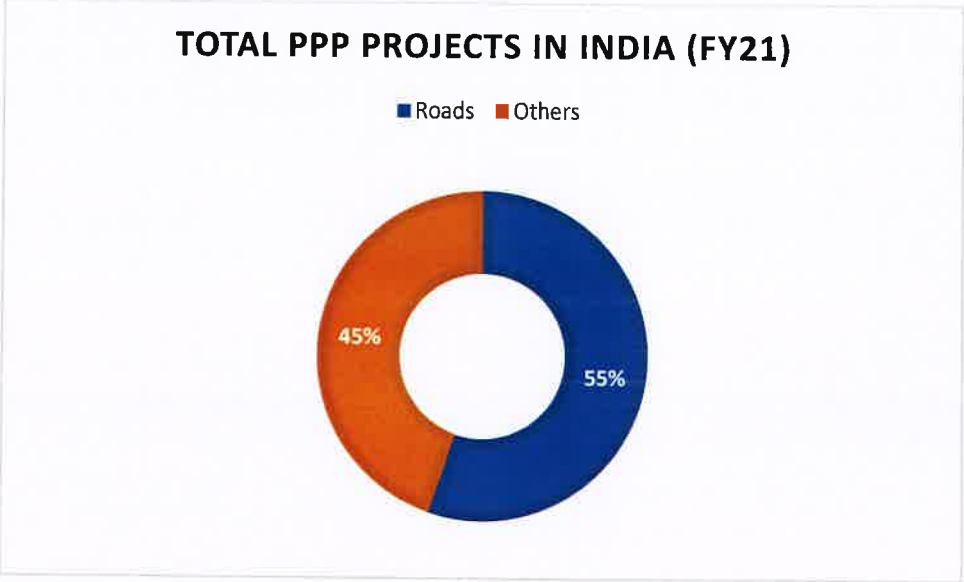


Source: IBEF Road Report March 2022

Private Sector Participation: -

- During the year 2020–21, 125 PPP projects (Including 69 road projects) with a total cost of Rs 1,72,314 crore were appraised.
- NHAI targeted 450 kilometers of the Build–operate–transfer (BOT) projects in FY22 and was looking forward to bidding out 600-1000 kilometers of highway stretch under the Build–operate–transfer (BOT) model as of November 2021.

- In August 2020, the Government of India revised the Model Concession Agreement for BOT projects to plug delays by imposing a deadline on the NHAI and incentivizing timely work by concessionaires. According to revised norms, the NHAI will have to hand over 90% of the project land (vacant and ready to build) to private developers, thus creating a more market-friendly sector and attracting more private players.
- In November 2020, L&T Construction bagged a contract to build India's longest river bridge, across Brahmaputra River connecting Dhubri in Assam to Phulbari in Meghalaya.
- KKR, a global investment firm, announced to acquire the entire stake of Global Infrastructure Partners in Highway Concessions One (HC1) and seven other highway assets totaling 487 kms.



(Source: IBEF Road Report March 2022 & Niti Aayog)

Government initiatives: -

1. **National Infrastructure Pipeline (NIP)**

   The government's ambitious National Infrastructure Pipeline which is to be implemented untill FY25 is an attempt undertaken by the centre to facilitate economic revival by relying on infrastructure creation. The NIP covers a gamut of sectors, rural and urban infrastructure as well and entails investments to the tune of INR 111 Lakh Crores to be undertaken by the central government, state governments and the private sector. The Roads sector is expected to account for 18% capital expenditure over FY2019-25.

2. **Bharatmala Pariyojana (BMP) – Phase I**

   Bharatmala Pariyojana is a 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 expressways.

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- A total of around 24,800 kms are being considered in Phase I. In addition, Phase I also includes 10,000 kms of balance road works under NHDP. Estimated outlay for Phase I is ~ INR 5.35 lakh Crores spread over 5 years.
- Summary of Phase 1 Components and approved outlay of for the same are as follows: -

Sr. No.	Components	Length (Km)	Outlay (INR crore)
1	Economic corridors development	9,000	120,000
2	Inter- corridors & feeder roads	6,000	80,000
3	National Corridors Efficiency Improvement	5,000	100,000
4	Border and International Connectivity	2,000	25,000
5	Coastal and port connectivity roads	2,000	20,000
6	Expressways	800	40,000
Total		24,800	385,000
7	Balance Road works under NHDP	10,000	1,50,000
Total			5,35,000

Source: MorTH Website

NHAI will consider only those projects that require minimal land acquisition worth INR 3 trillion under Bharatmala Pariyojana Scheme. A total of 65,000 kms of roads and highways are to be constructed under Bharatmala Pariyojana.

3. Gati Shakti – National Master Plan

India's Gati Shakti program 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). The main aim of this program is a faster approval process which can be done through the Gati Shakti portal and digitized the approval process completely.

4. Taxes and Other Sops

Companies enjoy 100% tax exemption in road projects for 5 years and 30% relief over the next 5 years.

5. Rural Development

Under the Union Budget 2022-23, the Government of India has allocated INR 19,000 crores for Pradhan Mantri Gram Sadak Yojana (PMGSY). As per the Union Budget 2019-20, 30,000 Km of PMGSY roads were built using green technology, waste plastic and cold mix technology, thereby reducing carbon footprint.

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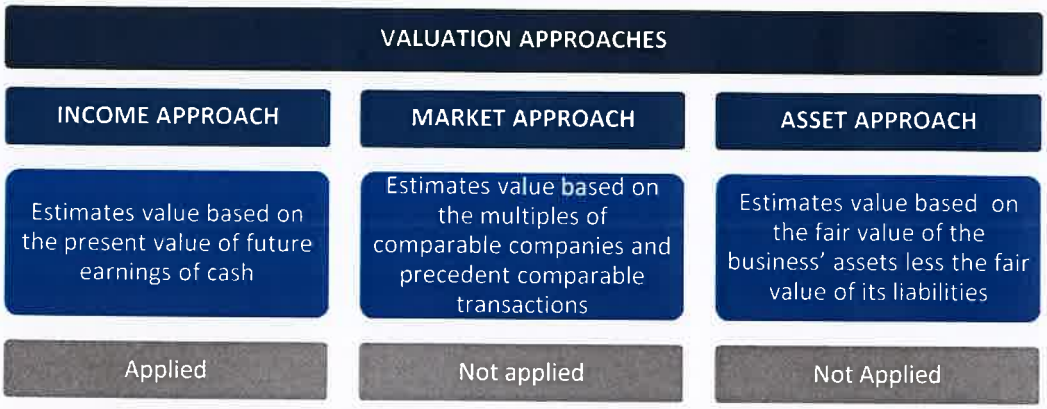
7. Valuation Approach and Methodology



Basis and Methodology of Valuation

- **Basis of Valuation**

  It means the indication of the type of value being used in an engagement. Fair Value as per ICAI VS defined as under:

  "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."

  Fair value basis has been adopted for enterprise valuation of the SPV

- **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 *inter-alia* due to changes in the condition of the asset to be valued and market parameters. 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 SPV is 31st July 2022. The attached Report is drawn up by reference to accounting and financial information as on 31st July 2022.

- **Premise of Value**

  Premise of Value refers to the conditions and circumstances how an asset is deployed. In the present case, we have determined the fair enterprise value of the SPV on a Going Concern Value defined as under:

  "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, the necessary licenses, systems, and procedures in place, etc."

Approach & Method	Applied/Not Applied	Description	Rationale
Income Approach Discounted Cash Flow Method (DCF)	Applied	▪ In the DCF method under the Income approach, forecast cash flows are discounted back to the Valuation date, estimating a net present value of the cash flow stream of the business. A terminal value at the end of the explicit forecast period is then determined and that value is also discounted back to the Valuation date to give an overall value for the business ▪ A discounted cash flow methodology typically requires the forecast period to be of such a length to enable the business to achieve a stabilized level of earnings, or to be reflective of an entire operation cycle for more cyclical industries ▪ The rate at which the future cash flows are discounted (the "discount rate") should reflect not only the time value of money, but also the risk associated with the business' future operations. The discount rate most generally employed is Weighted Average Cost of Capital ("WACC") or Cost of Equity (Ke), reflecting an optimal as opposed to actual financing structure	• Management has provided financial projections of the SPV, which represents their best estimate of the expected performance of the SPV for the balance tenor of their respective Concession period. Considering the aforementioned, DCF method has been adopted to estimate the enterprise value of the SPV.
Market Approach • Market Price Method	Not Applied	▪ Under this method, the value of a company is arrived at considering its market price over an appropriate period.	▪ As the SPV is not listed, this method is not applied
Market Approach • Comparable Companies Multiples ("CCM") Method	Not Applied	▪ Under Comparable Companies Method, the value of shares / business of a company is determined based on market multiples of publicly traded comparable companies. Although no two companies are entirely alike, the companies selected as comparable companies should be	▪ The SPV is operational and do not have project implementation risk. Further, the projected income and cash flows of the SPV primarily depends on the key terms of the respective concession agreements, residual tenor, project-

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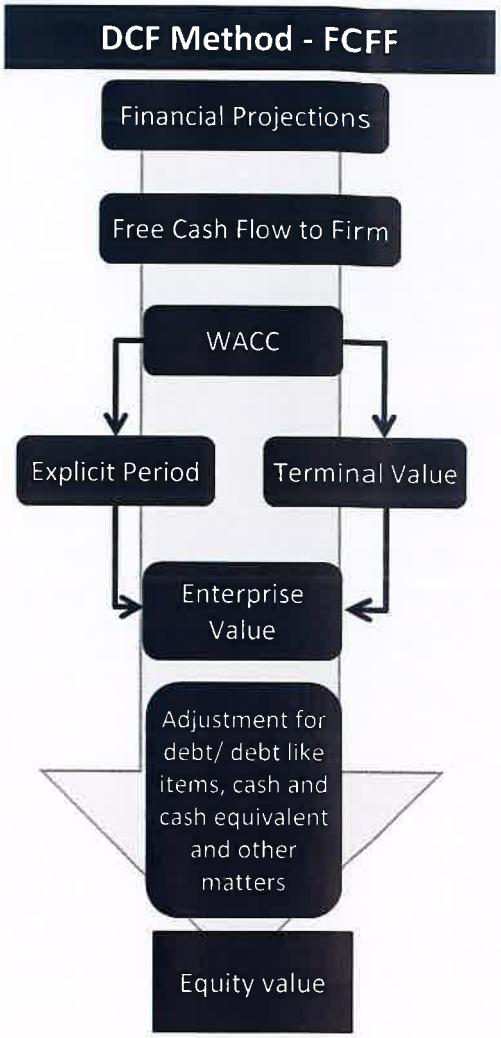
Approach & Method	Applied/Not Applied	Description	Rationale
		engaged in the same or a similar line of business as the subject company. ▪ The appropriate multiple is generally based on the performance of listed companies with similar business models and size.	specific characteristics/ factors, etc. which may differ from the other projects. Accordingly, this method is not adopted.
Market Approach • Comparable Transaction Multiples ("CTM") Method	Not Applied	▪ Under Comparable Transaction Multiples Method, the value of shares /business of a company is determined based on market multiples of publicly disclosed transactions in the similar space as that of the subject company ▪ Multiples are generally based on data from recent transactions in a comparable sector, but with appropriate adjustment after consideration is given to the specific characteristics of the business being valued	▪ The projected income and cash flows of the SPV primarily depend on the key terms of the respective concession agreements, residual tenor, project-specific characteristics/ factors, etc. which may differ from the other projects. We have not adopted this methodology due to unavailability of information in public domain involving recent transactions in similar projects
Asset based Approach • Adjusted Net Asset Value Method	Not Applied	▪ Under the Adjusted Net Asset Value Method, a Valuation of a 'going concern' business is computed by adjusting the assets and liabilities to the fair market value as of the date of the Valuation. ▪ A net asset value methodology is typically most appropriate when: ▪ Valuing a holding company or a capital-intensive company. ▪ Losses are continually generated by the business; or ▪ Valuation methodologies based on a company's net income or cash flow levels indicate a value lower than its adjusted net asset value.	▪ The SPV has entered into concession agreements and are expected to make the operating profits. In such a scenario, the true worth of the business is reflected in its future earning capacity rather than the historical cost of the project. The valuation of the SPV is carried out on a 'going concern value' premise. Since the Net Asset value does not capture the future earning potential of the businesses, we have not adopted the Asset approach for the valuation of the SPV.

Income Approach

The Income Approach is widely used for valuation under "Going Concern Value" premise. It focuses on the income generated by a company in the past as well as its future earning capability.

Discounted Cash Flow ("DCF") Method

- Under the DCF method, the business is valued by discounting its free cash flows for the explicit forecast period and the perpetuity value thereafter.
- Free Cash Flows to Firm ("FCFF") under the DCF method has been applied for estimating the enterprise value of the SPV.
- FCFF represent the cash available for distribution to both, the owners and creditors of the business. FCFF for the explicit period and perpetuity value is discounted by the Weighted Average Cost of Capital ("WACC") to derive the net present value. The WACC is an appropriate rate of discount to calculate the present value of the future cash flows as it considers equity–debt risk by incorporating debt–equity ratio of the firm.
- Enterprise Value ("EV") is derived by aggregating the present value of FCFF for the balance tenor of the Concession Agreement ("Explicit period") and Terminal value at the end of the Explicit period.
- Terminal value is estimated based on the business' potential for further growth beyond the Explicit period. Considering *inter-alia* estimated economic life of the projects and terms of the Concession Agreement, Terminal value has been estimated considering release of net working capital, at the end of the Explicit period.
- The Enterprise Value of the SPV have been determined as an aggregate of the present value of FCFF for the Explicit period and Terminal value.



Weighted Average Cost of Capital (WACC)

WACC has been estimated as under:

Particulars	Definition/Formula
WACC	Ke * (E/ (D + E)) + Kd * (1-T) * (D/(D + E))
Where:	
Ke	cost of equity
E	market value of equity
Kd	cost of debt
D	market value of debt
T	effective tax rate

The cost of equity is derived using the Capital Asset Pricing Model ("CAPM") as follows:

Particulars	Definition/Formula
Ke	Rf + ß * (Rm – Rf) + α
Where:	
Rf	the return on risk-free assets
Rm	the expected average return of the market
(Rm – Rf)	the average risk premium above the risk – free rate that a "market" portfolio of assets is earning
ß	the beta factor, being the measure of the systematic risk of a particular asset relative to the risk of a portfolio of all risky assets
α	Company specific risk factor (alpha), if any

A summary of WACC for the Specified Projects is appended as per **Appendix 1**.

8. Valuation of NHIPPL

8.1. Key underlying assumptions as provided by the Management are as follows:

We have carried out the Enterprise and Equity Valuation of the SPV as of 31st July 2022, considering *inter-alia* the latest Traffic Study Reports and Technical Due Diligence Study Reports of independent consultants, Business plan/ Projected financial statements of the SPV and other information provided by/ on behalf of the Management, industry analysis and other relevant factors. Management Projections considered for valuation of the SPV as at 31 July 2022 are in line with the financial projections which were considered for the valuation of the SPV as at 31 March 2022. Key assumptions underlying operating revenue, O&M expenses and MMR expenses for the financial projections as at March 31, 2022 were based of Traffic study reports and Technical Due Diligence reports of independent consultants appointed by the Investment manager. As per the Management no material change is expected in the key assumptions underlying the financial projections between 31 March 2022 and 31 July 2022.

- **Operating Revenue:** Operating revenue for the Specified Projects for the period from 1st August 2022 until 15th December 2051 (the "Projected Period") have been estimated by the Management considering the Traffic Study reports of independent traffic consultants appointed by NHIIMPL.

- **Operational and Maintenance Expenses (Routine maintenance):** O&M expenses for the Projected Period have been estimated by the Management considering the technical due diligence study reports of independent technical consultants appointed by NHIIMPL.

- **Major Maintenance & Repair Expenses (MMR / Periodic maintenance):** Periodic maintenance expenses are costs that are incurred to bring the road asset back to an earlier condition or to keep the road asset operating at its present condition. MMR expenses for the Projected Period have been estimated by the Management considering the technical due diligence study reports of independent technical consultants appointed by NHIIMPL.

- **Project Management (PM) Expenses:** PM expenses are being paid by NHIT to the Project Manager for management of all the toll road projects. These expenses have been estimated by the Management considering the PM agreement between NHIT and the Project Manager.

- **Insurance Expenses:** Insurance expenses for the Projected Period have been estimated by the Management considering the technical due diligence study reports of independent technical consultants appointed by NHIIMPL.

- **SPV Costs:** The Management has estimated the base year cost at INR 4.56 crores for each project and considered a 7.5% annual escalation thereafter. For the financial year post capacity augmentation, the cost has been assumed to increase by 150.0%.

- **Depreciation and Amortization**: Service Concession License to collect toll has been amortized over the period of concession.

- **Taxes:** Income taxes have been estimated considering, as appropriate, brought forward business losses and unabsorbed depreciation, tax depreciation/ amortisation policy followed by the SPV and the corporate income tax rate of 25.17%.

- **Capital Expenditure:** Initial construction expenses estimated to be incurred over the first 2 years of the Projected Period have been provided by the Management. There will be no further capital expenditure in the Projected Period. We have relied on the projections provided by the Management.

- **Working Capital:** Considering the nature of the business of operating toll road projects, the working capital requirement for the Projected Period has been estimated basis the net working capital position as of 31st March 2022 as a percentage of revenue which is around 0.01%.

8.2. Specified Projects of NHIPPL

8.2.1. Palanpur (Gujarat) to Abu Road (Rajasthan) ("PLN-ABU")

8.2.1.1. Project Overview

Parameters	Details
Project Name	NH27 (NH14) Palanpur/Khemana – Abu Road (Stretch 3)
Length of the project	45.00 kms
Toll Plaza Location	Khemana

Source: Information provided by the Management

8.2.1.2. Additional Procedures to be complied with in accordance with InvIT regulations

A. List of one-time sanctions/approvals which are obtained or pending:

The Investment Manager has confirmed that there are no Key Changes in the status of one-time sanctions/approvals since 31st March 2022 as reported in the full valuation report dated 30th May 2022.

B. List of up to date/ overdue periodic clearances:

The Investment Manager has confirmed that there are no Key Changes in the status of periodic clearances since 31st March 2022 as reported in the full valuation report dated 30th May 2022.

C. Estimates of already carried out as well as proposed major repairs and improvements along with estimated time of completion:

Historical Major Maintenance Expenses (INR Cr): Nil since the implementation date (16th December 2021) until 31st July 2022

Forecasted Major Maintenance Expenses (INR Cr):

Particulars for the year/ period ended	FY2023	FY2024	FY2025	FY2026	FY2027	FY2028	FY2029	FY2030
Major Maintenance Expenses	-	-	-	-	-	62.47	-	-

Particulars for the year/ period ended	FY2031	FY2032	FY2033	FY2034	FY2035	FY2036	FY2037
Major Maintenance Expenses	-	-	-	-	-	-	100.55

Particulars for the year/ period ended	FY2038	FY2039	FY2040	FY2041	FY2042	FY2043	FY2044
Major Maintenance Expenses	-	-	-	-	-	130.55	-

Particulars for the year/ period ended	FY2045	FY2046	FY2047	FY2048	FY2049	FY2050	FY2051	FY2052
Major Maintenance Expenses	-	-	-	-	162.72	-	-	153.37

Source: Information provided by the Management

D. On-going material litigations including tax disputes and claims in relation to the assets, if any;
As represented by the Management, there are no litigations pending as at 31st July 2022.

E. Revenue pendencies including local authority taxes associated with InvIT asset and compounding charges, if any
As represented by the Management, there are no revenue pendencies including local authority taxes associated or compounding charges for this project as at 31st July 2022.

F. Vulnerability to natural or induced hazards that may not have been covered in town planning building control.
As represented by the Management, any natural or induced hazards is adequately covered by insurance.

G. Physical Inspection
No Physical inspection has been carried out for this valuation.

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8.2.2. Abu Road (Rajasthan) to Swaroopganj (Rajasthan) ("ABU-SWA")

8.2.2.1. Project Overview

Parameters	Details
Project Name	NH27 (NH14) Aburoad - Swaroopganj (Stretch 1)
Length of the project	31.00 kms
Toll Plaza Location	Undavariya

Source: Information provided by the Management

8.2.2.2. Additional Procedures to be complied with in accordance with InvIT regulations

A. List of one-time sanctions/approvals which are obtained or pending:

The Investment Manager has confirmed that there are no Key Changes in the status of one-time sanctions/approvals since 31st March 2022 as reported in the full valuation report dated 30th May 2022.

B. List of up to date/ overdue periodic clearances:

The Investment Manager has confirmed that there are no Key Changes in the status of periodic clearances since 31st March 2022 as reported in the full valuation report dated 30th May 2022.

C. Estimates of already carried out as well as proposed major repairs and improvements along with estimated time of completion:

Historical Major Maintenance Expenses (INR Cr): Nil since the implementation date (16th December 2021) until 31st July 2022

Forecasted Major Maintenance Expenses (INR Cr):

Particulars for the year/ period ended	FY2023	FY2024	FY2025	FY2026	FY2027	FY2028	FY2029	FY2030
Major Maintenance Expenses	-	-	-	-	-	58.79	-	-

Particulars for the year/ period ended	FY2031	FY2032	FY2033	FY2034	FY2035	FY2036	FY2037
Major Maintenance Expenses	-	-	-	-	-	85.62	-

Particulars for the year/ period ended	FY2038	FY2039	FY2040	FY2041	FY2042	FY2043	FY2044
Major Maintenance Expenses	-	-	-	-	102.72	-	-

Particulars for the year/ period ended	FY2045	FY2046	FY2047	FY2048	FY2049	FY2050	FY2051	FY2052
Major Maintenance Expenses	-	-	-	126.27	-	-	-	-

Source: Information provided by the Management

D. On-going material litigations including tax disputes and claims in relation to the assets, if any;
As represented by the Management, there are no litigations pending as at 31st July 2022.

E. Revenue pendencies including local authority taxes associated with InvIT asset and compounding charges, if any
As represented by the Management, there are no revenue pendencies including local authority taxes associated or compounding charges for this project as at 31st July 2022.

F. Vulnerability to natural or induced hazards that may not have been covered in town planning building control.
As represented by the Management, any natural or induced hazards is adequately covered by insurance.

G. Date of physical inspection
No Physical inspection has been carried out for this valuation.

8.2.3. Kothakota Bypass (Telangana) to Kurnool (Andhra Pradesh) ("KOT-KUR")

8.2.3.1. Project Overview

Parameters	Details
Project Name	NH44 (NH7) Stretch of Kothakota Bypass – Kurnool Highway (Stretch 4)
Length of the project	74.622 kms
Toll Plaza Location	Pullur

Source: Information provided by the Management

8.2.3.2. Additional Procedures to be complied with in accordance with InvIT regulations

A. List of one-time sanctions/approvals which are obtained or pending:
The Investment Manager has confirmed that there are no Key Changes in the status of one-time sanctions/approvals since 31st March 2022 as reported in the full valuation report dated 30th May 2022.

B. List of up to date/ overdue periodic clearances:
The Investment Manager has confirmed that there are no Key Changes in the status of periodic clearances since 31st March 2022 as reported in the full valuation report dated 30th May 2022.

C. Estimates of already carried out as well as proposed major repairs and improvements along with estimated time of completion:

Historical Major Maintenance Expenses (INR Cr): Nil since the implementation date (16th December 2021) until 31st July 2022

Forecasted Major Maintenance Expenses (INR Cr):

Particulars for the year/ period ended	FY2023	FY2024	FY2025	FY2026	FY2027	FY2028	FY2029	FY2030
Major Maintenance Expenses	-	-	-	-	-	-	172.19	-

Particulars for the year/ period ended	FY2031	FY2032	FY2033	FY2034	FY2035	FY2036	FY2037
Major Maintenance Expenses	-	-	-	-	-	-	-

Particulars for the year/ period ended	FY2038	FY2039	FY2040	FY2041	FY2042	FY2043	FY2044
Major Maintenance Expenses	237.56	-	-	-	-	-	298.70

Particulars for the year/ period ended	FY2045	FY2046	FY2047	FY2048	FY2049	FY2050	FY2051	FY2052
Major Maintenance Expenses	-	-	-	-	-	367.18	-	-

Source: Information provided by the Management

D. On-going material litigations including tax disputes and claims in relation to the assets, if any;
As represented by the Management, there are no litigations pending as at 31st July 2022.

E. Revenue pendencies including local authority taxes associated with InvIT asset and compounding charges, if any
As represented by the Management, there are no revenue pendencies including local authority taxes associated or compounding charges for this project as at 31st July 2022.

F. Vulnerability to natural or induced hazards that may not have been covered in town planning building control.
As represented by the Management, any natural or induced hazards is adequately covered by insurance.

G. Date of physical inspection
No Physical inspection has been carried out for this valuation.

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8.2.4. Belgaum (Karnataka) to Kagal (Karnataka) ("BEL-KAG")

8.2.4.1. Project Overview

Parameters	Details
Project Name	NH48 (Old NH4) Stretch of Belgaum – Maharashtra / Karnataka Border (Kagal) Highway (Stretch 5)
Length of the project	77.705 kms
Toll Plaza Location	Hattargi and Kognoli

Source: Information provided by the Management

8.2.4.2. Additional Procedures to be complied with in accordance with InvIT regulations

A. List of one-time sanctions/approvals which are obtained or pending:

The Investment Manager has confirmed that there are no Key Changes in the status of one-time sanctions/approvals since 31st March 2022 as reported in the full valuation report dated 30th May 2022.

B. List of up to date/ overdue periodic clearances:

The Investment Manager has confirmed that there are no Key Changes in the status of periodic clearances since 31st March 2022 as reported in the full valuation report dated 30th May 2022.

C. Estimates of already carried out as well as proposed major repairs and improvements along with estimated time of completion:

Historical Major Maintenance Expenses (INR Cr): Nil since the implementation date (16th December 2021) until 31st July 2022

Forecasted Major Maintenance Expenses (INR Cr):

Particulars for the year/ period ended	FY2023	FY2024	FY2025	FY2026	FY2027	FY2028	FY2029	FY2030
Major Maintenance Expenses	-	-	-	-	-	-	-	-

Particulars for the year/ period ended	FY2031	FY2032	FY2033	FY2034	FY2035	FY2036	FY2037
Major Maintenance Expenses	-	-	-	-	115.28	-	-

Particulars for the year/ period ended	FY2038	FY2039	FY2040	FY2041	FY2042	FY2043	FY2044
Major Maintenance Expenses	-	-	-	135.40	-	-	-

Particulars for the year/ period ended	FY2045	FY2046	FY2047	FY2048	FY2049	FY2050	FY2051	FY2052
Major Maintenance Expenses	-	-	174.03	-	-	-	-	197.69

Source: Information provided by the Management

D. On-going material litigations including tax disputes and claims in relation to the assets, if any;
As represented by the Management, there are no litigations pending as at 31st July 2022.

E. Revenue pendencies including local authority taxes associated with InvIT asset and compounding charges, if any
As represented by the Management, there are no revenue pendencies including local authority taxes associated or compounding charges for this project as at 31st July 2022.

F. Vulnerability to natural or induced hazards that may not have been covered in town planning building control.
As represented by the Management, any natural or induced hazards is adequately covered by insurance.

G. Date of physical inspection
No physical inspection has been carried out for this valuation.

8.2.5. Chittorgarh (Rajasthan) to Kota (Rajasthan) ("CHT-KOT")

8.2.5.1. Project Overview

Parameters	Details
Project Name	NH27 (NH76) Chittorgarh – Kota & Chittorgarh Bypass (Stretch 2)
Length of the project	160.500 kms
Toll Plaza Location	Bassi, Aroli and Dhaneshwar

Source: Information provided by the Management

8.2.5.2. Additional Procedures to be complied with in accordance with InvIT regulations

A. List of one-time sanctions/approvals which are obtained or pending:
The Investment Manager has confirmed that there are no Key Changes in the status of one-time sanctions/approvals since 31st March 2022 as reported in the full valuation report dated 30th May 2022.

B. List of up to date/ overdue periodic clearances:
The Investment Manager has confirmed that there are no Key Changes in the status of periodic clearances since 31st March 2022 as reported in the full valuation report dated 30th May 2022.

C. Estimates of already carried out as well as proposed major repairs and improvements along with estimated time of completion:

Historical Major Maintenance Expenses (INR Cr): Nil since the implementation date (16th December 2021) until 31st July 2022

Forecasted Major Maintenance Expenses (INR Cr):

Particulars for the year/ period ended	FY2023	FY2024	FY2025	FY2026	FY2027	FY2028	FY2029	FY2030
Major Maintenance Expenses	73.49	-	-	-	-	34.50	47.40	-

Particulars for the year/ period ended	FY2031	FY2032	FY2033	FY2034	FY2035	FY2036	FY2037
Major Maintenance Expenses	-	-	-	-	97.14	-	-

Particulars for the year/ period ended	FY2038	FY2039	FY2040	FY2041	FY2042	FY2043	FY2044
Major Maintenance Expenses	-	-	-	125.59	-	-	-

Particulars for the year/ period ended	FY2045	FY2046	FY2047	FY2048	FY2049	FY2050	FY2051	FY2052
Major Maintenance Expenses	-	-	154.38	-	-	-	-	183.36

Source: Information provided by the Management

D. On-going material litigations including tax disputes and claims in relation to the assets, if any;
As represented by the Management, there are no litigations pending as at 31st July 2022.

E. Revenue pendencies including local authority taxes associated with InvIT asset and compounding charges, if any
As represented by the Management, there are no revenue pendencies including local authority taxes associated or compounding charges for this project as at 31st July 2022.

F. Vulnerability to natural or induced hazards that may not have been covered in town planning building control.
As represented by the Management, any natural or induced hazards is adequately covered by insurance.

G. Date of physical inspection
No physical inspection has been carried out for this valuation.

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9. Valuation Conclusion

We have carried out the Enterprise and Equity Valuation of the SPV as of 31st July 2022, considering *inter-alia* Traffic Study and Technical Due Diligence Study Reports of independent consultants, Business plan/ Projected financial statements of the SPV and other information provided by/ on behalf of the Management, industry analysis and other relevant factors.

We understand from the Management that the capital expenditure of approximately INR 598 Crore to be incurred over FY2023 and FY2024 shall be borne by the SPV.

The Valuation summary of NHIPPL as of 31st July 2022 is as follows:

SPV	WACC	Enterprise Value (INR Cr)	Equity Value (INR Cr.)
National Highways Infra Projects Pvt. Ltd. (NHIPPL)	10.50%	7,757.76	1,524.63

Particulars	In INR cr.
Enterprise Value	**7,757.76**
Less: Debt	-6,276.16
Less: Debt like	-3.52
Add: Cash and cash equivalent	46.56
Equity Value	**1,524.63**

Appendices

Appendix 1 - WACC

Particulars		Remarks
Debt-to-equity Ratio	~ 1.00	Considering *inter-alia* typical funding pattern for road infrastructure projects and long-term debt-equity ratio and permissible leverage under the SEBI InvIT Regulations
Unlevered Beta – Industry	~ 0.45	Beta is a measure of the risk of the shares of a company. ß is the co-variance between the return on sample stock and the return on the market. In order to determine the appropriate beta factor for the Company, consideration must be given either to the market beta of the Company or betas of comparable quoted companies. Unlevered beta has been estimated based on the 5-year monthly beta of select comparable companies.
Cost of Equity (Ke)		
Risk Free Rate (Rfr)	~7.31%	Based on 10-year zero coupon yield curve for GoI securities as at 31st July 2022
Equity Market Risk Premium	~7.00%	Equity Market equity risk premium is estimated considering inter-alia historical equity market returns over a risk-free rate and forward-looking equity market risk premium estimates. Data sources reviewed generated a range of equity risk premium indications. However, a 7% equity market risk premium was considered reasonable representative of the equity risk premium for India.
Relevered Beta	~ 0.90	Considering *inter-alia* 5-year monthly beta of comparable companies and debt-to-equity ratio
Additional Risk Premium	~1.00%	Considering *inter-alia* nature of revenue of the Specified Projects (toll collection), projected performance of the SPV, macro-economic additional uncertainties due to Covid 19 pandemic and certain global events, partially offset by the operational nature of the Specified Projects.
Cost of Equity (Ke)	**~14.6%**	
Cost of Debt (Kd)		
Pre-Tax Cost of Debt (Kd)	~8.0%	Management estimate considering *inter-alia* prevailing interest rate as of 31st July 2022 at which the Trust has borrowed money from the consortium of three banks, impact of measures taken/ expected to be taken by the Reserve Bank of India to curtail inflationary pressures, etc.
Effective tax rate	~19.8%	Estimated considering *inter-alia* business losses and unabsorbed depreciation, tax depreciation/ amortisation policy followed by the SPV and corporate income tax rate
Post-Tax Cost of Debt (Kd)	**~ 6.4%**	
WACC	**10.50%**	
Rounded off WACC	**10.50%**	

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Appendix 2 – Discounted Cash Flow (DCF)

Enterprise & Equity Valuation of the SPV

Amount in INR Cr.

Financial Year		FY2023	FY2024	FY2025	FY2026	FY2027	FY2028	FY2029	FY2030	FY2031	FY2032
Months		8.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Revenue		356.7	593.6	720.1	836.8	897.8	970.6	973.7	1,023.9	1,071.7	1,191.5
Operating EBITDA before MMR Provisions		265.7	466.0	555.4	661.8	693.4	759.6	777.3	806.9	847.8	950.6
Less: IM Expenses		(7.5)	(12.1)	(13.0)	(14.0)	(15.1)	(16.2)	(17.4)	(18.7)	(20.1)	(21.6)
Less: Income Tax		-	-	-	-	-	-	-	-	-	-
Less: MMR Expenses		(73.5)	-	-	-	-	(158.7)	(223.8)	-	-	-
Less: Capital Expenditure		(299.0)	(299.0)	-	-	-	-	-	-	-	-
(Increase)/Decrease in Working Capital		(15.6)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Free Cashflows to Firm		**(129.9)**	**154.8**	**542.3**	**647.8**	**678.3**	**584.7**	**536.1**	**788.2**	**827.7**	**929.0**
Time to Midpoint		0.33	1.17	2.17	3.17	4.17	5.17	6.17	7.17	8.17	9.17
Discount Factor	10.50%	0.97	0.89	0.81	0.73	0.66	0.60	0.54	0.49	0.44	0.40
Discounted Cash Flow		**(125.6)**	**137.8**	**436.8**	**472.1**	**447.4**	**348.9**	**289.5**	**385.2**	**366.0**	**371.7**

Mid Point Working	31-Jul-22	31-Mar-23	31-Mar-24	31-Mar-25	31-Mar-26	31-Mar-27	31-Mar-28	31-Mar-29	31-Mar-30	31-Mar-31	31-Mar-32
Days		121.50	426.00	791.50	1,156.50	1,521.50	1,887.00	2,252.50	2,617.50	2,982.50	3,348.00
Time to Midpoint		**0.33**	**1.17**	**2.17**	**3.17**	**4.17**	**5.17**	**6.17**	**7.17**	**8.17**	**9.17**

Financial Year		FY2033	FY2034	FY2035	FY2036	FY2037	FY2038	FY2039	FY2040	FY2041	FY2042
Months		12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Revenue		1,345.4	1,520.2	1,653.3	1,798.8	1,945.1	2,106.7	2,279.6	2,475.8	2,669.1	2,881.8
Operating EBITDA before MMR Provisions		1,086.5	1,244.7	1,319.0	1,393.3	1,517.3	1,617.8	1,752.4	1,913.6	2,081.8	2,254.8
Less: IM Expenses		(23.3)	(25.0)	(26.9)	(28.9)	(31.1)	(33.4)	(35.9)	(38.6)	(41.5)	(44.6)
Less: Income Tax		-	(227.1)	(256.4)	(310.7)	(340.2)	(331.8)	(427.5)	(468.5)	(444.0)	(528.0)
Less: MMR Expenses		-	-	(216.4)	(87.2)	(102.5)	(242.1)	-	-	(265.9)	(104.7)
Less: Capital Expenditure		-	-	-	-	-	-	-	-	-	-
(Increase)/Decrease in Working Capital		(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Free Cashflows to Firm		**1,063.3**	**992.6**	**819.3**	**966.5**	**1,043.5**	**1,010.5**	**1,289.0**	**1,406.5**	**1,330.3**	**1,577.5**
Time to Midpoint		10.17	11.17	12.17	13.18	14.18	15.18	16.18	17.18	18.18	19.18
Discount Factor	10.50%	0.36	0.33	0.30	0.27	0.24	0.22	0.20	0.18	0.16	0.15
Discounted Cash Flow		**385.0**	**325.3**	**243.0**	**259.3**	**253.4**	**222.1**	**256.3**	**253.1**	**216.6**	**232.4**

Mid Point Working	31-Jul-22	31-Mar-33	31-Mar-34	31-Mar-35	31-Mar-36	31-Mar-37	31-Mar-38	31-Mar-39	31-Mar-40	31-Mar-41	31-Mar-42
Days		3,713.50	4,078.50	4,443.50	4,809.00	5,174.50	5,539.50	5,904.50	6,270.00	6,635.50	7,000.50
Time to Midpoint		**10.17**	**11.17**	**12.17**	**13.18**	**14.18**	**15.18**	**16.18**	**17.18**	**18.18**	**19.18**

Financial Year		FY2043	FY2044	FY2045	FY2046	FY2047	FY2048	FY2049	FY2050	FY2051	FY2052
Months		12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	8.48
Revenue		3,111.0	3,364.4	3,613.4	3,892.5	4,185.9	4,517.4	4,840.5	5,194.7	5,571.3	4,242.8
Operating EBITDA before MMR Provisions		2,452.6	2,668.3	2,859.1	3,086.5	3,335.9	3,600.7	3,871.3	4,160.1	4,443.4	3,416.9
Less: IM Expenses		(47.9)	(51.5)	(55.4)	(59.6)	(64.0)	(68.8)	(74.0)	(79.5)	(85.5)	(65.0)
Less: Income Tax		(570.3)	(581.1)	(706.1)	(763.8)	(742.8)	(862.0)	(921.7)	(943.4)	(1,109.7)	(715.7)
Less: MMR Expenses		(133.0)	(304.4)	-	-	(334.6)	(128.7)	(165.8)	(374.1)	-	(544.5)
Less: Capital Expenditure		-	-	-	-	-	-	-	-	-	-
(Increase)/Decrease in Working Capital		(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	0.6
Free Cashflows to Firm		**1,701.3**	**1,731.3**	**2,097.6**	**2,263.1**	**2,194.5**	**2,541.2**	**2,709.7**	**2,763.0**	**3,248.1**	**2,092.3**
Time to Midpoint		20.18	21.18	22.18	23.18	24.18	25.18	26.18	27.18	28.18	29.04
Discount Factor	10.50%	0.13	0.12	0.11	0.10	0.09	0.08	0.07	0.07	0.06	0.06
Discounted Cash Flow		**226.9**	**208.9**	**229.0**	**223.6**	**196.2**	**205.6**	**198.4**	**183.1**	**194.7**	**115.2**

Mid Point Working	31-Jul-22	31-Mar-43	31-Mar-44	31-Mar-45	31-Mar-46	31-Mar-47	31-Mar-48	31-Mar-49	31-Mar-50	31-Mar-51	15-Dec-51
Days		7,365.50	7,731.00	8,096.50	8,461.50	8,826.50	9,192.00	9,557.50	9,922.50	10,287.50	10,599.50
Time to Midpoint		**20.18**	**21.18**	**22.18**	**23.18**	**24.18**	**25.18**	**26.18**	**27.18**	**28.18**	**29.04**

Particulars	Amount
Enterprise Value	**7,757.76**
Less: Debt	**(6,276.16)**
Less: Debt like	**(3.52)**
Add: Cash and cash equivalent	**46.56**
Equity Value	**1,524.63**

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Report on Enterprise Valuation of Three Road Projects proposed to be acquired by National Highways Infra Projects Private Limited ("NHIPPL") as of 31st July 2022

Head Office: 912, Venus Atlantis Corporate Park, Anandnagar Main Road, Prahaladnagar, Ahmedabad – 380015 Tel: +91 79 4050 6000
Corporate Office: 1121, Solitaire Corp. Park, Chakala, Andheri Kurla Road, Andheri (E), Mumbai - 400 093 Tel: +91 22 6130 6000

Private and Confidential

30th August 2022 Report Ref No: RVA2223DELREP023

National Highways Infra Investment Managers Private Limited
G-5 & 6, Sector-10, Dwarka
Delhi 110075

Sub: Enterprise Valuation of three new Toll Road projects, pursuant to SEBI (Infrastructure Investment Trusts) Regulations, 2014, as amended.

Dear Sir,

We refer to our appointment letter dated 29th December 2020 wherein RBSA Valuation Advisors LLP ("RBSA" or "We" or "us") has been appointed by National Highways Infra Investment Managers Private Limited ("NHIIMPL"/ the "Investment Manager"), as an independent valuer, as per Regulation 2(zzf) of the SEBI (Infrastructure Investment Trust) Regulations, 2014 ("SEBI InvIT Regulations") and our subsequent discussions, for carrying out the Enterprise Valuation of three Toll Road projects (together referred to as the "Specified Projects") proposed to be acquired by National Highways Infra Projects Private Limited ("NHIPPL" or the "SPV").

NHIPPL is a wholly owned subsidiary of National Highways Infra Trust ("NHIT" or the "Trust" or "InvIT") and is incorporated as a special purpose vehicle to operate and maintain the road projects. NHIT is registered with the Securities and Exchange Board of India ("SEBI") as an infrastructure investment trust under the SEBI InvIT Regulations. NHIIMPL is acting as Investment Manager to the Trust, NHAI is acting as Sponsor to the Trust, and IDBI Trusteeship Services Limited ("Trustee") is acting as Trustee to the Trust, within the meaning of the SEBI InvIT Regulations.

NHIPPL has entered into concession agreements with NHAI to operate, maintain and transfer the five projects under the Toll, Operate and Transfer ("TOT") model.

NHAI aims to monetize the Specified Projects through the InvIT (Infrastructure Investment Trust) route. In this context, NHIIMPL is evaluating a proposal for acquisition of the Specified Projects for which NHIPPL shall enter into concession agreements with NHAI ("Proposed Transaction"). The Specified Projects proposed to be acquired by NHIPPL on a TOT basis are as follows:

1. Agra Bypass (Uttar Pradesh)
2. Shivpuri (Madhya Pradesh) to Jhansi (Uttar Pradesh)
3. Borkhedi – Wadner – Deodhari – Kelapur (Maharashtra/Telangana Border)

In connection with the Proposed Transaction, the Trust intends to undertake the Enterprise Valuation of the Specified Projects, as on 31st July 2022 ("Valuation Date") as per the SEBI InvIT Regulations. RBSA Valuation Advisors LLP has been appointed by the Investment Manager, as an independent valuer, as per Regulation 2(zzf) of the SEBI InvIT Regulations, for the purpose of carrying out the Valuation of the Specified Projects.

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We have analyzed the information provided by/ on behalf of the Investment Manager through broad inquiry, analysis and review but have not carried out a due diligence or audit of such information. We have relied on the explanations and information provided by/ on behalf of the Investment Manager. We have no present or planned future interest in the Sponsor, NHIPPL or the Investment Manager except to the extent of our appointment as an independent valuer. Our professional fees for the valuation are not contingent upon the values reported herein. Our valuation analysis should not be construed as an investment advice specifically, we do not express any opinion on the suitability or otherwise of entering into any financial or other transaction with the Trust.

We enclose our valuation report (the "Report") providing our opinion on the fair enterprise valuation of the Specified Projects as of 31st July 2022 ("Valuation Date"), on a 'going concern value' premise and considering the Specified Projects as a 'stand-alone' business. The attached Report details the valuation approach and methodologies, calculations, and conclusions with respect to this valuation.

Our valuation analysis must be considered as a whole. Selecting portions of our analysis or the factors we considered, without considering all factors and analysis together could create a misleading view of the process underlying the valuation conclusions. 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.

Our valuation conclusion included herein, and Report complies with the SEBI InvIT Regulations and guidelines, circular or notification issued by SEBI there under.

Please note that the Report must be read in conjunction with the Assumptions and Limiting Conditions, which are contained in Section 3 of this Report. This letter, the Report and the summary of valuation included herein may be provided to the Trust's advisors, the Securities and Exchange Board of India and other regulatory and supervisory authority, as may be required under the applicable regulations in connection with the Transaction and can be reproduced and included in the draft placement memorandum and final placement memorandum proposed to be filed in connection with offering of the units of the Trust.

This letter should be read in conjunction with the attached Report.

For **RBSA Valuation Advisors LLP,**
(RVE No.: IBBI/RV-E/05/2019/110)

RBSA VALUATION ADVISORS LLP

Name: Ravishu Vinod Shah
Designation: Partner
Asset Class: Securities or Financial Assets (RV No.: IBBI/RV/06/2020/12728)
Date: 30th August 2022
Place: Mumbai

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1. Executive Summary

National Highway Authority of India ("NHAI") was set up by an act of the Indian Parliament, NHAI Act, 1988. NHAI was set up with the primary objective of facilitating development, maintenance and Management of national highways in India. NHAI has been entrusted with National Highways Development Project, along with other minor projects.

National Highways Infra Trust ("NHIT" or the "Trust" or "InvIT") is registered with the Securities and Exchange Board of India ("SEBI") as an infrastructure investment trust under the SEBI InvIT Regulations. National Highways Infra Investment Managers Private Limited ("NHIIMPL" or the "Investment Manager") is acting as Investment Manager to the Trust, National Highway Authority of India ("NHAI" or "Sponsor") is acting as Sponsor to the Trust and IDBI Trusteeship Services Limited ("Trustee") is acting as the Trustee to the Trust, within the meaning of the SEBI InvIT Regulations.

National Highways Infra Projects Private Limited ("NHIPPL" or the "SPV") is a wholly owned subsidiary of NHIT and is incorporated as a special purpose vehicle to operate and maintain the road projects. NHIPPL has entered into concession agreements with NHAI to operate, maintain and transfer the five projects under the Toll, Operate and Transfer ("TOT") model. NHAI aims to monetize the additional three Toll road projects (together referred to as the "Specified Projects") through the InvIT (Infrastructure Investment Trust) route. In this context, NHIIMPL is evaluating a proposal for acquisition of the Specified Projects for which NHIPPL shall enter into concession agreements with NHAI ("Proposed Transaction").

In this context, the Trust intends to undertake the Enterprise Valuation of the Specified Projects, as on 31st July 2022 as per the SEBI InvIT Regulations.

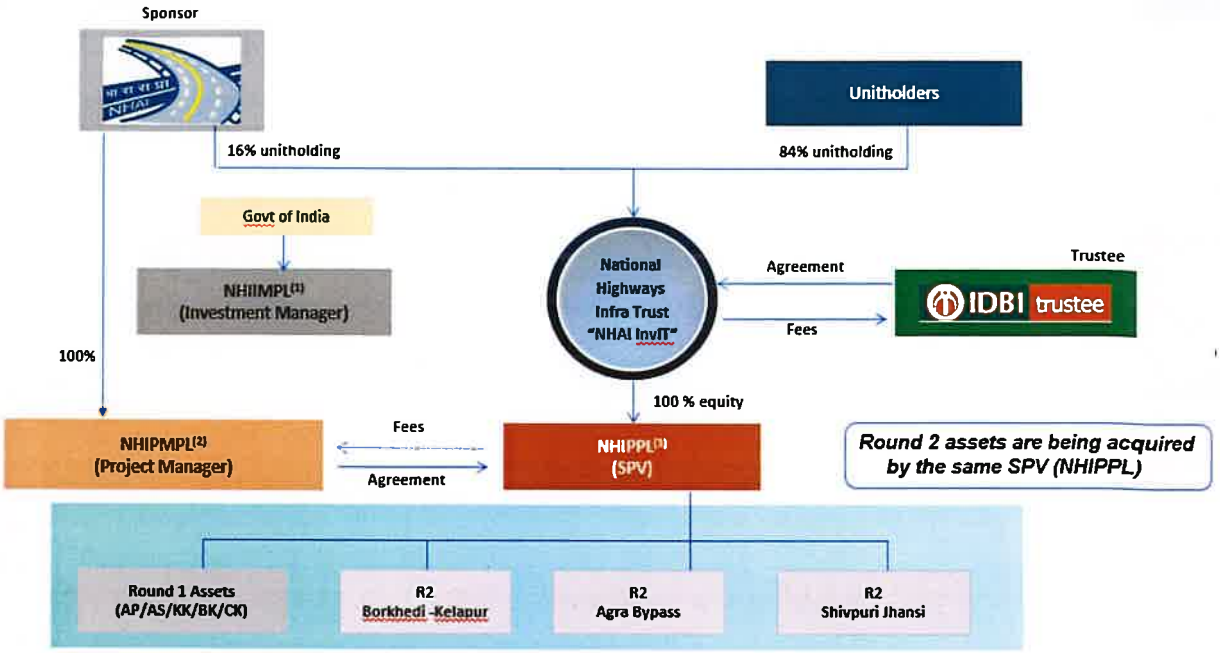
In connection with the Proposed Transaction, RBSA Valuation Advisors LLP has been appointed by the Investment Manager, as an independent valuer, as per Regulation 2(zzf) of the SEBI InvIT Regulations, for the purpose of carrying out the Valuation of the Specified Projects.

The Specified Projects proposed to be acquired by NHIPPL on a TOT basis are as follows:

Sr. No.	Name of Section	NH	Total Length (Kms)	Toll Plaza	Start Kms	End Kms
1	Agra Bypass	NH-2 – NH-3	32.800	Raibha	176.800 KM of NH-2	13.030 KM of NH-3
2	Shivpuri to Jhansi	NH-27	75.300	Raksha	1305.000 KM of NH-27	1380.387 KM of NH-27
3	Borkhedi-Wadner-Deodhari-Kelapur	NH-44	138.150	Daroda and Kelapur	36.600 KM of NH-44	175.600 KM of NH-44

Source: Information provided by the Management

National Highways Infra Trust Structure



NHIPPL - National Highways Infra Projects Private Limited, NHIIMPL - National Highways Infra Investment Managers Private Limited, NHIPMPL - National Highways InvIT Project Managers Private Limited

Valuation Analysis

The Discounted Cash Flow ("DCF") method under the Income Approach has been adopted for the Enterprise Valuation of the Specified Projects. Free Cash Flow to Firm method under DCF has been applied based on the projected financials of the Specified Projects provided by the management of NHIIMPL (the "Management"). The Enterprise Value of the Specified Projects as of 31st July 2022 has been estimated, on a 'going concern value' premise and considering the Specified Projects as a 'stand-alone' business. The Enterprise Value has been computed by discounting the free cash flows to the firm until the end of the concession period of 20 years beginning from 1st October 2022, using an appropriate WACC. Since the proposed effective implementation date is 1st October 2022, the cashflows have been discounted as of 30th September 2022.

The Investment Manager has appointed independent consultants to carry out Traffic study and estimation of toll revenue and Technical study for estimation of operating and maintenance expenses and major maintenance expenses, for each of the Specified Projects over the concession period of 20 years ending on 30th September 2042. We have relied upon the Traffic Study reports and Technical reports provided by independent consultants on the Specified Projects for the Enterprise Valuation.

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Valuation of a company/ business is not a precise science and the conclusions arrived at in many cases will be subjective and dependent on the exercise of individual judgment. There is, therefore, no indisputable single value and we normally express our opinion on the value as falling within a likely range. However, considering the nature of the engagement, we have provided a single point value estimate. While we have provided our opinion on the enterprise value of the Specified Projects based on the information made available to us and within the scope and constraints of our engagement, others may have a different opinion. Accordingly, we expressly disclaim all liability for any loss or damage of whatever kind which may arise from any person acting on any information and estimates contained in this Report which are contrary to the stated purpose.

While our work has involved an analysis of financial and other information provided by/ on behalf of the Management, our engagement does not include an audit in accordance with generally accepted auditing standards of the Specified Projects' existing business records. We have not carried out any independent technical evaluation or appraisal or due diligence of the assets or liabilities of the Specified Projects. Accordingly, we assume no responsibility and make no representations with respect to the accuracy or completeness of any information provided by/ on behalf of the Management. Our Report is subject to the scope, assumptions and limitations detailed hereinafter. As such the Report is to be read in totality, and not in parts, in conjunction with the relevant documents referred to herein and in the context of the purpose for which it is made.

Enterprise Valuation of the Specified Projects as of 31st July 2022 ("Valuation Date"), has been carried out considering *inter-alia* Traffic Study and Technical Reports of independent consultants, Business plan/ Projected financial statements of the Specified Projects and other information provided by/ on behalf of the Management, industry analysis and other relevant factors.

The Valuation summary of the Specified Projects as of 31st July 2022, is as follows:

Particulars	WACC	Enterprise Value (INR Cr)
Agra Bypass	10.60%	1,021
Shivpuri Jhansi		450
Borkhedi – Wadner – Deodhari - Kelapur		1,354
Total	**10.60%**	**2,825**

Note: The Enterprise Value of respective Specified Projects has been estimated considering *inter-alia* apportionment of common expenses to the Specified Projects and may not be representative of the Enterprise Value of each Specified Project on a 'standalone' basis.

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2. Engagement Overview

- National Highway Authority of India was set up by an act of the Indian Parliament, NHAI Act, 1988. NHAI was set up with the primary objective of facilitating development, maintenance and Management of national highways in India. NHAI has been entrusted with National Highways Development Project, along with other minor projects.

- National Highways Infra Trust ("NHIT" or the "Trust" or "InvIT") is registered with the Securities and Exchange Board of India ("SEBI") as an infrastructure investment trust under the SEBI InvIT Regulations. National Highways Infra Investment Managers Private Limited ("NHIIMPL" or the "Investment Manager") is acting as Investment Manager to the Trust, National Highway Authority of India ("NHAI" or "Sponsor") is acting as Sponsor to the Trust and IDBI Trusteeship Services Limited ("Trustee") is acting as the Trustee to the Trust, within the meaning of the SEBI InvIT Regulations.

- National Highways Infra Projects Private Limited ("NHIPPL" or "SPV") is a wholly owned subsidiary of NHIT to operate and maintain the road projects. NHIPPL has entered into concession agreements with NHAI to operate, maintain and transfer the five projects under the Toll, Operate and Transfer ("TOT") model. NHAI aims to monetize the additional three Toll road projects (together referred to as the "Specified Projects") through the InvIT (Infrastructure Investment Trust) route. In this context, NHIIMPL is evaluating a proposal for acquisition of the Specified Projects for which NHIPPL shall enter into concession agreements with NHAI ("Proposed Transaction").

- The Trust intends to undertake the Enterprise Valuation of the Specified Projects, as on 31st July 2022 as per the SEBI InvIT Regulations.

- In connection with the Proposed Transaction, RBSA Valuation Advisors LLP has been appointed by the Investment Manager, as an independent valuer, as per Regulation 2(zzf) of the SEBI InvIT Regulations, for the purpose of carrying out the Valuation of the Specified Projects.

- The Specified Projects proposed to be acquired by NHIPPL on a TOT basis are as follows:

Sr. No.	Name of Section	NH	Total Length (Kms)	Toll Plaza	Start Kms	End Kms
1	Agra Bypass	NH-2 – NH-3	32.800	Raibha	176.800 KM of NH-2	13.030 KM of NH-3
2	Shivpuri to Jhansi	NH-27	75.300	Raksha	1305.000 KM of NH-27	1380.387 KM of NH-27
3	Borkhedi-Wadner-Deodhari-Kelapur	NH-44	138.150	Daroda and Kelapur	36.600 KM of NH-44	175.600 KM of NH-44

Source: Information provided by the Management

- RBSA Valuation Advisors LLP is a registered valuer entity under the Section 247 of the Companies Act, 2013 registered with the Insolvency and Bankruptcy Board of India having Registered Valuer Entity No. IBBI/RV-E/05/2019/110.

- We declare that:
  - We are competent to undertake the financial valuation in terms of the SEBI InvIT Regulations;
  - We are an independent registered valuer entity and have prepared the Report on a fair and unbiased basis; and
  - We have at least two partners/ directors having experience of 5 years each in the valuation of infrastructure assets.

- The Valuation Date considered for the Enterprise Valuation of the Specified Projects is 31st July 2022. Valuation analysis and results are specific to the Valuation date. A valuation of this nature involves consideration of various factors including the operational and financial performance and position of the Specified Projects as at the Valuation Date, trends in the equity stock market and fixed income security market, macro-economic and industry trends, etc.

- We have carried out additional scope of work as per schedule V of SEBI InvIT Regulations (Refer para 10.1 for further details).

- This Report covers all the disclosures required as per the SEBI InvIT Regulations and the Valuation of the Specified Projects is impartial, true and fair and in compliance with the SEBI InvIT Regulations.

3. Assumptions and Limiting Conditions

3.1. This Report, its contents and the results herein are specific to (i) the purpose of valuation agreed as per the terms of our engagement; (ii) the date of this Report; (iii) Traffic Study and Technical Reports for the Specified Projects by independent consultants, and (iv) Business plan/ Projected financial statements of the Specified Projects and other information provided by/ on behalf of the Management and information obtained from public domain/ subscribed databases till 27th August 2022.

3.2. While our work has involved an analysis of financial and other information provided by/ on behalf of the Management, our engagement does not include an audit in accordance with generally accepted auditing standards of the Specified Projects' existing business records. We have not carried out any independent technical evaluation or appraisal or due diligence of the assets or liabilities of the Specified Projects. Accordingly, we assume no responsibility and make no representations with respect to the accuracy or completeness of any information provided by/ on behalf of the Management. Our Report is subject to the Scope, Assumptions and Limitations detailed hereinafter. As such the Report is to be read in totality, and not in parts, in conjunction with the relevant documents referred to herein and in the context of the purpose for which it is made.

3.3. The valuation of companies and businesses is not a precise science and the conclusions arrived at in many cases will be subjective and dependent on the exercise of individual judgment. There is, therefore, no indisputable single value and we normally express our opinion on the value as falling within a likely range, considering the purpose and requirement of this engagement, we have provided a single value. While we have provided our opinion on the fair value of the Specified Projects based on the information made available to us and within the scope and constraints of our engagement, others may have a different opinion.

3.4. A valuation of this nature is necessarily based on stock market, financial, economic and other conditions in general and industry trends in particular prevailing as on the Valuation Date and the information made available to us as of the date hereof. Events occurring after the Valuation date may affect this Report and the assumptions used in preparing it, and we do not assume any obligation to update, revise or reaffirm this Report.

3.5. In the course of valuation, we were provided with both written and verbal information as mentioned in the Section 4. We have analysed the information provided to us by/ on behalf of the Management through broad inquiry, analysis and review but have not carried out a due diligence or audit of the information provided for the purpose of this engagement. We have assumed that no information has been withheld that could have influenced the purpose of our Report.

3.6. Valuation may be based on estimates of future financial performance or opinions that represent reasonable expectations at a particular point in time. However, we do not provide assurance on the achievability of the results projected by the Management as events and circumstances do not occur as expected and differences between actual and expected results may be material. We express no

opinion as to how closely the actual results will correspond to those projected as the achievement of the projected results is inter-alia dependent on actions, plans and assumptions of the Management and macro-economic and other external factors which are beyond the control of the Management.

3.7. Our valuation is primarily from a business perspective and does not take into account various legal and other corporate structures beyond the limited information provided to us by the Investment Manager. The value conclusion is not intended to represent the value at any time other than the Valuation Date that is specifically stated in the Report.

3.8. We have also relied on the data from external sources to conclude the valuation. These sources are believed to be reliable and therefore, we assume no liability for the truth or accuracy of any data, opinions or estimates furnished by others that have been used in this analysis. Where we have relied on data, opinions or estimates from external sources, reasonable care has been taken to ensure that such data has been correctly extracted from those sources and/ or reproduced in its proper form and context.

3.9. The actual price achieved in case of a transaction may be higher or lower than our estimate of value depending upon the circumstances and timing of the transaction, the nature of the business and other relevant factors. The knowledge, negotiating ability and motivation of the buyers and sellers and the applicability of a discount or premium for control will also affect actual market price achieved. Accordingly, our valuation conclusion will not necessarily be the price at which any agreement proceeds. The final transaction price is something on which the parties themselves have to agree considering *inter-alia* their own assessment of the Transaction and inputs from other advisors.

3.10. This Report has been prepared for the sole use by the Investment Manager / Trust / Sponsor in connection with the purpose stated herein. It is inappropriate to use this Report for any purpose other than the purpose mentioned herein. This restriction does not preclude the Investment Manager from providing a copy of the Report to its third-party advisors whose review would be consistent with the intended use. Our Report may be disclosed in connection with any statutory and regulatory filing in connection with the Transaction and in accordance with the provision of SEBI InvIT Regulations. Further, the Report and summary of valuation included herein can be reproduced and included in the Draft placement memorandum and final placement memorandum, which may be filed with the SEBI. We shall not assume any responsibility to any third party to whom the Report is disclosed or otherwise made available.

3.11. The Report assumes that the Specified Projects comply fully with relevant laws and regulations applicable in its area of operations and usage unless otherwise stated, and that they will be managed in a competent and responsible manner. Further, unless specifically stated to the contrary, this Report has given no consideration to matters of a legal nature, including issues of legal title and compliance with local laws, and litigations and other contingent liabilities that are not recorded/ reflected in the financial statements provided to us.

3.12. It is clarified that this Report is not a fairness opinion under any of the stock exchange/ listing

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regulations. In case of any third-party having access to this Report, it should be noted that the Report is not a substitute for the third party's own due diligence/ appraisal/ enquiries/ independent advice that the third party should undertake for his purpose.

3.13. In the particular circumstances of this case, our liability (in contract or under statute or otherwise) for any economic loss or damage arising out of or in connection with this engagement, irrespective of the quantum of loss or damage caused, shall be limited to the amount of fees actually received by us from the Investment Manager, as laid out in the engagement letter, for such valuation work.

3.14. In rendering this Report, we have not provided any legal, regulatory, tax, accounting or actuarial advice and accordingly we do not assume any responsibility or liability in respect thereof.

3.15. This Report does not look into the business/ commercial reasons behind the Proposed Transaction nor the likely benefits arising out of the same. Similarly, it does not address the relative merits of investing in an infrastructure trust as compared with any other alternative business transaction, or other alternatives, or whether or not such alternatives could be achieved or are available.

3.16. We are not advisors with respect to legal tax and regulatory matters for the Proposed Transaction. No investigation of the Specified Projects' claim to title of assets has been made for the purpose of this Report and the Specified Projects' 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 is closed in the accounts. Therefore, no responsibility is assumed for matters of a legal nature.

3.17. The scope of work has been limited both in terms of the areas of the business and operations which have been reviewed. 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.

3.18. The outbreak of the Novel Coronavirus ("COVID-19"), declared by the World Health Organization as a "Global Pandemic" on 11th March 2020 and second wave of the same in April 2021, has adversely affected the Global and Indian economy. The third wave on account of Omicron hit India in January 2022. Travel restrictions implemented by many countries has affected the economic activities. Governments have announced various measures to combat COVID 19 pandemic and to support the economic and business activities. Though economic recovery is being witnessed in India coupled with the Government's vaccination efforts and fall in covid cases, with many countries declaring the same as common flu. There are still significantly higher uncertainties in the near to medium term. Considering the unprecedented set of circumstances, Value analysis is reported on the basis of 'material valuation uncertainty' and accordingly less certainty and a higher degree of caution should be attached to the Value Analysis than would normally be the case. It may be noted that the estimated value may change significantly and unexpectedly over a relatively short period of time based on the evolving conditions/ uncertainties on account of COVID 19 pandemic.

3.19. RBSA is not aware of any contingent, commitment or material issue, besides the information disclosed and additionally provided by the Investment Manager / Management which has been presented in this Report, which could materially affect the Specified Projects' economic

environment and future performance and therefore, their fair value.

3.20. We have no present or planned future interest in the Trustee, Investment Manager, the Sponsor or the SPV and the fee for this Report is not contingent upon the values reported herein. Our valuation analysis should not be construed as investment advice; specifically, we do not express any opinion on the suitability or otherwise of entering into any financial or other transaction.

3.21. We have relied upon the representations of the Management in respect of the information provided by them. We shall not be liable for any loss, damages, cost or expenses arising from fraudulent acts, misrepresentations, or willful default on part of the Investment Manager, the SPV, their directors, employee or agents.

- **Limitation of Liabilities**
  - It is agreed that, having regard to RBSA's interest in limiting the personal liability and exposure to litigation of its personnel, the Investment Manager, the Sponsor, the Trust or the Trustee will not bring any claim in respect of any damage against any of RBSA's personnel.
  - In no circumstances, RBSA 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 RBSA the likelihood of such damages. Any decision to act upon the Report is to be made by the Investment Manager and no communication by RBSA should be treated as an invitation or inducement to engage the Investment Manager to act upon the Report.
  - In the particular circumstances of this case, our liability (in contract or under statute or otherwise) for any loss or damage caused, shall be limited to the amount of fees actually received by us, as laid out in the engagement letter, for such valuation work.
  - It is clarified that the Sponsor and the Trust 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.
  - RBSA will not be liable if any loss arises due to the provision of false, misleading or incomplete information or documentation by the Investment Manager, the Sponsor, the Trust or the Trustee.

4. Sources of Information

For the purpose of undertaking this valuation exercise, we have relied on the following sources of information provided by/ on behalf of the Management:

- Draft Concession Agreements for the three projects between the SPV and NHAI for the Specified Projects;
- Reports of independent consultants appointed by the Investment Manager for Traffic study and estimation of toll revenue for the duration of the concession period for each of the Specified Projects ("Traffic Study Reports");
- Reports of independent consultants appointed by the Investment Manager for Technical study for estimation of operating and maintenance expenses and major maintenance expenses for the duration of the concession period for each of the Specified Projects ("Technical Reports");
- Projected financial statements of the Specified Projects for the concession period from 1st October 2022 to 30th September 2042 (FY2023 – FY2043) which the Management expects to be their best estimate of the expected performance of the Specified Projects ("Management Projections");
- Discussions with the Management to inter-alia understand expected future performance of the Specified Projects, key value drivers and other factors affecting the business of the Specified Projects;
- Management representation letter with respect to mandatory disclosures required by SEBI; and
- Capital IQ's database of publicly traded companies.

We have also obtained the explanations, information and representations, which we believed were reasonably necessary and relevant for our exercise from the Management.

5. Procedures

We have carried out the Enterprise Valuation of the Specified Projects, to the extent applicable, in accordance with ICAI Valuation Standards, 2018 ("ICAI VS") issued by the Institute of Chartered Accountants of India.

We have adopted the following procedures for carrying out the valuation analysis:

- Considered the key terms of Draft Concession Agreements;
- Analysis of the Management Projections;
- Considered the Traffic Study Reports and Technical Reports;
- Analysis of the key economic and industry factors which may affect the valuation of the Specified Projects;
- Analysis of the information available in public domain/ subscribed databases in respect of the comparable companies/ comparable transactions, as considered relevant by us;
- Selection of valuation approach and valuation methodology/(ies), in accordance with ICAI VS, as considered appropriate and relevant by us;
- Analysis of other publicly available information, as considered relevant by us; and
- Determination of Enterprise Value of the Specified Projects.

6. Industry Overview

Road Infrastructure in India

- India has the second largest road network in the world, spanning a total of ~ 5.9 million kilometers (kms). This comprises National Highways, Expressways, State Highways, Major District Roads, Other District Roads and Village Roads as under:

Particulars	In kms	% share
National Highways	140,995	2.21%
State Highways	171,039	2.68%
Other Roads	6,059,813	95.10%
Total	6,371,847	

Source: IBEF March 2022 Report

- This road network transports 64.5 per cent of all goods in the country and 90 per cent of India's total passenger traffic uses road network to commute. Road transportation has gradually increased over the years with improvement in connectivity between cities, towns, and villages in the Country.

Strong momentum in expansion of roadways

- In FY22, the Ministry of Road Transport and Highways constructed national highways extending ~10,457 kms.
- The Government of India aims to construct ~18,000 km of National Highways in FY2022-23 at record speed of ~50km per day.
- The Ministry of Road Transport and Highways constructed 2,284 kms of national highways until June 2021.
- In August 2021, The Ministry of Road Transport & Highways extended certain relief measures provided earlier in view of the second COVID-19 wave. The Central Government sanctioned more than INR 600 crore (US$ 81 million), of the Central Road and Infrastructure Fund (CRIF), for construction of 42 roads and bridges in Uttarakhand.
- In September 2021, the Government of India has planned to construct roads extending 313 kms for INR 11,000 crore (US$ 1.48 billion) to transform road infrastructure in Punjab, Haryana and Rajasthan.
- In October 2021, the Government inaugurated a national highway extending 527 kms and worth INR 4,075 crore (US$ 542.34 million) in Ahmednagar, Maharashtra, to boost connectivity in the state.
- In FY22 till October 2021, the Ministry of Road Transport and Highways constructed national highways extending 4,450 kms.

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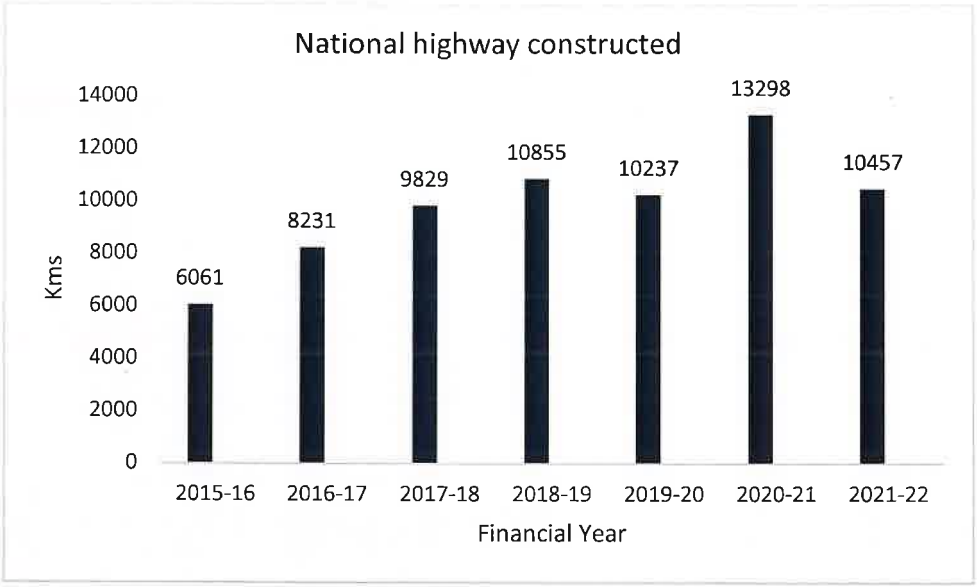


Source: IBEF March 2022 Report & Make in India portal

Growth Drivers

Growing demand	•Rise in two and four wheeler. •Increasing freight traffic. •Strong trade and tourist flows between state.
Policy Support	•Greater Government focus on infrastructure. •Standardised processes for bidding and tolling and clear policy framework. •Tax SOPS, FDI,FII Encouragement
Increasing Investment	•Under the Union Budget 2022-23, the Government of India has allocated INR 1,99,107.71 crore (US$ 26.04 billion) to the Ministry of Road Transport and Highways. •In FY22 (until November 2021) private sector invested INR15,164 crore (US$ 1.98 billion) in roads. •The Ministry allocated INR 3,150 crore (US$ 0.45 billion) for maintenance of roads and highways in FY20 and INR 280 crore (US$ 40 million) for road transport and safety.

Source: IBEF March 2022 Report

Future growth Prospects

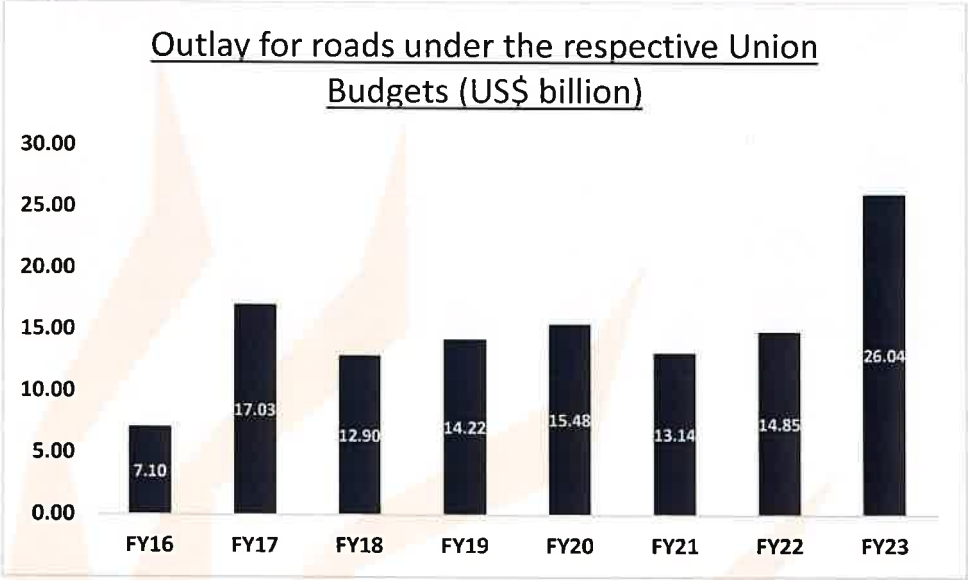
- In December 2021, the government set a highway monetization target of INR 2 trillion (US$ 26.20 billion) for the next 3 years.
- In October 2021, the Indian government announced five road projects in Ladakh, measuring 255 kms in length, to boost connectivity in the region.
- In August 2021, Union Minister of Road Transport and Highways, Mr. Nitin Gadkari, announced to launch 1,080-km (road construction) projects worth INR 25,370 crore (US$ 3.4 billion) under the Bharatmala Pariyojana—the ambitious road and highways project that aims to build highways

from Maharashtra, Gujarat, Rajasthan, Punjab, Haryana and then cover the entire string of Himalayan territories.

- In 2018, the Indian government announced its plan to construct the Delhi-Mumbai Express Highway (extending 1,380 kms), to improve connectivity from Delhi to Mumbai, covering states such as Haryana, Rajasthan, Gujarat and Madhya Pradesh. As of September 2021, contracts for more than 1,200 kms have been awarded. The estimated cost to construct the Delhi-Mumbai Express Highway is INR 98,000 crore (US$ 13.08 billion).
- NHAI is planning to raise Rs 40,000 crore (US$ 5.72 billion) to monetize its highway assets through Infrastructure Investment Trust.

Highlights of Union Budget 2022-23

- The Government has allocated INR 1,99,108 crore for Ministry of Road Transport and Highways – which is ~68.0% higher than last year's budget allocation.
- The Government plans to complete 25,000 Kilometers of National Highways.
- In July 2021, the Union Minister for Road Transport and Highways, Mr. Nitin Gadkari, laid the foundation stone for 16 National Highway projects in Manipur. These projects will cost US$ 556.67 million to build and will cover a total distance of 298 kms.
- To transform road infrastructure in Punjab, Haryana and Rajasthan, the Indian government has planned to construct roads extending 313 kms for INR 11,000 crore (US$ 1.48 billion).



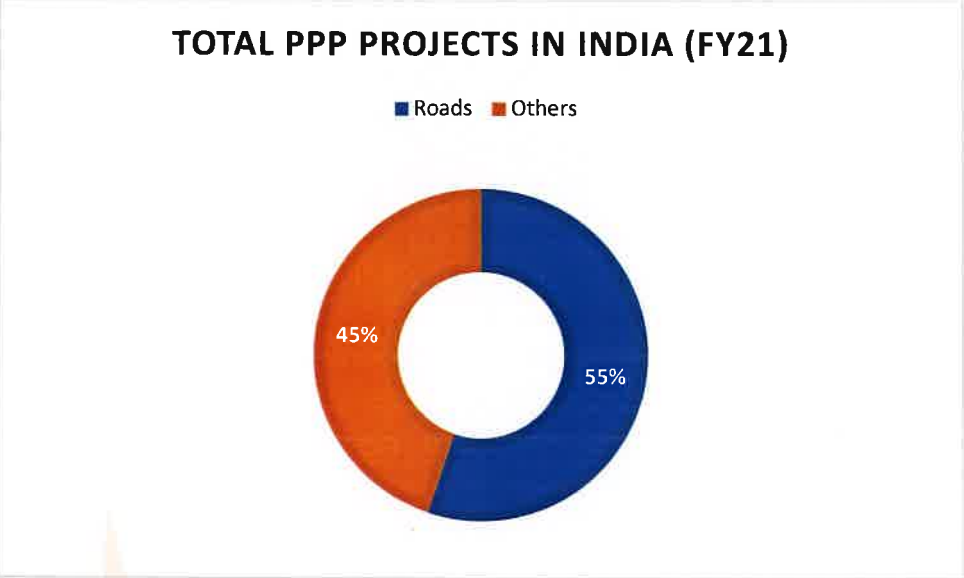
Source: IBEF Road Report March 2022

Private Sector Participation: -

- During the year 2020–21, 125 PPP projects (Including 69 road projects) with a total cost of Rs 1,72,314 crore were appraised.
- NHAI targeted 450 kilometers of the Build–operate–transfer (BOT) projects in FY22 and was looking forward to bidding out 600-1000 kilometers of highway stretch under the Build–operate–transfer (BOT) model as of November 2021.
- In August 2020, the Government of India revised the Model Concession Agreement for BOT projects to plug delays by imposing a deadline on the NHAI and incentivizing timely work by

concessionaires. According to revised norms, the NHAI will have to hand over 90% of the project land (vacant and ready to build) to private developers, thus creating a more market-friendly sector and attracting more private players.

- In November 2020, L&T Construction bagged a contract to build India's longest river bridge, across Brahmaputra River connecting Dhubri in Assam to Phulbari in Meghalaya, valued INR 2,500 – 5,000 crore (US$ 339.76 - 679.53 million).
- KKR, a global investment firm, announced to acquire the entire stake of Global Infrastructure Partners in Highway Concessions One (HC1) and seven other highway assets totaling 487 kms.



(Source: IBEF Road Report March 2022 & Niti Aayog)

Government initiatives: -

1. **National Infrastructure Pipeline (NIP)**

   The government's ambitious National Infrastructure Pipeline which is to be implemented untill FY25 is an attempt undertaken by the centre to facilitate economic revival by relying on infrastructure creation. The NIP covers a gamut of sectors, rural and urban infrastructure as well and entails investments to the tune of INR 111 Lakh Crores to be undertaken by the central government, state governments and the private sector. The Roads sector is expected to account for 18% capital expenditure over FY2019-25.

2. **Bharatmala Pariyojana (BMP) – Phase I**

   - Bharatmala Pariyojana is a 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 expressways.
   - A total of around 24,800 kms are being considered in Phase I. In addition, Phase I also includes 10,000 kms of balance road works under NHDP. Estimated outlay for Phase I is INR ~5.35 lakh Crores spread over 5 years.

- Summary of Phase 1 Components and approved outlay of for the same are as follows: -

Sr. No.	Components	Length (Km)	Outlay (INR crore)
1	Economic corridors development	9,000	120,000
2	Inter- corridors & feeder roads	6,000	80,000
3	National Corridors Efficiency Improvement	5,000	100,000
4	Border and International Connectivity	2,000	25,000
5	Coastal and port connectivity roads	2,000	20,000
6	Expressways	800	40,000
Total		24,800	385,000
7	Balance Road works under NHDP	10,000	1,50,000
Total			5,35,000

Source: MorTH Website

NHAI will consider only those projects that require minimal land acquisition worth INR 3 trillion under Bharatmala Pariyojana Scheme. A total of 65,000 kms of roads and highways are to be constructed under Bharatmala Pariyojana.

3. Gati Shakti – National Master Plan

India's Gati Shakti program 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). The main aim of this program is a faster approval process which can be done through the Gati Shakti portal and digitized the approval process completely.

4. Taxes and Other Sops

Companies enjoy 100% tax exemption in road projects for 5 years and 30% relief over the next 5 years.

5. Rural Development

Under the Union Budget 2022-23, the Government of India has allocated INR 19,500 crores for Pradhan Mantri Gram Sadak Yojana (PMGSY). As per the Union Budget 2019-20, 30,000 Km of PMGSY roads were built using green technology, waste plastic and cold mix technology, thereby reducing carbon footprint.

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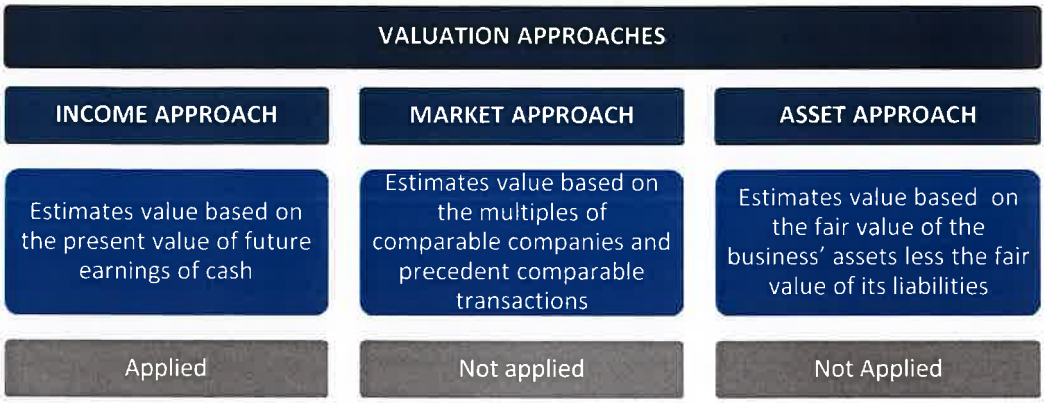
7. Valuation Approach and Methodology



Basis and Methodology of Valuation

- **Basis of Valuation**

  It means the indication of the type of value being used in an engagement. Fair Value as per ICAI VS defined as under:

  "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."

  Fair value basis has been adopted for enterprise valuation of the Specified Assets.

- **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 *inter-alia* due to changes in the condition of the asset to be valued and market parameters. 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 Specified Projects is 31st July 2022 ("Valuation Date"). The attached Report is drawn up by reference to accounting and financial information as on 26th August 2022.

- **Premise of Value**

  Premise of Value refers to the conditions and circumstances how an asset is deployed. In the present case, we have determined the fair enterprise value of the Specified Assets on a Going Concern Value defined as under:

  "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, the necessary licenses, systems, and procedures in place, etc."

Approach & Method	Applied/Not Applied	Description	Rationale
Income Approach Discounted Cash Flow Method (DCF)	Applied	▪ In the DCF method under the Income approach, forecast cash flows are discounted back to the Valuation Date, estimating a net present value of the cash flow stream of the business. A terminal value at the end of the explicit forecast period is then determined and that value is also discounted back to the Valuation Date to give an overall value for the business. ▪ A discounted cash flow methodology typically requires the forecast period to be of such a length to enable the business to achieve a stabilized level of earnings, or to be reflective of an entire operation cycle for more cyclical industries ▪ The rate at which the future cash flows are discounted (the "discount rate") should reflect not only the time value of money, but also the risk associated with the business' future operations. The discount rate most generally employed is Weighted Average Cost of Capital ("WACC") or Cost of Equity (Ke), reflecting an optimal as opposed to actual financing structure	• The Management has provided financial projections of the Specified Projects, which represent their best estimate of the expected performance of the Specified Projects for the tenor of their respective Concession period. Considering the aforementioned, the DCF method has been adopted to estimate the enterprise value of the Specified Projects.
Market Approach • Market Price Method	Not Applied	▪ Under this method, the value of a company is arrived at considering its market price over an appropriate period.	▪ As the Specified Projects are not listed, this method is not applied
Market Approach • Comparable Companies Multiples ("CCM") Method	Not Applied	▪ Under Comparable Companies Method, the value of shares / business of a company is determined based on market multiples of publicly traded comparable companies. Although no two companies are entirely alike, the companies selected as comparable companies should be engaged in the same or a similar line of business as the subject company. ▪ The appropriate multiple is generally	▪ The Specified Projects are operational and do not have project implementation risk. Further, the projected income and cash flows of the Specified Projects primarily depends on the key terms of the respective concession agreements, residual tenor, project-specific characteristics/ factors, etc. which may differ from the

Approach & Method	Applied/Not Applied	Description	Rationale
		based on the performance of listed companies with similar business models and size.	other projects. Accordingly, this method is not adopted.
Market Approach • Comparable Transaction Multiples ("CTM") Method	Not Applied	▪ Under Comparable Transaction Multiples Method, the value of shares /business of a company is determined based on market multiples of publicly disclosed transactions in the similar space as that of the subject company ▪ Multiples are generally based on data from recent transactions in a comparable sector, but with appropriate adjustment after consideration is given to the specific characteristics of the business being valued	▪ The projected income and cash flows of the Specified Projects primarily depend on the key terms of the respective concession agreements, residual tenor, project-specific characteristics/ factors, etc. which may differ from the other projects. We have not adopted this methodology due to unavailability of information in public domain involving recent transactions in similar projects.

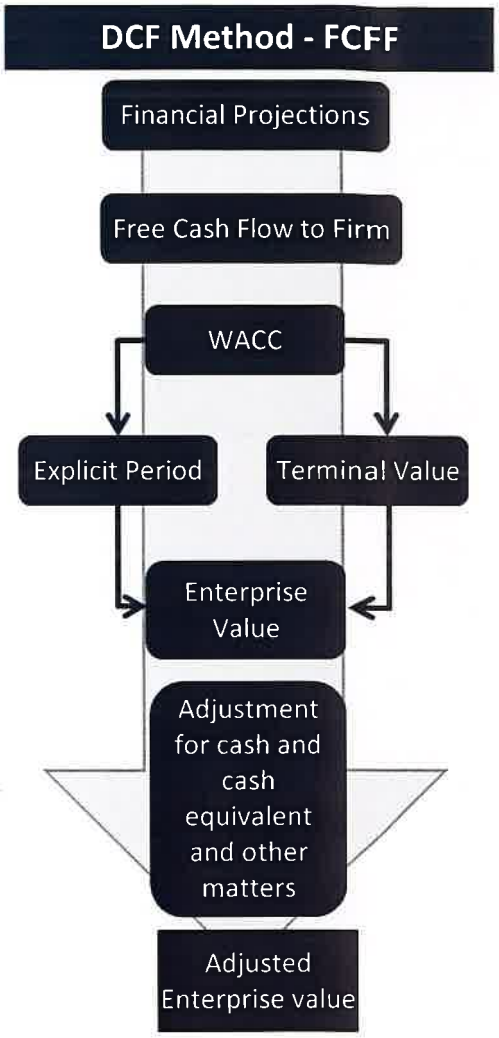
Asset based Approach
• Adjusted Net Asset Value Method
	Not Applied	▪ Under the Adjusted Net Asset Value Method, a Valuation of a 'going concern' business is computed by adjusting the assets and liabilities to the fair market value as of the date of the Valuation.
		▪ A net asset value methodology is typically most appropriate when:
		  ▪ Valuing a holding company or a capital-intensive company.
		  ▪ Losses are continually generated by the business; or
		  ▪ Valuation methodologies based on a company's net income or cash flow levels indicate a value lower than its adjusted net asset value.
			▪ The revenues and cashflows of the Specified Projects are largely predetermined for the concession period and are expected to make operating profits. In such a scenario, the true worth of the business is reflected in its future earning capacity rather than the historical cost of the project. The valuation of the Specified Projects is carried out on a 'going concern value' premise. Since the Net Asset Value does not capture the future earning potential of the businesses, we have not adopted the Asset approach for the valuation of the Specified Projects.

Income Approach

The Income Approach is widely used for valuation under "Going Concern" basis. It focuses on the income generated by a company in the past as well as its future earning capability.

Discounted Cash Flow ("DCF") Method

- Under the DCF method, the business is valued by discounting its free cash flows for the explicit forecast period and the perpetuity value thereafter.
- Free Cash Flows to Firm ("FCFF") under the DCF method has been applied for estimating the enterprise value of the Specified Projects.
- FCFF represent the cash available for distribution to both, the owners and creditors of the business. FCFF for the explicit period and perpetuity value is discounted by the Weighted Average Cost of Capital ("WACC") to derive the net present value. The WACC is an appropriate rate of discount to calculate the present value of the future cash flows as it considers equity–debt risk by incorporating debt–equity ratio of the firm.
- Enterprise Value ("EV") is derived by aggregating the present value of FCFF for the balance tenor of the Concession Agreement ("Explicit period") and Terminal value at the end of the Explicit period.
- Terminal value is estimated based on the business' potential for further growth beyond the Explicit period. Considering *inter-alia* the estimated economic life of the projects, Terminal value has been estimated considering release of net working capital, at the end of the Explicit period.
- The Enterprise Value of the Specified Assets have been determined as an aggregate of the present value of FCFF for the Explicit period and Terminal value.



Weighted Average Cost of Capital (WACC)

WACC has been estimated as under:

Particulars	Definition/Formula
WACC	Ke * (E/ (D + E)) + Kd * (1-T) * (D/(D + E))
Where:	
Ke	cost of equity
E	market value of equity
Kd	cost of debt
D	market value of debt
T	effective tax rate

The cost of equity is derived using the Capital Asset Pricing Model ("CAPM") as follows:

Particulars	Definition/Formula
Ke	Rf + ß * (Rm – Rf) + α
Where:	
Rf	the return on risk-free assets
Rm	the expected average return of the market
(Rm – Rf)	the average risk premium above the risk – free rate that a "market" portfolio of assets is earning
ß	the beta factor, being the measure of the systematic risk of a particular asset relative to the risk of a portfolio of all risky assets
α	Company specific risk factor (alpha), if any

A summary of WACC for the Specified Projects is appended as per **Appendix 1**.

8. Valuation of Specified Projects

8.1. Key underlying assumptions as provided by the Management are as follows:

- We have carried out the Enterprise Valuation of the Specified Projects as of 31st July 2022, considering inter-alia the latest Traffic Study Reports and Technical Due Diligence Study Reports of independent consultants dated August 2022, Business plan/ Projected financial statements of the Specified Projects and other information provided by/ on behalf of the Management, industry analysis and other relevant factors.
- **Operating Revenue:** Operating revenue for the Specified Projects for the forecast period from 1st October 2022 until 30th September 2042 (the "Projected Period") have been estimated by the Management considering the Traffic Study reports of independent traffic consultants appointed by NHIIMPL.
- **Operational and Maintenance Expenses (Routine maintenance)**: O&M expenses for the Specified Assets for the Projected Period have been estimated by the Management basis the technical study conducted by independent consultants.
- **Major Maintenance & Repair Expenses (MMR / Periodic maintenance)**: Periodic maintenance expenses are incurred to bring the road asset back to an earlier condition or to keep the road asset operating at its present condition. Like O&M expenses, MMR expenses have been estimated by the Management for the Projected Period basis the technical study reports of independent consultants.
- **Project Management (PM) Expenses**: PM expenses shall be paid by NHIT to the Project Manager for the Operations and Management of all the toll road projects. These expenses have been considered as per the PM agreement between NHIT and the Project Manager.
- **Insurance and Other Office Expenses**: These expenses for the Projected Period have been estimated by the Management basis the technical study conducted by independent consultants.
- **Administrative Costs:** The Management has estimated the base year Admin costs for each project and annual escalation as follows:

Project	Annualized Base Year Admin Cost (INR Crore)	Annual Escalation (%)
Agra Bypass	4.92	7.5%
Shivpuri Jhansi	6.06	7.5%
Borkhedi – Wadner – Deodhari – Kelapur	7.16	7.5%

- **Depreciation and Amortization**: One-time lumpsum consideration for Service Concession to be paid to NHAI and future capital expenditure have been amortized over the period of concession (20 years) on the basis of projected revenues.

- **Taxes:** Income taxes have been estimated considering, as appropriate, tax depreciation/ amortisation policy proposed to be followed by the SPV and corporate income tax rate of 25.17%.

- **Capital Expenditure:** The Management has projected that capital expenditure aggregating ~INR 857.1 crore shall be incurred by the SPV during FY2024 and FY2025 for the Specified Projects. There will be no further capital expenditure in the Projected Period. We have relied on the projections provided by the Management.

- **Working Capital:** Considering the nature of the business of operating toll road projects, the working capital requirement is estimated to be ~0.01% of the projected toll revenues for the Projected Period.

8.2. Specified Projects to be acquired by NHIPPL

8.2.1. Agra Bypass (Uttar Pradesh)

8.2.1.1. Project Overview

Parameters	Details
Project Name	NH-2 – NH-3 Agra Bypass (Uttar Pradesh)
Length of the project	32.80 kms
Toll Plaza Location	Raibha

Source: Management information

8.2.1.2. Additional Procedures to be complied with in accordance with InvIT regulations

A. List of one-time sanctions/approvals which are obtained or pending:

As represented by the Management, the list of sanctions/ approvals obtained untill 31st July 2022 is provided in **Appendix 3.**

B. List of up to date/ overdue periodic clearances:

As represented by the Management, all other material permits, registrations, licenses, approvals, consents and other authorizations (collectively, "Governmental Licenses") shall be obtained by NHIPPL as per individual project requirements once the rights and obligations are assumed by the SPV. The Project SPV (NHIPPL) would in due course and as required under applicable law procure all the Governmental Licenses issued by, and shall make all material declarations and filings with, the applicable Governmental Authority to own, lease, license, operate and use its properties and assets and to conduct the business by the Project SPV, as will be described in the placement documents. No notice of proceedings has been received relating to the revocation or modification of any Governmental Licenses, except as would not result in a Material Adverse Change. The general list of Governmental Licenses is enclosed in **Appendix 4.**

C. Estimates of already carried out as well as proposed major repairs and improvements along with estimated time of completion:

Historical Major Maintenance Expenses (INR Cr): Not applicable as represented by the Management

Forecasted Major Maintenance Expenses (INR Cr):

Particulars for the year/ period ended	31-Mar-23	31-Mar-24	31-Mar-25	31-Mar-26	31-Mar-27	31-Mar-28	31-Mar-29	31-Mar-30
No of Months	6	12	12	12	12	12	12	12
Major Maintenance Expenses	0.00	0.00	0.00	0.00	3.12	0.00	45.63	0.62

Particulars for the year/ period ended	31 Mar-31	31 Mar-32	31 Mar-33	31 Mar-34	31 Mar-35	31-Mar-36	31 Mar-37
No of Months	12	12	12	12	12	12	12
Major Maintenance Expenses	11.97	0.00	0.00	3.27	0.00	0.00	0.00

Particulars for the year/ period ended	31 Mar-38	31 Mar-39	31 Mar-40	31 Mar-41	31 Mar-42	30-Sep-42
No of Months	12	12	12	12	12	6
Major Maintenance Expenses	0.00	4.62	112.17	0.00	0.00	0.00

Source: Management information

D. On-going material litigations including tax disputes and claims in relation to the assets, if any;

As represented by the Management, there are no litigations pending against the project as at 31st July 2022.

E. Revenue pendencies including local authority taxes associated with InvIT asset and compounding charges, if any

As represented by the Management, there are no revenue pendencies including local authority taxes associated or compounding charges associated with the project as at 31st July 2022.

F. Vulnerability to natural or induced hazards that may not have been covered in town planning building control.

As represented by the Management, any natural or induced hazards would be adequately covered by insurance.

G. Latest Pictures of the project along with date of physical inspection

Please refer **Appendix 5.**

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8.2.2. Shivpuri (Madhya Pradesh) to Jhansi (Uttar Pradesh)

8.2.2.1. Project Overview

Parameters	Details
Project Name	NH27 Shivpuri (Madhya Pradesh) to Jhansi (Uttar Pradesh)
Length of the project	75.30 kms
Toll Plaza Location	Raksha

Source: Management information

8.2.2.2. Additional Procedures to be complied with in accordance with InvIT regulations

A. List of one-time sanctions/approvals which are obtained or pending:
As represented by the Management, the list of sanctions/ approvals obtained untill 31st July 2022 is provided in **Appendix 3.**

B. List of up to date/ overdue periodic clearances:
As represented by the Management, all other material permits, registrations, licenses, approvals, consents and other authorizations (collectively, "Governmental Licenses") shall be obtained by NHIPPL as per individual project requirements once the rights and obligations are assumed by the SPV. The Project SPV (NHIPPL) would in due course and as required under applicable law procure all the Governmental Licenses issued by, and shall make all material declarations and filings with, the applicable Governmental Authority to own, lease, license, operate and use its properties and assets and to conduct the business by the Project SPV, as will be described in the placement documents. No notice of proceedings has been received relating to the revocation or modification of any Governmental Licenses, except as would not result in a Material Adverse Change. The general list of Governmental Licenses is enclosed in **Appendix 4**.

C. Estimates of already carried out as well as proposed major repairs and improvements along with estimated time of completion:

Historical Major Maintenance Expenses (INR Cr): Not applicable as represented by the Management

Forecasted Major Maintenance Expenses (INR Cr):

Particulars for the year/ period ended	31-Mar-23	31-Mar-24	31-Mar-25	31-Mar-26	31-Mar-27	31-Mar-28	31-Mar-29	31-Mar-30
No of Months	6	12	12	12	12	12	12	12
Major Maintenance Expenses	0.00	0.00	0.00	0.00	5.08	0.00	77.72	1.05

Particulars for the year/ period ended	31 Mar-31	31 Mar-32	31 Mar-33	31 Mar-34	31 Mar-35	31-Mar-36	31 Mar-37
No of Months	12	12	12	12	12	12	12
Major Maintenance Expenses	19.66	5.31	1.16	2.65	110.81	1.29	9.68

Particulars for the year/ period ended	31 Mar-38	31 Mar-39	31 Mar-40	31 Mar-41	31 Mar-42	30-Sep-42
No of Months	12	12	12	12	12	6
Major Maintenance Expenses	25.01	4.57	0.00	119.11	19.70	0.00

Source: Management information

D. <u>On-going material litigations including tax disputes and claims in relation to the assets, if any;</u>
As represented by the Management, there are no litigations pending against the project as at 31st July 2022.

E. <u>Revenue pendencies including local authority taxes associated with InvIT asset and compounding charges, if any</u>
As represented by the Management, there are no revenue pendencies including local authority taxes associated or compounding charges associated with the project as at 31st July 2022.

F. <u>Vulnerability to natural or induced hazards that may not have been covered in town planning building control.</u>
As represented by the Management, any natural or induced hazards would be adequately covered by insurance.

G. <u>Latest Pictures of the project along with date of physical inspection</u>
Please refer **Appendix 6.**

8.2.3. Borkhedi – Wadner – Deodhari – Kelapur (Maharashtra/Telangana Border)

8.2.3.1. Project Overview

Parameters	Details
Project Name	NH44 Borkhedi – Wadner – Deodhari - Kelapur (Maharashtra)
Length of the project	138.15 kms
Toll Plaza Location	Daroda and Kelapur

Source: Management information

8.2.3.2. Additional Procedures to be complied with in accordance with InvIT regulations

A. List of one-time sanctions/approvals which are obtained or pending:

As represented by the Management, the list of sanctions/ approvals obtained untill 31st July 2022 is provided in **Appendix 3.**

B. List of up to date/ overdue periodic clearances:

As represented by the Management, all other material permits, registrations, licenses, approvals, consents and other authorizations (collectively, "Governmental Licenses") shall be obtained by NHIPPL as per individual project requirements once the rights and obligations are assumed by the SPV. The Project SPV (NHIPPL) would in due course and as required under applicable law procure all the Governmental Licenses issued by, and shall make all material declarations and filings with, the applicable Governmental Authority to own, lease, license, operate and use its properties and assets and to conduct the business by the Project SPV, as will be described in the placement documents. No notice of proceedings has been received relating to the revocation or modification of any Governmental Licenses, except as would not result in a Material Adverse Change. The general list of Governmental Licenses is enclosed in **Appendix 4**.

C. Estimates of already carried out as well as proposed major repairs and improvements along with estimated time of completion:

Historical Major Maintenance Expenses (INR Cr): Not applicable as represented by the Management

Forecasted Major Maintenance Expenses (INR Cr):

Particulars for the year/ period ended	31-Mar-23	31-Mar-24	31-Mar-25	31-Mar-26	31-Mar-27	31-Mar-28	31-Mar-29	31-Mar-30
No of Months	6	12	12	12	12	12	12	12
Major Maintenance Expenses	4.31	0.00	0.00	5.15	42.53	0.98	207.68	34.85

Particulars for the year/ period ended	31 Mar-31	31 Mar-32	31 Mar-33	31 Mar-34	31 Mar-35	31-Mar-36	31 Mar-37
No of Months	12	12	12	12	12	12	12
Major Maintenance Expenses	0.00	22.78	2.66	0.00	276.45	0.00	44.34

Particulars for the year/ period ended	31 Mar-38	31 Mar-39	31 Mar-40	31 Mar-41	31 Mar-42	30-Sep-42
No of Months	12	12	12	12	12	6
Major Maintenance Expenses	28.01	0.00	0.00	330.45	9.71	0.00

Source: Management information

D. <u>On-going material litigations including tax disputes and claims in relation to the assets, if any;</u>
As represented by the Management, there are no litigations pending against the project as at 31st July 2022.

E. <u>Revenue pendencies including local authority taxes associated with InvIT asset and compounding charges, if any</u>
As represented by the Management, there are no revenue pendencies including local authority taxes associated or compounding charges associated with the project as at 31st July 2022.

F. <u>Vulnerability to natural or induced hazards that may not have been covered in town planning building control.</u>
As represented by the Management, any natural or induced hazards would be adequately covered by insurance.

G. <u>Latest Pictures of the project along with date of physical inspection</u>
Please refer **Appendix 7.**

9. Valuation Conclusion

We have carried out the Enterprise Valuation of the Specified Projects as of 31st July 2022, considering *inter-alia* Traffic Study and Technical Reports of independent consultants, Business plan/ Projected financial statements of the Specified Projects and other information provided by/ on behalf of the Management, industry analysis and other relevant factors.

The Valuation summary of the Specified Projects as of 31st July 2022 is as follows:

Particulars	WACC	Enterprise Value (INR Cr)
Agra Bypass	10.60%	1,021
Shivpuri Jhansi		450
Borkhedi – Wardner – Deodhari - Kelapur		1,354
Total	**10.60%**	**2,825**

Note: The Enterprise Value of respective Specified Projects has been estimated considering *inter-alia* apportionment of common expenses to the Specified Projects and may not be representative of the Enterprise Value of each Specified Project on a 'standalone' basis.

Sensitivity Analysis

WACC	10.30%	10.40%	10.50%	10.60%	10.70%	10.80%	10.90%
Enterprise Value (INR Cr)	2,919	2,888	2,856	2,825	2,795	2,765	2,735
Percentage Change (%)	3.3%	2.2%	1.1%	0.0%	-1.1%	-2.1%	-3.2%

Appendices

Appendix 1 - WACC

Particulars		Remarks
Debt-to-equity Ratio	1.00	Considering *inter-alia* typical funding pattern for road infrastructure projects and long-term debt-equity ratio and permissible leverage under the SEBI InvIT Regulations
Unlevered Beta – Industry	0.45	Beta is a measure of the risk of the shares of a company. ß is the co-variance between the return on sample stock and the return on the market. In order to determine the appropriate beta factor for the Company, consideration must be given either to the market beta of the Company or betas of comparable quoted companies. Unlevered beta has been estimated based on the 5-year monthly beta of select comparable companies.
Cost of Equity (Ke)		
Risk Free Rate (Rfr)	~ 7.31%	Based on 10-year zero coupon yield curve for GoI securities as at 31st July 2022
Equity Market Risk Premium	~ 7.00%	Equity Market equity risk premium is estimated considering inter-alia historical equity market returns over a risk-free rate and forward-looking equity market risk premium estimates. Data sources reviewed generated a range of equity risk premium indications. However, a 7% equity market risk premium was considered reasonable representative of the equity risk premium for India.
Relevered Beta	~ 0.90	Considering *inter-alia* 5-year monthly beta of comparable companies and debt-to-equity ratio
Additional Risk Premium	1.00%	Considering *inter-alia* nature of revenue of the Specified Projects (toll collection), projected performance of the Specified Projects, macro-economic additional uncertainties due to Covid 19 pandemic and certain global events, partially offset by the operational nature of the Specified Projects.
Cost of Equity (Ke)	~ **14.6%**	
Cost of Debt (Kd)		
Pre-Tax Cost of Debt (Kd)	~ 8.0%	The Management estimate considering *inter-alia* prevailing interest rate at which the Trust has borrowed money from the consortium of three banks, impact of measures taken/ expected to be taken by the Reserve Bank of India to curtail inflationary pressures, etc.
Effective tax rate	~ 17.8%	Estimated considering *inter-alia* tax depreciation/ amortization policy proposed to be followed and corporate income tax rate
Post-Tax Cost of Debt (Kd)	~ **6.6%**	
WACC	~ **10.58%**	
Rounded off WACC	~ **10.60%**	

Appendix 2 – Discounted Cash Flow (DCF)

Enterprise Valuation of the Specified Projects

Amount in INR Cr.

Financial Year		FY2023	FY2024	FY2025	FY2026	FY2027	FY2028	FY2029
Months		6	12	12	12	12	12	12
Revenue		161.0	372.7	402.4	443.1	484.2	521.1	558.9
Operating EBITDA before MMR Provisions		137.1	287.2	312.1	347.5	383.1	414.1	455.4
Less: IM Expenses		(5.3)	(5.9)	(6.5)	(7.1)	(7.8)	(8.6)	(9.5)
Less: Income Tax		-	-	-	-	-	-	-
Less: MMR Expenses		(4.3)	-	-	(5.2)	(50.7)	(1.0)	(331.0)
Less: Capital Expenditure		-	(765.4)	(91.7)	-	-	-	-
(Increase)/Decrease in Working Capital		(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Free Cashflows		**127.4**	**(484.1)**	**213.9**	**335.3**	**324.5**	**404.5**	**114.9**
Time to Midpoint		0.25	1.00	2.00	3.00	4.00	5.00	6.00
Discount Rate	10.60%	0.98	0.90	0.82	0.74	0.67	0.60	0.55
Discounted Cash Flow		**124.2**	**(437.7)**	**174.9**	**247.8**	**216.9**	**244.4**	**62.8**

Financial Year		FY2030	FY2031	FY2032	FY2033	FY2034	FY2035	FY2036
Months		12	12	12	12	12	12	12
Revenue		602.4	656.7	718.8	777.5	838.5	914.4	997.4
Operating EBITDA before MMR Provisions		482.6	529.7	584.2	645.1	697.9	773.5	838.1
Less: IM Expenses		(10.4)	(11.4)	(12.6)	(13.9)	(15.2)	(16.8)	(18.4)
Less: Income Tax		-	-	-	(120.2)	(159.4)	(84.8)	(199.8)
Less: MMR Expenses		(36.5)	(31.6)	(28.1)	(3.8)	(5.9)	(387.3)	(1.3)
Less: Capital Expenditure		-	-	-	-	-	-	-
(Increase)/Decrease in Working Capital		(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Free Cashflows		**435.6**	**486.7**	**543.5**	**507.2**	**517.3**	**284.6**	**618.6**
Time to Midpoint		7.00	8.00	9.00	10.00	11.00	12.00	13.00
Discount Rate	10.60%	0.49	0.45	0.40	0.37	0.33	0.30	0.27
Discounted Cash Flow		**215.2**	**217.4**	**219.5**	**185.2**	**170.8**	**85.0**	**166.9**

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Financial Year		FY2037	FY2038	FY2039	FY2040	FY2041	FY2042	FY2043
Months		12	12	12	12	12	12	6
Revenue		1,083.0	1,177.7	1,279.8	1,393.4	1,508.0	1,633.5	887.7
Operating EBITDA before MMR Provisions		913.8	997.8	1,088.5	1,179.8	1,288.3	1,428.6	778.3
Less: IM Expenses		(20.3)	(22.3)	(24.5)	(27.0)	(29.7)	(32.7)	(18.0)
Less: Income Tax		(206.7)	(229.1)	(263.8)	(261.5)	(204.5)	(346.2)	(193.8)
Less: MMR Expenses		(54.0)	(53.0)	(9.2)	(112.2)	(449.6)	(29.4)	-
Less: Capital Expenditure		-	-	-	-	-	-	-
(Increase)/Decrease in Working Capital		(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	0.2
Free Cashflows		**632.8**	**693.3**	**791.0**	**779.0**	**604.5**	**1,020.4**	**566.7**
Time to Midpoint		14.00	15.00	16.00	17.00	18.00	19.00	19.75
Discount Rate	10.60%	0.24	0.22	0.20	0.18	0.16	0.15	0.14
Discounted Cash Flow		**154.4**	**153.0**	**157.8**	**140.5**	**98.6**	**150.5**	**77.5**

Enterprise Value	**2,825**

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Appendix 3 – List of one-time sanctions/approvals

- As represented by the Management, information regarding applicable one-time sanctions obtained by the respective Specified Projects is not available with the Trust.

Appendix 4 – List of Governmental Licenses

S. No.	Statutory Permission
1	Environmental Clearance
2	Forest Clearance
3	Tree Cutting permission
4	Borrow Area permission from state & local panchayat office
5	Boulder Extraction permission from state & local panchayat office
6	Quarry permission
7	Drilling & Blasting -Explosive License & permissing
8	Permission from State to draw Ground Water from river / reservoir
9	Factory License for Camp Set up
10	Shop & Establishment License for Setting up of Office other than Camp
11	Labour License
12	Inspector of Factories- For Setting up of Crusher, Batching Plant and HMP (CTE)
13	Inspector of Factories & Local Panchayat- For Consent to Operate- Crusher, Batching Plant and HMP (CTO)
14	PCB permission for Batching plant, HMP and Crusher Set up
15	PCB Permission/ State permission for using DG sets in camp and Construction projects
16	Approval /permission from Utility Shifting Agency- Electricity, Gas, Water pipelines for Excavations & elevated structure erection
17	Approval of Railways for ROB / RUB Construction
18	RTO permission to Operate and Run Construction equipments (movable) which does not have registration
19	Other any, as per local/ state Judicial body

Appendix 5 – Agra Bypass: Latest Pictures of the project along with date of physical inspection

- Date of physical inspection: 8th August 2022

Raibha Toll Plaza

Agra bypass Road Stretch

Appendix 6 – Shivpuri-Jhansi: Latest Pictures of the project along with date of physical inspection

- Date of physical inspection: 9th August 2022

Raksha Toll Plaza

Shivpuri to Jhansi Road Stretch

Appendix 7 – Borkhedi - Wadner - Deodhari - Kelapur: Latest Pictures of the project along with date of physical inspection

- Date of physical inspection: 24th August 2022

Daroda Toll Plaza

Borkhedi - Wadner - Deodhari - Kelapur Road Stretch

ANNEXURE B

TECHNICAL CONSULTANT REPORTS

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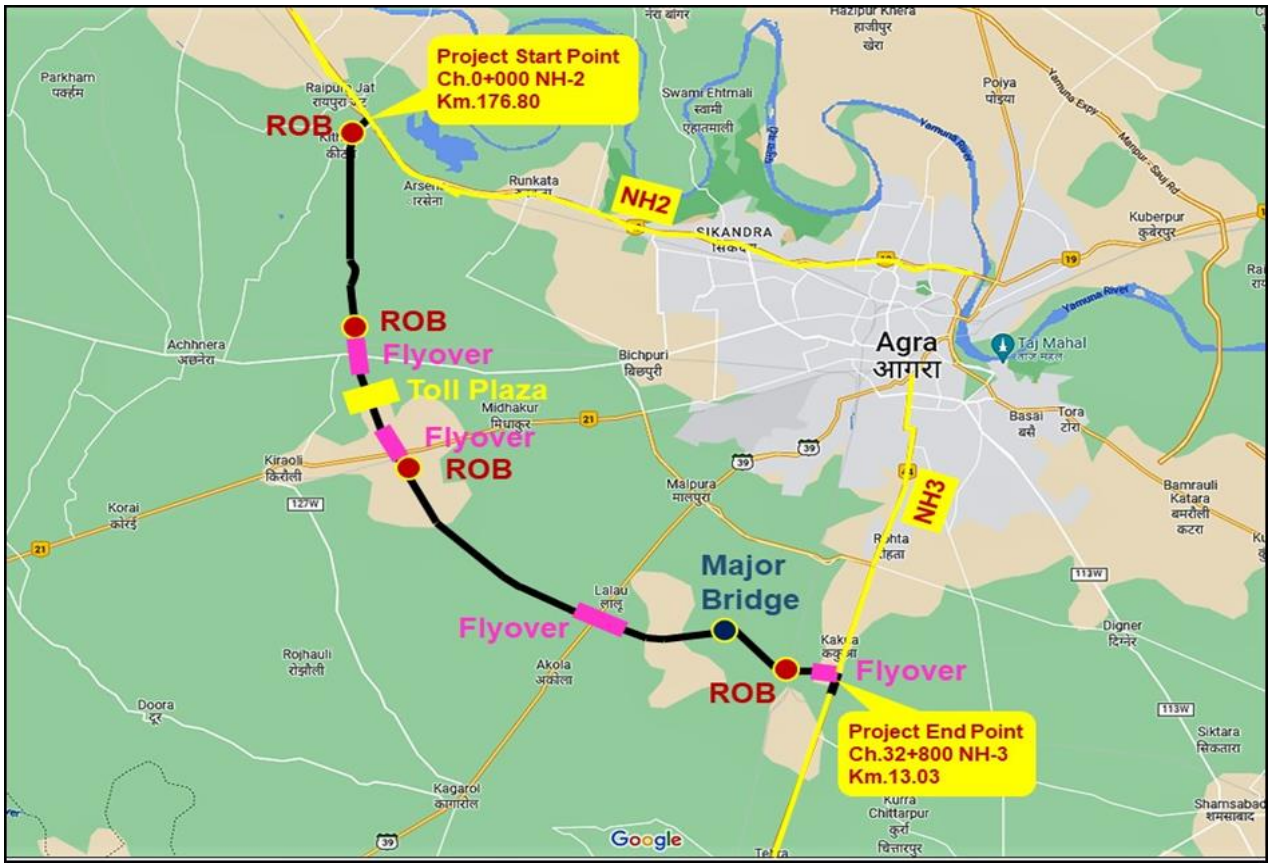
NATIONAL HIGHWAYS INFRA INVESTMENT MANAGERS PVT. LTD.

TECHNICAL DUE DILIGENCE OF AGRA BYPASS (32.80 KM) CONNECTING KM. 176.80 OF NH 2 TO KM 13.030 OF NH 3 IN THE STATE OF UTTAR PRADESH



FINAL REPORT

August 2022

CONSULTING
ENGINEERS GROUP LTD

TECHNICAL DUE DILIGENCE OF "AGRA BYPASS (32.80 KM) CONNECTING KM. 176.80 OF NH 2 TO KM 13.030 OF NH 3 IN THE STATE OF UTTAR PRADESH"

FINAL REPORT

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CHAPTER 1
INTRODUCTION

1.1 PROJECT BACKGROUND

NHAI is looking to monetize its road assets by engaging a private operator for undertaking operation, maintenance and management of the Project Highway for 20 years under Toll Operate Transfer (InvIT) Mode.

The National Highways Infra Investment Managers Private Limited (NHIIMPL) has appointed M/s Consulting Engineers Group Ltd. as Consultant for technical due diligence for Agra Bypass (Design Chainage 1.000 to Km 32.80 Km) connecting km. 176.80 of NH 2 to Km 13.030 of NH 3 in the state of Uttar Pradesh.

1.2 PROJECT HIGHWAY SALIENT FEATURES

The Project Index map is shown in **Figure 1.1.** The salient features of the project are as below.

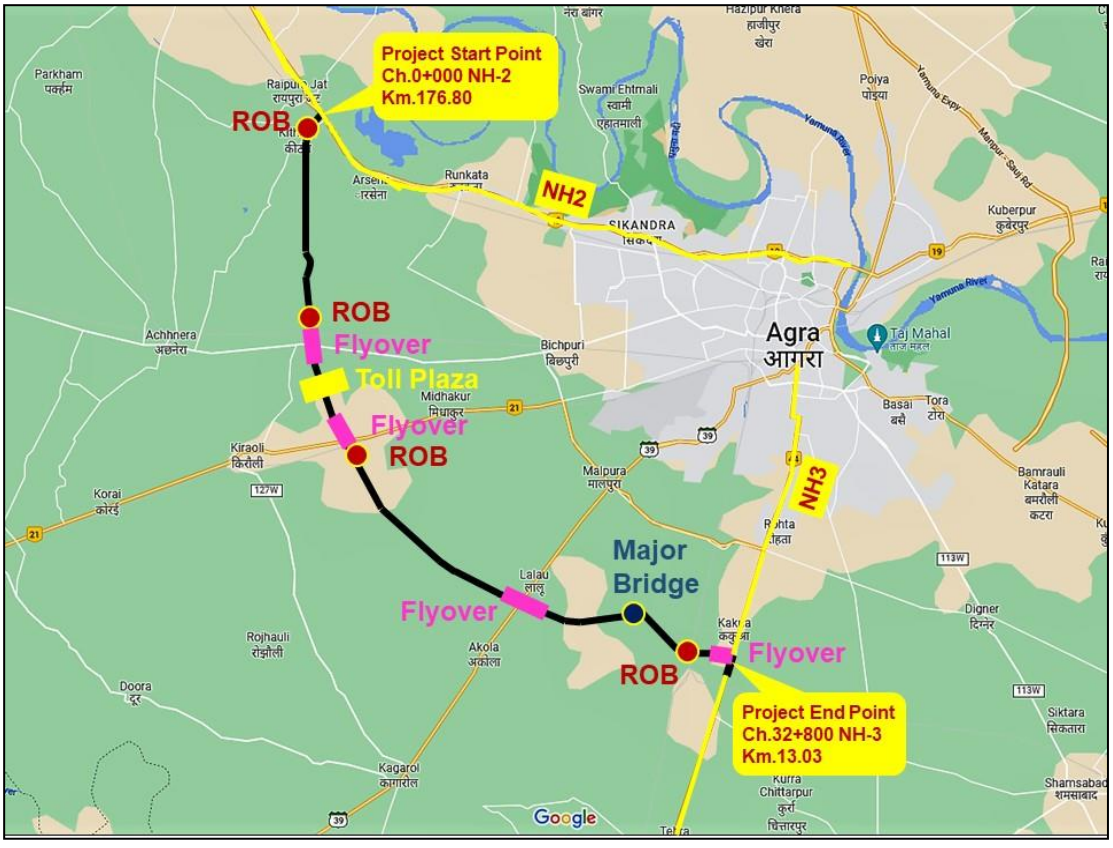


Figure 1.1: Project Index Map

The Project salient features & components are as follows.

Table 1.1: Project Salient Features & Components

Item No.	Particulars	Details
A	Start Chainage	km 176.8 of NH2 (0+000)
B	End Chainage	km 13.03 of NH3 (32+800)
C	Project Length	**32.80 Km**
1	Toll Plaza	1 No at Raibha (Km 10.80)
2	Slip Road Length (LHS +RHS)	LHS: 4.83 km; RHS: 5.45 km
3	Service Road Length	0.394 km
4	Major Junction	5 Nos
5	Minor Junction	15 Nos
6	VUP	10 Nos
7	PUP	12 Nos
8	AUP	Nil
9	Flyover	5 Nos
10	ROB	4 Nos
11	Major Bridge	1 No
12	Minor Bridge	11 Nos
13	Culvert	25 Nos
	Slab Culverts	Nil
	Pipe Culverts	06 Nos
	Box Culverts	22 Nos
14	Truck Lay Byes	NIL
15	Bus Bays	NIL
16	Toilet Blocks	NIL

1.3 REVIEW OF AVAILABLE DOCUMENTS

The following documents have been provided by NHIIMPL to carry out the study .

1. Concession Agreement & Technical Schedules (Dec 2021)
2. Monthly Progress Reports by Contractor during Construction
3. Monthly Progress Reports by Independent Engineer – January 2022- March 2023 (O & M)
4. As Built Highway & Structure Drawings
5. Technical Schedule for O & M

CHAPTER 2
SURVEYS & INVESTIGATION

2.1 GENERAL

NHIIMPL provided the Concession Agreement (CA) and Technical Schedules (December 2021) for Tolling , Operation, Maintenance & Transfer of the project to the Consultants. Consultant validated the details mentioned in Schedule A of CA through road and pavement inventory survey.

Schedule B of CA specifies that *The Concessionaire shall visit the Site and assess the durability and strength of Project Assets and make his own assessment for operation, management and maintenance as per Specifications and Standards and bear and pay all costs, expenses and charges in connection with or incidental to the performance of operation, management and maintenance.* To assess the project strength and maintenance requirements following survey & investigations have been carried out as per the Scope of Work.

- Road Inventory
- Structure Inventory
- Pavement Condition Survey
- Axle Load Survey
- Roughness Survey
- FWD Survey
- Material Survey
- Drone Videography

2.2 PAVEMENT CONDITION SURVEY

2.2.1 Flexible Pavement

The project section has flexible pavement for the total length of the road except the Toll Plaza.

- Alligator cracking is present in primarily in LHS as a result of overloading & non-maintenance.
- In LHS, ruts are present in at least one of the lanes from 5 to 40 mm.
- Patching over cracks is also present to varying extents.

- Cracks & ruts are mainly confined to inner lane due to channelization of truck traffic.
- Primarily coal laden trucks are overladen.
- RHS receives empty trucks, so cracking is minimal, but ruts of 20 to 50 mm.

Table 2.1: Summary of LHS Flexible Pavement Condition

Chainage		Alligator Cracking		Rutting Depth (mm)		Patching % Area
From Km	To Km	Inner Lane %	Outer Lane %	Inner Lane	Outer Lane	
0.000	1.000	10	10	0 to 20	0 to 20	0 % to 2%
1.000	2.000	10	10	5 to 5	5 to 10	0 % to 0.4%
2.000	3.000	20	0	10 to 10	0 to 0	0 % to 2.5%
3.000	4.000	10	0	10 to 10	0 to 0	0 % to 0.25%
4.000	5.000	10	0	10 to 10	0 to 0	0 % to 1%
5.000	6.000	0	0	5 to 5	0 to 0	0 % to 2.2%
6.000	7.000	0	0	5 to 5	5 to 5	0 % to 1.5%
7.000	8.000	0	0	5 to 5	0 to 0	0 % to 2.2%
8.000	9.000	10	0	5 to 5	5 to 5	0 % to 1%
9.000	10.000	0	0	10 to 10	5 to 5	0 % to 0.8%
10.000	11.000	10	0	20 to 20	5 to 5	0 % to 0.07%
11.000	12.000	20	20	0 to 5	0 to 5	0 % to 3.6%
12.000	13.000	10	0	5 to 5	0 to 0	0 % to 0.4%
13.000	14.000	10	10	10 to 10	0 to 0	0 % to 0.4%
14.000	15.000	40	20	10 to 10	5 to 5	1 % to 3.8%
15.000	16.000	30	10	20 to 20	5 to 5	0 % to 6%
16.000	17.000	40	10	20 to 20	5 to 5	0 % to 0.3%
17.000	18.000	70	10	30 to 30	5 to 5	0.3 % to 4%
18.000	19.000	60	10	20 to 20	5 to 5	0.3 % to 1.5%
19.000	20.000	60	10	20 to 20	5 to 5	0 % to 0.4%
20.000	21.000	30	0	0 to 20	0 to 0	0 % to 4.5%
21.000	22.000	10	0	20 to 20	0 to 0	0 % to 2.4%
22.000	23.000	10	0	15 to 15	0 to 0	0 % to 2.3%

Chainage		Alligator Cracking		Rutting Depth (mm)		Patching % Area
From Km	To Km	Inner Lane %	Outer Lane %	Inner Lane	Outer Lane	
23.000	24.000	10	0	15 to 15	0 to 0	0 % to 18%
24.000	25.000	10	0	10 to 10	0 to 5	0 % to 50%
25.000	26.000	40	10	20 to 40	0 to 0	1 % to 35%
26.000	27.000	30	10	20 to 20	0 to 0	0 % to 0.8%
27.000	28.000	30	10	30 to 30	5 to 5	
28.000	29.000	40	10	40 to 40	5 to 5	0 % to 50%
29.000	30.000	10	0	40 to 40	5 to 5	0 % to 1.2%
30.000	31.000	10	0	40 to 40	5 to 5	0 % to 2.8%
31.000	32.000	10	10	30 to 30	10 to 10	0 % to 47%
32.000	32.800	10	0	0 to 10	0 to 5	0 % to 0%

RHS has much less Alligator cracking and Rutting than LHS, since mainly empty trucks travel here.

Table 2.2: Summary of RHS Flexible Pavement Condition

Chainage		Alligator Cracking		Rutting Depth (mm)		Patching % Area
From km	To km	Inner Lane %	Outer Lane %	Inner Lane	Outer Lane	
0.000	1.000	10	10	0 to 20	0 to 20	0 % to 13%
1.000	2.000	10	10	30 to 30	30 to 30	0 % to 0%
2.000	3.000	10	10	30 to 30	20 to 20	0 % to 2%
3.000	4.000	10	10	30 to 30	20 to 20	0 % to 1.5%
4.000	5.000	0	0	0 to 0	0 to 0	0 % to 1.7%
5.000	6.000	10	10	20 to 20	5 to 5	0 % to 0.9%
6.000	7.000	10	10	20 to 20	5 to 5	0 % to 1.25%
7.000	8.000	10	10	20 to 20	5 to 5	0 % to 3%
8.000	9.000	20	20	30 to 30	5 to 5	0 % to 0.4%
9.000	10.000	20	20	30 to 30	5 to 5	0 % to 2.4%
10.000	11.000	20	20	30 to 30	5 to 5	0.2 % to 7%
11.000	12.000	30	30	30 to 30	5 to 5	0 % to 3%

Chainage		Alligator Cracking		Rutting Depth (mm)		Patching % Area
From km	To km	Inner Lane %	Outer Lane %	Inner Lane	Outer Lane	
12.000	13.000	30	30	30 to 30	5 to 5	0.3 % to 1.9%
13.000	14.000	30	30	30 to 30	5 to 5	0 % to 50%
14.000	15.000	20	20	30 to 30	5 to 5	0 % to 14%
15.000	16.000	20	20	40 to 40	5 to 5	0 % to 1.7%
16.000	17.000	10	10	40 to 40	5 to 5	0.07 % to 2.6%
17.000	18.000	10	10	30 to 40	5 to 5	0 % to 2%
18.000	19.000	10	10	30 to 30	5 to 5	1.1 % to 3%
19.000	20.000	10	10	30 to 30	5 to 5	0 % to 1%
20.000	21.000	10	10	30 to 50	5 to 5	0 % to 0.5%
21.000	22.000	10	10	40 to 50	5 to 5	0 % to 0.21%
22.000	23.000	10	10	30 to 50	5 to 5	0 % to 2.5%
23.000	24.000	10	10	30 to 40	5 to 5	0 % to 0.4%
24.000	25.000	10	10	30 to 30	5 to 5	0 % to 1.4%
25.000	26.000	10	10	20 to 30	5 to 5	0 % to 0.75%
26.000	27.000	0	0	30 to 30	5 to 5	0 % to 0.5%
27.000	28.000	20	10	30 to 30	5 to 5	0 % to 1%
28.000	29.000	20	20	30 to 50	5 to 5	0 % to 4%
29.000	30.000	20	10	20 to 30	5 to 5	0 % to 0.9%
30.000	31.000	10	0	30 to 30	5 to 5	0 % to 0.5%
31.000	32.000	20	0	20 to 20	5 to 10	0 % to 50%
32.000	32.800	20	20	0 to 40	0 to 30	0 % to 0.2%

In both directions, trucks are channelized in inner lane. So while inner lane shows a lot of distress, the outer lane is comparatively in a much better condition with cracking generally around 10% and rutting around 5 mm.

Rutting at 15.500 (LHS)	**Rutting at 29.100**
Patchwork on Outer Lane at 31.400	**Patchwork on Inner lane at 13.200**

Figure 2.1: Flexible Pavement Condition

2.2.2 Pavement damage due to Soil Erosion

Damage to pavements in the start and end portion of the embankments of grade separated structures & the diverging portion of service road is seen. Due to the absence of stone pitching, the embankment has eroded ultimately leading to settlement of the pavement in those portions. Stone pitching is needed at all such locations to arrest soil erosion in future.

Embankment erosion in MCW	**Embankment erosion in Service/Slip Road**

Figure 2.2: Pavement Damage due to Erosion

2.2.3 Rigid Pavement

- Rigid Pavement is provided only for Toll Plaza portion.
- Eleven (11) Panels are damaged which need immediate replacement.
- Damaged longitudinal sealants.

Figure 2.3: Rigid Pavement Condition

2.2.4 Service Road

There are a total of 33 service roads. They are generally in good condition. Damage is caused due to soil erosion. Summary of their condition, widths and locations are given below.

Table 2.3: Summary of Service/Slip Roads LHS

S. No.	From (m)	To (m)	Length (m)	Width (m)	Condition of Service Road
1	850.000	1350.000	500.000	5.5	Good
2	3020.000	3160.000	140.000	5.5	Good
3	8050.000	8350.000	300.000	5.5	Good
4	9030.000	9980.000	950.000	7.5	Good
5	13180.000	13580.000	400.000	7.5	Good
6	15550.000	15690.000	140.000	7	Fair
7	17990.000	18250.000	260.000	5.5	Fair
8	18900.000	19400.000	500.000	3.5	Fair
9	20820.000	21200.000	380.000	5.5	Good
10	23150.000	23750.000	600.000	5.5	Good
11	25620.000	26610.000	990.000	3.5	Poor

S. No.	From (m)	To (m)	Length (m)	Width (m)	Condition of Service Road
12	26620.000	26800.000	180.000	3.5	Good
13	27620.000	27850.000	230.000	3.5	Good
14	28800.000	28950.000	150.000	3.5	Fair
15	30000.000	30100.000	100.000	3.5	Good

Table 2.4: Summary of Service/Slip Roads RHS

S. No.	From (m)	To (m)	Length (m)	Width (m)	Condition of Service Road
1	31400.000	31360.000	40.000	3.5	Poor
2	30050.000	29900.000	150.000	5.5	Good
3	28940.000	28800.000	140.000	5.5	Good
4	27900.000	27700.000	200.000	3.5	Poor
5	27000.000	26850.000	150.000	3.5	Poor
6	25800.000	25650.000	150.000	5.5	Good
7	23700.000	22900.000	800.000	3.5	Good
8	21190.000	20860.000	330.000	5.5	Good
9	19400.000	18900.000	500.000	3.5	Good
10	18220.000	17950.000	270.000	5.5	Good
11	15690.000	15550.000	140.000	3.5	Good
12	13560.000	13140.000	420.000	5.5	Good
13	10000.000	9100.000	900.000	7.5	Good
14	8200.000	8000.000	200.000	3.5	Good
15	7180.000	6800.000	380.000	2	Good
16	5400.000	5000.000	400.000	2	Good
17	3250.000	3150.000	100.000	3.5	Good
18	1400.000	900.000	500.000	5.5	Good

2.3 STRUCTURE INVENTORY

2.3.1 Introduction

Structures at site were validated with respect to available data shceudle A of CA to highlight the mismatches, deficiencies, if any.

Furthermore, for validation & condition survey of structures, guidelines of IRC publications are usually utilized to identify various details/ defects viz

- Structure type and span arrangement (with respect to CA etc),
- Type & Condition of superstructure (for cracks, spalling of concrete, leaching, exposed & corroded Reinforcement etc.)
- Type & Condition of sub-structure (for cracks, spalling of concrete, leaching, exposed & corroded Reinforcement etc.),
- Type and condition of the bearing,
- Type and condition of expansion joint,
- Condition of Approaches (Return wall/ retaining wall/ RE wall)
- Growth of vegetation around the Vent ways
- Type & condition of pitching/ revetment
- Condition of Bed (i.e. Existing Bed protection measures, Scouring observed etc.)
- Condition of Wearing Coat
- Type and condition of railing/crash barrier
- Condition (rusting/ clogging) of drainage spouts
- Condition of weep holes.
- Hydraulic adequacy,
- Defunct, partially buried and submerged culverts

2.3.2 Validation for Structures

Cross drainage structures were validated during site visit based on the details provided in CA & As-built drawings.

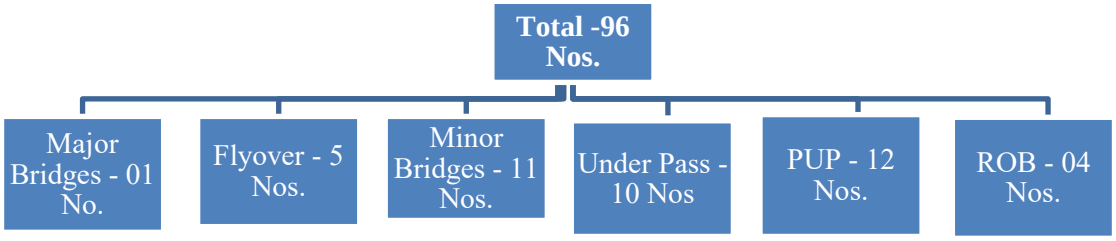


Figure 2.4: Summary of Existing Structures observed at Site

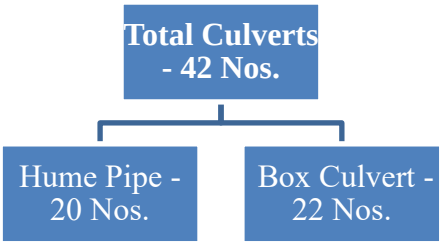


Figure 2.5: Summary of Existing culverts observed at Site

2.3.3 Validation of Existing Major Structures

The type, span & number of bridges have been validated with respect to bridges mentioned in MPR.

Table 2.5: Existing Major Structures Summary

S. No.	Description	As per CA	As per site validation
1	Major Bridges	01	01
2	Minor bridges	11	11
3	ROB	04	04
4	Flyover	05	05
5	PUP	12	12
6	HP Culvert	20	20
7	Box Culvert	22	22
8	Under Pass	10	10

2.3.4 Common Defects Observed in Structures

A) Growth of Vegetation obstructing the vent way or in Structure Components

At some bridge locations, the growth of vegetation & bushes was observed posing as an obstacle to the flow of stream/ drain. Some bridge locations are indicated below.

MNBR at Ch. 01+838	MNBR at Ch. 03+640

MNBR at Ch. 06+799	UP at Ch. 08+183
UP at Ch. 16+555	UP at Ch. 18+115
PUP at Ch 19+095	PUP at Ch 19+380
PUP at Ch 19+825	UP at Ch 21+054

PUP at Ch 21+384	PUP at Ch 22+007
PUP at Ch 22+515	PUP at Ch 24+464
PUP at Ch 25+843	PUP at Ch 26+334
UP at Ch 26+835	PUP at Ch 27+327

PUP at Ch 27+863	UP at Ch 28+948
PUP at Ch 31+401	

B) Cracks or other structural minor defects observed

At some locations cracks were observed in structural components and are represented below.

PUP at Ch 1+125	MNBR at CH.1+838

MNBR at CH.1+838	MNBR at CH. 3+142
MNBR at CH.6+799	MNBR at CH 6+799
ROB at CH 8+954 Settlement pass	ROB at CH 8+954
UP at Ch 15+661	UP at Ch 16+555

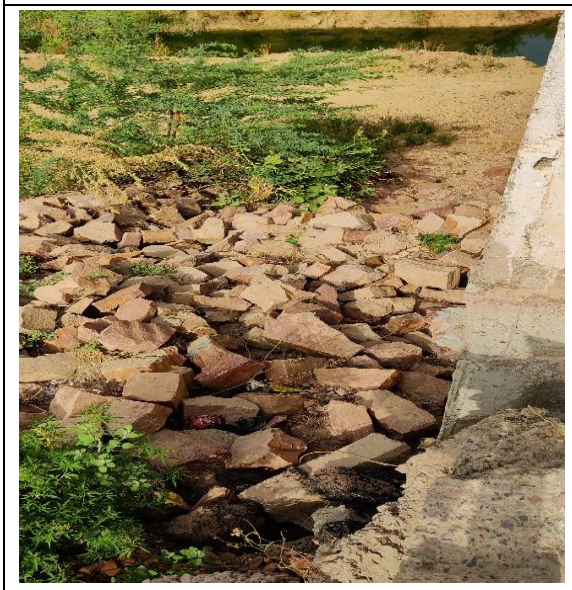
UP at Ch 18+825	UP at Ch 21+384
PUP at Ch 22+515	PUP at Ch 24+464
PUP at Ch 31+401	

C) Condition of stone pitching

Existing Stone Pitching were generally not found to be in fair condition. Some of the chainages are shown:

MNBR at Ch. 11+448	MNBR at Ch. 03+142
MNBR at Ch. 03+640	MNBR at Ch. 05+597
MNBR at Ch. 06+799	MNBR at Ch. 08+183
MNBR at Ch. 12+701	MNBR at Ch. 15+661

MNBR at CH. 17+661	PUP at CH. 19+055
PUP at CH. 19+380	PUP at CH. 19+825
UP at CH. 21+054	PUP at CH. 21+384

PUP at CH. 22+007	PUP at CH. 22+515
PUP at CH. 24+464	PUP at CH. 27+327
	
MNBR at CH. 31+547	

D) Damaged or absence of Railing/ Crash Barrier

At some locations cracks of minor in nature were observed in RCC railing/ crash barrier was observed to be in damaged condition and are represented below.

<table>
<tr><td> </td><td> </td></tr>
<tr><td>MNBR at CH.1+838</td><td>MNBR at CH.6+799</td></tr>
<tr><td> </td><td> </td></tr>
<tr><td>ROB at CH 8+954</td><td>UP at Ch 16+555</td></tr>
<tr><td> </td><td></td></tr>
<tr><td>PUP at Ch 31+401</td><td></td></tr>
</table>

E) Disturbed Quadrant pitching

At many locations, quadrant pitching was observed to be disturbed.

MNBR at Ch. 03+640	MNBR at Ch. 05+597
MNBR at Ch. 11+448	MNBR at Ch. 03+142
MNBR at Ch. 12+701	MNBR at Ch. 15+661

MNBR at CH. 17+661	PUP at CH. 19+380
PUP at CH. 19+825	PUP at CH. 22+515
PUP at CH. 24+464	PUP at CH. 27+327
MNBR at CH. 31+547	

2.3.5 Summary of Structure Conditions

- In consultant's view, the structures are in 'fair' functional state without hampering its design & loading capabilities. However, for smooth & optimum usage of the structures some periodic & routine maintenances are suggested wrt to the following (majorly) for their optimum functioning:
    - Expansion joints
    - Stone Pitching
    - Vegetation growth
    - Settlement at the structure locations
    - Repair for exposed reinforcement etc.
- In view of the same, there is no such structure that possess any major defects (affecting its service life adversely) requiring immediate attention/ repair/ short-term works .
- However, following site observations require attention in terms of the following:
    - Immediate clearing of the vegetation growth in pitching & over the structure components:
    - Approach slab: as settlement observed at many locations
    - Cleaning of Expansion Joints of the debris
    - Repair of damaged Crash barriers
- Consultant anticipates works on these structures should be conducted on routine & periodic basis as stipulated in the Schedule F of O&M Concession agreement.

2.4 ROAD INVENTORY

The details of all existing parameters such as width of carriageway, service roads / slip roads, sign boards, crash barriers, drainage arrangements etc as per Schedule A have been verified at site which are elaborated as below: -

2.4.1 Length of project highway

The length of project highway on both sides is as tabulated below.

Direction	Existing kilometer (km)		Length of Project Highway (km)	Remarks
	From	To		
Left Hand Side (LHS)	0	32.800	32.8	Direction: From Mathura to Gwalior (NH-2 to NH3)
Right Hand Side (RHS)	0	32.800	32.8	Direction: From Gwalior to Mathura (NH-3 to NH-2)

Further, Both Hand Side (BHS) indicates both Left and Right Hand Side of Project Highway.

Apart from above length, the Ramps after km 0+000 (Up Ramp-1: From Agra City (NH-2) to Agra Bypass - 220m;

Up Ramp-2 : From Mathura NH-2 to Agra Bypass- 510m;

Down Ramp-3: From Agra Bypass to Mathura (NH-2)- 402m; Down Ramp-4: From Agra Bypass to Gwalior (NH-3) - 475m) for Entry & Exit of Agra Bypass, at flyovers and at at –Grade Junction at end with NH-3 are also in the scope of work.

2.4.2 Built Up Settlements along Project Highway

The details of built up area / urban area / settlements along the Project Highway are given below.

S. No	Existing kilometer (km)		Length of Built-up-area (in km)		Name of Settlement
	From	To	LHS	RHS	
NIL					

2.4.3 Right of Way

The existing Right of Way for the whole stretch of project highway is as per tabulated below.

S. No.	Existing kilometer (km)		Side		Total ROW (m)
	From	To	LHS (m)	RHS (m)	
1	0+000	6+000	32	28	60
2	6+000	15+000	30	30	60
3	15+000	18+000	31	31	62

4	18+000	32+800	30	30	60

2.4.4 Carriageway

The configuration of project highway is 4-lane divided carriageway having 7m wide carriageway, 0.25m kerb shyness, and 1.5m paved shoulder on either side of median except at structures and approaches of grade separated structures. The carriageway width varies at locations of merging and diverging with junctions, median openings, at approaches to structures and for deck width and carriageway width of structures, tables for structures should be referred. The existing width of earthen shoulder varies from 0.5m to 1m throughout the project road except at structure & their approaches. Details of approximate existing carriageway widths are provided below.

S. No.	Existing kilometer (km)		Length (m)	LHS Carriageway Width (m)	Median width including shyness (m)	RHS Carriageway Width (m)	Remarks
	From	To					
1	0+000	0+125	125	10.4	-	-	Up Ramp-1 (From Agra City NH-2 to Agra Bypass)
2	0+125	0+172	47	Merging Taper	-	-	
3	0+000	0+172	142	Varies between 10.2 to 10.6m	-	-	Up Ramp-2 (From Mathura NH-2 to Agra Bypass)
4	0+000	0+172	142	Varies between 10.2 to 10.6m	-	10.4	Down Ramp-3 (From Agra Bypass to Mathura NH-2)
5	0+172	0+237	65	10.3	-	10.3	-
6	0+237	0+330	93	10.3	-	10.3	-
7	0+330	0+920	590	8.4 to 8.5	varies	8.4 to 8.5	-
8	0+920	1+330	410	8.2 to 10.3	5	8.4 to 10.3	-
9	1+330	1+730	400	8.3 to 8.5	5.3	8.5	-
10	1+730	1+930	200	8.4	5.3	8.5	-
11	1+930	3+230	1300	8.3 to 8.5	5.2	8.5	-
12	3+230	3+330	100	8.45	5.2	8.5	-

S. No.	Existing kilometer (km)		Length (m)	LHS Carriageway Width (m)	Median width including shyness (m)	RHS Carriageway Width (m)	Remarks
	From	To					
13	3+330	5+030	1700	8.3 to 8.5	5.2	8.5	-
14	5+030	5+330	300	8.4	5	8.5	-
15	5+330	5+430	100	8.4	5	8.5	-
16	5+430	5+730	300	8.4 to 8.5	5	8.5	-
17	5+730	6+130	400	8.4 to 8.5	5	8.5	-
18	6+130	8+067	1937	8.4 to 8.5	5	8.4 to 8.5	-
19	8+067	8+332	265	8.7	5	8.7	-
20	8+332	8+907	575	8.5	4.9	8.5	-
21	8+907	8+983	76	10.6	-	10.6	-
22	8+983	9+105	122	10.5	5	10.5	-
23	9+105	9+967	862	10.5	5	10.5	-
24	9+967	10+720	753	8.5	5	8.5	-
25	10+720	10+885	165	Toll Plaza	Toll Plaza	Toll Plaza	-
26	10+885	12+000	1115	8.5	5	8.5	-
27	12+000	12+590	590	8.5	5	8.4 to 8.5	-
28	12+590	13+176	586	8.5	5	8.5	-
29	13+176	13+548	372	10.6	5	10.5	-
30	13+548	13+800	252	10.5	5	10.5	-
31	13+800	15+553	1753	8.5	4.8	8.5	-
32	15+553	15+788	235	8.5	4.5	8.5	-
33	15+788	17+987	2199	8.5	4.8	8.5	-
34	17+987	18+252	265	8.4	4.8	8.4 to 8.5	-
35	18+252	18+937	685	8.4 to 8.5	4.9	8.4 to 8.5	-
36	18+937	20+865	1928	8.5	4.9	8.5	-
37	20+865	21+085	220	8.5	4.9	8.5	-
38	21+085	21+185	100	8.5	4.9	8.5	-
39	21+185	22+390	1205	8.5	4.9	8.5	-
40	22+390	23+134	744	8.6	4.9	8.5	-
41	23+134	23+709	575	10.5	4.9	10.7	-

S. No.	Existing kilometer (km)		Length (m)	LHS Carriageway Width (m)	Median width including shyness (m)	RHS Carriageway Width (m)	Remarks
	From	To					
42	23+709	25+668	1959	8.5	4.9	8.5	-
43	25+668	25+992	324	8.5	4.9	8.5	-
44	25+992	26+665	673	8.5	4.8	8.5	-
45	26+665	26+973	308	8.5	4.8	8.5	-
46	26+973	27+671	698	8.5	4.9	8.5	-
47	27+671	28+165	494	8.5	4.9	8.5	-
48	28+165	28+825	660	8.5	4.9	8.5	-
49	28+825	28+900	75	8.4	4.9	8.4	-
50	28+900	29+570	670	8.4 to 8.5	4.9	8.4 to 8.5	-
51	29+570	29+870	300	8.4	4.9	8.4	-
52	29+870	30+055	185	8.4	4.9	8.4	-
53	30+055	30+655	600	8.5	5	8.5	-
54	30+655	30+755	100	8.5	5	8.5	-
55	30+755	31+598	843	10.8	5	10.5	-
56	31+598	32+100	502	8.5	5	8.5	-
57	32+100	32+290	190	8.5	5	8.5	Taper portion for LHS-Ramp to Agra City (Varies between 0.0m to 8.5m)
58	32+290	32+800	510	8.5	4.8	8.5	LHS-Ramp to Agra City and RHS-Ramp to Agra Bypass from NH-3
59	32+100	32+290	190	Varies between 8.5 to 10.0	-	-	Exit Ramp-4 (From Agra Bypass to Gwalior)
60	32+290	32+800	510	Varies between 10.0m to			

S. No.	Existing kilometer (km)		Length (m)	LHS Carriageway Width (m)	Median width including shyness (m)	RHS Carriageway Width (m)	Remarks
	From	To					
				10.4m			

2.4.5 Bypasses

The details of existing bypasses are as under:

S. No.	Existing kilometer (km)		Length of Bypass (in km)		Bypass
	From	To	LHS	RHS	
NIL					

2.4.6 Service Roads/Slip Roads

A) Slip Road

Details of the Slip roads are given in table below.

S. No.	Existing kilometer (LHS) km		Length (m)	Width (m)	Existing kilometer (RHS) km		Length (m)	Width (m)
	From	To			From	To		
1	0+930	1+330	400	4.0-7.0	0+920	1+370	450	4.0-7.0
1	3+030	3+154	124		3+030	3+154	124	
2	8+045	8+337	292		5+016	5+410	394	
3	9+070	9+975	905	5.5-8.25	8+061	8+337	276	
4	13+180	13+745	565	5.5 – 7.0	9+070	9+965	895	5.5-8.25
5	15+555	15+686	131	4.0-7.0	13+150	13+745	595	5.5 – 7.0
6	17+990	18+260	270		15+555	15+686	131	4.0-7.0
7	18+930	19+304	374		17+975	18+260	285	
8	20+860	21+190	330		18+940	19+480	540	
9	23+130	23+695	565	5.5 – 7.0	20+860	21+190	330	
10	25+670	26+000	330	4.0-7.0	23+130	23+705	575	5.5 – 7.0
11	26+680	26+830	150		25+670	25+840	170	4.0-7.0
12	27+670	27+856	186		26+830	26+985	155	
13	28+800	28+938	138		27+690	27+856	166	
14	30+000	30+078	78		28+800	28+938	138	

S. No.	Existing kilometer (LHS) km		Length (m)	Width (m)	Existing kilometer (RHS) km		Length (m)	Width (m)
	From	To			From	To		
15	-	-	-	-	29+920	30+078	158	
16	-	-	-	-	31+360	31+432	72	
	Total (LHS)		**4838**		**Total (RHS)**		**5454**	**-**

B) Service Road

Details of the Service roads are given in table below:

S. No.	Existing kilometer LHS (km)		Length	Width	Existing kilometer RHS (km)		Length	Width
	From	To			From	To		
1			-	-	5+016	5+410	394	3.5-4.0
	Total Length		-	-	**Total Length**		394	-

2.4.7 Structures

There are total 96 structures along Project Highway. The details of structures along the Project Highway are given below.

S. No.	Type of Structure	Unit	Structures
1	Major Bridges	No	1
2	Minor Bridges	No	11
3	Flyover / Grade Separator	No	5
4	ROB	No	4
5	VUP	No	10
6	PUP	No	12
7	Slab Culverts	No	Nil
8	Pipe Culverts	No	6
9	Box Culverts	No	22
10	Utility Ducts	No.	25
	Total	**No.**	**96**

A) Major Bridge

The Site includes the following Major Bridges.

S. No	Existing kilometer (km)	Side	Span Arrangement	Length of Structure (m)	Carriage way width (m)	Deck Width (m)	Footpath	Type of Substructure	Type of Superstructure	Coordinates
1	28+072 UP No. 29/2	LHS	3 x 50.0	150.04	2 x 11.0	2 x 12.0	No	Wall Type/ Column Type	PSC Box Girder	791757.77 E
		RHS								2998793.74 N

B) Minor Bridge

The Site includes the following Minor Bridges.

S. No	Existing kilometer (km)	Side	Span Arrangement	Length of Structure (m)	Carriageway width (m)	Deck Width (m)	Footpath	Type of Substructure	Type of Superstructure	Coordinates
1	1+839 MNB No. 2/3	LHS	1X30.0	30.04	2x11.0	2x12.0	No	Wall type	PSC-I Girder with RCC Deck Slab	778191.00 E
		RHS								3016777.00 N
2	3+142 MNB No. 4/1	LHS	1X30.0	30.042	2x11.0	2x12.0	No	Wall type	PSC-I Girder with RCC Deck Slab	778184.89 E
		RHS								3015471.17 N
3	3+640 MNB No. 4/3	LHS	1X20.0	20.041	2x11.0	2x12.0	No	Wall type	PSC-I Girder with RCC Deck Slab	778201.87 E
		RHS								3014975.31 N
4	4+190 MNB No. 5/1	LHS	1X35.0	35.044	2x11.0	2x12.0	No	Wall type	PSC-I Girder with RCC Deck Slab	778219.12 E
		RHS								3014424.75 N
5	5+597 MNC No. 6/2	LHS	1X36.20	36.248	2x11.0	2x12.0	No	Wall type	PSC-I Girder with RCC Deck Slab	778275.56 E
		RHS								3013019.02 N
6	6+800 MNB No. 7/1	LHS	1X35.0	35.04	2x11.0	2x12.0	No	Wall type	PSC-I Girder with RCC Deck Slab	778314.48 E
		RHS								3011817.33 N
7	11+448	LHS	1X20.0	20.042	2x11.0	2x12.0	No	Wall	PSC-I Girder	779150.90 E

S. No	Existing kilometer (km)	Side	Span Arrangement	Length of Structure (m)	Carriageway width (m)	Deck Width (m)	Footpath	Type of Substructure	Type of Superstructure	Coordinates
	MNB No. 12/1	RHS						type	with RCC Deck Slab	3007276.31 N
8	12+718 MNB No. 13/3	LHS	1X25.0	25.044	2x11.0	2x12.0	No	PSC-I Girder with RCC Deck Slab	PSC-I Girder with RCC Deck Slab	779613.02 E
		RHS								3006111.41 N
9	17+661 MNB No. 18/2	LHS	1X25.0	25.052	2x11.0	2x12.0	No	Wall type	PSC-I Girder with RCC Deck Slab	782359.84 E
		RHS								3002023.92 N
10	28+981 MNB No. 29/3	LHS	1X40.0	40.04	2x11.0	2X12.0	No	PSC-I Girder with RCC Deck Slab	PSC-I Girder with RCC Deck Slab	792565.24 E
		RHS								2998476.42 N
11	31+547 MNB No. 32/3	LHS	1X25.0	25.04	2x11.0	2X12.0	No	Wall Type	PSC-I Girder with RCC Deck Slab	794663.55 E
		RHS								2997230.13 N

2.4.8 Flyover and Interchange

The Site includes the following Flyover and Interchange Structures.

S. No	Existing kilometer (km)	Side	Span Arrangement	Length of Structure (m)	Carriageway width (m)	Deck Width (m)	Footpath	Type of Substructure	Type of Superstructure	Coordinates
1	(-) 0+054 F/O No. 1/1	LHS	2x50.0	100.04	1x11.0	1x12.0	No	Column type/Circular type	PSC Box Girder (Continuous Span)	778776.96 E 3018454.39 N
2	9+413 F/O No. 10/1	LHS	1x30.0	30.04	2x11.0	2x12.0	No	Wall type	PSC-I Girder with RCC Deck Slab	778576.00 E 3009219.51 N
3	13+490 F/O No. 14/2	LHS	2X30.0	60.042	2X11.0	2x12.0	No	Wall type	PSC-I Girder with RCC Deck Slab	779994.34 E 3005422.10 N
4	23+390 F/O No. 24/1	LHS	1X30.0	30.04	2X11.0	2x12.0	No	Wall Type	PSC -I Girder with RCC Deck Slab	787240.34 E 2999118.43 N
5	32+800 F/O No. 33/2	LHS	3X33.0	99.08	1X11.0	1x12.0	No	Column type/Circular type	PSC Box Girder (Continuous Span)	795869.14 E 2997227.72 N

2.4.9 ROB

The Site includes the following ROBs.

S. No.	Existing kilometer (km)	Side	Span Arrangement	Length of Structure (m)	Carriageway width (m)	Deck Width (m)	Footpath	Type of Substructure	Type of Super structure	Coordinates
1	0+287 ROB No. 1/2	LHS RHS	2X15+1 X30+2X 15	90.04	2X11.0	2X12.0	No	Wall Type	RCC-I Girder/ PSC-I Girder with RCC Deck Slab	778557.76 E
2	8+954 ROB No. 9/3	LHS RHS	2X15+1 X30+2X 15	90.04	2X11.0	2x12.0	No	Wall Type	RCC-I Girder/ PSC-I Girder with RCC Deck Slab	778539.23 E
3	13+706 ROB No.14/4	LHS RHS	2X15+1 X30+2X 15	90.04	2X11.0	2x12.0	No	Wall Type	RCC-I Girder/ PSC-I Girder with RCC Deck Slab	780104.44 E
4	31+070 ROB No. 32/1	LHS RHS	1X30.0+ 2X48.0	126.04	2X11.0	2x12.0	No	Type Wall	PSC I Girder/Steel Plate Girder with RCC Deck Slab	794162.71 E

2.4.10 VUP

The Site includes the following VUP Structures.

S. No.	Existing kilometer (km)	Side	Span Arrangement	Length of Structure (m)	Carriageway width (m)	Deck Width (m)	Footpath	Type of Substructure	Type of Superstructure	Coordinates
1.	1+125 UP No. 2/1	LHS	1X10.0	11.50	2X11.0	2X12.0	No	RCC Box	RCC Box	778202.52 E
		RHS								3017492.46 N
2.	8+185 UP No. 9/1	LHS	1X10.0	11.50	2X11.0	2X12.0	No	RCC Box	RCC Box	778447.86 E
		RHS								3010439.31 N
3.	9+660 UP No. 10/2	LHS	1X10.0	11.50	2X11.0	2X12.0	No	RCC Box	RCC Box	778594.96 E
		RHS								3008947.91 N
4.	14+533 UP No. 15/2	LHS	1X10.0	11.50	2X11.0	2X12.0	No	RCC Box	RCC Box	780501.64 E
		RHS								3004511.00 N
5.	15+686 UP No. 16/1	LHS	1X10.0	11.50	2X11.0	2x12.0	No	RCC Box	RCC Box	781065.96 E
		RHS								3003510.87 N
6.	16+555 UP No. 17/2	LHS	1X10.0	11.50	2X11.0	2x12.0	No	RCC Box	RCC Box	781549.99 E
		RHS								3002784.88 N
7.	18+110 UP No. 19/1	LHS	1X10.0	11.50	2X11.0	2x12.0	No	RCC Box	RCC Box	782699.54 E
		RHS								3001724.50 N
8.	21+062 UP No. 22/1	LHS	1X10.0	11.50	2X11.0	2x12.0	No	RCC Box	RCC Box	785099.93 E
		RHS								3000059.61 N
9.	26+830 UP	LHS						RCC	RCC	790547.47 E

S. No.	Existing kilometer (km)	Side	Span Arrangement	Length of Structure (m)	Carriageway width (m)	Deck Width (m)	Footpath	Type of Substructure	Type of Superstructure	Coordinates
	No. 28/1	RHS	1X10.0	11.50	2X11.0	2X12.0	No	Box	Box	2998576.24 N
10.	28+948 MNB	LHS	1X10.0	11.50	2X11.0	2X12.0	No	RCC	RCC	792539.95 E
	No. 29/3	RHS						Box	Box	2998498.07 N

2.4.11 PUP

The Site includes the following PUP Structures.

S. No.	Existing kilometer (km)	Side	Span Arrangement	Length of Structure (m)	Carriageway width (m)	Deck Width (m)	Footpath	Type of Substructure	Type of Superstructure	Coordinates
1.	19+060	LHS	1X7.0	8.8	2X11.0	2x12.0	No	RCC	RCC	783422.00 E
	PUP No. 20/1	RHS						Box	Box	3001124.00 N
2.	19+380	LHS	1X7.0	8.8	2X11.0	2x12.0	No	RCC	RCC	783677.79 E
	PUP No. 20/2	RHS						Box	Box	3000925.94 N
3.	19+830	LHS	1X7.0	8.8	2X11.0	2x12.0	No	RCC	RCC	784025.79 E
	PUP No. 20/3	RHS						Box	Box	3000648.29 N
4.	21+396	LHS	1X7.0	8.8	2X11.0	2X12.0	No	RCC	RCC	785403.36 E
	PUP No. 22/2	RHS						Box	Box	2999928.29 N
5.	22+007	LHS	1X7. 0	9.2	2X11.0	2X12.0	No	RCC	RCC	785972.36 E
	PUP No. 23/1	RHS						Box	Box	2999673.50 N

S. No.	Existing kilometer (km)	Side	Span Arrangement	Length of Structure (m)	Carriageway width (m)	Deck Width (m)	Footpath	Type of Substructure	Type of Superstructure	Coordinates
6.	22+511 PUP No. 23/2	LHS	1X7. 0	9.2	2X11.0	2X12.0	No	RCC Box	RCC Box	786414.05 E
		RHS								2999431.82 N
7.	24+473 PUP No. 26/1	LHS	1X7. 0	9.2	2X11.0	2X12.0	No	RCC Box	RCC Box	788245.64 E
		RHS								2998752.28 N
8.	25+840 PUP No. 27/1	LHS	1X7. 0 (SKEW)	9.2	2X11.0	2X12.0	No	RCC Box	RCC Box	789569.99 E
		RHS								2998415.71 N
9.	26+330 UP No. 27/2	LHS	1X7.0 (SKEW)	9.2	2X11.0	2X12.0	No	RCC Box	RCC Box	790055.37 E
		RHS								2998489.57 N
10.	27+326 PUP No. 28/2	LHS	1X7.0 (SKEW)	9.2	2X11.0	2X12.0	No	RCC Box	RCC Box	791029.59 E
		RHS								2998667.79 N
11.	27+880 MJB No. 29/1	LHS	1X7.0 (SKEW)	9.2	2X11.0	2X12.0	No	RCC Box	RCC Box	791559.85 E
		RHS								2998768.81 N
12.	31+432 PUP No. 32/2	LHS	1X7.0 (SKEW)	9.2	2X11.0	2X12.0	No	RCC Box	RCC Box	794517.35 E
		RHS								2997229.07 N

2.4.12 Culverts

Details of culverts (Slab, Pipe & Box) are given below.

i) Slab Culverts

S. No.	Structure No.	Chainage	Span Arrangement
Nil			

ii) Pipe Culverts

S. No.	Structure No./ Coordinates	Existing kilometer(km)	Span Arrangement
1A	-	0+000 (On LHS Ramp)	1X1.2 (Dia)
1B	-	-(0+290) (On Delhi -Gwalior UP Ramp)	1X1.2 (Dia)
1C	-	0+100 (On Gwalior- Delhi Down Ramp)	1X1.2 (Dia)
2	-	6+640	1X1.2 (Dia)
3	-	20+180	2x1.2 (Dia)
4	-	24+035	1X1.2 (Dia)

iii) Box Culverts

S. No.	Structure No	Existing Kilometer (km)	Span Arrangement	Coordinates
1.	--	0+737	1X3.5	778273.17 E
				3017869.98 N
2.	BC No. 2/2	1+470	1X6.0	778192.90 E
				3017145.93 N
3.	BC No. 3/1	2+342	1X6.0	778183.80 E
				3016274.43 N
4.	BC No. 3/2	2+870	1X6.0	778179.57 E
				3015747.21 N
5.	BC No. 4/2	3+343	1X6.0	778189.10 E
				3015272.66 N
6.	BC No. 5/1	4+867	1X6.0	778239.64 E

S. No.	Structure No	Existing Kilometer (km)	Span Arrangement	Coordinates
				3013749.53 N
7.	MNB No. 6/2	5+420	1X6.0	778256.36 E
				3013200.65 N
8.	BC No. 8/1	7+060	1X6.0	778329.72 E
				3011557.62 N
9.	UP No. 9/2	8+559	1X6.0	778471.44 E
				3010069.88 N
10.	BC No. 11/1	10+470	1X6.0	778804.52 E
				3008160.55 N
11.	BC No. 13/1	11+840	1X6.0	779285.78 E
				3006908.04 N
12.	CC No. 13/2	12+521	1X6.0	779535.92 E
				3006277.93 N
13.	BC No. 14/1	13+130	1x4.0	779812.27 E
				3005734.49 N
14.	BC No. 14/3	13+530	1X6.0	780007.69 E
				3005390.61 N
15.	BC No. 15/1	14+040	1X6.0	780259.78 E
				3004942.56 N
16.	BC No. 17/1	16+203	1X6.0	781331.70 E
				3003062.55 N
17.	BC No. 18/1	17+502	1X6.0	782233.78 E
				3002131.42 N
18.	PUP No. 25/1	23+834	1x4.2	787649.59 E
				2998960.47 N
19.	BC No. 30/1	29+376	1X6.0	792854.43 E
				2998186.81 N
20.	BC No. 31/1	30+108	1X6.0	793359.51 E
				2997677.21 N
21.	BC No. 31/2	30+276	1X6.0	793478.89 E
				2997557.03 N
22.	BC No. 33/1	32+040	1X6	795159.62 E
				2997262.77 N

2.4.13 Utility Ducts

The details of utility ducts along Project Highway are given below:

S. No.	Existing kilometer (km)	Type of Culvert (Pipe, Slab, Box, Arch)	Span Arrangement (dia.)
1.	0+780	Pipe	1X0.6
2.	3+500	Pipe	1X0.6
3.	11+010	Pipe	1X0.6
4.	11+550	Pipe	1X0.6
5.	12+300	Pipe	1X0.6
6.	12+740	Pipe	1X0.6
7.	14+140	Pipe	1X0.6
8.	14+270	Pipe	1X0.6
9.	14+820	Pipe	1X0.6
10.	15+140	Pipe	1X0.6
11.	15+465	Pipe	1X0.6
12.	16+400	Pipe	1X0.6
13.	16+795	Pipe	1X0.6
14.	16+853	Pipe	1X0.6
15.	16+950	Pipe	1X0.6
16.	17+160	Pipe	1X0.6
17.	17+590	Pipe	1X0.6
18.	17+860	Pipe	1X0.6
19.	17+982	Pipe	1X0.6
20.	21+650	Pipe	1X0.6
21.	21+965	Pipe	1X0.6
22.	22+630	Pipe	1X0.6
23.	22+900	Pipe	1X0.6
24.	23+560	Pipe	1X0.6
25.	28+400	Pipe	1X0.6

2.4.14 Junctions

In existing Project Highway, there are total 5 major junctions (below flyovers) and 15 minor junctions. Details of all junctions are provided below. However, any junctions found extra to be included in scope of the Concessionaire and not considered under change of scope.

a) Grade Separated Major Junction

S. No.	Existing kilometer (km)	Type of Junction	Direction		Type of Cross Road	Remarks
			Left	Right		
1	0+000	T	Agra	Mathura	NH-2	Below Flyover
2	9+413	+	Agra	Achhnera	NH-11	Below Flyover
3	13+490	+	Agra	Kiraoli	NH-21	Below Flyover
4	23+390	+	Agra	Kharagarh	SH-39	Below Flyover
5	32+800	T	Agra	Dholpur	NH-3	Below Flyover

b) Minor Junction

S. No.	Existing kilometer (km)	Type of Junction	Name of Access Road		Remarks
			LHS	RHS	
1.	1+125	+	Achhera	Kitham	Below VUP
2.	5+387	┤	Village Road	-	At Grade Junction
3.	5+983	+	Kathawari	Mangura	At Grade Junction
4.	8+185	X	Kathwali	Raiba	Below VUP
5.	12+455	┤	Village Road	-	At Grade Junction
6.	15+686	X	Dawaoli Midhakur	Bawanagla	Below VUP
7.	18+110	+	Midhakur	Kalahara	Below VUP
8.	19+060	+	Nagla sikarwar	Karaoli road	PUP
9.	21+062	+	Jitora	Ujrai	Below VUP
10.	25+840	+	Malpura	Nagla-kare	PUP
11.	26+830	+	Mankenda	Nagla Sawla	Below VUP
12.	27+880	⊢	-	Nagla	PUP
13.	28+948	+	Mundhera	Mundhera	Below VUP
14.	30+108	⊢	-	khuthawati	Box Structure
15.	31+432	X	Bhandai Railway station	Bad	PUP

2.4.15 Toll Plaza

S. No.	Particular	Details of Raibha Toll Plaza
1.	Toll Plaza Chainage	km 10+800
2.	Number of Tolling Lanes	5+5 (including 2 nos. of extra wide lanes)
3.	Weigh in Motion Facility (Number of Lanes)	Nil
4.	No. of ETC Lanes	5+5
5.	Number of Toll Booths	9 (8-Single TB & 1-Double TB)
6.	Canopy	Yes (damaged)
7.	Administrative Building	Yes
8.	Availability of Tunnel or Elevated Walkway for Movement between Toll Lanes and Administrative Building	No
9.	Availability of Static Weigh Bridge	No
10.	Availability of Loading/Unloading Facility for Overloaded Vehicles	No
11.	Storage facility for Overloaded Material	No
12.	High mast Light	Yes
13.	Street Light	Yes
14.	User Fee Boards	Yes
15.	Cantilever/Gantry Boards	Yes

2.4.16 Bus Bays

The details of Bus Bays on the Project Highway are given in table below

S.No.	Existing kilometer (km)	Side	Remark
Nil			

2.4.17 Truck Lay Bye

The details of Truck Lay Bye on the Project Highway are given in table below

S.No	Existing kilometer (km)	Side	Remark
Nil			

2.4.18 RCC Drain

Details of existing RCC drains shoulder side on Project Highway is given below.

S. No.	Existing kilometer (km)		Direction	Length (m)	Remark
	From	To			
1	32+380	32+800	RHS	420	Along the Rampfrom NH-3 (Gwalior) toAgra Bypass

2.4.19 Pavement Type

S. No.	Existing kilometer (km)		Pavement Type		Remarks
	From	To	LHS	RHS	
1	0+000	32+800	Flexible (Bituminous)	Flexible (Bituminous)	Project Highway except Toll Plaza Approach.
2	10+715	10+820	Rigid (Cement Concrete)	--	Toll Plaza Approach on LHS
3	10+785	10+890	--	Rigid (Cement Concrete)	Toll Plaza Approach on RHS

Summary - The above parameters of the project highway have been verified on site and have been found in order as per the information stated above.

2.4.20 Improvement Proposal

Schedule B provides the initial improvement proposal to be executed in one year from appointed dated. Consultant collected the Site Inventory for improvements proposed in the schedule. The same have been elaborated below: -

1) **Proposed New Slip Roads:-** New Slip Roads are proposed at the below mentioned locations with a width of 7 meters.

S. No.	Existing kilometer (km)		Length (m)		Width (m)
	From	To	LHS	RHS	
1.	15+716	15+826	110	-	7
2.	15+686	15+826	-	140	7
3.	19+304	19+490	186	-	7
4.	19+480	19+600	-	120	7
5.	25+840	26+020	-	180	7

S. No.	Existing kilometer (km)		Length (m)		Width (m)
	From	To	LHS	RHS	
6.	26+830	26+985	155	-	7
7.	26+675	26+830	-	155	7
8.	30+320	30+420	-	100	7
-	**Total Length (m)**		**451**	**695**	-

2) Proposed New Service Roads:- As per Site inventory, considering the traffic circulation, New Service Roads are proposed at the below mentioned locations with a width of 7 meters.

S. No.	Existing kilometer (km)		Length(m)	Width(m)	Side
	From	To			
1.	4+890	5+016	126	7.0	RHS

3) Widening /Improvement of existing service road:- As per the site inventory, following sections shall be widened to 7m paved width as detailed below:

S. No.	Existing kilometer km		Length (m)	Width (m)	Side
	From	To			
1	5+016	5+410	394	7.0	RHS

4) Widening of Existing Structures:- Widening of Structures due to Improvement of Entry & Exit Arrangements are given below:

S. No.	Existing kilometer (km)	Details of Existing Culvert		Improvement Proposal
		Type of Structure	Span/dia. (m)	
1	1+470	RCC Box	1x6.0	Widening
2	2+870	RCC Box	1x6.0	Widening
3	23+834	RCC Box	1x4.2	Widening

5) Repair and Rehabilitation of Embankment/Earthen Shoulders/Paved Shoulders / Stone Pitching:

i. Repair & Rehabilitation of Embankment:

The damaged embankment slopes along the Project Highway and Service/Slip roads shall be re-instated as per the specifications & standards. The treatments for various

embankment heights include the following. K = Providing kerbs, C = Providing chute drains and SP = Provision of Stone Pitching

S. No.	Existing km		Length (m)	Proposed Embk. Treatment/ Protection
	From	To		
1	0+817	0+849	32	C
2	0+849	0+862	13	C
3	1+406	1+430	24	K+C+SP
4	1+430	1+459	29	K+C
5	1+473	1+530	57	K+C+SP
6	1+530	1+540	10	K+C+SP
7	1+540	1+547	7	K+C+turfing
8	1+547	1+720	173	K+C+SP
9	1+720	1+816	96	C+SP
10	2+077	2+332	255	K+C+SP
11	2+346	2+410	64	K+C+turfing
12	2+410	2+692	282	K+C+SP
13	2+692	2+860	168	K+C+SP
14	2+874	3+000	126	K+C+SP
15	3+738	3+995	257	C
16	4+144	4+168	24	SP
17	4+489	4+610	121	K+C+SP
18	4+873	5+406	533	K+C+SP
19	5+818	5+910	92	C
20	5+910	6+000	90	Turfing
21	6+000	6+339	339	Turfing
22	6+339	6+450	111	C
23	6+450	6+540	90	C+SP
24	7+022	7+052	30	K+C+SP
25	7+068	7+092	24	K+C+SP
26	7+092	7+120	28	K+C+SP
27	7+120	7+690	570	K+C+turfing
28	7+690	8+031	341	K+C+SP
29	8+352	8+433	81	K+C+SP
30	10+032	10+100	68	K+C+turfing

S.	Existing km		Length	Proposed Embk. Treatment/
31	10+100	10+260	160	K+C+SP
32	10+260	10+360	100	K+C+turfing
33	10+350	10+464	114	K+C+SP
34	10+479	10+620	141	K+C+SP
35	10+620	10+720	100	K+C+turfing
36	11+118	11+170	52	K+C+turfing
37	11+170	11+210	40	K+C+SP
38	11+260	11+381	121	K+C+SP
39	11+381	11+407	26	C+SP
40	11+560	11+649	89	C+SP
41	11+649	11+803	154	K+C+SP
42	11+820	12+507	687	K+C+SP
43	12+528	12+635	107	K+C+SP
44	12+868	13+015	147	K+C+SP
45	13+015	13+048	33	K+C+SP
46	14+118	14+488	370	K+C+SP
47	14+488	14+523	35	C+SP
48	14+557	14+715	158	K+C+SP
49	14+715	14+910	195	K+C+SP
50	14+910	15+000	90	Turfing
51	15+000	15+050	50	K+C+SP
52	15+050	15+270	220	K+C+turfing
53	15+270	15+407	137	K+C+SP
54	15+407	15+508	101	K+C+SP
55	15+508	15+555	47	K+C+SP
56	15+815	15+853	38	K+C+SP
57	15+853	16+040	187	K+C+SP
58	16+040	16+191	151	Turfing
59	16+205	16+330	125	K+C+turfing
60	16+330	16+381	51	K+C+SP
61	16+381	16+542	161	K+C+SP
62	16+560	16+705	145	K+C+SP
63	16+705	16+780	75	K+C+SP

S.	Existing km		Length	Proposed Embk. Treatment/
64	16+780	17+228	448	Turfing
65	17+300	17+372	72	C+SP
66	17+797	17+939	142	C+SP
67	18+368	18+528	160	C+SP
68	18+827	18+912	85	K
69	20+862	20+896	34	K+C
70	21+207	21+219	12	C+SP
71	23+092	23+135	43	K+C+SP
72	23+698	23+824	126	K
73	25+627	25+631	4	K+C+SP
74	25+631	25+669	38	K+C+SP
75	25+669	25+674	5	C+SP
76	25+990	26+005	15	K+C+SP
77	26+005	26+031	26	K+C+SP
78	26+644	26+677	33	K+C+SP
79	27+629	27+638	9	K+C+SP
80	27+638	27+668	30	K+C+SP
81	27+668	27+692	24	K+C+SP
82	28+161	28+790	629	K+C+SP
83	28+790	28+951	161	C+SP
84	28+990	29+368	378	K+C+SP
85	29+382	29+945	563	K+C+SP
86	29+945	29+959	14	K+C+SP
87	29+959	29+994	35	K+C+SP
88	29+994	30+074	80	K+C+SP
89	30+392	30+428	36	K+C+SP
90	30+552	30+587	35	K+C+SP
91	31+772	31+790	18	Turfing
92	31+790	31+808	18	K+C+SP
93	31+674	31+772	98	C+SP
94	31+849	32+036	187	K+C+SP
95	32+049	32+095	46.5	K+C+SP

6) Junction Improvement

a) Major Junctions – **Following major junctions have been considered for improvement.**

S. No.	Existing kilometer (km)	Type	Improvement Proposal
1.	0+000	3 arm	Junction Improvement shall be as per IRC: SP: 84-2019, Provision of At – Grade Pedestrian crossing facility. Road Signage and Pavement marking as required.
2.	9+413	4 arm	
3.	13+490	4 arm	
4.	23+390	4 arm	
5.	32+800	3 arm	

b) Minor Junctions:- **Below mentioned** minor junctions have been proposed to be developed as per the provisions of Section 3.2 of IRC: SP: 84- 2019. At – Grade Pedestrian crossing facility, Road Signage, Speed Breaker and Pavement marking shall be provided at all minor junctions.

S. No.	Existing kilometer (km)	Type of Junction	Improvement Strategies	Remarks
1.	1+125	+	Junction Improvement with Provision of At – Grade Pedestrian crossing facility. Road Signage and Pavement marking as per IRC: SP:84-2019	VUP
2.	5+983	+	Junction Improvement as per IRC: SP:84-2019, Provision of at – grade Pedestrian crossing facility. Rumble strips, Road Signage and Pavement marking with Channelizing Island, Acceleration and deceleration lane.	At Grade Junction
3.	8+185	X	Junction Improvement with Provision of At – Grade Pedestrian crossing facility. Road Signage and Pavement marking as per IRC: SP:84-2019	VUP
4.	12+455	┤	Junction Improvement as per IRC:SP:84-2019 Provision of at – grade Pedestrian crossing facility. Rumble strips, Road Signage and Pavement marking with Channelizing Island,Acceleration and deceleration lane.	At Grade Junction
5.	15+686	X	Junction Improvement with Provision of At	VUP

S. No.	Existing kilometer (km)	Type of Junction	Improvement Strategies	Remarks
			– Grade Pedestrian crossing facility. Road Signage and Pavement marking as per IRC: SP:84-2019	
6.	18+110	+	Junction Improvement with Provision of At – Grade Pedestrian crossing facility. Road Signage and Pavement marking as per IRC: SP:84-2019	VUP
7.	19+060	+	Junction Improvement with Provision of At – Grade Pedestrian crossing facility. Road Signage and Pavement marking as per IRC: SP:84-2019	PUP
8.	21+062	+	Junction Improvement with Provision of At – Grade Pedestrian crossing facility. Road Signage and Pavement marking as per IRC: SP:84-2019	VUP
9.	25+840	+	Junction Improvement with Provision of At – Grade Pedestrian crossing facility. Road Signage and Pavement marking as per IRC: SP:84-2019	PUP
10.	26+830	+	Junction Improvement with Provision of At – Grade Pedestrian crossing facility. Road Signage and Pavement marking as per IRC: SP:84-2019	VUP
11.	27+880	⊢	Junction Improvement with Provision of At – Grade Pedestrian crossing facility. Road Signage and Pavement marking as per IRC: SP:84-2019	PUP
12.	28+948	+	Junction Improvement with Provision of At – Grade Pedestrian crossing facility. Road Signage and Pavement marking as per IRC: SP:84-2019	VUP
13.	30+108	⊢	Junction Improvement with Provision of At – Grade Pedestrian crossing facility. Road Signage and Pavement marking as per IRC: SP:84-2019	Box
14.	31+432	X	Junction Improvement with Provision of At – Grade Pedestrian crossing facility. Road Signage and Pavement marking as per IRC: SP:84-2019	PUP

7) Entry Exit Arrangements:- Improvements to the entry /exit arrangements shall be constructed/modified as per the Fig. 2.1A & 2.1C of IRC: SP: 84-2019, at the below mentioned locations:

S. No.	Structure Location/ Existing kilometer (km)	LHS Exit	LHS Entry	RHS Exit	RHS Entry
1.	0+000 (Up Ramp-1 from Agra NH-2 to Agra Bypass)	Yes	-		0+000 (Up Ramp-1 from Agra NH-2 to Agra Bypass)
2.	0+000 (Up Ramp-2: Mathura NH-2 to Agra Bypass)	Provision of exit arrangement as per required standards is not feasible due to land constraint, hence adequate safety measures with road signages, road markings etc. need to be provided within available ROW.	-	-	-
3.	0+000 (Down Ramp-3: Agra Bypass to Mathura NH-2)	-	-	-	Provision of entry arrangement as per required standards is not feasible due to land constraint, hence adequate safety measures with road signages, road markings etc. need to be provided within available ROW.

S. No.	Structure Location/ Existing kilometer (km)	LHS Exit	LHS Entry	RHS Exit	RHS Entry
4.	Slip Roads at VUP at km. 1+125	Yes	Yes	Yes	Yes
5.	Slip Roads at Minor Bridge at km 3+142	Yes	-	-	Yes
6.	Service Road at km 4+890 to km 5+200	-	-	Yes	-
7.	Slip Roads at VUP at km 8+185	Yes	Yes	Yes	Yes
8.	Slip Roads at Flyover at km 9+413	Provision of exit arrangement as per required standards is not feasible. Hence adequate safety measures with road signages, road markings etc. need to be provided within available ROW.	Yes	Yes	Provision of entry arrangement as per required standards is not feasible. Hence, adequate safety measures with road signages, road markings etc. need to be provided within available ROW.
9.	Slip Roads at Flyover at km 13+490	Yes	Provision of entry and exit arrangements as per required standards is not feasible. Hence, adequate	Yes	9.

S. No.	Structure Location/ Existing kilometer (km)	LHS Exit	LHS Entry	RHS Exit	RHS Entry
			safety measures with road signages, road markings etc. need to be provided within available ROW.		
10.	Slip Roads at VUP at km 15+686	Yes	Yes	Yes	Yes
11.	Slip Roads at VUP at km 18+110	Yes	Yes	Yes	Yes
12.	Slip Roads at PUP at km 19+060	Yes	-	-	Yes
13.	Slip Roads at PUP at km 19+380	-	Yes	Yes	-
14.	Slip Roads at VUP at km 21+062	Yes	Yes	Yes	Yes
15.	Slip Roads at Flyover at km 23+390	Yes	Yes	Yes	Yes
16.	Slip Roads at PUP at km 25+840	Yes	Yes	Yes	Yes
17.	Slip Roads at VUP at km 26+830	Yes	Yes	Yes	Yes

S. No.	Structure Location/ Existing kilometer (km)	LHS Exit	LHS Entry	RHS Exit	RHS Entry
18.	Slip Roads at PUP at km 27+880	Yes	-	Yes	
19.	Slip Roads at VUP at km 28+948	Yes	-	Yes	
20.	Slip Roads at Box Structure at km 30+108	Yes	-	-	
21.	Slip Roads at Box Structure at km 30+276	-	-	Yes	
22.	Slip Roads at PUP at km 31+432	-	Provision of entry arrangement as per required standards is not feasible due to existing ROB @ 31+070 in short distance. Hence, adequate safety measures with road signages, road markings etc. need to be provided within available ROW.	22.	Slip Roads at PUP at km 31+432

S. No.	Structure Location/ Existing kilometer (km)	LHS Exit	LHS Entry	RHS Exit	RHS Entry
23.	Slip Roads and Ramps at Flyover, Interchange at km 32+800	Yes	Yes	Yes	Yes

8) RCC Drains:- Reinforced Cement Concrete drains shall be provided as detailed below at the following locations:

S. No.	Existing kilometer (km)		Side	Length (m)	Improvement Proposal
	From	To			
1.	10+710	11+120	BHS	410	Minimum 1.5 m wide drain shall be provided on both sides at Toll Plaza Location

9) Rainwater Harvesting**:-** Rain Water Harvesting Structures shall be provided along the Project stretch minimum one number on each side of the carriageway in each Kilometer as per specifications & standards mentioned in IRC.

10) Highway Lighting

Highway Lighting shall be provided at the following locations:

S. No.	Existing kilometer (km)		Length (m)	Remarks
	From	To		
1	-	-	620	Ramp From Mathura (NH-2) to Agra Bypass including Flyover at km 0+000
2	-	-	500	Ramp from Agra Bypass to Mathura (NH-2)
3	-	-	300	Ramp from Agra(NH-2) to Agra Bypass
4	8+850	10+155	1305	ROB @ km 8+954, Flyover @ km 9+413 and VUP @ 9+660

S. No.	Existing kilometer (km)		Length (m)	Remarks
	From	To		
5	-	-	275	Ramp From Bharatpur to Agra Bypass
6	-	-	310	Ramp from Agra Bypass to Agra
7	-	-	560	Ramp From Agra Bypass to Bharatpur
8	-	-	570	Ramp From Agra-to-Agra Bypass
9	12+980	13+800	820	Flyover @ km 13+490 & ROB @ km 13+706 (LHS)
10	12+955	13+800	845	Flyover @ km 13+490 & ROB @ km 13+706 (RHS)
11	-	-	350	Slip Road & Ramp From Fatehpur-Sikri (NH-21) to Agra Bypass
12	-	-	340	Slip Road & Ramp From Agra Bypass to Agra (NH-21)
13	-	-	300	Ramp From Agra Bypass to Fatehpur-Sikri (NH-21)
14	-	-	360	Ramp From Agra(NH-21) to Agra Bypass
15	22+945	23+880	935	Flyover @ km 23+390 (LHS & RHS)
16	-	-	240	Ramp From Kagarol (SH-39) to Agra Bypass

11) High Mast

New high mast light poles shall be provided with a height of 20m at the following locations.

S. No.	Existing kilometer (km)	Minimum Nos. of High masts	Location
1.	0+000	4	Interchange
2.	9+400	2	Junction below Flyover (Bharatpur-Agra Road)
3.	13+480	2	Junction below Flyover (at NH-21)
4.	23+390	2	Junction below Flyover (at SH-39)
5.	32+800	4	Interchange

12) Traffic Signs

a) Existing damaged and non-standards sign boards; Gantry & Cantilever signs shall be replaced.

b) Road signages (cautionary, mandatory and informatory) along the project highway shall be provided wherever required, as per IRC:67-2012 & IRC:SP:84-2019.

c) Overhead Gantry signs (Minimum 7 Nos) and Cantilever Gantry signs (Minimum 4 Nos) shall be provided suitably on the project highway as per IRC:SP:84-2019.

The total number of sign boards proposed shall be as tabulated below.

S.No.	Detail of Signboard	No. Proposed
1	90 cm equilateral triangle	342
2	60 cm equilateral triangle	0
3	60 cm circular	121
4	80 mm x 60 mm rectangular	28
5	60 cm x 45 cm rectangular	0
6	60 cm x 60 cm square	0
7	90 cm high octagon	15
8	Direction and Place Identification signs upto 0.9 sqm size board.	66
9	Direction and Place Identification signs with size more than 0.9 sqm size board.	68
10	Cantilever Over Head	10
11	Over head Gantry	8

1) Road Studs

Road Studs including solar studs shall be provided throughout the project highway as Per IRC:SP:84-2019 – Total 14,578 no. of road studs are to be proposed for the total length of highway.

2) Road Delineators

Road Delineators shall be provided throughout the project highway as per IRC:SP:84-2019 & IRC:79-2019 – Total 166 No. of road delineators are to be proposed for the total length of highway.

3) Kilometer/ Hectometer/Boundary Stones

The damaged/missing kilometer and hectometer stones shall be provided. All the Kilometer & Hectometer stones shall be repainted. Boundary Stones shall be provided throughout the project highway as per IRC: 25 at 50 meter interval on either side. In addition to the above new installation items, any deficient road furniture, kerb item shall be replaced / repaired as per provisions of applicable specifications and standards.

A total of 1313 No. of Km/Hectometer/Boundary stones are proposed to be installed for the total length of highway.

4) Transverse Bar Marking

The Transverse Thermoplastic Bar Marking shall be provided as per NHAI Circular (105/2012) issued vide letter no. 11041/218/2007-Admn, dated- 11th June 2012 and IRC:99- 2018, at the hazardous locations including but not limited to the locations, Median openings (U-Turn Facilities), Toll Plaza approaches, approaches to at-Grade junctions, exit ramps and down side of the approach of the flyovers for both carriageways of Main Highway etc.

A total of 64 Sq.m. of transverse bar markings are proposed to be done.

5) W- Beam Crash Barriers

a) The existing damaged and missing W-Beam crash barriers shall be re-instated/provided throughout the project length including Service/Slip Roads.

b) The Concessionaire shall provide new W-beam crash barriers in median on either side throughout the Project Highway.

c) The W-Beam crash barrier shall be provided for embankment height more than and equal to 3m. on Main Carriageway & Service/Slip Roads.

d) W-Beam crash barrier shall be provided between proposed Service Road & Main Carriageway.

The total length of W Beam Crash Barrier considered for installation is as tabulated below: -

From	To	Length
15716	15826	110
15826	19304	
19304	19490	186
19490	26830	
26830	26985	155
26985	32800	

From	To	Length
0	4890	
4890	5016	126
5016	5410	394
5410	15686	
15686	15826	140
15826	19480	
19480	19600	120
19600	25840	
25840	26020	180
26020	26675	
26675	26830	155
26830	30320	
30320	30420	155
30420	32800	
		1,721
Damaged MBCB	Total	**1,170**
High Embankment		**8,400**

2.5 AXLE LOAD SURVEY

Axle Load Survey was conducted at each toll plaza as per the schedule below.

Table 2.6: Schedule of Axle Load Surveys

Location	Location	Date
Raibha Toll Plaza	10.800 km	7th to 8rd June 2022

Axle Load Survey in progress at Raibha Toll Plaza

2.5.1 Vehicle Damage Factor (VDF)

VDF was calculated for Flexible using the Axle Load Data from Raibha Toll Plaza. VDF will be used for calculation of MSA, which is needed to determine overlay thickness.

Table 2.7: VDF at Toll Plaza

Direction	Bus	LCV	2A	3A	MAV
LHS	0.52	2.38	2.83	9.04	24.09
RHS	0.52	0.39	1.91	3.07	5.13

VDF in LHS shows a stark difference from the values in RHS. LHS is characterized by overloaded trucks carrying aggregate & sand. In RHS these trucks return empty, while other trucks are lightly loaded. This trend is reflected in pavement condition with significantly distress in LHS.

2.5.2 Traffic

CVC survey was not a part of the services. Values are taken from traffic report provided by NHIIMPL, by averaging values from May 2022 to July 2022.

Table 2.8: ADT for Commercial Traffic at Raibha Toll Plaza (May 2022)

Direction	Bus	LCV	2A	3A	MAV
Both	398	420	1496	1770	3197

Capacity Augmentation

Traffic consultant provided the traffic report wherein AADT in PCU for each year has been mentioned. As per Concession Agreement 14.1.1. the project *requires the capacity augmentation for any homogenous/tollable section(s)[1] of the Project Highway in case the average daily traffic of PCUs for that homogenous/tollable section(s), in any Accounting Year shall exceed the designed capacity Target Traffic[2] for Project Highway .*

Target traffic as per IRC SP 84, is 40000 PCU. Referring to following table, target traffic is achieved in FY2030. Preparation of DPR may be executed by NHAI FY 2031 and FY2032. It is assumed that construction of 6 lane will be in 2033 to FY 2034.

[2] Target Traffic to be determined for LOS B as per IRC Code - IRC: SP:84-2019 or any amendments thereof

Table 2.9: Traffic Projections in PCU

Year	Traffic in PCU	Year	Traffic in PCU
FY 23	30,455	FY 34	49,708
FY 24	30,501	FY 35	52,140
FY 25	30,617	FY 36	54,645
FY 26	32,872	FY 37	57,220
FY 27	35,229	FY 38	59,865
FY 28	37,014	FY 39	62,578
FY 29	38,875	FY 40	65,356
FY 30	**40,834**	FY 41	68,197
FY 31	42,896	FY 42	71,098
FY 32	45,066	FY 43	74,055
FY 33	47,350		

It is estimated that Capacity Augmentation will occur in 2032-33. Construction for Six-Laning under EPC mode is due in FY 2032-34. There would be a 5-year Defect Liability Period (DLP) from FY 2034 to FY 2038. Project shall be hand back to InvIT Concessionaire for maintenance of 6-lane highway & assets in 2039-40.

2.5.3 Design Traffic for Overlay Design

A growth rate of 5% is assumed. Calculated MSA for various years as per actual VDF **(Table 3.6)** is shown below. Overlay is proposed to be provided for a 10-year period as per Schedule B. Future overlays/resurfacings will be at maximum 6 year intervals as mandated by Schedule B.

Table 2.10: Design Traffic at Raibha Toll Plaza

Design Life	Agra-Delhi LHS	Delhi-Agra RHS
10 years	178	45

2.6 ROUGHNESS SURVEY

Roughness survey was carried out from 7th June 2022 using Laser Profilometer.

NSV with Laser Profiler

Measurement was done in IRI. The IRI values were converted to BI used to classify pavement condition were taken from execution Schedule F. For Flexible Pavement, classification is - **Good <2000, 2000<=Fair<2400, Poor>=2400**.

Table 2.11: Summary of Flexible Pavement Roughness

From km	To km	Roughness LHS		Roughness RHS	
		BI (mm/km)	Classification	BI (mm/km)	Classification
0.000	1.000	3425	Poor	2323	Fair
1.000	2.000	1782	Good	2490	Poor
2.000	3.000	1787	Good	1590	Good
3.000	4.000	1900	Good	2635	Poor
4.000	5.000	2074	Fair	2322	Fair
5.000	6.000	1736	Good	1736	Good
6.000	7.000	1816	Good	2231	Fair
7.000	8.000	1321	Good	1871	Good
8.000	9.000	2222	Fair	2366	Fair
9.000	10.000	2441	Poor	2165	Fair
10.000	11.000	2840	Poor	2109	Fair
11.000	12.000	2165	Fair	1831	Good
12.000	13.000	2285	Fair	2578	Poor
13.000	14.000	3021	Poor	2156	Fair
14.000	15.000	2388	Fair	2668	Poor
15.000	16.000	2277	Fair	2182	Fair
16.000	17.000	2220	Fair	2399	Fair
17.000	18.000	2621	Poor	1998	Good
18.000	19.000	2352	Fair	3318	Poor
19.000	20.000	2239	Fair	2451	Poor
20.000	21.000	1829	Good	2835	Poor
21.000	22.000	2486	Poor	3519	Poor
22.000	23.000	1850	Good	2835	Poor
23.000	24.000	2356	Fair	2711	Poor
24.000	25.000	2089	Fair	2142	Fair
25.000	26.000	2059	Fair	2023	Fair
26.000	27.000	2174	Fair	2079	Fair
27.000	28.000	2960	Poor	1980	Good

From km	To km	Roughness LHS		Roughness RHS	
		BI (mm/km)	Classification	BI (mm/km)	Classification
28.000	29.000	3257	Poor	2287	Fair
29.000	30.000	1690	Good	2067	Fair
30.000	31.000	2584	Poor	2307	Fair
31.000	32.000	2701	Poor	2562	Poor
32.000	32.800	2451	Poor	2323	Fair
		Summary LHS		Summary RHS	
		Classification	Length in km	Classification	Length in km
		Good	9.000	Good	6.000
		Fair	13.000	Fair	14.895
		Poor	10.695	Poor	11.800

2.7 FWD SURVEY & ANALYSIS

FWD testing was done for 5 points/km in Flexible Pavement. The results are used to determine the overlay requirement. Test pits were conducted at 5 km intervals in a staggered manner to measure crust thickness which is an input for FWD analysis and overlay design.

FWD Survey in progress

The tables below show the BT & Granular thickness, Back-calculated modulus, and overlay requirement for various sections. Overlay of 50 mm BC is required in LHS from km 25.000 to 32.800. No overlay is required in remaining stretches of LHS, and in RHS.

Table 2.12: Calculated Overlay in Flexible Pavement LHS

From km	To km	Length in km	Pavement Thickness (mm)		15th Percentile			Before overlay		Design Traffic (in msa) LHS	After overlay		Overlay Thickness (mm)	
			BT	Granular	BT Layer	Granular Layer	Sub grade	Remaining Fatigue Life	Remaining Rutting Life		Remaining Fatigue Life	Remaining Rutting Life	BC	DBM
0.000	3.000	3.000	260	460	1454	369	77	325	2076	178	-	-	-	-
3.000	6.000	3.000	260	460	1408	367	77	312	1986	178	-	-	-	-
6.000	9.000	3.000	260	460	1403	369	77	314	1997	178	-	-	-	-
9.000	12.000	3.000	260	470	1502	367	77	335	2343	178	-	-	-	-
12.000	15.000	3.000	260	470	2082	368	77	484	3427	178	-	-	-	-
15.000	17.000	2.000	260	470	1444	368	77	324	2251	178	-	-	-	-
17.000	19.000	2.000	230	460	1503	365	77	192	1325	178	-	-	-	-
19.000	22.000	3.000	230	460	1514	365	77	194	1332	178	-	-	-	-
22.000	25.000	3.000	230	460	1495	364	77	190	1312	178	-	-	-	-
25.000	27.000	2.000	200	490	1499	367	77	114	1110	178	344.4	3088	50	-
27.000	30.000	3.000	200	490	1514	367	77	115	1118	178	346.4	3116	50	-
30.000	32.800	2.800	200	490	1520	367	77	116	1123	178	347.8	3125	50	-

Table 2.13: Calculated Overlay in Flexible Pavement RHS

From km	To km	Length in km	Pavement Thickness (mm)		15th Percentile			Before overlay		Design Traffic (in msa) RHS	After overlay		Overlay Thickness (mm)	
			BT	Granular	BT Layer	Granular Layer	Sub grade	Remaining Fatigue Life	Remaining Rutting Life		Remaining Fatigue Life	Remaining Rutting Life	BC	DBM
0.000	3.000	3.000	250	470	1534	368	77	288	2064	45	-	-	-	-
3.000	6.000	3.000	250	470	1502	367	77	282	2019	45	-	-	-	-
6.000	9.000	3.000	250	470	1548	368	77	291	2082	45	-	-	-	-
9.000	12.000	3.000	235	525	1471	368	77	218	2637	45	-	-	-	-
12.000	15.000	3.000	235	525	2264	368	77	351	4025	45	-	-	-	-
15.000	18.000	3.000	240	490	1525	367	77	241	2111	45	-	-	-	-
18.000	22.000	4.000	240	490	1521	368	77	242	2117	45	-	-	-	-
22.000	25.000	3.000	240	490	1483	367	77	235	2059	45	-	-	-	-
25.000	28.000	3.000	210	470	1506	367	77	136	1070	45	-	-	-	-
28.000	31.000	3.000	210	470	1465	367	77	133	1045	45	-	-	-	-
31.000	32.800	1.800	210	470	1545	364	77	137	1081	45	-	-	-	-

Existing pavement has bituminous thickness ranging from 200 to 260 mm, and Granular thickness ranging from 460 to 525 mm. It has been observed from our FWD analysis experience that chances of Structural Overlay (50 mm BC) requirement are very low when BT thickness is at least 200 mm and granular thickness is at least 450 mm. Both conditions are met in present case, so only Resurfacings (40 mm BC) are likely in the future.

2.8 MATERIAL INVESTIGATION

Test Pits were conducted in a staggered manner at 5 km intervals to measure crust thickness and collect subgrade soil sample for testing in the laboratory.

2.8.1 Test Results of Subgrade Soil

The subgrade soil was tested in an NABL accredited lab to get reliable results. The data is shown below.

Table 2.14: Summary of Subgrade Soil Test Results

S. No.	Km	Side	IS Classification	Gradation: Percent by weight retained on the Sieve (IS:2720-IV)						silt and clay content %	Atterberg Limits [IS :2720-Pt-V]			Modified Proctor Test (IS:2720-Pt-VII)		FSI %	Soaked CBR % at 97% of MDD	FDD (gm/cc)	FMC (%)	% Compac-tion
				19 mm	10 mm	4.75 mm	2.0 mm	425 micron	75 micron		LL %	PL %	PI%	MDD (gm/cc)	OMC (%)					
1	5.300	LHS	CL	0.00	0.00	0.00	1.35	2.65	23.35	72.65	30	19	11	1.99	10	0.00	8	1.7	7.1	85
2	8.600	RHS	CL	0.00	0.00	0.00	0.15	1.90	15.90	82.05	33	20	13	1.91	11	12.12	5	1.7	11.9	89
4	12.500	LHS	CL	0.00	0.00	0.40	0.30	1.50	26.50	71.30	29	20	9	1.97	11	0.00	8	1.75	4.85	89
3	15.400	RHS	ML -CL	0.00	2.00	1.30	0.50	2.75	34.45	59.00	25	19	6	1.88	12	0.00	9	1.48	1.02	79
6	18.900	LHS	GC	41.48	4.00	1.72	0.72	1.88	15.16	35.04	26	18	8	2.02	10	0.00	9	1.51	3.52	75

S. No.	Km	Side	IS Classification	Gradation: Percent by weight retained on the Sieve (IS:2720-IV)						silt and clay content %	Atterberg Limits [IS :2720-Pt-V]			Modified Proctor Test (IS:2720-Pt-VII)		FSI %	Soaked CBR % at 97% of MDD	FDD (gm/cc)	FMC (%)	% Compac-tion
				19 mm	10 mm	4.75 mm	2.0 mm	425 micron	75 micron		LL %	PL %	PI%	MDD (gm/cc)	OMC (%)					
5	21.350	RHS	CL	0.00	0.00	0.00	0.15	2.85	34.35	62.65	28	19	9	1.95	10	0.00	8	1.83	7.42	94
7	28.300	LHS	CL	0.00	0.00	0.90	0.45	1.40	23.00	74.25	31	20	11	1.92	12	0.00	8	1.38	9.09	72
8	30.100	RHS	CL	0.00	0.00	2.65	1.45	4.70	32.00	59.20	28	19	9	1.95	11	0.00	9	1.6	5.53	82

2.8.2 Crust thickness

A total of 8 pits were conducted. BT thickness varies from 200 mm to 260 mm. Combined thickness of Granular Base (WMM) and Subbase (GSB) varies from 460 to 525 mm.

Table 2.15: Crust Thickness

S. No.	Location (km)	Side	BT Layer (mm)	WMM (mm)	GSB (mm)
1	5.300	LHS	260	300	160
2	8.600	RHS	250	310	160
3	12.500	LHS	260	280	190
4	15.400	RHS	235	380	145

S. No.	Location (km)	Side	BT Layer (mm)	WMM (mm)	GSB (mm)
5	18.900	LHS	230	240	220
6	21.350	RHS	240	320	170
7	28.300	LHS	200	280	210
8	30.100	RHS	210	320	150

CHAPTER 3
REHABILITATION PLAN & MAINTENNANCE STRATEGY OF HIGHWAY PAVEMENT

3.1 PAVEMENT REHABILITATION PLAN

The Schedule B Clause 2 specifies that that report & rehabilitation strategy has to be followed based on surveys & investigation with design life of 10 years . Consultant proposed following pavement repair strategy for the project based on the FWD survey Analysis carried out and traffic MSA of 178 & 45 on LHS (Agra Delhi) & RHS (Delhi-Agra) respectively

- Milling, 40-50 mm, is proposed to remove existing cracked surface
- Inlay with DBM is proposed to restore pavement thickness prior to structural overlay
- Structural Overlay of 50 mm BC only in LHS from km 25 to 32.8
- Where structural overlay isn't needed, mill & inlay with 40 mm BC.
- Where overlay is not needed, resurfacing of 40 mm BC provided as per Schedule B
- Composite Glass Grid has been proposed considering cracks extend to DBM
- Where cracking > 20% & rutting > 20 mm, milling+ Composite Glass Grid (Saint Gobian CG-100) + inlay with DBM or BC
- Where crack area <= 20%, mill + Inlay with DBM or BC

Table 3.1: Rehabilitation Plan

S. No.	Schedule B Requirement	Rehabilitation Plan
1	As per the pavement distresses, the remedial measures shall be carried out as per IRC: 82- 2015. The remedial measures include but not limited to crack sealing, pothole filling and sealing with bituminous slurry. Moreover, the sections having severe distresses such as alligator cracking and severe rutting shall be milled and the milled sections shall be filled with the appropriate material as per specifications & standards.	Milling, 40-50 mm is proposed to remove existing cracked surface.
		Where cracking > 20% & rutting > 20 mm, milling+ Composite GlassGrid (Saint Gobian CG-100) + inlay with DBM or BC. Inlay with DBM needed to restore pavement thickness prior to structural overlay
		Where crack area <= 20%, mill +

S. No.	Schedule B Requirement	Rehabilitation Plan
		Inlay with DBM or BC
2	For the strengthening of the existing carriageway, Concessionaire shall carryout FWD survey for the entire project highway as per IRC 115- 2014 along with traffic survey and based on the analysis of FWD survey, remaining life is to be assessed. The strengthening requirements shall be assessed for the design life of 10 years as per IRC 115-2014 and the design traffic in MSA calculated accordingly.	Structural Overlay of 50 mm BC only in LHS from km 25 to 32.8. No structural overlay is needed on RHS.
3	The strengthening of the existing pavement of the project highway shall be taken up after pre-overlay treatment and profile corrective course. Further if some sections, which do not require structural overlay as per FWD analysis, functional overlay of 40 mm Bituminous Concrete shall be laid in those stretches for improving roughness and life of pavement after providing profile corrective course if required.	Functional Overlay is proposed Km 5-8 LHS.
4	The functional overlay of 40 mm thick Bituminous Concrete shall be provided on existing Service / Slip Roads and Ramps after pre-overlay treatments including profile corrective course.	Considered as per Schedule.

Km wise Rehabilitation plan is summarized below.

Table 3.2: Summary of Pavement Rehab Plan

From km	To km	Length in km	Mill & inlay 40 mm BC	Mill & inlay 50 mm BC	Provide Composite GlassGrid	Mill& Inlay 50 mm DBM	Overlay (BC+DBM) mm
LHS							
0.000	5.000	5.000	✓				
5.000	8.000	3.000					40
8.000	14.000	6.000	✓				
14.000	21.000	7.0000		✓	✓		
21.000	25.000	4.000	✓				

From km	To km	Length in km	Mill & inlay 40 mm BC	Mill & inlay 50 mm BC	Provide Composite GlassGrid	Mill& Inlay 50 mm DBM	Overlay (BC+DBM) mm
25.000	29.000	4.000				✓	50
29.000	32.800	3.800				✓	50
RHS							
0.000	11.000	11.000	✓				
11.000	14.000	3.000		✓	✓		
14.000	32.800	18.800	✓				

3.2 PAVEMENT MAINTENANCE OVERLAY CYCLE

Schedule B Clause 2 specifies that *The Concessionaire shall carry out the periodic maintenance in full length of project stretch including main carriageway, service/slip roads, Ramps and at facilities etc.* ***either in every sixth year or in the year in which roughness index exceeds the limit as given in Schedule F whichever comes earlier.***

- **Main carriageway**

  Overlays at every six years cycle will be the in year 2022-2023 (as initial improvement works) 2028-2029, 2034-2035 & 2039-2040 across 20 years. However Construction for Six-Laning under EPC mode is due in FY 2032-34. There would be a 5-year Defect Liability Period (DLP) from FY 2034 to FY 2038. Hence second overlay cycle will not be there. The third overlay cycle in 2039-2040 will come after DLP.

- **Service Road**

  Initial overlay in the year 2022-23 is proposed with 40 mm BC VG 40 as intial improvement proposal. Future overlays in 2028-2029 and 2039-2040 with 30 mm BC is proposed.

  Maintenance Calendar is attached at the end of the chapter.

Periodic Maintenance Calendar Showing the timing of Major Maintenance works for Pavement & Structures is provided to understand the relevant years at a glance.

CHAPTER 4
REHABILITATION PLAN & MAINTENANCE STRATEGEY-STRUCTURES

4.1 CONDITION OF EXISTING STRUCTURES

There are 04 Flyovers, 01 Major Bridges, 04 ROB, 11 Minor Bridges, 10 UPs, 12 PUPs, & 42 Culverts along the project stretch. There is no such structure that possesses any major defects (affecting its service life adversely) requiring immediate attention/ repair/ short-term works except the followings.

- Vegetation growth in structure components
- Bearings requiring cleaning & greasing
- Minor damage to Crash barrier & footpath due to above.
- Choked Drainage spouts

4.2 REHABILITATION PLAN OF STRUCTURES

Structures are in 'fair' functional state without hampering its design & loading capabilities. For smooth & optimum usage of the structures, some periodic & routine maintenances are suggested (with respect to following) for optimum functioning.

- Expansion joints
- Pitching
- Vegetation growth
- Drainage provisions
- Approach Slab settlement

Table 4.1: General Maintenance in Initial Improvement Works

S. N.	CH.	Issues										
		Pitching	Exp Jt	Drainage	Bearing	Crash Barrier	Vent way	Vegetation on str component	Defects (spalling/ leaching/ stains/ cracks/ honeycombing, exposed Reinforcement etc.)			
									Superstructure		Deck	Sub-str
									RCC	Steel		
1	Major Bridge	RM	RC	-	-	-	-	RC	-	-	-	-
2	Minor Bridge	RM	RC	-	-	-	-	RC	-	-	-	-
3	ROB	RM	RC	-	-	-	-	RC	-	-	-	-
4	Underpass	RM	-	-	-	-	-	RC	-	-	-	-
5	PUP	RM	-	-	-	-	-	RC	-	-	-	-
6	Flyover	-	RC	-	-	-	-	RC	-	-	-	-
7	Box Culvert	RM	-	-	-	-	-	RC	-	-	-	-
8	HP Culvert	-	-	-	-	-	RC	RC	-	-	-	-

Legend: RM= Requires General Maintenance; RC: Requires Clearing; RT: Required Treatment; RIT: Requires immediate Treatment; NA: Not applicable

4.3 MAJOR MAINTENANCE OF STRCTURES

Following items have been considered for Major Maintenance during Concession Period of 20 Years as per Schedule-F of Concession Agreement.

Rigid Apron - For Box Culverts

Flexible Apron - For Box Culverts

Curtain Wall - For Box Culverts

Polymer Modified cement (25 mm thick)

Guinting over surface area of Substructure

NDT of Substructure

Bridge Load test

POT cum PTFE bearing

Metallic bearing

Greasing and Cleaning bearing and joints

Polymer mixed cement Injection /Epoxy Grout by injection through nipples:

Repair and rehabilitation & Painting of steel structures.

Replacement of Strip seal Expansion joint

Replacement of Asphaltic plug Expansion Joint

Replacement of Glass Grid

Cleaning Weep holes

Replacing approach slabs Once in concession period.

Replacement of stone pitching quadrant

Repairing of Filter media

Crash Barrier

Structure numbers

CHAPTER 5
BOQ, RATE ANALYSIS AND COST ESTIMATES

5.1 RATES

The rate analysis is based on Standard Data Book of MORT&H 2019 model and inputs from basic rates of Materials, labour, machinery is taken as follows:

a) Inputs for Basic rates of Labor are taken from: Central Wages (31/03/2022).

b) Inputs for Basic rates of materials, sand is taken as per site Enquiry/Market rates.

c) Inputs for Basic rates of Bitumen cement and Steel are taken from following sources: -

- Bitumen- IOCL, Mathura –For initial improvement works, base rate of bitumen (VG-40) is taken as Rs 45,500 & For Operation cost base rate of bitumen is taken as Rs 36,000
- Cement- UPPWD SOR 2020-21.
- Steel- SAIL for the month of June 2022.
- GST 18% considered.

Table 5.1: Basic Rates of Major Items

S. No.	Item Description		Unit	Basic Rate
1	VG 10 (80/100)	For Operation & Maintenance	MT	32500.00
2	VG 30 (60/70)		MT	33300.00
3	VG 40 (30/40)		MT	36000.00
4	VG 10 (80/100)	For Initial Improvement Works	MT	42000.00
5	VG 30 (60/70)		MT	42800.00
6	VG 40 (30/40)		MT	45500.00
7	Cement		tonne	6700
8	Steel		MT	71174

5.2 PROJECT COST

Project cost has been worked out under the following heads: -

✓ **Initial Improvement Cost**

- ✓ **Opex Cost** (**Routine**, **Periodic** and **Operations** Cost.)
- ✓ **Major Maintenance Cost**

All above cost is un- escalated.

Table 5.2: Cost Summary

S. No.	Description	Cost (Rs. In Crores)
1	**Initial Improvement Cost**	150.33
2	**Operation and Maintenance**	
A	Routine	62.94
B	Periodic	116.81
C	Operations	219.32
	Total Cost	**399.07**
	Diff.	
	Major Maintenance Cost	**116.81**

5.3 INITIAL IMPROVEMENT WORKS COST

Following improvement & repair works has been mentioned in Schedule B of CA.

Service Road , Entry Exit , Repair and Rehabilitation of Embankment, Repair & Rehabilitation of Structure , Junction Improvement, Street Light, Repair of Existing Light ,Toilet Block , Toll admin building, Static Weigh Bridge, Highway Patrol Vehicle, Ambulance , Crane ,DG Set, ATMS for Entire Length of Project ,High Mast Light, Median Opening, Storage Lane ,Overhead Gantry, Cantilever Sign Board, New W-beam Safety Barriers, Drain (RCC/Lined/Chute) , Rain Water Harvesting structure, Truck Lay bye, Bus bays, Traffic Signage, Road studs, kerb raising, Road delineator, Tree Plantation ,Gabion Wall ,Footpath ,Water ATM ,Lane Level Equipment cost, Server, Additional RAM .

Completion Schedule for improvement proposal has been proposed as 12 months from appointed date as per Clause 9 of Schedule B of CA.

Accordingly initial improvement works has been considered to be executed during year 2022-2023.

Table 5.3: Summary of Initial Improvement Cost

S.	Description	As per Schedule B

No.		Cost in Rs Cr.
1	Major Maintenance Works of Road	
(a)	Rehabilitation of Existing Highway	41.98
(b)	Rehabilitation of Existing Slip Road	3.23
(c)	Repair & Rehabilitation of Structure	0.49
(d)	Repair of Existing Highway	0.00
2	New Slip Road	8.90
3	Junction Improvement	9.23
4	Cross Drainage Works	1.21
5	Drainage and Protection Works	37.77
6	Traffic Signs, Markings and Other Appurtenances	2.67
7	Miscellaneous	5.39
8	Horticulture	0.96
9	Toll Plaza	2.06
10	Equipment for Hybrid ETC System (HES)	2.53
11	ATMS	7.87
A)	**Civil Construction Cost**	**124.29**
	Contingency 5 % for 50% Amount to be executed in next 6 month	3.11
B)	**Add 18% GST on (A)**	22.93
C)	**Total Civil Construction Cost including GST & Contingency**	**150.33**

5.4 MAJOR MAINTENANCE COST

1. Major maintenance for highway is taken as per Schedule-F maintenance requirement of concession agreement.

2. Major maintenance for structure as per Schedule-F maintenance requirement of concession agreement

Major Maintenance Items Cost (Un-escalated) during Concession Period of 20 Years as per Schedule-F of Concession Agreement cost is shown below.

Table 5.4: Major Maintenance Cost

Component	Major Maintenance	MCW MM (Cr.)
Flexible Pavement	BC (VG-40 for MCW and remaining VG-40), Tack coat , Road Marking	75.02
	Signboards	0.37
	Hectometre stones	0.004
	Kilometre stones	0.005
	5th Kilometre stones	0.003
	Boundary stones	0.03
	Kerb	1.04
	Studs For Periodic Overlay	1.88
	TCMS Periodic Cost	7.14
	ATMS cost replacement	13.00
	Axle Load Survey	0.02
Structures	Rigid Apron - For Box Culverts	0.14
	Flexible Apron - For Box Culverts	0.04
	Curtain Wall - For Box Culverts	0.27
	Polymer Modified cement (25 mm thick)	0.40
	Guinting over surface area of Substructure	0.85
	NDT of Substructure	1.83
	Bridge Load test	0.72
	POT cum PTFE bearing	7.28
	Metallic bearing	0.57
	Greasing and Cleaning bearing and joints	0.33
	Polymer mixed cement Injection /Epoxy Grout by injection through nipples:	0.94
	Repair and rehabilitation & Painting of steel structures.	0.15
	Replacement of Strip seal Expansion joint	1.24
	Replacement of Asphaltic plug Expansion Joint	0.11
	Replacement of Glass Grid	0.52
	Cleaning Weep holes	0.36
	Replacing approach slabs Once in concession	1.17

Component	Major Maintenance	MCW MM (Cr.)
	period.	
	Replacement of stone pitching quadrant	0.74
	Repairing of Filter media	0.45
	Crash Barrier	0.19
	Structure numbers	0.003
Total Cost (Rs. in Crores)		**116.81**

5.5 OPERATION & MAINTENANCE COST COMPONENTS

The operation cost has been worked out in detail based on **Schedule-F Maintenance requirement**. The brief summary of items as below.

Operational Maintenance

(1) Tolling Operations: -

a) **Manpower (Toll collection, Security & Traffic Management)**

Cost is taken as per market enquiry.

b) **Power (Street Lighting, Toll Plaza, High Mast)-**

Electricity Bills, Maintenance, Tolling Operations - DG Set Maintenance, Tolling Operations – Diesel, Tolling Operations - Electricity Expenses are taken as per market enquiry.

c) **TCMS operations** cost is taken as per market enquiry.

d) **TCMS spares cost** is taken as per market enquiry.

e) Plaza building cost is taken as per market enquiry.

f) Internet Lease line / Broadband & other miscellaneous items (Fire Services, Supply of water for drinking & Sanitation etc.) cost is taken as per market enquiry

(2) Incident Management Cost Components

a) Maintenance of Highway Patrol Vehicle, Ambulance, Cranes are taken as per market Enquiry.

b) Tolling Operations for Vehicle Hire Charges, tolling operations for Vehicle Maintenance Charge are taken as per market Survey/Enquiry

Routine Maintenance & Routine Maintenance Repair Cost Components

Routine Maintenance & its Repair Cost is based on Schedule-F Maintenance requirement & Following brief summary of items considered.

(1) Main Carriageway & Service Road / Slip Road

a) Maintenance of earthen shoulder

b) Repair of rain cuts

c) Cleaning of Drains, service roads & other items.

d) Repair of rutting.

e) Treatment of bleeding bituminous surface & laying of slurry seal.

f) Filling Pot-holes.

g) Repair of stone pitching & stone pitching filter media

h) Laying of 300 mm thick stone pitching & stone pitching filter media

i) Removal of rank vegetation/weeds.

j) Repair of localized failed areas of PQC for CC Pavement

(2) Structures

a) Clearance of Structures from Vegetation/Debris

b) Bed Protection for Structures

c) Detailed Visual Inspection and NDT of Structures.

d) Polymer Modified cement

e) Guinting over surface area of Substructure

f) Bridge Load test

g) Greasing and Cleaning bearing and joints for sliding/Free bearings.

h) Replacement of Strip Seal Expansion joint

i) Leak proof test for expansion joint (biannually).

j) Replacement of Drainage spouts.

k) Cleaning of drainage spouts

l) Cleaning Weep holes

m) Replacing of Reinforced Cement Concrete Grade M 40 crash barrier

n) Replacement of RCC railing/Parapet over Bridges

o) Repair of approach slabs

p) Repairing of stone pitching quadrant & Filter Media

q) Repair and rehabilitation & Painting of steel structures

(3) Highway Lighting

Maintenance for street light of Single Arm, Double Arm and High Mast Light is taken as per Schedule-F Maintenance requirement.

(4) Bus Shelter

Maintenance cost of Bus Shelter is taken as per Schedule-F Maintenance requirement.

(5) Truck Lay Bye

Maintenance cost of Truck Lay Bye is taken as per Schedule-F Maintenance requirement.

(6) HSSE Expense

HSSE Expense are taken as per Schedule-F Maintenance requirements.

(7) Road Furniture

Repairs cost of Road Furniture items are taken as per Schedule-F Maintenance requirement. Brief summary of Road Furniture items is as below:

a) Repair of existing M.S. pedestrian Railing & W-Beam metal crash barrier.

b) Maintenance of Kerb stone.

c) Road Marking.

(8) Signage

Maintenance cost of road Signage is taken as per Schedule-F maintenance requirement.

(9) Median & Avenue Plantation

Maintenance cost of median & Avenue Plantation is taken as per Schedule-F maintenance requirement.

ATMS

(a) Maintenance of ATMS (Operation Expenses) is taken as per market enquiry.

(b) Maintenance of ATMS System Technical support staff are taken as per market enquiry.

(c) Control room manpower- ATMS Control Room Operations staff are taken as per market enquiry.

(d) **Power**- Electricity consumption for ATMS is taken as per market enquiry

Routine Maintenance & repair cost, Lighting, ATMS replacement cost, MCW & SR Overlay, Toll Plaza Operation cost etc. is taken as nil during Capacity Augmentation & DLP

ADMIN Expenses

Staff Welfare, Office Rent, Project Insurance Premium, Independent Engineer, Audit Fees, travelling (Outstation), Conveyance including Fuel, Stationery, Printing & Courier, Professional Fees (Advisory services, compliance/filings, Legal etc.), SPV Cost, Communication Charges, Misc.-Admin etc. expense is taken as per Market enquiry.

Year-wise Summary of Routine, periodic and O & M Expenses (Unescalated Cost with GST) is given in **Table 8.**

Table 5.5: Year-wise Summary of O&M Cost

S. No.	Financial Year	Routine Maintenance in Cr.	Periodic Maintenance in Cr.	Operational Cost in Cr.	Total in Cr.
1	2022-23	4.84	-	11.47	16.31
2	2023-24	4.84	-	11.47	16.31
3	2024-25	4.84	-	11.47	16.31
4	2025-26	4.84	-	11.47	16.31
5	2026-27	4.84	2.71	11.47	19.02
6	2027-28	4.84	-	11.47	16.31
7	*2028-29	2.89	37.12	11.47	51.48
8	2029-30	4.84	0.48	11.47	16.79
9	2030-31	4.84	9.09	11.47	25.40
10	2031-32	4.84	-	11.47	16.31
11	2032-33	0.01	-	9.55	9.57
12	2033-34	0.01	2.24	9.55	11.81
13	2034-35	0.01	-	9.98	9.99

S. No.	Financial Year	Routine Maintenance in Cr.	Periodic Maintenance in Cr.	Operational Cost in Cr.	Total in Cr.
14	2035-36	0.01	-	9.98	9.99
15	2036-37	0.01	-	9.98	9.99
16	2037-38	0.01	-	9.98	9.99
17	2038-39	0.01	2.66	9.98	12.66
18	*2039-40	2.86	62.50	11.89	77.25
19	2040-41	4.81	-	11.89	16.70
20	2041-42	4.81	-	11.89	16.70
	TOTAL	**59.00**	**116.81**	**219.37**	**395.20**

- The repair cost for the year in which periodic /major cost maintenance are considered as 50% of the annual estimated repair cost.

CHAPTER 6
CONCLUSIONS

6.1 CONCLUSION

- Alligator Cracking is present in primarily on left side carriageway as a result of overloading & non-maintenance. Primarily coal laden trucks are overladen. Right hand Side Carriageway receives empty trucks, so cracking is minimal, but ruts of 20 to 50 mm.

- Embankment erosion, lack of traffic sign boards are some of the issues observed at site.

- There is no such structure that possesses any major defects (affecting its service life adversely) requiring immediate attention/ repair/ short-term works except Vegetation growth in structure components , Bearings requiring cleaning & greasing, Minor damage to Crash barrier & footpath , Choked Drainage spouts etc

- Following pavement repair strategy for the project based on the FWD survey Analysis carried out and traffic MSA of 178 & 45 on LHS (Agra Delhi) & RHS (Delhi-Agra) respectively

  - ✓ Milling, 40-50 mm, is proposed to remove existing cracked surface
  - ✓ Inlay with DBM is proposed to restore pavement thickness prior to structural overlay
  - ✓ Structural Overlay of 50 mm BC only in LHS from km 25 to 32.8
  - ✓ Where structural overlay isn't needed, mill & inlay with 40 mm BC.
  - ✓ Where overlay is not needed, resurfacing of 40 mm BC provided as per Schedule B
  - ✓ Composite Glass Grid has been proposed considering cracks extend to DBM
  - ✓ Where cracking > 20% & rutting > 20 mm, milling+ Composite Glass Grid (Saint Gobian CG-100) + inlay with DBM or BC
  - ✓ Where crack area <= 20%, mill + Inlay with DBM or BC

- Target traffic as per IRC SP 84, is 40000 PCU. Referring to following table, target traffic is achieved in FY2030. Preparation of DPR may be executed by

NHAI FY 2031 and FY2032. It is assumed that construction of 6 lane will be in 2033 to FY 2034.

Table 6.1: Projected Traffic

Year	Traffic in PCU	Year	Traffic in PCU
FY 23	30,455	FY 34	49,708
FY 24	30,501	FY 35	52,140
FY 25	30,617	FY 36	54,645
FY 26	32,872	FY 37	57,220
FY 27	35,229	FY 38	59,865
FY 28	37,014	FY 39	62,578
FY 29	38,875	FY 40	65,356
FY 30	**40,834**	FY 41	68,197
FY 31	42,896	FY 42	71,098
FY 32	45,066	FY 43	74,055
FY 33	47,350		

- Schedule B Clause 2 specifies that *The Concessionaire shall carry out the periodic maintenance in full length of project stretch including main carriageway, service/slip roads, Ramps and at facilities etc.* ***either in every sixth year or in the year in which roughness index exceeds the limit as given in Schedule F whichever comes earlier.***

  ✓ **Main carriageway**

  Overlays at every six years cycle will be the in year 2022-2023 (as initial improvement works) 2028-2029, 2034-2035 & 2039-2040 across 20 years. However Construction for Six-Laning under EPC mode is due in FY 2032-34. There would be a 5-year Defect Liability Period (DLP) from FY 2034 to FY 2038. Hence second overlay cycle will not be there. The third overlay cycle in 2039-2040 will come after DLP.

  ✓ **Service Road**

  Initial overlay in the year 2022-23 is proposed with 40 mm BC VG 40 as intial improvement proposal. Future overlays in 2028-2029 and 2039-2040 with 30 mm BC is proposed.

  Maintenance Calendar is attached at the end of the chapter.

- Major maintenance for structure as per Schedule-F maintenance requirement of concession agreement.
- Project cost has been worked out under the following heads: -
  - ✓ **Initial** Improvement Cost
  - ✓ Operation Cost (Routine, Periodic and Operations Cost.)
  - ✓ Major Maintenance **Cost**

All above cost is un- escalated.

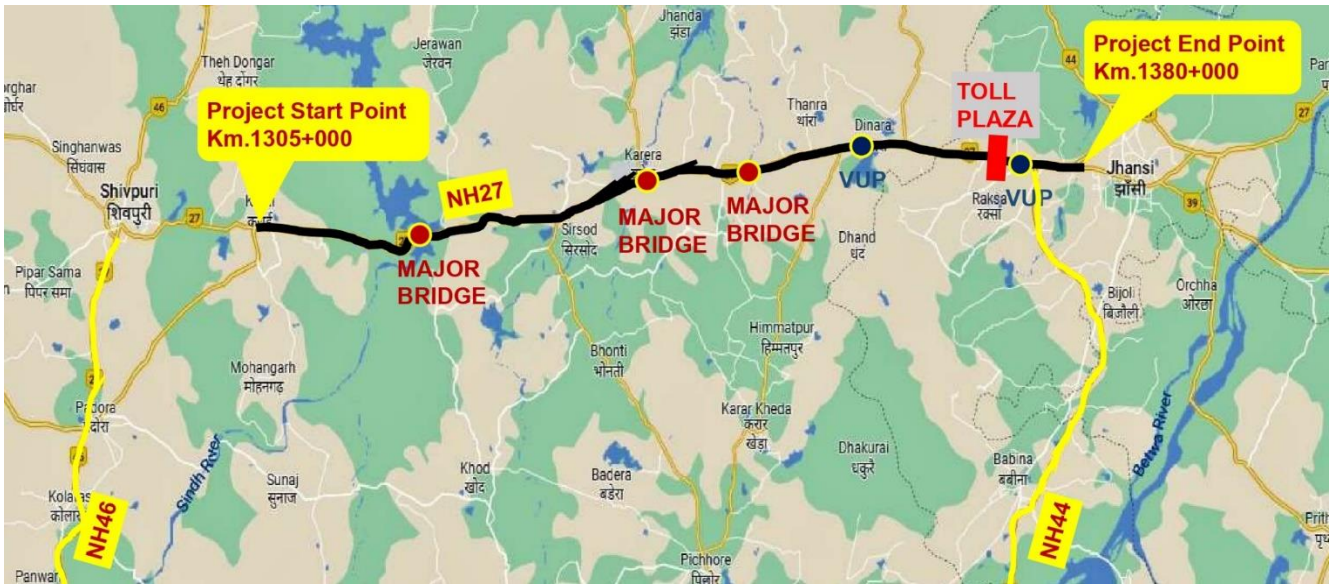
Table 6.2: Cost Summary

S. No.	Description	Cost (Rs. In Crores)
1	**Initial Improvement Cost**	150.33
2	**Operation and Maintenance**	
A	Routine	62.94
B	Periodic	116.81
C	Operations	219.32
	Total Cost	**399.07**
	Diff.	
	Major Maintenance Cost	**116.81**

❑❑❑

NATIONAL HIGHWAYS INFRA INVESTMENT MANAGERS PVT. LTD.

Technical Due Diligence of Shivpuri – Jhansi From Km 1305+000 To Km 1380+387 (75 Kms) on NH-27 in the State Of Madhya Pradesh and Uttar Pradesh



FINAL REPORT

August 2022

CONSULTING ENGINEERS GROUP LTD

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CHAPTER 1

INTRODUCTION

1.1 PROJECT BACKGROUND

NHAI is looking to monetize its road assets by engaging a private operator for undertaking operation, maintenance and management of the Project Highway for 20 years under Toll Operate Transfer (InvIT) Mode.

The National Highways Infra Investment Managers Private Limited (NHIIMPL) has appointed M/s Consulting Engineers Group Ltd. as Consultant for technical due diligence for Shivpuri – Jhansi from Km 1305+000 to Km 1380+387 (Total length -75 Kms) on NH-27 in the state of Madhya Pradesh and Uttar Pradesh.

1.2 PROJECT HIGHWAY SALIENT FEATURES

The Project Index map is shown in **Figure 1.1.** The salient feature of the project are as below.

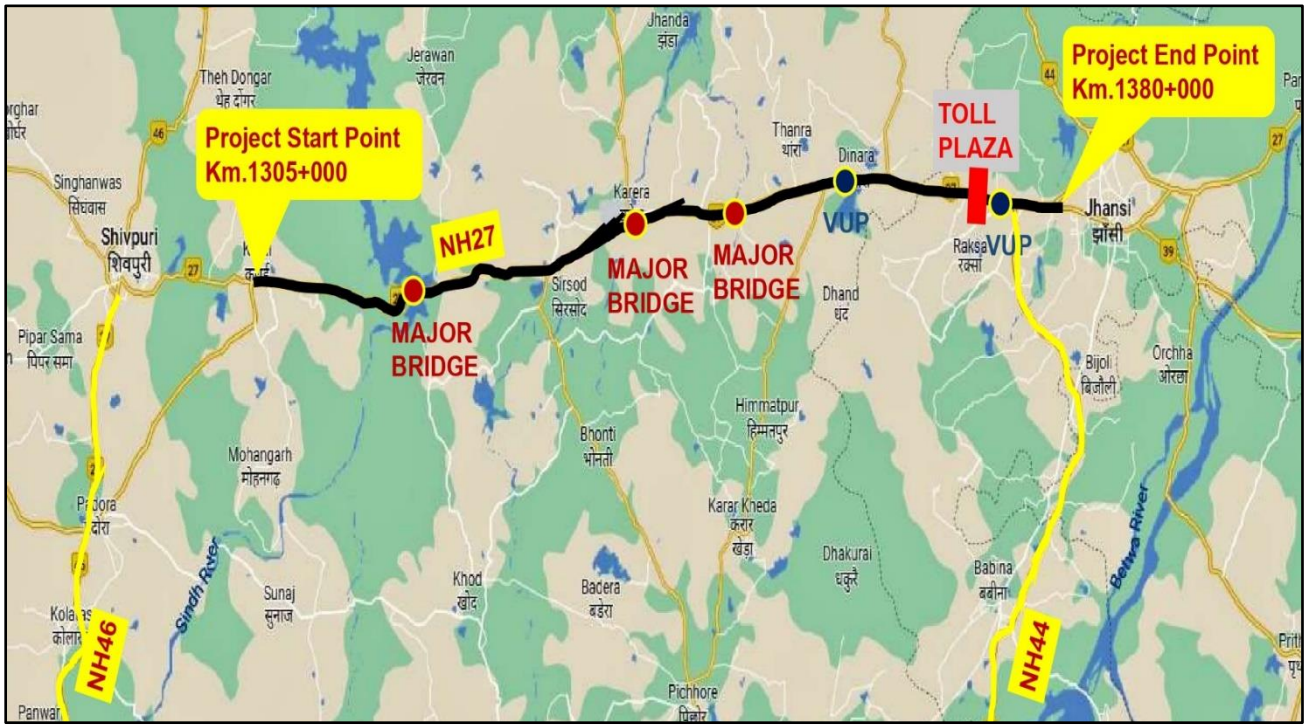


Figure 1.1: Project Index Map

The Project salient features & components are as follows.

The salient features of highway and structural components along with the pavement of the project road are tabulated as below: -

Table 1.1 Project Salient Features & Components

Item No	Particulars	Details
A	Start Chainage	KM 1305.000
B	End Chainage	Km 1387.387
C	Project Length	75.387 Km
1	Toll Plaza	1 No at RAKSHA (Km 1374.650)
2	Service Road Length (LHS +RHS)	TOTAL =6.0 Km LHS: 2.96km RHS: 3.04 km
3	Slip Road Length	5.8 Km
4	Junction LHS	14 Nos
5	Junction RHS	38 Nos
6	Truck Lay Byes	08 Nos
7	Bus Bays	30 Nos
8	Toilet Blocks	01 Nos
9	VUP	02 Nos
10	PUP	03 Nos
11	AUP	Nil
12	Flyover	Nil
13	ROB	Nil
14	Major Bridge	03 Nos
15	Minor Bridge	15 Nos
16	Culvert	146 Nos
17	Slab Culverts	02 Nos
18	Pipe Culverts	92 Nos
19	Box Culverts	54Nos
20	Pavement type	a) Flexible Pavement b) Rigid Pavement for the Raksha Toll Plaza area

1.3 REVIEW OF AVAILABLE DOCUMENTS

The following documents have been provided by NHIIMPL to carry out the study .

1. Concession Agreement & Technical Schedules (Dec 2021)
2. Monthly Progress Reports by Contractor during Construction
3. Monthly Progress Reports by Independent Engineer – January 2022- March 2023 (O & M)
4. As Built Highway & Structure Drawings

CHAPTER 2
SURVEYS & INVESTIGATION

2.1 GENERAL

NHIIMPL provided the Concession Agreement (CA) and Technical Schedules (December 2021) for Tolling , Operation, Maintenance & Transfer of the project to the Consultants. Consultant validated the details mentioned in Schedule A of CA through road and pavement inventory survey.

Schedule B of CA specifies that *The Concessionaire shall visit the Site and assess the durability and strength of Project Assets and make his own assessment for operation, management and maintenance as per Specifications and Standards and bear and pay all costs, expenses and charges in connection with or incidental to the performance of operation, management and maintenance.* To assess the project strength and maintenance requirements following survey & investigations have been carried out as per the Scope of Work.

- Road Inventory
- Structure Inventory
- Pavement Condition Survey
- Axle Load Survey
- Roughness Survey
- FWD Survey
- Material Survey
- Drone Videography

2.1.1 Pavement Condition

The total stretch from start to end of the project has flexible pavement, except for Toll Plaza. As per the general practice, the portion of Toll Plaza has rigid pavement.

- Flexible Pavement has the following mentioned distresses: -

a) Patches: Patching has been done for a substantial length of the project in such a ways that the work done of patches are large enough to be mistaken for overlay.
b) Cracking: Cracking is present in entire length, both lanes. The cracks observed are mostly minor.
c) Rutting: Ruts are present, but minimal from 2 to 5 mm.
d) BC mix design has problems in patchwork which fails after single monsoon, which needs to be observed after the passage of a monsoon season.

The photos of distress of pavement at various locations such as rutting, patchwork, cracks etc are shown .

The distresses recorded include Alligator Cracking, Rutting & Patching (over cracks). While the survey was carried out in 200 m intervals, a km-wise summary is shown in **Table 2.1 and 2.2** for LHS and RHS respectively.

Both sides show extensive alligator cracking irrespective of loading patters. Axle Load survey shows that heavily loaded trucks are present in LHS. Rutting is minimal, between none to 5 mm. Extent of alligator cracking is summarized in the tables below for every km; length of toll plaza (0.150 km) is excluded.

Table 2.1: Summary of LHS Flexible Pavement condition

Chainage		Length in km	Alligator Cracking %	
From (km)	To (km)		Inner Lane %	Outer Lane %
1305.087	1305.200	0.113	10	0
1305.200	1306.000	0.800	0	0
1306.000	1307.000	1.000	10	10
1307.000	1308.000	1.000	20	10
1308.000	1309.000	1.000	30	30
1309.000	1310.000	1.000	10	0
1310.000	1311.000	1.000	30	20
1311.000	1312.000	1.000	30	20
1312.000	1313.000	1.000	40	30
1313.000	1314.000	1.000	20	20
1314.000	1315.000	1.000	20	10
1315.000	1316.000	1.000	20	20

Chainage		Length in km	Alligator Cracking %	
From (km)	To (km)		Inner Lane %	Outer Lane %
1316.000	1317.000	1.000	30	30
1317.000	1318.000	1.000	20	20
1318.000	1319.000	1.000	0	0
1319.000	1320.000	1.000	10	10
1320.000	1321.000	1.000	40	40
1321.000	1322.000	1.000	30	30
1322.000	1323.000	1.000	0	0
1323.000	1324.000	1.000	40	40
1324.000	1325.000	1.000	30	20
1325.000	1326.000	1.000	50	50
1326.000	1327.000	1.000	50	40
1327.000	1328.000	1.000	40	30
1328.000	1329.000	1.000	60	50
1329.000	1330.000	1.000	50	40
1330.000	1331.000	1.000	60	40
1331.000	1332.000	1.000	60	10
1332.000	1333.000	1.000	60	50
1333.000	1334.000	1.000	60	40
1334.000	1335.000	1.000	40	30
1335.000	1336.000	1.000	40	30
1336.000	1337.000	1.000	40	30
1337.000	1338.000	1.000	70	60
1338.000	1339.000	1.000	50	50
1339.000	1340.000	1.000	40	40
1340.000	1341.000	1.000	30	30
1341.000	1342.000	1.000	40	40
1342.000	1343.000	1.000	40	40
1343.000	1344.000	1.000	60	60
1344.000	1345.000	1.000	70	70
1345.000	1346.000	1.000	70	60
1346.000	1347.000	1.000	60	60
1347.000	1348.000	1.000	60	60
1348.000	1349.000	1.000	70	70
1349.000	1350.000	1.000	10	50
1350.000	1351.000	1.000	20	40
1351.000	1352.000	1.000	0	20

Chainage		Length in km	Alligator Cracking %	
From (km)	To (km)		Inner Lane %	Outer Lane %
1352.000	1353.000	1.000	20	20
1353.000	1354.000	1.000	20	20
1354.000	1355.000	1.000	60	50
1355.000	1356.000	1.000	40	40
1356.000	1357.000	1.000	30	30
1357.000	1358.000	1.000	30	30
1358.000	1359.000	1.000	30	40
1359.000	1360.000	1.000	10	10
1360.000	1361.000	1.000	10	10
1361.000	1362.000	1.000	60	60
1362.000	1363.000	1.000	60	60
1363.000	1364.000	1.000	60	60
1364.000	1365.000	1.000	60	60
1365.000	1366.000	1.000	60	60
1366.000	1367.000	1.000	60	60
1367.000	1368.000	1.000	50	50
1368.000	1369.000	1.000	70	70
1369.000	1370.000	1.000	30	30
1370.000	1371.000	1.000	30	30
1371.000	1372.000	1.000	30	30
1372.000	1373.000	1.000	30	30
1373.000	1374.000	1.000	30	30
1374.000	1375.000	0.850	40	40
1375.000	1376.000	1.000	80	80
1376.000	1377.000	1.000	80	80
1377.000	1378.000	1.000	80	80
1378.000	1379.000	1.000	80	80
1379.000	1380.000	1.000	80	80
1380.000	1380.387	0.387	80	80

In RHS, where cracking has affected the riding quality, the maintenance contractor has done patching over complete inner lane and 3/4th outer lane. The patching is temporary solution and its condition will need to be assessed post-monsoon.

Table 2.2: Summary of RHS Flexible Pavement condition

Chainage		Length in km	Alligator Cracking %	
From (km)	To (km)		Inner Lane %	Outer Lane %
1305.087	1306.000	0.913	50	50
1306.000	1307.000	1.000	50	50
1307.000	1308.000	1.000	60	60
1308.000	1309.000	1.000	60	60
1309.000	1310.000	1.000	60	60
1310.000	1311.000	1.000	40	40
1311.000	1312.000	1.000	10	10
1312.000	1313.000	1.000	10	10
1313.000	1314.000	1.000	10	10
1314.000	1315.000	1.000	20	20
1315.000	1316.000	1.000	20	20
1316.000	1317.000	1.000	10	10
1317.000	1318.000	1.000	40	40
1318.000	1319.000	1.000	30	30
1319.000	1320.000	1.000	30	30
1320.000	1321.000	1.000	30	30
1321.000	1322.000	1.000	30	30
1322.000	1323.000	1.000	30	30
1323.000	1324.000	1.000	40	40
1324.000	1325.000	1.000	40	40
1325.000	1326.000	1.000	50	50
1326.000	1327.000	1.000	30	30
1327.000	1328.000	1.000	30	30
1328.000	1329.000	1.000	40	40
1329.000	1330.000	1.000	20	40
1330.000	1331.000	1.000	20	40
1331.000	1332.000	1.000	60	60
1332.000	1333.000	1.000	60	60
1333.000	1334.000	1.000	60	60
1334.000	1335.000	1.000	30	30
1335.000	1336.000	1.000	20	20
1336.000	1337.000	1.000	50	50
1337.000	1338.000	1.000	40	40
1338.000	1339.000	1.000	0.00	30
1339.000	1340.000	1.000	20	30

Chainage		Length in km	Alligator Cracking %	
From (km)	To (km)		Inner Lane %	Outer Lane %
1340.000	1341.000	1.000	20	20
1341.000	1342.000	1.000	10	10
1342.000	1343.000	1.000	10	10
1343.000	1344.000	1.000	10	10
1344.000	1345.000	1.000	10	10
1345.000	1346.000	1.000	10	10
1346.000	1347.000	1.000	10	10
1347.000	1348.000	1.000	10	10
1348.000	1349.000	1.000	20	20
1349.000	1350.000	1.000	20	20
1350.000	1351.000	1.000	10	10
1351.000	1352.000	1.000	10	10
1352.000	1353.000	1.000	10	10
1353.000	1354.000	1.000	10	10
1354.000	1355.000	1.000	30	30
1355.000	1356.000	1.000	30	30
1356.000	1357.000	1.000	30	30
1357.000	1358.000	1.000	10	10
1358.000	1359.000	1.000	10	10
1359.000	1360.000	1.000	20	20
1360.000	1361.000	1.000	40	40
1361.000	1362.000	1.000	40	40
1362.000	1363.000	1.000	60	60
1363.000	1364.000	1.000	10	10
1364.000	1365.000	1.000	10	10
1365.000	1366.000	1.000	70	70
1366.000	1367.000	1.000	60	60
1367.000	1368.000	1.000	60	60
1368.000	1369.000	1.000	40	40
1369.000	1370.000	1.000	20	20
1370.000	1371.000	1.000	10	10
1371.000	1372.000	1.000	10	10
1372.000	1373.000	1.000	60	60
1373.000	1374.000	1.000	60	60
1374.000	1375.000	0.850	30	30
1375.000	1376.000	1.000	20	20

Chainage		Length in km	Alligator Cracking %	
From (km)	To (km)		Inner Lane %	Outer Lane %
1376.000	1377.000	1.000	30	30
1377.000	1378.000	1.000	70	70
1378.000	1379.000	1.000	70	70
1379.000	1380.000	1.000	70	70
1380.000	1380.387	0.387	70	70

- In both directions, trucks are channelized in inner lane. So, while inner lane shows a lot of distress, the outer lane is comparatively in a much better condition with cracking generally around 10% and rutting around 5 mm.

Full width Patchwork

Alligator Cracks 1308+200

Rutting at 1309-1310

Full width patchwork

Rutting at 1317+400 (LHS)	**Patchwork on structures**
Minor Potholes	**Patchwork on Inner lane 1348+400**

- During inventory survey, it is observed that full width patchwork for major portion of the highway has been done. It is not an overlay as per the observations. Minor distresses still exist on the project road.

2.1.2 Rigid Pavement

- Rigid Pavement is present only at the Toll Plaza location.
- Rigid pavement is provided from the end of the median till the end of booth on both sides of the road (LHS and RHS).
- Damage to a few slabs in the Toll Plaza portion is observed and is severe enough to warrant immediate reconstruction.
- Longitudinal seal of rigid panels needs to be filled to avoid further damage of cracks by expansion.
- Major part of the rigid pavement is in good condition.

- The over dimensional lane has been totally damaged, may be due to plying of loaded vehicles and needs immediate reconstruction.

Rigid pavement OD lane LHS

Longitudinal Sealant at Toll Plaza (RHS)

Toll Plaza

Toll Plaza (RHS)

- Conventional liquid Joint sealant has a life of 3-5 years, but has not been replaced since construction. Sealant is failing and resulting in cracking of slab due to joint widening.

2.2 STRUCTURE INVENTORY

Structures at site were validated with respect to available data schedule A of CA to highlight the mismatches, deficiencies, if any.

Furthermore, for validation & condition survey of structures, guidelines of IRC publications are usually utilized to identify various details/ defects viz

- Structure type and span arrangement (wrt CA etc),
- Type & Condition of superstructure (for cracks, spalling of concrete, leaching, exposed & corroded Reinforcement etc.)
- Type & Condition of sub-structure (for cracks, spalling of concrete, leaching, exposed & corroded Reinforcement etc.),
- Type and condition of the bearing,
- Type and condition of expansion joint,
- Condition of Approaches (Return wall/ retaining wall/ RE wall)
- Growth of vegetation around the Vent ways
- Type & condition of pitching/ revetment
- Condition of Bed (i.e. Existing Bed protection measures, Scouring observed etc.)
- Condition of Wearing Coat
- Type and condition of railing/crash barrier
- Condition (rusting/ clogging) of drainage spouts
- Condition of weep holes.
- Hydraulic adequacy,
- Defunct, partially buried and submerged culverts

2.2.1 Data Validation For Structures

Cross drainage structures were validated during site visit based on the details provided in CA/ Technical Consultant Report/ IE/ AE Inspection report & As-built drawings..

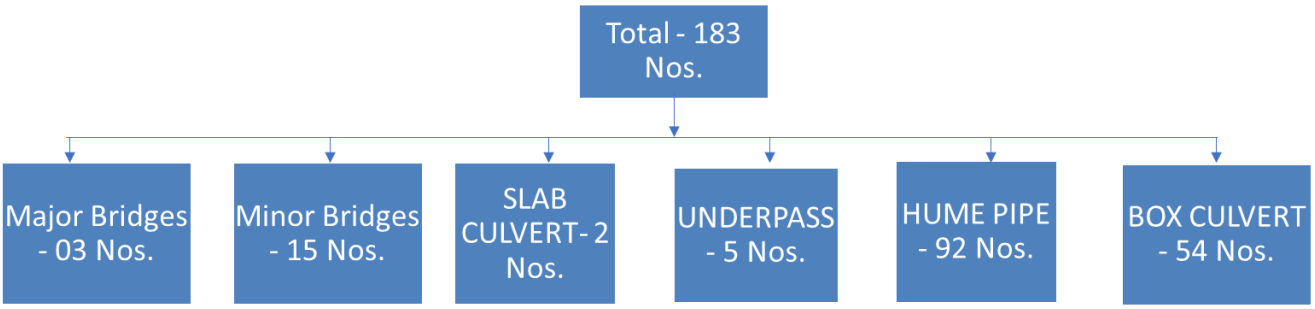


Figure 2.1:Summary of Existing Structures observed at Site

2.2.2 Validation of Existing Major Structures

The type, span & number of bridges have been validated with respect to bridges mentioned in MPR.

Table 2.3:Existing Major Structures Summary

S. No.	Description	As per ca	As per site validation
1	Major Bridges	03	03
2	Minor bridges	15	15
3	ROB	0	0
4	Slab Culvert	02	02
5	Underpass	05	05
6	HP Culvert	92	92
7	Box Culvert	54	54

2.2.3 Common Defects Observed in Structures

Common Defects

Growth of Vegetation obstructing the vent way or in Structure Components

At some bridge locations, the growth of vegetation & bushes was observed posing as an obstacle to the flow of stream/ drain. Such bridge locations are indicated below.

Major Bridge at Ch. 1319+870

Cracks or other structural minor defects observed -

At some locations cracks were observed in structural components and are represented below.

Major Bridge at Ch. 1319+870

Disturbed Quadrant pitching

At many locations, quadrant pitching was observed to be disturbed.

Major Bridge at Ch. 1356+285

Damaged or absence of Railing/ Crash Barrier - At some locations cracks of minor in nature were observed in RCC railing/ crash barrier

MINOR BRIDGE AT 1359+451

Observations – Major Structures

Major Bridge at Ch. 1319+870

Details

- Span – 48 X 28m
- Deck Width- 2 x 10.25 m
- Foundation- Raft Foundation
- Type of Superstructure –PSC Girder
- Type of Bearing- Elastomeric Bearing

Condition

- Structure is overall in 'Good' condition
- Vegetation found on Wing Walls.
- Minor Disturbed stone pitching.
- Settlement crack found at the support location.

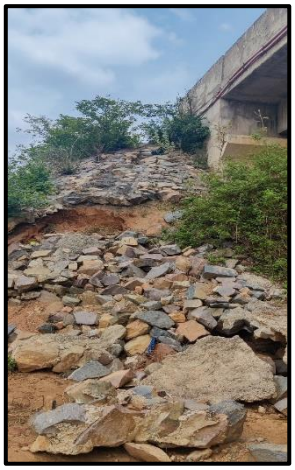
Major Bridge at Ch. 1341+285

Details

- Span – 7 X 20m
- Deck Width- 2 x 10.25 m
- Type of Superstructure –PSC box Girder
- Type of Bearing- POT/PTFE Bearing

Condition

- Structure is overall in 'Good' condition
- Vegetation found on Wing Walls.
- Minor Disturbed stone pitching.



Major Bridge at Ch. 1351+676

Details

- Span – 7 X 14.6m
- Deck Width- 2 x 10.25 m
- Type of Superstructure –PSC Girder/ PSC Box Girder
- Type of Bearing- POT/PTFE Bearing

Condition

- Structure is overall in 'Good' condition
- Vegetation found on Wing Walls.
- Minor Disturbed stone pitching.

2.2.4 Summary

- In consultant's view, the structures are in 'fair' functional state without hampering its design & loading capabilities. However, for smooth & optimum usage of the structures some periodic & routine maintenances are suggested wrt to the following (majorly) for their optimum functioning:
    - Expansion joints

- Stone Pitching
- Vegetation growth
- Settlement at the structure locations
- Repair for exposed reinforcement etc.

- In view of the same, there is no such structure that possess any major defects (affecting its service life adversely) requiring immediate attention/ repair/ short-term works .
- However, following site observations require attention in terms of the following:
  - Immediate clearing of the vegetation growth in pitching & over the structure components:
  - Approach slab: as settlement observed at many locations
  - Cleaning of Expansion Joints of the debris
  - Repair of damaged Crash barriers
- Consultant anticipates works on these structures should be conducted on routine & periodic basis as stipulated in the O&M Concession agreement.

2.3 ROAD INVENTORY

The details of all existing parameters such as width of carriageway, service roads / slip roads, sign boards, crash barriers, drainage arrangements etc as per Schedule A have been verified at site which are elaborated as below: -

2.3.1 Length of Project Highway

The length of project highway on both sides is as tabulated below.

Direction	Existing kilometer (km)		Length of Project Highway (km)	Remarks
	From	To		
Left Hand Side (LHS)	1305+087	1380+387	75.300	Shivpuri to Jhansi
Right Hand Side (RHS)	1380+387	1305+087	75.300	Jhansi to Shivpuri

2.3.2 Built-Up settlements along project highway

Chainage		Length (Km)	Side	Village name
From	To			
1310+100	1310+200	0.1	LHS	Bhada Bawadi
1310+350	1310+500	0.15	LHS	Bhada Bawadi
1328+260	1328+700	0.437	LHS	Deewat
1329+100	1329+200	0.1	LHS	Gadroli
1329+500	1329+700	0.2	LHS	Gadroli
1330+700	1330+800	0.1	LHS	Gadroli
1332+700	1333+500	0.8	LHS	Ghasarahi
1333+900	1334+200	0.3	LHS	Kalothara
1335+900	1336+300	0.4	LHS	Kalothara
1340+100	1340+500	0.4	LHS	Kalothara
1340+800	1341+000	0.2	LHS	Karera
1342+900	1343+100	0.2	LHS	Karera
1343+900	1344+200	0.3	LHS	Khadpura
1344+300	1344+400	0.1	LHS	Khadpura
1347+600	1347+800	0.2	LHS	Khadpura
1358+500	1358+700	0.2	LHS	Chandawara
1359+250	1359+350	0.1	LHS	Chandawara
1359+700	1360+500	0.8	LHS	Chandawara
1360+600	1360+800	0.2	LHS	Chandawara
1361+290	1361+900	0.61	LHS	Chandawara
1362+000	1362+600	0.6	LHS	Chandawara
1363+090	1363+300	0.21	LHS	Dinara
1365+500	1365+700	0.2	LHS	Nunwaha
1365+900	1366+200	0.3	LHS	Nunwaha
1368+100	1368+500	0.4	LHS	Kudraya
1369+600	1369+800	0.2	LHS	Kudraya
1371+100	1371+500	0.4	LHS	Dhikoli
1372+100	1372+250	0.15	LHS	Dhikoli
1373+000	1373+300	0.3	LHS	Dhikoli
1374+700	1374+900	0.2	LHS	Kot Kherta
1375+600	1376+700	1.1	LHS	Dagarwaha
1376+890	1376+950	0.06	LHS	Dagarwaha
1377+200	1377+350	0.15	LHS	-
1377+450	1377+650	0.2	LHS	-

Chainage		Length (Km)	Side	Village name
From	To			
1378+750	1379+210	0.46	LHS	-
1379+500	1379+900	0.4	LHS	-
1380+100	1380+320	0.22	LHS	-
1378+750	1379+210	0.46	LHS	-
1379+500	1379+900	0.4	LHS	-
1380+100	1380+320	0.22	LHS	-
1380+450	1380+670	0.221	LHS	Raksa
1304+850	1305+070	0.215	RHS	Karai
1308+760	1308+960	0.2	RHS	Bhada Bawadi
1310+650	1310+820	0.17	RHS	Dadaur
1311+780	1311+980	0.2	RHS	Beerpur
1323+160	1323+830	0.675	RHS	Chhan
1327+670	1327+920	0.245	RHS	Salaiya Karera
1328+250	1328+760	0.51	RHS	Salaiya Karera
1329+480	1329+600	0.125	RHS	Salaiya Karera
1332+960	1333+410	0.45	RHS	Ghasarahi
1335+570	1336+200	0.63	RHS	Kalothara
1339+700	1341+280	1.58	RHS	Sillarpur
1342+900	1343+770	0.87	RHS	Karera
1344+000	1344+530	0.53	RHS	Shyopura
1345+110	1346+220	1.11	RHS	Shyopura
1346+970	1347+330	0.36	RHS	Toda kareree
1347+560	1347+720	0.16	RHS	Toda kareree
1348+080	1349+040	0.96	RHS	Lahi
1351+000	1351+460	0.46	RHS	Kalipahadi
1351+940	1352+100	0.16	RHS	Bahera
1358+510	1358+810	0.3	RHS	Dabra dinara
1359+920	1360+390	0.475	RHS	Chandawara
1361+030	1362+760	1.73	RHS	Ganj dinara
1363+560	1363+760	0.195	RHS	Abas
1363+930	1364+190	0.255	RHS	Abas
1365+300	1365+430	0.13	RHS	Nunwaha
1365+940	1366+460	0.52	RHS	Nunwaha
1368+330	1368+510	0.18	RHS	Sihuli
1373+020	1373+530	0.515	RHS	Dhikoli
1373+730	1374+020	0.285	RHS	Kot Khera

Chainage		Length (Km)	Side	Village name
From	To			
1375+590	1376+660	1.07	RHS	Kot Khera
1377+400	1377+820	0.42	RHS	Sijwaha
1379+000	1379+230	0.23	RHS	Pali pahari
1380+200	1380+670	0.471	RHS	Raksa

2.3.3 Right of Way

S. No.	Existing kilometer (km)		Length of Project Highway (km)	ROW
	From	To		
1	1305+087	1380+387	75.300	45 meters

2.3.4 Carriageway

Generally, the existing carriage way is of 4-lane standards. The carriageway width slightly varies at locations of merging and diverging with junctions, median openings, at approaches to structures. For deck width and carriageway width of structures, tables for structures should be referred. Details of carriageway are provided below.

Direction	Existing kilometre (km)		Width of Carriageway	Remarks
	From	To		
Left Hand Side (LHS)	1305+087	1380+387	7.0m to 8.5m	Shivpuri to Jhansi
Right Hand Side (RHS)	1380+387	1305+087	7.0m to 8.5m	Jhansi to Shivpuri

2.3.5 Details of Existing Median Width

Sr. No.	Chainage (km) From	Chainage (km) To	Length (m)	Median Width
1	1305+087	1305+810	810	4.5
2	1305+810	1305+960	150	1.5
3	1305+960	1310+200	4240	4.5
4	1310+200	1310+900	700	1.5
5	1310+900	1311+730	830	4.6
6	1311+730	1317+580	5850	1.5
7	1317+580	1317+730	150	1.5

Sr. No.	Chainage (km) From	Chainage (km) To	Length (m)	Median Width
8	1317+730	1321+230	3500	4.6
9	1321+230	1328+310	7080	4.8
10	1328+310	1329+720	1410	4.8
11	1329+720	1330+610	890	4.8
12	1330+610	1330+760	150	1.6
13	1330+760	1333+280	2520	4.7
14	1333+280	1334+520	1240	4.5
15	1334+520	1335+960	1440	4.5
16	1335+960	1336+130	170	1.5
17	1336+130	1359+420	23290	4.5
18	1359+420	1366+580	7160	4.5
19	1366+580	1367+770	1190	4.6
20	1367+770	1368+010	240	5.5
21	1368+010	1370+630	2620	4.6
22	1370+630	1377+900	7270	4.5
23	1377+900	1378+290	390	2.5
24	1378+290	1380+387	1710	4.4

2.3.6 Width of Paved Shoulder

Sr. No.	Chainage (km) From	Chainage (km) To	Length (m)	Paved Shoulder Width
LHS				
1	1305+087	1313+81	8810	1.256
2	1313+82	1313+89	70	0.352
3	1313+9	1319+86	5960	1.324
4	1319+87	1321+22	1350	1.812
5	1321+23	1321+91	680	1.324
6	1321+92	1341+42	19500	1.256
7	1341+43	1352+05	10620	1.325
8	1352+06	1361+3	9240	1.124
9	1361+31	1362+48	1170	1.425
10	1362+49	1369+3	6810	1.124
11	1369+31	1375+6	6290	1.425
12	1375+61	1376+8	1190	1.852
13	1376+81	1380+387	3490	1.156

Sr. No.	Chainage (km) From	Chainage (km) To	Length (m)	Paved Shoulder Width
RHS				
1	1380+387	1379+490	810	1.752
2	1379+480	1376+140	3340	1.125
3	1376+130	1375+060	1070	1.625
4	1375+050	1359+10	15950	1.125
5	1359+090	1359+010	80	0.325
6	1358+990	1351+370	7620	1.325
7	1351+360	1351+180	180	1.852
8	1351+170	1340+380	10790	1.125
9	1340+370	1335+380	4990	1.125
10	1335+370	1326+680	8690	1.414
11	1326+670	1320+380	6290	1.269
12	1320+3700	1319+260	1110	0.691
13	1319+250	1312+220	7030	1.413
14	1312+210	1311+150	1060	1.366
15	1311+140	1310+330	810	1.284
16	1310+320	1305+087	5320	1.481

2.3.7 Details of Earthen Shoulder

Sr. No.	Chainage (km) From	Chainage (km) To	Earthen Shoulder Width
LHS			
1	1305+087	1305+690	0.852
2	1305+700	1306+710	0.524
3	1306+720	1307+140	0.854
4	1307+150	1307+330	1.524
5	1307+340	1312+020	1.124
6	1312+030	1313+890	1.142
7	1313+900	1318+110	0.654
8	1318+120	1319+250	1.526
9	1319+260	1321+660	1.125
10	1321+670	1321+920	1.255
11	1321+930	1322+970	2.524
12	1322+980	1328+090	0.625
13	1328+100	1329+730	2.252

Sr. No.	Chainage (km) From	Chainage (km) To	Earthen Shoulder Width
14	1329+740	1331+310	0.856
15	1331+320	1332+370	0.845
16	1332+380	1351+870	2.124
17	1351+880	1368+050	0.624
18	1368+060	1368+510	2.212
19	1368+520	1370+580	1.254
20	1370+590	1373+910	1.154
21	1373+920	1377+680	1.256
22	1377+690	1378+150	2.562
23	1378+160	1380+387	2.526

Sr. No.	Chainage (km) From	Chainage (km) To	Earthen Shoulder Width
RHS			
1	1379+400	1379+110	1.618
2	1379+100	1377+260	1.292
3	1377+250	1374+840	1.415
4	1374+830	1373+700	1.742
5	1373+690	1371+400	1.548
6	1371+390	1368+700	1.356
7	1368+690	1367+300	1.342
8	1367+290	1362+700	1.248
9	1362+690	1360+840	1.516
10	1360+830	1360+230	1.346
11	1360+220	1357+730	1.348
12	1357+720	1354+030	1.345
13	1354+020	1351+030	1.546
14	1351+020	1350+340	1.358
15	1350+330	1347+340	1.456
16	1347+330	1346+040	1.654
17	1346+030	1345+840	1.652
18	1345+830	1341+740	1.312
19	1341+730	1329+940	1.352
20	1329+930	1329+680	1.512
21	1329+670	1322+180	1.526
22	1322+170	1321+800	1.326

Sr. No.	Chainage (km) From	Chainage (km) To	Earthen Shoulder Width
23	1321+790	1319+400	1.216
24	1319+390	1309+600	1.426
25	1309+590	1306+400	1.145
26	1306+390	1305+600	1.231
27	1305+590	1305+087	1.152

2.3.8 Bypass

S.No.	Location of Bypass		Length (Km)	Side	Name of Village
	From (km)	To (km)			
1	1340+000	1345+000	5	RHS	Karera Village

2.3.9 Service Roads

S.No.	Location of Service Road		Side	Length (Km)	Width (m)
	From (km)	To (km)			
1	1310+280	1310+800	LHS	0.52	7.00
2	1358+230	1359+320	LHS	1.09	5.5
3	1369+230	1370+580	LHS	1.35	7
4	1370+540	1369+220	RHS	1.32	7
5	1359+330	1358+220	RHS	1.11	5.5
6	1310+830	1310+220	RHS	0.61	7

2.3.10 Slip Roads

S.No.	Location of Slip Road		Side	Length (Km)	Width (m)
	From (km)	To (km)			
1	1361+300	1362+440	LHS	1.14	5.5
2	1375+530	1376+750	LHS	1.22	5.5
3	1379+845	1380+387	LHS	0.54	5.5
4	1376+760	1375+520	RHS	1.24	5.5
5	1362+410	1361+270	RHS	1.14	5.5
6	1380+387	1379+845	RHS	0.54	5.5

2.3.11 Structures

S. No.	Type of Structure	Numbers of Structures
1	Major Bridges	3
2	Minor Bridges	15
3	Slab Culverts	2
4	Pipe Culverts	92
5	Box Culverts	54
6	Flyovers	Nil
7	Road Over Bridges	Nil
8	Vehicular Underpasses	2
9	Pedestrian Underpasses	3

2.3.12 Major Junction

Sr. No.	Chainage	Type	Type of Intersection
1	1322+960	T	3 leg Unsignalized
2	1333+230	X	Staggered
3	1338+930	T	3 leg Unsignalized
4	1339+900	X	4 leg Unsignalized
5	1343+000	X	4 leg Unsignalized
6	1344+850	T	3 leg Unsignalized
7	1349+060	X	4 leg Unsignalized
8	1354+640	T	3 leg Unsignalized
9	1359+800	T	3 leg Unsignalized
10	1362+960	T	3 leg Unsignalized
11	1363+360	Y	3 leg Unsignalized
12	1365+920	T	3 leg Unsignalized
13	1376+030	T	3 leg Unsignalized
14	1377+390	T	3 leg Unsignalized

2.3.13 Minor Junction

Sr. No.	Chainage	Type	Type of Intersection
1	1305+870	T	3 leg Unsignalized
2	1308+130	T	3 leg Unsignalized
3	1308+790	T	3 leg Unsignalized
4	1309+706	T	3 leg Unsignalized
5	1313+210	T	3 leg Unsignalized
6	1314+040	T	3 leg Unsignalized
7	1317+640	Y	3 leg Unsignalized
8	1323+920	T	3 leg Unsignalized
9	1328+060	Y	3 leg Unsignalized
10	1328+240	T	3 leg Unsignalized
11	1329+490	T	3 leg Unsignalized
12	1330+670	T	3 leg Unsignalized
13	1330+700	T	3 leg Unsignalized
14	1332+310	T	3 leg Unsignalized
15	1333+840	T	3 leg Unsignalized
16	1334+450	T	3 leg Unsignalized
17	1335+440	T	3 leg Unsignalized
18	1336+020	T	3 leg Unsignalized
19	1336+360	T	3 leg Unsignalized
20	1341+770	Y	3 leg Unsignalized
21	1344+120	T	3 leg Unsignalized
22	1344+420	T	3 leg Unsignalized
23	1345+170	T	3 leg Unsignalized
24	1346+020	T	3 leg Unsignalized
25	1346+710	T	3 leg Unsignalized
26	1348+030	T	3 leg Unsignalized
27	1350+180	T	3 leg Unsignalized

Sr. No.	Chainage	Type	Type of Intersection
28	1351+240	X	4 leg Unsignalized
29	1352+070	T	3 leg Unsignalized
30	1353+130	X	Staggered
31	1353+740	T	3 leg Unsignalized
32	1354+350	T	3 leg Unsignalized
33	1357+380	T	3 leg Unsignalized
34	1362+790	T	3 leg Unsignalized
35	1363+050	T	3 leg Unsignalized
36	1367+090	T	3 leg Unsignalized
37	1372+590	T	3 leg Unsignalized
38	1373+320	T	3 leg Unsignalized

2.3.14 Project facilities

Description	Quantity
ATMS/HTMS	Nil
Bus bays	30
Truck lay byes	8
Fuel stations	11
Toll plaza	1

2.3.15 Bus Bays

Sr.No.	Chainage (Km)	Bus Stop	Type	Side
1	1306+050	Present	RCC structure	LHS
2	1310+450	Present	RCC structure	LHS
3	1311+900	Present	RCC structure	LHS
4	1314+255	Present	RCC structure	LHS
5	1328+300	Present	RCC structure	LHS
6	1333+168	Present	RCC structure	LHS
7	1339+000	Present	Steel Structure	LHS
8	1349+250	Present	RCC structure	LHS
9	1354+650	Present	Steel Structure	LHS
10	1359+600	Present	RCC structure	LHS
11	1365+800	Present	RCC structure	LHS
12	1372+931	Present	RCC structure	LHS

1	1306+186	Present	RCC structure	RHS
2	1310+540	Present	RCC structure	RHS
3	1311+800	Present	RCC structure	RHS
4	1323+175	Present	RCC structure	RHS
5	1328+235	Present	Steel Structure	RHS
6	1333+168	Present	RCC structure	RHS
7	1336+350	Present	Steel Structure	RHS
8	1339+950	Present	RCC structure	RHS
9	1341+046	Present	RCC Structure	RHS
10	1349+374	Present	RCC Structure	RHS
11	1350+180	Present	RCC Structure	RHS
12	1354+488	Present	RCC structure	RHS
13	1357+380	Present	Steel Structure	RHS
14	1360+000	Present	RCC Structure	RHS
15	1365+916	Present	RCC Structure	RHS
16	1369+700	Present	Steel Structure	RHS
17	1372+931	Present	RCC Structure	RHS
18	1378+725	Present	RCC Structure	RHS

2.3.16 Truck Lay Byes

S. No.	Chainage (Km)	Latitude (deg)	Longitude (deg)	Remarks	Side
1	1306+610	25.41494041	77.79931152	Present without Toilets	LHS
2	1330+490	25.42186068	78.02381723	Present without Toilets	LHS
3	1350+750	25.45320202	78.21806927	Present without Toilets	LHS
4	1374+170	25.46358258	78.44604657	Present without Toilets	LHS
5	1374+250	25.46310465	78.44710674	Present without Toilets	RHS
6	1350+840	25.45327456	78.21921	Present without Toilets	RHS
7	1330+580	25.42165712	78.02509705	Present without Toilets	RHS
8	1306+950	25.4146245	77.80315344	Present without Toilets	RHS

2.3.17 Toll Plaza

S. No.	Particular	Details of Raksha Toll Plaza
1.	Toll Plaza Chainage	1374+570 km
2.	Number of Tolling Lanes	8

S. No.	Particular	Details of Raksha Toll Plaza
3.	Weigh in Motion Facility (Number of Lanes)	8
4.	No. of ETC Lanes	8
5.	Number of Toll Booths	8
6.	Canopy	Yes
7.	Administrative Building	Yes
8.	Availability of Tunnel or Elevated Walkway for Movement between Toll Lanes and Administrative Building	No
9.	Availability of Static Weigh Bridge	Yes
10.	Availability of Loading/Unloading Facility for Overloaded Vehicles	No
11.	Storage facility for Overloaded Material	No
12.	High mast Light	Yes
13.	Street Light	No
14.	User Fee Boards	Yes
15.	Cantilever/Gantry Boards	No

2.3.18 Shoulder drain

Sr.No.	From Ch.	To Ch.	Side	Type
1	1361.320	1362.320	LHS	Closed Drain
2	1367.770	1367.970	LHS	Open Drain
3	1375.580	1376.690	LHS	Closed Drain
4	1377.900	1378.280	LHS	Open Drain
5	1380.000	1380.387	LHS	Closed Drain

Sr.No.	From Ch.	To Ch.	Side	Type
1	1361.309	1362.440	RHS	Closed Drain
2	1367.450	1367.650	RHS	Open Drain
3	1375.580	1376.650	RHS	Closed Drain
4	1377.600	1377.980	RHS	Open Drain
5	1380.000	1380.387	RHS	Closed Drain

2.3.19 Pavement Type

S. No	Chainage From (km)	Chainage To (km)	Pavement Type		Length (in km)
			LHS	RHS	
1	1305+087	1374+620	BT - Bituminous	BT - Bituminous	69.62
2	1374+620	1374+770	CC – Cement Concrete	CC – Cement Concrete	0.15
3	1374+770	1380+387	BT - Bituminous	BT - Bituminous	5.53

2.4 INITIAL IMPROVEMENT WORKS

Schedule B provides the initial improvement proposal to be executed in one year from appointed dated. Consultant collected the Site Inventory for improvements proposed in the schedule. The same have been elaborated below: -

1) Construction of New Service Roads

S. No.	Existing Kilometer (Km)		Length (m)	Width (m)	Side
	From	To			
1	1323+100	1323+400	300	7	RHS
2	1335+470	1336+400	930	7	RHS
3	1368+200	1368+500	300	7	RHS
4	1372+900	1373+300	400	7	RHS
5	1332+600	1333+320	720	7	LHS
6	1335+800	1336+400	600	7	LHS
7	1378+600	1380+000	1400	7	LHS
	Total Length =		4650 m		

2) Widening of Existing Culverts

Following box and pipe culverts are proposed to be widened due to improvements of entry and exit arrangements and acceleration, deceleration lane and tapering.

S.No	Chainage	Type of Culvert	Proposal
1	1323+700	Pipe culvert	Widening
2	1333+700	Pipe culvert	Widening
3	1333+700	Pipe culvert	Widening
4	1336+100	Pipe culvert	Widening
5	1336+100	Pipe culvert	Widening
6	1336+300	Pipe culvert	Widening
7	1336+300	Pipe culvert	Widening
8	1336+700	Box culvert	Widening
9	1336+700	Box culvert	Widening
10	1379+300	Slab culvert	Widening
11	1379+800	Box culvert	Widening
12	1310+300	Pipe culvert	Widening
13	1312+200	Pipe culvert	Widening
14	1323+500	Box culvert	Widening
15	1323+900	Pipe culvert	Widening
16	1324+400	Pipe culvert	Widening
17	1328+800	Pipe culvert	Widening
18	1332+900	Pipe culvert	Widening
19	1334+800	Pipe culvert	Widening
20	1335+900	Pipe culvert	Widening
21	1336+800	Box culvert	Widening
22	1336+800	Box culvert	Widening
23	1337+100	Box culvert	Widening
24	1337+100	Box culvert	Widening
25	1339+600	Pipe culvert	Widening
26	1340+400	Box culvert	Widening
27	1342+500	Box culvert	Widening
28	1343+700	Box culvert	Widening
29	1343+700	Box culvert	Widening
30	1345+800	Pipe culvert	Widening
31	1347+300	Pipe culvert	Widening
32	1347+300	Pipe culvert	Widening
33	1355+300	Pipe culvert	Widening
34	1357+600	Pipe culvert	Widening
35	1358+000	Pipe culvert	Widening
36	1360+200	Box culvert	Widening
37	1363+350	Pipe culvert	Widening

S.No	Chainage	Type of Culvert	Proposal
38	1364+000	Pipe culvert	Widening
39	1367+700	Pipe culvert	Widening
40	1369+000	Box culvert	Widening
41	1374+200	Pipe culvert	Widening
42	1374+300	Box culvert	Widening
43	1377+900	Box culvert	Widening

3) New Construction of culverts

New culverts are proposed for cross road locations. The same are tabulated below:

S.No.	Chainage	Type of Culvert	Proposal
1.	1308+700	Pipe culvert	New Construction
2.	1310+700	Pipe culvert	New Construction
3.	1311+800	Pipe culvert	New Construction
4.	1312+430	Pipe culvert	New Construction
5.	1313+200	Pipe culvert	New Construction
6.	1329+500	Pipe culvert	New Construction
7.	1332+300	Pipe culvert	New Construction
8.	1341+800	Pipe culvert	New Construction
9.	1350+200	Pipe culvert	New Construction
10.	1323+920	Pipe culvert	New Construction
11.	1330+730	Pipe culvert	New Construction
12.	1305+900	Pipe culvert	New Construction
13.	1309+706	Pipe culvert	New Construction
14.	1351+200	Pipe culvert	New Construction
15.	1305+950	Pipe culvert	New Construction
16.	1314+080	Pipe culvert	New Construction
17.	1328+240	Pipe culvert	New Construction
18.	1333+200	Pipe culvert	New Construction
19.	1346+900	Pipe culvert	New Construction
20.	1373+300	Pipe culvert	New Construction

4) Widening of Earthen Shoulder

At locations where the earthen shoulder is not as per standard width, it is proposed to widen the earthen shoulder.

Sr. No.	Chainage (km) From	Chainage (km) To	Earthen Shoulder Width	Length	Widening Width	Embankment Qty
LHS						
1	1305087	1305690	0.852	603	0.648	390.744
2	1305700	1306710	0.524	1010	0.976	985.76
3	1306720	1307140	0.854	420	0.646	271.32
4	1307150	1307330	1.524	0	0	0
5	1307340	1312020	1.124	4680	0.376	1759.68
6	1312030	1313890	1.142	1860	0.358	665.88
7	1313900	1318110	0.654	4210	0.846	3561.66
8	1318120	1319250	1.526	0	0	0
9	1319260	1321660	1.125	2400	0.375	900
10	1321670	1321920	1.255	250	0.245	61.25
11	1321930	1322970	2.524	0	0	0
12	1322980	1328090	0.625	5110	0.875	4471.25
13	1328100	1329730	2.252	0	0	0
14	1329740	1331310	0.856	1570	0.644	1011.08
15	1331320	1332370	0.845	1050	0.655	687.75
16	1332380	1351870	2.124	0	0	0
17	1351880	1368050	0.624	16170	0.876	14164.92
18	1368060	1368510	2.212	0	0	0
19	1368520	1370580	1.254	2060	0.246	506.76
20	1370590	1373910	1.154	3320	0.346	1148.72
21	1373920	1377680	1.256	3760	0.244	917.44
22	1377690	1378150	2.562	0	0	0
23	1378160	1380387	2.526	0	0	0
RHS						
1	1379400	1379110	1.618	0	0	0
2	1379100	1377260	1.292	1840	0.208	382.72
3	1377250	1374840	1.415	2410	0.085	204.85
4	1374830	1373700	1.742	0	0	0
5	1373690	1371400	1.548	0	0	0
6	1371390	1368700	1.356	2690	0.144	387.36
7	1368690	1367300	1.342	1390	0.158	219.62
8	1367290	1362700	1.248	4590	0.252	1156.68
9	1362690	1360840	1.516	0	0	0
10	1360830	1360230	1.346	600	0.154	92.4
11	1360220	1357730	1.348	2490	0.152	378.48
12	1357720	1354030	1.345	3690	0.155	571.95
13	1354020	1351030	1.546	0	0	0

Sr. No.	Chainage (km) From	Chainage (km) To	Earthen Shoulder Width	Length	Widening Width	Embankment Qty
14	1351020	1350340	1.358	680	0.142	96.56
15	1350330	1347340	1.456	2990	0.044	131.56
16	1347330	1346040	1.654	0	0	0
17	1346030	1345840	1.652	0	0	0
18	1345830	1341740	1.312	4090	0.188	768.92
19	1341730	1329940	1.352	11790	0.148	1744.92
20	1329930	1329680	1.512	0	0	0
21	1329670	1322180	1.526	0	0	0
22	1322170	1321800	1.326	370	0.174	64.38
23	1321790	1319400	1.216	2390	0.284	678.76
24	1319390	1309600	1.426	9790	0.074	724.46
25	1309590	1306400	1.145	3190	0.355	1132.45
26	1306390	1305600	1.231	790	0.269	212.51
27	1305590	1305087	1.152	503	0.348	175.044

5) Stone Pitching

Sr. No.	Location	Chainage (Km)		Side	Length (m)	Safety Provision
		From	To			
1	Near Sindh River Bridge	1322+100	1322+930	LHS	830	Stone Pitching
		1322+430	1322+930	RHS	500	Stone Pitching

6) Improvement to Major/Minor Junctions

Sr. No.	Chainage	Type	Type of Intersection	Side
1.	1322+960	T	3 leg Unsignalized	RHS
2.	1333+230	X	Staggered	BHS
3.	1338+930	T	3 leg Unsignalized	LHS
4.	1339+900	X	4 leg Unsignalized	LHS
5.	1343+000	X	Staggered	BHS
6.	1344+850	T	3 leg Unsignalized	LHS
7.	1349+060	X	4 leg Unsignalized	BHS
8.	1354+640	T	3 leg Unsignalized	LHS
9.	1359+800	T	3 leg Unsignalized	RHS
10.	1362+960	T	3 leg Unsignalized	LHS

Sr. No.	Chainage	Type	Type of Intersection	Side
11.	1363+360	Y	3 leg Unsignalized	RHS
12.	1365+920	T	3 leg Unsignalized	LHS
13.	1376+030	T	3 leg Unsignalized	LHS
14.	1377+390	T	3 leg Unsignalized	RHS
15.	1305+870	T	3 leg Unsignalized	RHS
16.	1313+210	T	3 leg Unsignalized	RHS
17.	1314+040	T	3 leg Unsignalized	RHS
18.	1323+920	T	3 leg Unsignalized	RHS
19.	1328+060	Y	3 leg Unsignalized	LHS
20.	1328+240	T	3 leg Unsignalized	RHS
21.	1329+490	T	3 leg Unsignalized	RHS
22.	1330+700	T	3 leg Unsignalized	RHS
23.	1332+310	T	3 leg Unsignalized	RHS
24.	1341+770	Y	3 leg Unsignalized	RHS
25.	1350+180	T	3 leg Unsignalized	RHS
26.	1351+240	X	3 leg Unsignalized	LHS
27.	1351+240	X	3 leg Unsignalized	RHS

7) Rural Roads Improvement

Sr. No.	Chainage	Type	Side	Improvement Proposals
1	1308+700	T	RHS	Direct Tapering of 90m on both sides and strengthening of connecting rural roads
2	1310+700	T	LHS	
3	1311+800	T	RHS	
4	1312+430	T	RHS	
5	1346+900	T	RHS	

8) Amola Junction Improvement

At Amola junction chainage 1323.050 Km main carriageway to be raised by 2 meter to prevent dam water to damage the road. The junction shall be designed as per standard drawings for major junction including the main road as well as the side road.

9) Proposed Lined Drain

Reinforced Cement Concrete drains of minimum size of 1.5 m shall be provided at the following locations:

Sr. No.	Chainage (km)		Side	Length (m)
	From	To		
1	1305+980	1306+030	LHS	50
2	1310+680	1310+780	LHS	100
3	1313+300	1313.+330	LHS	30
4	1318+200	1318+850	LHS	650
5	1323+000	1323+150	LHS	150
6	1323+400	1323+520	LHS	120
7	1327+500	1327+600	LHS	100
8	1328+200	1328+670	LHS	470
9	1330+710	1330+760	LHS	50
10	1332+600	1333+320	LHS- Service Road	720
11	1332+750	1332+800	LHS	50
12	1332+815	1333+320	LHS	505
13	1333+385	1333+410	LHS	25
14	1333+950	1334+200	LHS	250
15	1335+500	1335+560	LHS	60
16	1335+800	1336+400	LHS- Service Road	600
17	1336+000	1336+300	LHS	300
18	1340+110	1340+970	LHS	860
19	1341+180	1341+210	LHS	30
20	1342+040	1342+200	LHS	160
21	1343+000	1343+100	LHS	100
22	1344+000	1344+100	LHS	100
23	1344+300	1344+400	LHS	100
24	1361+210	1361+320	LHS	110
25	1365+550	1366+170	LHS	620
26	1365+900	1366+110	LHS	210
27	1370+420	1370+600	LHS	180
28	1370+850	1370+900	LHS	50
29	1377+450	1377+680	LHS	230
30	1377+800	1377+900	LHS	100
31	1378+600	1380+000	LHS-Service Road	1400
32	1378+750	1379+000	LHS	250
33	1379+600	1380+000	LHS	400
34	1319+780	1319+880	RHS	100
35	1311+800	1311+980	RHS	180
36	1312+550	1312+590	RHS	40

Sr. No.	Chainage (km)		Side	Length (m)
	From	To		
37	1313+340	1313+370	RHS	30
38	1318+100	1318+850	RHS	750
39	1309+780	1309+800	RHS	100
40	1323+100	1323+400	RHS-Service Road	300
41	1323+170	1323+830	RHS	660
42	1327+680	1327+900	RHS	220
43	1330+700	1330+750	RHS	50
44	1332+980	1333+410	RHS	430
45	1334+350	1334+470	RHS	120
46	1335+470	1336+400	RHS-Service Road	930
47	1335+550	1336+120	RHS	570
48	1336+870	1336+910	RHS	40
49	1342+590	1342+670	RHS	80
50	1343+050	1343+220	RHS	170
51	1343+520	1343+800	RHS	280
52	1347+060	1347+200	RHS	140
53	1365+300	1365+410	RHS	110
54	1365+900	1365+950	RHS	50
55	1366+260	1366+450	RHS	190
56	1368+200	1368+500	RHS-Service Road	300
57	1370+820	1370+880	RHS	60
58	1372+900	1373+300	RHS-Service Road	400
59	1373+300	1373+430	RHS	130
60	1373+720	1373+900	RHS	180
			Total Length =	**15740**

10) Proposed Locations for Chute Drain

Sr. No.	From	To	Side	Length
1	1314+700	1314+850	RHS	150
2	1314+000	1314+100	LHS	100
3	1321+600	1321+700	RHS	100
4	1330+300	1330+450	LHS	150
Total Length(m) = 500				

11) Median Openings to be shifted

Sr. No.	Chainage (Km) where median opening is to be closed	Latitude	Longitude	Chainage (Km) where new opening is to be proposed	Latitude	Longitude
1	1310+220	25.41306237	77.8352871	1309+900	25.413434°	77.832146°
2	1310+820	25.41234263	77.8408024	1311+100	25.411822°	77.843489°
3	1358+220	25.46666223	78.2908846	1358+000	25.466582°	78.288716°
4	1359+300	25.46786701	78.3013064	1359+000	25.467359°	78.298425°
5	1361+200	25.47074536	78.3202683	1360+310	25.469412°	78.311611°
6	1362+500	25.47216667	78.3318172	1362+250	25.471547°	78.329396°
7	1369+200	25.46662276	78.397725	1369+050	25.466663°	78.396206°
8	1370+600	25.46657906	78.4103829	1370+300	25.466532°	78.407377°
9	1375+500	25.46000716	78.4592218	1375+780	25.459945°	78.462041°
10	1376+800	25.45972343	78.4707441	1376+500	25.459817°	78.467761°
11	1379+950	25.45766924	78.502835	1379+750	25.457684°	78.500907°

12) Proposal for Storage Lane

As per cl. 2.14.3 of IRC SP 84 2019 storage lane shall be provided for following locations.

Sr. No.	Chainage (Km)	Proposals for Storage Length for Median Opening (m)
1	1314+080	110
2	1323+000	110
3	1343+030	110
4	1346+900	110
5	1347+500	110
6	1349+100	110
7	1351+200	110
8	1353+100	110
9	1354+700	110
10	1357+400	110

Sr. No.	Chainage (Km)	Proposals for Storage Length for Median Opening (m)
11	1359+800	110
12	1365+900	110
13	1367+100	110
14	1369+200	110
15	1371+300	110
16	1372+650	110
17	1373+300	110
18	1373+300	110
19	1374+180	110
20	1374+400	110
21	1374+950	110
22	1378+700	110

13) Landscaping and tree plantation:

Landscaping and Tree Plantation shall be done but not limited to the following as per IRC SP: 84-2019 and as per NHAI policy.

Landscaping shall be provided at the following locations: -

a) Avenue Plantations as per IRC SP 21 including tree guard
b) Grade Separated Intersections
c) Entry and Exit Ramp
d) At grade islands of intersection locations
e) Toll Plaza Area

14) Bus-bays and Bus shelters:

Sr. No.	Chainage	Location	Remarks
1	1377+300	RHS	All facilities in conformance to Cl. 12.7 of IRC: SP-84:2019 to be provided.
2	1377+300	LHS	

15) Lighting along the Project Highway:

Lighting including fixing of poles and LED lights shall be provided at following locations on the Project Highway in accordance with IRC: SP:84-2019.

Grade Separated Structures: The Flyovers, ROB and service /slip roads shall have lighting, as per Manual. Lighting shall be provided at top & underside of the Grade Separated structures. The locations are given below.

Sr. No.	Location of Service Road		Location	Side	Length (m)	Remarks
	From	To				
1	1310+280	1310+800	Service road	LHS	520	Existing
2	1358+230	1359+320	Service road	LHS	1090	Existing
3	1361+300	1362+420	Service road	LHS	1120	Existing
4	1369+230	1370+580	Service road	LHS	1350	Existing
5	1375+530	1376+750	Service road	LHS	1220	Existing
6	1376+360	1375+120	Service road	RHS	1240	Existing
7	1370+140	1368+820	Service road	RHS	1320	Existing
8	1358+930	1357+820	Service road	RHS	1110	Existing
9	1310+430	1306+560	Service road	RHS	3870	Existing
10	1332+600	1333+320	Service road	LHS	720	Proposed
11	1335+800	1336+400	Service road	LHS	600	Proposed
12	1378+600	1380+000	Service road	LHS	1400	Proposed
13	1323+100	1323+400	Service road	RHS	300	Proposed
14	1335+470	1336+400	Service road	RHS	930	Proposed
15	1368+200	1368+500	Service road	RHS	300	Proposed
16	1372+900	1373+300	Service road	RHS	400	Proposed
17	1306+600	1306+838	Truck Lay Bye	BHS	238	Existing

Sr. No.	Location of Service Road		Location	Side	Length (m)	Remarks
	From	To				
18	1330+500	1330+737	Truck Lay Bye	BHS	237	Existing
19	1350+800	1351+026	Truck Lay Bye	BHS	226	Existing
20	1374+200	1374+405	Truck Lay Bye	BHS	205	Existing
21	1365+880	1367+120	Truck Lay Bye	BHS	1240	Proposed

16) High Mast Light locations:

High Mast Lighting (provided with 20m height) including fixing of poles and LED lights shall be provided at following locations on the Project Highway in accordance with IRC: SP:84-2019. At all the minor junctions & at Amola junction high mast has to be provided. Total 39 No. of high mast are proposed.

17) W- Beam Crash Barriers

a) The existing damaged and missing W-Beam crash barriers shall be re-stained throughout the project length including Service/Slip Roads.

b) The Concessionaire shall provide new W-beam crash barriers in median as per Fig.17 of IRC:119-2015 i.e. throughout the Project Highway.

c) The W-Beam crash barrier shall be provided for embankment height more than and equal to 3m. on Main Carriageway & Service/Slip Roads.

d) W-Beam crash barrier shall be provided between proposed Service Road & Main Carriageway.

18) Road Studs

Road Studs including Solar Studs shall be provided throughout the project highway as Per IRC: SP:84-2019. – 33,467 No of Road studs have been proposed as per IRC standards.

19) Kerb Stones Raising

The raising of Kerb stones/ new Kerb stones shall be provided throughout the project road of 150 Kms after carrying out the strengthening of the main carriageway & service/slip roads.

20) Traffic Signages

a) Existing damaged and non-standards sign boards; Gantry & cantilever signs shall be replaced.

b) Road signages (cautionary, mandatory and Informatory) along the project highway shall be provided wherever required, as per IRC:67-2012 & IRC: SP:84-2019.

c) Overhead Gantry signs and Cantilever Gantry signs shall be provided suitably on the project highway as per IRC: SP:84-2019

The total number of signages are as tabulated below: -

S.No.	Type of Signboard	Unit	No.
1	90 cm equilateral triangle	each	602
2	60 cm equilateral triangle	each	19
3	60 cm circular	each	14
4	80 mm x 60 mm rectangular	each	43
5	60 cm x 45 cm rectangular	each	0
6	60 cm x 60 cm square	each	0
7	90 cm high octagon	each	26
8	Direction and Place Identification signs upto 0.9 sqm size board.	Sqm.	23
9	Direction and Place Identification signs with size more than 0.9 sqm size board.	Sqm.	153
10	Road Delineators	each	11705
11	Cantilever Over Head	each	0
12	Over head Gantry	each	0

21) Kilometer/ Hectometer/Boundary Stones

The damaged/missing kilometer and hectometer stones shall be provided. All the Kilometer & Hectometer stones shall be repainted. Boundary Stones shall be provided throughout the project highway as per IRC:SP: 25 at 50 m interval on either side.

Total 19 No. of Km stones and 368 No. of Hectometer stones are proposed.

22) Proposal for Gabion Wall

Sr.No.	Chainage (Km)		Side	Length (m)
	From	To		
1	1319+650	1319+750	RHS	100

2.5 AXLE LOAD SURVEY

Axle Load Survey was conducted at each toll plaza as per the schedule below.

Table 2.4: Schedule of Axle Load Surveys

Location	Chainage	Date
Raksha Toll Plaza	1374.570	21st to 22nd June 2022

Axle Load Survey at Raksha Toll Plaza

2.5.1 Vehicle Damage Factor (VDF)

VDF was calculated for Flexible using the Axle Load Data from Raksha Toll Plaza. VDF will be used for calculation of MSA, which is needed to determine overlay thickness.

Table 2.5: VDF at Toll Plaza

Direction	Bus	LCV	2A	3A	MAV
Shivpuri-Jhansi (LHS)	6.18	1.36	3.55	5.76	20.871
Jhansi-Shivpuri (RHS)s		0.12	1.74	3.23	10.369

VDF in LHS shows a stark difference from the values in RHS. LHS is characterized by overloaded trucks carrying Fertilizer, Cement, Kota Stone, Car, Agricultural produce. In RHS the trucks carry similar Agricultural produce (normally loaded) and few Sand laden trucks, with higher number of empty trucks. This trend is not reflected in pavement condition, as cracking is seen in both directions.

2.5.2 Traffic In Vehicle Numbers

CVC survey was not a part of the services. Values are taken from the Schedule M provided by NHAI for September 2021 to May 2022. Total commercial traffic for May 2022 was divided by 31 to get Average Daily Traffic (ADT) and is shown in Table 3.5.

Table 2.6: ADT for Commercial Traffic at Raibha Toll Plaza (May 2022)

Direction	Bus	LCV	2A	3A	MAV
Both	253	273	447	502	1,517

2.5.3 Capacity Augmentation

Traffic consultant appointed by NHIIMPL provided the traffic report wherein AADT in PCU for each year has been mentioned (reproduced below).

Table 2 Projected Traffic

Year	Traffic in PCU	Year	Traffic in PCU
FY 23	14,919	FY 34	21,912
FY 24	15,702	FY 35	22,904
FY 25	16,550	FY 36	23,928
FY 26	17,455	FY 37	24,987
FY 27	18,421	FY 38	26,083
FY 28	19,329	FY 39	27,198
FY 29	19,585	FY 40	28,353
FY 30	19,810	FY 41	29,547
FY 31	20,744		
FY 32	21,712		
FY 33	22,148		

As per Concession Agreement 14.1.1. *the project requires the capacity augmentation for any homogenous/tollable section(s)1 of the Project Highway in case the average daily traffic of PCUs for that homogenous/tollable section(s), in any Accounting Year shall exceed the designed capacity Target Traffic2 for Project Highway .*

[2] Target Traffic to be determined for LOS B as per IRC Code - IRC: SP:84-2019 or any amendments thereof

Target traffic as per IRC SP 84, is 40000 PCU. Referring to following table, target traffic is not achieved during the Concession Period. Hence Capacity Augmentation in not envisaged.

2.5.4 Design Traffic for Overlay Design

A growth rate of 5% is assumed. Calculated MSA for various years as per actual VDF (Table 3.6) is shown below. Overlay is proposed to be provided for a 10-year period as per Schedule B. Future overlays/resurfacings will be at maximum 6 year intervals as mandated by Schedule B.

Table 2.7: Design Traffic at Raibha Toll Plaza

Design Life	LHS	RHS
10 years	69	33

2.6 ROUGHNESS SURVEY

Roughness survey was carried out from 21st to 22nd June 2022 using Laser Profiler.

NSV with Laser

Measurement was done in IRI. The IRI values were converted to BI used to classify pavement condition were taken from execution Schedule F. For Flexible Pavement, classification is - **Good <2000, 2000<=Fair<2400, Poor>=2400**.

Table 2.8: Summary of Flexible Pavement Roughness

From km	To km	Roughness LHS		Roughness RHS	
		BI (mm/km)	Classification	BI (mm/km)	Classification
1305.087	1306.000	1969	Good	1669	Good
1306.000	1307.000	2357	Fair	1673	Good

From km	To km	Roughness LHS		Roughness RHS	
		BI (mm/km)	Classification	BI (mm/km)	Classification
1307.000	1308.000	2276	Fair	2457	Poor
1308.000	1309.000	2096	Fair	1692	Good
1309.000	1310.000	2052	Fair	2345	Fair
1310.000	1311.000	2620	Poor	2441	Poor
1311.000	1312.000	1954	Good	1717	Good
1312.000	1313.000	1669	Good	1232	Good
1313.000	1314.000	1802	Good	1246	Good
1314.000	1315.000	2053	Fair	2318	Fair
1315.000	1316.000	1868	Good	2339	Fair
1316.000	1317.000	1802	Good	1915	Good
1317.000	1318.000	1874	Good	2321	Fair
1318.000	1319.000	1940	Good	2349	Fair
1319.000	1320.000	2366	Fair	3129	Poor
1320.000	1321.000	3557	Poor	3440	Poor
1321.000	1322.000	2250	Fair	2545	Poor
1322.000	1323.000	2125	Fair	2081	Fair
1323.000	1324.000	2583	Poor	1644	Good
1324.000	1325.000	1322	Good	1356	Good
1325.000	1326.000	2798	Poor	1423	Good
1326.000	1327.000	2597	Poor	1542	Good
1327.000	1328.000	2693	Poor	2054	Fair
1328.000	1329.000	3463	Poor	2136	Fair
1329.000	1330.000	2431	Poor	2208	Fair
1330.000	1331.000	2169	Fair	1737	Good
1331.000	1332.000	2164	Fair	1439	Good
1332.000	1333.000	2820	Poor	1480	Good
1333.000	1334.000	2468	Poor	1765	Good
1334.000	1335.000	1889	Good	1562	Good
1335.000	1336.000	1954	Good	1249	Good
1336.000	1337.000	1905	Good	1697	Good

From km	To km	Roughness LHS		Roughness RHS	
		BI (mm/km)	Classification	BI (mm/km)	Classification
1337.000	1338.000	3080	Poor	1516	Good
1338.000	1339.000	1801	Good	1443	Good
1339.000	1340.000	1602	Good	1686	Good
1340.000	1341.000	1490	Good	1336	Good
1341.000	1342.000	3241	Poor	2717	Poor
1342.000	1343.000	3771	Poor	1998	Good
1343.000	1344.000	3191	Poor	1538	Good
1344.000	1345.000	2243	Fair	1536	Good
1345.000	1346.000	2603	Poor	1418	Good
1346.000	1347.000	2901	Poor	1474	Good
1347.000	1348.000	2040	Fair	1380	Good
1348.000	1349.000	2073	Fair	1340	Good
1349.000	1350.000	1661	Good	1403	Good
1350.000	1351.000	1675	Good	1210	Good
1351.000	1352.000	2111	Fair	2052	Fair
1352.000	1353.000	2175	Fair	1407	Good
1353.000	1354.000	2118	Fair	1602	Good
1354.000	1355.000	3044	Poor	1386	Good
1355.000	1356.000	2006	Fair	1444	Good
1356.000	1357.000	1634	Good	1230	Good
1357.000	1358.000	2023	Fair	1259	Good
1358.000	1359.000	1765	Good	1143	Good
1359.000	1360.000	2134	Fair	2464	Poor
1360.000	1361.000	1844	Good	1998	Good
1361.000	1362.000	3094	Poor	1880	Good
1362.000	1363.000	5564	Poor	3279	Poor
1363.000	1364.000	2031	Fair	1217	Good
1364.000	1365.000	2875	Poor	1516	Good
1365.000	1366.000	5153	Poor	2541	Poor
1366.000	1367.000	2858	Poor	2095	Fair

From km	To km	Roughness LHS		Roughness RHS	
		BI (mm/km)	Classification	BI (mm/km)	Classification
1367.000	1368.000	3195	Poor	1648	Good
1368.000	1369.000	2178	Fair	1650	Good
1369.000	1370.000	1775	Good	1266	Good
1370.000	1371.000	1647	Good	1393	Good
1371.000	1372.000	1685	Good	1898	Good
1372.000	1373.000	1459	Good	1499	Good
1373.000	1374.000	1395	Good	1687	Good
1374.000	1375.000	4635	Poor	3769	Poor
1375.000	1376.000	2923	Poor	2410	Poor
1376.000	1377.000	3300	Poor	1553	Good
1377.000	1378.000	3701	Poor	1913	Good
1378.000	1379.000	3554	Poor	2738	Poor
1379.000	1380.000	3942	Poor	3226	Poor
1380.000	1380.387	2311	Fair	2043	Fair
		Summary LHS		Summary RHS	
		Classification	Length in km	Classification	Length in km
		Good	24.913	Good	50.913
		Fair	21.387	Fair	11.387
		Poor	28.850	Poor	12.850

2.7 FWD SURVEY & ANALYSIS

FWD survey was carried out between 14th and 19th June. Testing was done for 5 points/km. The results are used to determine the overlay requirement. Test pits were conducted at 5 km intervals in a staggered manner to measure crust thickness which is an input for FWD analysis and overlay design.

The tables below show the BT & Granular thickness, Back calculated modulus, and overlay requirement for various sections. Overlay varying from 50 mm BC to 40 mm BC +85 mm DBM is required in LHS for 62763 km. No overlay is required in RHS.

Table 2.9: Calculated Overlay in Flexible Pavement LHS

From km	To km	Length in km	Pavement Thickness (mm)		15th Percentile			Before overlay		Design Traffic (in msa) LHS	After overlay		Overlay Thickness (mm)	
			BT	Granular	BT Layer	Granular Layer	Subgrade	Remaining Fatigue Life	Remaining Rutting Life		Remaining Fatigue Life	Remaining Rutting Life	BC	DBM
1305.087	1308.000	2.913	220	390	917	297	77	65	246	69	205.8	806	50	0
1308.000	1311.000	3.000	220	390	987	361	77	107	354	69	NA	NA	0	0
1311.000	1315.000	4.000	220	390	888	276	77	54	215	69	139.3	589	40	0
1315.000	1318.000	3.000	180	490	1092	353	77	57	598	69	147.9	1452	40	0
1318.000	1320.000	2.000	180	490	1125	64	77	3	80	69	69.3	1726	40	75
1321.000	1325.000	4.000	180	490	1266	357	77	65	674	69	165.3	1615	40	0
1325.000	1328.000	3.000	160	490	1276	196	77	12	182	69	110.2	1490	40	50
1328.000	1331.000	3.000	160	490	1295	62	77	2	54	69	70.1	2732	40	85
1331.000	1335.000	4.000	160	490	1242	85	77	3	88	69	78.1	2059	40	80
1335.000	1338.000	3.000	160	440	1304	82	77	3	60	69	70.1	1419	40	75

From km	To km	Length in km	Pavement Thickness (mm)		15th Percentile			Before overlay		Design Traffic (in msa) LHS	After overlay		Overlay Thickness (mm)	
			BT	Granular	BT Layer	Granular Layer	Subgrade	Remaining Fatigue Life	Remaining Rutting Life		Remaining Fatigue Life	Remaining Rutting Life	BC	DBM
1338.000	1341.000	3.000	160	440	1296	165	77	9	90	69	84.0	889	40	50
1341.000	1345.000	4.000	160	440	1301	82	77	3	59	69	70.0	1415	40	75
1345.000	1348.000	3.000	180	490	1342	312	77	50	553	69	127.7	1369	40	0
1348.000	1351.000	3.000	180	490	1610	213	77	29	363	69	74.3	971	40	0
1351.000	1355.000	4.000	180	490	1616	361	77	81	821	69	#DIV/0!	#DIV/0!	0	0
1355.000	1358.000	3.000	160	420	1584	76	77	4	64	69	73.0	1426	40	70
1358.000	1361.000	3.000	160	420	1580	327	77	42	222	69	103.9	588	40	0
1361.000	1365.000	4.000	160	420	1630	64	77	3	68	69	74.9	1825	40	75
1365.000	1368.000	3.000	150	420	1594	162	77	9	70	69	82.2	751	40	50
1368.000	1371.000	3.000	150	420	1619	299	77	28	160	69	72.5	439	40	0
1371.000	1375.000	4.000	150	420	1659	223	77	16	105	69	131.9	953	40	50
1375.000	1378.000	3.000	250	420	1271	322	77	177	857	69	NA	NA	0	0
1378.000	1381.000	3.000	250	420	1330	340	77	206	971	69	NA	NA	0	0

Table 2.10: Calculated Overlay in Flexible Pavement RHS

From km	To km	Length in km	Pavement Thickness (mm)		15th Percentile			Before overlay		Design Traffic (in msa) RHS	After overlay		Overlay Thickness (mm)	
			BT	Granular	BT Layer	Granular Layer	Subgrade	Remaining Fatigue Life	Remaining Rutting Life		Remaining Fatigue Life	Remaining Rutting Life	BC	DBM
1305.087	1308.000	2.913	200	230	1418	359	77	73	52	33	NA	NA	0	0
1308.000	1311.000	3.000	200	230	1409	355	77	71	51	33	NA	NA	0	0
1311.000	1315.000	4.000	200	230	1384	360	77	72	51	33	NA	NA	0	0
1315.000	1318.000	3.000	220	480	1332	362	77	143	1215	33	NA	NA	0	0
1318.000	1320.000	2.000	220	480	1293	362	77	140	1185	33	NA	NA	0	0
1321.000	1325.000	4.000	220	480	1362	364	77	148	1251	33	NA	NA	0	0
1325.000	1328.000	3.000	200	400	1295	366	77	95	374	33	NA	NA	0	0
1328.000	1331.000	3.000	200	400	1319	362	77	94	374	33	NA	NA	0	0
1331.000	1335.000	4.000	200	400	1218	355	77	85	337	33	NA	NA	0	0
1335.000	1338.000	3.000	180	440	1222	302	77	42	287	33	NA	NA	0	0
1338.000	1341.000	3.000	180	440	1226	347	77	58	363	33	NA	NA	0	0
1341.000	1345.000	4.000	180	440	1203	285	77	37	258	33	NA	NA	0	0
1345.000	1348.000	3.000	220	400	1299	361	77	132	515	33	NA	NA	0	0
1348.000	1351.000	3.000	220	400	1592	353	77	151	616	33	NA	NA	0	0
1351.000	1355.000	4.000	220	400	1619	362	77	161	651	33	NA	NA	0	0
1355.000	1358.000	3.000	190	460	1620	359	77	95	709	33	NA	NA	0	0

From km	To km	Length in km	Pavement Thickness (mm)		15th Percentile			Before overlay		Design Traffic (in msa) RHS	After overlay		Overlay Thickness (mm)	
			BT	Granular	BT Layer	Granular Layer	Subgrade	Remaining Fatigue Life	Remaining Rutting Life		Remaining Fatigue Life	Remaining Rutting Life	BC	DBM
1358.000	1361.000	3.000	190	460	1555	329	77	76	592	33	NA	NA	0	0
1361.000	1365.000	4.000	190	460	1585	355	77	91	683	33	NA	NA	0	0
1365.000	1368.000	3.000	180	400	1680	364	77	80	327	33	NA	NA	0	0
1368.000	1371.000	3.000	180	400	1687	270	77	44	210	33	NA	NA	0	0
1371.000	1375.000	4.000	180	400	1607	321	77	59	257	33	NA	NA	0	0
1375.000	1378.000	3.000	190	390	1490	350	77	79	296	33	NA	NA	0	0
1378.000	1381.000	3.000	190	390	1512	363	77	87	318	33	NA	NA	0	0

Existing pavement has bituminous thickness ranging from 150 to 250 mm, with average thickness of 190 mm. Granular thickness ranges from 380 to 500 mm. It has been observed from our FWD analysis experience that chances of Structural Overlay (minimum 50 mm BC) requirement are very low when BT thickness is at least 200 mm and granular thickness is at least 450 mm. These conditions will be met after current overlay thickness is constructed. So, only Functional Overlays (minimum 40 mm BC) are likely in the future.

2.8 MATERIAL INVESTIGATION

Test Pits were conducted in a staggered manner at 5 km intervals to measure crust thickness and collect subgrade soil sample for testing in the laboratory. Borrow areas were found for use in embankment and subgrade for new Service Roads. Aggregate samples were collected from crusher plants to determine suitability in construction.

2.8.1 CRUST THICKNESS

A total of 16 pits were conducted. BT thickness varies from 150 mm to 250 mm. Combined thickness of Granular Base (WMM) and Subbase (GSB) varies from 380 to 500 mm.

Table 2.11: Crust Thickness

S. No.	Location (km)	Side	BT Layer (mm)	WMM (mm)	GSB (mm)
1	1305.100	RHS	200	230	270
2	1310.000	LHS	220	240	150
3	1315.000	RHS	220	210	180
4	1318.800	LHS	180	220	270
5	1325.000	RHS	200	220	190
6	1329.800	LHS	160	250	240
7	1335.000	RHS	180	250	200
8	1340.000	LHS	160	240	200
9	1345.000	RHS	220	200	220
10	1350.000	LHS	180	260	230
11	1355.000	RHS	190	240	180
12	1359.950	LHS	160	250	170
13	1365.100	RHS	180	220	160
14	1369.200	LHS	150	230	190
15	1374.000	RHS	190	230	150
16	1379.500	LHS	250	220	200

2.8.2 SUBGRADE TEST RESULTS

Subgrade soil was tested for Field Moisture and Density at site. Samples were brought to NABL accredited lab for further testing. Results are shown below. Note that permission from NHAI PIU for cutting of pavement layers in the MCW area was not received, so all tests were conducted at the paved shoulder-earthen shoulder interface or where paved shoulder was broken due to erosion.

Summary of Subgrade Soil Lab Tests

S. No.	Km	Side	IS Classification	Gradation: Percent by weight retained on the Sieve (IS:2720-IV)						Clay & silt content %	Atterberg Limits [IS :2720-Pt-V]			FMC (%)	FDD gm/cc.	Modified Proctor Test (IS:2720-Pt-VIII)		FSI [IS :2720-Pt-XXXX]	4-day soaked CBR @ 97% MDD	Existing Level of Compaction (%)
				19 mm	10 mm	4.75 mm	2.0 mm	425µ	75 µ		LL%	PL%	PI%			MDD gm/cc.	OMC (%)			
1	1305.100	RHS	SC	8.40	9.08	11.32	9.78	20.26	10.26	30.90	30	18	12	1.79	6.98	2.19	6	33.33	20	81.74
2	1310.000	LHS	SC	5.92	10.32	6.32	2.48	5.28	29.46	40.22	28	17	11	1.75	9.25	2.16	7	20.00	18	81.02
3	1315.000	RHS	GC	12.10	13.12	16.04	9.62	14.40	9.68	25.04	28	18	10	1.91	5.8	2.20	6	22.22	22	86.82
4	1318.800	LHS	SC	0.00	5.48	5.02	2.98	24.60	27.68	34.24	31	19	12	Density not conducted due to water leakage		2.12	6	20.00	21	-
5	1325.000	RHS	SC	9.92	6.12	6.02	4.82	29.04	17.64	26.44	29	18	11	1.81	8.05	2.10	6	22.22	22	86.19

S. No.	Km	Side	IS Classification	Gradation: Percent by weight retained on the Sieve (IS:2720-IV)						Clay & silt content %	Atterberg Limits [IS :2720-Pt-V]			FMC (%)	FDD gm/cc.	Modified Proctor Test (IS:2720-Pt-VIII)		FSI [IS :2720-Pt-XXXX]	4-day soaked CBR @ 97% MDD	Existing Level of Compaction (%)
				19 mm	10 mm	4.75 mm	2.0 mm	425µ	75 µ		LL%	PL%	PI%			MDD gm/cc.	OMC (%)			
6	1329.800	LHS	SC	4.96	7.20	3.20	2.86	37.44	21.40	22.94	28	19	9	1.8	5.28	2.10	7	10.00	21	85.71
7	1335.000	RHS	SC	4.96	7.22	11.60	8.22	30.88	15.76	21.36	29	19	10	1.81	9.15	2.10	6	22.22	21	86.19
8	1340.000	LHS	SC	8.74	15.16	14.76	7.60	22.76	12.68	18.30	28	20	8	1.77	5.48	2.20	6.5	10.00	25	80.45
9	1345.000	RHS	SC	7.40	7.28	4.52	3.28	15.08	24.54	37.90	29	20	9	1.75	11.14	2.07	7	10.00	22	84.54
10	1350.000	LHS	SC	2.46	5.66	5.24	3.12	24.12	29.06	29.34	30	19	11	1.82	7.8	2.12	6	22.22	18	85.85
11	1355.000	RHS	SC	0.00	3.52	6.04	7.88	49.46	16.66	14.44	26	18	8	1.81	5.14	2.10	6	10.00	22	86.19
12	1359.950	LHS	SC	0.00	1.64	5.00	5.92	42.70	22.08	22.66	26	18	8	1.77	10.22	2.10	6	10.00	19	84.29
13	1365.100	RHS	SC	0.00	3.88	5.80	9.88	50.96	14.20	15.28	28	18	10	1.91	3.26	2.10	7	20.00	20	90.95
14	1369.200	LHS	SC	0.00	2.28	1.38	1.28	20.66	27.16	47.24	31	20	11	1.91	3.22	2.12	7	22.22	18	90.09
15	1374.000	RHS	SC	10.30	3.14	6.38	13.36	37.12	12.04	17.66	29	18	11	1.8	9.29	2.08	7	22.22	20	86.54
16	1379.500	LHS	SC	5.12	11.14	8.26	4.70	24.38	18.20	28.20	29	19	10	1.81	8.06	2.12	7	10.00	17	85.38

CHAPTER 3
REHABILITATION PLAN & MAINTENANCE STRATEGY OF HIGHWAY PAVEMENT

3.1 PAVEMENT REHABILITATION PLAN

The Schedule B Clause 2 specifies that that report & rehabilitation strategy has to be followed based on surveys & investigation with design life of 10 years. Consultant proposed following pavement repair strategy for the project based on the FWD survey Analysis carried out traffic MSA of 69 & 33 on LHS & RHS respectively

- Mill & Inlay 40 mm BC
- Mill & Inlay 40 or 50 mm DBM (DBM of 40 mm where Structural Overlay includes DBM)
- Structural Overlay – BC 40 mm/ 50 mm + DBM 50-85 mm
- Mill & Inlay 40 or 50 mm DBM + Composite GlassGrid
- Mill & Inlay 50 mm BC + Composite GlassGrid
- Functional Overlay of 40 mm BC where no structural overlay

It is recommended to cut cores post monsoon to determine depth of cracking, so that requirement of Glass Grid can be restricted to locations where DBM also shows cracking. Km wise Rehabilitation plan is summarized below.

Table 3.1: Rehabilitation Plan

S No.	Schedule B Requirement	Rehabilitation Plan
1	As per the pavement distresses, the remedial measures shall be carried out as per IRC: 82- 2015. The remedial measures include but not limited to crack sealing, pothole filling and sealing with bituminous slurry. Moreover, the sections having severe distresses such as alligator cracking and severe rutting shall be milled and the milled sections shall be filled with the appropriate material as per specifications & standards.	Milling, 40-50 mm is proposed to remove existing cracked surface.
		Where cracking > 20% & rutting > 20 mm, milling+ Composite GlassGrid (Saint Gobian CG-100) + inlay with 40/50 mm DBM or 50 mm BC. Inlay with DBM needed to restore pavement thickness prior to

S No.	Schedule B Requirement	Rehabilitation Plan
		structural overlay. Where cracking > 20% & rutting > 20 mm, milling+ Composite GlassGrid (Saint Gobian CG-100) + inlay with 40/50 mm DBM or 50 mm BC. Inlay with DBM needed to restore pavement thickness prior to structural overlay. Where crack area <= 20%, **mill + Inlay with DBM 40/ 50 mm or BC 50 mm.**
2	For the strengthening of the existing carriageway, Concessionaire shall carryout FWD survey for the entire project highway as per IRC 115- 2014 along with traffic survey and based on the analysis of FWD survey, remaining life is to be assessed. The strengthening requirements shall be assessed for the design life of 10 years as per IRC 115-2014 and the design traffic in MSA calculated accordingly.	Structural Overlay of 40 mm BC or **40 mm BC+50-85 mm DBM in LHS . No structural overlay is needed on RHS.**
3	The strengthening of the existing pavement of the project highway shall be taken up after pre-overlay treatment and profile corrective course. Further if some sections, which do not require structural overlay as per FWD analysis, functional overlay of 40 mm Bituminous Concrete shall be laid in those stretches for improving roughness and life of pavement after providing profile corrective course if required.	Condition of Pavement is not good. Either milling + inlay or structural overlay is required. 40 mm BC is proposed as inlay if no structural overlay is needed.
4	The functional overlay of 40 mm thick Bituminous Concrete shall be provided on existing Service / Slip Roads and Ramps after pre-overlay treatments including profile corrective course.	Considered as per Schedule.

Table 3.2: Summary of Pavement Rehabilitation Plan

Left Side

Pavement Strategy	Treatment	LHS		
		From	To	Length (km)
Structural Overlay as per FWD	BC 50 mm	1305	1308	3
		1311	1318	7
		1320	1325	5
		1345	1351	6
		1358	1361	3
		1368	1371	3
	BC 40 mm + DBM 50 mm	1318	1320	2
		1371	1375	4
	BC 40 mm + DBM 75 mm	1355	1358	3
	BC 40 mm + DBM 50-75 mm	1361	1368	7
	BC 40 mm + DBM 50-85 mm	1325	1345	20
				63
Functional Overlay 40 mm BC		0	0	0
Mill & Inlay 40 mm BC		1309	1310	1
		1351	1354	3
				4
Mill & Inlay 40 or 50 mm DBM		1305	1308	3
		1313	1316	3
		1317	1318	1
		1319	1320	1
		1359	1361	2
				10
Mill & Inlay 40 or 50 mm DBM + GlassGrid		1311	1313	2
		1316	1317	1
		1320	1322	2
		1323	1351	28
		1355	1359	4
		1361	1375	14
				51
Mill & Inlay 50 mm BC + GlassGrid		1308	1309	1
		1310	1311	1
		1375	1380	5
				7

RHS Side

Pavement Strategy	RHS		
	From	To	Length (km)
Structural Overlay as per FWD	0	0	0
Functional Overlay 40 mm BC	0	0	0
Mill & Inlay 40 mm BC	1311	1317	6
	1335	1336	1
	1340	1354	14
	1357	1360	3
	1363	1365	2
	1369	1372	3
	1375	1376	1
			30
Mill & Inlay 40 or 50 mm DBM	0	0	0
Mill & Inlay 40 or 50 mm DBM + GlassGrid	0	0	0
Mill & Inlay 50 mm BC + GlassGrid			
	1305	1311	6
	1317	1335	18
	1336	1340	4
	1354	1357	3
	1365	1369	4
	1372	1375	3
	1376	1380	4
			42

3.2 OVERLAY CYCLE DURING OPERATION PERIOD

Schedule B Clause 2 specifies that *The Concessionaire shall carry out the periodic maintenance in full length of project stretch including main carriageway, service/slip roads, Ramps and at facilities etc. either in every sixth year or in the year in which roughness index exceeds the limit as given in Schedule F whichever comes earlier*. Following maintenance cycle is proposed

- **Main Carriageway**

  Overlays at every six years cycle will be the in year 2022-2023 (as initial improvement works) 2028-2029, 2034-2035 & 2040-2041 across 20 years. **Six-Laning is not anticipated as per traffic projections**.

- **Service & Slip Road**

  Initial overlay in FY 2022-23 is proposed with 40 mm BC VG 40. Future overlays in 2028-2029, 2034-2035, and 2040-2041 are proposed with 30 mm

BC as commercial traffic does not use these roads, their deterioration is much slower than MCW.

Periodic Maintenance Calendar Showing the timing of Major Maintenance works for Pavement & Structures is provided to understand the relevant years at a glance.

CHAPTER 4
REHABILITATION PLAN & MAINTENANCE STRATEGY-STRUCTURES

4.1 CONDITION OF EXISTING STRUCTURES

There are 03 Major Bridges, 15 Minor Bridges, 2 VUPs, 3 PUPs, & 148 Culverts along the project stretch. There is no such structure that possesses any major defects (affecting its service life adversely) requiring immediate attention/ repair/ short-term works except the followings.

- Vegetation growth in structure components
- Bearings requiring cleaning & greasing
- Minor damage to Crash barrier & footpath due to above.
- Choked Drainage spouts

4.2 REHABILITATION PLAN OF STRUCTURES

Structures are in 'fair' functional state without hampering its design & loading capabilities. For smooth & optimum usage of the structures, some periodic & routine maintenances are suggested (with respect to following) for optimum functioning.

- Expansion joints
- Pitching
- Vegetation growth
- Drainage provisions
- Approach Slab settlement

Table 4.1: General Maintenance in Initial Improvement Works

SN	Ch	Issues										
		Pitching	Exp Jt	Drainage	Bearing	Crash Barrier	Vent way	Vegetation on str component	Defects (spalling/ leaching/ stains/ cracks/ honeycombing, exposed Reinforcement etc)			
									Superstructure		Deck	Sub-str
									RCC	Steel		
1	MAJOR BRIDGE	RM	RC	-	-	-	-	RC	-	-	-	-
2	MINOR BRIDGE	RM	RC	-	-	-	-	RC	-	-	-	-
3	UNDERPASS	-	-	-	-	-	-	RC	-	-	-	-
4	SLAB CULVERT	-	-	-	-	-	RC	RC	-	-	-	-
5	BOX CULVERT	-	-	-	-	-	-	RC	-	-	-	-
6	HP CULVERT	-	-	-	-	-	RC	RC	-	-	-	-

Legend: RM= Requires General Maintenance; RC: Requires Clearing; RT: Required Treatment; RIT: Requires immediate Treatment; NA: Not applicable

4.3 MAJOR MAINTENANCE OF STRCTURES

Following items have been considered for Major Maintenance during Concession Period of 20 Years as per Schedule-F of Concession Agreement.

Rigid Apron - For Box Culverts

Flexible Apron - For Box Culverts

Curtain Wall - For Box Culverts

Polymer Modified cement (25 mm thick)

Guinting over surface area of Substructure

NDT of Substructure

Bridge Load test

POT cum PTFE bearing

Metallic bearing

Greasing and Cleaning bearing and joints

Polymer mixed cement Injection /Epoxy Grout by injection through nipples:

Repair and rehabilitation & Painting of steel structures.

Replacement of Strip seal Expansion joint

Replacement of Asphaltic plug Expansion Joint

Replacement of Glass Grid

Cleaning Weep holes

Replacing approach slabs Once in concession period.

Replacement of stone pitching quadrant

Repairing of Filter media

Crash Barrier

Structure numbers

CHAPTER 5
BOQ, RATE ANALYSIS AND COST ESTIMATES

5.1 RATES

The rate analysis is based on Standard Data Book of MORT&H 2019 model and inputs from basic rates of Materials, labour, machinery is taken as follows:

a) Inputs for Basic rates of Labor are taken from: Central Wages (31/03/2022).

b) Inputs for Basic rates of materials, sand is taken as per site Enquiry/Market rates.

c) Inputs for Basic rates of Bitumen cement and Steel are taken from following sources: -

   i. Bitumen- IOCL, Mathura –For initial improvement works, base rate of bitumen (VG-40) is taken as Rs 45,500 & For Operation cost base rate of bitumen is taken as Rs 36,000

   ii. Cement- UPPWD SOR 2020-21.

   iii. Steel- SAIL for the month of June 2022.

   iv. GST 18% considered.

Table 5.1: Basic Rates of Major items

S. No.	Item Description		Unit	Basic Rate
1	VG 10 (80/100)	For Operation & Maintenance	MT	32660.00
2	VG 30 (60/70)		MT	33460.00
3	VG 40 (30/40)		MT	36000.00
4	VG 10 (80/100)	For Initial Improvement Works	MT	42160.00
5	VG 30 (60/70)		MT	42960.00
6	VG 40 (30/40)		MT	45500.00
7	Cement		tonne	6700
8	Steel		MT	67856

5.2 PROJECT COST

Project cost has been worked out under the following heads: -

- ✓ **Initial Improvement Cost**
- ✓ **Opex Cost** (**Routine**, **Periodic** and **Operations** Cost.)
- ✓ **Major Maintenance Cost**

All above cost is un- escalated.

Table 5.2: Cost Summary

S. No	Description (with CA)	Cost (Rs. In Crores)
1	**Initial Improvement Cost**	248.31
2	**Operation and Maintenance**	
A	Routine	146.11
B	Periodic	262.01
C	Operations	298.44
	Total Cost	**706.56**
	Major Maintenance Cost	**262.01**

5.3 INITIAL IMPROVEMENT WORKS COST

Following improvement & repair works has been mentioned in Schedule B of CA.

Service Road , Entry Exit , Repair and Rehabilitation of Embankment, Repair & Rehabilitation of Structure , Junction Improvement, Street Light, Repair of Existing Light ,Toilet Block , Toll admin building, Static Weigh Bridge, Highway Patrol Vehicle, Ambulance , Crane ,DG Set, ATMS for Entire Length of Project ,High Mast Light, Median Opening, Storage Lane ,Overhead Gantry, Cantilever Sign Board, New W-beam Safety Barriers, Drain (RCC/Lined/Chute) , Rain Water Harvesting structure, Truck Lay bye, Bus bays, Traffic Signage, Road studs, kerb raising, Road delineator, Tree Plantation ,Gabion Wall ,Footpath ,Water ATM ,Lane Level Equipment cost, Server, Additional RAM .

Completion Schedule for improvement proposal has been proposed as 12 months from appointed date as per Clause 9 of Schedule B of CA.

Accordingly initial improvement works has been considered to be executed during year 2022-2023.

Table 5.3: Summary of Initial Improvement Cost

Sr. No.	Description	Amount in Cr.
1	**Major Maintenance Work**	
	Repair and Rehabilitation of pavement	129.47
	Reconstruction of Road	6.75
	Repair / Widening and Rehabilitation of Structures	4.52
2	**Service Road**	
	New Service Road,	8.13
	Acceleration and Deceleration length (m)	
	Adjacent road	
	Storage length @ Median Opening	1.90
3	**Project Facilities**	
	Bus Bay	0.62
	Truck Bay	1.75
	Bus Shelter	0.00
	Rain Water Harvesting	0.62
	Tree Plantation	0.72
	Lined Drain (RCC Drain)	12.00
	Unlined Drain	0.0026
	Stone Pitching	0.44
	Median Opening	0.18
	Gabion Wall	0.29
	Footpath	1.25
	Construction of Toilet Blocks, Toll Plaza misc items	0.87
	Electrical Work at Street Light, Toilet Block, Truck lay bay and PUP	10.71
4	**Provision for Road Furniture**	
	*W-Beam Crash Barrier	0.08
	Other Sign Board, Road Marking, chevrons	3.52
	Stud	1.83
	Kerb Stone	1.55
	Ordinary kilometer stone (precast)	0.005
	Hectometer stone (precast)	0.03
5	**ATMS**	18.07
	Total Cost	**205.30**
	Contingency 5 % for last 6 months of 1 year	5.13
	Add 18% GST =	37.88
	Total Cost (including GST)	**248.31**

Schedule B specifies *The Concessionaire shall provide new W-beam crash barriers in median as per Fig.17 of IRC:119-2015 i.e. throughout the Project Highway W- Beam Crash Barrier in median.* NHIMMPL requested the clarifications from NHAI wherein NHAI replied to follow the Standards & Specification . Schedule C of CA does not mention about standards & specifications to be followed for W beam crash barrier. Therefore, provision of W beam Crash Barrier in the median and its quantity is not considered in initial improvement works.

5.4 MAJOR MAINTENANCE COST

1. Major maintenance for highway is taken as per Schedule-F maintenance requirement of concession agreement.
2. Major maintenance for structure as per Schedule-F maintenance requirement of concession agreement

Major Maintenance Items Cost (Un-escalated) during Concession Period of 20 Years as per Schedule-F of Concession Agreement cost is shown below.

Table 5.4: Major Maintenance Cost (un-escalated)

Sr. No.	Components	Major Maintenance	Cost (Rs. Crores)
1	**Road works:-**	BC overlay (with VG-40 for MCW and for service road),	189.66
	Flexible Pavement for MCW, service roads etc.	Tack coat, Milling, Road Marking etc.	
		Signboard	1.25
		Hectometre stones	0.02
		Kilometre stones	0.03
		5th Kilometre stones	0.01
		Boundary stones	0.15
		Kerb	3.48
		Studs For Periodic Overlay	6.47
		Kerb raising / Kerb Replacement	2.71
		TCMS Periodic Cost	5.45
		ATMS cost	29.85
		Axle Load Survey	0.03
2	Structures	Rigid Apron - For Box Culverts	0.73
		Flexible Apron - For Box Culverts	0.18
		Curtain Wall - For Box Culverts	1.43

Sr. No.	Components	Major Maintenance	Cost (Rs. Crores)
		Polymer Modified cement	0.45
		Guinting over surface area of Substructure	0.94
		NDT of Substructure	6.39
		Bridge Load test	0.58
		POT cum PTFE bearing	4.34
		Elastomeric bearing	0.07
		Greasing and Cleaning bearing and joints for sliding/Free bearings	0.34
		Polymer mixed cement Injection/Epoxy Grout by injection through nipples	1.77
		Repair and rehabilitation & Painting of steel structures.	-
		Replacement of Compression Seal Expansion joint	0.64
		Replacement of Asphaltic plug Expansion Joint	0.53
		Replacement of Glass Grid	1.13
		Cleaning Weep holes	0.23
		Replacing approach slabs	1.19
		Replacement of stone pitching quadrant	0.89
		Repairing of Filter media	0.63
		Crash Barrier	0.45
		Structure numbers	0.01
Total (Cr.)			**262.01**

5.5 OPERATION & MAINTENANCE COST COMPONENTS

The operation cost has been worked out in detail based on **Schedule-F Maintenance requirement**. The brief summary of items as below.

Operational Maintenance

(1) Tolling Operations: -

a) **Manpower (Toll collection, Security & Traffic Management)**

Cost is taken as per market enquiry.

b) **Power (Street Lighting, Toll Plaza, High Mast)**-

Electricity Bills, Maintenance, Tolling Operations - DG Set Maintenance, Tolling Operations – Diesel, Tolling Operations - Electricity Expenses are taken as per market enquiry.

c) **TCMS operations** cost is taken as per market enquiry.

d) **TCMS spares cost** is taken as per market enquiry.

e) Plaza building cost is taken as per market enquiry.

f) Internet Lease line / Broadband & other miscellaneous items (Fire Services, Supply of water for drinking & Sanitation etc.) cost is taken as per market enquiry

(2) Incident Management Cost Components

a) Maintenance of Highway Patrol Vehicle, Ambulance, Cranes are taken as per market Enquiry.

b) Tolling Operations for Vehicle Hire Charges, tolling operations for Vehicle Maintenance Charge are taken as per market Survey/EnquiryRoutine Maintenance & Routine Maintenance Repair Cost Components

Routine Maintenance & its Repair Cost is based on Schedule-F Maintenance requirement & Following brief summary of items considered.

(1) Main Carriageway & Service Road / Slip Road

a) Maintenance of earthen shoulder

b) Repair of rain cuts

c) Cleaning of Drains, service roads & other items.

d) Repair of rutting.

e) Treatment of bleeding bituminous surface & laying of slurry seal.

f) Filling Pot-holes.

g) Repair of stone pitching & stone pitching filter media

h) Laying of 300 mm thick stone pitching & stone pitching filter media

i) Removal of rank vegetation/weeds.

j) Repair of localized failed areas of PQC for CC Pavement

(2) Structures

a) Clearance of Structures from Vegetation/Debris
b) Bed Protection for Structures
c) Detailed Visual Inspection and NDT of Structures.
d) Polymer Modified cement
e) Guinting over surface area of Substructure
f) Bridge Load test
g) Greasing and Cleaning bearing and joints for sliding/Free bearings.
h) Replacement of Strip Seal Expansion joint
i) Leak proof test for expansion joint (biannually).
j) Replacement of Drainage spouts.
k) Cleaning of drainage spouts
l) Cleaning Weep holes
m) Replacing of Reinforced Cement Concrete Grade M 40 crash barrier
n) Replacement of RCC railing/Parapet over Bridges
o) Repair of approach slabs
p) Repairing of stone pitching quadrant & Filter Media
q) Repair and rehabilitation & Painting of steel structures

(3) Highway Lighting

Maintenance for street light of Single Arm, Double Arm and High Mast Light is taken as per Schedule-F Maintenance requirement.

(4) **Bus Shelter**

Maintenance cost of Bus Shelter is taken as per Schedule-F Maintenance requirement.

(5) Truck Lay Bye

Maintenance cost of Truck Lay Bye is taken as per Schedule-F Maintenance requirement.

(6) **HSSE Expense**

HSSE Expense are taken as per Schedule-F Maintenance requirements.

(7) **Road Furniture**

Repairs cost of Road Furniture items are taken as per Schedule-F Maintenance requirement. Brief summary of Road Furniture items is as below:

a) Repair of existing M.S. pedestrian Railing & W-Beam metal crash barrier.

b) Maintenance of Kerb stone.

c) Road Marking.

(8**) Signage**

Maintenance cost of road Signage is taken as per Schedule-F maintenance requirement.

(9) **Median & Avenue Plantation**

Maintenance cost of median & Avenue Plantation is taken as per Schedule-F maintenance requirement.

ATMS

(a) Maintenance of ATMS (Operation Expenses) is taken as per market enquiry.

(b) Maintenance of ATMS System Technical support staff are taken as per market enquiry.

(c) **Control room manpower**- ATMS Control Room Operations staff are taken as per market enquiry.

(d) **Power**- Electricity consumption for ATMS is taken as per market enquiry

ADMIN Expenses

Staff Welfare, Office Rent, Project Insurance Premium, Independent Engineer, Audit Fees, travelling (Outstation), Conveyance including Fuel, Stationery, Printing & Courier, Professional Fees (Advisory services, compliance/filings, Legal etc.), SPV Cost, Communication Charges, Misc.-Admin etc. expense is taken as per Market enquiry.

Year-wise Summary of Routine, periodic and O & M Expenses (Unescalated Cost with GST).

Table 5.5: Year-wise Summary of O&M Cost

Sr No.	Financial Year	Routine Maintenance in Cr.	Periodic Maintenance in Cr.	Operational Cost in Cr.	Total in Cr.
		Current (Cr.)	Current (Cr.)	Current (Cr.)	Current (Cr.)
1	2022-23	7.31	-	14.92	22.23
2	2023-24	7.31	-	14.92	22.23
3	2024-25	7.31	-	14.92	22.23
4	2025-26	7.31	-	14.92	22.23
5	2026-27	7.31	4.43	14.92	26.65
6	2027-28	7.31	-	14.92	22.23
7	2028-29	*4.39	63.23	14.92	82.53
8	2029-30	7.31	0.82	14.92	23.05
9	2030-31	7.31	14.93	14.92	37.15
10	2031-32	7.31	3.89	14.92	26.12
11	2032-33	7.31	0.82	14.92	23.05
12	2033-34	7.31	1.82	14.92	24.04
13	2034-35	*4.39	73.33	14.92	90.64
14	2035-36	7.31	0.82	14.92	23.05
15	2036-37	7.31	5.98	14.92	28.21
16	2037-38	7.31	14.93	14.92	37.15
17	2038-39	7.31	2.64	14.92	24.86
18	2039-40	7.31	-	14.92	22.23
19	2040-41	*4.39	64.12	14.92	83.43
20	2041-42	7.31	10.25	14.92	32.48
	TOTAL	**137.35**	**262.01**	**298.44**	**697.80**

*The repair cost for the year in which periodic /major cost maintenance are considered as 50% of the annual estimated repair cost.

CHAPTER 6
CONCULSION

6.1 CONCLUSION

- Cracking is present in entire length, both lanes. Ruts are present, but minimal from 2 to 5 mm. There is overloading in Shivpuri-Jhansi direction (LHS), while other direction has normal loading. Maintenance contractor has covered cracked area with large patches extending to the outer lane of the pavement. Patches are large enough to be mistaken for overlay.BC mix design has problems in patchwork which may fail after single monsoon.
- There is no such structure that possesses any major defects (affecting its service life adversely) requiring immediate attention/ repair/ short-term works except Vegetation growth in structure components , Bearings requiring cleaning & greasing, Minor damage to Crash barrier & footpath , Choked Drainage spouts etc
- Consultant proposed following pavement repair strategy for the project based on the FWD survey Analysis carried out traffic MSA of 69 & 33 on LHS & RHS respectively
    - Mill & Inlay 40 mm BC
    - Mill & Inlay 40 or 50 mm DBM (DBM of 40 mm where Structural Overlay includes DBM)
    - Structural Overlay – BC 40 mm/ 50 mm + DBM 50-85 mm
    - Mill & Inlay 40 or 50 mm DBM + Composite GlassGrid
    - Mill & Inlay 50 mm BC + Composite GlassGrid
    - Functional Overlay of 40 mm BC where no structural overlay

- Traffic consultant appointed by NHIIMPL provided the traffic report wherein AADT in PCU for each year has been mentioned (reproduced below).

Table 6.1: Projected Traffic

Year	Traffic in PCU	Year	Traffic in PCU
FY 23	14,919	FY 34	21,912
FY 24	15,702	FY 35	22,904

Year	Traffic in PCU	Year	Traffic in PCU
FY 25	16,550	FY 36	23,928
FY 26	17,455	FY 37	24,987
FY 27	18,421	FY 38	26,083
FY 28	19,329	FY 39	27,198
FY 29	19,585	FY 40	28,353
FY 30	19,810	FY 41	29,547
FY 31	20,744		
FY 32	21,712		
FY 33	22,148		

Target traffic as per IRC SP 84, is 40000 PCU. Referring to following table, target traffic is not achieved during the Concession Period. Hence **Capacity Augmentation in not envisaged.**

- Schedule B Clause 2 specifies that The Concessionaire shall carry out the periodic maintenance in full length of project stretch including main carriageway, service/slip roads, Ramps and at facilities etc. either in every sixth year or in the year in which roughness index exceeds the limit as given in Schedule F whichever comes earlier. Following maintenance cycle is proposed

Main Carriageway

Overlays at every six years cycle will be the in year 2022-2023 (as initial improvement works) 2028-2029, 2034-2035 & 2040-2041 across 20 years. **Six-Laning is not anticipated as per traffic projections**.

Service & Slip Road

Initial overlay in FY 2022-23 is proposed with 40 mm BC VG 40. Future overlays in 2028-2029, 2034-2035, and 2040-2041 are proposed with 30 mm BC as commercial traffic does not use these roads, their deterioration is much slower than MCW.

- Major maintenance for structure as per Schedule-F maintenance requirement of concession agreement.

- Project cost has been worked out under the following heads: -
  - **Initial Improvement Cost**
  - **Operation Cost** (**Routine**, **Periodic** and **Operations** Cost.)
  - **Major Maintenance Cost**

All above cost is un- escalated.

Table 6.2: Project Cost Summary

S. No	Description	Cost (Rs. In Crores)
1	**Initial Improvement Cost**	248.31
2	**Operation and Maintenance**	
A	Routine	146.11
B	Periodic	262.01
C	Operations	298.44
	Total Cost	**706.56**
	Major Maintenance Cost	**262.01**

SAMARTH INFRAENGG Technocrats Pvt. Ltd

SIT/PJRP/223606/038
29th August 2022

Chief Operating Officer
National Highways Infra Investment Managers Pvt. Ltd.
G-5&6, Sector 10, Dwarka,
New Delhi – 110075

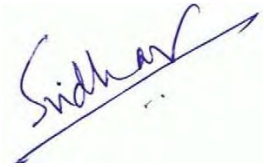
Sub: Submission of Final Report for **"**Bundle-Borkhedi-Wadner-Deodhar-Kelapur-Maharastra/Telangana Border**"**

K/A Mr. Mr. Shubhra Bhattacharya

Please find enclosed herewith copy of **"**Final Report**"** for technical due diligence study on Borkhedi-Wadner-Deodhari-Kelapur-Maharashtra/Telangana Border Section of NH-44 (old NH-7) from km 36+600 to km 175+000 in the state of Maharashtra with due incorporation of necessary corrections as suggested during the presentation and comments on report.

Thanking you and assuring you best services all the time.

Yours Sincerely,
SAMARTH Infraengg Technocrats Pvt. Ltd.



D V Sridhar Murthy
Managing Director

Encl.: **"**Final Report**"** for **"**Bundle-Borkhedi-Wadner-Deodhar-Kelapur-Maharastra**"**

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NHAI INVIT

Final Report

Technical due diligence study for Tolling, Operation, Maintenance & Transfer of Borkhedi – Wadner – Deodhari – Kelapur – Maharashtra – Telangana boarder from km 36+600 to km 175+000 of NH-44 section in the state of Maharashtra

SAMARTH INFRAENGG Technocrats Private Limited

SAMARTH Infraengg Technocrats

August 2022

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ABBREVIATIONS AND SYMBOLS

AADT	-Average Annual Daily Traffic
AE	-Authority Engineer
AMC	-Annual Maintenance Contract
ATMS	-Advanced Traffic Management System
BC	-Bituminous Concrete
BOQ	-Bill of Quantities
BOT	-Build, Operate & Transfer
CA	-Concession Agreement
CBR	-Californian 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
MAV	-Multi Axle Vehicle
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
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
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

National Highways Authority of India ("NHAI"/ "Authority") is an autonomous body of the Government of India ("GoI") under the Ministry of Road Transport and Highways ("MoRTH") and was constituted on June 15, 1989 by an Act of Parliament titled - The National Highways Authority of India Act, 1988 ("NHAI Act"). NHAI was operationalized in February 1995 with the appointment of full time Chairman and other Members. The functioning of NHAI is governed by NHAI Act and rules, and regulations framed thereunder.

NHAI has set up an Infrastructure Investment Trust namely Na**tional Highways Infra Trust ("InvIT")** and is acting as its Sponsor to the said InvIT.

National Highways Infra Investment Managers Private Limited ("NHIIMPL") has been appointed as the Investment Manager to the InvIT

National Highways Infra Projects Private Limited **("NHIPPL"),** a wholly owned subsidiary of InvIT is planning to enter into concession agreements with NHAI for **"Tolling, Operation, Maintenance &** Transfer of Borkhedi-Wadner-Deodhari-Kelapur-Maharashtra/Telangana Border Section of NH-44 (old NH-7) from km 36+600 to km 175+000 in the state of Maharashtra**"**.

Work awarded by National Highways Infra Investment Managers Private Limited **("NHIIMPL")** on behalf of NHIT to M/s SAMARTH INFRAENGG Technocrats Pvt. Ltd as the Technical Consultants for undertaking technical due diligence study on Borkhedi-Wadner-Deodhari-Kelapur-Maharashtra/Telangana Border Section of NH-44 (old NH-7) from km 36+600 to km 175+000 in the state of Maharashtra to estimate immediate requirements for the above project to undertake the maintenance, repair & rehabilitation of various elements as per the provisions of concession agreement and estimate a tentative assessment of Operation& Maintenance costs over the entire concession period.

1.2 PROJECT AT A GLANCE

The site of the four-lane divided Project Highway starts at Km 36.600 of (old NH-7 old) New NH-44 and ends at Km 175+000. The total Length of the project Highway is 138.400 Km. National Highway – 44 begins from Srinagar and ends in Kanyakumari the highway passes through the states of Jammu & Kashmir, Punjab, Haryana, Delhi, Uttar Pradesh, Madhya Pradesh, Maharashtra, Telangana, Andhra Pradesh, Karnataka, and Tamil Nadu.

The Highway connects several cities and town such as Srinagar, Anantnag, Domel, Jammu, Pathankot, Jalandhar, Ludhiana, Ambala, Kurukshetra, Panipat, Sonipat, Delhi, Faridabad, Mathura, Agra, Gwalior, Jhansi, Sagar, Lakhnadon, Seoni, Nagpur, Adilabad, Hyderabad, Kurnool, Anantapur, Bengaluru, Salem, Namakkal , Karur, Dindigul Madurai, Tirunelveli and Kanyakumari. NH 44 covers

the North-South Corridor of NHDP and it is officially listed as running over 3,745 km from Srinagar to Kanyakumari. It is the longest national highway in India.

Map Showing the Project Corridor

As per the Schedule, the design chainage at start point of the project road shall be km 36.600 and the design chainage at end point of the project road shall be km 175.000 with a total length of 138.400km.

Table 1: Project Corridor Chainage System

Referencing system	Project Corridor Start Point (km)	Project Corridor End Point (km)	Length (km)
CA Design Chainage	36.600	175.000	138.400

The Project Corridor starts at Borkhedi Toll and ends at Maharashtra/Telangana Border near Pimpalkhuti village. Photograph showing the start and end point of the project road are presented below:

Start Point at km 36.600

End Point at km 175.000

1.3 OBJECTIVE AND SCOPE OF SERVICES

The main objective of the study is to review the current status of project corridor including details pertaining to its construction and maintenance and to provide requisite technical information for processing the acquisition of said project by client. Objective of the study can be broadly defined with following tasks:

- Study CA requirements for construction/maintenance requirements
- Undertake Detailed Reconnaissance to appreciate the project corridor characteristics
- Collection of relevant records and documents and review of same
- Undertake Engineering Studies to Establish:
    - Present Condition of Existing Road Assets
    - Quality of Executed Works/Quantity of Reutilization
    - Requirement of Immediate improvement costs as per Sch B (1st Year Capex)
    - Major Maintenance Strategies Over Concession Period
    - Routine Maintenance & Operations Requirements Over Concession Period
    - Prepare BOQ
    - Prepare Rate Analysis and finalize unit rates
    - EPC and O&M Cost

End Result is the finalization of:

- Initial improvement Works

- Major Maintenance Schedules/Cost
- Routine Maintenance Cost
- Operations Cost

The elaborate scope of services as defined in the "terms of reference" for consultants is as below:

i) Detailed reconnaissance.

ii) Video graphic survey of the entire Project corridor.

iii) Carrying out inventory and condition surveys for Project Road.

iv) Carrying out Inventory and detailed condition surveys for bridges & cross drainage structures (along with Photographs thereof) including recommendation for either strengthening/rehabilitation or reconstruction.

v) 24 hrs. Axle load survey along with axle load spectrum analysis for rigid pavement of the project corridor at two locations, wherever applicable (7-day traffic count to be provided by client)

vi) Test pits required @ every 10 km interval along the Project corridor.

vii) Carrying out necessary laboratory tests to determine the CBR value of the subgrade materials to be obtained from potential borrow pits and the quality of the aggregates from potential quarries for the pavement layers, concrete etc. The existing ground which will support the embankment and pavement must be tested for its adequacy, particularly in silty or clayey water-logged areas.

viii) Carrying out deflection test by Falling Weight Deflect meter (FWD) for existing pavement as per relevant IRC code at the rate of 5 points in km in each direction making it 10 points for both directions in the damaged stretches as well as fair stretches.

ix) Availability of construction materials as per required specification to be confirmed. Detailed Logistic plan showing the locations of the potential Borrow pits, Quarries, etc.

x) Report on existing condition of Toll Plazas and its associated facilities and proposal for their improvement.

xi) Preparation of Maintenance (Routine, Periodic and Major) costs to be incurred over the period of the concession keeping in mind the requirements of the draft Concession Agreement like adequate resources, maintenance of Cranes, Ambulance, ATMS, etc.,

xii) Independently develop a bottom-up forecast of Operating expenses for each project, with detailed break-up of each type of operating expense, along with underlying assumptions

1.4 DATA COLLECTION AND REVIEW

In brief, following were covered

- ✓ Review of Concession Agreement & Schedules,
- ✓ Review of Detailed Project Report prepared by NHAI
- ✓ Review of As-built drawings, Plan and profiles, Structural drawings & Detailed Project Reports and Designs where available

- ✓ Review of O&M costs as presented in DPR reports
- ✓ Review of MPR provided by NHAI
- ✓ Review of Latest NSV and FWD data provided by PIU, NHAI

CHAPTER 2. SURVEY AND INVESTIGATION

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
- Visual Pavement Condition
- FWD Surveys
- Roughness Surveys using NSV
- Pavement Composition surveys (Test Pits)
- Subgrade Investigations & Laboratory testing
- Material Investigations
- Axle Load Survey
- Structure Inventory and Condition Surveys

2.2 ROAD INVENTORY

The project corridor has Flexible pavement in the entire length, with 7.0m wide carriageway flanked by 1.5m paved shoulder plus 1.0 m to 1.5 m earthen shoulder on each side expect at Approach locations.

In general, the median width is 4.5m all along the project road except at median openings associated with storage lane (median width is 1m).

The project corridor generally runs in plain to rolling terrain. The land use along the project road is mostly Agricultural. It passes through urban settlements like, Sonegaon Iodhi, Barbadi, Kankati, Shedgaon Pati, Jamb, Hinganghat, Sonegaon, Kutki, Ghatsavli, Daroda, Wadner, Pipri, Pohana, Wadki, Bori, Adani, Karanji, Sakhara, Konghara, Pandharkawada, Kelapur, Marath Wakdi, Ballarpur, Bori, and Pimpalkhuti.

In general, road embankments are in the range of 0.5-2.5m height. Embankments higher than 2.5m are observed mainly in the approaches of CD structures and Underpass locations.

The Project Road has about 18 Major junctions and 274 Minor junctions along its length. Photographs showing the Junctions are presented below:

Major Junction at km 59.457 LHS

Major Junction at km 153.204 RHS

Minor Junction at km 49.100 RHS

Minor Junction at km 108.700 LHS

About 10 numbers of High mast lighting is observed along the project road. They are located at Major Junctions, Built-up areas and Toll Plaza location. Photos showing High mast lighting are presented below:

High mast lighting at toll near Km 92.500 LHS

High mast lighting at Junction near Km 95+570 RHS

Altogether, the Project road has about thirty-six (36) Bus Bay with Bus shelter and twenty (20) locations only Bus shelter and twenty-three (23) locations only Bus bays without Bus Shelter exists along the project Road. Few photos taken at the bus shelters and bus bays are presented below:

Bus Bay with Bus Shelter near km 85.642, RHS

Bus shelter near km 95.526, RHS on Service Road

Damaged bus Sheleter at km 127.585 LHS

Bus shelter near km 153.090 on Service Road, LHS

The Project Road has Six Truck lay bye. The Four truck lay bye are provided with Flexible Pavement and the Two truck lay bye are provided with Rigid Pavement. Pavement condition appears to be Fair at all truck lay bye locations. Four truck lay bye are provided with Separators and remaining two truck lay byes location separator is not provided.

The photo depicting the truck lay bye portion is presented below:

Truck Lay bye on LHS km 68.240

Truck Lay bye on RHS km 112.135

The Project Road has two Toll Plaza 1st Toll plaza is at Daroda village near km 92+500 and 2nd Toll plaza is at Kelapur village near Km 150+400. Rigid pavement exists at only 1st toll plaza for the length of 100m and flexible pavement exist at taper portion. At 2nd toll plaza flexible pavement exists. The condition of toll plaza appears to be fair. 1st toll plaza has 5 lanes in each direction including extra wide lane and at 2nd toll plaza has 2 lanes in each direction including 1 extra wide lane. 2 High mast lights and double arm lights are present at approaches of 1st toll plaza.

Few photos taken at toll plaza location are presented below:

Toll Plaza at km 92+500

Weigh bridge, RHS @ 92+500

Weigh bridge, LHS @ 92+500

Highway Nest Mini @ 92+500

Administrative Building @ 92+500

Toll Plaza at km 150+400

Temporary office @ 150+400

Service road/slip roads have been observed at the project corridor. Few photos depicting the service road pavement surface type, condition and the other associated feature like pedestrian guard railing are presented below.

Service Road @ km 66.700 to km 67.350-LHS_5.5m wide

Service Road @ km 89.400 to km 87.000-RHS_5.5m wide

Service Road @ km 128.800 to km 129.150 - LHS_5.80m wide

Service Road @ km 132.320 to km 134.080-RHS_ 6m wide

Service Road @ km 152.750 to km 153.000-RHS_6m wide

Service Road @ km 153.220 to km 153.600-RHS_7.5m wide

The collected Road Inventory Data is presented in Appendix 1 of this Report.

2.3 PAVEMENT CONDITION SURVEY

In the entire stretch, the surface of the pavement condition is fair to poor. The surface distresses like Pot holes, Delamination, Raveling, Cracking, Patching & Rutting distresses were observed along the project corridor on both sides. Severe Pot holes, Severe Delamination & Severe Cracking observed at some location on both sides of the carriageway. The collected Pavement Condition Data is presented in Appendix 2 of this Report.

Few photos taken during visual pavement condition Surveys are presented below:

<table>
<tr><td>
Delamination at km 43.000-LHS</td><td>
Inner lane patch work at km 50.100-RHS</td></tr>
<tr><td>
Fair condition at Km 57.000 LHS</td><td>
Cracking km 58.800-RHS</td></tr>
</table>

Longitudinal cracking at Km 59.100 RHS

Alligator cracking at km 74.900-RHS

Fair condition km 88.000-LHS

Bleeding at km 92.000-LHS

Raveling at km 95.300-LHS

Delimitation at km 100.050-LHS

Rutting at Km 113.600 RHS

Shoving at km 125.600

Pothole at Km 143.300 LHS

Bleeding & Patching at Km 127.700 RHS

Pothole at Km 43.200 RHS

Cracking at Km 44. 300 RHS

2.4 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. 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

The homogenous sections as identified in either direction (i.e., LHS & RHS) of the project stretch were presented in the table below followed by graphical representation.

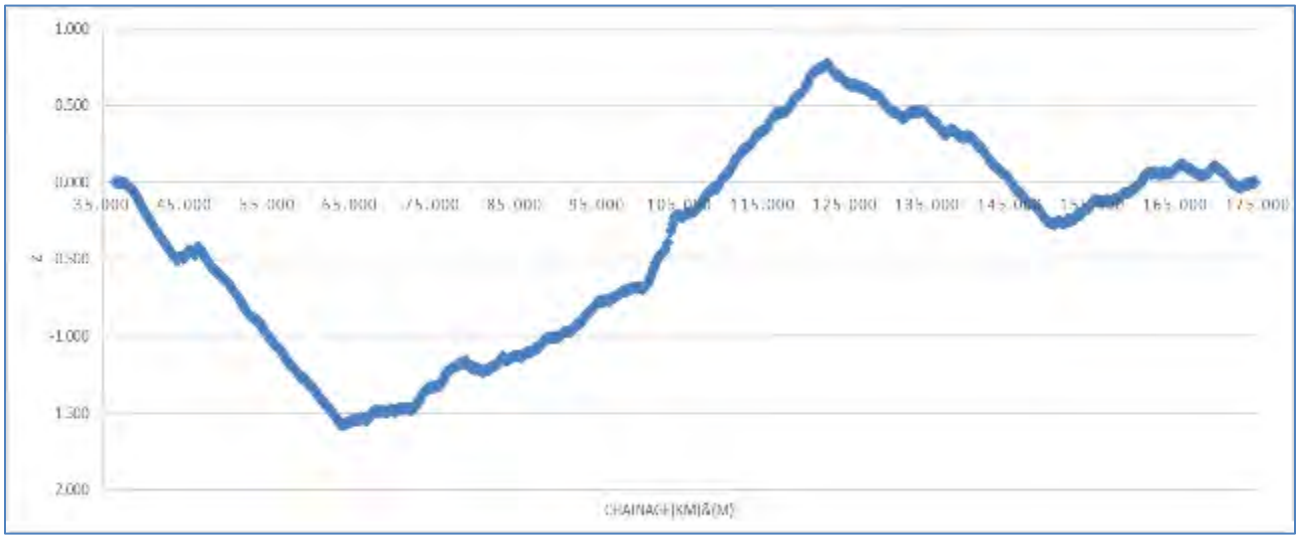
Table 2: Summary of Homogenous Section - LHS & RHS

LHS			
S.No	From	To	Length (m)
1	36.60	40.20	3.6
2	40.20	43.00	2.8
3	43.00	46.40	3.4
4	46.40	49.00	2.6
5	49.00	53.60	4.6
6	53.60	57.60	4.0
7	57.60	60.80	3.2
8	60.80	63.60	2.8
9	63.60	67.40	3.8
10	67.40	69.40	2.0
11	69.40	71.40	2.0
12	71.40	74.80	3.4
13	74.80	78.05	3.3
14	78.05	82.00	3.9
15	82.00	85.40	3.4
16	85.40	88.60	3.2
17	88.60	93.60	5.0
18	93.60	100.80	7.2
19	100.80	104.20	3.4
20	104.20	106.80	2.6
21	106.80	110.00	3.2
22	110.00	113.00	3.0
23	113.00	115.40	2.4
24	115.40	119.20	3.8
25	119.20	123.00	3.8
26	123.00	125.80	2.8
27	125.80	128.60	2.8
28	128.60	131.80	3.2
29	131.80	134.80	3.0
30	134.80	137.60	2.8
31	137.60	140.20	2.6
32	140.20	143.60	3.4
33	143.60	146.80	3.2
34	146.80	151.40	4.6
35	151.40	154.40	3.0
36	154.40	158.00	3.6
37	158.00	161.00	3.0
38	161.00	164.60	3.6
39	164.60	167.60	3.0
40	167.60	170.60	3.0
41	170.60	174.60	4.0

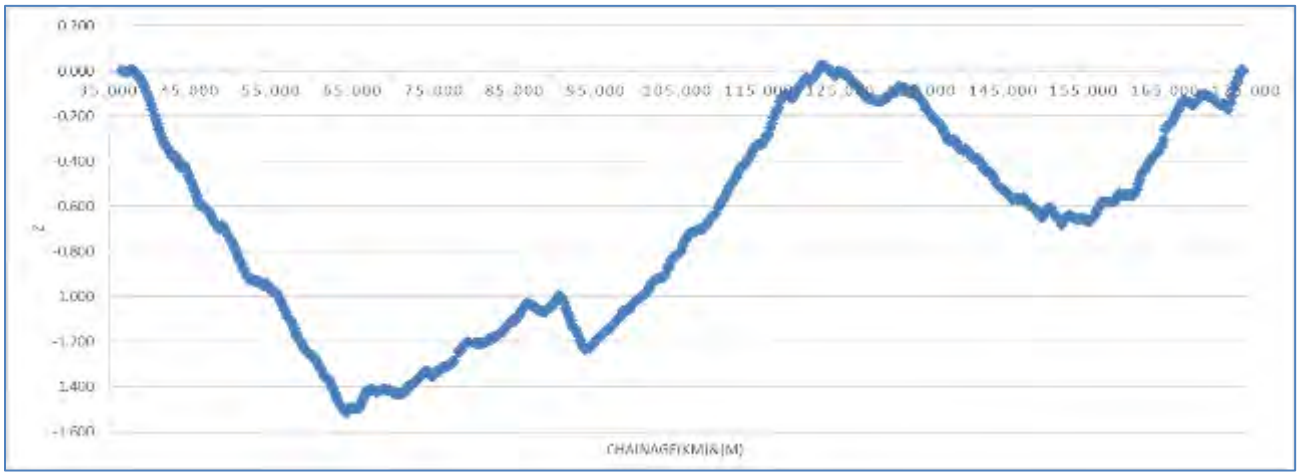
RHS			
S.No	From	To	Length (m)
1	36.60	38.60	2.0
2	38.60	42.80	4.2
3	42.80	46.60	3.8
4	46.60	49.20	2.6
5	49.20	52.40	3.2
6	52.40	58.00	5.6
7	58.00	60.00	2.0

RHS			
S.No	From	To	Length (m)
8	60.00	63.60	3.6
9	63.60	66.80	3.2
10	66.80	70.60	3.8
11	70.60	74.70	4.1
12	74.70	78.40	3.7
13	78.40	86.00	7.6
14	86.00	90.20	4.2
15	90.20	93.60	3.4
16	93.60	97.80	4.2
17	97.80	102.80	5.0
18	102.80	107.60	4.8
19	107.60	113.00	5.4
20	113.00	117.00	4.0
21	117.00	119.60	2.6
22	119.60	123.00	3.4
23	123.00	125.20	2.2
24	125.20	128.00	2.8
25	128.00	129.20	1.2
26	129.20	132.00	2.8
27	132.00	137.60	5.6
28	137.60	142.60	5.0
29	142.60	146.80	4.2
30	146.80	149.60	2.8
31	149.60	153.00	3.4
32	153.00	155.40	2.4
33	155.40	160.20	4.8
34	160.20	164.60	4.4
35	164.60	167.00	2.4
36	167.00	172.00	5.0
37	172.00	174.60	2.6

Delineation of Homogeneous Section – LHS



Delineation of Homogeneous Section – RHS

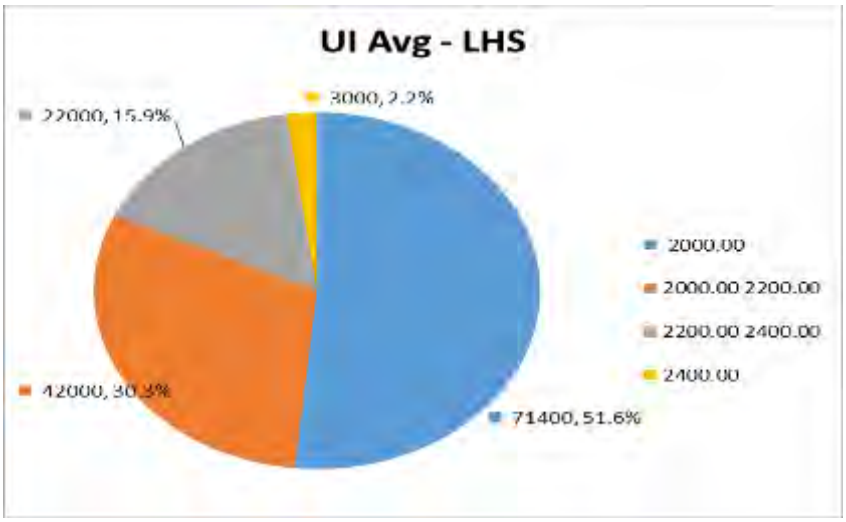


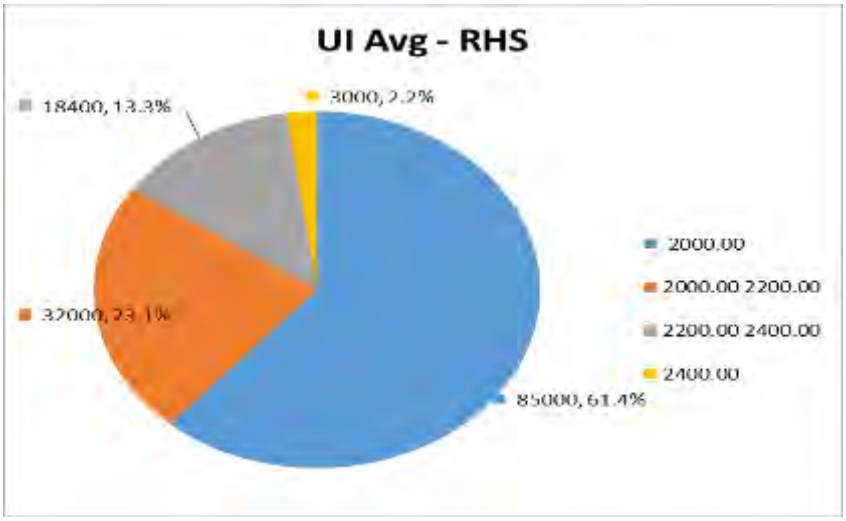
2.5 ROUGHNESS SURVEYS

The Roughness data has been collected using Network Survey Vehicle and analyzed in terms of International Roughness Index (IRI), separately for each lane, for both direction of travel. Pavement Roughness report covering the data collection and methodology, computation of IRI for each km length in each direction is presented in Appendix 4 of this Report.

As per Schedule-F, Roughness on the Bituminous Concrete pavement surface is considered to be Desirable when its BI value is less than 2000 mm/Km and the same shall be Acceptable when its value is less than 2400mm/Km.

Average UI values along the corridor were grouped in to four categories, Pie chart showing the range of UI values in each carriageway of the project road have been presented below:





It can be seen from the above pie charts, that about 51.6% & 61.4% of the length of the Project Road has good riding quality (UI<2000 mm/km) in LHS carriageway and RHS carriageway respectively. Overlay of 2.2% (Kms 3.000) on both LHS and RHS carriageway is required as unevenness Index (UI) is greater than 2400 mm/km.

2.6 PAVEMENT COMPOSITION SURVEYS (TEST PITS)

The composition of the existing pavement crust has been noted from test pit surveys. Thus, a total of 13 pits have been dug along the corridor and the data on composition of pavement has been noted. 13 out of 12 pits done on Main Carriage way edge, 1 on service road test pits done. Photographs have been taken at all test pit locations depicting the crust thickness and nature of material in the pavement. Photos showing Test Pits are presented below:

BK-TP-1

BK-TP-2

BK-TP-3

BK-TP-4

BK-TP-5

BK-TP-6

BK-TP-7

BK-TP-8

BK-TP-9

BK-TP-10

BK-TP-11

BK-SR-TP-1

Results of the test pit survey showing average thickness of pavement layers are presented in the Table below.

Table 3: Details of Pavement Composition along the Project Road

Sl. No	Test Pit Number	Design Chainage	Direction	BT	WMM	Morrum	GSB	Total
1	BK-TP-1	56+540	RHS	230	220		230	680
2	BK-TP-2	63+800	LHS	230	200		170	600
3	BK-TP-3	71+750	RHS	160	160		230	550
4	BK-TP-4	81+150	LHS	140	240		240	620
5	BK-TP-5	95+200	RHS	100	200		240	540
6	BK-TP-6	101+300	LHS	140	260		180	580
7	BK-TP-7	114+500	RHS	140	170	80	280	670
8	BK-TP-8	119+600	LHS	140	140		160	440
9	BK-TP-9	134+950	RHS	200	220		180	600
10	BK-TP-10	155+000	LHS	140	240		220	600
11	BK-TP-11	160+000	RHS	130	240		180	550
12	BK-TP-12	140+300	LHS	200	220		250	670

Sl. No	Test Pit Number	Design Chainage	Direction	BT	WMM	Morrum	GSB	Total
13	BK-SR-TP-1	139+200	RHS	160	200		160	520

2.7 SUBGRADE INVESTIGATIONS & LABORATORY TESTING

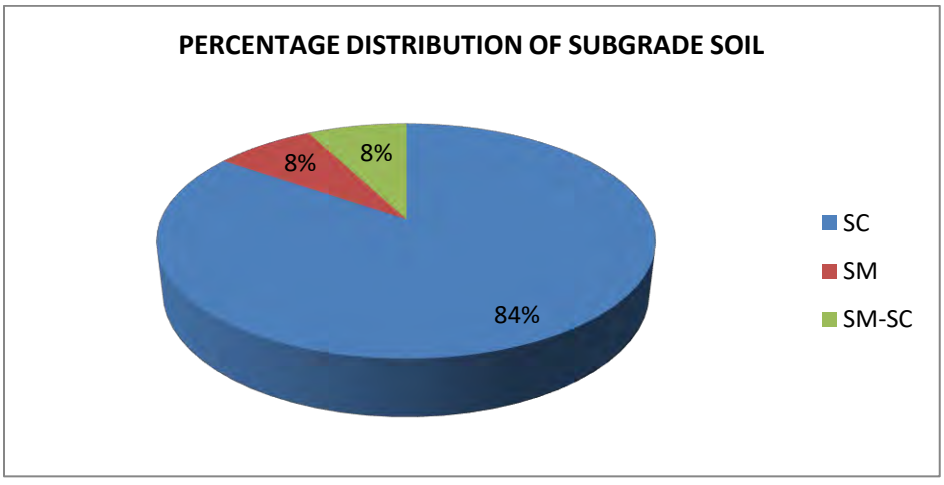
Sub-grade Investigations have been carried out to examine the subgrade soil characteristics along the project road. A total number of 13 test pits have been carefully dug from the pavement surface up to sub-grade level. 12 out of 13 pits done on Main Carriage way edge and remaining 1 test pits done on 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

Soil classification has been done according to IS Classification of Soils (ISC) as detailed in IS 1498 - 1978. Laboratory test results indicate Most of the Subgrade soil samples collected belongs to Coarse Grained Soil. About 11 Nos. of SC type, 01 Nos. of SM-SC type & each 1 No. of SM.

Pie Chart showing the percentage distribution of soil classification of existing subgrade sample is presented below:



2.8 BORROW AREA

Potential borrow areas for sub-grade/ embankment fill and granular sub-base along the project road within economic haulage leads have been identified. The sources identified as potential borrow sources 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 4: Borrow Area Details

Sl. No	Borrow Area No	Existing Chainage	Side	Off set	Village and contact person	Quantity	Rate	Land	Coordinates	Remarks
1	BT-BP-1	65+000	LHS	1 km	Vill-Jamb Name-Ajay Awachat (Premraj Awachat) Mob-9822367882	15 Acres* 15 feet	Rate -Rs 13/- per feet with all	Pvt. Land	20.597713 78.923025	Collected
2	BT-BP-2	40+300	LHS	06 km	Vill- Sone gaon Name- Anil Patel Mob-9923129184	15 Acres* 10 feet	Rate -Rs 250/- per Unit Rayolity -Rs 7- per feet	Pvt. Land	20.812929 78.965804	Collected
3	BT-BP-3	38+000	LHS	1.8 km	Vill- Alagodi Name- Manish kumar Mob-9922926956	10 Acres* 10 feet	Rate -Rs 235/- per Tonne	Pvt. Land	20.829519 78.96991	Collected
4	BT-BP-4	90+250	LHS	0.5 km	Vill-Darada Name-Anand Chandwani Mob-8888883398 8888807705	10 Acres* 10 feet	Rate -Rs 4/- per cft Rayolity -Rs 8.5/- per cft	Pvt. Land	20.46646 78.769404	Collected
5	BT-BP-5	97+750	LHS	1.9 km	Vill: Gangapur Name: Gajana Hatte Mob-9922225390	6 Acres*10 feet	Rate -Rs 200/- per Unit Rayolity -Rs 7/- per cft	Pvt. Land	20.405839 78.759738	Collected
6	BT-BP-6	105+500	LHS	4.2 km	Vill: Sasti (Pohana) Name: Balu Kubde Mob-7798624250	5 Acres* 10 feet	Rate -Rs 300/- per Unit Rayolity -Rs 7/- per cft	Pvt. Land	20.334375 78.745873	Collected
7	BT-BP-7	132+000	RHS	0.4 km	Vill: Karanjai Name: Aresh Desh raju Mob- 9476420509	10 Acres* 10 feet	Rate -Rs 250/- per Unit	Pvt. Land / Govt. Land	20.143208 78.624848	Collected
8	BT-BP-8	141+900	LHS	0.3	Vill: Sakhara Name: Gnaneswru Hunmanth (Dinesh Ueike) Mob-9657802491	7 Acres* 15 feet	Rate -Rs 250/- per Unit With out Rayolity	Pvt. Land	20.087623 78.56384	Collected
9	BT-BP-9	126+400	RHS	0.4 km	Vill: Singal deep	20 Acres* 10 feet	Only Rayolity	Govt. Land	20.180793 78.660265	Collected
10	BT-BP-10	156+000	RHS	0.3 km	Vill: Zunzarpur	30 Acres* 10 feet	Only Rayolity	Govt. Land	19.976711 78.536128	Collected
11	BT-BP-11	165+550	RHS	2.0 km	Vill: Kopamandvi Name: Rabi Sen Mob- 9476420509	10 Acres* 15 feet	Only Rayolity	Govt. Land	19.5328 78.3046	Collected
12	BT-BP-12	171+000	LHS	0.3 km	Vill: Bori	10 Acres* 10 feet	Only Rayolity	Govt. Land	19.855989 78.574734	Collected

Sl. No	Borrow Area No	Existing Chainage	Side	Off set	Village and contact person	Quantity	Rate	Land	Coordinates	Remarks
13	BT-BP-13	174+500	LHS	0.2 km	Vill: Pimpal Khuti	25Acres* 10 feet	Permission	Govt. Land	19.826203 78.573742	Collected

Soil samples from these borrow sources have been collected in bulk by excavating test pits down up to 1.0m depth from the existing ground surface. The top organic soil layer of approximately 150mm thickness was removed before sampling. The samples collected from these identified borrow pits/ gravel quarries have been tested for the suitability of utilizing them as embankment fill/ sub-grade.

Few photos showing Borrow areas are presented below:

BK-BP-1

BK-BP-2

BK-BP-3

BK-BP-4

BK-BP-5

BK-BP-6

BK-BP-7

BK-BP-8

BK-BP-9

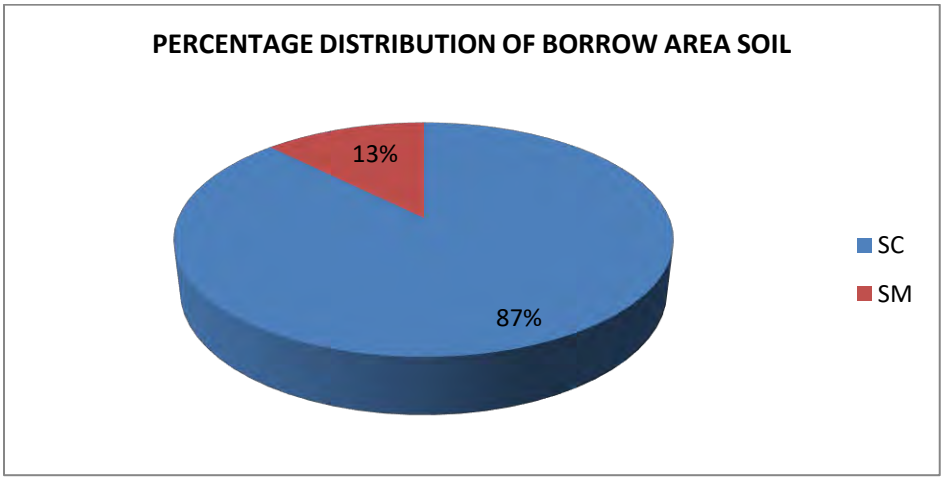
BK-BP-10

BK-BP-11

BK-BP-12

BK-BP-13

Pie Chart showing the percentage distribution of soil classification of Borrow area sample is presented below



2.9 AGGREGATE AND 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 5: Aggregate Samples Details

Sl. No.	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	Coordinates
1	BK-AQ-1	74+600	LHS	Sawali Wagh	divendra S. Naidu Crusher Name: divendra S. Naidu Mob: 9834912811	12.7 km	Plenty	40mm-Rs 17/- per cft 20mm-Rs 20/- per cft 10mm-Rs 12/- per cft 6mm-Rs 9/- per cft dust - Rs 15/- per cft M Sand - Rs 20/- per cft GSB - Rs 16/- per cft WMM - Rs 18/- per cft	Extra : Royalty Rs- 10/- Per Cft & GST-5 %	20.495998 70.933231
2	BK-AQ-2	74+600	LHS	Sawali Wagh	Aditya S. Bhimaswar Name: Aditya S. Bhimaswar Mob: 9891964542	12.7 km	Plenty	40mm-Rs 15/- per cft 20mm-Rs 18/- per cft 10mm-Rs 12/- per cft 6mm-Rs 8/- per cft dust - Rs10/- per cft GSB - Rs 12/- per cft WMM - Rs 13/- per cft	Extra : Royalty Rs- 6/- Per Cft & GST-5 %	20.4996757 78.935837
3	BK-AQ-3	90+200	LHS	Dorada	Shiva Krupa Matals Name: Anand Chandwani Mob:8888883398 8888807905	0.5 km	Plenty	40mm-Rs 15/- per cft 20mm-Rs 20/- per cft 10mm-Rs 9/- per cft 6mm-Rs 6/- per cft dust - Rs 6/- per cft M Sand - Rs 19/- per cft GSB - Rs 15/- per cft WMM - Rs 15/- per cft	Extra : Royalty Rs- 8.5/- Per Cft & GST-5 %	20.461156 78.773114
4	BK-AQ-4	63+000	LHS	Nandori (Wasikori road)	Bajij Metal & Concrete Name-Anil Baiji Mob-9011169177	13.1 km	Plenty	40 & 60 mm-Rs 15/- per cft 20mm-Rs 18/- per cft 10mm-Rs 10/- per cft 6mm-Rs 12/- per cft dust - Rs 12/- per cft M Sand - Rs 18/- per cft GSB - Rs 16/- per cft WMM - Rs 16/- per cft	Extra : Royalty Rs- 7/- Per Cft & GST-5 %	20.516044 78.98818
5	BK-AQ-5	63+000	LHS	Nandori (Wasikori road)	Asta Vinayaka Crusher Name-Rajabhau Maadamwar Mob-9822229707 Name-Abhay Madamwar Mob-9822201066	13.2 km	Plenty	40mm-Rs 15/- per cft 20mm-Rs 18/- per cft 10mm-Rs 12/- per cft 6mm-Rs 8/- per cft dust - Rs10/- per cft GSB - Rs 12/- per cft WMM - Rs 13/- per cft	Extra : Royalty Rs- 6/- Per Cft & GST-5 %	20.510568 78.984859

Sl. No.	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	Coordinates
6	BK-AQ-6	38+000	LHS	Alagodi	K.S Metal & Mining INdustrial Name-Manish Kumar Mob-9922926956	1.8 km	Plenty	60mm-Rs 545/- per ton 40mm-Rs 50/- per ton 20mm-Rs 600/- per ton 10mm-Rs 500/- per ton 6mm-Rs 500/- per ton C.Sand - Rs 515/- per ton GSB - Rs 450/- per ton WMM - Rs 470/- per ton	Extra : Royalty Rs- 170/- Per ton & GST-5 %	20.829519 78.96991
7	BK-AQ-7	143+600	LHS	Pandharkawada (Khairgaon)	Sri Ram Stone Crusher Name-Manoj Sharma Mob-9421214444	1.2 km	Plenty	Bouiders-Rs 500/- per Brass 60mm-Rs 1200/- per Brass 40mm-Rs1600/- per Brass 22mm-Rs 2200/- per Brass 20mm-Rs 2000/- per Brass 10mm-Rs 1400/- per Brass 6mm-Rs 1200/- per Brass Dust-Rs 1000/- per Brass C-Sand-Rs 2950/- per Brass GSB-Rs 1200/- per Brass Murram - Rs100/- per Brass	Loading Rs-100/- per Brass Royality-Rs 700/- per Brass GST 5%	20.070245 78.555502

Photos showing Aggregate sample are presented below:

BK-AQ-1

BK-AQ-2

BK-AQ-3

BK-AQ-4

BK-AQ-5

BK-AQ-6

BK-AQ-7

Table 6: Sand Samples Details

Sl No.	Sand Source	Village & Name	Name of river	Existing Chainage	side	Offset	Rate	Remarks	Coordinates
1	BT-SQ-1	Vill: Kankati (Khadhili) Name-yuvaraju Kurmuri Mob- 9860169432 8669042215	Wana river	50+400	LHS	1.6 km	Rate : Rs 45/- Per cft	With out loading, Royalty & GST	20.722033 79.930089
2	BT-SQ-2	Vill: Jamb Name-Ravinder Krishnaji Burili Mob- 9422844564 9689630068	Wain Gangar river	62+350	LHS	150 km	Rate : Rs 50/- Per feet	With loading & royality	
3	BT-SQ-3	Vill: Jamb Name-Ravinder Krishnaji Burili Mob- 9422844564 9689630068	Wana river	62+350	LHS	20 km	Rate : Rs 40/- Per feet	With loading & royality	
4	BT-SQ-4	PimpalKhuti	Pen Ganga river	174+500	RHS	1.4 km			19.817316 78.576033
5	BT-SQ-5	Sekapur Bai Name-Ankur Thakur Mob - 9764064949	Wana river	95+200	LHS	11 km	Rate : Rs 3000/- Per Brass	With loading & royality Rs- 2000/- Per Brass GST %	

2.10 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. Surveys have been conducted on the Project Road at two locations first near km 150+500 on 1st June'2022 to 2nd June 2022 and second near km 92+200 on 3rd June 2022 to 4th June 2022. The surveys have 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 7: Details of Standard Axels Used

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.

Axle Load Survey @ 92+500 LHS

Axle Load Survey @ 92+500 RHS

Axle Load Survey @ 150+500 LHS

Axle Load Survey @ 150+500 RHS

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 8: VDF Values Estimated at the Toll Plaza Location-km 90+200

Mode Type	Borkhedi to MH/TS Border Carriageway	MH/TS Border to Borkhedi Carriageway
LCV	0.595	1.246
2 Axle Truck	2.734	2.754
3 Axle Truck	4.999	4.838
MAV (4-6 Axle)	8.796	8.834
Buses	0.598	1.811

Table 9: VDF Values Estimated at the Toll Plaza Location-km 150+500

Mode Type	Borkhedi to MH/TS Border Carriageway	MH/TS Border to Borkhedi Carriageway
LCV	0.235	0.256
2 Axle Truck	2.697	2.468

Mode Type	Borkhedi to MH/TS Border Carriageway	MH/TS Border to Borkhedi Carriageway
3 Axle Truck	5.662	4.471
MAV (4-6 Axle)	9.863	7.042
Buses	1.914	1.502

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

Sl. No.	Particulars	Length/ Nos.	As per Site	Schedule-A	Schedule-B	Remarks
1	Start Chainage (Km)	Km	36.6	36.6	36.6	
2	End chainage (Km)	Km	175.0	175.0	175.0	
3	Length of the Project Corridor	Kms	138.4	138.4	138.4	The actual distance between 36.6 and 175.0 is 138.150 only
4	Service Road / Slip Road	Kms	48.015	48.015	4.142	
5	Toll Plaza	Nos.	2	2	1	Existing Toll Plaza at 150+540 to be shifted at 156+650
6	No.of Lanes (Both side)	Nos.	14	14	8	1st toll plaza total 10 lanes and new plaza 8 lanes
7	ROBs	Nos.	3	3		
8	Flyovers	Nos.	5	5		
9	Uni Directional Flyovers	Nos.	2	2		
10	VUPs	Nos.	2	2	3	Construction of New VUP with (1x15 + 1x25 + 1x15) shall be constructed under separate contract, bids are under evaluation. 2 numbers with 1x20x5.5 are in Scope
11	PUP's/CUP's	Nos.	22	22		
12	FOBs	Nos.	1	0		
13	Major Bridges	Nos.	8	8	1	(3x45.7) + (2x52.525)
14	Minor Bridges	Nos.	59	59		
15	Culverts (Pipe)	Nos.	93	91		
16	Culvert (Slab/Box)	Nos.	40	39	1	
17	Major Junctions	Nos.	18	18	18	
18	Minor junctions	Nos.	274	272	241	

Sl. No.	Particulars	Length/ Nos.	As per Site	Schedule-A	Schedule-B	Remarks
19	Bus Bays with Shelter	Nos.	36	39	79	New-25, Ratained-22, Repair and rehabilitation-23, Retained and Miantained-7 and shifted-2
20	Bus Bays	Nos.	23	23		
21	Bus Shelters	Nos.	20	17		
22	Truck Lay bye	Nos.	6	6	6	Shall be improved including Facilities at Truck lay bye
23	High Mast Lights	Nos.	10	10	25	New High mast -25
24	Single Arm Lightnings	Nos.	6	416	2216	
25	Double Arm Lightnings	Nos.	395		1017	
26	Three Arm Lightnings	Nos.	14			
27	Solar Blinkers	Nos.	60	58		additional as per scope
28	RCC Open Lined Drain	Kms	6.42	6.105		
29	Median drain	Kms	3.749	2.72		
30	Median Opening	Nos.	81	0	80	Retained, improved and new
31	W-Beam Safety Barriers	Kms	49.014		18.64	
32	Rigid Concrete Barriers	Kms	24.12		As per IRC: 119:2015	
33	Concrete Railing	Kms	0.98	0		
34	Pedestrian Guard Rails	m	10840		13.269	
35	Delineators	Nos.	1400	2107	As per SP 84-2019	
36	Road Signs	Nos.	1122	0		
37	Gantry Sign Boards	Nos.	22	24		
38	Cantilever Sign Boards	Nos.	18	27		

In the project stretch, the Service/Slip Roads with an overall length of km 45.920 have been observed. Location of service roads and slip roads are provided in Appendix 6 of this report:

Lined Covered drains and open lined drains exist mostly at service load locations in built-up areas along the project road. Length of Lined Covered is about 29.482 Kms and open lined drains are about 6.420km. Details of the Lined Covered and open lined drains are presented in Appendix 6 of this report

Median Drain is observed for a length of 3.749 km on super-elevated sections and while in the remaining length of super-elevated sections, median cuts exist, along the project corridor. Location wise details of Median Drains are presented in the table below and Median Cuts details are presented in Appendix 6 of this report.

Table 11: Median Drains along the Project Road

S. No.	Existing Km		Location	Length (m)	Remark
	From	To			
1	37.300	37.400	Median	0.100	Open Drain
2	75.950	76.270	Median	0.320	Open Drain
3	76.350	76.850	Median	0.500	Open Drain
4	78.745	79.115	Median	0.370	Open Drain
5	79.675	79.852	Median	0.177	Open Drain
6	80.767	80.960	Median	0.193	Open Drain
7	89.186	89.325	Median	0.139	Open Drain
8	93.350	93.393	Median	0.043	Open Drain
9	109.000	109.880	Median	0.880	Open Drain
10	121.115	121.280	Median	0.165	Open Drain
11	151.362	151.782	Median	0.420	Open Drain
12	154.695	154.815	Median	0.120	Open Drain
13	166.095	166.140	Median	0.045	Open Drain
14	166.165	166.202	Median	0.037	Open Drain
15	168.989	169.129	Median	0.140	Open Drain
16	173.600	173.700	Median	0.100	Open Drain
Total length km				3.749	

Summary of RE/RCC walls and pitching along with grouting are found in approaches of some of the Grade-Separators/ROB/Major Bridges along the Project Corridor and are listed in the Appendix 6.

Table 12: Summary of Type of Slope Details

Approach Type	Length
Embankment	1.260
Stone Pitching	8.310
RCC Wall	1.740
RE Wall	14.810
Stone Pitching + RCC Wall	1.270
Embankment + RCC Wall	2.100
Total	29.490

Median width of 4.5m & 1.2 was generally adopted along the project road. 81nos of Median openings are found along the project corridor. Details of Median openings are presented in the Appendix 6 of this report.

Safety 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. Details of safety barriers provided along the corridor include the following.

Single faced single barrier are observed for a length of 31.384 Kms and single faced double barrier observed for a length of 17.630km along the project corridor. Details of Metal Beam Crash Barrier are provided in the Appendix 6 of this report.

Concrete crash barrier and Concrete Railing are observed at Structure locations along the project corridor. Length of Concrete crash barrier is about 21.120 Kms and Concrete railing are about 0.670km. Details of Concrete Crash Barrier and concert railing are provided in the Appendix 6 of this report.

Pedestrian Guard Rails are observed on separator between main carriageway and service road along the project corridor for a length of 10.840Kms. Details of Pedestrian Guard Rails are presented in the Annexure-6 of this report.

Table 13: Summary of Safety Barriers along Project Road

Safety Barrier	Length (km)	Damage (km)
Single faced single barrier	31.384	0.325
Single faced double barrier	17.630	0.128
Concrete Crash Barrier	24.120	-
Concrete Railing	0.670	0.019
Pedestrians Guard Rail	10.840	0.096

List of major and minor junctions developed are presented in the Appendix 6 of this Report.

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.

1122 nos of Road signs are observed along the project corridor. Details of Road Signs are presented in the Appendix 6 of this report.

Table 14: Road Signs along the Project Road

Description	LHS	RHS	Junction	Total
Octagonal	2	3	24	29
Circular	25	25	2	52
Triangular	166	173	36	375
Rectangular	109	102	16	227
Facility informatory	0	0	0	0
Chevron	124	123	0	247
Hazard	47	44	5	96
Route Marker	12	11	0	23
Safety Boards	10	11	0	21
Toll Boards	5	7	0	12
Cantilever Gantry	11	7	0	18

Description	LHS	RHS	Junction	Total
Over Head Gantry	7	15	0	22
Variable Message Sign	0	0	0	0
Project Descriptive	0	0	0	0
Total	518	521	83	1122

Total 1400 nos of delineators are observed along the project corridor on both sides including median. Details of Delineators are presented in the Appendix 6 of this report.

High mast lights are observed at toll plaza and major junction locations along the project corridor and are presented in the table below.

Table 15: Locations of High mast Lighting

S. No	Chainage	Location	Facility, if any	As per site	Remark
1	42.710	RHS	Junction	1	
2	77.300	Median	Junction	1	
3	77.600	LHS	Junction	1	
4	77.600	RHS	Junction	1	
5	92.400	LHS	Toll	1	
6	92.600	RHS	Toll	1	
7	95.6	RHS	Junction	1	
8	113.100	RHS	Junction	1	
9	149.200	LHS	Junction	1	
10	133.300	RHS	Junction	1	
			Total	10	

Street lights in the form of Double arm lights are observed at built-up sections and Single arm are observed at Service Road and truck Lay bye along the project corridor. Details of Street lights are presented in the table below.

Table 16: Locations of Street Lighting

Double Arm:

S. No	Chainage		Length	Location	Facility, if any	As per site
	From	To				
1	62.500	62.950	0.450	Median	Built-up Area	9
2	63.000	64.300	1.300	Median	Built-up Area	40
3	72.900	78.400	5.500	LHS	Built-up Area	147
4	72.900	78.400	5.500	RHS	Built-up Area	148
5	91.800	92.400	0.600	Median	Toll	14
6	92.600	93.200	0.600	Median	Toll	15

S. No	Chainage		Length	Location	Facility, if any	As per site
	From	To				
7	173.600	174.300	0.700	Median	ROB	22
			14.650		Total	395

Single Arm:

S. No	Chainage		Length	Location	Facility, if any	As per site
	From	To				
1	68.300	68.350	0.050	LHS	Built-up Area	2
2	150.400	150.450	0.050	LHS	Toll	2
3	150.400	150.450	0.050	RHS	Toll	2
			0.150		Total	6

Triple Arm:

S. No	Chainage		Length	Location	Facility, if any	As per site
	From	To				
1	72.900	78.400	5.500	LHS	Built-up Area	7
2	72.900	78.400	5.500	RHS	Built-up Area	7
			11.000		Total	14

Road user facilities such as Bus Stops and Truck Laybys have been provided along the corridor. The project Road has total 36 numbers of Bus bay/bus shelters,23 number of bus bay without shelter and 20 number of only bus shelters and 6 numbers of truck laybys along the project Road. The details of the bus bay/bus shelter are presented in the Appendix 6 of this report and truck laybys are presented in the table below.

3.2 BRIDGE WORKS

List of Bridges found during the inventory surveys along the corridor are as follows:

Table 17: Details of CD & Other Structures

S. No	Site Chainage (Km)	Type of Structure	Side	Str on	Age of Str	Span Arrangement (m)	Deck Width (m)	Remarks
1	37+418	ROB	LHS	MCW	New	1 x 51.35	11.35	
2	37+418	ROB	RHS	MCW	New	1 x 51.35	11.35	
3	76+371	ROB	LHS	MCW	New	2 x 14.3 + 1 x 30.40 + 1 x 14 + 14.3	13.75	
4	76+371	ROB	RHS	MCW	New	2 x 14.3 + 1 x 30.40 + 1 x 14 + 14.3	13.75	
5	173+522	ROB	LHS	MCW	New	1 x 22 + 1 x 10.4	12	
6	173+522	ROB	RHS	MCW	New	1 x 22 + 1 x 10.4	12	
7	49+770	MJB	LHS	MCW	New	10 x 32.0	10.25	
8	49+770	MJB	RHS	MCW	New	10 x 32.0	10.25	

S. No	Site Chainage (Km)	Type of Structure	Side	Str on	Age of Str	Span Arrangement (m)	Deck Width (m)	Remarks
9	58+555	MJB	LHS	MCW	Old	2 x 13.2 + 2 x 36.8	11.25	
10	58+555	MJB	RHS	MCW	New	2 x 13.2 + 2 x 36.8	10.25	
11	79+520	MJB	LHS	MCW	Old	6 x 22.85 + 3 x 27.4	8.5	
12	79+520	MJB	RHS	MCW	New	6 x 22.85 + 3 x 27.4	12	
13	80+154	MJB	LHS	MCW	Old	5 x 13.25	8.5	
14	80+154	MJB	RHS	MCW	New	5 x 13.25	12	
15	109+770	MJB	LHS	MCW	New	1 x 45.75 + 2 x 49.5 + 1 x 45.65	12	
16	109+770	MJB	RHS	MCW	Old	1 x 45.75 + 2 x 49.5 + 1 x 45.65	8.5	
17	141+095	MJB	LHS	MCW	Old	3 x 21.5	12	
18	141+095	MJB	RHS	MCW	Old	3 x 21.5	12	
19	149+640	MJB	LHS	MCW	Old	6 x 21.6	10.5	
20	149+640	MJB	RHS	MCW	New	6 x 21.6	12	
21	160+337	MJB	LHS	MCW	New	4 x 19	12	
22	160+337	MJB	RHS	MCW	New	4 x 19	12	
23	41+792	MNB	LHS	MCW	New	1 x 8.5	12	
24	41+792	MNB	RHS	MCW	Old	1 x 8.5	12	
25	43+526	MNB	LHS	MCW	New	1 x 10.40	12	
26	43+526	MNB	RHS	MCW	Old	3 x 3.4	12	
27	45+414	MNB	LHS	MCW	Old	1 x 6.5	12	
28	45+414	MNB	RHS	MCW	Old	1 x 6.5	12	
29	46+391	MNB	LHS	MCW	New	1 x 7.5	12	
30	46+391	MNB	RHS	MCW	New	1 x 7.5	12	
31	48+015	MNB	LHS	MCW	Old	3 x 4.5	12	
32	48+015	MNB	RHS	MCW	New	1 x 10.36	12	
33	51+539	MNB	LHS	MCW	Old	1 x 8.9	12	
34	51+539	MNB	RHS	MCW	New	1 x 8.9	12	
35	53+653	MNB	LHS	MCW	Old	1 x 6.2	12	
36	53+653	MNB	RHS	MCW	New	1 x 6.2	12	
37	55+792	MNB	LHS	MCW	Old	1 x 8.75	12	
38	55+792	MNB	RHS	MCW	New	3 x 2.91	12	
39	57+272	MNB	LHS	MCW	Old	1 x 9.16	12	
40	57+272	MNB	RHS	MCW	Old	1 x 9.16	12	
41	59+945	MNB	LHS	MCW	Old	5 x 6.7	12	

S. No	Site Chainage (Km)	Type of Structure	Side	Str on	Age of Str	Span Arrangement (m)	Deck Width (m)	Remarks
42	59+945	MNB	RHS	MCW	Old	5 x 6.7	12	
43	60+623	MNB	LHS	MCW	Old	1 x 4.8	12	
44	60+623	MNB	RHS	MCW	Old	1 x 4.8	12	
45	61+126	MNB	LHS	MCW	Old	1 x 9.94	12	
46	61+126	MNB	RHS	MCW	Old	1 x 9.94	12	
47	65+875	MNB	LHS	MCW	Old	3 x 12.10	13	
48	65+875	MNB	RHS	MCW	New	3 x 12.10	13	
49	67+289	MNB	LHS	SR	New	1 x 6	9	
50	67+289	MNB	LHS	MCW	New	1 x 6	12.65	
51	67+289	MNB	RHS	MCW	New	1 x 6	12.65	
52	67+289	MNB	RHS	SR	New	1 x 6	9	
53	68+684	MNB	LHS	MCW	New	1 x 6.26	12	
54	68+684	MNB	RHS	MCW	Old	1 x 6.26	12	
55	70+360	MNB	LHS	MCW	New	1 x 9.2	12	
56	70+360	MNB	RHS	MCW	New	1 x 9.2	12	
57	78+075	MNB	LHS	SR	New	1 x 3.2	9	
58	78+075	MNB	LHS	MCW	New	1 x 3.2	13.5	
59	78+075	MNB	RHS	MCW	New	1 x 3.2	13.5	
60	78+075	MNB	RHS	SR	New	1 x 3.2	9	
61	81+809	MNB	LHS	MCW	Old	2 x 4.86	12	
62	81+809	MNB	RHS	MCW	New	2 x 4.86	12	
63	84+736	MNB	LHS	MCW	Old	4 x 8.3	12	
64	84+736	MNB	RHS	MCW	New	4 x 8.3	12	
65	87+304	MNB	LHS	MCW	New	1 x 5	12	
66	87+304	MNB	RHS	MCW	New	1 x 5	12	
67	89+076	MNB	LHS	MCW	New	1 x 10.0	12	
68	89+076	MNB	RHS	MCW	New	1 x 10.0	12	
69	89+358	MNB	LHS	MCW	New	3 x 13.7	12	
70	89+358	MNB	RHS	MCW	Old	3 x 13.7	12	
71	94+486	MNB	LHS	SR	New	1 x 8	8.00	
72	94+486	MNB	LHS	MCW	New	1 x 8	10.88	
73	94+486	MNB	RHS	MCW	New	1 x 8	10.88	
74	94+486	MNB	RHS	SR	New	1 x 8	8.00	
75	98+084	MNB	LHS	MCW	New	1 x 6.0	12	
76	98+084	MNB	RHS	MCW	New	1 x 6.0	12	
77	98+492	MNB	LHS	MCW	New	1 x 6.0	12	
78	98+492	MNB	RHS	MCW	New	1 x 6.0	12	

S. No	Site Chainage (Km)	Type of Structure	Side	Str on	Age of Str	Span Arrangement (m)	Deck Width (m)	Remarks
79	100+920	MNB	LHS	MCW	New	1 x 21.30	12	
80	100+920	MNB	RHS	MCW	New	1 x 21.30	12	
81	102+837	MNB	LHS	MCW	New	1 x 6.0	12	
82	102+837	MNB	RHS	MCW	New	1 x 6.0	12	
83	103+687	MNB	LHS	MCW	New	1 x 15 + 1 x 14.4 + 1 x 15	12	
84	103+687	MNB	RHS	MCW	New	1 x 15 + 1 x 14.4 + 1 x 15	12	
85	106+505	MNB	LHS	MCW	New	3 x 18.7	12	
86	106+505	MNB	RHS	MCW	New	3 x 18.7	12	
87	110+655	MNB	LHS	MCW	New	1 x 5.6	12	
88	110+655	MNB	RHS	MCW	New	1 x 5.6	12	
89	111+690	MNB	LHS	MCW	New	3 x 13.6	12	
90	111+690	MNB	RHS	MCW	Old	3 x 13.6	12	
91	113+913	MNB	LHS	MCW	New	3 x 3.0	12	
92	113+913	MNB	RHS	MCW	New	3 x 3.0	12	
93	114+928	MNB	LHS	MCW	New	3 x 18	12	
94	114+928	MNB	RHS	MCW	New	3 x 18	12	
95	118+280	MNB	LHS	MCW	New	2 x 7	12	
96	118+280	MNB	RHS	MCW	New	2 x 7	12	
97	123+310	MNB	LHS	MCW	New	1 x 24.70	12	
98	123+310	MNB	RHS	MCW	New	1 x 24.70	12	
99	124+278	MNB	LHS	MCW	New	1 x 12.6	12	
100	124+278	MNB	RHS	MCW	New	1 x 12.6	12	
101	128+640	MNB	LHS	MCW	New	2 x 17	12	
102	128+640	MNB	RHS	MCW	New	2 x 17	12	
103	129+257	MNB	LHS	MCW	New	1 x 9.5	12	
104	129+257	MNB	RHS	MCW	New	1 x 9.5	12	
105	129+875	MNB	LHS	MCW	New	1 x 9.5	12	
106	129+875	MNB	RHS	MCW	New	1 x 9.5	12	
107	134+150	MNB	LHS	MCW	New	2 x 17	12	
108	134+150	MNB	RHS	MCW	New	2 x 17	12	
109	137+685	MNB	LHS	MCW	Old	4 x 7.5	12	
110	137+685	MNB	RHS	MCW	New	2 x 15	12	
111	141+000	MNB	LHS	MCW	New	1 x 21.70	12	
112	141+000	MNB	RHS	MCW	New	1 x 21.70	12	
113	141+970	MNB	LHS	MCW	New	1 x 17	12	

S. No	Site Chainage (Km)	Type of Structure	Side	Str on	Age of Str	Span Arrangement (m)	Deck Width (m)	Remarks
114	141+970	MNB	RHS	MCW	New	1 x 17	12	
115	142+410	MNB	LHS	MCW	New	1 x 12	12	
116	142+410	MNB	RHS	MCW	New	1 x 12	12	
117	145+290	MNB	LHS	MCW	New	2 x 17.5	12	
118	145+290	MNB	RHS	MCW	New	2 x 17.5	12	
119	151+235	MNB	LHS	MCW	New	1 x 21.70	12	
120	151+235	MNB	RHS	MCW	Old	3 x 7.30	12	
121	152+298	MNB	LHS	MCW	Old	2 x 6	12	
122	152+298	MNB	RHS	MCW	New	2 x 6	12	
123	154+683	MNB	LHS	MCW	Old	3 x 9	12	
124	154+683	MNB	RHS	MCW	New	3 x 9	12	
125	157+161	MNB	LHS	MCW	Old	3 x 8.5	12	
126	157+161	MNB	RHS	MCW	New	3 x 8.5	12	
127	158+704	MNB	LHS	MCW	Old	3 x 8.70	12	
128	158+704	MNB	RHS	MCW	New	3 x 8.70	12	
129	162+091	MNB	LHS	MCW	Old	3 x 5.30	12	
130	162+091	MNB	RHS	MCW	New	3 x 5.30	12	
131	162+724	MNB	LHS	MCW	New	1 x 20	12	
132	162+724	MNB	RHS	MCW	New	1 x 20	12	
133	164+567	MNB	LHS	MCW	New	2 x 3.5	12	
134	164+567	MNB	RHS	MCW	New	2 x 3.5	12	
135	165+169	MNB	LHS	MCW	Old	4 x 8.5	12	
136	165+169	MNB	RHS	MCW	New	4 x 8.5	12	
137	166+147	MNB	LHS	MCW	New	1 x 17	12	
138	166+147	MNB	RHS	MCW	New	1 x 17	12	
139	169+143	MNB	LHS	MCW	New	1 x 17	12	
140	169+143	MNB	RHS	MCW	New	1 x 17	12	
141	170+504	MNB	LHS	MCW	Old	1 x 6.6	12	
142	170+504	MNB	RHS	MCW	Old	1 x 6.6	12	
143	172+883	MNB	LHS	MCW	New	2 x 7.5	12	
144	172+883	MNB	RHS	MCW	New	2 x 7.5	12	
145	174+626	MNB	LHS	MCW	Old	2 x 8	12	
146	174+626	MNB	RHS	MCW	New	2 x 8	12	
147	74+493	Flyover	LHS	MCW	New	1 x 15 + 1 x 25 + 1 x 15	12	

S. No	Site Chainage (Km)	Type of Structure	Side	Str on	Age of Str	Span Arrangement (m)	Deck Width (m)	Remarks
148	74+493	Flyover	RHS	MCW	New	1 x 15 + 1 x 25 + 1 x 15	12	
149	77+855	Flyover	LHS	MCW	New	6 x 30 + 1 x 45 + 8 x 30 + 2 x 45	13.75	
150	77+855	Flyover	RHS	MCW	New	6 x 30 + 1 x 45 + 8 x 30 + 2 x 45	13.75	
151	79+868	Flyover	RHS	MCW	New	1 x 15 + 1 x 25 + 1 x 15	12	
152	113+081	Flyover	LHS	MCW	New	12.615 + 30 + 12.615	12	
153	113+081	Flyover	RHS	MCW	New	12.615 + 30 + 12.615	12	
154	132+670	Flyover	LHS	MCW	New	1 x 15.5 + 1 x 32 + 1 x 15.5	12	
155	132+670	Flyover	RHS	MCW	New	1 x 15.5 + 1 x 32 + 1 x 15.5	12	
156	139+465	Flyover	RHS	MCW	New	1 x 15.5 + 1 x 32 + 1 x 15.5	12	
157	169+640	Flyover	LHS	MCW	New	1 x 15 + 1 x 20 + 1 x 15	12	
158	169+640	Flyover	RHS	MCW	New	1 x 15 + 1 x 20 + 1 x 15	12	
159	112+870	VUP	LHS	MCW	New	1 x 12.0	13.75	
160	112+870	VUP	RHS	MCW	New	1 x 12.0	13.75	
161	113+230	VUP	LHS	MCW	New	1 x 12.0	13.75	
162	113+230	VUP	RHS	MCW	New	1 x 12.0	13.75	
163	67+095	PUP	LHS	MCW	New	1 x 6	13.7	
164	67+095	PUP	RHS	MCW	New	1 x 6	13.7	
165	74+292	PUP	LHS	MCW	New	1 x 6	13.75	
166	74+292	PUP	RHS	MCW	New	1 x 6	13.75	
167	74+732	PUP	LHS	MCW	New	1 x 6	13.5	
168	74+732	PUP	RHS	MCW	New	1 x 6	13.5	
169	76+117	PUP	LHS	MCW	New	1 x 6	13.75	
170	76+117	PUP	RHS	MCW	New	1 x 6	13.75	
171	76+635	PUP	LHS	MCW	New	1 x 6	13.75	
172	76+635	PUP	RHS	MCW	New	1 x 6	13.75	
173	82+717	PUP	LHS	MCW	New	1 x 6	13.75	
174	82+717	PUP	RHS	MCW	New	1 x 6	13.75	

S. No	Site Chainage (Km)	Type of Structure	Side	Str on	Age of Str	Span Arrangement (m)	Deck Width (m)	Remarks
175	84+996	PUP	LHS	MCW	New	1 x 6	13.75	
176	84+996	PUP	RHS	MCW	New	1 x 6	13.75	
177	90+005	PUP	LHS	MCW	New	1 x 6	13.75	
178	90+005	PUP	RHS	MCW	New	1 x 6	13.75	
179	94+350	PUP	LHS	MCW	New	1 x 6.0	12	
180	94+350	PUP	RHS	MCW	New	1 x 6.0	12	
181	99+626	PUP	LHS	MCW	New	1 x 6.0	12	
182	99+626	PUP	RHS	MCW	New	1 x 6.0	12	
183	105+155	PUP	LHS	MCW	New	1 x 6.0	12	
184	105+155	PUP	RHS	MCW	New	1 x 6.0	12	
185	115+504	PUP	LHS	MCW	New	1 x 6.0	12	
186	115+504	PUP	RHS	MCW	New	1 x 6.0	12	
187	128+840	PUP	LHS	MCW	New	1 x 6.0	12	
188	128+840	PUP	RHS	MCW	New	1 x 6.0	12	
189	130+147	PUP	LHS	MCW	New	1 x 6.0	12	
190	130+147	PUP	RHS	MCW	New	1 x 6.0	12	
191	133+225	PUP	LHS	MCW	New	1 x 6.0	12	
192	133+225	PUP	RHS	MCW	New	1 x 6.0	12	
193	137+860	PUP	LHS	MCW	New	1 x 6.0	12	
194	137+860	PUP	RHS	MCW	New	1 x 6.0	12	
195	147+580	PUP	LHS	MCW	New	1 x 6.0	12	
196	147+580	PUP	RHS	MCW	New	1 x 6.0	12	
197	148+912	PUP	LHS	MCW	New	1 x 6.0	12	
198	148+912	PUP	RHS	MCW	New	1 x 6.0	12	
199	153+379	PUP	LHS	MCW	New	1 x 6.0	12	
200	153+379	PUP	RHS	MCW	New	1 x 6.0	12	
201	157+718	PUP	LHS	MCW	New	1 x 6.0	12	
202	157+718	PUP	RHS	MCW	New	1 x 6.0	12	
203	159+015	PUP	LHS	MCW	New	1 x 6.0	12	
204	159+015	PUP	RHS	MCW	New	1 x 6.0	12	
205	169+391	PUP	LHS	MCW	New	1 x 6.0	12	
206	169+391	PUP	RHS	MCW	New	1 x 6.0	12	
207	75+600	FOB	BHS	MCW	New	2 x 27.4	4.8	

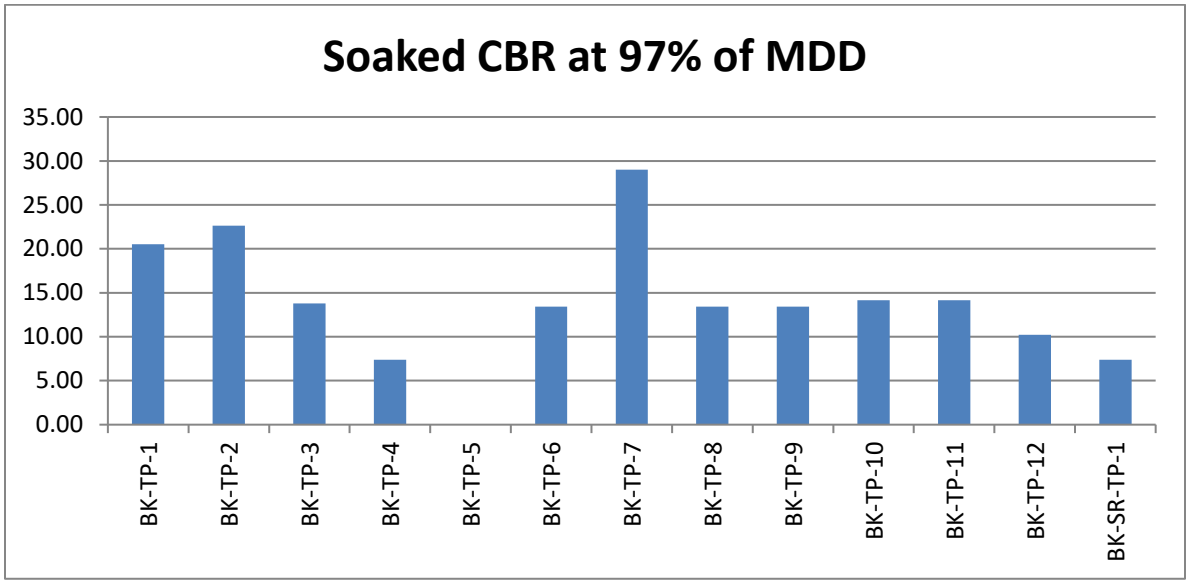
4.1 EMBANKMENT & SUBGRADE

The embankment for project road has been constructed with available soils from nearby areas. The soil appears to be silty sand and silts with Coarse Grained 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.

The subgrade of the project road appears to be in good condition as revealed by test pit investigations. Laboratory results conducted on subgrade indicates that most of subgrade soils are coarse grain type soils. Condition of subgrade appears to intact as no major evidence of subsidence of depressions exists along the corridor. CBR of subgrade soils for lab testing indicates a good value greater than 10% at ten locations. Results of Subgrade CBR are as follows:

Table 18: Details of Soaked CBR Values of Existing Subgrade Soils

Lab Sample No	Site Identification		Grain Size Analysis					Atterberg Limits (%)			Soil Class	MDD (gm/cc)	OMC (%)	Dry density At 97%	Soaked CBR 97% MDD	Free Swelling Index (%)
	Location (km)	Up/Dn	Percentage passing from					LL	PL	PI						
			4.75 mm IS	425 mic IS	75 mic IS	Gravel %	Sand %									
BK-TP-1	56+540	RHS	77.60	38.26	23.00	22.40	54.60	27	20	7	SM-SC	2.19	10.20	2.12	20.52	10.00
BK-TP-2	63+800	LHS	78.29	39.84	20.65	21.71	57.64	-	NP	NP	SM	2.22	9.00	2.15	22.64	4.76
BK-TP-3	71+750	RHS	73.36	43.76	36.60	26.64	36.76	33	22	11	SC	2.05	11.60	1.99	13.80	18.18
BK-TP-4	81+150	LHS	84.00	44.03	30.99	16.00	53.01	37	22	15	SC	1.82	15.00	1.77	7.39	17.39
BK-TP-5	95+200	RHS	70.95	35.52	21.65	29.05	49.30	51	32	19	SC	1.70	19.20	1.65	NA	18.18
BK-TP-6	101+300	LHS	79.56	36.76	26.61	20.44	52.95	34	23	11	SC	2.01	12.20	1.95	13.44	23.81
BK-TP-7	114+500	RHS	70.56	38.63	26.57	29.44	43.99	29	20	9	SC	2.16	10.80	2.10	29.01	13.64
BK-TP-8	119+600	LHS	73.64	37.69	25.79	26.36	47.85	33	18	15	SC	2.01	12.80	1.95	13.44	13.64
BK-TP-9	134+950	RHS	74.97	38.88	30.84	25.03	44.13	41	24	17	SC	2.00	12.40	1.94	13.44	23.81
BK-TP-10	155+000	LHS	68.77	35.92	26.55	31.23	42.22	30	20	10	SC	2.11	9.20	2.05	14.15	13.64
BK-TP-11	160+000	RHS	82.09	47.43	35.50	17.91	46.59	31	20	11	SC	2.09	12.00	2.03	14.15	13.04
BK-TP-12	140+300	LHS	81.12	43.50	31.88	18.88	49.24	36	24	12	SC	1.96	18.00	1.90	10.23	19.05
BK-SR-TP-1	139+200	RHS	76.96	51.49	37.45	23.04	39.51	40	26	14	SC	1.84	16.20	1.78	7.39	30.43



The following observations can be made from the above test results conducted on of existing subgrade samples

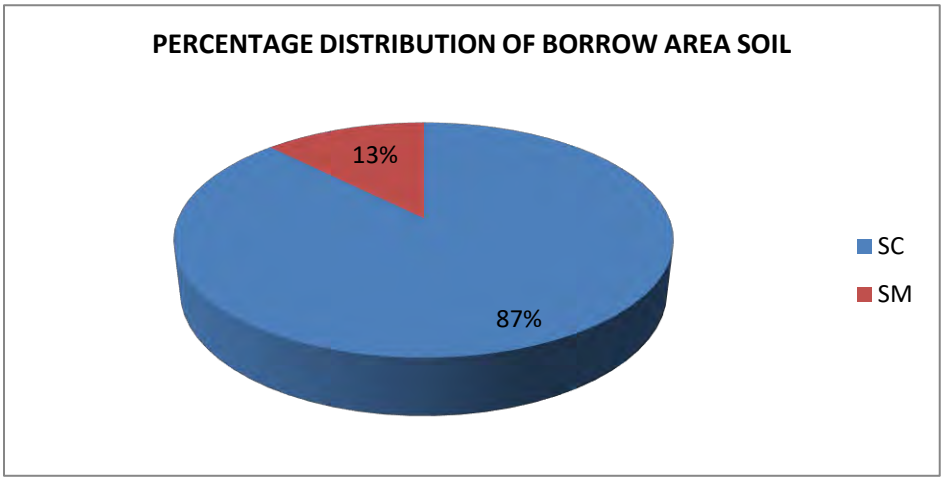
- Maximum Dry Density for all subgrade samples varies between 1.70 and 2.22 gm/cc. One sample are not satisfying the MDD criterion (MDD>=1.75 gm/cc)
- OMC for existing subgrade samples varies between 9.0 to 19.20.
- Free Swelling Index for existing subgrade samples varies between 4.76 to 30.43. All the 13 samples are satisfying the FSI criterion (FSI<=50%).

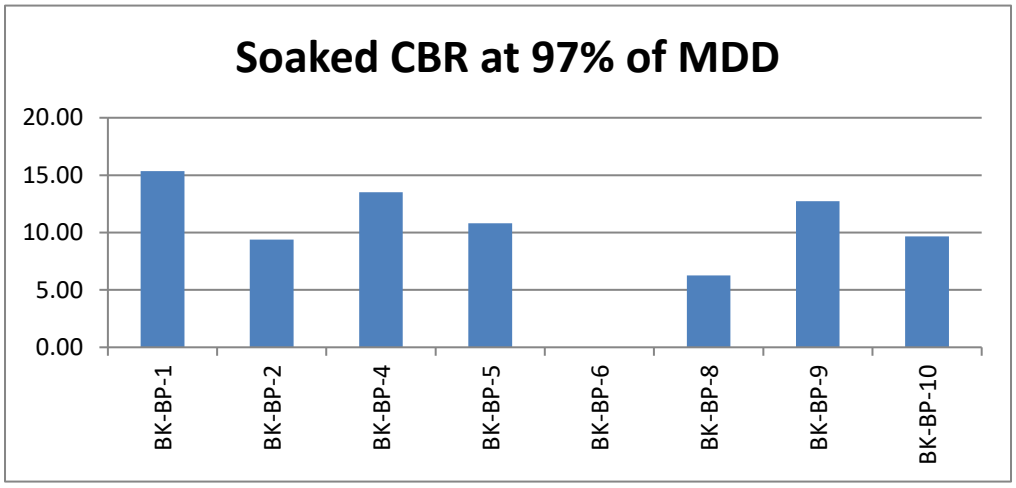
On whole, it can be concluded that the existing subgrade is in fair condition.

Table 19: Test Results of Barrow area Samples Details

Lab Sample No	Site Identification		Grain Size Analysis					Atterberg Limits (%)			Soil Class	MDD (gm/cc)	OMC (%)	Dry density At 97%	Soaked CBR 97% MDD	Free Swelling Index (%)
	Location (km)	Up/Dn	Percentage passing from					LL	PL	PI						
			4.75 mm IS	425 micIS	75 micIS	Gravel %	Sand %									
BK-BP-1	65+000	LHS	86.36	36.23	25.41	13.64	60.95	31	20	11	SC	2.10	11.30	2.04	15.35	13.04
BK-BP-2	40+300	LHS	75.21	43.65	31.02	24.79	44.19	41	26	15	SC	1.93	13.60	1.87	9.38	29.17
BK-BP-4	90+250	LHS	76.24	41.00	31.20	23.76	45.04	36	22	14	SC	2.02	11.20	1.96	13.50	23.81
BK-BP-5	97+750	LHS	75.56	44.65	32.13	24.44	43.43	42	27	15	SC	1.96	13.00	1.90	10.80	23.81
BK-BP-6	105+500	LHS	72.41	38.94	26.68	27.59	45.73	53	33	20	SC	1.60	21.00	1.55	NA	22.73

Lab Sample No	Site Identification		Grain Size Analysis					Atterberg Limits (%)			Soil Class	MDD (gm/cc)	OMC (%)	Dry density At 97%	Soaked CBR 97% MDD	Free Swelling Index (%)
	Location (km)	Up/Dn	Percentage passing from					LL	PL	PI						
			4.75 mm IS	425 mic IS	75 mic IS	Gravel %	Sand %									
BK-BP-8	141+900	LHS	68.69	37.43	32.51	31.31	36.18	44	30	14	SC	1.81	15.00	1.76	6.25	21.74
BK-BP-9	126+400	RHS	84.53	51.74	25.58	15.47	58.95	-	NP	NP	SM	2.11	10.30	2.05	12.74	10.00
BK-BP-10	156+000	RHS	71.01	38.02	24.19	28.99	46.82	37	23	14	SC	1.90	15.50	1.84	9.66	42.86





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 20: Test Results of Aggregate Samples Details

S. No	Sample	Location (km)	Up/Dn	A.I.V	Water Absorption	Specific Gravity
1	BK-AQ-1	74+600	LHS	8.56	0.19	2.89
2	BK-AQ-2	74+600	LHS	14.94	0.34	2.88
3	BK-AQ-3	90+200	LHS	12.32	0.28	2.88
4	BK-AQ-4	63+000	LHS	10.41	0.41	2.82
5	BK-AQ-5	63+000	LHS	9.60	0.24	2.80
6	BK-AQ-6	38+000	LHS	11.05	0.33	2.73
7	BK-AQ-7	143+600	LHS	11.66	0.33	2.77

Table 21: Test Results of Sand Samples Details

Sl 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	BK-SQ-1	50+400	LHS	100	85	61	30	9	1	1	4.13	NO ZONE
2	BK-SQ-2	62+350	LHS	100	95	87	65	30	6	1	3.17	ZONE-I
3	BK-SQ-3	62+350	LHS	100	84	68	50	36	15	1	3.46	NO ZONE
4	BK-SQ-4	174+500	RHS	100	90	78	52	29	8	1	3.41	ZONE-I
5	BK-SQ-5	95+200	LHS	100	96	88	71	45	11	1	2.89	ZONE-II

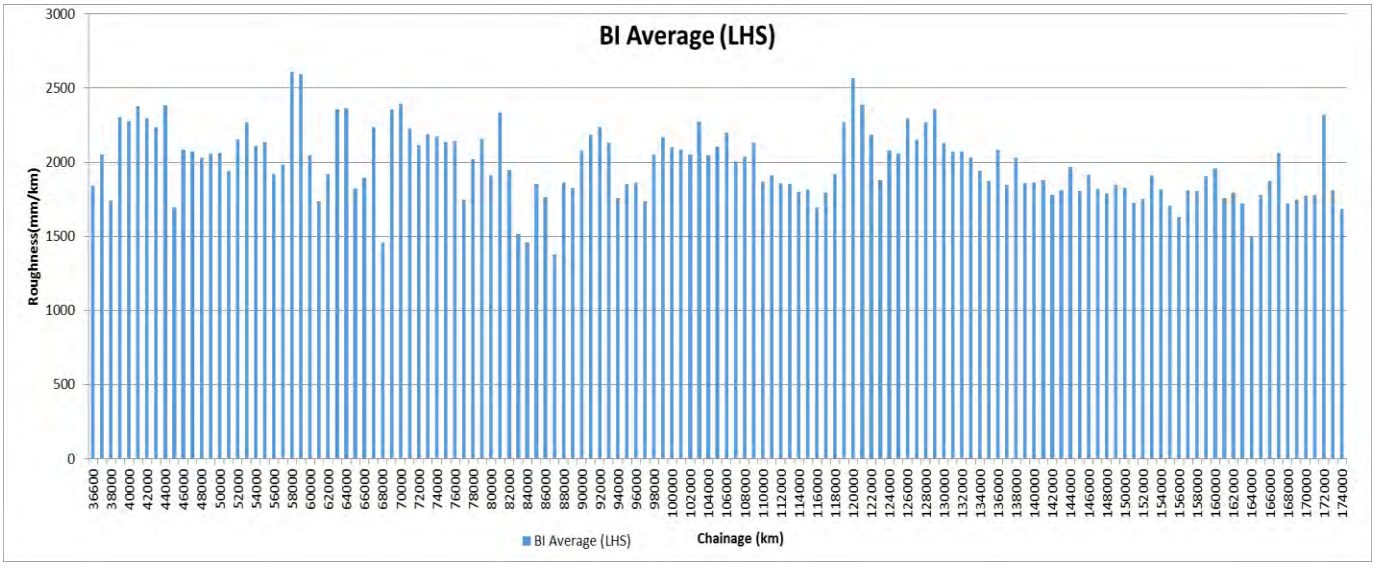
4.2 PAVEMENT CONDITION

The distresses in bituminous surface have been captured on the project corridor for each lane separately by NSV survey. Pavement Condition report covering the data collection for each km length in each direction has been presented in the Annexure-2.

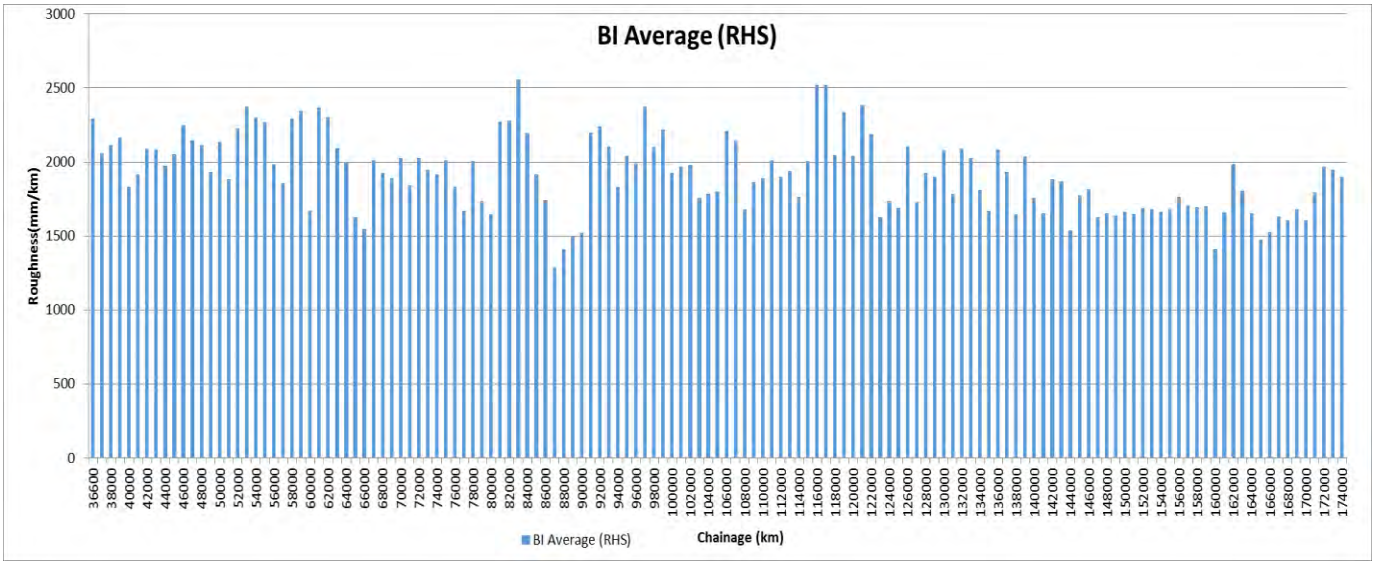
The project corridor has been provided with flexible pavement over entire length and even on service roads also. Rigid pavement is only provided at Toll Plaza. The present surface condition appears to be intact with major distresses like cracking, Raveling, Patching, Rutting, Shoving and Delamination.

4.3 ROUGHNESS

The roughness surveys conducted along the corridor indicate good riding quality over the length of project corridor. Bar diagrams showing the Kilometer wise roughness along the project road are presented below:



UI Avg (LHS)



UI Avg (RHS)

Almost entire project road is having good to Fair riding quality. From the above charts, 3km of both carriageway requires functional overlay as unevenness Index (UI) is greater than 2400 mm/km.

4.4 FWD ANALYSIS AND ASSESSMENT OF OVERLAY REQUIREMENT

The FWD data collected has been analyzed as per IRC guidelines and presented in the tables below.

Table 22: Summary of Design Moduli of different layers - LHS

Sl.No	Side	From	To	Length	15th Percentile MR values		
					MR for BT	MR for Granular	MR for Subgrade
SECTION - 1							
1	LHS	36.60	40.20	3.6	1385	249	77
2	LHS	40.20	43.00	2.8	1404	367	77
3	LHS	43.00	46.40	3.4	1426	135	67
4	LHS	46.40	49.00	2.6	1400	157	68
5	LHS	49.00	53.60	4.6	1398	253	77
6	LHS	53.60	57.60	4.0	1329	293	77
7	LHS	57.60	60.80	3.2	1314	255	77
8	LHS	60.80	63.60	2.8	1308	366	77
9	LHS	63.60	67.40	3.8	1260	104	77
10	LHS	67.40	69.40	2.0	1325	128	77
11	LHS	69.40	71.40	2.0	1323	155	77
12	LHS	71.40	74.80	3.4	1455	140	77
13	LHS	74.80	78.05	3.3	1491	160	77
14	LHS	78.05	82.00	3.9	1478	165	75
15	LHS	82.00	85.40	3.4	1479	120	77
16	LHS	85.40	88.60	3.2	1475	265	77
17	LHS	88.60	93.60	5.0	1440	195	77
18	LHS	93.60	100.80	7.2	1326	147	77
19	LHS	100.80	104.20	3.4	1170	89	59
20	LHS	104.20	106.80	2.6	1357	224	77
21	LHS	106.80	110.00	3.2	1157	80	77
22	LHS	110.00	113.00	3.0	1374	90	77
SECTION - 2							
23	LHS	113.00	115.40	2.4	1405	178	77
24	LHS	115.40	119.20	3.8	1275	85	77
25	LHS	119.20	123.00	3.8	1435	82	77
26	LHS	123.00	125.80	2.8	1456	343	77
27	LHS	125.80	128.60	2.8	1372	335	77
28	LHS	128.60	131.80	3.2	1413	301	77
29	LHS	131.80	134.80	3.0	1221	228	77
30	LHS	134.80	137.60	2.8	1305	364	77
31	LHS	137.60	140.20	2.6	1283	235	77
32	LHS	140.20	143.60	3.4	1310	359	77
33	LHS	143.60	146.80	3.2	1308	288	77
34	LHS	146.80	151.40	4.6	1265	255	77
35	LHS	151.40	154.40	3.0	1126	150	50
36	LHS	154.40	158.00	3.6	1154	192	77
37	LHS	158.00	161.00	3.0	1166	139	59
38	LHS	161.00	164.60	3.6	1173	195	75
39	LHS	164.60	167.60	3.0	1174	224	72
40	LHS	167.60	170.60	3.0	1315	273	77
41	LHS	170.60	174.60	4.0	1316	291	77

Table 23: Summary of Design Moduli of different layers - RHS

Sl.No	Side	From	To	Length	15th Percentile MR values		
					MR for BT	MR for Granular	MR for Subgrade
SECTION - 1							
1	RHS	36.60	38.60	2.0	758	145	77
2	RHS	38.60	42.80	4.2	1336	361	77
3	RHS	42.80	46.60	3.8	1321	311	73
4	RHS	46.60	49.20	2.6	1226	158	77
5	RHS	49.20	52.40	3.2	1308	367	77
6	RHS	52.40	58.00	5.6	1315	232	77
7	RHS	58.00	60.00	2.0	1149	229	77
8	RHS	60.00	63.60	3.6	1303	304	77
9	RHS	63.60	66.80	3.2	781	94	77
10	RHS	66.80	70.60	3.8	843	157	77
11	RHS	70.60	74.70	4.1	1516	161	77
12	RHS	74.70	78.40	3.7	1650	224	77
13	RHS	78.40	86.00	7.6	1343	142	77
14	RHS	86.00	90.20	4.2	1337	180	77
15	RHS	90.20	93.60	3.4	1378	313	77
16	RHS	93.60	97.80	4.2	1431	172	77
17	RHS	97.80	102.80	5.0	1440	145	77
18	RHS	102.80	107.60	4.8	1393	140	77
19	RHS	107.60	113.00	5.4	1399	153	77
SECTION - 2							
20	RHS	113.00	117.00	4.0	1426	134	76
21	RHS	117.00	119.60	2.6	1281	185	77
22	RHS	119.60	123.00	3.4	1290	144	77
23	RHS	123.00	125.20	2.2	1314	237	77
24	RHS	125.20	128.00	2.8	1307	365	77
25	RHS	128.00	129.20	1.2	1316	277	76
24	RHS	129.20	132.00	2.8	1289	234	77
25	RHS	132.00	137.60	5.6	1222	237	77
26	RHS	137.60	142.60	5.0	1182	324	77
27	RHS	142.60	146.80	4.2	1226	338	77
28	RHS	146.80	149.60	2.8	1192	258	77
29	RHS	149.60	153.00	3.4	877	173	69
30	RHS	153.00	155.40	2.4	973	146	77
31	RHS	155.40	160.20	4.8	1036	111	77
32	RHS	160.20	164.60	4.4	1270	102	77
33	RHS	164.60	167.00	2.4	1272	141	73
34	RHS	167.00	172.00	5.0	1282	202	77
35	RHS	172.00	174.60	2.6	1248	159	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 1126 Mpa to 1491 Mpa in LHS & 758 Mpa to 1650 Mpa in RHS Carriageway, however, the MR value of BT layer restricted to 3000 Mpa. The MR value for Granular Layers is 80 Mpa to 367 Mpa in LHS & 94 Mpa to 367 Mpa in RHS Carriageway. Similarly, the MR value for Subgrade Layer is 50 Mpa to 77 Mpa in LHS Carriageway and 69 Mpa to 77 Mpa in RHS Carriageway.

4.5 PAVEMENT COMPOSITION

The average Crust thickness for BT is 162mm, for Granular 213mm and the total crust average is 591mm which is obtained from test-pits.

4.6 CD STRUCTURES

The CD structures along the corridor are constructed appears to be as per the standards and specifications prevailing during execution. Presently, majority of structures appear new and seem to be in good condition without any major distress. Structure wise conditions along the project corridor are presented below:

Table 24: Summary of Structures

S. No	Type of Str	No. of Structure			Total No. of Structures	Total No. of Locations	Remarks
		LHS	RHS	BHS			
1	ROB	3	3	0	6	3	
2	MJB	8	8	0	16	8	
3	MNB	62	62	0	124	59	
4	Flyover	5	7	0	12	7	
5	VUP	2	2	0	4	2	
6	PUP	22	22	0	44	22	
7	FOB	0	0	1	1	1	
8	BC	0	0	30	30	30	
9	SC	0	0	10	10	10	
10	PC	0	0	96	96	96	

Table 25: Details of ROB

S. No	Skew (Yes/No)	Site Chainage (Km)	Type of Str	Side	Str on	Age of Str	Span (m)	Total Length (m)	Deck Width (m)	Carriage way Width (m)	Type of Foundation	Type of Substructure		Type of Superstructure	Type of Bearings	Type of Exp.Joints
												Abutment	Pier			
1	Yes	37+418	ROB	LHS	MCW	New	1 x 51.35	51.35	11.35	8.7	Not Visible	RCC Wall Type		Steel Girder	Pot PTFE	Strip Seal
2	Yes	37+418	ROB	RHS	MCW	New	1 x 51.35	51.35	11.35	9.8	Not Visible	RCC Wall Type		PSC Girder	Elastomeric	Strip Seal
3	No	76+371	ROB	LHS	MCW	New	2 x 14.3 + 1 x 30.40 + 1 x 14 + 14.3	87.30	13.75	9	Not Visible	RCC Wall Type	RCC Trestle Type	RCC Girder & Steel Girder	Pot PTFE	Strip Seal
4	No	76+371	ROB	RHS	MCW	New	2 x 14.3 + 1 x 30.40 + 1 x 14 + 14.3	87.30	13.75	9	Not Visible	RCC Wall Type	RCC Trestle Type	RCC Girder & Steel Girder	Pot PTFE	Strip Seal
5	Yes	173+522	ROB	LHS	MCW	New	1 x 22 + 1 x 10.4	32.40	12	9	Not Visible	RCC Wall Type	RCC Wall Type	PSC Girder & RCC Solid Slab	Pot PTFE & Elastomeric	Strip Seal
6	Yes	173+522	ROB	RHS	MCW	New	1 x 22 + 1 x 10.4	32.40	12	9	Not Visible	RCC Wall Type	RCC Wall Type	RCC Girder	Elastomeric	Strip Seal

Table 26: Details of Major Bridges

S. No.	Skew (Yes /No)	Site Chainage (Km)	Type of Str	Side	Str on	Age of Str	Span Arrangement (m)	Total Length (m)	Deck Width (m)	Carriage way Width (m)	Type of Foundation	Type of Substructure		Type of Superstructure	Type of Bearings	Type of Exp.Joints
												Abutment	Pier			
1	No	49+770	MJB	LHS	MCW	New	10 x 32.0	320.00	10.25	8.5	Not Visible	RCC Wall Type	RCC Wall Type	PSC Girder	Elastomeric	Strip Seal
2	No	49+770	MJB	RHS	MCW	New	10 x 32.0	320.00	10.25	8.5	Not Visible	RCC Wall Type	RCC Wall Type	PSC Girder	Elastomeric	Strip Seal
3	No	58+555	MJB	LHS	MCW	Old	2 x 13.2 + 2 x 36.8	100.00	11.25	7.5	Not Visible	RCC Wall Type	RCC Circular Type	PSC Box Girder & RCC Solid Slab	Elastomeric	Strip Seal
4	No	58+555	MJB	RHS	MCW	New	2 x 13.2 + 2 x 36.8	100.00	10.25	7.5	Not Visible	RCC Wall Type	RCC Circular Type	PSC Box Girder & RCC Solid Slab	Elastomeric	Strip Seal
5	No	79+520	MJB	LHS	MCW	Old	6 x 22.85 + 3 x 27.4	219.30	8.5	7.5	Not Visible	Stone Masonry Wall Type	Stone Masonry Wall Type	Arch Girder Type	Elastomeric	Strip Seal
6	No	79+520	MJB	RHS	MCW	New	6 x 22.85 + 3 x 27.4	219.30	12	9	Not Visible	RCC Wall Type	RCC Circular Type	PSC Girder	Pot PTFE	Strip Seal
7	No	80+154	MJB	LHS	MCW	Old	5 x 13.25	66.25	8.5	7.5	Not Visible	Stone Masonry Wall Type	Stone Masonry Wall Type	RCC Girder	Tar Paper	Filler Joint
8	No	80+154	MJB	RHS	MCW	New	5 x 13.25	66.25	12	9	Not Visible	RCC Wall Type	RCC Wall Type	RCC Solid Slab	Pot PTFE	Strip Seal
9		109+770	MJB	LHS	MCW	New	1 x 45.75 + 2 x 49.5 + 1 x 45.65	190.40	12	9	Pile	RCC Wall Type	RCC Wall Type	PSC Box Girder	Spherical	Strip Seal
10	No	109+770	MJB	RHS	MCW	Old	1 x 45.75 + 2 x 49.5 + 1 x 45.65	190.40	8.5	7.5	Well	RCC Wall Type	RCC Wall Type	PSC Girder	Rocker	Strip Seal

S. No.	Skew (Yes /No)	Site Chainage (Km)	Type of Str	Side	Str on	Age of Str	Span Arrangement (m)	Total Length (m)	Deck Width (m)	Carriage way Width (m)	Type of Foundation	Type of Substructure		Type of Superstructure	Type of Bearings	Type of Exp.Joints
												Abutment	Pier			
11	No	141+095	MJB	LHS	MCW	Old	3 x 21.5	64.50	12	11	Not Visible	RCC Wall Type	RCC Wall Type	RCC Girder	Elastomeric	Strip Seal
12	No	141+095	MJB	RHS	MCW	Old	3 x 21.5	64.50	12	11	Not Visible	RCC Wall Type	RCC Wall Type	RCC Girder	Elastomeric	Strip Seal
13	Yes	149+640	MJB	LHS	MCW	Old	6 x 21.6	129.60	10.5	7.5	Open	RCC Wall Type	RCC Wall Type	RCC Girder	Elastomeric	Strip Seal
14	Yes	149+640	MJB	RHS	MCW	New	6 x 21.6	129.60	12	11	Open	RCC Wall Type	RCC Wall Type	RCC Girder	Elastomeric	Strip Seal
15	No	160+337	MJB	LHS	MCW	New	4 x 19	76.00	12	9	Not Visible	RCC Wall Type	RCC Circular Type	RCC Girder	Elastomeric	Strip Seal
16	No	160+337	MJB	RHS	MCW	New	4 x 19	76.00	12	9	Not Visible	RCC Wall Type	RCC Circular Type	RCC Girder	Elastomeric	Strip Seal

Table 27: Details of Minor Bridges

S. No.	Skew (Yes /No)	Site Chainage (Km)	Type of Str	Side	Str on	Age of Str	Span Arrangement (m)	Total Length (m)	Deck Width (m)	Carriage way Width (m)	Type of Foundation	Type of Substructure		Type of Superstructure	Type of Bearings	Type of Exp.Joints
												Abutment	Pier			
1	No	41+792	MNB	LHS	MCW	New	1 x 8.5	8.50	12	8.75	Not Visible	RCC Wall Type	-	RCC Solid Slab	-	-
2	No	41+792	MNB	RHS	MCW	Old	1 x 8.5	8.50	12	8.75	Not Visible	RCC Wall Type	-	RCC Solid Slab	-	-
3	No	43+526	MNB	LHS	MCW	New	1 x 10.40	10.40	12	8.75	Not Visible	RCC Wall Type	-	RCC Solid Slab	-	-
4	No	43+526	MNB	RHS	MCW	Old	3 x 3.4	10.40	12	8.75	Not Visible	RCC Wall Type	RCC Wall Type	RCC Solid Slab	-	-
5	No	45+414	MNB	LHS	MCW	Old	1 x 6.5	6.50	12	8.75	Not Visible	RCC Wall Type	-	RCC Solid Slab	-	-
6	No	45+414	MNB	RHS	MCW	Old	1 x 6.5	6.50	12	8.75	Not Visible	RCC Wall Type	-	RCC Solid Slab	-	-
7	No	46+391	MNB	LHS	MCW	New	1 x 7.5	7.50	12	8.75	Not Visible	RCC Wall Type	-	RCC Solid Slab	-	-
8	No	46+391	MNB	RHS	MCW	New	1 x 7.5	7.50	12	8.75	Not Visible	RCC Wall Type	-	RCC Solid Slab	-	-
9	No	48+015	MNB	LHS	MCW	Old	3 x 4.5	10.36	12	8.75	Not Visible	RCC Wall Type	RCC Wall Type	RCC Solid Slab	-	-
10	No	48+015	MNB	RHS	MCW	New	1 x 10.36	10.36	12	8.75	Not Visible	RCC Wall Type	RCC Wall Type	RCC Solid Slab	-	-
11	No	51+539	MNB	LHS	MCW	Old	1 x 8.9	8.90	12	8.75	Not Visible	RCC Wall Type	-	RCC Solid Slab	-	-
12	No	51+539	MNB	RHS	MCW	New	1 x 8.9	8.90	12	8.75	Not Visible	RCC Wall Type	-	RCC Solid Slab	-	-

S. No.	Skew (Yes /No)	Site Chainage (Km)	Type of Str	Side	Str on	Age of Str	Span Arrangement (m)	Total Length (m)	Deck Width (m)	Carriage way Width (m)	Type of Foundation	Type of Substructure		Type of Superstructure	Type of Bearings	Type of Exp.Joints
												Abutment	Pier			
13	No	53+653	MNB	LHS	MCW	Old	1 x 6.2	6.20	12	8.75	Not Visible	RCC Wall Type	-	RCC Solid Slab	-	-
14	No	53+653	MNB	RHS	MCW	New	1 x 6.2	6.20	12	8.75	Not Visible	RCC Wall Type	-	RCC Solid Slab	-	-
15	No	55+792	MNB	LHS	MCW	Old	1 x 8.75	8.75	12	8.75	Not Visible	Stone Masonry Wall Type	Stone Masonry Wall Type	RCC Solid Slab	-	-
16	No	55+792	MNB	RHS	MCW	New	3 x 2.91	8.75	12	8.75	Not Visible	RCC Wall Type	RCC Wall Type	RCC Solid Slab	-	-
17	No	57+272	MNB	LHS	MCW	Old	1 x 9.16	9.16	12	8.75	Not Visible	RCC Wall Type	-	RCC Solid Slab	-	-
18	No	57+272	MNB	RHS	MCW	Old	1 x 9.16	9.16	12	8.75	Not Visible	RCC Wall Type	-	RCC Solid Slab	-	-
19	No	59+945	MNB	LHS	MCW	Old	5 x 6.7	33.50	12	9.3	Not Visible	RCC Wall Type	RCC Wall Type	RCC Solid Slab	-	-
20	No	59+945	MNB	RHS	MCW	Old	5 x 6.7	33.50	12	9.3	Not Visible	RCC Wall Type	RCC Wall Type	RCC Solid Slab	-	-
21	No	60+623	MNB	LHS	MCW	Old	1 x 4.8	5.80	12	9.3	Not Visible	RCC Wall Type	-	RCC Solid Slab	-	-
22	No	60+623	MNB	RHS	MCW	Old	1 x 4.8	5.80	12	9.3	Not Visible	RCC Wall Type	-	RCC Solid Slab	-	-
23	No	61+126	MNB	LHS	MCW	Old	1 x 9.94	10.00	12	9.3	Not Visible	RCC Wall Type	-	RCC Solid Slab	-	-
24	No	61+126	MNB	RHS	MCW	Old	1 x 9.94	10.00	12	9.3	Not Visible	RCC Wall Type	-	RCC Solid Slab	-	-

S. No.	Skew (Yes /No)	Site Chainage (Km)	Type of Str	Side	Str on	Age of Str	Span Arrangement (m)	Total Length (m)	Deck Width (m)	Carriage way Width (m)	Type of Foundation	Type of Substructure		Type of Superstructure	Type of Bearings	Type of Exp.Joints
												Abutment	Pier			
25	No	65+875	MNB	LHS	MCW	Old	3 x 12.10	36.30	13	9.3	Not Visible	RCC Wall Type	RCC Wall Type	RCC Girder	Elastomeric	-
26	No	65+875	MNB	RHS	MCW	New	3 x 12.10	36.30	13	9.3	Not Visible	RCC Wall Type	RCC Wall Type	RCC Solid Slab	Pot PTFE	-
27	No	67+289	MNB	LHS	SR	New	1 x 6	7.00	9	8	Raft	RCC Box	-	RCC Box	-	-
28	No	67+289	MNB	LHS	MCW	New	1 x 6	7.00	12.65	11.75	Raft	RCC Box	-	RCC Box	-	-
29	No	67+289	MNB	RHS	MCW	New	1 x 6	7.00	12.65	11.75	Raft	RCC Box	-	RCC Box	-	-
30	No	67+289	MNB	RHS	SR	New	1 x 6	7.00	9	8	Raft	RCC Box	-	RCC Box	-	-
31	No	68+684	MNB	LHS	MCW	New	1 x 6.26	6.26	12	11	Raft	RCC Box	-	RCC Box	-	-
32	No	68+684	MNB	RHS	MCW	Old	1 x 6.26	6.26	12	11	Raft	RCC Box	-	RCC Box	-	-
33	Yes	70+360	MNB	LHS	MCW	New	1 x 9.2	9.20	12	10.5	Not Visible	RCC Wall Type	-	RCC Solid Slab	Elastomeric	-
34	Yes	70+360	MNB	RHS	MCW	New	1 x 9.2	9.20	12	10.5	Not Visible	RCC Wall Type	-	RCC Solid Slab	Elastomeric	-
35	No	78+075	MNB	LHS	SR	New	1 x 3.2	4.00	9	8	Not Visible	RCC Box	-	RCC Box	-	-
36	No	78+075	MNB	LHS	MCW	New	1 x 3.2	4.00	13.5	12.5	Not Visible	RCC Box	-	RCC Box	-	-
37	No	78+075	MNB	RHS	MCW	New	1 x 3.2	4.00	13.5	12.5	Not Visible	RCC Box	-	RCC Box	-	-
38	No	78+075	MNB	RHS	SR	New	1 x 3.2	4.00	9	8	Not Visible	RCC Box	-	RCC Box	-	-
39	No	81+809	MNB	LHS	MCW	Old	2 x 4.86	9.72	12	9.3	Not Visible	RCC Wall Type	RCC Wall Type	RCC Solid Slab	-	-
40	No	81+809	MNB	RHS	MCW	New	2 x 4.86	9.72	12	9.3	Not Visible	RCC Wall Type	RCC Wall Type	RCC Solid Slab	Elastomeric	-
41	No	84+736	MNB	LHS	MCW	Old	4 x 8.3	33.20	12	11	Not Visible	Stone Masonry Wall Type	Stone Masonry Wall Type	RCC Solid Slab	-	-

S. No.	Skew (Yes /No)	Site Chainage (Km)	Type of Str	Side	Str on	Age of Str	Span Arrangement (m)	Total Length (m)	Deck Width (m)	Carriage way Width (m)	Type of Foundation	Type of Substructure		Type of Superstructure	Type of Bearings	Type of Exp.Joints
												Abutment	Pier			
42	No	84+736	MNB	RHS	MCW	New	4 x 8.3	33.20	12	11	Not Visible	RCC Wall Type	RCC Wall Type	RCC Solid Slab	POT PTFE	Strip Seal
43	No	87+304	MNB	LHS	MCW	New	1 x 5	6.20	12	11	Raft	RCC Box	-	RCC Box	-	-
44	No	87+304	MNB	RHS	MCW	New	1 x 5	6.20	12	11	Raft	RCC Box	-	RCC Box	-	-
45	No	89+076	MNB	LHS	MCW	New	1 x 10.0	11.40	12	11	Raft	RCC Box	-	RCC Box	-	-
46	No	89+076	MNB	RHS	MCW	New	1 x 10.0	11.40	12	11	Raft	RCC Box	-	RCC Box	-	-
47	No	89+358	MNB	LHS	MCW	New	3 x 13.7	41.10	12	9	Not Visible	RCC Wall Type	RCC Wall Type	RCC Solid Slab	Pot PTFE	Strip Seal
48	No	89+358	MNB	RHS	MCW	Old	3 x 13.7	41.10	12	9	Not Visible	Stone Masonry Wall Type	Stone Masonry Wall Type	RCC Girder	Elastomeric	Strip Seal
49	No	94+486	MNB	LHS	SR	New	1 x 8	8.00	8.00	7	Not Visible	RCC Wall Type	-	RCC Solid Slab	-	-
50	No	94+486	MNB	LHS	MCW	New	1 x 8	8.00	10.88	9.3	Not Visible	RCC Wall Type	-	RCC Solid Slab	-	-
51	No	94+486	MNB	RHS	MCW	New	1 x 8	8.00	10.88	9.3	Not Visible	RCC Wall Type	-	RCC Solid Slab	-	-
52	No	94+486	MNB	RHS	SR	New	1 x 8	8.00	8.00	7	Not Visible	RCC Wall Type	-	RCC Solid Slab	-	-
53	No	98+084	MNB	LHS	MCW	New	1 x 6.0	6.80	12	9.3	Raft	RCC Box	-	RCC Box	-	-
54	No	98+084	MNB	RHS	MCW	New	1 x 6.0	6.80	12	9.3	Raft	RCC Box	-	RCC Box	-	-
55	No	98+492	MNB	LHS	MCW	New	1 x 6.0	6.80	12	9.3	Raft	RCC Box	-	RCC Box	-	-
56	No	98+492	MNB	RHS	MCW	New	1 x 6.0	6.80	12	9.3	Raft	RCC Box	-	RCC Box	-	-
57	No	100+920	MNB	LHS	MCW	New	1 x 21.30	21.30	12	9	Not Visible	RCC Wall Type	-	RCC Solid Slab	Elastomeric	Strip Seal

S. No.	Skew (Yes /No)	Site Chainage (Km)	Type of Str	Side	Str on	Age of Str	Span Arrangement (m)	Total Length (m)	Deck Width (m)	Carriage way Width (m)	Type of Foundation	Type of Substructure		Type of Superstructure	Type of Bearings	Type of Exp.Joints
												Abutment	Pier			
58	No	100+920	MNB	RHS	MCW	New	1 x 21.30	21.30	12	9	Not Visible	RCC Wall Type	-	RCC Solid Slab	Elastomeric	Strip Seal
59	No	102+837	MNB	LHS	MCW	New	1 x 6.0	7.50	12	9	Raft	RCC Box	-	RCC Box	-	-
60	No	102+837	MNB	RHS	MCW	New	1 x 6.0	7.50	12	9	Raft	RCC Box	-	RCC Box	-	-
61	No	103+687	MNB	LHS	MCW	New	1 x 15 + 1 x 14.4 + 1 x 15	44.40	12	9	Not Visible	RCC Wall type	RCC Wall type	RCC Solid Slab	Elastomeric	Strip Seal
62	No	103+687	MNB	RHS	MCW	New	1 x 15 + 1 x 14.4 + 1 x 15	44.40	12	9	Not Visible	RCC Wall type	RCC Wall type	RCC Solid Slab	Elastomeric	Strip Seal
63	No	106+505	MNB	LHS	MCW	New	3 x 18.7	56.10	12	9	Not Visible	RCC Wall type	RCC Wall type	RCC Solid Slab	Elastomeric	Strip Seal
64	No	106+505	MNB	RHS	MCW	New	3 x 18.7	56.10	12	9	Not Visible	RCC Wall type	RCC Wall type	RCC Solid Slab	Elastomeric	Strip Seal
65	No	110+655	MNB	LHS	MCW	New	1 x 5.6	5.60	12	9	Raft	RCC Box	-	RCC Box	-	-
66	No	110+655	MNB	RHS	MCW	New	1 x 5.6	5.60	12	9	Raft	RCC Box	-	RCC Box	-	-
67	No	111+690	MNB	LHS	MCW	New	3 x 13.6	40.80	12	9	Not Visible	RCC Wall type	RCC Wall type	RCC Solid Slab	Elastomeric	Strip Seal
68	No	111+690	MNB	RHS	MCW	Old	3 x 13.6	40.80	12	9	Not Visible	Stone Masonry Wall Type	Stone Masonry Wall Type	RCC Girder	Elastomeric	Strip Seal
69	No	113+913	MNB	LHS	MCW	New	3 x 3.0	10.80	12	9	Raft	RCC Box	RCC Box	RCC Box	-	-
70	No	113+913	MNB	RHS	MCW	New	3 x 3.0	10.80	12	9	Raft	RCC Box	RCC Box	RCC Box	-	-
71	No	114+928	MNB	LHS	MCW	New	3 x 18	54.00	12	9	Not Visible	RCC Wall type	RCC Wall type	Voided slab	Elastomeric	Strip Seal
72	No	114+928	MNB	RHS	MCW	New	3 x 18	54.00	12	9	Not Visible	RCC Wall type	RCC Wall type	Voided slab	Elastomeric	Strip Seal

S. No.	Skew (Yes /No)	Site Chainage (Km)	Type of Str	Side	Str on	Age of Str	Span Arrangement (m)	Total Length (m)	Deck Width (m)	Carriage way Width (m)	Type of Foundation	Type of Substructure		Type of Superstructure	Type of Bearings	Type of Exp.Joints
												Abutment	Pier			
73	No	118+280	MNB	LHS	MCW	New	2 x 7	14.00	12	9	Not Visible	RCC Wall type	RCC Wall type	RCC Solid Slab	-	-
74	No	118+280	MNB	RHS	MCW	New	2 x 7	14.00	12	9	Not Visible	RCC Wall type	RCC Wall type	RCC Solid Slab	-	-
75	No	123+310	MNB	LHS	MCW	New	1 x 24.70	24.70	12	11	Not Visible	RCC Wall type	-	PSC Girder	Elastomeric	Strip Seal
76	No	123+310	MNB	RHS	MCW	New	1 x 24.70	24.70	12	11	Not Visible	RCC Wall type	-	PSC Girder	Elastomeric	Strip Seal
77	No	124+278	MNB	LHS	MCW	New	1 x 12.6	12.6	12	11	Not Visible	RCC Wall Type	-	RCC Girder	Elastomeric	Strip seal
78	No	124+278	MNB	RHS	MCW	New	1 x 12.6	12.6	12	11	Not Visible	RCC Wall Type	-	RCC Girder	Elastomeric	Strip seal
79	No	128+640	MNB	LHS	MCW	New	2 x 17	34.00	12	11	Not Visible	RCC Wall Type	RCC Wall Type	RCC Girder	Elastomeric	Strip seal
80	No	128+640	MNB	RHS	MCW	New	2 x 17	34.00	12	11	Not Visible	RCC Wall Type	RCC Wall Type	RCC Girder	Elastomeric	Strip seal
81	No	129+257	MNB	LHS	MCW	New	1 x 9.5	9.50	12	11	Not Visible	RCC Wall Type	-	RCC Solid Slab	-	-
82	No	129+257	MNB	RHS	MCW	New	1 x 9.5	9.50	12	11	Not Visible	RCC Wall Type	-	RCC Solid Slab	-	-
83	No	129+875	MNB	LHS	MCW	New	1 x 9.5	9.50	12	11	Not Visible	RCC Wall Type	-	RCC Solid Slab	-	-
84	No	129+875	MNB	RHS	MCW	New	1 x 9.5	9.50	12	11	Not Visible	RCC Wall Type	-	RCC Solid Slab	-	-
85	No	134+150	MNB	LHS	MCW	New	2 x 17	34.00	12	11	Not Visible	RCC Wall Type	RCC Wall Type	RCC Girder	Elastomeric	Strip seal

S. No.	Skew (Yes /No)	Site Chainage (Km)	Type of Str	Side	Str on	Age of Str	Span Arrangement (m)	Total Length (m)	Deck Width (m)	Carriage way Width (m)	Type of Foundation	Type of Substructure		Type of Superstructure	Type of Bearings	Type of Exp.Joints
												Abutment	Pier			
86	No	134+150	MNB	RHS	MCW	New	2 x 17	34.00	12	11	Not Visible	RCC Wall Type	RCC Wall Type	RCC Girder	Elastomeric	Strip seal
87	No	137+685	MNB	LHS	MCW	Old	4 x 7.5	30.00	12	11	Not Visible	Stone masonry wall type	Stone masonry wall type	RCC Solid Slab	-	-
88	No	137+685	MNB	RHS	MCW	New	2 x 15	30.00	12	11	Not Visible	RCC Wall Type	RCC Wall Type	RCC Girder	Elastomeric	Strip seal
89	No	141+000	MNB	LHS	MCW	New	1 x 21.70	21.70	12	11	Not Visible	RCC Wall Type	-	RCC Girder	Elastomeric	Strip seal
90	No	141+000	MNB	RHS	MCW	New	1 x 21.70	21.70	12	11	Not Visible	RCC Wall Type	-	RCC Girder	Elastomeric	Strip seal
91	No	141+970	MNB	LHS	MCW	New	1 x 17	17.00	12	11	Not Visible	RCC Wall Type	-	RCC Girder	Elastomeric	Strip seal
92	No	141+970	MNB	RHS	MCW	New	1 x 17	17.00	12	11	Not Visible	RCC Wall Type	-	RCC Girder	Elastomeric	Strip seal
93	No	142+410	MNB	LHS	MCW	New	1 x 12	12.00	12	11	Not Visible	RCC Wall Type	-	RCC Girder	Elastomeric	Strip seal
94	No	142+410	MNB	RHS	MCW	New	1 x 12	12.00	12	11	Not Visible	RCC Wall Type	-	RCC Girder	Elastomeric	Strip seal
95	No	145+290	MNB	LHS	MCW	New	2 x 17.5	35.00	12	11	Not Visible	RCC Wall Type	RCC Wall Type	RCC Girder	Elastomeric	Strip seal
96	No	145+290	MNB	RHS	MCW	New	2 x 17.5	35.00	12	11	Not Visible	RCC Wall Type	RCC Wall Type	RCC Girder	Elastomeric	Strip seal
97	No	151+235	MNB	LHS	MCW	New	1 x 21.70	21.70	12	11	Not Visible	RCC Wall Type	-	RCC Girder	Elastomeric	Strip seal

S. No.	Skew (Yes /No)	Site Chainage (Km)	Type of Str	Side	Str on	Age of Str	Span Arrangement (m)	Total Length (m)	Deck Width (m)	Carriage way Width (m)	Type of Foundation	Type of Substructure		Type of Superstructure	Type of Bearings	Type of Exp.Joints
												Abutment	Pier			
98	Yes	151+235	MNB	RHS	MCW	Old	3 x 7.30	21.90	12	11	Not Visible	Stone masonry wall type	Stone masonry wall type	RCC Solid Slab	-	-
99	Yes	152+298	MNB	LHS	MCW	Old	2 x 6	12.00	12	11	Open	RCC Wall Type	RCC Wall Type	RCC Solid Slab	-	-
100	Yes	152+298	MNB	RHS	MCW	New	2 x 6	12.00	12	11	Raft	RCC Box	-	RCC Box	-	-
101	No	154+683	MNB	LHS	MCW	Old	3 x 9	27.00	12	11	Open	RCC Wall Type	RCC Wall Type	RCC Solid Slab	-	-
102	No	154+683	MNB	RHS	MCW	New	3 x 9	27.00	12	11	Open	RCC Wall Type	RCC Wall Type	RCC Solid Slab	-	-
103	No	157+161	MNB	LHS	MCW	Old	3 x 8.5	25.50	12	11	Open	RCC Wall Type	RCC Wall Type	RCC Solid Slab	-	-
104	No	157+161	MNB	RHS	MCW	New	3 x 8.5	25.50	12	11	Open	RCC Wall Type	RCC Wall Type	RCC Solid Slab	-	-
105	No	158+704	MNB	LHS	MCW	Old	3 x 8.70	26.10	12	11	Open	RCC Wall Type	RCC Wall Type	RCC Solid Slab	-	-
106	No	158+704	MNB	RHS	MCW	New	3 x 8.70	26.10	12	11	Open	RCC Wall Type	RCC Wall Type	RCC Solid Slab	-	-
107	No	162+091	MNB	LHS	MCW	Old	3 x 5.30	15.90	12	11	Open	Stone masonry wall type	Stone masonry wall type	RCC Solid Slab	-	-
108	No	162+091	MNB	RHS	MCW	New	3 x 5.30	15.90	12	11	Open	RCC Wall Type	RCC Wall Type	RCC Solid Slab	-	-
109	No	162+724	MNB	LHS	MCW	New	1 x 20	20.00	12	11	Not Visible	RCC Wall Type	-	RCC Girder	Elastomeric	Strip seal

S. No.	Skew (Yes /No)	Site Chainage (Km)	Type of Str	Side	Str on	Age of Str	Span Arrangement (m)	Total Length (m)	Deck Width (m)	Carriage way Width (m)	Type of Foundation	Type of Substructure		Type of Superstructure	Type of Bearings	Type of Exp.Joints
												Abutment	Pier			
110	No	162+724	MNB	RHS	MCW	New	1 x 20	20.00	12	11	Not Visible	RCC Wall Type	-	RCC Girder	Elastomeric	Strip seal
111	No	164+567	MNB	LHS	MCW	New	2 x 3.5	7.00	12	11	Raft	RCC Box	-	RCC Box	-	-
112	No	164+567	MNB	RHS	MCW	New	2 x 3.5	7.00	12	11	Raft	RCC Box	-	RCC Box	-	-
113	No	165+169	MNB	LHS	MCW	Old	4 x 8.5	34.00	12	11	Open	Stone masonry wall type	Stone masonry wall type	RCC Solid Slab	-	-
114	No	165+169	MNB	RHS	MCW	New	4 x 8.5	34.00	12	11	Open	RCC Wall Type	RCC Wall Type	RCC Solid Slab	-	-
115	No	166+147	MNB	LHS	MCW	New	1 x 17	17.00	12	9	Not Visible	RCC Wall Type	-	RCC Girder	Elastomeric	Strip seal
116	No	166+147	MNB	RHS	MCW	New	1 x 17	17.00	12	9	Not Visible	RCC Wall Type	-	RCC Girder	Elastomeric	Strip seal
117	No	169+143	MNB	LHS	MCW	New	1 x 17	17.00	12	9	Not Visible	RCC Wall Type	-	RCC Girder	Elastomeric	Strip seal
118	No	169+143	MNB	RHS	MCW	New	1 x 17	17.00	12	9	Not Visible	RCC Wall Type	-	RCC Girder	Elastomeric	Strip seal
119	No	170+504	MNB	LHS	MCW	Old	1 x 6.6	6.60	12	10	Open	Stone masonry wall type	-	RCC Solid Slab	-	-
120	No	170+504	MNB	RHS	MCW	Old	1 x 6.6	6.60	12	10	Open	RCC Wall Type	-	RCC Solid Slab	-	-
121	No	172+883	MNB	LHS	MCW	New	2 x 7.5	15.00	12	11	Open	RCC Wall Type	RCC Wall Type	RCC Solid Slab	-	-
122	No	172+883	MNB	RHS	MCW	New	2 x 7.5	15.00	12	11	Open	RCC Wall Type	RCC Wall Type	RCC Solid Slab	-	-

S. No.	Skew (Yes /No)	Site Chainage (Km)	Type of Str	Side	Str on	Age of Str	Span Arrangement (m)	Total Length (m)	Deck Width (m)	Carriage way Width (m)	Type of Foundation	Type of Substructure		Type of Superstructure	Type of Bearings	Type of Exp.Joints
												Abutment	Pier			
123	Yes	174+626	MNB	LHS	MCW	Old	2 x 8	16.00	12	11	Not Visible	RCC Wall Type	RCC Wall Type	RCC Solid Slab	-	-
124	Yes	174+626	MNB	RHS	MCW	New	2 x 8	16.00	12	11	Not Visible	RCC Wall Type	RCC Wall Type	RCC Solid Slab	-	-

Table 28: Details of Flyover

S. No.	Skew (Yes /No)	Site Chainage (Km)	Type of Str	Side	Stron	Age of Str	Span Arrangement (m)	Total Length (m)	Deck Width (m)	Carriage way Width (m)	Type of Foundation	Type of Substructure		Type of Superstructure	Type of Bearings	Type of Exp.Joints
												Abutment	Pier			
1	No	74+493	Flyover	LHS	MCW	New	1 x 15 + 1 x 25 + 1 x 15	55.00	12	9	Not Visible	RCC Wall Type	RCC Wall Type	Voided Slab	Pot PTFE	Strip Seal
2	No	74+493	Flyover	RHS	MCW	New	1 x 15 + 1 x 25 + 1 x 15	55.00	12	9	Not Visible	RCC Wall Type	RCC Wall Type	Voided Slab	Pot PTFE	Strip Seal
3	No	77+855	Flyover	LHS	MCW	New	6 x 30 + 1 x 45 + 8 x 30 + 2 x 45	555.00	13.75	12.75	Not Visible	RCC Trestle Type	RCC Trestle Type	PSC Girder	Pot PTFE	Strip Seal
4	No	77+855	Flyover	RHS	MCW	New	6 x 30 + 1 x 45 + 8 x 30 + 2 x 45	555.00	13.75	12.75	Not Visible	RCC Trestle Type	RCC Trestle Type	PSC Girder	Pot PTFE	Strip Seal
5	No	79+868	Flyover	RHS	MCW	New	1 x 15 + 1 x 25 + 1 x 15	55.00	12	9	Not Visible	RCC Wall Type	RCC Wall Type	Voided Slab	Pot PTFE	Strip Seal
6	No	113+081	Flyover	LHS	MCW	New	12.615 + 30 + 12.615	55.23	12	9	Not Visible	RCC Wall Type	RCC Wall Type	RCC Solid Slab & PSC Girder	Elastomeric	Strip Seal
7	No	113+081	Flyover	RHS	MCW	New	12.615 + 30 + 12.615	55.23	12	9	Not Visible	RCC Wall Type	RCC Wall Type	RCC Solid Slab & PSC Girder	Elastomeric	Strip Seal
8	No	132+670	Flyover	LHS	MCW	New	1 x 15.5 + 1 x 32 + 1 x 15.5	63.00	12	11	Not Visible	RCC Wall Type	RCC Wall Type	RCC Girder & PSC Girder	Elastomeric	Strip Seal
9	No	132+670	Flyover	RHS	MCW	New	1 x 15.5 + 1 x 32 + 1 x 15.5	63.00	12	11	Not Visible	RCC Wall Type	RCC Wall Type	RCC Girder & PSC Girder	Elastomeric	Strip Seal
10	No	139+465	Flyover	RHS	MCW	New	1 x 15.5 + 1 x 32 + 1 x 15.5	63.00	12	11	Not Visible	RCC Wall Type	RCC Wall Type	RCC Girder & PSC Girder	Elastomeric	Strip Seal
11	No	169+640	Flyover	LHS	MCW	New	1 x 15 + 1 x 20 + 1 x 15	50.00	12	9	Not Visible	RCC Wall Type	RCC Wall Type	RCC Girder	Elastomeric	Strip Seal

S. No.	Skew (Yes /No)	Site Chainage (Km)	Type of Str	Side	Str on	Age of Str	Span Arrangement (m)	Total Length (m)	Deck Width (m)	Carriage way Width (m)	Type of Foundation	Type of Substructure		Type of Superstructure	Type of Bearings	Type of Exp.Joints
												Abutment	Pier			
12	No	169+640	Flyover	RHS	MCW	New	1 x 15 + 1 x 20 + 1 x 15	50.00	12	9	Not Visible	RCC Wall Type	RCC Wall Type	RCC Girder	Elastomeric	Strip Seal

Table 29: **Details of VUP's**

S.No.	Skew (Yes /No)	Site Chainage (Km)	Type of Structure	Side	Str on	Age of Str	Span Arrangement (m)	Total Length (m)	Deck Width (m)	Carriage way Width (m)	Type of Foundation	Type of Substructure		Type of Superstructure
												Abutment	Pier	
1	No	112+870	VUP	LHS	MCW	New	1 x 12.0	13.70	13.75	9	Raft	RCC Box		
2	No	112+870	VUP	RHS	MCW	New	1 x 12.0	13.70	13.75	9	Raft	RCC Box		
3	No	113+230	VUP	LHS	MCW	New	1 x 12.0	13.70	13.75	9	Raft	RCC Box		
4	No	113+230	VUP	RHS	MCW	New	1 x 12.0	13.70	13.75	9	Raft	RCC Box		

Table 30: **Details of PUP's**

S.No.	Skew (Yes/No)	Site Chainage (Km)	Type of Structure	Side	Str on	Age of Str	Span Arrangement (m)	Total Length (m)	Deck Width (m)	Carriage way Width (m)	Type of Foundation	Type of Superstructure
1	No	67+095	PUP	LHS	MCW	New	1 x 6	7.00	13.7	9.3	Raft	RCC Box
2	No	67+095	PUP	RHS	MCW	New	1 x 6	7.00	13.7	9.3	Raft	RCC Box
3	No	74+292	PUP	LHS	MCW	New	1 x 6	7.20	13.75	11	Raft	RCC Box
4	No	74+292	PUP	RHS	MCW	New	1 x 6	7.20	13.75	11	Raft	RCC Box
5	No	74+732	PUP	LHS	MCW	New	1 x 6	7.20	13.5	11	Raft	RCC Box
6	No	74+732	PUP	RHS	MCW	New	1 x 6	7.20	13.5	11	Raft	RCC Box
7	No	76+117	PUP	LHS	MCW	New	1 x 6	7.20	13.75	11	Raft	RCC Box
8	No	76+117	PUP	RHS	MCW	New	1 x 6	7.20	13.75	11	Raft	RCC Box
9	No	76+635	PUP	LHS	MCW	New	1 x 6	7.20	13.75	11	Raft	RCC Box
10	No	76+635	PUP	RHS	MCW	New	1 x 6	7.20	13.75	11	Raft	RCC Box
11	No	82+717	PUP	LHS	MCW	New	1 x 6	7.00	13.75	11	Raft	RCC Box
12	No	82+717	PUP	RHS	MCW	New	1 x 6	7.00	13.75	11	Raft	RCC Box

S.No.	Skew (Yes/No)	Site Chainage (Km)	Type of Structure	Side	Str on	Age of Str	Span Arrangement (m)	Total Length (m)	Deck Width (m)	Carriage way Width (m)	Type of Foundation	Type of Superstructure
13	No	84+996	PUP	LHS	MCW	New	1 x 6	7.00	13.75	11	Raft	RCC Box
14	No	84+996	PUP	RHS	MCW	New	1 x 6	7.00	13.75	11	Raft	RCC Box
15	No	90+005	PUP	LHS	MCW	New	1 x 6	7.20	13.75	11	Raft	RCC Box
16	No	90+005	PUP	RHS	MCW	New	1 x 6	7.20	13.75	11	Raft	RCC Box
17	No	94+350	PUP	LHS	MCW	New	1 x 6.0	6.80	12	9.3	Raft	RCC Box
18	No	94+350	PUP	RHS	MCW	New	1 x 6.0	6.80	12	9.3	Raft	RCC Box
19	No	99+626	PUP	LHS	MCW	New	1 x 6.0	7.50	12	9.25	Raft	RCC Box
20	No	99+626	PUP	RHS	MCW	New	1 x 6.0	7.50	12	9.25	Raft	RCC Box
21	No	105+155	PUP	LHS	MCW	New	1 x 6.0	7.50	12	9	Raft	RCC Box
22	No	105+155	PUP	RHS	MCW	New	1 x 6.0	7.50	12	9	Raft	RCC Box
23	No	115+504	PUP	LHS	MCW	New	1 x 6.0	7.50	12	9	Raft	RCC Box
24	No	115+504	PUP	RHS	MCW	New	1 x 6.0	7.50	12	9	Raft	RCC Box
25	No	128+840	PUP	LHS	MCW	New	1 x 6.0	7.40	12	9	Raft	RCC Box
26	No	128+840	PUP	RHS	MCW	New	1 x 6.0	7.40	12	9	Raft	RCC Box
27	No	130+147	PUP	LHS	MCW	New	1 x 6.0	7.40	12	11	Raft	RCC Box
28	No	130+147	PUP	RHS	MCW	New	1 x 6.0	7.40	12	11	Raft	RCC Box
29	No	133+225	PUP	LHS	MCW	New	1 x 6.0	7.40	12	11	Raft	RCC Box
30	No	133+225	PUP	RHS	MCW	New	1 x 6.0	7.40	12	11	Raft	RCC Box
31	No	137+860	PUP	LHS	MCW	New	1 x 6.0	7.40	12	11	Raft	RCC Box
32	No	137+860	PUP	RHS	MCW	New	1 x 6.0	7.40	12	11	Raft	RCC Box
33	No	147+580	PUP	LHS	MCW	New	1 x 6.0	7.50	12	11	Raft	RCC Box
34	No	147+580	PUP	RHS	MCW	New	1 x 6.0	7.50	12	11	Raft	RCC Box
35	No	148+912	PUP	LHS	MCW	New	1 x 6.0	7.50	12	11	Raft	RCC Box
36	No	148+912	PUP	RHS	MCW	New	1 x 6.0	7.50	12	11	Raft	RCC Box
37	No	153+379	PUP	LHS	MCW	New	1 x 6.0	7.50	12	11	Raft	RCC Box
38	No	153+379	PUP	RHS	MCW	New	1 x 6.0	7.50	12	11	Raft	RCC Box
39	No	157+718	PUP	LHS	MCW	New	1 x 6.0	7.50	12	11	Raft	RCC Box
40	No	157+718	PUP	RHS	MCW	New	1 x 6.0	7.50	12	11	Raft	RCC Box
41	No	159+015	PUP	LHS	MCW	New	1 x 6.0	7.50	12	11	Raft	RCC Box
42	No	159+015	PUP	RHS	MCW	New	1 x 6.0	7.50	12	11	Raft	RCC Box
43	No	169+391	PUP	LHS	MCW	New	1 x 6.0	7.50	12	11	Raft	RCC Box
44	No	169+391	PUP	RHS	MCW	New	1 x 6.0	7.50	12	11	Raft	RCC Box

Table 31: Details of FOB

S.No.	Skew (Yes/No)	Site Chainage (Km)	Type of Structure	Side	Str on	Age of Str	Span Arrangement (m)	Total Length (m)	Deck Width (m)	Carriage way Width (m)	Type of Foundation	Type of Substructure		Type of Superstructure
												Abutment	Pier	
1	No	75+600	FOB	BHS	MCW	New	2 x 27.4	54.80	4.8	4	Open	Steel Truss	Steel Truss	Steel Bowstring

Table 32: Age of structures

S. No	Type of Structure	LHS		RHS		BHS		Total (Nos)		Total no. of Structures
		Old	New	Old	New	Old	New	Old	New	
1	ROB	0	3	0	3	0	0	0	6	6
2	MJB	5	3	2	6	0	0	7	9	16
3	MNB	21	41	12	50	0	0	33	91	124
4	Flyover	0	5	0	7	0	0	0	12	12
5	VUP	0	2	0	2	0	0	0	4	4
6	PUP	0	22	0	22	0	0	0	44	44
7	FOB	0	0	0	0	0	1	0	1	1
8	BC	0	0	0	0	30	0	30	0	30
9	SC	0	0	0	0	10	0	10	0	10
10	PC	0	0	0	0	96	0	96	0	96

Table 33: Summary of Expansion joints and bearings

S. No	Type of Str	Expansion joints		Bearings									
				Pot PTFE		Elastomeric		Spherical		Rocker Roller		Tar Paper	
		Old	New	Old	New	Old	New	Old	New	Old	New	Old	New
1	ROB	0	20	0	108	0	20	0	0	0	0	0	0
2	MJB	38	55	0	108	156	248	0	16	16	0	30	0
3	MNB	8	91	0	52	60	446	0	0	0	0	0	0
4	Flyover	0	52	0	212	0	168	0	0	0	0	0	0
5	VUP	0	0	0	0	0	0	0	0	0	0	0	0
6	PUP	0	0	0	0	0	0	0	0	0	0	0	0
7	FOB	0	0	0	0	0	0	0	0	0	0	0	0
8	BC	0	0	0	0	0	0	0	0	0	0	0	0
9	SC	0	0	0	0	0	0	0	0	0	0	0	0
10	PC	0	0	0	0	0	0	0	0	0	0	0	0
Total No's		46	218	0	480	216	882	0	16	16	0	30	0

S. No	Type of Str	Expansion joints		Bearings											
				Pot PTFE		Elastomeric		Spherical		Rocker Roller		Tar Paper			
		Old	New	Old	New	Old	New	Old	New	Old	New	Old	New		
		264		480		1098		16		16		30			
		1640													

Table 34: Summary and combination of Super Structures

S. No	Type of Str	PSC Box Girder	PSC Girder	RCC Girder	Voided slab	RCC Solid Slab	Steel Girder	Steel Bowstring	PSC Box Girder & RCC Solid Slab	PSC Girder & RCC Solid Slab	RCC Girder & Steel Girder	RCC Solid Slab & PSC Girder	RCC Girder & PSC Girder	RCC Box	Total no. of Structures
1	ROB	0	1	1	0	0	1	0	0	1	2	0	0	0	6
2	MJB	1	5	7	0	1	0	0	2	0	0	0	0	0	16
3	MNB	0	2	25	2	68	0	0	0	0	0	0	0	27	124
4	Flyover	0	2	2	3	0	0	0	0	0	0	2	3	0	12
5	VUP	0	0	0	0	0	0	0	0	0	0	0	0	4	4
6	PUP	0	0	0	0	0	0	0	0	0	0	0	0	44	44
7	FOB	0	0	0	0	0	0	1	0	0	0	0	0	0	1

Table 35: Summary of Sub Structures

S. No	Type of Str	ABUTMENT						PIER					
		RCC Wall Type	RCC Circular Type	RCC Trestle Type	Stone Masonry Wall Type	Steel Truss	RCC Box	RCC Wall Type	RCC Circular Type	RCC Trestle Type	Stone Masonry Wall Type	Steel Truss	RCC Box
1	ROB	6	0	0	0	0	0	2	0	2	0	0	0
2	MJB	14	0	0	2	0	0	9	5	0	2	0	0
3	MNB	88	0	0	9	0	27	41	0	0	8	0	2
4	Flyover	10	0	2	0	0	0	10	0	2	0	0	0
5	VUP	0	0	0	0	0	4	0	0	0	0	0	0
6	PUP	0	0	0	0	0	44	0	0	0	0	0	0
7	FOB	0	0	0	0	1	0	0	0	0	0	1	0

Chainage: 49+770
General Description
LHS MCW (New)

- Type of Structure : MJB
- Span Arrangement : 10 x 32.0 m
- Total deck width of structure : 10.25 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Pedestal damaged in 1st span middle girder on Pier cap P-1
- ✓ Minor Steel exposed on soffit of deck slab near expansion joint on Pier1
- ✓ On Pier cap P-2 first pedestal from left side and middle pedestal damaged in span 3
- ✓ Bearing distresses observed on all Piers (Shape out)
- ✓ Steel bar exposed on cantilever portion of the soffit of deck slab in span 5 at left side
- ✓ Pedestals damaged on Pier cap P-7 in the 7th span
- ✓ Cracks observed on Pier cap at left side of outer facing and also crack observed on

string location of girder at right end girder

- ✓ Bottom flange of the girder damaged on right end girder above the bearing in the span between LP9-LA2.

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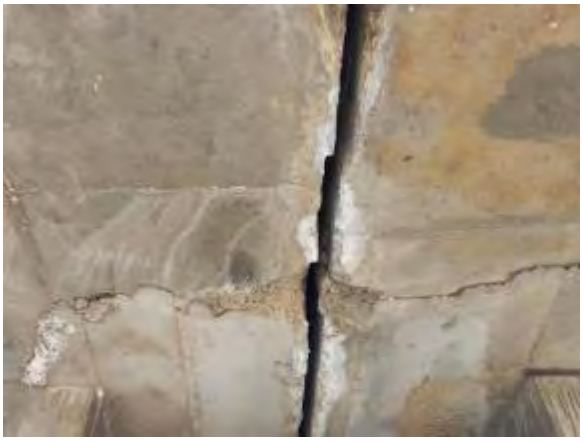
Chainage: 49+770
General Description
RHS MCW (New)

- Type of Structure : MJB
- Span Arrangement : 10 x 32.0 m
- Total deck width of structure : 10.25 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Bearing distress observed on all Piers (Shape out)
- ✓ Spalling observed on pedestal at right end girder from RP1 to RP2
- ✓ Spalling and steel exposed on soffit of deck slab at left side of cantilever portion in 3rd,4th & 5th span
- ✓ Minor crack observed on Pier cap at left side facing on P6 & P8
- ✓ Rubber sealant damaged on Pier 6 & 7
- ✓ Left end & right end pedestals damaged on Pier8 from P8 to P9
- ✓ Left end pedestal damaged on Pier9 from P9 to P8.



Chainage: 58+555
General Description
LHS MCW (Old)

- Type of Structure : MJB
- Span Arrangement : 2 x 13.2 + 2 x 36.8 m
- Total deck width of structure : 11.25 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : Box Girder & RCC Solid Slab
- 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:

- ✓ Rubber sealant damaged in A1, P2 & A2 Expansion joints and Remaining joints are filled with dust and debris
- ✓ Drainage spouts are clogged with debris at some locations

Chainage: 58+555
General Description
RHS MCW (New)

- Type of Structure : MJB
- Span Arrangement : 2 x 13.2 + 2 x 36.8 m
- Total deck width of structure : 10.25 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : Box Girder & RCC Solid Slab
- 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:

- ✓ Expansion joints filled with dust and debris
- ✓ Drainage spouts are clogged with debris at some locations

Chainage: 79+520
General Description
LHS MCW (Old)

- Type of Structure : MJB
- Span Arrangement : 6 x 22.85 + 3 x 27.4 m
- Total deck width of structure : 8.5 m
- Type of Foundation : Not Visible
- Type of Substructure : Stone Masonry Wall Type
- Type of Superstructure : Arch Girder Type
- 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 joints filled with dust and debris.
- ✓ Expansion joint concrete portion damaged on A2.
- ✓ Cracks in girder right side face on Pier P1.
- ✓ Cracks observed at bottom side of diaphragm on Pier 1.
- ✓ Minor damage on bottom of the right end girder on Pier 1.
- ✓ Spalling & reinforcement exposed on soffit of deck slab at median side in span no 4,5,6,7,8 & 9.
- ✓ Minor damage in bottom of the girder on Pier 6.
- ✓ Crack observed on cross girder & pedestal at median side in span 8.

Chainage: 79+520
General Description
RHS MCW (New)

- Type of Structure : MJB
- Span Arrangement : 6 x 22.85 + 3 x 27.4 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Rubber sealant damaged on P3 Expansion joint and remaining joints are filled with debris and dust.
- ✓ Drainage spouts are clogged with debris at some locations.
- ✓ Cracks observed on Pier cap P4 7 Segregation observed on bottom bulb girder at pier.
- ✓ Spalling observed on Pier cap P4 & P8 at median side.

Chainage: 80+154
General Description
LHS MCW (Old)

- Type of Structure : MJB
- Span Arrangement : 5 x 13.25 m
- Total deck width of structure : 8.5 m
- Type of Foundation : Not Visible
- Type of Substructure : Stone Masonry Wall Type
- Type of Superstructure : RCC Girder
- Type of Bearing :
- Type of Railing / Crash Barrier : Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Cracks and minor spalling observed on bottom bulb and soffit of girders at some locations.
- ✓ Drainage spouts are clogged with debris.
- ✓ Cracks and spalling observed on bottom flange of the right end girder.
- ✓ Reinforcement exposed on cantilever portion of the soffit of deck slab in span 1 at median side.

Chainage: 80+154
General Description
RHS MCW (New)

- Type of Structure : MJB
- Span Arrangement : 5 x 13.25 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- 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 filed with dust and debris
- ✓ Rubber sealant damaged in A1 Expansion joint
- ✓ Drainage spouts are clogged with debris

Chainage: 109+770
General Description
LHS MCW (New)

- Type of Structure : MJB
- Span Arrangement : 1 x 45.75 + 2 x 49.5 + 1 x 45.65 m
- Total deck width of structure : 12 m
- Type of Foundation : Pile
- Type of Substructure : RCC Wall Type
- Type of Superstructure : PSC Box Girder
- Type of Bearing : Spherical
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Expansion joint damaged on P2 & P3, remaining joints are filled with dust and debris
- ✓ Cracks observed on deck soffit in span 2 and above Pier cap & Pier wall in P1& P2

2.

Chainage: 109+770
General Description
RHS MCW (Old)

- Type of Structure : MJB
- Span Arrangement : 1 x 45.75 + 2 x 49.5 + 1 x 45.65 m
- Total deck width of structure : 8.5 m
- Type of Foundation : Well
- Type of Substructure : RCC Wall Type
- Type of Superstructure : PSC Girder
- Type of Bearing : Rocker
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Expansion joints are filled with silt and debris
- ✓ Segregation observed on bottom flange of the right end girder
- ✓ Minor cracks and debris observed on Pier cap bottom at some locations
- ✓ Spalling observed on bottom of the Pier cap on Pier 2 & 3
- ✓ Segregation observed on diaphragm on Pier 2
- ✓ Segregation and reinforcement exposed on cantilever portion of the deck slab in span 3
- ✓ Segregation observed at bottom of the diaphragm on Pier 3
- ✓ Bearing distress(displacement) observed in 4th Span between P3-A2

Chainage: 141+095
General Description
LHS MCW (Old)

- Type of Structure : MJB
- Span Arrangement : 3 x 21.5 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Expansion joints filled with debris and dust
- ✓ Drainage spouts are clogged at some locations
- ✓ Minor spalling observed in Pedestal no 3 on Pier cap P2

Chainage: 141+095
General Description
RHS MCW (Old)

- Type of Structure : MJB
- Span Arrangement : 3 x 21.5 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Expansion joints filed with dust and debris
- ✓ Drainage spouts are clogged with debris
- ✓ Pedestal damage observed on P2 Pier cap & cracks in pedestal on Pier cap P1 at median side
- ✓ Pedestal edges damaged on Abutment cap A2

Chainage: 149+640
General Description
LHS MCW (Old)

- Type of Structure : MJB
- Span Arrangement : 6 x 21.6 m
- Total deck width of structure : 10.5 m
- Type of Foundation : Open
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC 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 joints filled with silt and debris
- ✓ Minor spalling observed on deck soffit at some locations
- ✓ Segregation observed on girders at some locations
- ✓ Minor hairline cracks observed on web portion of the girders in span 3,4 & 5
- ✓ Debris observed on Pier caps and Abutment caps

Chainage: 149+640
General Description
RHS MCW (New)

- Type of Structure : MJB
- Span Arrangement : 6 x 21.6 m
- Total deck width of structure : 12 m
- Type of Foundation : Open
- Type of Substructure : 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:

- ✓ Expansion joints filled with silt and debris
- ✓ Drainage spouts clogged at some locations
- ✓ Minor hairline cracks observed on web portion of the left end girder

Chainage: 160+337
General Description
LHS MCW (New)

- Type of Structure : MJB
- Span Arrangement : 4 x 19 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Expansion joint damaged on A1, Rubber sealant damaged in P3 & A2 and remaining joints are filled with silt and debris
- ✓ Drainage spouts clogged at some locations
- ✓ Minor hairline cracks observed on web portion of girders (2 No's) from right end in span 1&3
- ✓ Corrosion stains on soffit of girders in span 1 & 4

Chainage: 160+337
General Description
RHS MCW (New)

- Type of Structure : MJB
- Span Arrangement : 4 x 19 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Segregation observed on soffit of girders & A2 Abutment wall
- ✓ Expansion joints filled with silt and debris

Chainage: 37+418
General Description
LHS MCW (New)

- Type of Structure : ROB
- Span Arrangement : 1 x 51.35 m
- Total deck width of structure : 11.35 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- 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:

- ✓ Cracks observed on A2 Abutment wall.
- ✓ Expansion joints filled with debris.
- ✓ Pot holes on wearing course.
- ✓ Drainage spouts clogged.

Chainage: 37+418
General Description
RHS MCW (New)

- Type of Structure : ROB
- Span Arrangement : 1 x 51.35 m
- Total deck width of structure : 11.35 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Segregation and corrosion stains observed on soffit of girders at many locations
- ✓ Previous patch works observed on girders
- ✓ Expansion joints damaged on both A1&A2

Chainage: 76+371
General Description
LHS MCW (New)

- Type of Structure : ROB
- Span Arrangement : 2 x 14.3 + 1 x 30.40 + 1 x 14 + 1 x 14.3 m
- Total deck width of structure : 13.75 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC 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 and debris
- ✓ Drainage spouts clogged at some locations
- ✓ Vegetation growth observed on RE walls and A2 median location
- ✓ No major distress found on structure

Chainage: 76+371
General Description
RHS MCW (New)

- Type of Structure : ROB
- Span Arrangement : 2 x 14.3 + 1 x 30.40 + 1 x 14 + 1 x 14.3 m
- Total deck width of structure : 13.75 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC 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 and debris
- ✓ Drainage spouts clogged at some locations
- ✓ Vegetation growth observed on RE walls and A2 median location
- ✓ No major distress found on structure

Chainage: 173+522
General Description
LHS MCW (New)

- Type of Structure : ROB
- Span Arrangement : 1 x 22 + 1 x 10.4 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : PSC Girder & RCC Solid Slab
- Type of Bearing : Pot PTFE & Elastomeric
- 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 and debris
- ✓ Structure is in fair condition

Chainage: 173+522
General Description
RHS MCW (New)

- Type of Structure : ROB
- Span Arrangement : 1 x 22 + 1 x 10.4 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Expansion joints buried under wearing coat
- ✓ Drainage spouts are clogged at some locations
- ✓ Segregation observed on girders at some locations

Chainage: 74+493
General Description
LHS MCW (New)

- Type of Structure : Flyover
- Span Arrangement : 1 x 15 + 1 x 25 + 1 x 15 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : Voided Slab
- 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 are filled with debris and dust
- ✓ Vegetation growth observed on RE Blocks

Chainage: 74+493
General Description
RHS MCW (New)

- Type of Structure : Flyover
- Span Arrangement : 1 x 15 + 1 x 25 + 1 x 15 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : Voided Slab
- 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 are filled with debris and dust
- ✓ Vegetation growth observed on RE Blocks

Chainage: 77+855
General Description
LHS MCW (New)

- Type of Structure : Flyover
- Span Arrangement : 6 x 30 + 1 x 45 + 8 x 30 + 2 x 45 m
- Total deck width of structure : 13.75 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Trestle 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:

- ✓ Diaphragm damage observed above the bearing on Pier Cap P-6
- ✓ Minor segregation observed on bottom flange of the 5th girder from left side
- ✓ Crack observed in Pier cap P-16 on left side outer face

Chainage: 77+855
General Description
RHS MCW (New)

- Type of Structure : Flyover
- Span Arrangement : 6 x 30 + 1 x 45 + 8 x 30 + 2 x 45 m
- Total deck width of structure : 13.75 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Trestle 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:

- ✓ Structure condition is good

Chainage: 79+868
General Description
RHS MCW (New)

- Type of Structure : Flyover
- Span Arrangement : 1 x 15 + 1 x 25 + 1 x 15 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : Voided Slab
- 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:

- ✓ Rubber sealant damaged on A1 Expansion joint and remaining are filled with debris
- ✓ Drainage spouts are clogged with debris

Chainage: 113+081
General Description
LHS MCW (New)

- Type of Structure : Flyover
- Span Arrangement : 1 x 12.615 + 1 x 30 + 1 x 12.615 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab & 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:

- ✓ Expansion joint damaged on A2 and remaining al filled with silt and debris
- ✓ Drainage spouts clogged at some locations
- ✓ Crack observed in diaphragm on above Pier Cap- 2 at median side

Chainage: 113+081
General Description
RHS MCW (New)

- Type of Structure : Flyover
- Span Arrangement : 1 x 12.615 + 1 x 30 + 1 x 12.615 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab & 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:

- ✓ Minor segregation on soffit of girders
- ✓ Expansion joints damaged on A1 & P1
- ✓ Rubber sealant damaged on A2 Expansion joint

Chainage: 132+670
General Description
LHS MCW (New)

- Type of Structure : Flyover
- Span Arrangement : 1 x 15.5 + 1 x 32 + 1 x 15.5 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Girder & 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:

- ✓ Rubber sealant damaged in A1 & A2 Expansion joint and remaining joints are filled with debris and silt.
- ✓ Drainage spouts clogged at some locations.
- ✓ Spalling observed on end of the girder on pier-1.

Chainage: 132+670
General Description
RHS MCW (New)

- Type of Structure : Flyover
- Span Arrangement : 1 x 15.5 + 1 x 32 + 1 x 15.5 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Girder & 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:

- ✓ Expansion Joints are filled with debris and dust
- ✓ Shrinkage cracks observed on pier cap-1.

Chainage: 139+465
General Description
RHS MCW (New)

- Type of Structure : Flyover
- Span Arrangement : 1 x 15.5 + 1 x 32 + 1 x 15.5 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Girder & 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:

- ✓ Expansion Joints are filled with debris and dust
- ✓ Rubber sealant damaged on Pier P2 Expansion joint

Chainage: 169+640
General Description
LHS MCW (New)

- Type of Structure : Flyover
- Span Arrangement : 1 x 15 + 1 x 20 + 1 x 15 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Expansion Joints are filled with debris and dust
- ✓ Drainage spouts are clogged with debris

Chainage: 169+640
General Description
RHS MCW (New)

- Type of Structure : Flyover
- Span Arrangement : 1 x 15 + 1 x 20 + 1 x 15 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ All expansion joints partially damaged
- ✓ Drainage spouts clogged
- ✓ Pier cap(P-1) edge damaged on outer side
- ✓ Segregation observed on cross girder at some locations

Chainage: 41+792
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 8.5 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Vegetation growth observed on wing walls.
- ✓ Hand rail damage observed.
- ✓ Structure is in fair condition.
- ✓ Drainage spouts clogged with debris.

Chainage: 41+792
General Description
RHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 1 x 8.5 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Segregation and steel exposed on soffit of deck slab near construction joint at median side.
- ✓ Spalling and reinforcement exposed on wing walls.
- ✓ Spalling and reinforcement exposed on top slab below the handrail.
- ✓ Drainage spouts clogged with debris.

Chainage: 43+526

General Description

LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 10.40 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Hand Railing
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Stone pitching damaged at LA1 and not available at LA2.
- ✓ Vegetation growth observed on stone pitching.

Chainage: 43+526
General Description
RHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 3 x 3.4 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Spalling observed on top slab on the Retaining Wall.
- ✓ Stone pitching damaged on both sides.
- ✓ Hand rail damaged.
- ✓ Vegetation on stone pitching.
- ✓ Spalling observed on 2nd Pier.

Chainage: 45+414
General Description
LHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 1 x 6.5 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Stagnation of water observed.
- ✓ Quadrant pitching damaged on both sides.
- ✓ Hand rail damaged.

Chainage: 46+391

General Description

LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 7.5 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Parapet wall
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Minor damages on retaining wall.
- ✓ Structure is in good condition.

Chainage: 46+391
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 7.5 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Minor damages on retaining wall.
- ✓ Structure is in good condition.

Chainage: 48+015
General Description
LHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 3 x 4.5 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Spalling and reinforcement exposed on LA1 side.
- ✓ Spalling observed on LA1 at median side.

Chainage: 48+015
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 10.36 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Down take pipes are not provided for drainage spouts.
- ✓ Structure condition is good.
- ✓ No Quadrant pitching.

Chainage: 51+539
General Description
LHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 1 x 8.9 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts clogged.
- ✓ Structure condition good.

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Chainage: 51+539
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 8.9 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts clogged.
- ✓ Structure condition good.
- ✓ Quadrant pitching damaged at RA2 side.

Chainage: 53+653
General Description
LHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 1 x 6.2 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Due to segregation, Steel exposed on wing wall at LA1.
- ✓ No drainage spouts.
- ✓ Structure condition is fair.

Chainage: 53+653
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 6.2 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ No Quadrant pitching.
- ✓ No down take pipe for drainage water.
- ✓ Structure is in good condition.

Chainage: 55+792
General Description
LHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 1 x 8.75 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : Stone Masonry Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- 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 on both sides.
- ✓ Down take pipes not provided on both sides for drainage spouts.
- ✓ Structure condition is good.

Chainage: 55+792
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 3 x 2.91 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- 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 on both sides.
- ✓ Down take pipes not provided on both sides for drainage spouts.
- ✓ Structure condition is good.

Chainage: 57+272
General Description
LHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 1 x 9.16 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Vegetation growth observed on Quadrant pitching.
- ✓ No down take pipe provided for drainage spouts.
- ✓ Handrail damaged on LHS.
- ✓ Steel exposed on side wall of LA1 at median side.

Chainage: 57+272
General Description
RHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 1 x 9.16 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Vegetation growth observed on Quadrant pitching.
- ✓ No down take pipe provided for drainage spouts.
- ✓ Steel exposed on side wall of LA1 at median side.

Chainage: 59+945
General Description
LHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 5 x 6.7 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Down take pipes not provided for drainage spouts.
- ✓ Quadrant pitching damaged on both sides.
- ✓ Structure condition good.

Chainage: 59+945
General Description
RHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 5 x 6.7 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Down take pipes not provided for drainage spouts.
- ✓ Quadrant pitching damaged on both sides.
- ✓ Structure condition good.

Chainage: 60+623
General Description
LHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 1 x 4.8 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Vegetation growth observed.
- ✓ Stone pitching damaged.
- ✓ No down take pipe for drainage spouts.
- ✓ Structure condition good.

Chainage: 60+623
General Description
RHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 1 x 4.8 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Vegetation growth observed.
- ✓ Stone pitching damaged.
- ✓ No down take pipe for drainage spouts.
- ✓ Structure condition good.

Chainage: 61+126
General Description
LHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 1 x 9.94 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Steel bar exposed on edge of deck slab in entire span.

Chainage: 61+126
General Description
RHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 1 x 9.94 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Handrail damaged.
- ✓ Structure condition fair.

Chainage: 65+875
General Description
LHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 3 x 12.10 m
- Total deck width of structure : 13 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC 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:

- ✓ In first span left side of first girder damaged and steel exposed.
- ✓ Cantilever portion of the deck slab damaged and steel exposed in 3rd span.
- ✓ Stone pitching damaged.
- ✓ Rubber sealant damaged on LA1.
- ✓ Expansion joints buried under BT overlays.

Chainage: 65+875
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 3 x 12.10 m
- Total deck width of structure : 13 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- 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:

- ✓ Stone pitching damaged.
- ✓ Rubber sealant damaged on RA1.
- ✓ Expansion joints filled with debris.

Chainage: 67+289
General Description
LHS MCW & SR (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 6 m
- Total deck width of structure : 9 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ No Quadrant pitching.
- ✓ Structure condition fair.

Chainage: 67+289
General Description
RHS MCW & SR (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 6 m
- Total deck width of structure : 12.65 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ No Quadrant pitching.
- ✓ Structure condition fair.

Chainage: 68+684
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 6.26 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Stone pitching damaged.
- ✓ Condition good.

Chainage: 68+684
General Description
RHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 1 x 6.26 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Segregation and steel exposed at soffit of deck slab.
- ✓ Widening with 2M from slab to box.

Chainage: 70+360
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 9.2 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- 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:

- ✓ Vegetation observed on Quadrant pitching.
- ✓ Handrail damaged.
- ✓ Drainage spouts clogged.

Chainage: 70+360
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 9.2 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- 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:

- ✓ Honey combing observed on top slab at median.
- ✓ Segregation and steel exposed on soffit of deck slab at RA2.
- ✓ Drainage spouts clogged.

Chainage: 78+075
General Description
LHS MCW & SR (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 3.2 m
- Total deck width of structure : 9 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition good.
- ✓ Widening with box.
- ✓ Water flow observed.
- ✓ Vegetation growth observed.

Chainage: 78+075
General Description
RHS MCW & SR (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 3.2 m
- Total deck width of structure : 13.5 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition good.
- ✓ Widening with box.
- ✓ Water flow observed.
- ✓ Vegetation growth observed.

Chainage: 81+809
General Description
LHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 2 x 4.86 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Vegetation growth observed.
- ✓ Drainage spouts clogged.
- ✓ Widened with stone masonry wall.

Chainage: 81+809
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 2 x 4.86 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- 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:

- ✓ Vegetation growth observed.
- ✓ Drainage spouts clogged with debris.
- ✓ Structure is in good condition.

Chainage: 84+736
General Description
LHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 4 x 8.3 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : Stone Masonry Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Spalling observed on top slab in 3rd span at median side.
- ✓ Vegetation growth observed.
- ✓ Drainage spouts clogged.

Chainage: 84+736
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 4 x 8.3 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- 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:

- ✓ Stone pitching damaged.
- ✓ Honey combing observed.
- ✓ Expansion joints filled with debris.
- ✓ Drainage spouts clogged with Debris.

Chainage: 87+304
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 5 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Vegetation growth on stone pitching.
- ✓ Structure condition good.

Chainage: 87+304
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 5 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Vegetation growth on stone pitching.
- ✓ Structure condition good.

Chainage: 89+076
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 10.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Vegetation growth observed on stone pitching.
- ✓ Drainage spouts are clogged with debris.

Chainage: 89+076
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 10.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Vegetation growth observed on stone pitching.
- ✓ Drainage spouts are clogged with debris.

Chainage: 89+358
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 3 x 13.7 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- 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:

- ✓ Vegetation growth observed on stone pitching.
- ✓ Rubber sealant damaged on LA2.
- ✓ Drainage spouts are clogged with debris.
- ✓ Expansion joints are filled with dust and debris.
- ✓ Structure is in fair condition.

Chainage: 89+358
General Description
RHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 3 x 13.7 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Previous repair works done for the substructure.
- ✓ Spalling observed on girder end above pier-2 at right side of the bridge.
- ✓ Expansion joints are filled with dust and debris.
- ✓ Structure is in fair condition.

Chainage: 94+486
General Description
LHS SR (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 8 m
- Total deck width of structure : 8 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Vegetation growth observed on Quadrant Stone pitching.
- ✓ Structure is in fair condition.

Chainage: 94+486
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 8 m
- Total deck width of structure : 10.875 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Vegetation growth observed on Quadrant Stone pitching.
- ✓ Structure is in fair condition.

Chainage: 94+486
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 8 m
- Total deck width of structure : 10.875 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Vegetation growth observed on Quadrant Stone pitching.
- ✓ Structure is in fair condition.

Chainage: 94+486
General Description
RHS SR (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 8 m
- Total deck width of structure : 8 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Vegetation growth observed on Quadrant Stone pitching.
- ✓ Structure is in fair condition.

Chainage: 98+084
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts not provided.
- ✓ Vegetation grown on Wing wall.
- ✓ Structure is in fair condition.

Chainage: 98+084
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts not provided.
- ✓ Vegetation grown on Wing wall.
- ✓ Structure is in fair condition.

Chainage: 98+492
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts not provided.
- ✓ Vegetation grown on Wing wall.
- ✓ Structure is in fair condition.

Chainage: 98+492
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts are clogged with debris.
- ✓ Structure is in fair condition.

Chainage: 100+920
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 21.30 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- 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 in LA2 Expansion joint.
- ✓ Corrosion stains observed on outer side of deck soffit.
- ✓ Bearing distresses observed on all bearings on Abutment-2.

Chainage: 100+920
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 21.30 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- 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:

- ✓ Drainage spouts are clogged with debris.
- ✓ Expansion joints are clogged with debris.
- ✓ Bearing distresses observed on all bearings on Abutment-2.

Chainage: 102+837
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 102+837
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 103+687
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 15 + 1 x 14.4 + 1 x 15 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall type
- Type of Superstructure : RCC Solid Slab
- 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:

- ✓ Expansion joint buried with BT Particles.
- ✓ Drainage spouts are clogged with debris.

Chainage: 103+687
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 15 + 1 x 14.4 + 1 x 15 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall type
- Type of Superstructure : RCC Solid Slab
- 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 in A1, P2&A2 Expansion joints.
- ✓ Drainage spouts are clogged with debris.

Chainage: 106+505
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 3 x 18.7 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall type
- Type of Superstructure : RCC Solid Slab
- 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:

- ✓ Expansion joint partially filled with debris.
- ✓ Drainage spouts are clogged with debris.
- ✓ Minor Spalling on soffit of deck slab in span-2 near drainage spout location.

Chainage: 106+505
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 3 x 18.7 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall type
- Type of Superstructure : RCC Solid Slab
- 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:

- ✓ Expansion joint Rubber sealant damaged at P2.
- ✓ Drainage spouts are clogged with debris.
- ✓ Structure is in fair condition.

Chainage: 110+655
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 5.6 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 110+655
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 5.6 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 111+690
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 3 x 13.6 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall type
- Type of Superstructure : RCC Solid Slab
- 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:

- ✓ Expansion joint Rubber sealant damaged at P2.
- ✓ Drainage spouts are clogged with debris.
- ✓ Structure is in fair condition.

Chainage: 111+690
General Description
RHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 3 x 13.6 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : Stone Masonry 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:

- ✓ Previous repair works done for the substructure.
- ✓ Expansion joints are filled with dust and debris.
- ✓ Structure is in fair condition

Chainage: 113+913
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 3 x 3.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts are clogged debris.
- ✓ Structure is in fair condition.

Chainage: 113+913
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 3 x 3.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts are clogged debris.
- ✓ Structure is in fair condition.

Chainage: 114+928
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 3 x 18 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall type
- Type of Superstructure : Voided slab
- 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:

- ✓ Pedestal edge damaged at some locations.
- ✓ Expansion joint partially divided with silt and debris.
- ✓ Rubber sealant damaged in Pier 1, 2 and Abutment.
- ✓ Bearing distresses observed on pier-1.

Chainage: 114+928
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 3 x 18 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall type
- Type of Superstructure : Voided slab
- 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:

- ✓ Pedestal edge damaged at some locations.
- ✓ Cracks observed on pedestal on Pier cap, span 1.
- ✓ Expansion joint steel channel partially damaged.

Chainage: 118+280
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 2 x 7 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Segregation of soffit of deck slab at median location.
- ✓ Drainage spouts are clogged with debris.

Chainage: 118+280
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 2 x 7.0m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- 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: 123+310
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 24.70 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Expansion joint buried with BT layer on Abutment and partially filled with silt and debris.
- ✓ Drainage spouts clogged with debris.
- ✓ Inclined cracks observed on web portion of girders at some locations.

Chainage: 123+310
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 24.70 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Cracks observed on girders at some locations.
- ✓ Drainage spouts are clogged with debris.

Chainage: 124+278
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 12.6 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Expansion joints partially filled with silt and debris.
- ✓ Honey combine observed on end Girder - median side.
- ✓ Quadrant pitching not available at Abutment-1.

Chainage: 124+278
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 12.6 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Expansion joints filled with BT particles and rubber sealant damaged on both joints.
- ✓ No major distress found on the structure.
- ✓ Crash barrier damaged on A-1 side.
- ✓ Structure condition good.

Chainage: 128+640
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 2 x 17 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Rubber sealant damaged in A-1 Expansion joint.
- ✓ Drainage spouts clogged at some locations.
- ✓ Expansion joints damaged on Pier-1 and Abutment A-2.
- ✓ Minor cracks observed on soffit of all Girders.

Chainage: 128+640
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 2 x 17 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Minor cracks observed on soffit of all Girders.
- ✓ Drainage spouts clogged at some locations.
- ✓ Expansion joints filled with silt and debris.

Chainage: 129+257
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 9.5 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- 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 good condition.
- ✓ Vegetation growth on LA-2 side return wall.

Chainage: 129+257
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 9.5 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- 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 good condition.
- ✓ Vegetation growth on LA-2 side return wall.

Chainage: 129+875
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 9.5 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- 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 good condition.

Chainage: 129+875
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 9.5 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- 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 good condition.

Chainage: 134+150
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 2 x 17 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Rubber sealant damaged on Pier-2 and remaining are filled with silt and debris.
- ✓ Drainage spouts clogged at some locations.

Chainage: 134+150
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 2 x 17 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Expansion joints partially filled with silt and debris.
- ✓ Drainage spouts clogged at some locations.
- ✓ No major distress found on structure.
- ✓ Structure condition good.

Chainage: 137+685
General Description
LHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 4 x 7.5 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : Stone masonry wall type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Hand Railing
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Old stone masonry sub structure widened on both sides with RCC wall type and RCC solid slab.
- ✓ Spalling and reinforcement exposed in span 3 and 4.
- ✓ Rust observed on exposed steel.
- ✓ Drainage spouts clogged.

Chainage: 137+685
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 2 x 15 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Expansion joints partially filled with silt and debris.
- ✓ Drainage spouts clogged at some locations.
- ✓ No major distress found.

Chainage: 141+000
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 X 21.70 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Expansion joints filled with silt and debris.
- ✓ Drainage spouts clogged at some locations.
- ✓ Structure condition good.

Chainage: 141+000
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 X 21.70 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Expansion joints filled with silt and debris.
- ✓ Drainage spouts clogged at some locations.
- ✓ No major distress found.
- ✓ Structure condition good.

Chainage: 141+970
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 17 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Expansion joints filled with debris.
- ✓ Drainage spouts clogged with mud and debris.
- ✓ No major distress found.
- ✓ Structure condition fair.

Chainage: 141+970
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 17 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Expansion joints filled with silt and debris.
- ✓ Drainage spouts clogged at some locations.
- ✓ Structure condition good.
- ✓ No major distress found.

Chainage: 142+410
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 12 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

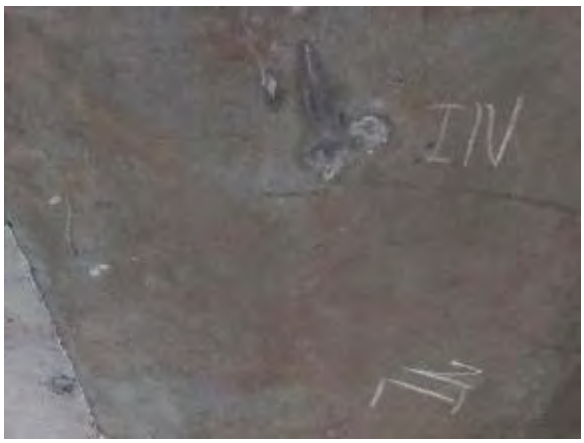
- ✓ Rubber sealant damaged on both Exp.joints.
- ✓ Hair line cracks observed on soffit of girder and bottom of girders at some locations.
- ✓ Drainage spouts clogged.
- ✓ Segregation observed on above the bottom bulb of girder at A2.
- ✓ Rubber sealant damaged on RA1.

Chainage: 142+410
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 12 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Expansion joints filled with silt and debris.
- ✓ Drainage spouts clogged.
- ✓ Minor hairline cracks observed on web and bottom bulb of Girders at some locations.



Chainage: 145+290
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 2 x 17.5 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Expansion joints filled with mud and debris.
- ✓ Drainage spots clogged.
- ✓ Stone pitching partially damaged on A-2 side.
- ✓ Vertical cracks observed on A-2 Abutment wall.

Chainage: 145+290
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 2 x 17.5 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Expansion joints filled with silt and debris.
- ✓ Drainage spouts clogged at some locations.
- ✓ No major distress found.
- ✓ Structure condition good.

Chainage: 151+235
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 21.70 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Expansion joints filled with silt and debris.
- ✓ Drainage spouts clogged.
- ✓ Rubber sealant damaged on LA1 & LA2.

Chainage: 151+235
General Description
RHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 3 x 7.30 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : Stone masonry wall type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Stone masonry wall type sub structure with RCC solid slab widened with RCC structure on outer side.
- ✓ Spalling and reinforcement exposed on 2nd span at median side.
- ✓ Minor spalling observed on hand railing bottom on PierP-2 at median side.
- ✓ Hand railing on median side, Crash barrier on outer side.

Chainage: 152+298
General Description
LHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 2 x 6 m
- Total deck width of structure : 12 m
- Type of Foundation : Open
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure widened on outer side.
- ✓ No distress found on the structure.
- ✓ Structure condition good.

Chainage: 152+298
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 2 x 6 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts clogged.
- ✓ Structure condition good.

Chainage: 154+683
General Description
LHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 3 x 9 m
- Total deck width of structure : 12 m
- Type of Foundation : Open
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Minor spalling and reinforcement exposed on soffit of deck Slab side at some locations.
- ✓ Reinforcement exposed and rust formed on steel bars observed in 3rd span.

Chainage: 154+683
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 3 x 9 m
- Total deck width of structure : 12 m
- Type of Foundation : Open
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts clogged at some locations.
- ✓ No distress found on structure.
- ✓ Structure condition good.

Chainage: 157+161
General Description
LHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 3 x 8.5 m
- Total deck width of structure : 12 m
- Type of Foundation : Open
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts clogged.
- ✓ No distress found on structure.
- ✓ Structure condition fair.

Chainage: 157+161
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 3 x 8.5 m
- Total deck width of structure : 12 m
- Type of Foundation : Open
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition good.

Chainage: 158+704
General Description
LHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 3 x 8.70 m
- Total deck width of structure : 12 m
- Type of Foundation : Open
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts clogged at some locations.
- ✓ Segregation observed on Pier walls.
- ✓ No major distress found on structure.

Chainage: 158+704
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 3 x 8.70 m
- Total deck width of structure : 12 m
- Type of Foundation : Open
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition good.

Chainage: 162+091
General Description
LHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 3 x 5.30 m
- Total deck width of structure : 12 m
- Type of Foundation : Open
- Type of Substructure : Stone masonry wall type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition good.
- ✓ Old stone masonry widened with RCC structure outside.

Chainage: 162+091
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 3 x 5.30 m
- Total deck width of structure : 12 m
- Type of Foundation : Open
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition good.

Chainage: 162+724
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 20 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Expansion joints filled with silt and debris.
- ✓ Corrosion stains observed on soffit of Girders at some locations.

Chainage: 162+724
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 20 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Rubber sealant damaged in both A1 and A2 expansion joints.
- ✓ Corrosion stains observed on soffit of Girders at some locations.

Chainage: 164+567
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 2 x 3.5 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition good.

Chainage: 164+567
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 2 x 3.5 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition good.

Chainage: 165+169
General Description
LHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 4 x 8.5 m
- Total deck width of structure : 12 m
- Type of Foundation : Open
- Type of Substructure : Stone masonry wall type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Old stone masonry sub structure widened with RCC structure on outer side.
- ✓ Spalling and reinforcement exposed on all spans.
- ✓ Drainage spouts clogged.

Chainage: 165+169
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 4 x 8.5 m
- Total deck width of structure : 12 m
- Type of Foundation : Open
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts clogged at some locations.
- ✓ Rubber sealant damaged on RA1.
- ✓ Structure condition good.

Chainage: 166+147
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 17 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Expansion joints filled with silt and debris.
- ✓ Rubber sealant damaged in both joints.
- ✓ Drainage spouts clogged at some locations.
- ✓ Spalling & steel expose on bottom of the diaphragm at A2.

Chainage: 166+147
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 17 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Expansion joints filled with silt and debris.
- ✓ Rubber sealant partially damaged.
- ✓ Drainage spouts clogged at some locations.
- ✓ No other distress found on structure.
- ✓ Structure condition good.

Chainage: 169+143
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 17 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Expansion joints damaged in A3 and A2 Rubber sealant damaged.
- ✓ No other distress found.

Chainage: 169+143
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 1 x 17 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : 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:

- ✓ Expansion joints damaged in RA-2 and Rubber sealant damaged in A2.
- ✓ Drainage spouts clogged at some locations.

Chainage: 170+504
General Description
LHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 1 x 6.6 m
- Total deck width of structure : 12 m
- Type of Foundation : Open
- Type of Substructure : Stone masonry wall type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Old stone masonry sub structure widened with RCC slab.
- ✓ Segregation observed on soffit of deck slab.

Chainage: 170+504
General Description
RHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 1 x 6.6 m
- Total deck width of structure : 12 m
- Type of Foundation : Open
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- 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: 172+883
General Description
LHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 2 x 7.5 m
- Total deck width of structure : 12 m
- Type of Foundation : Open
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition good.

Chainage: 172+883
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 2 x 7.5 m
- Total deck width of structure : 12 m
- Type of Foundation : Open
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition good.

Chainage: 174+626
General Description
LHS MCW (Old)

- Type of Structure : MNB
- Span Arrangement : 2 x 8 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ No major distress found on structure.
- ✓ Structure condition good.

Chainage: 174+626
General Description
RHS MCW (New)

- Type of Structure : MNB
- Span Arrangement : 2 x 8 m
- Total deck width of structure : 12 m
- Type of Foundation : Not Visible
- Type of Substructure : RCC Wall Type
- Type of Superstructure : RCC Solid Slab
- Type of Bearing :
- 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.
- ✓ Drainage spouts clogged.

Chainage: 112+870
General Description
LHS MCW (New)

- Type of Structure : VUP
- Span Arrangement : 1 x 12.0 m
- Total deck width of structure : 13.75 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 112+870
General Description
RHS MCW (New)

- Type of Structure : VUP
- Span Arrangement : 1 x 12.0 m
- Total deck width of structure : 13.75 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 113+230
General Description
LHS MCW (New)

- Type of Structure : VUP
- Span Arrangement : 1 x 12.0 m
- Total deck width of structure : 13.75 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 113+230
General Description
RHS MCW (New)

- Type of Structure : VUP
- Span Arrangement : 1 x 12.0 m
- Total deck width of structure : 13.75 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 67+095
General Description
LHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6 m
- Total deck width of structure : 13.7 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Reinforcement exposed on side wall at LA1.
- ✓ Vegetation growth on Abutment A1 & A2.

Chainage: 67+095
General Description
RHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6 m
- Total deck width of structure : 13.7 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Minor spalling observed on deck soffit.

Chainage: 74+292
General Description

LHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6 m
- Total deck width of structure : 13.75 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations

Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts not provided.
- ✓ Vegetation growth on RE wall.

Chainage: 74+292
General Description
RHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6 m
- Total deck width of structure : 13.75 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts not provided.
- ✓ Vegetation growth on RE wall.

Chainage: 74+732
General Description
LHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6 m
- Total deck width of structure : 13.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts not provided.
- ✓ Structure is in fair condition.

Chainage: 74+732
General Description
RHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6 m
- Total deck width of structure : 13.5 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts not provided.
- ✓ Structure is in fair condition.

Chainage: 76+117
General Description
LHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6 m
- Total deck width of structure : 13.75 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts are clogged with debris.
- ✓ Structure is in fair condition.

Chainage: 76+117
General Description
RHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6 m
- Total deck width of structure : 13.75 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts are clogged with debris.
- ✓ Structure is in fair condition.

Chainage: 76+635
General Description
LHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6 m
- Total deck width of structure : 13.75 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 76+635
General Description
RHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6 m
- Total deck width of structure : 13.75 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- Type of Railing / Crash Barrier : Crash Barrier
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Drainage spouts are clogged with debris.
- ✓ Structure is in fair condition.

Chainage: 82+717
General Description
LHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6 m
- Total deck width of structure : 13.75 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 82+717
General Description
RHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6 m
- Total deck width of structure : 13.75 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 84+996
General Description
LHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6 m
- Total deck width of structure : 13.75 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 84+996
General Description
RHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6 m
- Total deck width of structure : 13.75 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 90+005
General Description
LHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6 m
- Total deck width of structure : 13.75 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 90+005
General Description
RHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6 m
- Total deck width of structure : 13.75 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 94+350
General Description
LHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 94+350
General Description
RHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 99+626
General Description
LHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 99+626
General Description
RHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 105+155
General Description
LHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 105+155
General Description
RHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 115+504
General Description
LHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 115+504
General Description
RHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 128+840
General Description
LHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 128+840
General Description
RHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 130+147
General Description
LHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 130+147
General Description
RHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 133+225
General Description
LHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 133+225
General Description
RHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 137+860
General Description
LHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 137+860
General Description
RHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 147+580
General Description
LHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 147+580
General Description
RHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 148+912
General Description
LHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 148+912
General Description
RHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 153+379
General Description
LHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 153+379
General Description
RHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 157+718
General Description
LHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 157+718
General Description
RHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 159+015
General Description
LHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 159+015
General Description
RHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 169+391
General Description
LHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 169+391
General Description
RHS MCW (New)

- Type of Structure : PUP
- Span Arrangement : 1 x 6.0 m
- Total deck width of structure : 12 m
- Type of Foundation : Raft
- Type of Substructure : RCC Box
- Type of Superstructure : RCC Box
- Type of Bearing :
- 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: 75+600
General Description
BHS MCW (New)

- Type of Structure : FOB
- Span Arrangement : 2 x 27.4 m
- Total deck width of structure : 4.8 m
- Type of Foundation : Open
- Type of Substructure : Steel Truss
- Type of Superstructure : Steel Bowstring
- Type of Bearing :
- Type of Railing / Crash Barrier :
- Method of Inspection : Visual

Observations
Visual Observations on condition of the structure are as below:

- ✓ Structure condition fair.

S.No.	Design Chainage (Km)	Type of Culvert As per Site	Side	Structure on	Span Arrangement (No x Length) As Per site	Vertical Clearance	Deck Width (m)	Floor Protection (Yes/No)		Quadrant Stone Pitching (Yes/No)		Observations
								LHS	RHS	LHS	RHS	
1	38+483	PC	BHS	MCW	3 x 1.2	1.2	27.50	NV	NV	No	No	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
2	38+908	PC	BHS	MCW	1 x 1.2	1.2	27.50	NV	NV	No	No	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
3	39+249	PC	BHS	MCW	1 x 1.2	1.2	34.00	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
4	39+624	PC	BHS	MCW	4 x 1.2	1.2	27.50	NV	NV	No	No	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
5	40+262	PC	BHS	MCW	4 x 1.2	1.2	27.50	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
6	40+996	PC	BHS	MCW	4 x 1.2	1.2	27.50	NV	NV	No	No	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
7	41+016	BC	BHS	MCW	1 x 3	2	25.00	NV	NV	Wing Wall	Wing Wall	> Structure is in fair condition.
8	42+335	SC	BHS	MCW	1 x 4	3	24.00	No	No	Wing Wall	Wing Wall	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition.
9	42+387	BC	BHS	MCW	1 x 3	2	24.00	Yes	Yes	Wing Wall	Wing Wall	> Structure is in fair condition.
10	43+018	PC	BHS	MCW	1 x 1.2	1.2	27.50	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
11	43+166	PC	BHS	MCW	2 x 0.9	0.9	27.50	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition

S.No.	Design Chainage (Km)	Type of Culvert As per Site	Side	Structure on	Span Arrangement (No x Length) As Per site	Vertical Clearance	Deck Width (m)	Floor Protection (Yes/No)		Quadrant Stone Pitching (Yes/No)		Observations
								LHS	RHS	LHS	RHS	
12	45+985	SC	BHS	MCW	1 x 3.7	2	24.00	NV	NV	Wing Wall	Wing Wall	> Vegetation, Debris & Silt observed on Vent way. > RHS old stone masonry. > Structure is in fair condition.
13	46+847	SC	BHS	MCW	1 x 3	2	24.00	NV	NV	Wing Wall	Wing Wall	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition.
14	47+100	SC	BHS	MCW	1 x 3.6	2	24.00	NV	NV	Wing Wall	Wing Wall	> Debris & Silt observed on Vent way. > LHS Widened 2 x 1.2 Pipe culvert. > Structure is in fair condition.
15	48+720	PC	BHS	MCW	2 x 0.9	0.9	31.50	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
16	50+017	BC	BHS	MCW	1 x 3	2.5	24.00	Yes	Yes	Wing Wall	Wing Wall	> Structure is in fair condition.
17	51+180	SC	BHS	MCW	1 x 3.2	1.5	24.00	NV	NV	Wing Wall	Wing Wall	> Vegetation, Debris & Silt observed on Vent way. > LHS old stone masonry. > Structure is in fair condition.
18	56+122	SC	BHS	MCW	1 x 3.2	2	24.00	NV	NV	Wing Wall	Wing Wall	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition.
19	57+155	SC	BHS	MCW	1 x 2	1.5	24.00	NV	NV	Wing Wall	Wing Wall	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition.
20	59+182	PC	BHS	MCW	1 x 1	1	23.00	NV	NV	No	No	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
21	61+789	PC	BHS	MCW	2 x 1	1	26.00	NV	NV	Yes	Yes	> Structure is in fair condition.

S.No.	Design Chainage (Km)	Type of Culvert As per Site	Side	Structure on	Span Arrangement (No x Length) As Per site	Vertical Clearance	Deck Width (m)	Floor Protection (Yes/No)		Quadrant Stone Pitching (Yes/No)		Observations
								LHS	RHS	LHS	RHS	
22	62+442	PC	BHS	MCW	1 x 1	1	24.20	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
23	63+168	PC	BHS	MCW	2 x 1.2	1.2	33.00	NV	NV	No	No	> Debris & Silt observed on Vent way. > Structure is in fair condition
24	64+144	BC	BHS	MCW	1 x 4	3	24.00	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition.
25	64+883	PC	BHS	MCW	3 x 1	1	27.50	NV	NV	No	No	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
26	66+224	BC	BHS	MCW	1 x 4	3.5	24.00	NV	NV	Yes	No	> Structure is in fair condition.
27	68+950	PC	BHS	MCW	2 x 1.2	1.2	27.50	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
28	69+506	BC	BHS	MCW	1 x 3	2.5	24.00	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition.
29	70+135	PC	BHS	MCW	2 x 1	1	27.50	NV	NV	No	No	> Vegetation, Debris & Silt observed on Vent way. > RHS Not Visible. > Structure is in fair condition
30	70+605	PC	BHS	MCW	1 x 1.2	1.2	27.50	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
31	71+317	PC	BHS	MCW	1 x 1	1	27.50	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
32	71+641	PC	BHS	MCW	3 x 1.2	1.2	27.50	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition

S.No.	Design Chainage (Km)	Type of Culvert As per Site	Side	Structure on	Span Arrangement (No x Length) As Per site	Vertical Clearance	Deck Width (m)	Floor Protection (Yes/No)		Quadrant Stone Pitching (Yes/No)		Observations
								LHS	RHS	LHS	RHS	
33	72+427	PC	BHS	MCW	1 x 1.2	1.2	39.50	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
34	73+785	PC	BHS	MCW	3 x 1.2	1.2	39.00	NV	NV	No	No	> Structure is in fair condition.
35	75+721	PC	BHS	MCW	1 x 1.2	1.2	37.00	NV	NV	No	No	> Structure is in fair condition.
36	77+106	PC	BHS	MCW	2 x 1.2	1.2	55.00	NV	NV	NV	NV	> Connected to drains.
37	82+214	PC	BHS	MCW	3 x 1.2	1.2	27.50	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
38	82+570	PC	BHS	MCW	3 x 1	1	37.00	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
39	82+890	PC	BHS	MCW	1 x 1	1	32.00	NV	NV	No	No	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
40	83+092	BC	BHS	MCW	1 x 4.6	2	24.00	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition.
41	86+261	BC	BHS	MCW	1 x 4	2.5	28.30	NV	NV	Yes	Yes	> Structure is in fair condition.
42	86+536	PC	BHS	MCW	4 x 0.3	0.3	34.00	NV	NV	NV	No	> LHS not Visible.
43	86+981	PC	BHS	MCW	5 x 0.3	0.3	24.00	NV	NV	NV	No	> LHS not Visible.
44	90+770	PC	BHS	MCW	3 x 1.2	1.2	27.50	NV	NV	Yes	No	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
45	91+721	PC	BHS	MCW	1 x 1	1	24.00	NV	NV	Yes	Yes	> Structure is in fair condition.
46	93+137	PC	BHS	MCW	2 x 1.2	1.2	24.00	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition

S.No.	Design Chainage (Km)	Type of Culvert As per Site	Side	Structure on	Span Arrangement (No x Length) As Per site	Vertical Clearance	Deck Width (m)	Floor Protection (Yes/No)		Quadrant Stone Pitching (Yes/No)		Observations
								LHS	RHS	LHS	RHS	
47	93+985	BC	BHS	MCW	1 x 5	4.2	24.00	NV	NV	Wing Wall	Wing Wall	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition.
48	95+345	BC	BHS	MCW	1 x 2	2	47.83	NV	NV	Wing Wall	Wing Wall	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition.
49	95+914	BC	BHS	MCW	1 x 3	3	24.00	NV	NV	Wing Wall	Wing Wall	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition.
50	97+267	BC	BHS	MCW	1 x 2	3	24.00	Yes	Yes	Wing Wall	Wing Wall	> Structure is in fair condition.
51	99+135	BC	BHS	MCW	1 x 2	2	24.20	NV	NV	Wing Wall	Wing Wall	> Structure is in fair condition.
52	100+121	BC	BHS	MCW	1 x 3	2	24.00	NV	NV	Wing Wall	Wing Wall	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition.
53	102+111	BC	BHS	MCW	1 x 4	2.5	24.00	NV	NV	Wing Wall	Wing Wall	> Structure is in fair condition.
54	102+336	BC	BHS	MCW	1 x 3	2	24.00	NV	NV	Wing Wall	Wing Wall	> Structure is in fair condition.
55	105+494	PC	BHS	MCW	2 x 1.2	1.2	49.00	NV	NV	No	No	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
56	105+721	PC	BHS	MCW	1 x 1.2	1.2	24.50	NV	NV	No	No	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
57	111+095	BC	BHS	MCW	1 x 3	3	24.00	NV	NV	Wing Wall	Wing Wall	> Debris & Silt observed on Vent way. > Structure is in fair condition.
58	111+349	PC	BHS	MCW	2 x 1.2	1.2	27.50	NV	NV	No	No	> Debris & Silt observed on Vent way. > Structure is in fair condition
59	115+857	BC	BHS	MCW	1 x 3	2.5	24.00	NV	NV	Wing Wall	Wing Wall	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition.

S.No.	Design Chainage (Km)	Type of Culvert As per Site	Side	Structure on	Span Arrangement (No x Length) As Per site	Vertical Clearance	Deck Width (m)	Floor Protection (Yes/No)		Quadrant Stone Pitching (Yes/No)		Observations
								LHS	RHS	LHS	RHS	
60	116+101	PC	BHS	MCW	2 x 1.2	1.2	24.00	NV	NV	No	No	> Not visible at the site.
61	117+608	BC	BHS	MCW	1 x 4	2.5	24.00	NV	NV	Wing Wall	Wing Wall	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition.
62	116+900	PC	BHS	MCW	2 x 1.2	1.2	24.00	NV	NV	No	No	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
63	118+305	PC	BHS	MCW	2 x 1.2	1.2	27.50	NV	NV	Yes	Yes	> Debris & Silt observed on Vent way. > Structure is in fair condition
64	119+509	PC	BHS	MCW	1 x 1.2	1.2	27.50	NV	NV	Yes	Yes	> Structure is in fair condition.
65	119+935	BC	BHS	MCW	1 x 3	3	27.50	NV	NV	Wing Wall	Wing Wall	> Not accessible High embankment.
66	121+200	PC	BHS	MCW	1 x 1.2	1.2	39.00	NV	NV	Yes	Yes	> Structure is in fair condition.
67	121+934	PC	BHS	MCW	1 x 1.2	1.2	39.00	NV	NV	Yes	Yes	> Structure is in fair condition.
68	122+122	PC	BHS	MCW	1 x 1.2	1.2	39.00	NV	NV	Yes	Yes	> Debris & Silt observed on Vent way. > Structure is in fair condition
69	124+917	PC	BHS	MCW	1 x 1.2	1.2	24.00	NV	NV	Yes	Yes	> Structure is in fair condition.
70	125+160	PC	BHS	MCW	1 x 1.2	1.2	27.50	NV	NV	No	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
71	125+615	PC	BHS	MCW	1 x 1.2	1.2	27.50	NV	NV	No	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
72	126+247	PC	BHS	MCW	2 x 1.2	1.2	26.00	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
73	126+612	PC	BHS	MCW	1 x 1.2	1.2	26.00	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition

S.No.	Design Chainage (Km)	Type of Culvert As per Site	Side	Structure on	Span Arrangement (No x Length) As Per site	Vertical Clearance	Deck Width (m)	Floor Protection (Yes/No)		Quadrant Stone Pitching (Yes/No)		Observations
								LHS	RHS	LHS	RHS	
74	127+180	PC	BHS	MCW	1 x 1.2	1.2	26.00	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > RHS old Stone Masonry > Structure is in fair condition
75	128+055	PC	BHS	MCW	1 x 1	1	26.00	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
76	130+442	PC	BHS	MCW	1 x 1.2	1.2	24.40	NV	NV	Yes	Yes	> Structure is in fair condition.
77	130+662	BC	BHS	MCW	1 x 5	4	24.00	NV	NV	Wing Wall	Wing Wall	> Structure is in fair condition.
78	130+892	PC	BHS	MCW	1 x 1.2	1.2	27.50	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
79	131+440	BC	BHS	MCW	1 x 5	1.5	24.00	NV	NV	Wing Wall	Wing Wall	> Structure is in fair condition.
80	132+550	PC	BHS	MCW	1 x 1.2	1.2	50.00	NV	NV	No	No	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
81	134+395	BC	BHS	MCW	1 x 3	2.5	24.00	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition.
82	135+057	PC	BHS	MCW	1 x 1	1	27.50	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
83	135+596	PC	BHS	MCW	1 x 1	1	27.50	NV	NV	Yes	Yes	> Structure is in fair condition.
84	135+757	PC	BHS	MCW	1 x 1.2	1.2	28.00	NV	NV	Yes	Yes	> Structure is in fair condition.
85	138+210	BC	BHS	MCW	1 x 3	2.5	23.80	NV	NV	Yes	Yes	> Debris & Silt observed on Vent way. > Structure is in fair condition.
86	138+655	PC	BHS	MCW	1 x 1.2	1.2	27.50	NV	NV	No	No	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition

S.No.	Design Chainage (Km)	Type of Culvert As per Site	Side	Structure on	Span Arrangement (No x Length) As Per site	Vertical Clearance	Deck Width (m)	Floor Protection (Yes/No)		Quadrant Stone Pitching (Yes/No)		Observations
								LHS	RHS	LHS	RHS	
87	138+920	PC	BHS	MCW	1 x 1.2	1.2	24.60	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
88	139+735	PC	BHS	MCW	1 x 1	1	33.00	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
89	140+210	PC	BHS	MCW	1 x 1.2	1.2	28.10	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
90	141+570	PC	BHS	MCW	1 x 1	1	27.50	NV	NV	Yes	No	> Vegetation, Debris & Silt observed on Vent way. > RHS not visible. > Structure is in fair condition
91	141+925	BC	BHS	MCW	1 x 6	5	24.00	NV	NV	Wing Wall	Wing Wall	> Debris & Silt observed on Vent way. > Structure is in fair condition.
92	142+170	PC	BHS	MCW	1 x 1.2	1.2	27.50	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
93	143+370	PC	BHS	MCW	1 x 1	1	26.00	NV	NV	No	No	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
94	144+006	PC	BHS	MCW	1 x 1.2	1.2	33.74	NV	NV	No	No	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
95	144+645	BC	BHS	MCW	1 x 6	3	28.00	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition.
96	144+940	PC	BHS	MCW	1 x 1.2	1.2	24.37	NV	NV	Yes	Yes	> Structure is in fair condition
97	145+035	PC	BHS	MCW	1 x 1.2	1.2	24.20	NV	NV	Yes	Yes	> Structure is in fair condition

S.No.	Design Chainage (Km)	Type of Culvert As per Site	Side	Structure on	Span Arrangement (No x Length) As Per site	Vertical Clearance	Deck Width (m)	Floor Protection (Yes/No)		Quadrant Stone Pitching (Yes/No)		Observations
								LHS	RHS	LHS	RHS	
98	145+670	PC	BHS	MCW	1 x 1.2	1.2	27.50	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
99	145+937	PC	BHS	MCW	1 x 1	1	26.50	NV	NV	Yes	Yes	> Structure is in fair condition
100	146+205	PC	BHS	MCW	1 x 1	1	26.50	NV	NV	No	No	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
101	146+670	PC	BHS	MCW	1 x 1.2	1.2	27.50	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
102	147+032	BC	BHS	MCW	1 x 4.8	3	28.00	NV	NV	Wing Wall	Wing Wall	> Debris & Silt observed on Vent way. > Structure is in fair condition.
103	147+545	PC	BHS	MCW	1 x 1.2	1.2	52.00	NV	NV	No	No	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
104	147+940	BC	BHS	MCW	1 x 6	5	28.00	NV	NV	Wing Wall	Wing Wall	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition.
105	148+390	PC	BHS	MCW	1 x 1.2	1.2	40.00	NV	NV	No	No	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
106	148+507	PC	BHS	MCW	1 x 1.2	1.2	42.00	NV	NV			> Not visible at the site.
107	148+951	PC	BHS	MCW	2 x 1.2	1.2	54.00	NV	NV	No	No	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
108	149+970	PC	BHS	MCW	1 x 1.2	1.2	37.00	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
109	150+110	BC	BHS	MCW	1 x 6	4	24.25	NV	NV	Wing Wall	Wing Wall	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition.

S.No.	Design Chainage (Km)	Type of Culvert As per Site	Side	Structure on	Span Arrangement (No x Length) As Per site	Vertical Clearance	Deck Width (m)	Floor Protection (Yes/No)		Quadrant Stone Pitching (Yes/No)		Observations
								LHS	RHS	LHS	RHS	
110	150+250	PC	BHS	MCW			27.50	NV	NV			> Culvert not visible at site.
111	151+705	PC	BHS	MCW	2 x 1.2	1.2	27.50	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
112	153+525	PC	BHS	MCW	2 x 1.2	1.2	49.00	NV	NV	No	No	> Structure is in fair condition.
113	155+000	PC	BHS	MCW	1 x 1.2	1.2	27.50	NV	NV	Yes	Yes	> Structure is in fair condition.
114	155+464	PC	BHS	MCW	2 x 1.2	1.2	27.50	NV	NV	No	No	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
115	157+371	PC	BHS	MCW	1 x 1.2	1.2	26.00	NV	NV	No	No	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
116	157+679	PC	BHS	MCW	1 x 1.2	1.2	54.00	NV	NV	Yes	Yes	> Structure is in fair condition.
117	159+152	PC	BHS	MCW	1 x 1.2	1.2	27.00	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
118	160+033	SC	BHS	MCW	1 x 3.5	3	27.50	NV	NV	Wing Wall	Wing Wall	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition.
119	160+514	PC	BHS	MCW	1 x 1.2	1.2	27.50	NV	NV	No	No	> Structure is in fair condition.
120	160+579	PC	BHS	MCW	1 x 1.2	1.2	27.50	NV	NV	No	No	> Structure is in fair condition.
121	161+005	PC	BHS	MCW	1 x 1.2	1.2	27.50	NV	NV	No	No	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
122	161+580	BC	BHS	MCW	1 x 3	3	24.00	NV	NV	Yes	Yes	> Structure is in fair condition.
123	161+778	PC	BHS	MCW	1 x 1.2	1.2	27.50	NV	NV	No	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition

S.No.	Design Chainage (Km)	Type of Culvert As per Site	Side	Structure on	Span Arrangement (No x Length) As Per site	Vertical Clearance	Deck Width (m)	Floor Protection (Yes/No)		Quadrant Stone Pitching (Yes/No)		Observations
								LHS	RHS	LHS	RHS	
124	162+309	PC	BHS	MCW	1 x 1.2	1.2	27.50	NV	NV	Yes	Yes	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
125	163+691	PC	BHS	MCW	1 x 1.2	1.2	27.50	NV	NV	No	No	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
126	164+145	SC	BHS	MCW	1 x 5.2	3	27.50	NV	NV	Wing Wall	Wing Wall	> Structure is in fair condition.
127	167+775	PC	BHS	MCW	1 x 1.2	1.2	27.50	NV	NV	No	No	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
128	168+421	PC	BHS	MCW	1 x 1.2	1.2	27.50	NV	NV	No	No	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
129	169+276	PC	BHS	MCW	1 x 1.2	1.2	46.00	NV	NV	Yes	Yes	> Structure is in fair condition.
130	170+049	PC	BHS	MCW	1 x 1.2	1.2	46.00	NV	NV	No	No	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition
131	172+162	SC	BHS	MCW	1 x 4.1	2	24.00	NV	NV	Wing Wall	Wing Wall	> Vegetation, Debris & Silt observed on Vent way. > Structure is in fair condition.
132	173+600	PC	BHS	MCW	1 x 1.2	1.2	52.00	NV	NV	No	No	> Structure is in fair condition.
133	174+217	PC	BHS	MCW	1 x 1.2	1.2	48.00	NV	NV	No	Yes	> Structure is in fair condition.
134	174+375	PC	BHS	MCW	1 x 1.2	1.2	48.00	NV	NV	Yes	Yes	> Structure is in fair condition.
135	174+445	PC	BHS	MCW	1 x 1.2	1.2	48.00	NV	NV	No	Yes	> Structure is in fair condition.
136	174+775	PC	BHS	MCW	1 x 1.2	1.2	48.00	NV	NV	No	No	> Structure is in fair condition.

Photos depicting the existing Slab culvert are presented below

Slab Culvert at Km 42+335

Slab Culvert at Km 45+985

Slab Culvert at Km 46+847

Slab Culvert at Km 51+180

Slab Culvert at Km 57+155

Slab Culvert at Km 164+145

Photos depicting the existing Box culvert are presented below

Box Culvert at Km 41+016

Box Culvert at Km 42+387

Box Culvert at Km 66+244

Box Culvert at Km 83+092

Box Culvert at Km 93+985

Box Culvert at Km 95+914

Box Culvert at Km 100+121	Box Culvert at Km 130+662
Box Culvert at Km 134+395	Box Culvert at Km 141+925

Box Culvert at Km 147+032	Box Culvert at Km 161+580

Photos depicting the existing Pipe culvert are presented below

Pipe Culvert at Km 38+483

Pipe Culvert at Km 39+249

Pipe Culvert at Km 40+262

Pipe Culvert at Km 43+166

Pipe Culvert at Km61+789

Pipe Culvert at Km 63+168

Pipe Culvert at Km 70+605	Pipe Culvert at Km 73+785
Pipe Culvert at Km 90+720	Pipe Culvert at Km 105+494
Pipe Culvert at Km 111+349	Pipe Culvert at Km 116+901

Pipe Culvert at Km 122+122	Pipe Culvert at Km 125+615
Pipe Culvert at Km 127+180	Pipe Culvert at Km 135+596

Pipe Culvert at Km 146+670	Pipe Culvert at Km 168+421

4.7 DRAINAGE AND SLOPE PROTECTION

RCC covered drains constructed along the corridor appear to be in good condition for most of length and functioning well.

Median drains at curve locations are in good condition where they need cleaning. No major distress is observed on the carriageway on downstream side at median drain locations.

Slope protection in the form of pitching has been provided along the corridor. At few locations, the slope protection is with of vegetation and is mentioned in the tables above.

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 different locations appear to be in fair condition. At some isolated locations small length damaged.

Roadway delineators installed along the length of corridor appear to be good condition at most of locations. Very few delineators got damaged.

4.9 ROAD USER FACILITITES

The bus stop and bus bay, Truck lay bye provided along the corridor appear to be fair in condition.

CHAPTER 5. REHABILITATION PLANS AND DESIGNS

5.1 DESIGN TRAFFIC LOADING

Design Traffic loading has been estimated by considering the traffic data (given) and VDFs as estimated from the latest axle load survey data for all types of vehicles for the design period of 10 years, 15 years and 20 years as below:

Table 36: Traffic Volume (AADT)

Vehicle/Mode	AADT at 92+500 FY22 (Vehicles)	AADT at 150+500 FY22 (Vehicles)
LCV	443	422
2A truck	1422	1604
3A truck	1389	1398
MAV truck	1691	1751
BUS	190	242

*Note: 50:50 directional distributions are considered.

Table 37: Estimated Design traffic loading

Year	Design Lane MSA on Existing Carriageway			
	Km. 92+500		Km. 150+500	
	UP	DN	UP	DN
6th year from Now	27	28	31	23
10th year from Now	50	51	57	44
15th year from Now	87	88	98	75
20th year from Now	133	136	152	116

The computation of traffic loadings is presented in Appendix 6 of this Report. The traffic loading appears more or less same in either direction.

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) 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.
- 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 38: Remaining life of the existing pavement on Both Carriageways

Sections	From	To	Length	Existing - BT layer MR value	MR of Granular Layer Thickness	MR (or) E- Subgrade	Existing BT layer (mm)	Existing Granular layer(mm)	Total BT Layer thickness	Total Crust	E- BT layer	ver. Strain (Ev)	tan. Strain (Et)	Nf- Fatigue life, mSA	Rutting life, mSA
LHS															
1	36.60	40.20	3.6	1385	249	77	170	400	170	570	1385	0.0003217	0.0002127	28	96
2	40.20	43.00	2.8	1404	367	77	170	400	170	570	1404	0.0002841	0.0001651	75	169
3	43.00	46.40	3.4	1426	135	67	208	414	208	622	1426	0.0003197	0.0002351	19	99
4	46.40	49.00	2.6	1400	157	68	250	430	250	680	1400	0.0002536	0.0001793	55	283
5	49.00	53.60	4.6	1398	253	77	250	430	250	680	1398	0.0002179	0.0001434	131	563
6	53.60	57.60	4.0	1329	293	77	228	452	228	680	1329	0.0002193	0.0001485	119	547
7	57.60	60.80	3.2	1314	255	77	220	460	220	680	1314	0.0002309	0.0001675	75	433
8	60.80	63.60	2.8	1308	366	77	220	460	220	680	1308	0.0002075	0.0001341	180	703
9	63.60	67.40	3.8	1260	104	77	181	415	181	595	1260	0.0003522	0.0003254	6	64
10	67.40	69.40	2.0	1325	128	77	160	430	160	590	1325	0.0003638	0.0003249	6	55
11	69.40	71.40	2.0	1323	155	77	160	430	160	590	1323	0.0003526	0.0002959	8	64
12	71.40	74.80	3.4	1455	140	77	128	422	128	550	1455	0.0004209	0.0003658	3	28
13	74.80	78.05	3.3	1491	160	77	120	420	120	540	1491	0.0004264	0.0003564	4	27
14	78.05	82.00	3.9	1478	165	75	125	435	125	560	1478	0.0004044	0.0003400	4	34
15	82.00	85.40	3.4	1479	120	77	140	480	140	620	1479	0.0003544	0.0003575	4	62
16	85.40	88.60	3.2	1475	265	77	131	405	131	536	1475	0.0003656	0.0002493	15	54
17	88.60	93.60	5.0	1440	195	77	130	400	130	530	1440	0.0004092	0.0003049	7	32
18	93.60	100.80	7.2	1326	147	77	170	438	170	608	1326	0.0003337	0.0002872	9	82

Sections	From	To	Length	Existing - BT layer MR value	MR of Granular Layer Thickness	MR (or) E- Subgrade	Existing BT layer (mm)	Existing Granular layer(mm)	Total BT Layer thickness	Total Crust	E- BT layer	ver. Strain (Ev)	tan. Strain (Et)	Nf- Fatigue life, mSA	Rutting life, mSA
19	100.80	104.20	3.4	1170	89	59	146	445	146	591	1170	0.0004841	0.0004479	2	15
20	104.20	106.80	2.6	1357	224	77	150	400	150	550	1357	0.0003629	0.0002558	14	56
21	106.80	110.00	3.2	1157	80	77	150	400	150	550	1157	0.0004393	0.0004569	2	23
22	110.00	113.00	3.0	1374	90	77	150	400	150	550	1374	0.0004198	0.0003959	3	29
23	113.00	115.40	2.4	1405	178	77	150	450	150	600	1405	0.0003381	0.0002841	9	77
24	115.40	119.20	3.8	1275	85	77	150	500	150	650	1275	0.0003460	0.0004218	2	69
25	119.20	123.00	3.8	1435	82	77	141	321	141	462	1435	0.0005255	0.0004264	2	10
26	123.00	125.80	2.8	1456	343	77	140	300	140	440	1456	0.0004365	0.0002064	31	24
27	125.80	128.60	2.8	1372	335	77	200	570	200	770	1372	0.0001778	0.0001507	110	1415
28	128.60	131.80	3.2	1413	301	77	200	570	200	770	1413	0.0001836	0.0001596	85	1224
29	131.80	134.80	3.0	1221	228	77	200	570	200	770	1221	0.0002057	0.0001998	40	731
30	134.80	137.60	2.8	1305	364	77	228	412	228	640	1305	0.0002263	0.0001316	194	474
31	137.60	140.20	2.6	1283	235	77	230	400	230	630	1283	0.0002602	0.0001709	71	252
32	140.20	143.60	3.4	1310	359	77	200	470	200	670	1310	0.0002183	0.0001477	123	558
33	143.60	146.80	3.2	1308	288	77	200	454	200	654	1308	0.0002435	0.0001713	69	340
34	146.80	151.40	4.6	1265	255	77	200	430	200	630	1265	0.0002683	0.0001876	50	219
35	151.40	154.40	3.0	1126	150	50	200	430	200	630	1126	0.0003947	0.0002664	14	38
36	154.40	158.00	3.6	1154	192	77	147	457	147	603	1154	0.0003415	0.0003023	8	73
37	158.00	161.00	3.0	1166	139	59	140	460	140	600	1166	0.0004427	0.0003765	4	23
38	161.00	164.60	3.6	1173	195	75	140	460	140	600	1173	0.0003519	0.0003097	8	64
39	164.60	167.60	3.0	1174	224	72	149	348	149	497	1174	0.0004457	0.0002752	12	22
40	167.60	170.60	3.0	1315	273	77	150	340	150	490	1315	0.0004054	0.0002324	21	34
41	170.60	174.60	4.0	1316	291	77	150	349	150	499	1316	0.0003877	0.0002224	25	41
RHS															
1	36.60	38.60	2.0	758	145	77	270	330	270	600	758	0.0003252	0.0002325	34	92
2	38.60	42.80	4.2	1336	361	77	270	330	270	600	1336	0.0002361	0.0001134	339	391
3	42.80	46.60	3.8	1321	311	73	270	330	270	600	1321	0.0002516	0.0001245	238	293
4	46.60	49.20	2.6	1226	158	77	270	330	270	600	1226	0.0002769	0.0001762	66	190
5	49.20	52.40	3.2	1308	367	77	168	342	168	510	1308	0.0003401	0.0001730	67	75
6	52.40	58.00	5.6	1315	232	77	137	379	137	516	1315	0.0004051	0.0002742	11	34
7	58.00	60.00	2.0	1149	229	77	230	450	230	680	1149	0.0002409	0.0001799	64	357
8	60.00	63.60	3.6	1303	304	77	268	469	268	737	1303	0.0001839	0.0001223	258	1215
9	63.60	66.80	3.2	781	94	77	270	470	270	740	781	0.0002484	0.0002732	18	311
10	66.80	70.60	3.8	843	157	77	256	466	256	722	843	0.0002464	0.0002229	36	322
11	70.60	74.70	4.1	1516	161	77	153	400	153	552	1516	0.0003779	0.0002843	9	46
12	74.70	78.40	3.7	1650	224	77	160	390	160	550	1650	0.0003424	0.0002221	21	73
13	78.40	86.00	7.6	1343	142	77	160	304	160	464	1343	0.0004833	0.0003128	7	15
14	86.00	90.20	4.2	1337	180	77	160	270	160	430	1337	0.0005115	0.0002820	10	12
15	90.20	93.60	3.4	1378	313	77	150	330	150	480	1378	0.0003967	0.0002099	30	37
16	93.60	97.80	4.2	1431	172	77	119	398	119	517	1431	0.0004489	0.0003518	4	21
17	97.80	102.80	5.0	1440	145	77	120	453	120	573	1440	0.0004037	0.0003804	3	34
18	102.80	107.60	4.8	1393	140	77	130	460	130	590	1393	0.0003829	0.0003674	3	44

Sections	From	To	Length	Existing - BT layer MR value	MR of Granular Layer Thickness	MR (or) E- Subgrade	Existing BT layer (mm)	Existing Granular layer(mm)	Total BT Layer thickness	Total Crust	E- BT layer	ver. Strain (Ev)	tan. Strain (Et)	Nf- Fatigue life, mSA	Rutting life, mSA
19	107.60	113.00	5.4	1399	153	77	122	413	122	536	1399	0.0004386	0.0003710	3	24
20	113.00	117.00	4.0	1426	134	76	133	485	133	618	1426	0.0003607	0.0003631	3	57
21	117.00	119.60	2.6	1281	185	77	140	530	140	670	1281	0.0002941	0.0003066	7	145
22	119.60	123.00	3.4	1290	144	77	161	475	161	636	1290	0.0003230	0.0003079	7	95
23	123.00	125.20	2.2	1314	237	77	170	450	170	620	1314	0.0002917	0.0002217	25	150
24	125.20	128.00	2.8	1307	365	77	170	450	170	620	1307	0.0002534	0.0001675	76	284
25	128.00	129.20	1.2	1316	277	76	170	450	170	620	1316	0.0002800	0.0002008	37	181
24	129.20	132.00	2.8	1289	234	77	204	507	204	711	1289	0.0002272	0.0001899	47	466
25	132.00	137.60	5.6	1222	237	77	215	475	215	690	1222	0.0002356	0.0001837	56	395
26	137.60	142.60	5.0	1182	324	77	208	461	208	669	1182	0.0002289	0.0001584	102	450
27	142.60	146.80	4.2	1226	338	77	220	550	220	770	1226	0.0001771	0.0001427	149	1441
28	146.80	149.60	2.8	1192	258	77	220	550	220	770	1192	0.0001943	0.0001710	76	947
29	149.60	153.00	3.4	877	173	69	239	456	239	695	877	0.0002769	0.0002262	33	190
30	153.00	155.40	2.4	973	146	77	240	450	240	690	973	0.0002625	0.0002331	27	242
31	155.40	160.20	4.8	1036	111	77	231	448	231	678	1036	0.0002755	0.0002660	15	194
32	160.20	164.60	4.4	1270	102	77	130	429	130	559	1270	0.0004411	0.0004489	2	23
33	164.60	167.00	2.4	1272	141	73	130	430	130	560	1272	0.0004315	0.0003832	3	25
34	167.00	172.00	5.0	1282	202	77	150	445	150	595	1282	0.0003367	0.0002762	11	78
35	172.00	174.60	2.6	1248	159	77	220	500	220	720	1248	0.0002381	0.0002173	29	377

It can be seen from the above table

- Section1 LHS: -About 56.4 Km length on LHS requires strengthening Overlay as the remaining life of these sections is less than the 10th Year Design MSA.
- Section2 LHS: - About 43.6 Km length on LHS requires strengthening Overlay as the remaining life of these sections is less than the 10th Year Design MSA.
- Section1 RHS: - About 57.0 Km length on RHS requires strengthening Overlay as the remaining life of these sections is less than the 10th Year Design MSA.
- Section2 RHS: - About 38.4 Km length on RHS requires strengthening Overlay as the remaining life of these sections is less than the 10th Year Design MSA

Table 39: Design of overlay for LHS & RHS MCW

S.No	From	To	Length	Existing - BT layer MR value	MR of Granular Layer Thickness	MR (or) E- Subgrade	Existing BT layer(mm)	Existing Granular layer(mm)	Proposed BT	Total BT Layer thickness	Total Crust	E- BT layer	ver. Strain (Ev)*10^-6	tan. Strain (Et)*10^-6	Nf- Fatigue life, mSA	Rutting life,mSA
1	36.60	40.20	3.6	1385	249	77	170	400	40	210	610	1385	0.0002527	0.0001703	68	288
2	43.00	46.40	3.4	1426	135	67	208	414	50	258	672	1426	0.0002351	0.0001712	65	399
3	63.60	67.40	3.8	1260	104	77	181	415	85	266	680	1260	0.0002098	0.0001825	56	668
4	67.40	69.40	2.0	1325	128	77	160	430	90	250	680	1325	0.0002148	0.0001793	57	601
5	69.40	71.40	2.0	1323	155	77	160	430	75	235	665	1323	0.0002274	0.0001835	53	464
6	71.40	74.80	3.4	1455	140	77	128	422	105	233	655	1455	0.0002271	0.0001786	54	467
7	74.80	78.05	3.3	1491	160	77	120	420	105	225	645	1491	0.0002323	0.0001755	56	421
8	78.05	82.00	3.9	1478	165	75	125	435	100	225	660	1478	0.0002293	0.0001749	58	447
9	82.00	85.40	3.4	1479	120	77	140	480	105	245	725	1479	0.0001960	0.0001748	58	910
10	85.40	88.60	3.2	1475	265	77	131	405	55	186	591	1475	0.0002658	0.0001791	53	229
11	88.60	93.60	5.0	1440	195	77	130	400	85	215	615	1440	0.0002498	0.0001771	56	303
12	93.60	100.80	7.2	1326	147	77	170	438	70	240	678	1326	0.0002212	0.0001832	53	526
13	100.80	104.20	3.4	1170	89	59	146	445	125	271	716	1170	0.0002294	0.0001856	56	446
14	104.20	106.80	2.6	1357	224	77	150	400	60	210	610	1357	0.0002550	0.0001787	57	276
15	106.80	110.00	3.2	1157	80	77	150	400	125	275	675	1157	0.0002025	0.0001851	57	785
16	110.00	113.00	3.0	1374	90	77	150	400	110	260	660	1374	0.0002118	0.0001821	52	640
17	113.00	115.40	2.4	1405	178	77	150	450	80	230	680	1405	0.0002168	0.0001720	64	576
18	115.40	119.20	3.8	1275	85	77	150	500	125	275	775	1275	0.0001706	0.0001740	67	1707
19	119.20	123.00	3.8	1435	82	77	141	321	130	271	592	1435	0.0002238	0.0001689	68	499
20	123.00	125.80	2.8	1456	343	77	140	300	40	180	480	1456	0.0003372	0.0001662	71	78
21	131.80	134.80	3.0	1221	228	77	200	570	40	240	810	1221	0.0001670	0.0001583	100	1881
22	146.80	151.40	4.6	1265	255	77	200	430	40	240	670	1265	0.0002134	0.0001503	119	619
23	151.40	154.40	3.0	1126	150	50	200	430	65	265	695	1126	0.0002682	0.0001794	66	220
24	154.40	158.00	3.6	1154	192	77	147	457	85	232	688	1154	0.0002153	0.0001769	68	594
25	158.00	161.00	3.0	1166	139	59	140	460	110	250	710	1166	0.0002392	0.0001811	62	369

S.No	From	To	Length	Existing - BT layer MR value	MR of Granular Layer Thickness	MR (or) E- Subgrade	Existing BT layer(mm)	Existing Granular layer(mm)	Proposed BT	Total BT Layer thickness	Total Crust	E- BT layer	ver. Strain (Ev)*10^-6	tan. Strain (Et)*10^-6	Nf- Fatigue life, mSA	Rutting life,mSA
26	161.00	164.60	3.6	1173	195	75	140	460	85	225	685	1173	0.0002218	0.0001806	62	519
27	164.60	167.60	3.0	1174	224	72	149	348	75	224	572	1174	0.0002839	0.0001766	68	170
28	167.60	170.60	3.0	1315	273	77	150	340	50	200	540	1315	0.0002967	0.0001754	63	139
29	170.60	174.60	4.0	1316	291	77	150	349	50	200	549	1316	0.0002858	0.0001686	73	165

S.no	From	To	Length	Existing - BT layer MR value	MR of Granular Layer Thickness	MR (or) E- Subgrade	Existing BT layer(mm)	Existing Granular layer(mm)	Proposed BT	Total BT Layer thickness	Total Crust	E- BT layer	ver. Strain (Ev)*10^-6	tan. Strain (Et)*10^-6	Nf- Fatigue life, mSA	Rutting life,mSA
1	36.60	38.60	2.0	758	145	77	270	330	40	310	640	758	0.0002488	0.0001813	89	309
2	52.40	58.00	5.6	1315	232	77	137	379	70	207	586	1315	0.0002681	0.0001795	58	220
3	63.60	66.80	3.2	781	94	77	270	470	50	320	790	781	0.0001814	0.0001964	63	1293
4	66.80	70.60	3.8	843	157	77	256	466	40	296	762	843	0.0001929	0.0001742	95	978
5	70.60	74.70	4.1	1516	161	77	153	400	75	228	627	1516	0.0002415	0.0001769	54	353
6	74.70	78.40	3.7	1650	224	77	160	390	50	210	600	1650	0.0002546	0.0001662	64	278
7	78.40	86.00	7.6	1343	142	77	160	304	85	245	549	1343	0.0002787	0.0001806	55	184
8	86.00	90.20	4.2	1337	180	77	160	270	75	235	505	1337	0.0003127	0.0001785	58	109
9	90.20	93.60	3.4	1378	313	77	150	330	40	190	520	1378	0.0003077	0.0001687	70	118
10	93.60	97.80	4.2	1431	172	77	119	398	105	224	622	1431	0.0002431	0.0001749	59	343
11	97.80	102.80	5.0	1440	145	77	120	453	110	230	683	1440	0.0002164	0.0001781	55	581
12	102.80	107.60	4.8	1393	140	77	130	460	105	235	695	1393	0.0002116	0.0001793	55	643
13	107.60	113.00	5.4	1399	153	77	122	413	110	232	646	1399	0.0002311	0.0001758	59	431
14	113.00	117.00	4.0	1426	134	76	133	485	100	233	718	1426	0.0002062	0.0001830	50	723
15	117.00	119.60	2.6	1281	185	77	140	530	75	215	745	1281	0.0001988	0.0001886	49	853
16	119.60	123.00	3.4	1290	144	77	161	475	75	236	711	1290	0.0002106	0.0001891	48	657

S.no	From	To	Length	Existing - BT layer MR value	MR of Granular Layer Thickness	MR (or) E- Subgrade	Existing BT layer(mm)	Existing Granular layer(mm)	Proposed BT	Total BT Layer thickness	Total Crust	E- BT layer	ver. Strain (Ev)*10^-6	tan. Strain (Et)*10^-6	Nf- Fatigue life, mSA	Rutting life,mSA
17	123.00	125.20	2.2	1314	237	77	170	450	40	210	660	1314	0.0002307	0.0001767	61	435
18	128.00	129.20	1.2	1316	277	76	170	450	40	210	660	1316	0.0002233	0.0001662	78	504
19	149.60	153.00	3.4	877	173	69	239	456	40	279	735	877	0.0002163	0.0001776	85	582
20	153.00	155.40	2.4	973	146	77	240	450	40	280	730	973	0.0002043	0.0001808	72	754
21	155.40	160.20	4.8	1036	111	77	231	448	50	281	728	1036	0.0002014	0.0001912	55	804
22	160.20	164.60	4.4	1270	102	77	130	429	120	250	679	1270	0.0002134	0.0001887	49	619
23	164.60	167.00	2.4	1272	141	73	130	430	115	245	675	1272	0.0002233	0.0001754	65	504
24	167.00	172.00	5.0	1282	202	77	150	445	60	210	655	1282	0.0002381	0.0001906	47	377
25	172.00	174.60	2.6	1248	159	77	220	500	40	260	760	1248	0.0001884	0.0001690	76	1089

Input data used and the output from the IIT Pave software has been presented as screen shots for ready reference as Appendix 8 of this Report.

5.3 STRUCTURAL REHABILITATION

All the structures appear to be in good condition. About Fifteen locations, structures are closely monitored by use of Mobile Bridge Inspection Unit (MBIU). Details of these structures where MBIU is used are presented in the following table

Table 40: Locations of MBIU survey

Sl No.	Chainage	Type of Str	Side	Structure on	Age of Structure	Span Arrangement (No x Length)	Remarks
1	49+770	MJB	LHS	MCW	New	10 x 32.0	
	49+770	MJB	RHS	MCW	New	10 x 32.0	
72	58+555	MJB	LHS	MCW	Old	2 x 13.2 + 2 x 36.8	
	58+555	MJB	RHS	MCW	New	2 x 13.2 + 2 x 36.8	
3	79+520	MJB	LHS	MCW	Old	6 x 22.85 + 3 x 27.4	
	79+520	MJB	RHS	MCW	New	6 x 22.85 + 3 x 27.4	
4	80+154	MJB	LHS	MCW	Old	5 x 13.25	
	80+154	MJB	RHS	MCW	New	5 x 13.25	
5	109+770	MJB	LHS	MCW	New	1 x 45.75 + 2 x 49.5 + 1 x 45.65	
	109+770	MJB	RHS	MCW	Old	1 x 45.75 + 2 x 49.5 + 1 x 45.65	
6	141+095	MJB	LHS	MCW	Old	3 x 21.5	
	141+095	MJB	RHS	MCW	Old	3 x 21.5	
7	149+640	MJB	LHS	MCW	Old	6 x 21.6	
	149+640	MJB	RHS	MCW	New	6 x 21.6	
8	160+337	MJB	LHS	MCW	New	4 x 19	
	160+337	MJB	RHS	MCW	New	4 x 19	
9	74+493	Flyover	LHS	MCW	New	1 x 15 + 1 x 25 + 1 x 15	
	74+493	Flyover	RHS	MCW	New	1 x 15 + 1 x 25 + 1 x 15	
10	77+855	Flyover	LHS	MCW	New	6 x 30 + 1 x 45 + 8 x 30 + 2 x 45	
	77+855	Flyover	RHS	MCW	New	6 x 30 + 1 x 45 + 8 x 30 + 2 x 45	
11	79+868	Flyover	RHS	MCW	New	1 x 15 + 1 x 25 + 1 x 15	
12	113+081	Flyover	LHS	MCW	New	12.615 + 30 + 12.615	
	113+081	Flyover	RHS	MCW	New	12.615 + 30 + 12.615	
13	132+670	Flyover	LHS	MCW	New	1 x 15.5 + 1 x 32 + 1 x 15.5	

Sl No.	Chainage	Type of Str	Side	Structure on	Age of Structure	Span Arrangement (No x Length)	Remarks
	132+670	Flyover	RHS	MCW	New	1 x 15.5 + 1 x 32 + 1 x 15.5	
14	139+465	Flyover	RHS	MCW	New	1 x 15.5 + 1 x 32 + 1 x 15.5	
15	169+640	Flyover	LHS	MCW	New	1 x 15 + 1 x 20 + 1 x 15	
	169+640	Flyover	RHS	MCW	New	1 x 15 + 1 x 20 + 1 x 15	

Based on the Visual Inspection, it is felt prudent to suggest NDT tests to evolve rehabilitation strategies for the following structures.

1. Old Major Bridge, km80+154 LHS
2. Old Major Bridge, km109+770 RHS
3. Old Major Bridge, km149+640 LHS
4. New Minor Bridge, km123+310 BHS
5. New Minor Bridge, km128+640 BHS
6. Old Minor Bridge, km137+685 LHS
7. Old Minor Bridge, km151+235 RHS
8. Old Minor Bridge, km165+169 LHS

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 and includes main criterion of maintaining roughness at 4 IRI as per Schedule F.

6.2 CA SPECIFICATIONS FOR MAJOR MAINTENANCE

Schedule F prescribe the maintenance standards to be adopted for project. Summary of same is presented below.

- In order to determine the Asset Performance Parameters for the Base Year, the Concessionaire shall carry out Revalidation and Testing on the road project to arrive at updated Base Year Parameters 45 days before Appointed Date (O&M Handover Date)
- Initial Maintenance Requirement shall be assessed/revalidated based on Base Year Performance Parameters For clarification of doubt, Concessionaire will arrive at Base Year Parameters 45-days after Appointed Date
- NHAI/Independent Consultant may audit the Revalidation and Testing processes
- Maintenance standards given under Sch-F are given in table below:

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/ Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification / Repair	Maintenance Specifications
		Desirable	Acceptable					
Flexible Pavement - Routine Inspection (Pavement of MCW, Service Road, Approach of Grade structures, approaches of connecting roads, slip roads, lay byes etc. as applicable)	Potholes	Nil	<0.1% of area and subjected to limit of 10mm in depth	Daily	Length Measurement Unit like Scale, Tape, odometer etc.	IRC 82: 2015 and Distress Identification Manual for Long Term Pavement Performance Program, FHWA 2003	24-48 hours	MORT&H Specification 3004.2
	Cracking	Nil	<5% subject to limit of 0.5 sqm for any 50m length	Daily			7-15 days	MORT&H Specification 3004.3
	Rutting	Nil	<5mm	Daily	Straight Edge		15 -30 days	MORT&H Specification 3004.2
	Corrugations and Shoving	Nil	0.1% of area	Daily	Length Measurement Unit like Scale, Tape, odometer etc.		3-7 days	IRC:82-2015
	Bleeding	Nil	<1% of area	Daily			3-7 days	MORT&H Specification 3004.4
	Ravelling/ Stripping	Nil	<1% of area	Daily	Length Measurement Unit like Scale, Tape, odometer etc.		7-15 days	IRC:82-2015 read with IRC Sp-81

Asset Type	Performance Parameter	Level of Service (LOS)		Frequency of Inspection	Tools/ Equipment	Standards and References for Inspection and Data Analysis	Time limit for Rectification / Repair	Maintenance Specifications
		Desirable	Acceptable					
	Edge Deformation / Breaking	Nil	<1m for any 100m section and/or width <0.1m at any Location restricted to 30cm from the edge.	Daily			7- 15 days	IRC:82-2015
Flexible Pavement - Programmed Inspection	Roughness IRI	2000 mm/km	2400 mm/km	Bi-Annually	Class I Profilometer SCRIM (Sideway force Coefficient Routine Investigation Machine or equivalent)	Class I Profilometer: ASTM E950 (98) :2004 -Standard Test Method for measuring Longitudinal Profile of Travelled Surfaces With Accelerometer Established Inertial Profiling Reference ASTM E1656 - 94:2000- Standard Guide for Classification of Automatic Pavement Condition Survey Equipment -	180 days	IRC:82-2015
	Skid Number	60SN	50SN	Bi-Annually			180 days	BS:7941-1:2006, IRC:82-2015
	Rutting	<10mm for any 50 m section and/or, length ofsection <5m	<10mm for any 50 m section and/or, length of section <10m	Bi-Annually	Network Survey vehicle (NSV) with all its module such as Laser Profilometers, Transverse profile logger, Laser crack measurement system, Video logging modules, high resolution Odometer etc.		15-30 days	IRC:82-2015
	Pavement Condition Index	>3/85	>2.1/70	Bi-Annually			180 days	IRC:82-2015/ ASTM D 6433-07

Asset Type	Performance Parameter	Level of Service (LOS)		Frequencyof Inspection	Tools/ Equipment	Standards and References for Inspection andData Analysis	Time limit for Rectification / Repair	Maintenance Specifications
		Desirable	Acceptable					
	Other Pavement Distresses	-	-	Bi- Annually	-	-	2-7 days	IRC:82-2015
	Deflection/ Remaining Life	-	-	Annually	Falling Weight Deflectometer	IRC 115: 2014	180 days	IRC:115-2014
Rigid Pavement (Pavement of MCW, Service Road, Grade separated structure, approaches of connecting roads, lay byes, etc. as applicable.	Roughness BI	<2200mm/km	<2400mm/km	Bi- Annually	Class I Profilometer SCRIM (Sideway force Coefficient Routine Investigation Machine or equivalent) British Pendulum Tester	ASTM E950 (98) :2004 and ASTM E1656 -94: 2000	180 days	IRC: SP:83-2018
	Skid	Skid Resistance No. at different speed of vehicles		Bi- Annually		IRC: SP:83-2018	180 days	IRC: SP:83-2018
		Minimum SN	Traffic Speed	Bi-Annually	SCRIM (Sideway force Coefficient Routine Investigation Machine or equivalent) British Pendulum Tester	IRC: SP:83-2018	180 days	IRC: SP:83-2018
		36	50					
		33	65					
		32	80					
		31	95					
		31	110					

Embankment /Slope	Edge drop at shoulders	Nil	40mm	Daily	Length Measurement Unit like Scale,Tape, odometer etc.	IRC	7-15 days	MORT&H Specification
	Slope of camber/cross fall	Nil	<2% variation in prescribed slope of camber /cross fall	Daily			7-15 days	MORT&H Specification
	Embankment Slopes	Nil	<15 % variation in prescribe side slope	Daily			7-15 days	MORT&H Specification
	Embankment Protection	Nil	Nil	Daily	NA		7-15 days	MORT&H Specification
	Rain Cuts/Gullies inslope	Nil	Nil	Daily Specially During Rainy Season	NA	-	7-15 days	MORT&H Specification
Cut Section/ Slope	Unstable Slopes	Nil	-	Daily Specially During Rainy Season	NA	IRC	2-7 days	MORT&H andIRC Specifications

6.3 INPUTS FOR M&M SCHEDULE

6.3.1 PROJECT SECTIONS

Since roughness is the main criterion for major maintenance, Project Corridor has been divided in to various sections depending the present roughness values:

- Section 1: Roughness value <2000 mm/Km
- Section 2: Roughness values >2000<2200 mm/Km
- Section 3: Roughness>2200<2400 mm/Km
- Section 4: Roughness>2400 mm/KM

Direction wise analysis has been done separately for LHS (UP)/RHS (DN) and each direction length has been divided into sections based on above.

6.3.2 TRAFFIC (AADT)

The following traffic data has been used in the analysis is as below:

Vehicle/Mode	AADT at 92+500 FY22 (Vehicles)	AADT at 150+500 FY22 (Vehicles)
LCV	443	422
2A truck	1422	1604
3A truck	1389	1398
MAV truck	1681	1751
BUS	190	242

Note: 50:50 directional distributions are considered.

6.3.3 VECHILE DAMAGE FACTORS (VDF)

VDF values as obtained from axle load surveys are used for various sections are as given below:

VDF Values Estimated at the Toll Plaza Location-km 92+500

Mode Type	Borkhedi to MH/TS Border Carriageway	MH/TS Border to Borkhedi Carriageway
LCV	0.595	1.246
2 Axle Truck	2.734	2.754
3 Axle Truck	4.999	4.838
MAV (4-6 Axle)	8.796	8.834
Buses	0.598	1.811

VDF Values Estimated at the Toll Plaza Location-km 150+500

Mode Type	Borkhedi to MH/TS Border Carriageway	MH/TS Border to Borkhedi Carriageway
LCV	0.235	0.256
2 Axle Truck	2.697	2.468
3 Axle Truck	5.662	4.471
MAV (4-6 Axle)	9.863	7.042
Buses	1.914	1.502

6.3.4 HDM INPUTS

FWD and Roughness values are used as obtained from surveys and investigations as below:

Section-1 40mm OL (36.6 to 93.750)	LHS				RHS			
	<2000	>=2000 and <2200	>=2200 and <2400	>2400	<2000	>=2000 and <2200	>=2200 and <2400	>2400
Length	7400	10000	7000	2600	7000	11000	1250	0
Roughness	1848	2081	2308	2541	1835	2090	2274	0
IRI	2.61	2.91	3.19	3.47	2.60	2.92	3.15	0.00
Deflection	0.35	0.35	0.30	0.35	0.60	0.59	0.70	0.00
Cracking	0.68%	1.48%	2.23%	0.60%	0.00%	0.64%	2.50%	0.00%
Raveling	0.50%	1.00%	2.00%	11.78%	28.57%	46.00%	56.00%	0.00%
Rut Depth	0.38	0.20	0.57	0.00	0.00	0.00	1.00	0.00
Patching	0.45%	0.66%	0.17%	0.67%	0.00%	0.80%	0.50%	0.00%
Potholes	0.00%	0.02%	0.11%	0.00%	0.00%	0.00%	0.00%	0.00%
BT Crust	215	237	181	220	167	158	135	0
Granular Crust	438	433	404	460	457	437	420	0

Section-1 80mm OL (36.6 to 93.750)	LHS				RHS			
	<2000	>=2000 and <2200	>=2200 and <2400	>2400	<2000	>=2000 and <2200	>=2200 and <2400	>2400
Length	13000	9750	7400	0	17200	6150	7600	1000
Roughness	1726	2129	2302	0	1717	2047	2275	2558
IRI	2.46	2.97	3.18	0.00	2.45	2.86	3.15	3.49
Deflection	0.54	0.58	0.52	0.00	0.47	0.48	0.41	0.56
Cracking	1.48%	2.63%	1.33%	0.00%	1.13%	5.36%	2.15%	0.80%
Raveling	0.38%	0.30%	0.50%	0.00%	0.30%	0.29%	0.58%	0.00%
Rut Depth	0.38	0.65	0.38	0.00	0.22%	0.51%	0.10%	0.00%
Patching	0.15%	1.02%	1.59%	0.00%	0.00%	0.00%	0.00%	0.00%
Potholes	0.00%	0.10%	0.00%	0.00%	0.83	0.57	0.00	0.00
BT Crust	138	123	170	0	180	170	127.5	160.0
Granular Crust	433	414	422	0	370	381	328.0	270.0

Section-1 80mm OL (93.750 to 113.000)	LHS				RHS			
	<2000	>=2000 and <2200	>=2200 and <2400	>2400	<2000	>=2000 and <2200	>=2200 and <2400	>2400
Length	7000	11000	1250	0	12000	4250	3000	0
Roughness	1835	2090	2274	0	1865	2092	2269	0
IRI	2.60	2.92	3.15	0.00	2.63	2.92	3.14	0.00
Deflection	0.60	0.59	0.70	0.00	0.59	0.54	0.59	0.00
Cracking	0.00%	0.64%	2.50%	0.00%	0.40%	0.44%	0.00%	0.00%
Raveling	28.57%	46.00%	56.00%	0.00%	0.72%	2.80%	2.67%	0.00%
Rut Depth	0.00	0.00	1.00	0.00	0.35%	0.40%	0.27%	0.00%
Patching	0.00%	0.80%	0.50%	0.00%	0.02%	0.00%	0.07%	0.00%
Potholes	0.00%	0.00%	0.00%	0.00%	0.00	0.00	0.00	0.00
BT Crust	167	158	135	0	127	124	112.5	0.0
Granular Crust	457	437	420	0	433	405	448.3	0.0

Section-2 40mm OL (113.000 to 175.000)	LHS				RHS			
	<2000	>=2000 and <2200	>=2200 and <2400	>2400	<2000	>=2000 and <2200	>=2200 and <2400	>2400
Length	22000	6800	4000	0	26000	6000	0	0
Roughness	1822	2095	2310	0	1758	2072	0	0
IRI	2.58	2.92	3.19	0.00	2.50	2.89	0.00	0.00
Deflection	0.39	0.34	0.39	0.00	0.40	0.41	0.00	0.00
Cracking	0.03%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%
Raveling	4.17%	30.36%	50.75%	0.00%	0.33%	0.00%	0.00%	0.00%
Rut Depth	0.00	1.00	0.00	0.00	1.65%	4.73%	0.00%	0.00%
Patching	0.13%	1.47%	1.00%	0.00%	0.04%	0.10%	0.00%	0.00%
Potholes	0.00%	0.06%	0.00%	0.00%	0.30	0.00	0.00	0.00
BT Crust	187	191	188	0	209	204	0.0	0.0
Granular Crust	412	444	513	0	491	473	0.0	0.0

Section-2 80mm OL (113.000 to 175.000)	LHS				RHS			
	<2000	>=2000 and <2200	>=2200 and <2400	>2400	<2000	>=2000 and <2200	>=2200 and <2400	>2400
Length	22600	3600	2000	1000	22000	4000	2000	2000
Roughness	1801	2109	2329	2569	1685	2070	2360	2520
IRI	2.55	2.94	3.21	3.51	2.41	2.89	3.25	3.45
Deflection	0.57	0.47	0.57	0.72	0.55	0.54	0.56	0.71
Cracking	0.71%	0.25%	5.80%	0.00%	0.04%	1.10%	0.00%	25.50%
Raveling	0.17%	3.50%	31.50%	100.00%	0.35%	33.25%	65.00%	1.20%
Rut Depth	0.38	0.00	0.00	0.00	0.14%	0.25%	0.00%	1.40%

Patching	0.51%	1.28%	0.20%	0.00%	0.03%	0.00%	0.00%	0.00%
Potholes	0.00%	0.00%	0.00%	0.00%	0.00	0.00	0.00	0.00
BT Crust	158	173	144	140	176	149	155.0	140.0
Granular Crust	459	445	380	300	445	506	490.0	530.0

6.3.5 OPTIONS FOR MM SCHEDULE

Based on the requirements of CA, various options have been considered to be used as responsive overlays triggered at specified level of roughness of 2400mm/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 2400mm/Km with regular maintenance
- ✓ Opt-1: Responsive Overlay of 30mm BC whenever roughness is >2400mm/KM with regular maintenance
- ✓ Opt-2: Responsive Overlay of 40mm BC whenever roughness is >2400mm/KM with regular maintenance
- ✓ Opt-2: Scheduled Overlay of 40mm BC at every 6th Year with regular maintenance

6.4 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:

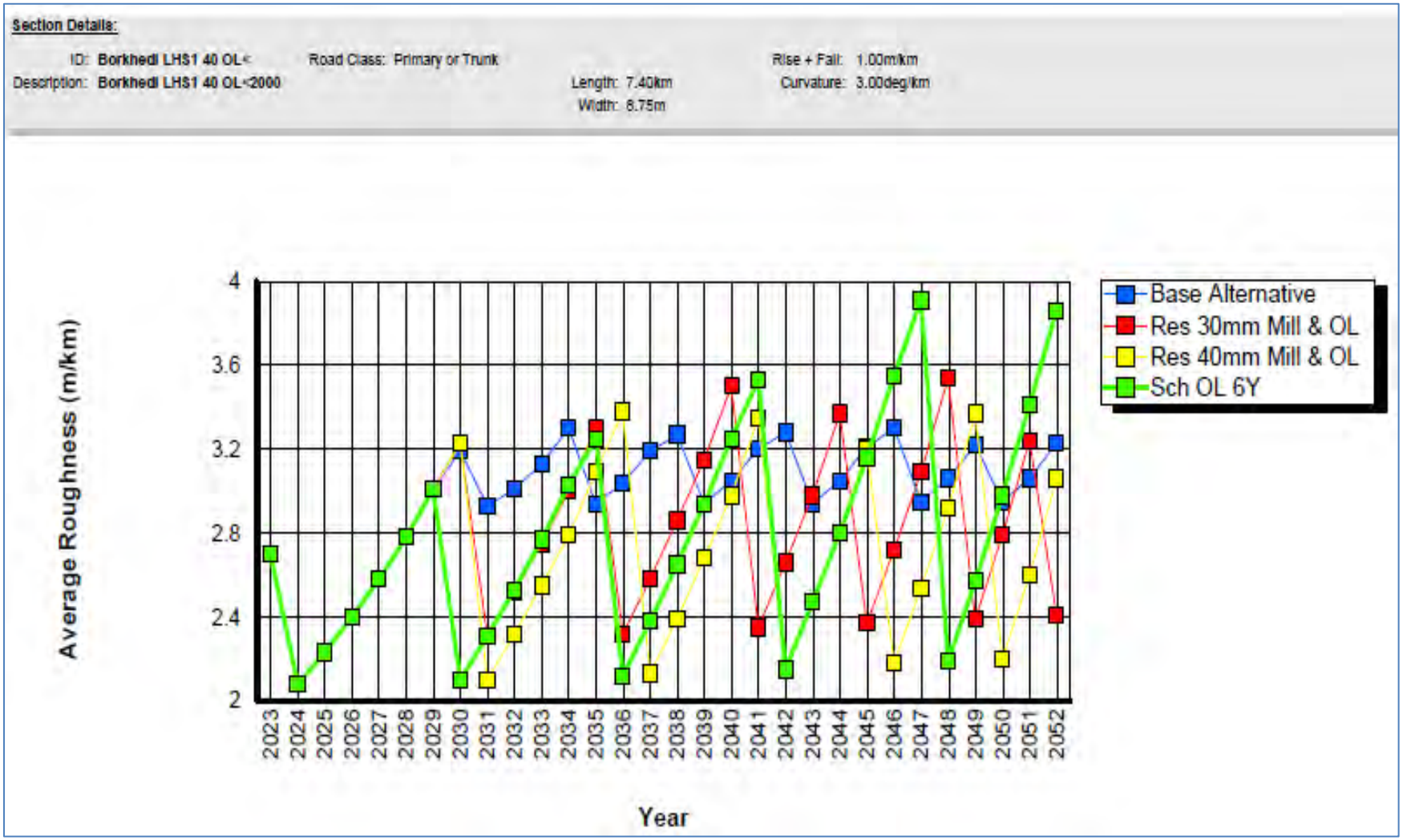


Figure 1: Average Roughness in LHS section-1 40mm OL Km.36.600 to Km. 93.750- (<2000mm/Km)

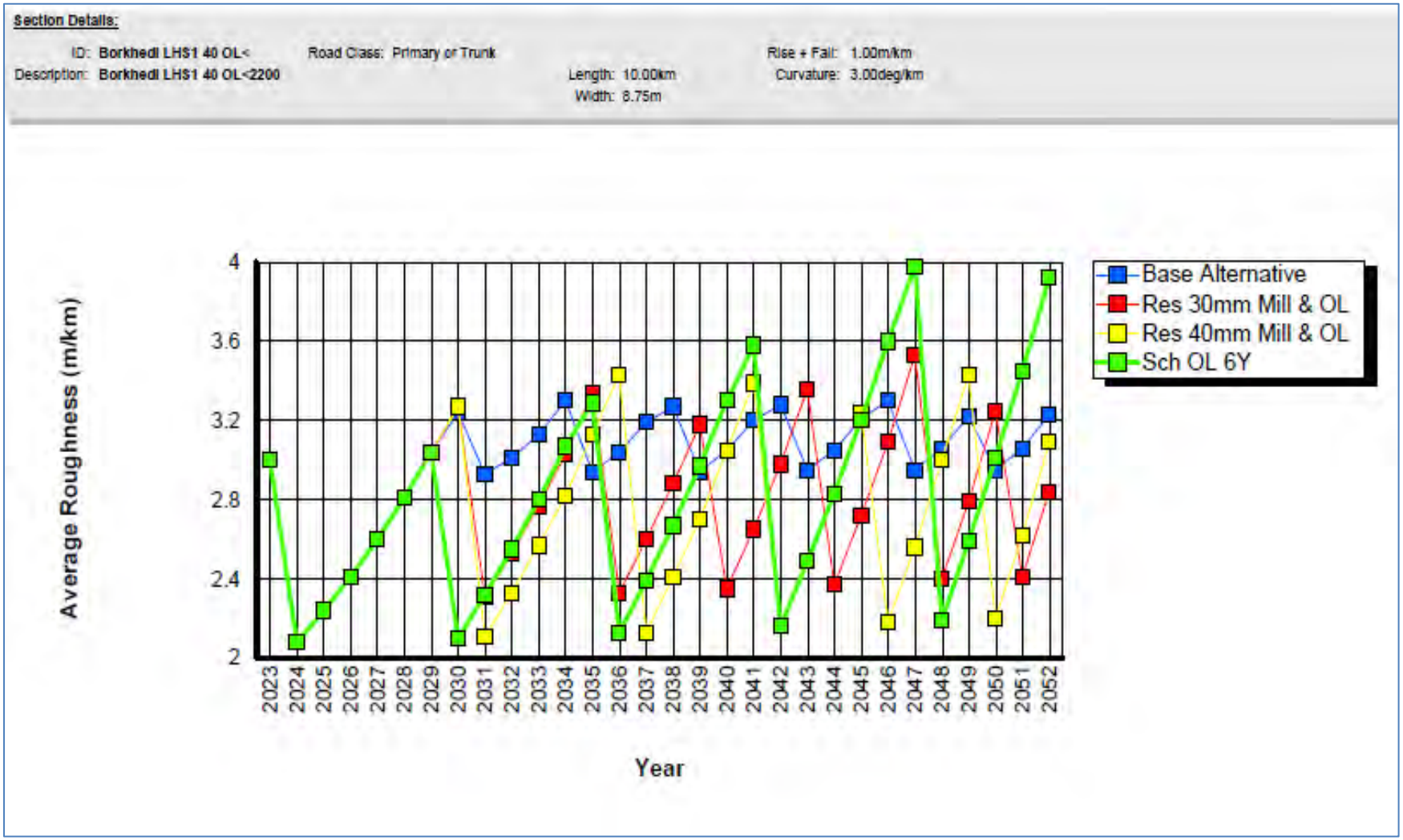


Figure 2: Average Roughness in LHS section-1 40mm OL Km.36.600 to Km. 93.750- (<2200mm/Km)

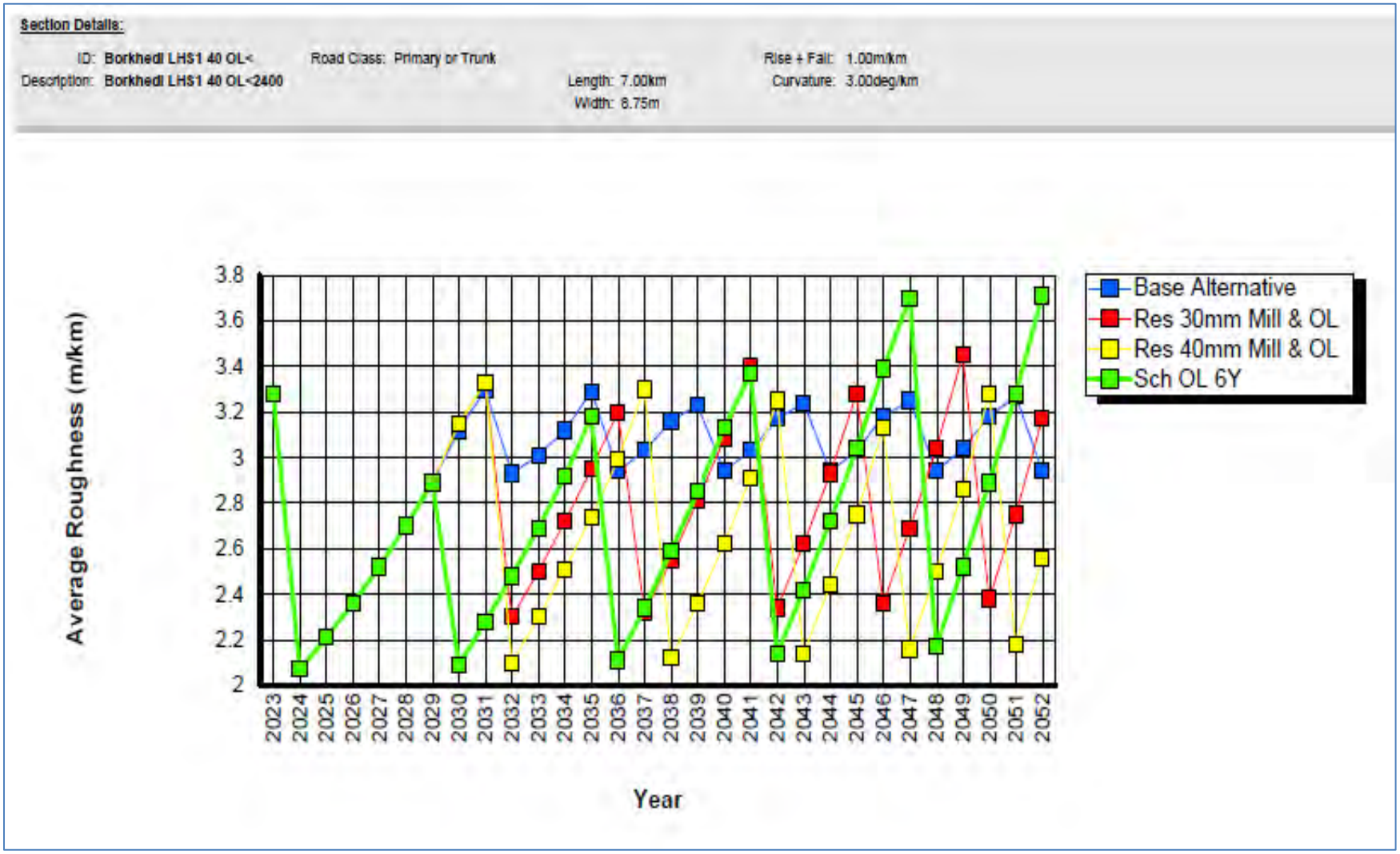


Figure 3: Average Roughness in LHS section-1 40mm OL Km.36.600 to Km. 93.750- (<2400mm/Km)

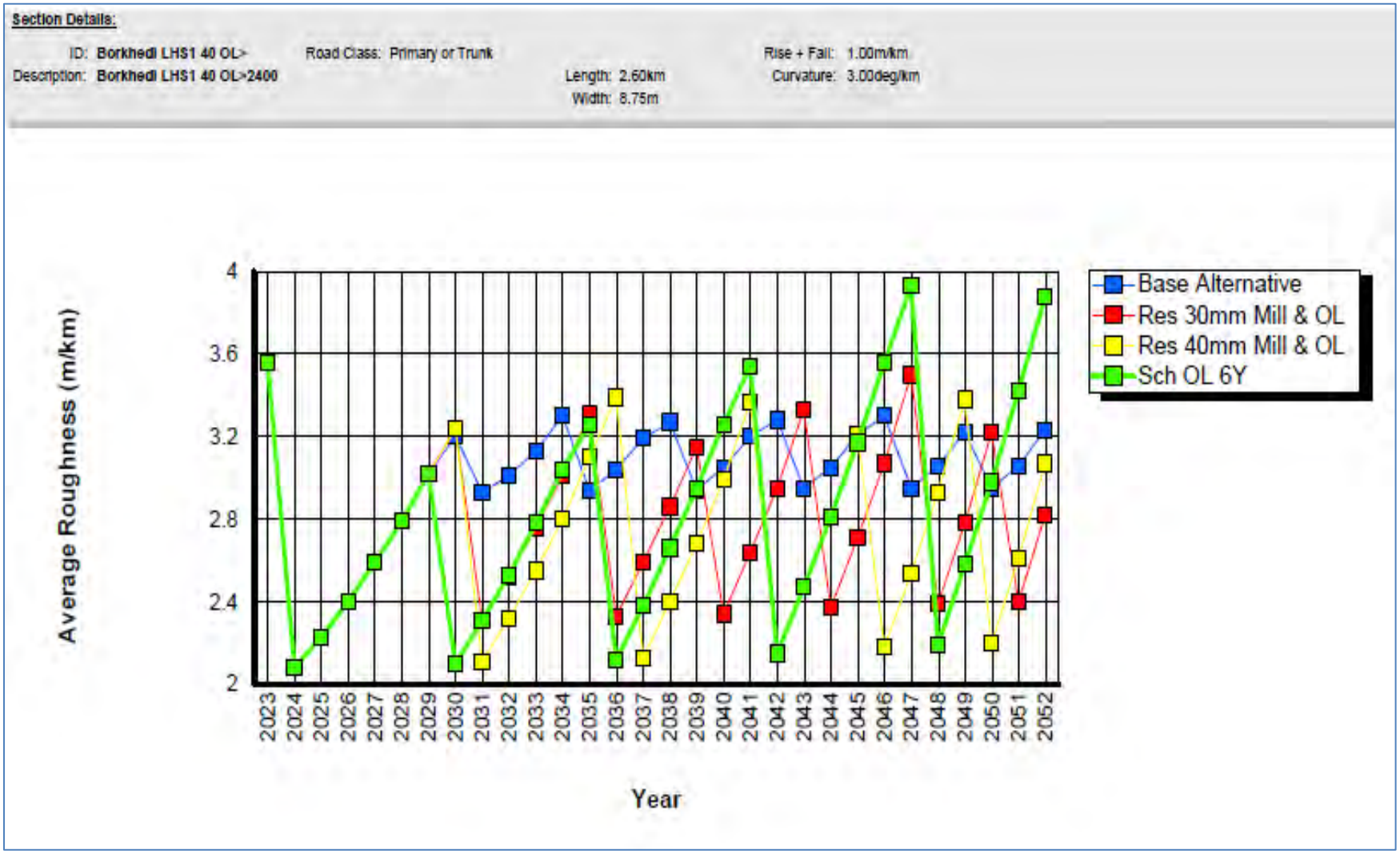


Figure 4: Average Roughness in LHS section-1 40mm OL Km.36.600 to Km. 93.750- (>2400mm/Km)

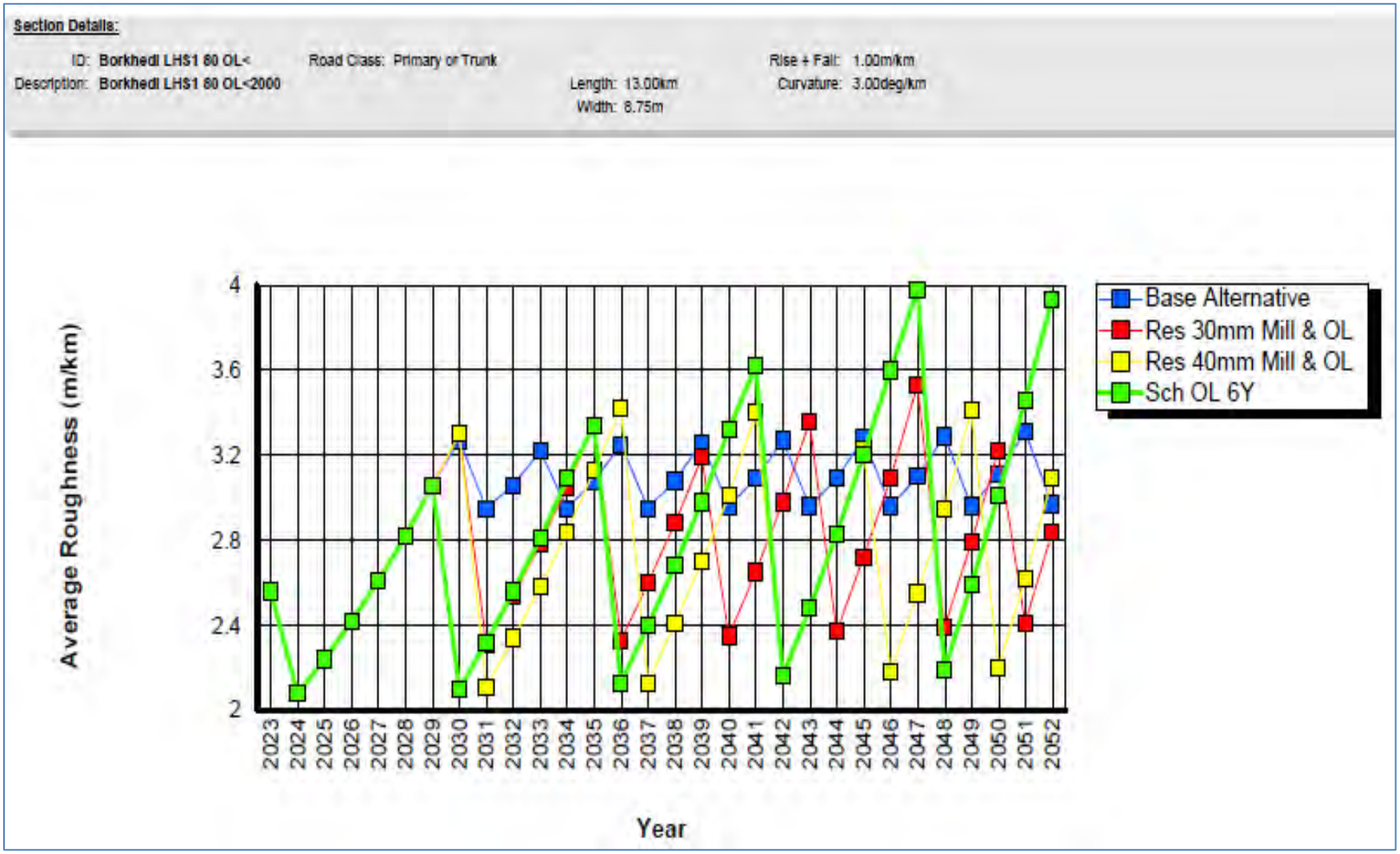


Figure 5: Average Roughness in LHS section-1 80mm OL Km 36.600 to Km 93.750 (<2000mm/Km)

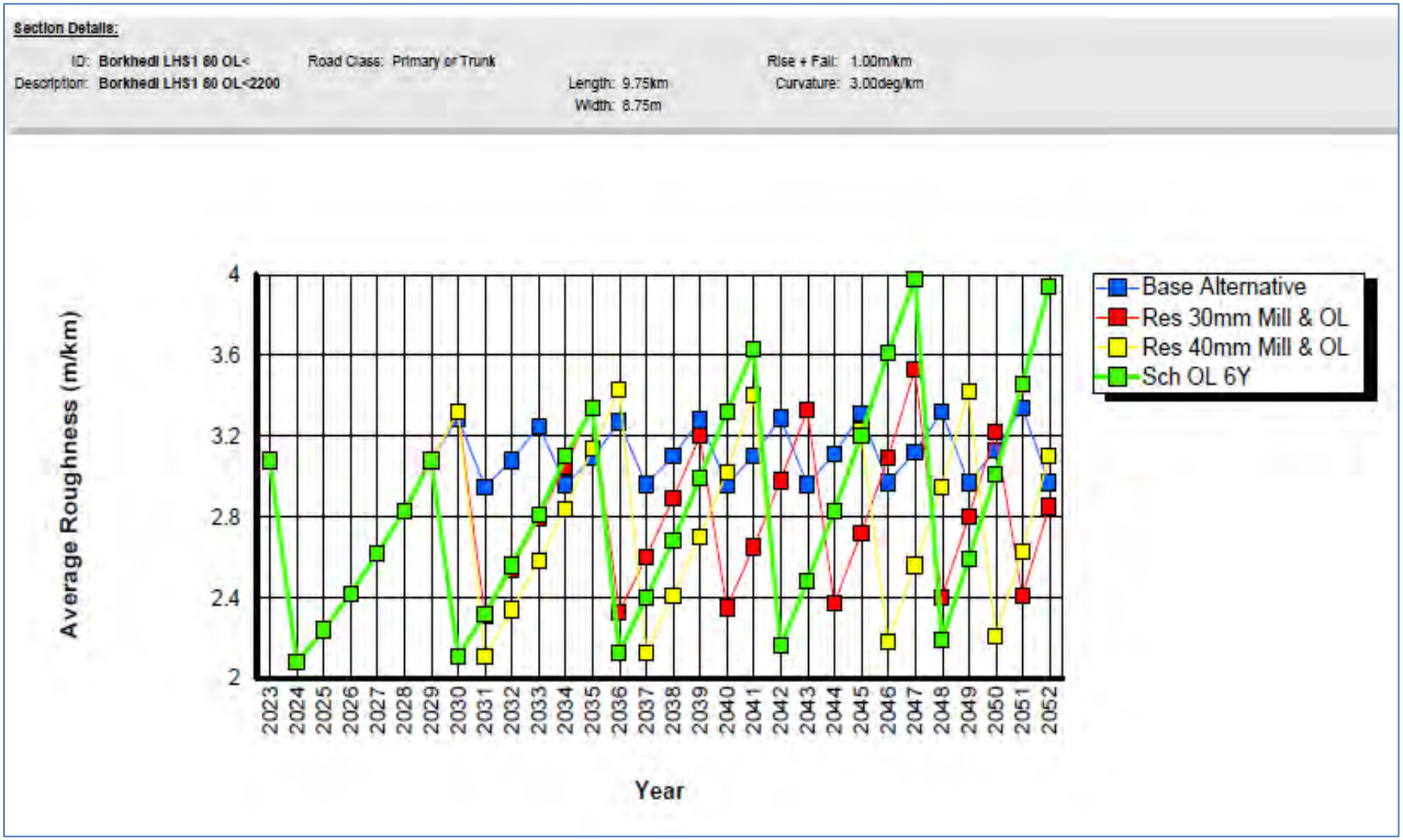


Figure 6: Average Roughness in LHS section-1 80mm OL Km 36.600 to Km 93.750 (<2200mm/Km)

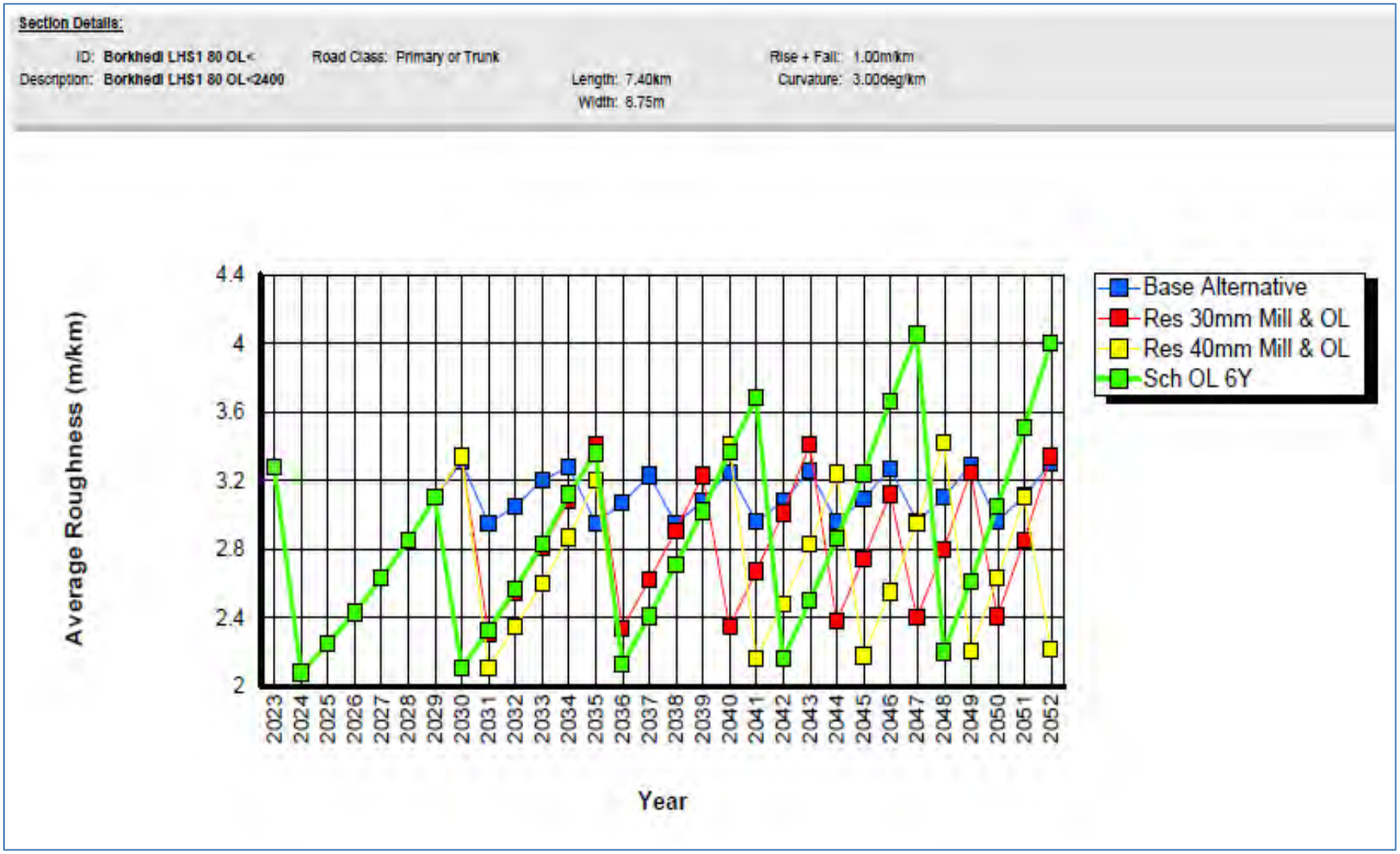


Figure 7: Average Roughness in LHS section-1 80mm OL Km 36.600 to Km 93.750 (<2400mm/Km)

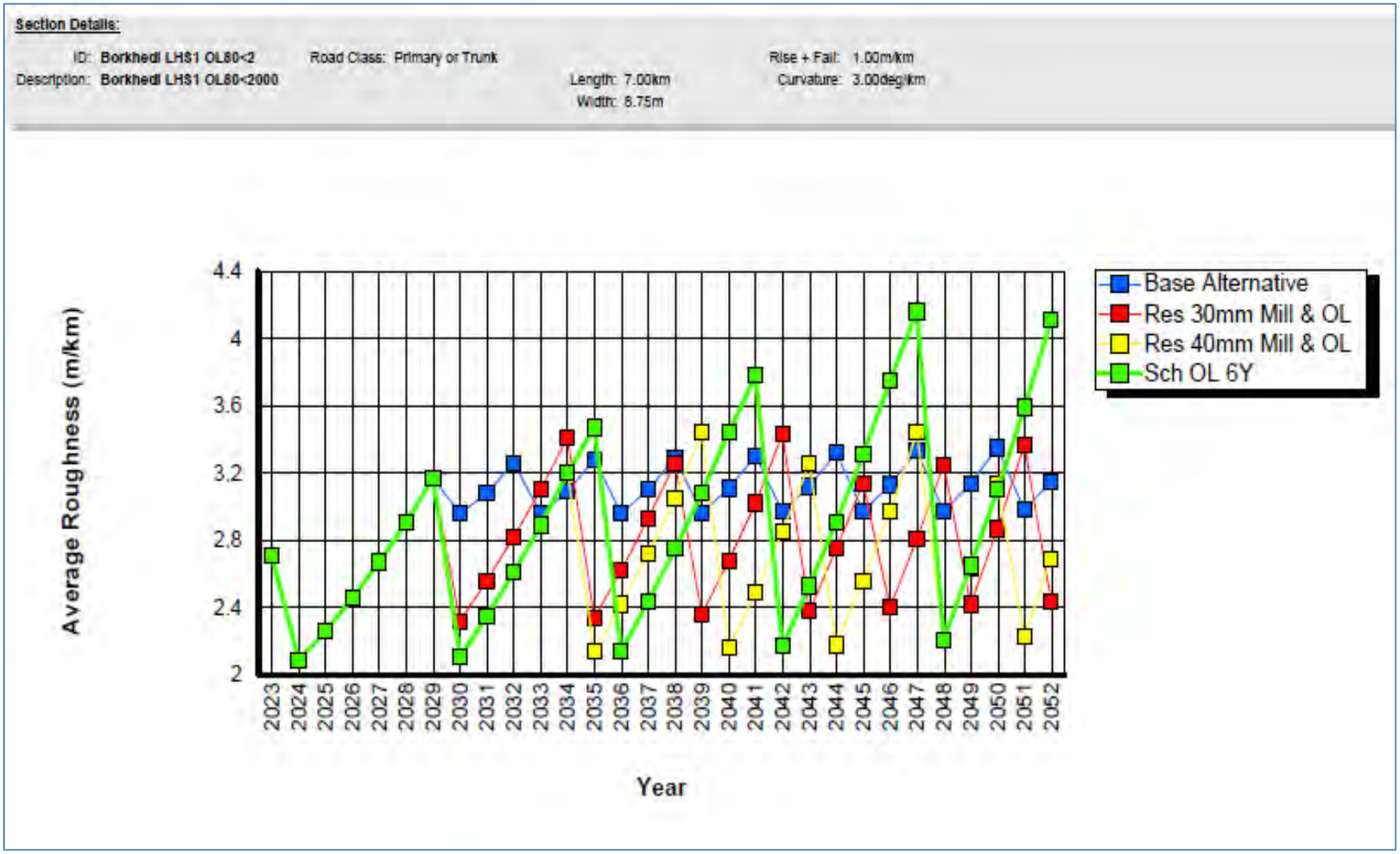


Figure 8: Average Roughness in LHS section-1 80mm OL Km 93.750 to Km 113.000 (<2000mm/Km)

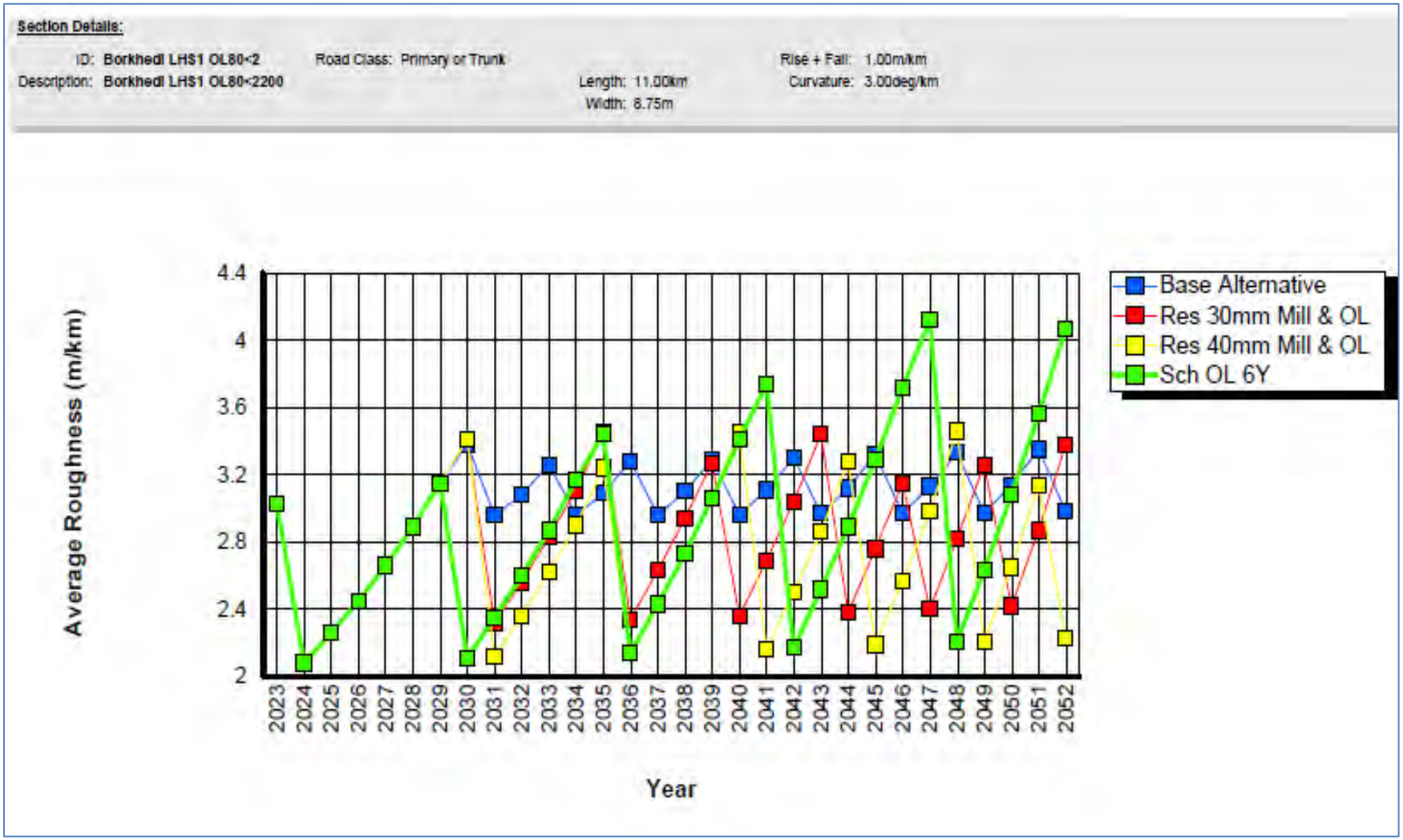


Figure 9: Average Roughness in LHS section-1 80mm OL Km 93.750 to Km 113.000 (<2200mm/Km)

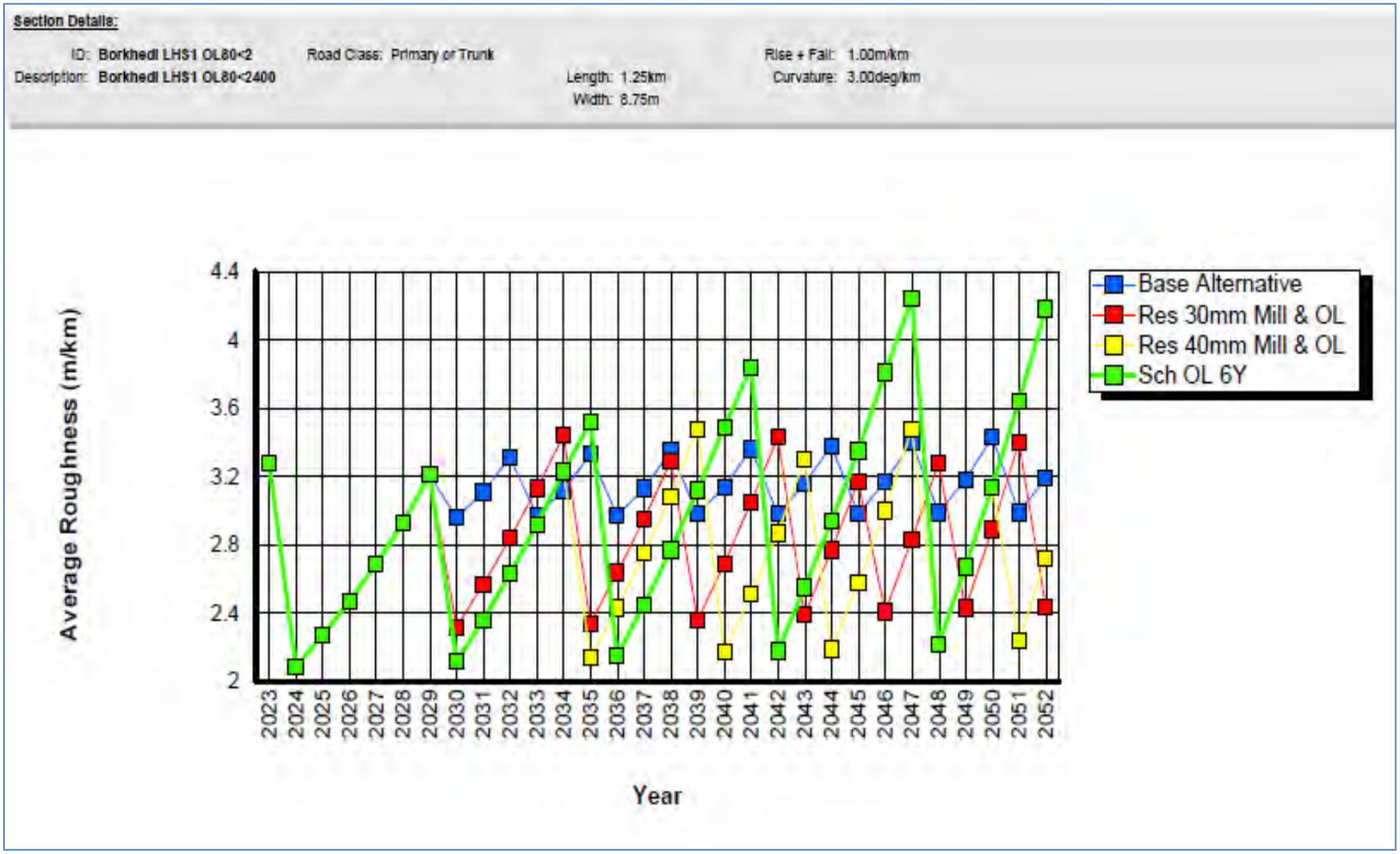


Figure 10: Average Roughness in LHS section-1 80mm OL Km 93.750 to Km 113.000 (<2400mm/Km)

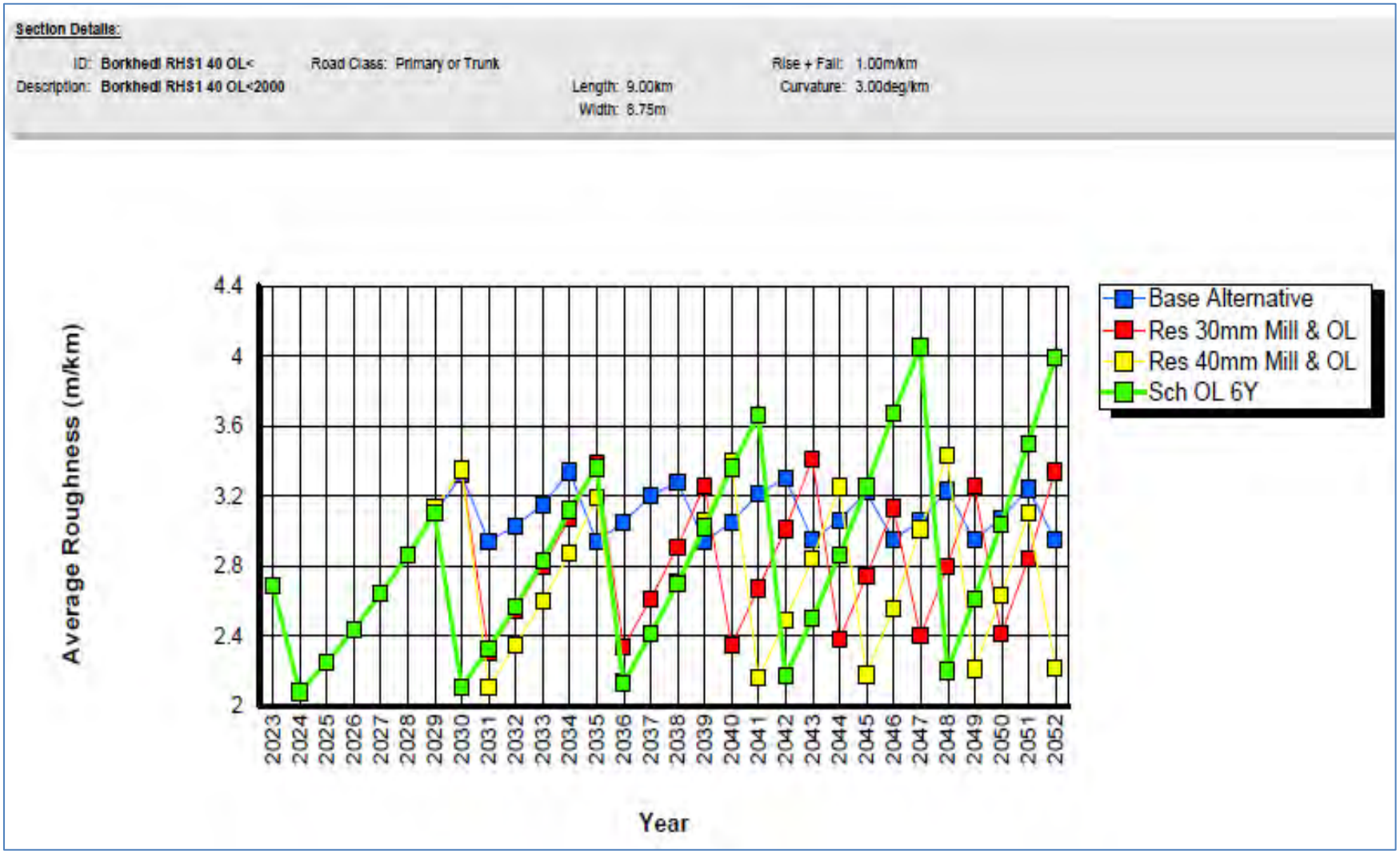


Figure 11: Average Roughness in RHS section-1 40mm OL Km.36.60 to Km. 93.75- (<2000mm/Km)

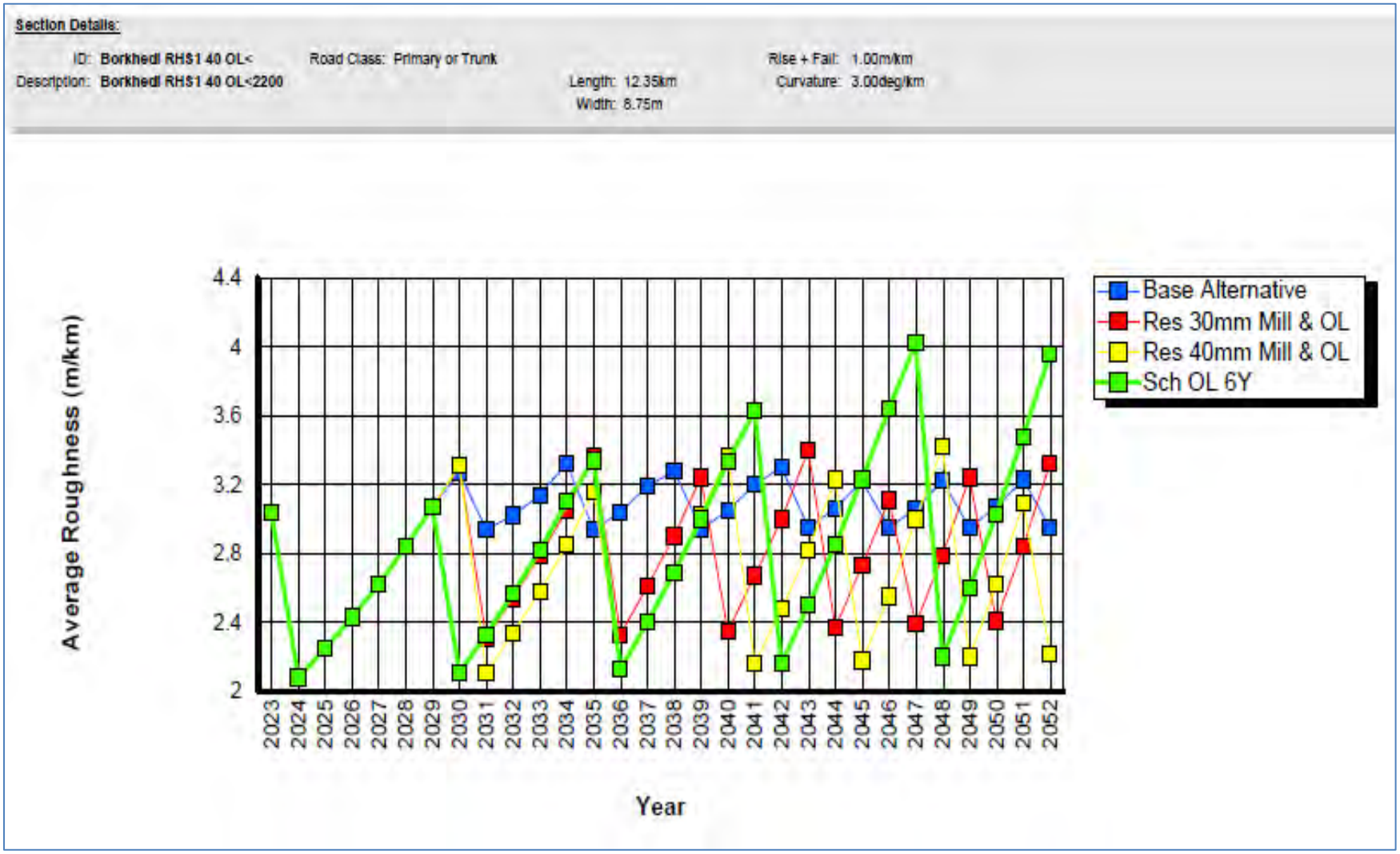


Figure 12: Average Roughness in RHS section-1 40mm OL Km.36.60 to Km. 93.75 (<2200mm/Km)

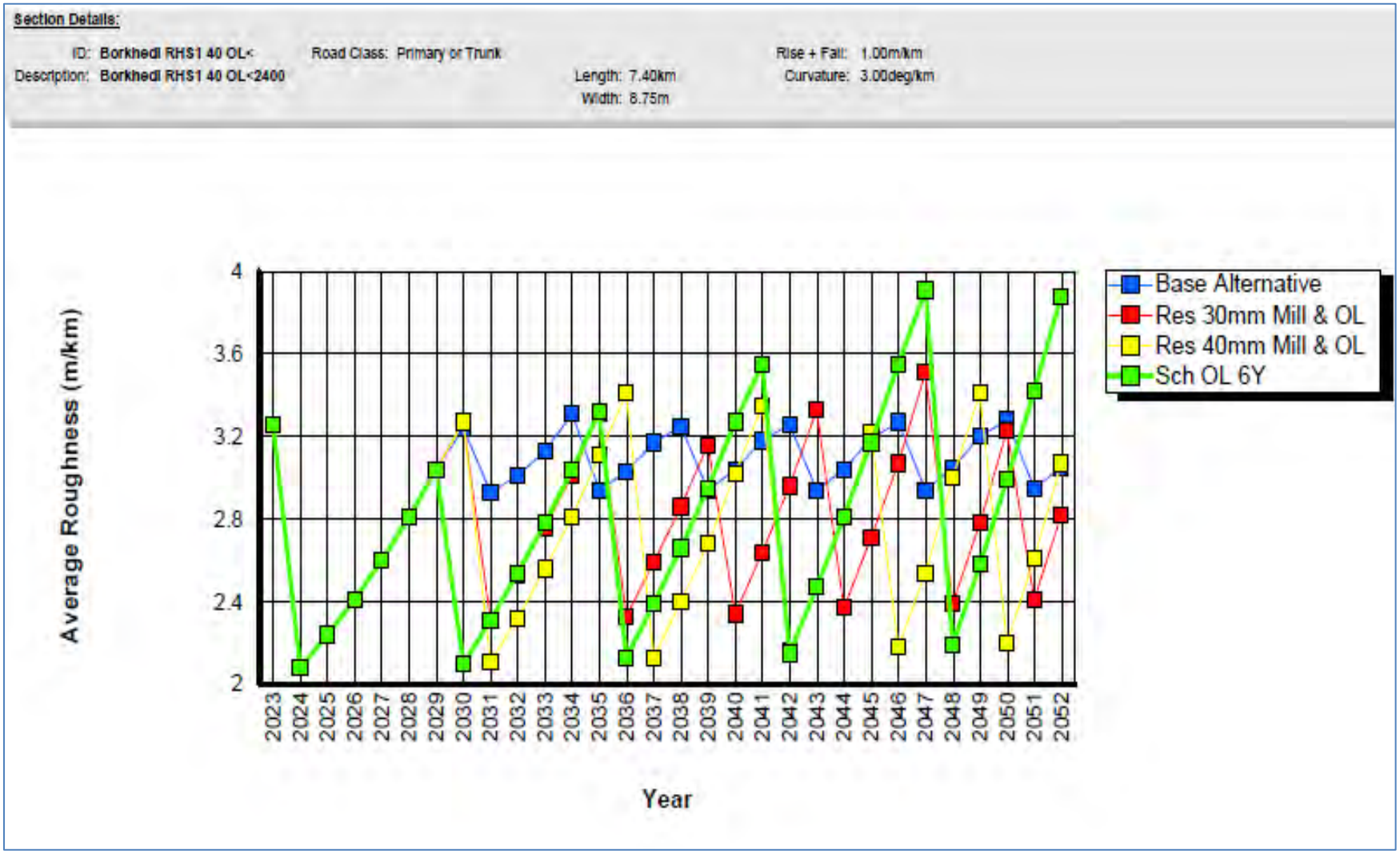


Figure 13: Average Roughness in RHS section-1 40mm OL Km.36.60 to Km. 93.75 (<2400mm/Km)

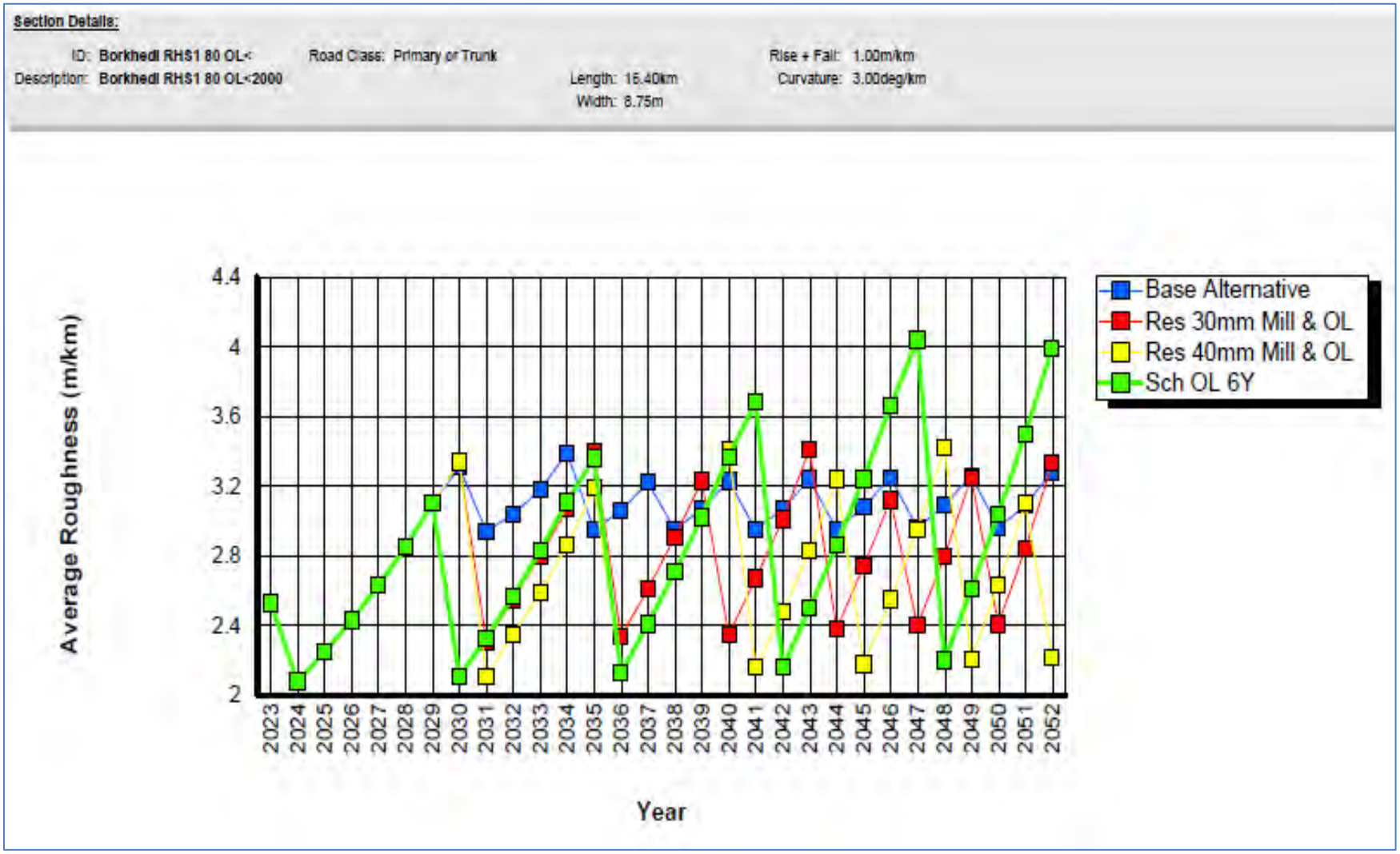


Figure 14: Average Roughness in RHS section-1 80mm OL Km 36.600 to Km 93.750 (<2000mm/Km)

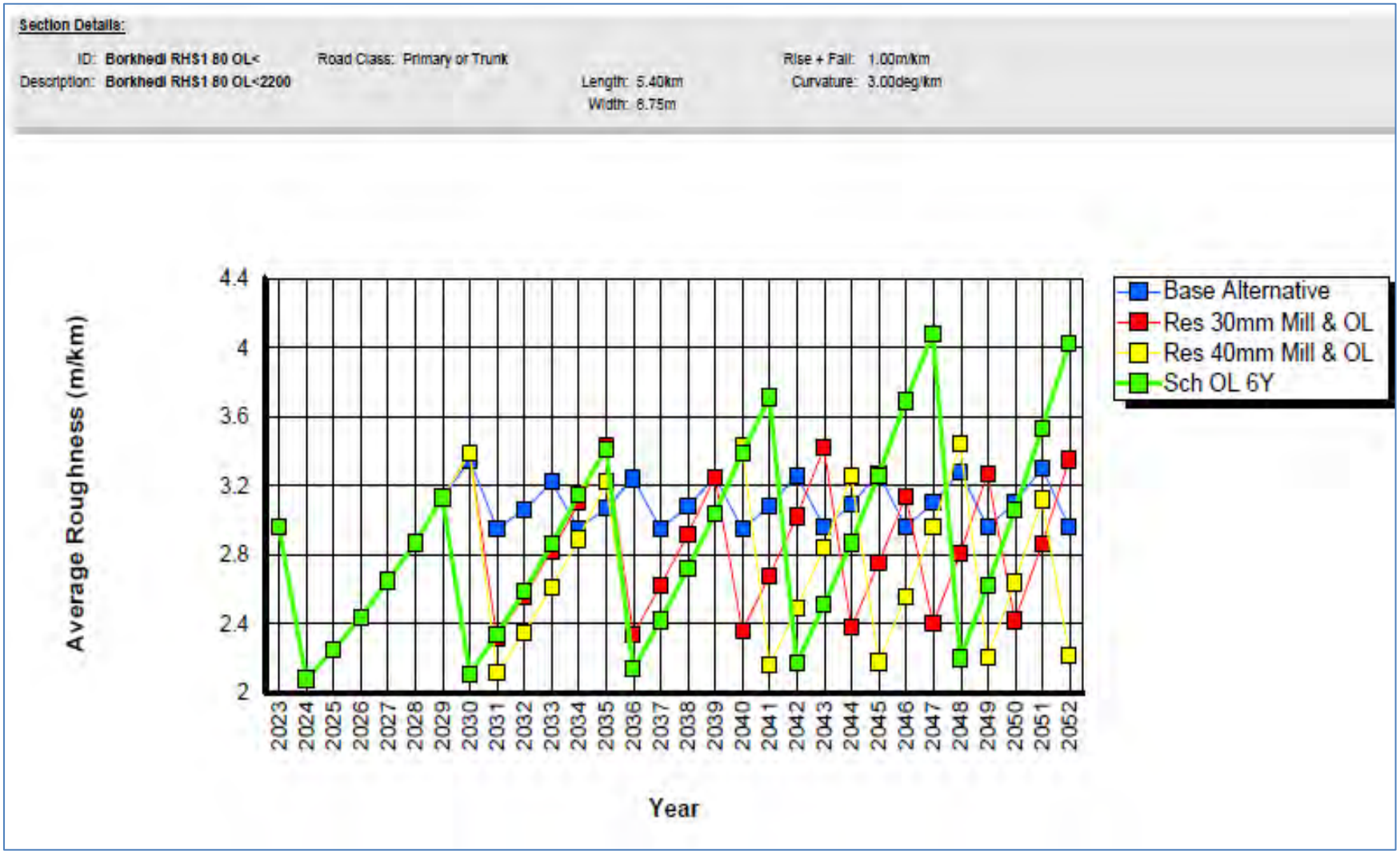


Figure 15: Average Roughness in RHS section-1 80mm OL Km 36.600 to Km 93.750(<2200mm/Km)

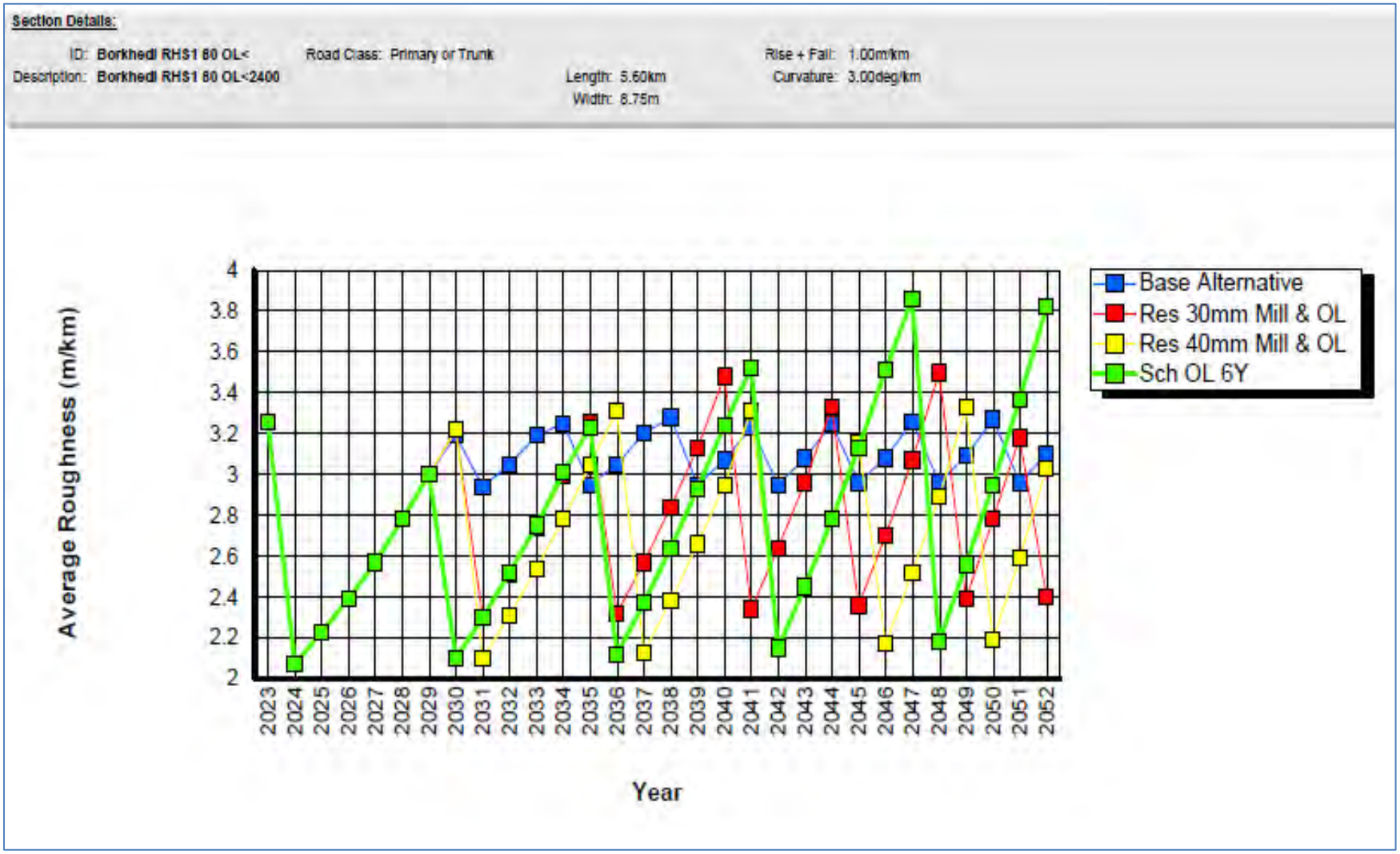


Figure 16: Average Roughness in RHS section-1 80mm OL Km 36.600 to Km 93.750 (<2400mm/Km)

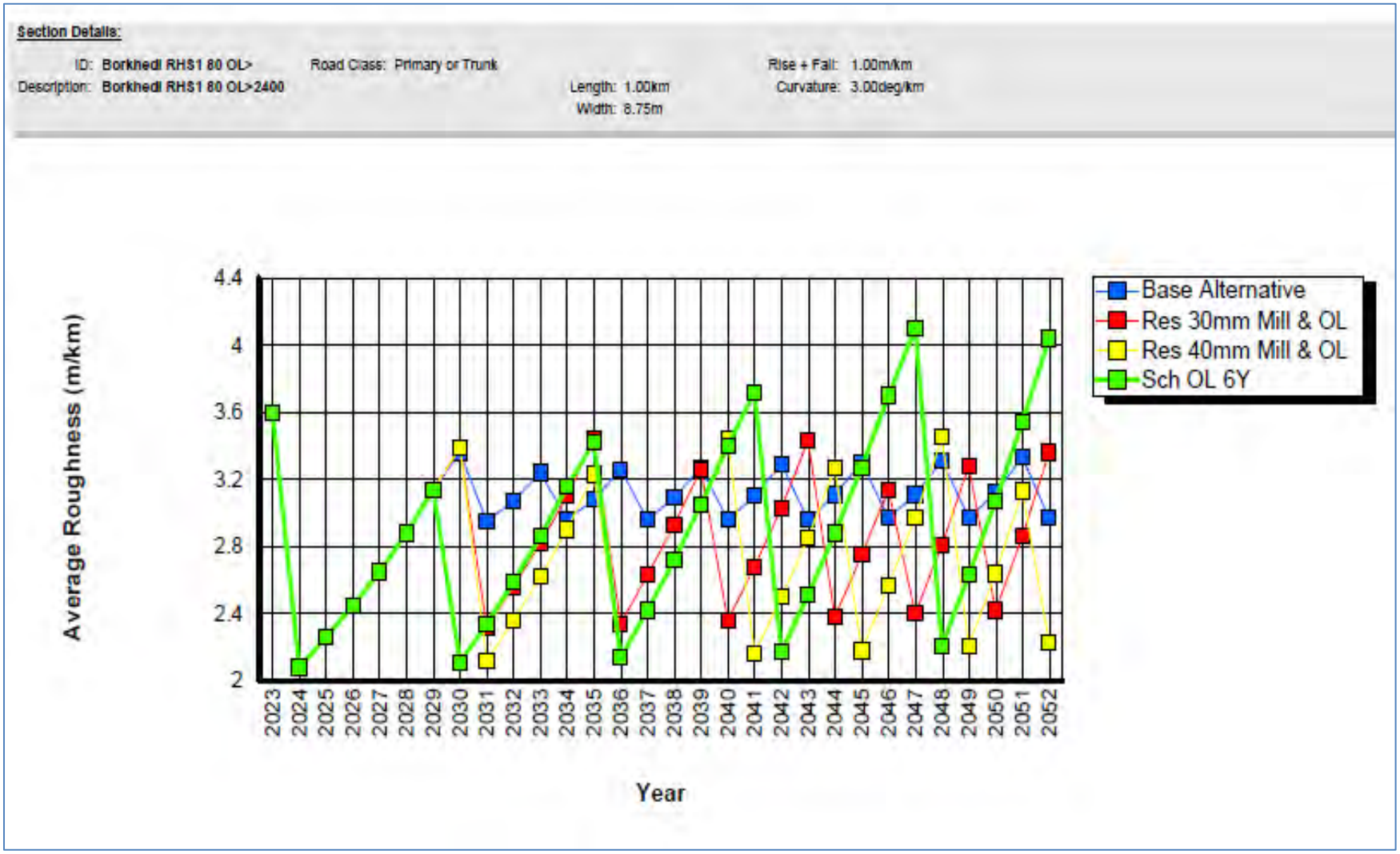


Figure 17: Average Roughness in RHS section-1 80mm OL Km 36.600 to Km 93.750 (>2400mm/Km)

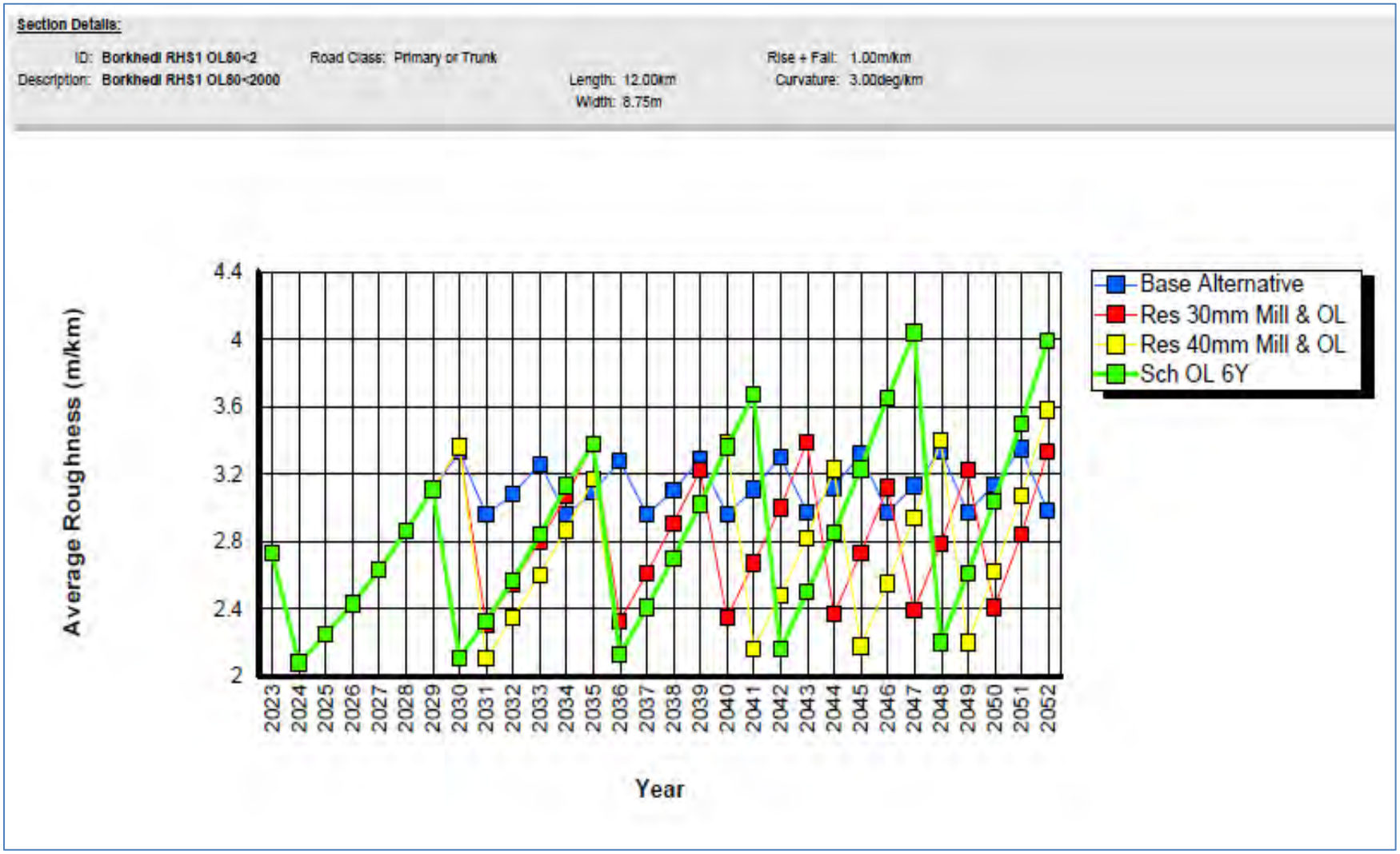


Figure 18: Average Roughness in RHS section-1 80mm OL Km 93.750 to Km 113.000 (<2000mm/Km)

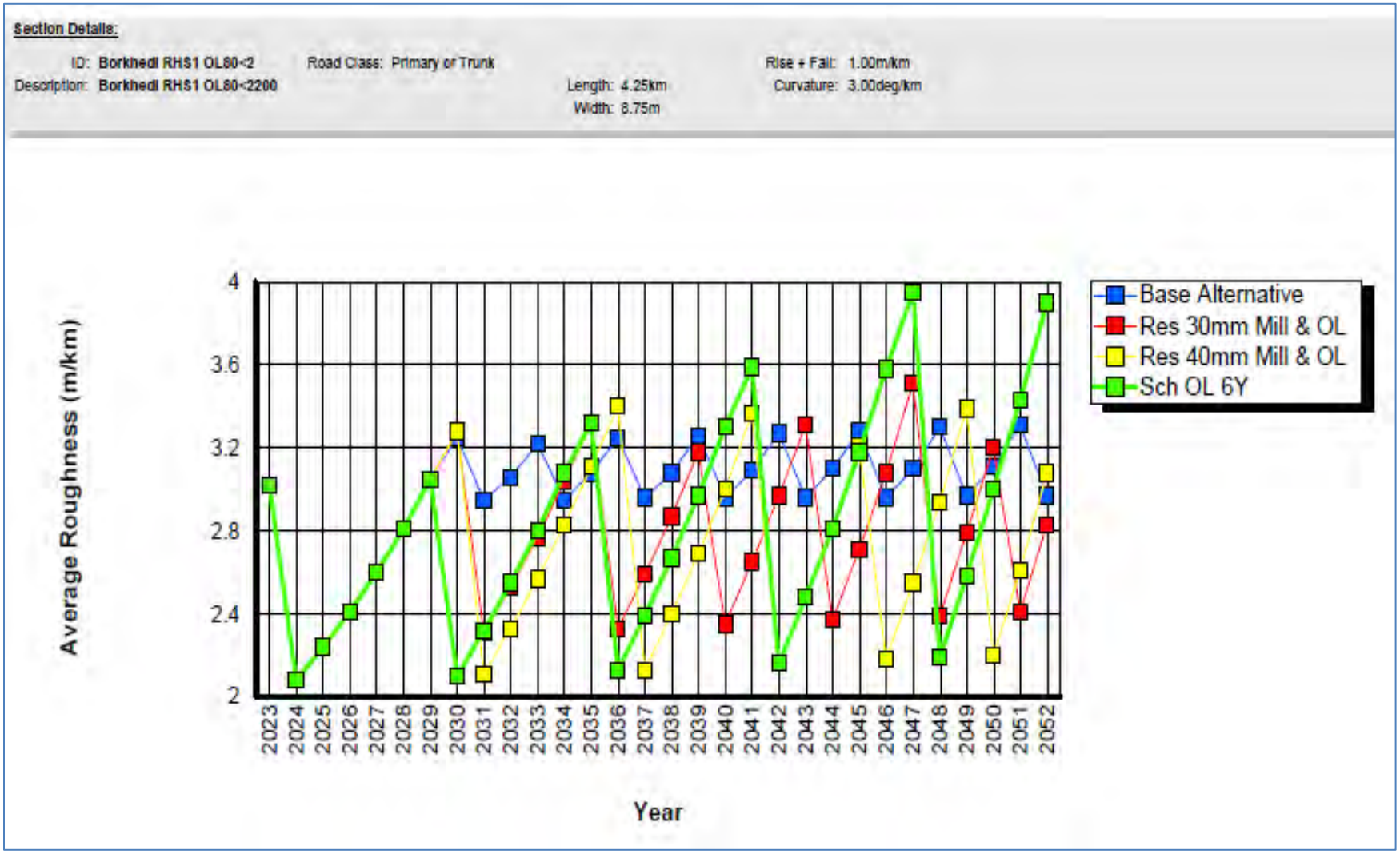


Figure 19: Average Roughness in RHS section-1 80mm OL Km 93.750 to Km 113.000 (<2200mm/Km)

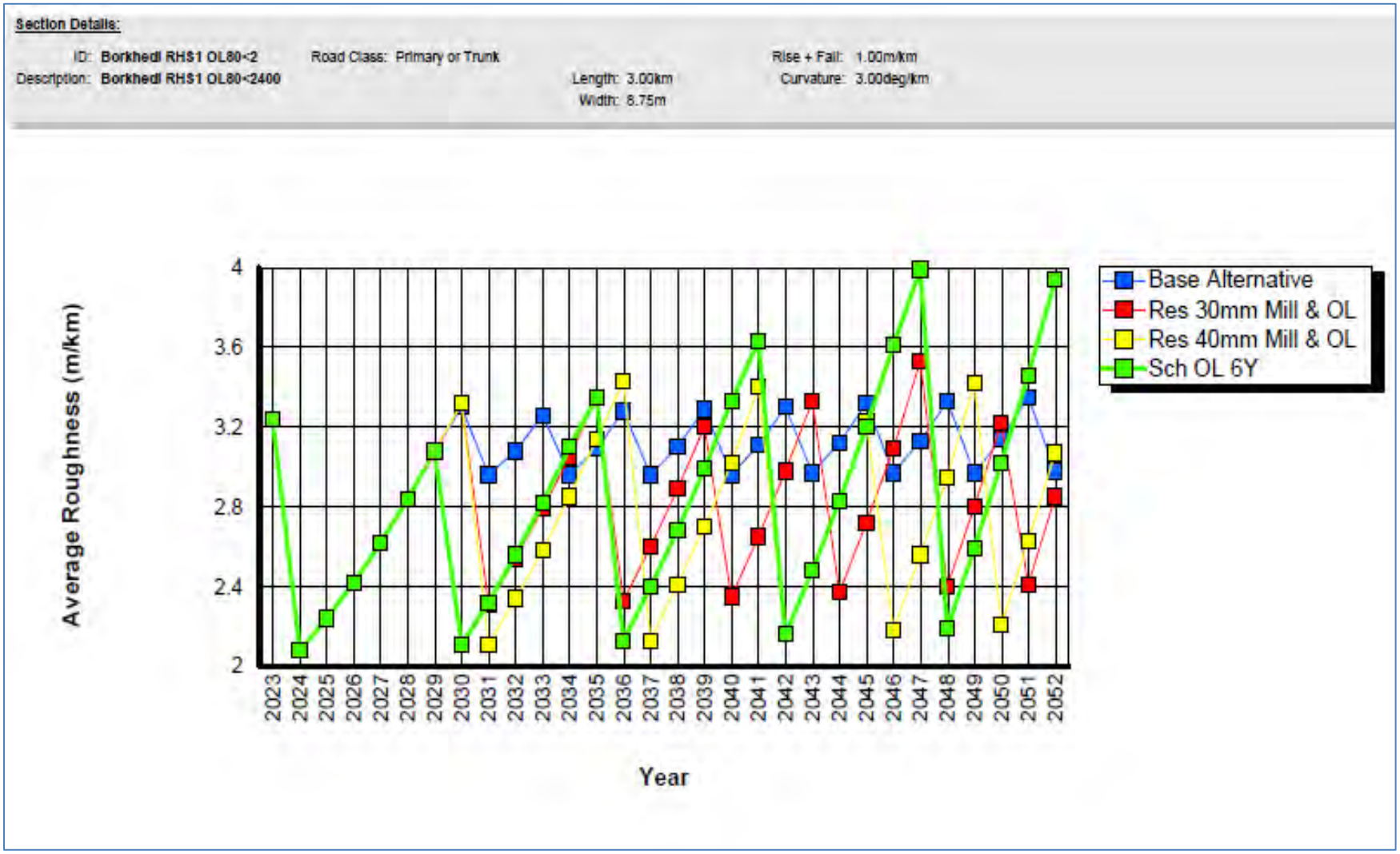


Figure 20: Average Roughness in RHS section-1 80mm OL Km 93.750 to Km 113.000 (<2400mm/Km)

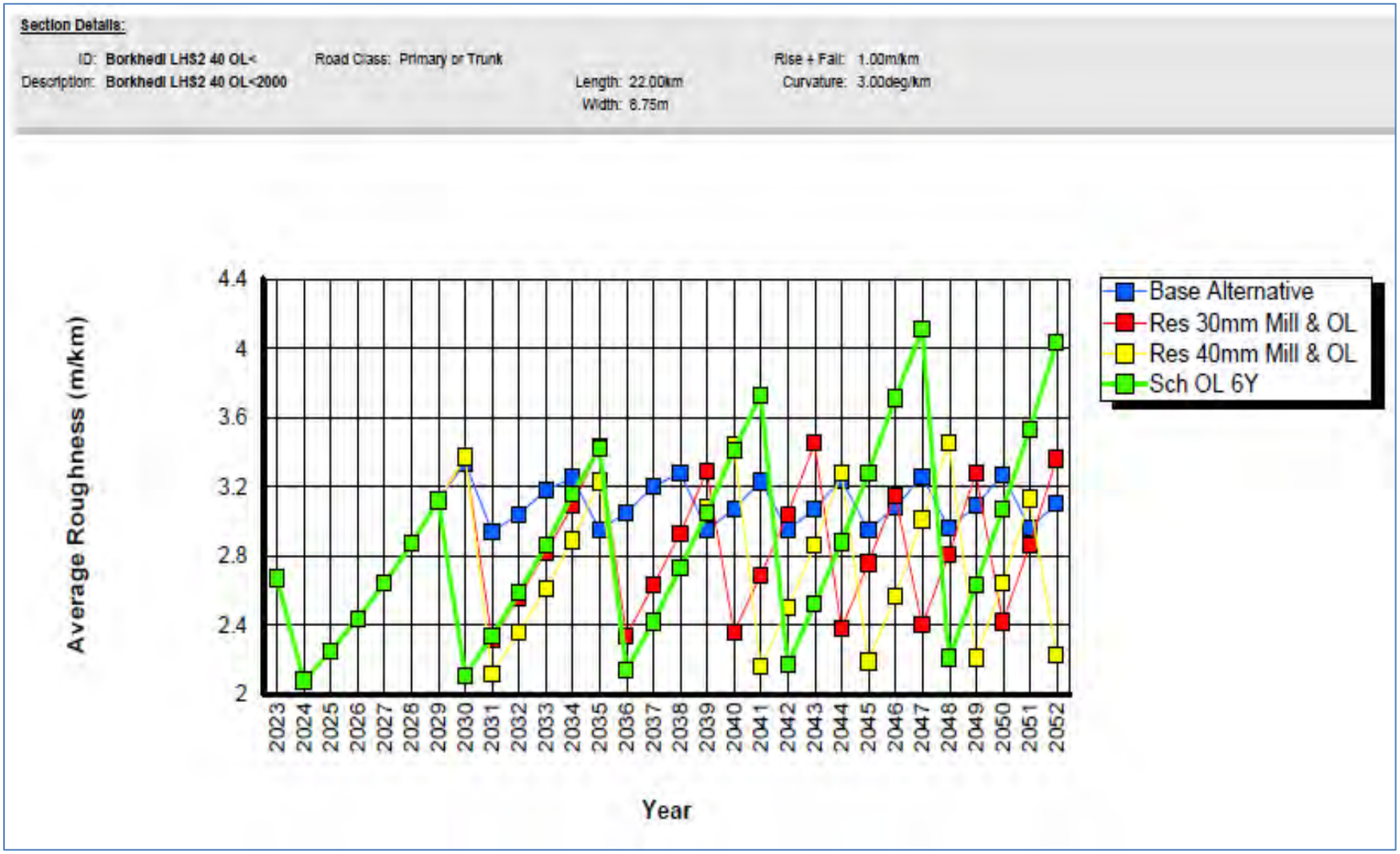


Figure 21: Average Roughness in LHS section-2 40mm OL Km 113.00 to Km 175.000 (<2000mm/Km)

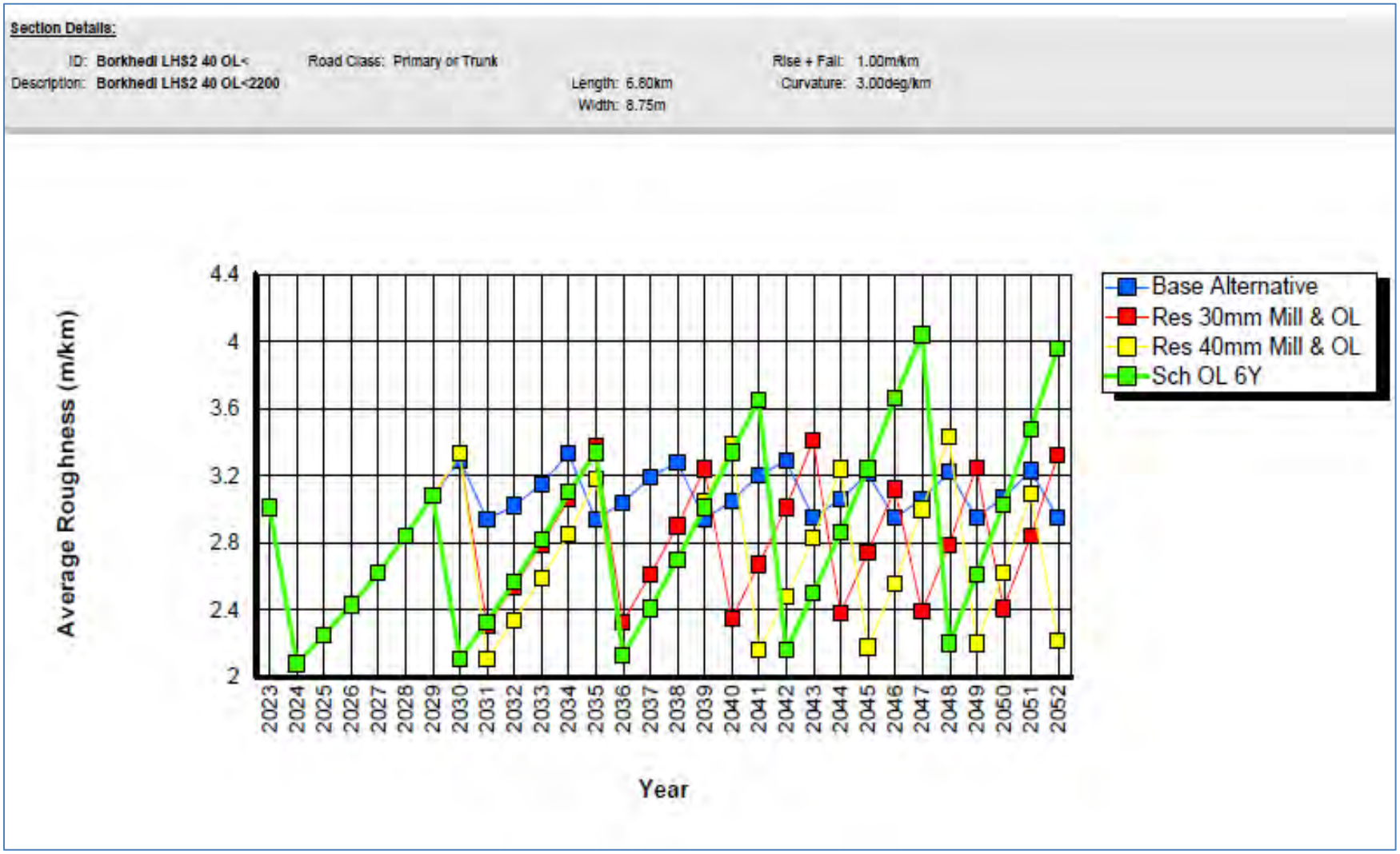


Figure 22: Average Roughness in LHS section-2 40mm OL Km 113.00 to Km 175.000 (<2200mm/Km)

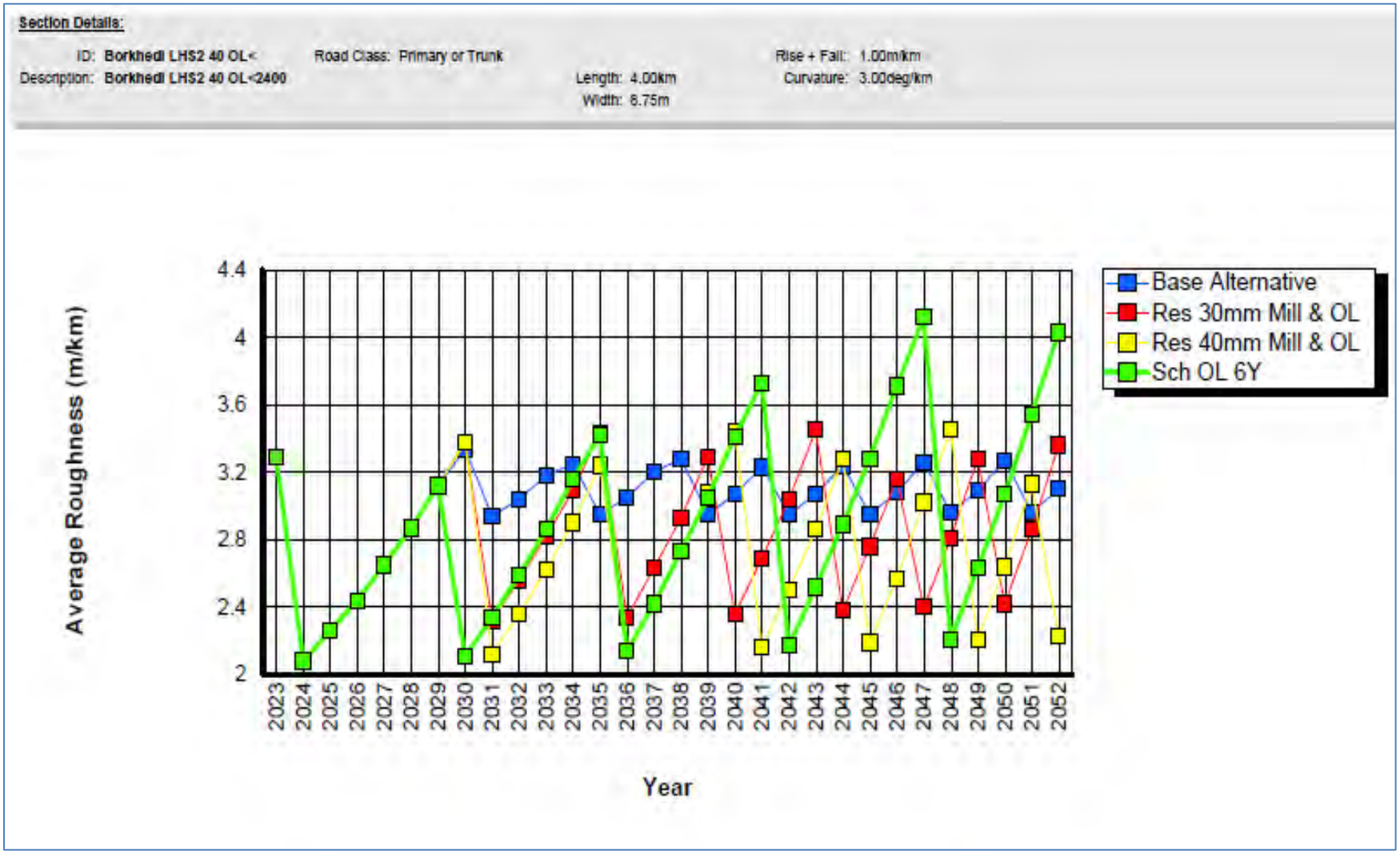


Figure 23: Average Roughness in LHS section-2 40mm OL Km 113.00 to Km 175.000 (<2400mm/Km)

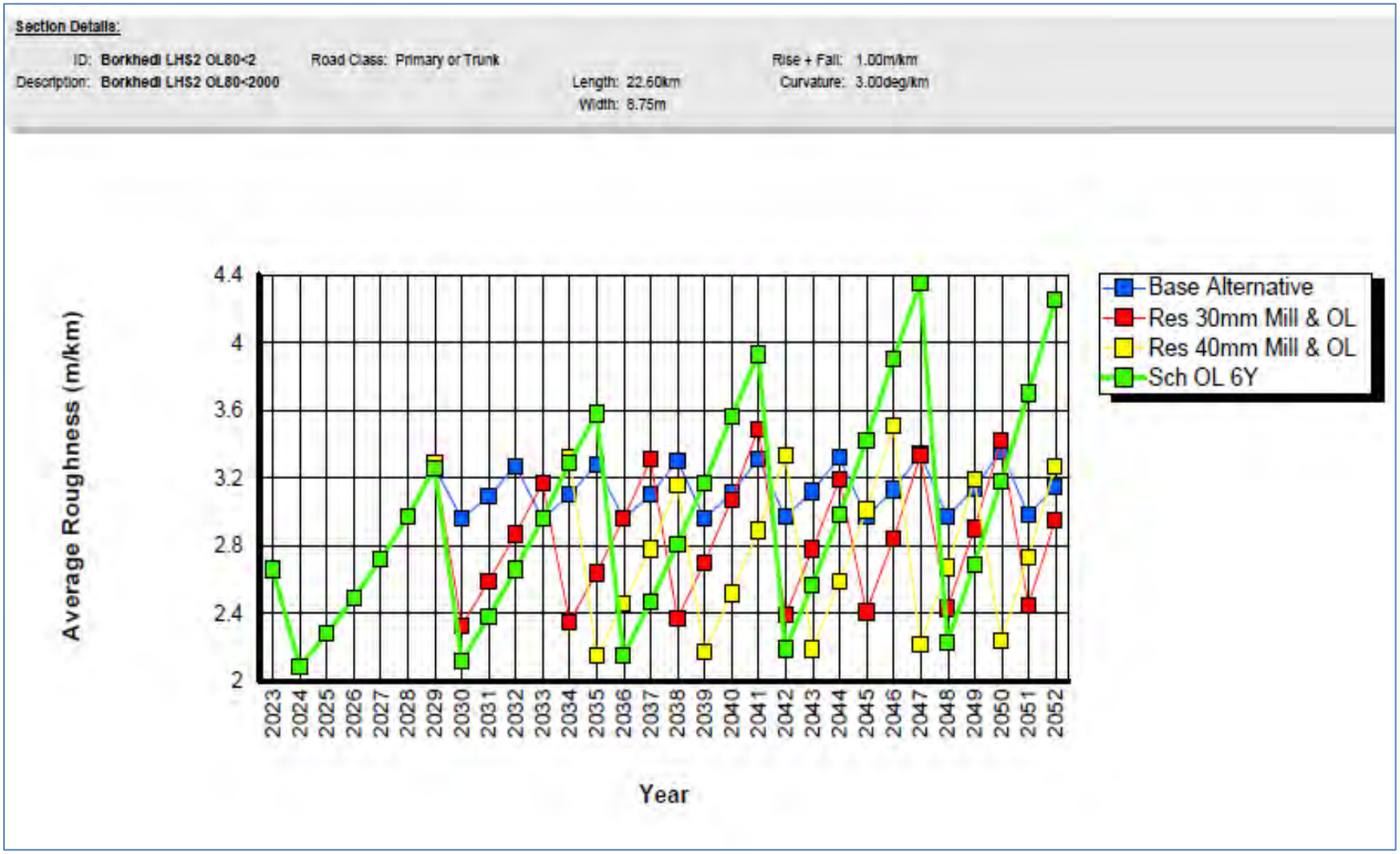


Figure 24: Average Roughness in LHS section-2 80mm OL Km 36.600 to Km 175.000 (<2000mm/Km)

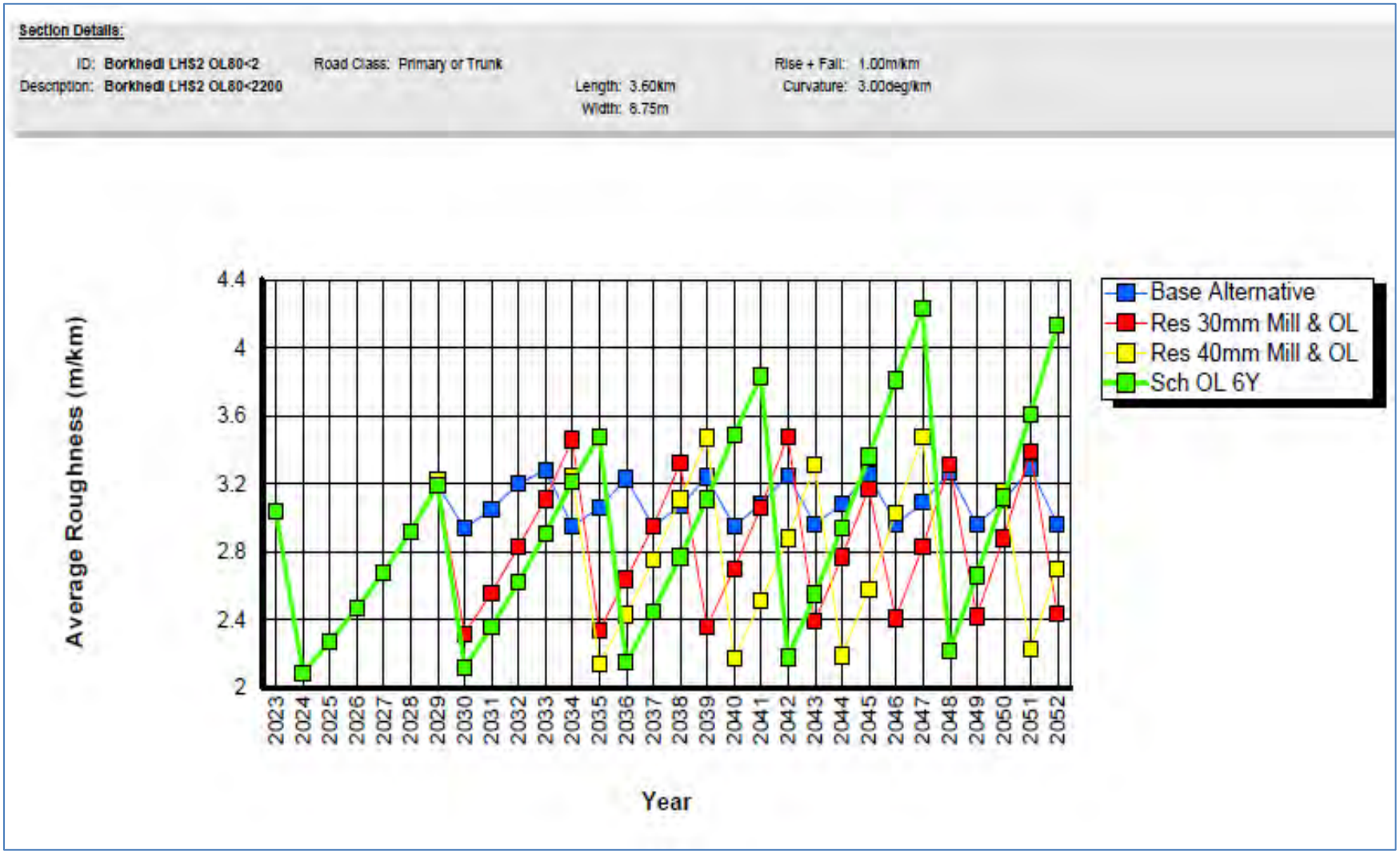


Figure 25: Average Roughness in LHS section-2 80mm OL Km 113.000 to Km 175.000 (<2200mm/Km)

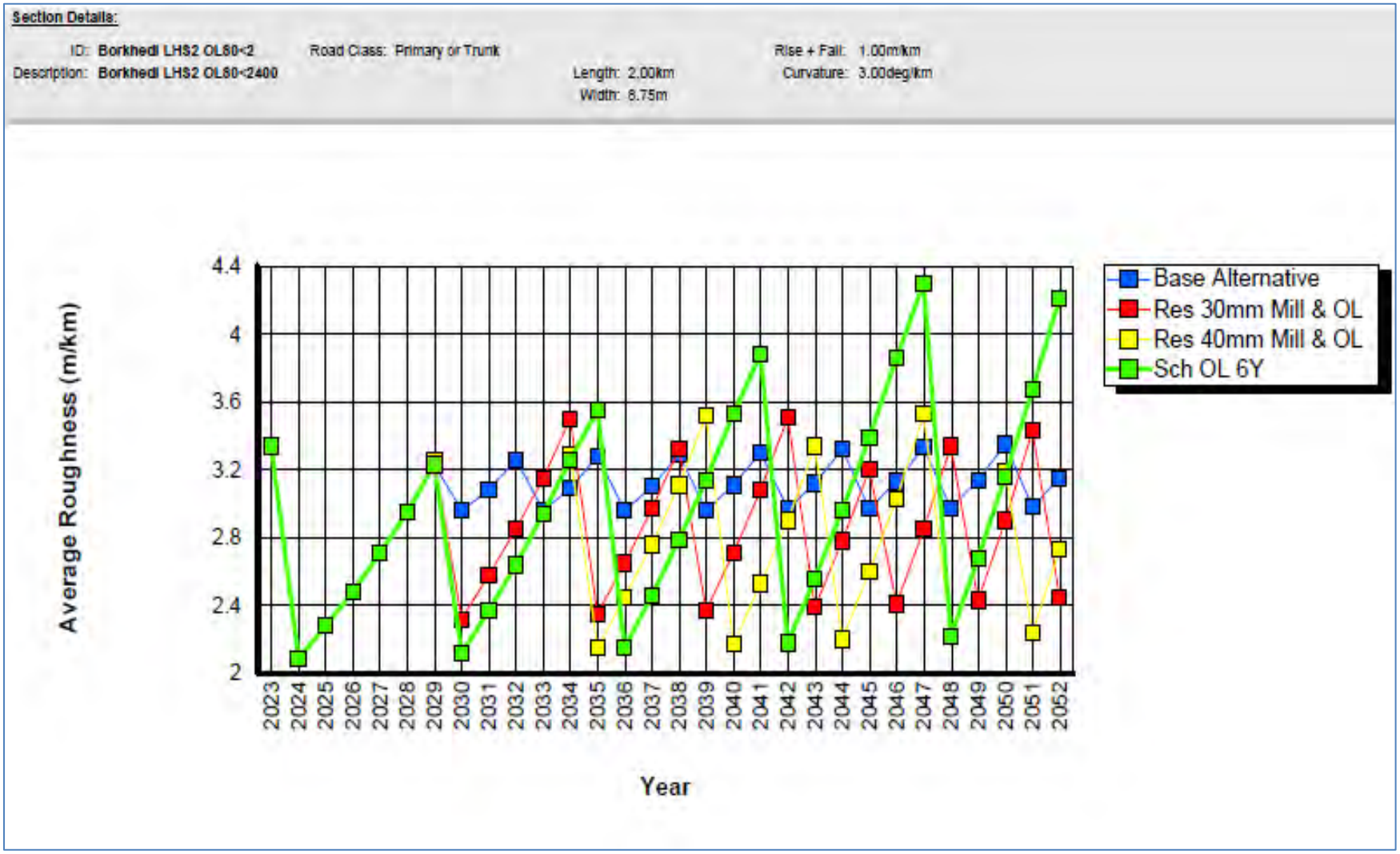


Figure 26: Average Roughness in LHS section-2 80mm OL Km 113.000 to Km 175.000 (<2400mm/Km)

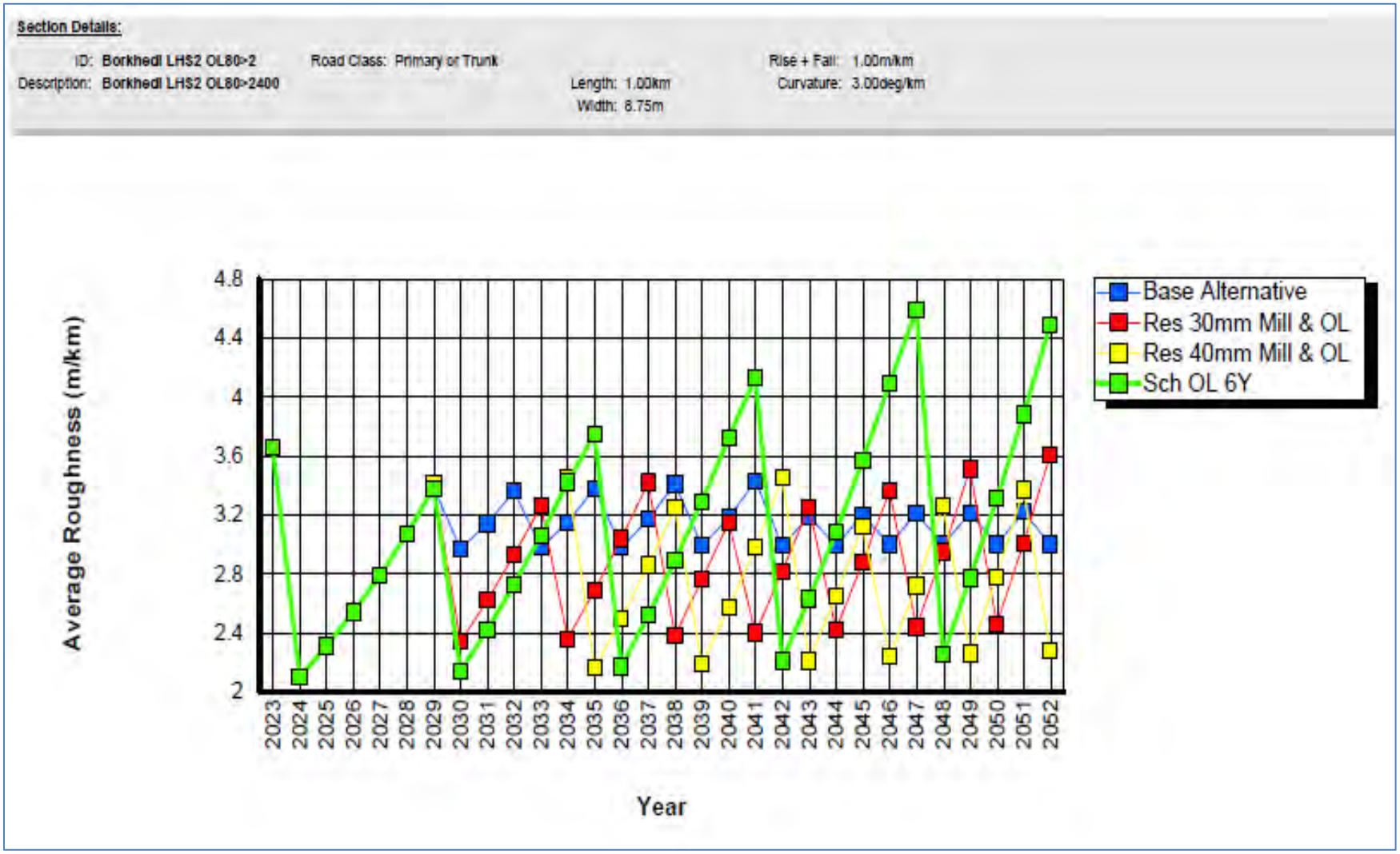


Figure 27: Average Roughness in LHS section-2 80mm OL Km 113.000 to Km 175.000 (>2400mm/Km)

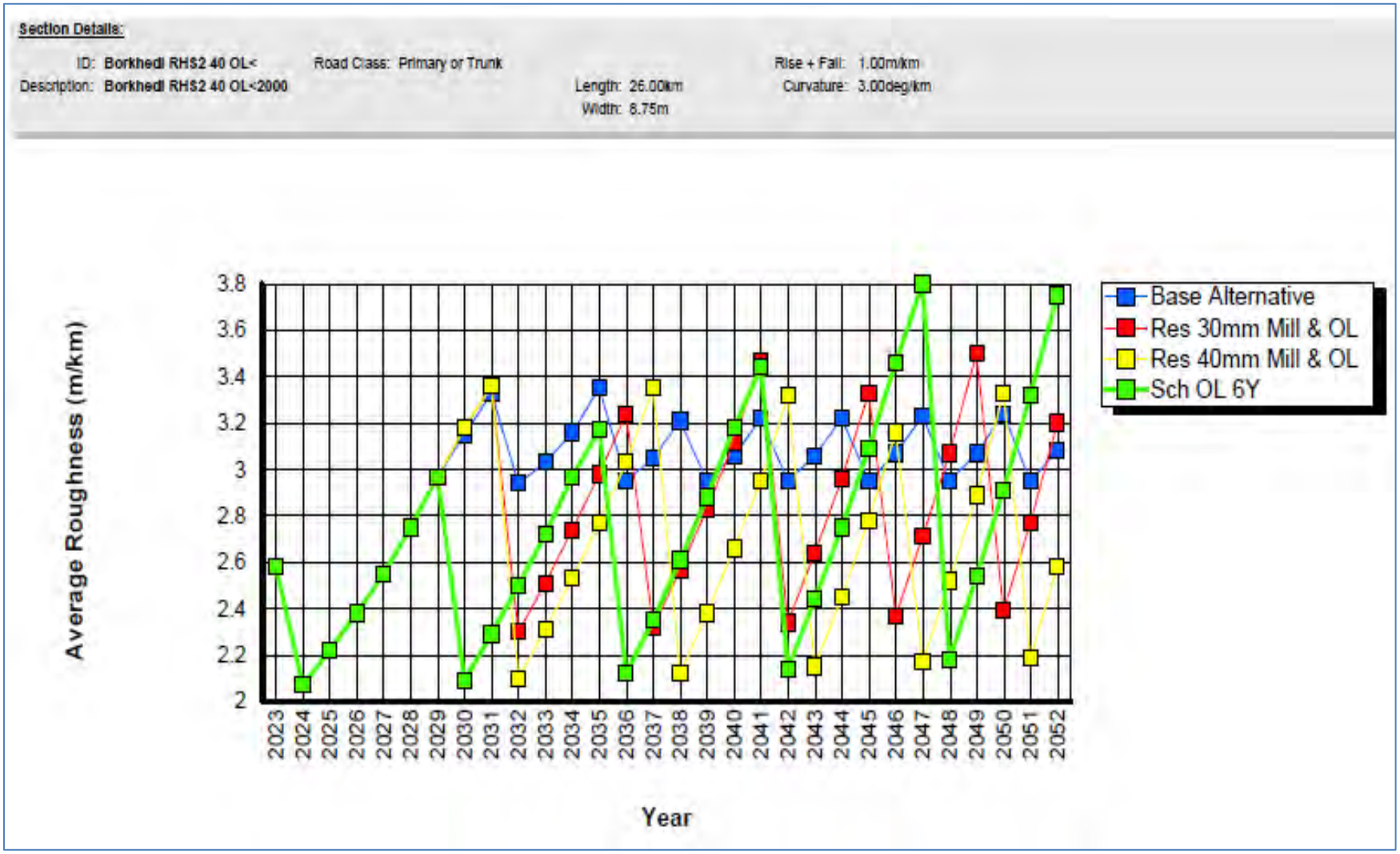


Figure 28: Average Roughness in RHS section-2 40mm OL Km 113.000 to Km 175.000 (<2000mm/Km)

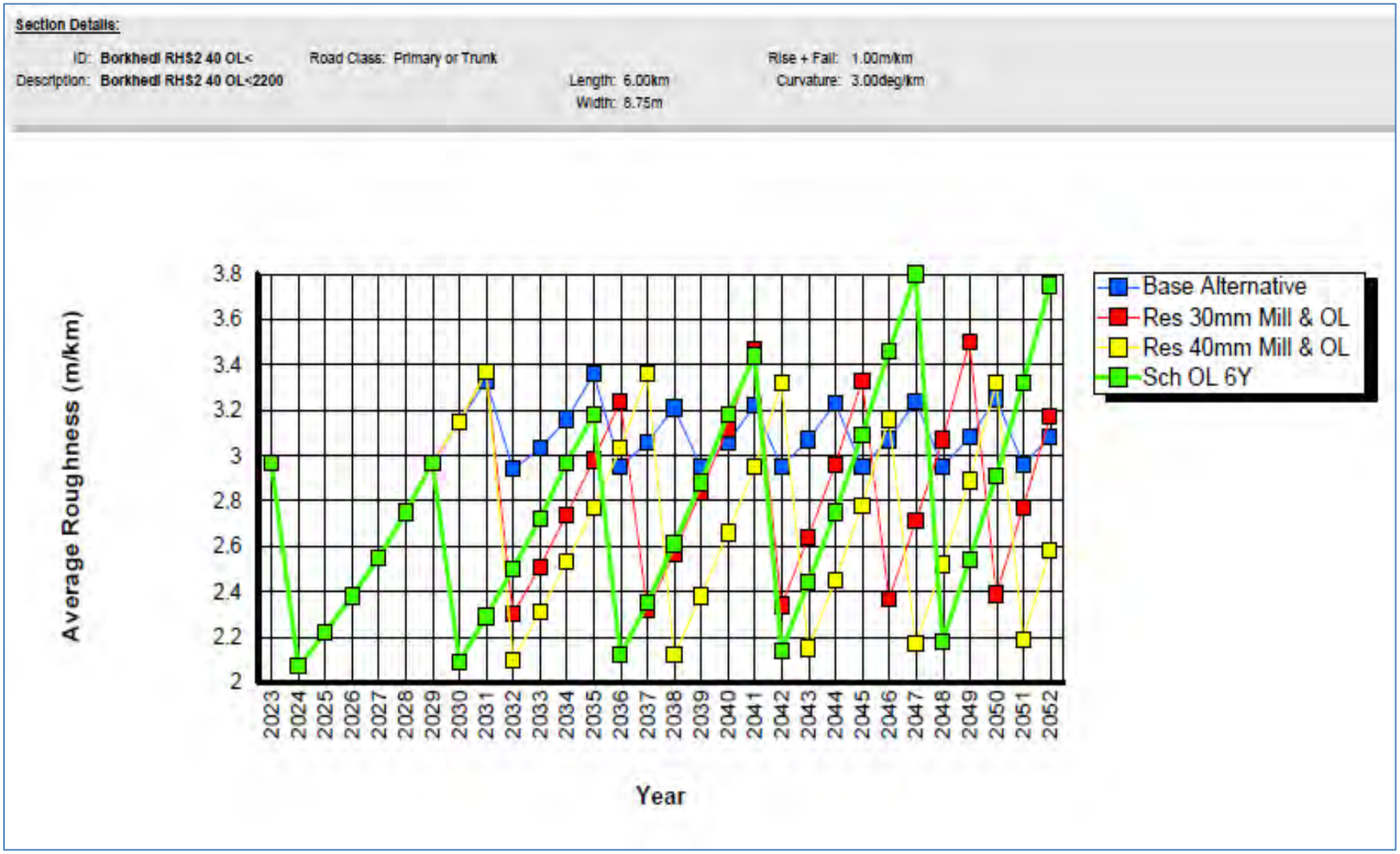


Figure 29: Average Roughness in RHS section-2 40mm OL Km 113.000 to Km 175.000 (<2200mm/Km)

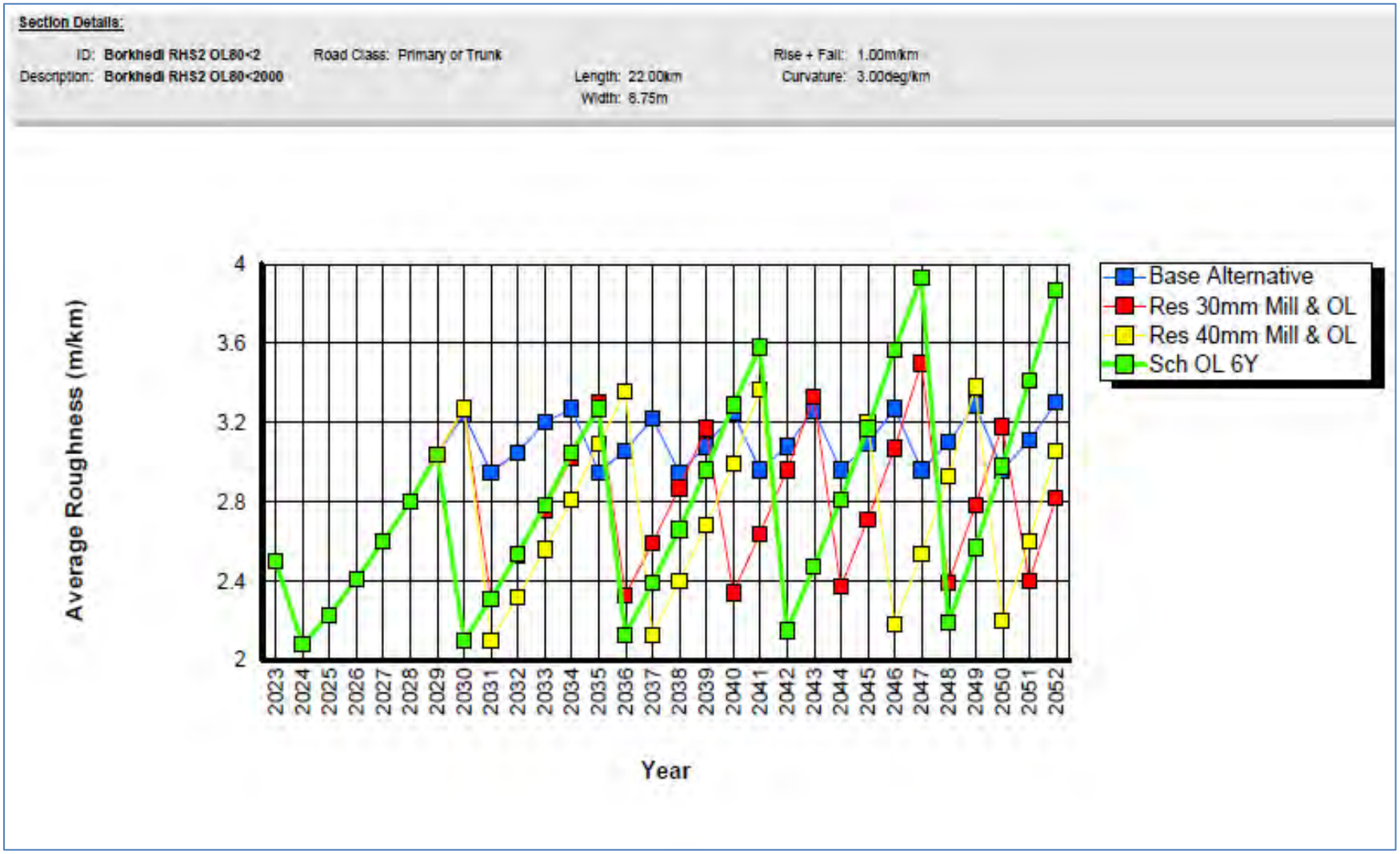


Figure 30: Average Roughness in RHS section-2 80mm OL Km 113.000 to Km 175.000 (<2000mm/Km)

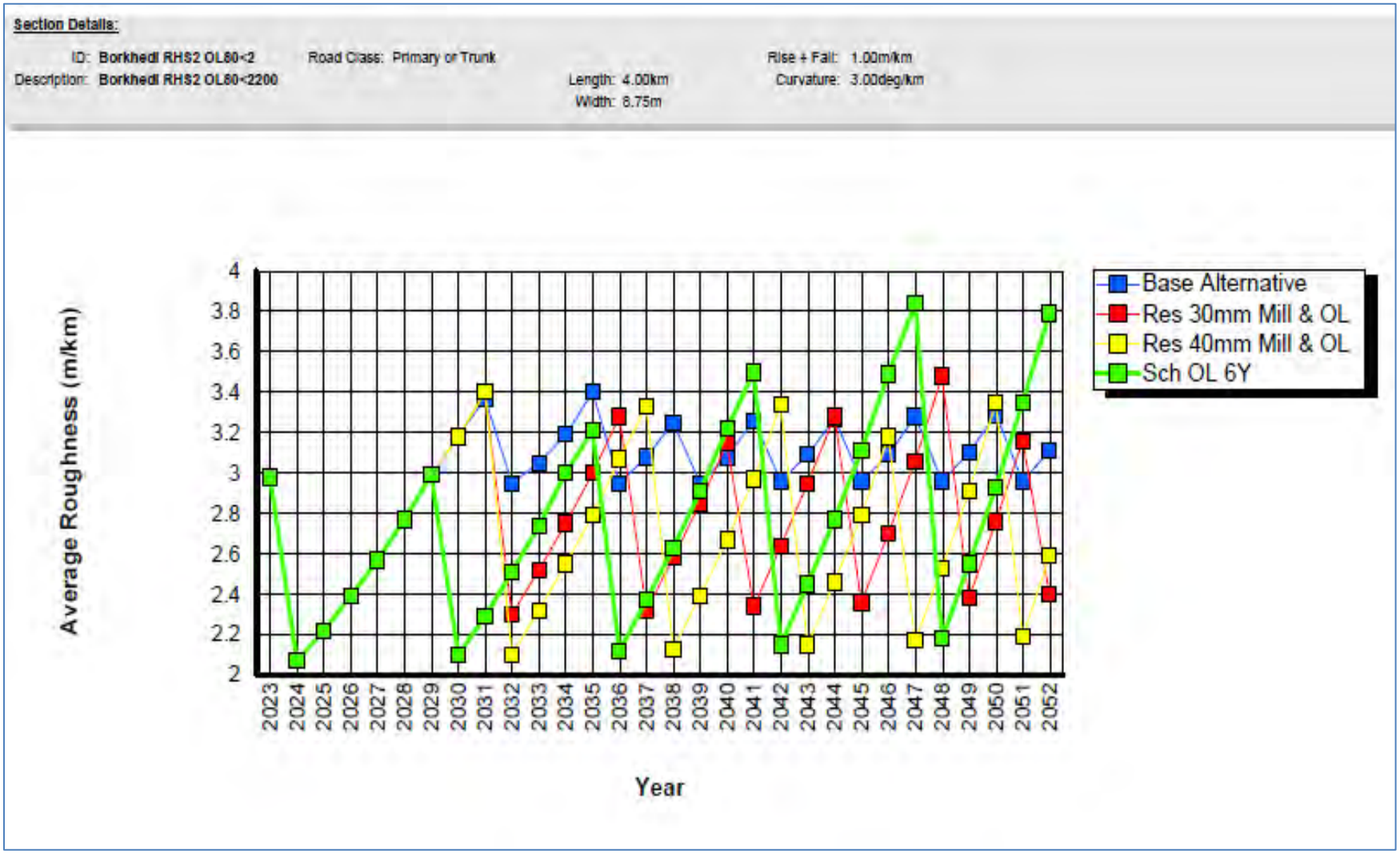


Figure 31: Average Roughness in RHS section-2 80mm OL Km 113.000 to Km 175.000 (<2200mm/Km)

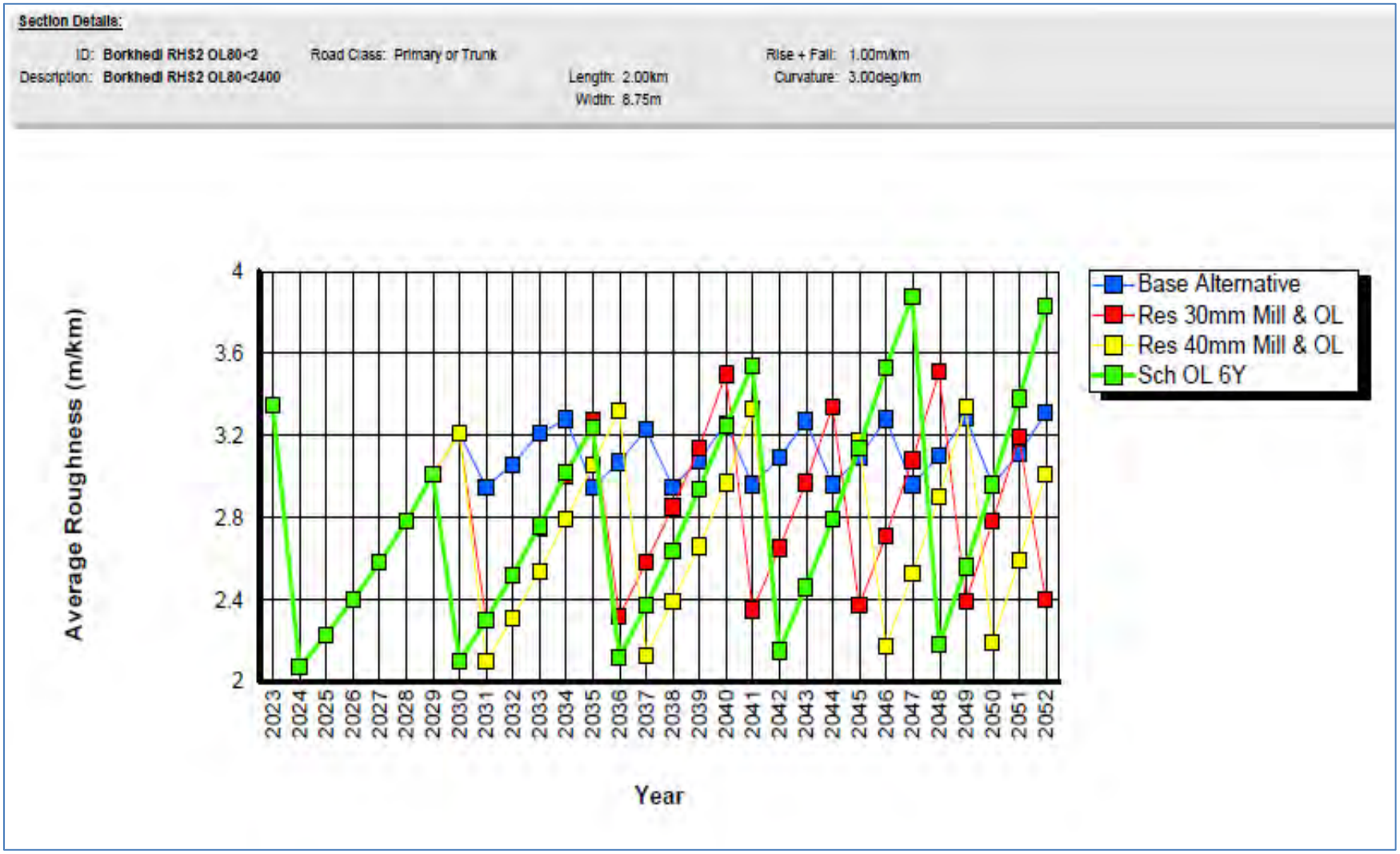


Figure 32: Average Roughness in RHS section-2 80mm OL Km 113.000 to Km 175.000 (<2400mm/Km)

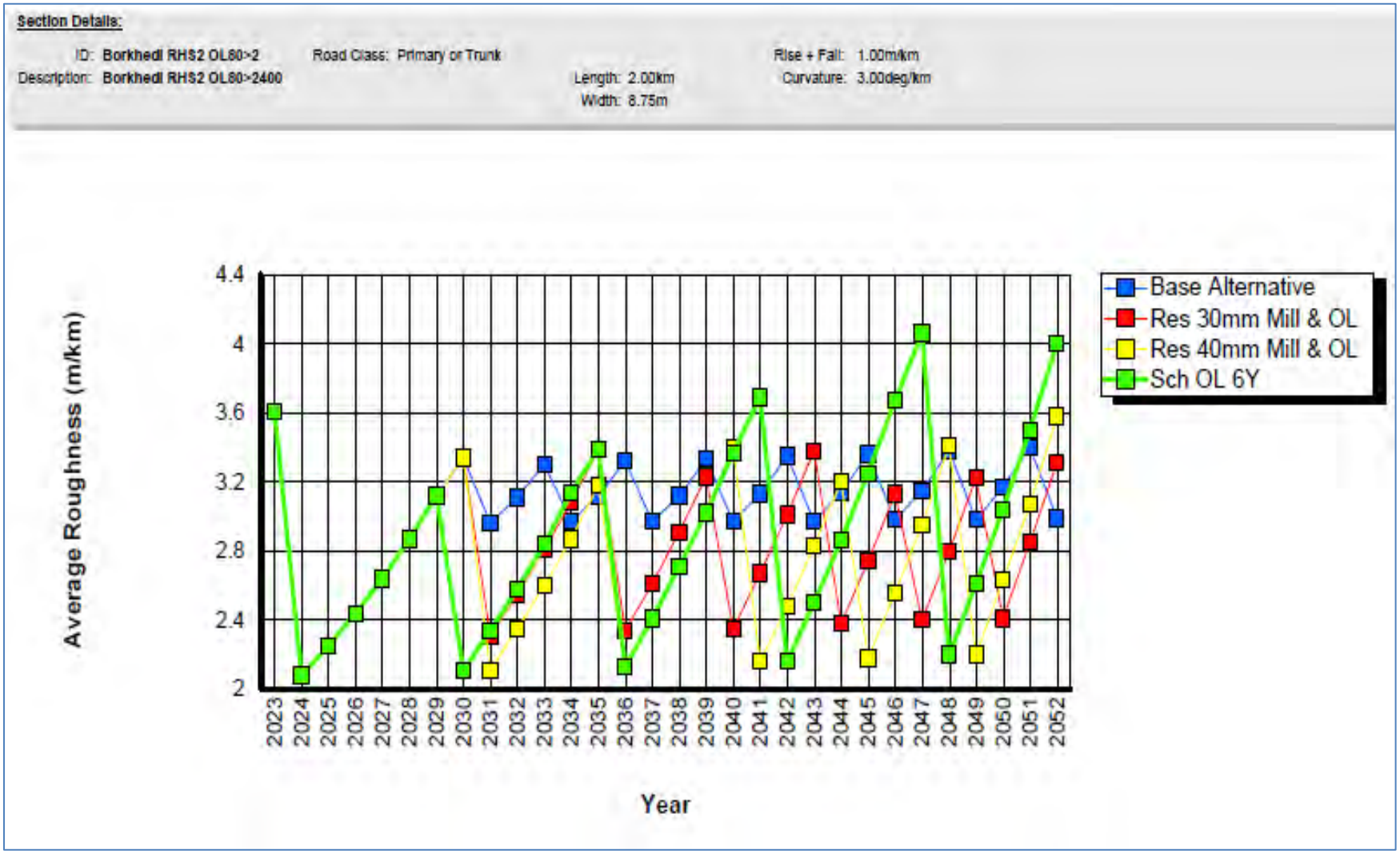


Figure 33: Average Roughness in RHS section-2 80mm OL Km 113.000 to Km 175.000 (>2400mm/Km)

6.5 M&M SCHEDULE

Looking at the present condition and progression of roughness, it is felt prudent to consider the 40mm with 6L OL as the preferred option. Adopted MM schedule for the project is as below:

Table 41: Adopted MM schedule for the project for LHS & RHS

Section-1: LHS-40mm Overlay (Km.36.600 to Km.113.000)

Base Year	Criteria:	(DD 40mm mill & OL)								Remarks
		Obtained MM schedule for LHS				Adjusted MM schedule for LHS				
		IRI<2000	>=2000 and <2200	>=2200 and <2400mm	>=2400	IRI<2000	>=2000 and <2200	>=2200 and <2400mm	>=2400	
	Length:	7400	10000	7000	2600	7400	10000	7000	2600	
	Financial Year	Case-1	Case-2	Case-3	Case-4	Case-1	Case-2	Case-3	Case-4	
0	2022									
1	2023	40	40	40	40	40	40	40	40	OL provide by NHAI
2	2024									
3	2025									
4	2026									
5	2027									
6	2028									
7	2029					40	40	40	40	
8	2030	40	40		40					
9	2031			40						
10	2032									
11	2033									
12	2034									
13	2035					40	40	40	40	
14	2036	40	40		40					
15	2037			40						
16	2038									
17	2039									
18	2040									
19	2041	40	40		40	40	40	40	40	
20	2042			40						

Section-1: LHS-80mm Overlay (Km.36.600 to Km.113.000)

Base Year	Criteria:	(DD 40mm mill & OL)								Remarks
		Obtained MM schedule for LHS					Adjusted MM schedule for LHS			
		IRI<2000	>=2000 and <2200	>=2200 and <2400mm	>=2400		IRI<2000	>=2000 and <2200	>=2200 and <2400mm	>=2400	
	Length:	20000	20750	8650	0		20000	20750	8650	0	
	Financial Year	Case-1	Case-2	Case-3	Case-4		Case-1	Case-2	Case-3	Case-4	
0	2022										
1	2023	40	40	40			40	40	40		OL provide by NHAI
2	2024										
3	2025										
4	2026										
5	2027										
6	2028										
7	2029						40	40	40		
8	2030	40	40	40							
9	2031										
10	2032										
11	2033										
12	2034										
13	2035			40			40	40	40		
14	2036	40	40								
15	2037										
16	2038										
17	2039										
18	2040			40							
19	2041	40	40				40	40	40		
20	2042										

Section-1: RHS-40mm Overlay (Km.36.600 to Km.113.000)

Base Year	Criteria:	(DD 40mm mill & OL)								Remarks
		Obtained MM schedule for LHS					Adjusted MM schedule for LHS			
		IRI<2000	>=2000 and <2200	>=2200 and <2400mm	>=2400		IRI<2000	>=2000 and <2200	>=2200 and <2400mm	>=2400	
	Length:	8200	11600	5400	0		8200	11600	5400	0	
	Financial Year	Case-1	Case-2	Case-3	Case-4		Case-1	Case-2	Case-3	Case-4	
0	2022										
1	2023	40	40	40			40	40	40		OL provide by NHAI
2	2024										
3	2025										
4	2026										
5	2027										

Base Year	Criteria:	(DD 40mm mill & OL)								Remarks
		Obtained MM schedule for LHS				Adjusted MM schedule for LHS				
		IRI<2000	>=2000 and <2200	>=2200 and <2400mm	>=2400	IRI<2000	>=2000 and <2200	>=2200 and <2400mm	>=2400	
	Length:	8200	11600	5400	0	8200	11600	5400	0	
	Financial Year	Case-1	Case-2	Case-3	Case-4	Case-1	Case-2	Case-3	Case-4	
6	2028									
7	2029					40	40	40		
8	2030	40	40	40						
9	2031									
10	2032									
11	2033									
12	2034									
13	2035	40	40	40		40	40	40		
14	2036									
15	2037									
16	2038									
17	2039									
18	2040	40	40	40						
19	2041					40	40	40		
20	2042									

Section-1: RHS-40mm Overlay (Km.36.600 to Km.113.000)

Base Year	Criteria:	(DD 40mm mill & OL)								Remarks
		Obtained MM schedule for LHS				Adjusted MM schedule for LHS				
		IRI<2000	>=2000 and <2200	>=2200 and <2400mm	>=2400	IRI<2000	>=2000 and <2200	>=2200 and <2400mm	>=2400	
	Length:	29200	10400	10600	1000	29200	10400	10600	1000	
	Financial Year	Case-1	Case-2	Case-3	Case-4	Case-1	Case-2	Case-3	Case-4	
0	2022									
1	2023	40	40	40	40	40	40	40	40	OL provide by NHAI
2	2024									
3	2025									
4	2026									
5	2027									
6	2028									
7	2029					40	40	40	40	
8	2030	40	40		40					
9	2031			40						
10	2032									
11	2033									
12	2034									
13	2035	40	40		40	40	40	40	40	
14	2036									
15	2037			40						

Base Year	Criteria:	(DD 40mm mill & OL)								Remarks
		Obtained MM schedule for LHS				Adjusted MM schedule for LHS				
		IRI<2000	>=2000 and <2200	>=2200 and <2400mm	>=2400	IRI<2000	>=2000 and <2200	>=2200 and <2400mm	>=2400	
	Length:	29200	10400	10600	1000	29200	10400	10600	1000	
	Financial Year	Case-1	Case-2	Case-3	Case-4	Case-1	Case-2	Case-3	Case-4	
16	2038									
17	2039									
18	2040	40	40		40					
19	2041					40	40	40	40	
20	2042			40						

Section-2: LHS-40mm Overlay (Km.113.000 to Km.175.000)

Base Year	Criteria:	40mm OVERLAY								Remarks
		Obtained MM schedule for LHS				Adjusted MM schedule for LHS				
		IRI<2000	>=2000 and <2200	>=2200 and <2400mm	>=2400	IRI<2000	>=2000 and <2200	>=2200 and <2400mm	>=2400	
	Length:	22000	6800	4000	0	22000	6800	4000	0	
	Financial Year	Case-1	Case-2	Case-3	Case-4	Case-1	Case-2	Case-3	Case-4	
0	2022									
1	2023	40	40	40		40	40	40		
2	2024									
3	2025									
4	2026									
5	2027									
6	2028									
7	2029					40	40	40		
8	2030	40	40	40						
9	2031									
10	2032									
11	2033									
12	2034									
13	2035	40	40	40		40	40	40		
14	2036									
15	2037									
16	2038									
17	2039									
18	2040	40	40	40						
19	2041					40	40	40		

Section-2: LHS-80mm Overlay (Km.113.000 to Km.175.000)

Base Year	Criteria:	(DD 40mm mill & OL)								Remarks
		Obtained MM schedule for LHS					Adjusted MM schedule for LHS			
		IRI<2000	>=2000 and <2200	>=2200 and <2400mm	>=2400		IRI<2000	>=2000 and <2200	>=2200 and <2400mm	>=2400	
	Length:	22600	3600	2000	1000		22600	3600	2000	1000	
	Financial Year	Case-1	Case-2	Case-3	Case-4		Case-1	Case-2	Case-3	Case-4	
0	2022										
1	2023	80	80	80	80		80	80	80	80	
2	2024										
3	2025										
4	2026										
5	2027										
6	2028										
7	2029	40	40	40	40		40	40	40	40	
8	2030										
9	2031										
10	2032										
11	2033										
12	2034	40	40	40	40						
13	2035						40	40	40	40	
14	2036										
15	2037										
16	2038	40		40	40						
17	2039		40								
18	2040										
19	2041						40	40	40	40	
20	2042	40		40	40						

Section-2: RHS-40mm Overlay (Km.113.000 to Km.175.000)

Base Year	Criteria:	(DD 40mm mill & OL)								Remarks
		Obtained MM schedule for LHS					Adjusted MM schedule for LHS			
		IRI<2000	>=2000 and <2200	>=2200 and <2400mm	>=2400		IRI<2000	>=2000 and <2200	>=2200 and <2400mm	>=2400	
	Length:	26000	6000	0	0		26000	6000	0	0	
	Financial Year	Case-1	Case-2	Case-3	Case-4		Case-1	Case-2	Case-3	Case-4	
0	2022										
1	2023	40	40				40	40			
2	2024										
3	2025										
4	2026										
5	2027										
6	2028										
7	2029						40	40			
8	2030										
9	2031	40	40								

Base Year	Criteria:	(DD 40mm mill & OL)								Remarks
		Obtained MM schedule for LHS					Adjusted MM schedule for LHS			
		IRI<2000	>=2000 and <2200	>=2200 and <2400mm	>=2400		IRI<2000	>=2000 and <2200	>=2200 and <2400mm	>=2400	
	Length:	26000	6000	0	0		26000	6000	0	0	
	Financial Year	Case-1	Case-2	Case-3	Case-4		Case-1	Case-2	Case-3	Case-4	
10	2032										
11	2033										
12	2034										
13	2035						40	40			
14	2036										
15	2037	40	40								
16	2038										
17	2039										
18	2040										
19	2041						40	40			
20	2042	40	40								

Section-2: RHS-80mm Overlay (Km.113.000 to Km.175.000)

Base Year	Criteria:	(DD 40mm mill & OL)								Remarks
		Obtained MM schedule for LHS					Adjusted MM schedule for LHS			
		IRI<2000	>=2000 and <2200	>=2200 and <2400mm	>=2400		IRI<2000	>=2000 and <2200	>=2200 and <2400mm	>=2400	
	Length:	22000	4000	2000	2000		22000	4000	2000	2000	
	Financial Year	Case-1	Case-2	Case-3	Case-4		Case-1	Case-2	Case-3	Case-4	
0	2022										
1	2023	80	80	80	80		80	80	80	80	
2	2024										
3	2025										
4	2026										
5	2027										
6	2028										
7	2029						40	40	40	40	
8	2030	40		40	40						
9	2031		40								
10	2032										
11	2033										
12	2034										
13	2035				40		40	40	40	40	
14	2036	40		40							
15	2037		40								
16	2038										
17	2039										
18	2040				40						
19	2041	40		40			40	40	40	40	
20	2042		40								

6.6 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 replaced immediately.
- Joint buried with debris shall be inspected for any distress, if any distress is shown it shall be replays immediately.
- During visual inspection it is seen that some Expansion joints are bad where as some are not showing any defects.
- Due to this it is considered provident to change the Expansion joints which are visibly damaged in initial stage.
- 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. Balance joints which are not replaced initially will be replaced as on when defects are shown in the joints. This aspect is considered in BOQ.

Bearings:

- In order to identify the bearings requiring immediate replacement, the following strategy is adopted.
    1. Girder Bridges showing diagonal cracks at support, distress in the Pedestals and any form of distress in support location is regarded as a candidate for replacement. By visual inspection there are only a handful of such situations.
    2. Wherever pedestals are damaged either by cracking or spalling poisons confinement is proposed by Jacketing/MS plate bonding such procedure is very effective and common.
    3. All Metallic Bearings need to be taken up for servicing.

Wearing Coat:

It is necessary to replace the Wearing coat at every 15years interval, as wearing coat is a very week component of the bridge structure which is subjected to severe deterioration due to Loading, Environment etc. As of now, we have considered sealing of cracks by Fog Seal and for which does not show any distress other than cracking by viz. Pot holes, abrading etc. Based on this aspect, this cost has been considered in highway O&M cost.

Periodic Maintenance strategy for Replacement of Bearings & Expansion joint:

Below strategy has been considered for periodic major maintenance of the structures.

Sl.no	Description		Bridge components	Year of Replacement			
				% of Replacement			
				2028	2035	2042	2050
1	Old structure	Structures which are older than 15years as of now	Periodic Replacement of bearings, Expansion joint	100%		50%	50%
2	New Structure	Structures which are Not older than 15years as of now		50%	50%	50%	50%

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.

The gist of the cost components considered are presented below:

- Initial Improvement Works
- 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: Basic Material Rates excluding GST

Sl.no	Description	Units	Source	Basic rate	Lead in Kms	Rate per unit per Km
1	Good earth	Cum	BA	43.00	6.60	7.00
2	40 mm	Cum	Crusher	643.00	29.95	7.65
3	20 mm	Cum	Crusher	731.00	29.95	7.65
4	12 mm	Cum	Crusher	562.00	29.95	7.65
5	6 mm	Cum	Crusher	440.00	29.95	7.65
6	Dust	Cum	Crusher	480.00	29.95	7.65
7	M sand	Cum	Crusher	769.00	29.95	7.65
8	GSB	Cum	Crusher	572.00	29.95	7.65
9	Boulders	Cum	Querry	312.00	7.00	7.65
10	Sand source to Plant	Cum	River	769.00	30.00	7.00
11	Sand source to working site	Cum	Stock yard	769.00	10.00	7.00
12	Bitumen 60/70	MT	Mumbai	44810.00	778.00	7.00
13	Bitumen 80/100	MT	Mumbai	44510.00	778.00	7.00
14	VG-40	MT	Mumbai	For Capex 42000.00 For MMR 36000	778.00	7.00
15	CRMB-55	MT	Mumbai	45810.00	778.00	7.00
16	PMB	MT	Mumbai	53810.00	778.00	7.00
17	SS1	MT	Mumbai	40040.00	778.00	7.00
18	MS	MT	Mumbai	40040.00	778.00	7.00
19	RS1	MT	Mumbai	40540.00	778.00	7.00
20	Steel	MT	Borkhedi	62500.00	88.00	7.00
21	HTS Strands	MT	Borkhedi	67000.00	88.00	7.00
22	Cement	MT	Borkhedi	6400.00	88.00	7.00
23	Structural Steel	MT	Borkhedi	63700.00	88.00	7.00

7.2 INITIAL IMPROVEMENT WORKS (SCHEDULE-B)

Costs associated with initial improvements 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 Initial Improvement costs:

- Scope given in schedule-B
- Scope which is not executed
- Road work items
- Bridge Work Items
- Pavement Rehabilitation works
- Structural Rehabilitation works
- Drainage Works
- Slope Protection works
- Safety Works

Summary of Initial Improvement Costs are included in table below:

Table 43: Summary of Initial Improvement Cost

S.no	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
1	Initial Improvement works (Highway & Str)	LS	1	341,57,00,614	341,57,00,614
2	Repair/Rehabilitation (Highway)	LS	1	5,01,34,092	5,01,34,092
3	Repair/Rehabilitation (Structures)	LS	1	2,95,72,621	2,95,72,621
4	TMS	LS	1	3,83,25,306	3,83,25,306
5	ATMS	LS	1	33,15,60,000	33,15,60,000
6	Revalidation surveys	LS	1	1,80,83,393	1,80,83,393
Total Cost excluding GST					388,33,76,027
GST at 18%					69,90,07,685
Total Cost including GST					458,23,83,711
Total Cost including GST IN Crores					458.238

Table 44: Summary of Repair/Rehabilitation Cost (Highway)

S.no	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)	Remarks
1	RCC Covered Drain	Sq.m	30	1384	41517	Cover slab damage
2	Light Poles	No	3	2500	7500	Repair of light poles
3	Median Cuts Drain	Nos	3122	680		Cleaning required (Covered in RM)
4	Median Kerb	m	389	272	105808	Kerb damage
5	Median Plantation-Non Functional	Km	85.79	58902	5053070	
6	Single Faced Single Barrier (MCB)	m	325	3712	1206400	
7	Repaire of Solar Blinkers	No	14	3000	42000	Bulb not working
8	Replacement of Km Stones	No	222	3629	805638	
9	5th kilometer stole	No	56	6220	348320	
10	Replacement of Hectometer Stones	No	1114	1011	1126254	
11	Guard Post	No	4	939	3756	Damaged
12	Road Signs	No	31	4412	136772	Damaged
13	Crack seal	Sq.m	32515	89	288050	Covered in EPC Cost (As total road is suggeted for Overlay. Only 10%cosidered during Construction period
14	Fog seal	Sq.m	162435	43	701882	
15	Delineators	No	22	677	14894	
16	Chevrons	No	4	5075	20300	Damaged
17	PGRs	m	96	2522	242112	
18	Bus Shelter	No	13	15000	195000	Shelter roof damage/Missing
19	Concrete Railing	m	19	2522	47918	
20	Median Kerb painting	Sq.m	59422	129	7665438	
21	single faced double Barrier (MCB)	m	128	6310	807731	
22	Fixed Gantry - Sign Damage	No	2	20000	40000	Damage
23	Pavement marking at Hazard locatoins	Sq.m	495	958	474012	hazard marking at narrow road locations
24	Anti Glare	No	948	650	616200	Anti glare to be provided
25	Hand Rail on Crash barrier	m	2760	300	828000	missing on CCB
26	MCB to be provide	m	4200	5568	23385600	MCB to provide at narrow median which not include in SCH-B
27	Gantry at km 153+890	No	1	100000	100000	Gantry to be relocated due to Proposed VUP
28	PGR Paint	Sq.m	10320	116.00	1197120	Paint to be done(Washed out/Got Rust)
29	Median Kerb to Raise	m	14900	272	4052800	Median Kerb to be Raised
30	Replacement of solar blinkers	No	29	20000	580000	Blinker missing

Table 45: Summary of Repair/Rehabilitation Cost (Structures)

Item No.	Description	Unit	Total Quantity	Rate in Rs	Amount in Rs	Remarks
1	Cleaning and adding rubber sealent near expansion joints	m	589	52	30628	
2	Replacement of Damaged Concrete Railing all complete as per Technical specifications and as directed by the Engineer	Rm	40	3776	149756	
3	Provision of an RCC crash barrier (0.35sqm cross sectional area) constructed with M-40 grade concrete including reinforcement	cum	0.8	14120	10872	
4	Lifting of superstructure by providing necessary hydraulic jacks,mechanical jacks,sleepers,packing etc complete including cost of labour,equipment,tools,consumables etc complete.	Nos	29	103704	3007416	
5	Elastomeric bearings	Cum	6800000	2	10540000	
6	POT/PTFE bearings	Nos	16	84974	1359584	
7	Cutting of groove of 15 mm x 15 mm along crack and sealing the same with epoxy putty including cost of material , labour etc.	RM	206	156	32120	
8	Anti corrosion paint for Steel 45 microns primar with Zinc bonding coat	Lit	14	525	7088	
9	Micro Concrete	Cum	10.39	60480	628569	
10	Concrete	Cum	1	12813	6407	
11	HYSD Bars	MT	4	12244	52588	
12	Cement Mortar (1:1) Grouting	Kg	111	312	34757	
13	Patching of damaged concrete surface with polymer Modified mortar upto maximum thickness of 45mm thickness in layer not exceeding 15mm and curing compounds, available in present formulations, to be applied including bond coat.	sqm	313	2333	730964	
14	Sealing of crack / porous concrete with Epoxy Grout by injection through nipples complete as per clause 2803.1.	Kg	12	1297	15564	
15	Providing and laying Filter material underneath pitching in slopes.	cum	40	3325	134160	
16	Providing and laying Pitching on slopes laid over prepared filter media including boulder apron laid dry in front of toe of embankments.	cum	81	3163	255248	
17	Anti corbon paint/Epoxy	Sq.m	154	700	107835	
18	Replacement of existing damaged Expansion joints by providing and laying of Strip Seal Expansion Joint System, including removal of existing damaged	Rm	552	16973	9364004	

Item No.	Description	Unit	Total Quantity	Rate in Rs	Amount in Rs	Remarks
	expansion joints by dismantling of deck slab, wearing coat etc. and back filling of the recess up to final finish level with MIicro conc, complete as per M.O.R. T&H specification.					
19	Structural steel	MT	6	70519	416642	
Total Amount for Immediate repairs as per Site					2.96	Cr.

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. Bridges

1. Wearing coat comprising of 53 mm thick BC including water proofing material.
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 shortcreting 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-M-35 Concrete
14. Providing and filling joint sealing compound as per drawings of pourable grade, (Bitumastic sealant in the gap b/w Abutment & Approach slab. As per Technical specifications
15. Providing and laying Filter material underneath pitching in slopes.
16. Providing and laying Pitching on slopes laid over prepared filter media including boulder apron laid dry in front of toe of embankments.
17. Test s UPV, RHT and Load test for span 15m and above as per Schedule I.
18. Vegetation cleaning before and after monsoon.
19. Repair of damaged structure portion due accidents and any others.
20. Level of Service if applicable.

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, labours 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 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

7.5 OPERATIONS COSTS

Cost towards Operations include the following:

- Toll Plaza Operation cost
- Operation and management costs of rest areas and lay byes
- SPV Costs
- Survey Costs
- Insurance
- Audit charges
- I.C for O&M period
- Administrative Cost
- Electricity Bill of lighting

7.6 TOTAL OPERATION & MAINTENANCE COSTS

Year on year operation cost is summation of following:

- ✓ Routine Maintenance & Incident Management
- ✓ Periodic Maintenance
- ✓ Operations Cost

Following table presents the summary of Operations & Maintenance cost for the project

Table 46: Abstract cost (Un-escalated)

Abstract of Total un-escalated Cost (O&M COST and Periodic Cost)													
S.No	Financial Year	Routine Maintenance	Total Toll Plaza Operation and Maintenance	Electricity & Patrolling Expenses	ATMS Operation and Maintenance Expenses	SPV Cost & IE Cost	Insurance Cost	Total O&M	TCMS Periodic Cost	MMR Periodic Cost	ATMS Periodic Cost	Total Periodic Cost	Total Cost
1	2022-23	13.37	6.36	10.29	1.2	5.54	3.15	39.9	-	4.31	-	4.31	44.22
2	2023-24	13.37	6.36	10.29	1.2	5.54	3.15	39.9	-	-	-	-	39.9
3	2024-25	13.37	6.36	10.29	1.2	5.54	3.15	39.9	-	-	-	-	39.9
4	2025-26	13.37	6.36	10.29	1.2	5.54	3.15	39.9	-	4.65	-	4.65	44.55
5	2026-27	13.37	6.36	10.29	1.2	5.54	3.15	39.9	3.17	33.9	-	37.06	76.97
6	2027-28	13.37	6.36	10.29	1.2	5.54	3.15	39.9	-	0.82	-	0.82	40.73
7	2028-29	*10.36	6.36	10.29	1.2	5.54	3.15	36.89	-	168.95	-	168.95	205.85
8	2029-30	13.37	6.36	10.29	1.2	5.54	3.15	39.9	-	-	27.39	27.39	67.29
9	2030-31	13.37	6.36	10.29	1.2	5.54	3.15	39.9	-	-	-	-	39.9
10	2031-32	13.37	6.36	10.29	1.2	5.54	3.15	39.9	3.17	13.55	-	16.71	56.62
11	2032-33	13.37	6.36	10.29	1.2	5.54	3.15	39.9	-	1.88	-	1.88	41.79
12	2033-34	13.37	6.36	10.29	1.2	5.54	3.15	39.9	-	-	-	-	39.9
13	2034-35	* 10.36	6.36	10.29	1.2	5.54	3.15	36.89	-	182.88	-	182.88	219.77
14	2035-36	13.37	6.36	10.29	1.2	5.54	3.15	39.9	-	-	-	-	39.9
15	2036-37	13.37	6.36	10.29	1.2	5.54	3.15	39.9	-	-	27.39	27.39	67.29
16	2037-38	13.37	6.36	10.29	1.2	5.54	3.15	39.9	3.17	13.55	-	16.72	56.62
17	2038-39	13.37	6.36	10.29	1.2	5.54	3.15	39.9	-	-	-	-	39.9
18	2039-40	13.37	6.36	10.29	1.2	5.54	3.15	39.9	-	-	-	-	39.9
19	2040-41	*10.36	6.36	10.29	1.2	5.54	3.15	36.89	-	177.9	-	177.9	214.8
20	2041-42	13.37	6.36	10.29	1.2	5.54	3.15	39.9	3.17	1.88	-	5.05	44.95
21	2042-43	-	-	-	-	-	-	-	-	-	-	-	-
		258.39	127.12	205.75	24.08	110.79	62.91	789.06	12.66	604.28	54.77	671.71	1460.77

Note: *The repair cost for the year in which periodic/ major maintenance are considered at 50% of the annual estimated repair cost

Capex cost is not included in the above table

All the Costs are inclusive of applicable GST.

Table 47: Cost Summary

Year	EPC & Immediate Repair's Cost	Routine Maintenance					Periodic Maintenance				Electricity bill of lighting	Toll Plaza operation cost	SPV Cost	Survey Costs	Insurance charges	Audit charge	IE Fee	Administrative Cost	Total Recurring cost
		Routine Maintenance	R&R of Road items	Toll and HTMS AMC cost	Incident management	R&R of Structures	Functional +Structural overlay MCW+ S/R	Replacement of ATMS @every 7 years	Replacement of TMS @every 5years	Structure specified repairs									
2023	458.24	5.72	5.42	1.20	3.94	0.60	0.00			4.31	6.34	6.36	3.36	1.63	3.15	0.45	1.55	0.18	502.45
2024		5.72	5.42	1.20	3.94	0.60	0.00			-	6.34	6.36	3.36	1.63	3.15	0.45	1.55	0.18	39.90
2025		5.72	5.42	1.20	3.94	0.60	0.00			-	6.34	6.36	3.36	1.63	3.15	0.45	1.55	0.18	39.90
2026		5.72	5.42	1.20	3.94	0.60	4.65			-	6.34	6.36	3.36	1.63	3.15	0.45	1.55	0.18	44.55
2027		5.72	5.42	1.20	3.94	0.60	25.00		3.17	8.90	6.34	6.36	3.36	1.63	3.15	0.45	1.55	0.18	76.97
2028		5.72	5.42	1.20	3.94	0.60	0.00			0.82	6.34	6.36	3.36	1.63	3.15	0.45	1.55	0.18	40.73
2029		5.72	2.71	1.20	3.94	0.30	168.95			-	6.34	6.36	3.36	1.63	3.15	0.45	1.55	0.18	205.85
2030		5.72	5.42	1.20	3.94	0.60	0.00	27.39		-	6.34	6.36	3.36	1.63	3.15	0.45	1.55	0.18	67.29
2031		5.72	5.42	1.20	3.94	0.60	0.00			-	6.34	6.36	3.36	1.63	3.15	0.45	1.55	0.18	39.90
2032		5.72	5.42	1.20	3.94	0.60	4.65		3.17	8.90	6.34	6.36	3.36	1.63	3.15	0.45	1.55	0.18	56.62
2033		5.72	5.42	1.20	3.94	0.60	0.00			1.88	6.34	6.36	3.36	1.63	3.15	0.45	1.55	0.18	41.79
2034		5.72	5.42	1.20	3.94	0.60	0.00			-	6.34	6.36	3.36	1.63	3.15	0.45	1.55	0.18	39.90
2035		5.72	2.71	1.20	3.94	0.30	182.88			-	6.34	6.36	3.36	1.63	3.15	0.45	1.55	0.18	219.77
2036		5.72	5.42	1.20	3.94	0.60	0.00			-	6.34	6.36	3.36	1.63	3.15	0.45	1.55	0.18	39.90
2037		5.72	5.42	1.20	3.94	0.60	0.00	27.39		-	6.34	6.36	3.36	1.63	3.15	0.45	1.55	0.18	67.29
2038		5.72	5.42	1.20	3.94	0.60	4.65		3.17	8.91	6.34	6.36	3.36	1.63	3.15	0.45	1.55	0.18	56.62
2039		5.72	5.42	1.20	3.94	0.60	0.00			-	6.34	6.36	3.36	1.63	3.15	0.45	1.55	0.18	39.90
2040		5.72	5.42	1.20	3.94	0.60	0.00			-	6.34	6.36	3.36	1.63	3.15	0.45	1.55	0.18	39.90
2041		5.72	2.71	1.20	3.94	0.30	168.95			8.95	6.34	6.36	3.36	1.63	3.15	0.45	1.55	0.18	214.80
2042		5.72	5.42	1.20	3.94	0.60	0.00		3.17	1.88	6.34	6.36	3.36	1.63	3.15	0.45	1.55	0.18	44.95
Total:	458.24	114.46	100.24	24.08	78.88	11.15	559.724	54.77	12.66	44.55	126.87	127.12	67.25	32.54	62.91	9.00	30.93	3.62	1919.01

*Provision of 25 Crores is made in the 4th year as a contingency to take care of balance reconstruction and additional DBM requirement of the project

8.1 DATA COLLECTION AND REVIEW TMS WORKS

1) Provisions as per CA and other documents are as below.

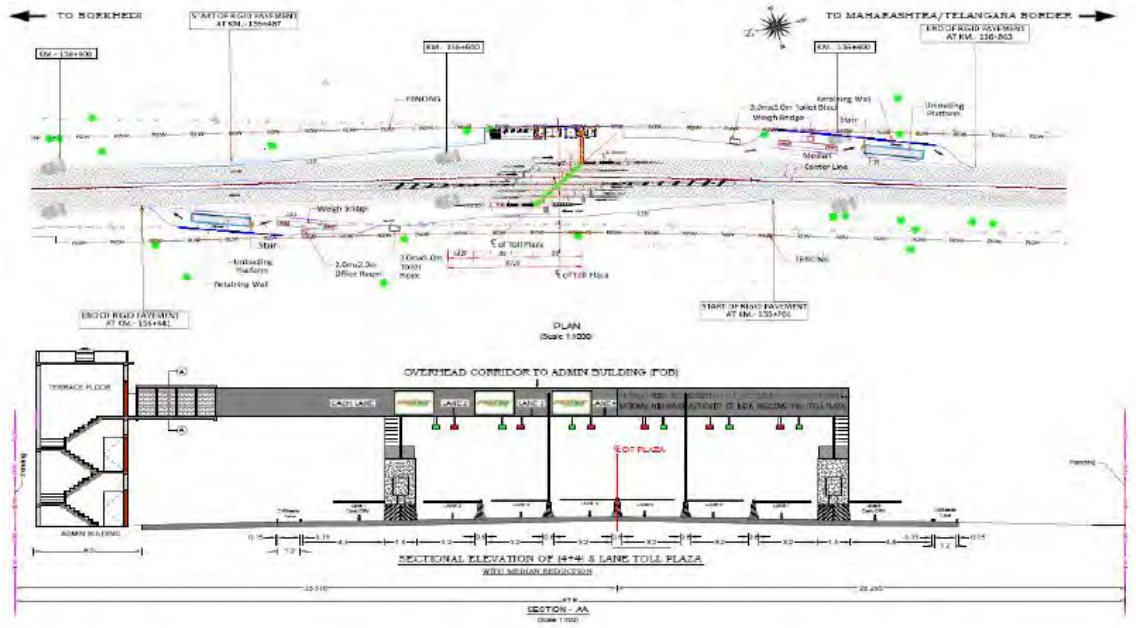
(a) Clause 9.1 of Schedule B - Daroda toll plaza at Km. 92.500. The Existing toll plaza is proposed to be retained. The following improvement proposal shall be constructed.

- It is recommended to update the existing Hybrid ETC system as per IHMCL guidelines in all toll lanes.
- The toll plaza shall be established in accordance with IRC: SP:84-2019.
- Rigid pavement shall be constructed from the start of the taper to end of taper at the toll plaza area.
- Loading & unloading area and storage facility for overloaded material for each existing static weigh bridge shall be constructed.
- Toll plaza lighting shall be provided conforming to IRC: SP: 84:2019.
- Fencing shall be provided on both sides of the toll plaza premises including approaches.
- The adequacy of space available at toll plaza for traffic aid post & medical aid posts shall be checked and improved if required. The instruments, other machineries and facilities for traffic aid post & medical aid posts shall be provided as per CA and specifications & standards.
- Existing toll plaza Administration building shall be repaired / rehabilitated as per the specifications & standards given in IRC: SP: 84:2019.
- The existing toll booths, toll plaza building and toll plaza premises including all facilities, parking etc. shall be reinstalled and maintained. The concessionaire shall restore and maintain the Administration building.
- NHAI/Policy guide lines / management of toll plaza / 2021 Policy circular no. 17.5.82 dt. 24th May 2021 also shall be followed for toll plaza.
- Toilet blocks shall be operated and maintained to desired level of cleanliness on both side of toll plaza as per NHAI policy. If not maintained and for lack of proper upkeep, facilities etc. fine up to Rs. 10000/- will be imposed on every occurrence on concessionaire. The concessionaire shall also make arrangements for regular water supply, electricity etc. for mini nest, toilet blocks and water ATM.

(b) Clause 9.1 of Schedule B - Proposed new toll plaza at Km. 156.650 - The existing Kelapur toll plaza at Km. 150.000 is proposed to be shifted to Km. 156.650 as per IRC: SP:84:2019 within the available ROW so as to have minimum 8 lane (including 2 reversible lanes) toll plaza with rigid pavement as per the drawing given in Appendix B-IV.

Appendix-B-IV

PROPOSED TOLL PLAZA AT km. 156+650



- Static weighbridge along with one room, loading/unloading platform and storage facility for overloaded material shall be constructed for each direction of traffic within the available ROW as per the standards and specifications given in IRC: SP: 84:2019.
- Toll plaza administrative building and toll plaza complex shall be provided as per the standards and specifications given in IRC: SP: 84:2019. Required no. of parking bays are to be provided within the toll plaza area in consultation with Authority engineer.
- Toilet blocks and water ATM (One in each direction) on both side of toll plaza with adequate parking facility near toll plaza area shall be provided as per the drawings and standards given in NHAI Circular dt. 09.11.2017 (Ref. NHAI/GM(T)HO/Highway Nest (Mini)/2017/108290). The O & M of these shall be in the scope of the concessionaire.
- Toilet blocks shall be operated and maintained to desired level of cleanliness on both side of toll plaza as per NHAI policy. If not maintained and for lack of proper upkeep, facilities etc. fine up to Rs. 10000/- will be imposed on every occurrence on concessionaire. The concessionaire shall also make arrangements for regular water supply, electricity etc. for mini nest, toilet blocks and water ATM.
- Fencing shall be provided on both sides of the toll plaza premises including approaches.

- NHAI/Policy guidelines/ management of toll plaza / 2021 policy circular no. 17.5.82 dated 24th May 2021 shall be followed.

(c) Schedule C states as below:

- Engineering and safety improvements along the project highway shall conform to the IRC: SP: 84:2019, Manual of specifications & Standards for Four laning of Highways through Public Private Partnership published by IRC.
- Clause 2 – Deviations from the manual - Section 10.

10.	Section-10	**Proposed Improvement at Toll Plaza**	The Toll Plazas shall be improved as given in Schedule-B and as per NHAI/PolicyGuidelines/management of toll plaza/2021 Policy circular No. 17.5.82 dated 24th May 2021.
11.	Section -10 Clause -10.3	**Number of Toll lane : -** Adequate land for Toll Plaza shall be acquired to permit the provision of toll lanes for a projected peak hour's traffic of 20 years subject to a minimum number of 16 toll lanes including all, other buildings and structures to be accommodated at the Toll Plaza location.	Existing Daroda Toll plaza shall be retained with existing lanes and new toll plaza shall be constructed as per the Drawing given in Schedule-B and NHAI policy circular no. 17.5.82 dated 24.05.2021 and documents issued by IHMCL.
12.	Section-10 Clause-10.4.5	**Tunnel at Toll Plaza** For movement between Toll office and Toll Booth of each toll lane, an underground tunnel across all toll lanes shall be provided.	No Tunnel is proposed at Toll Plazas as per NHAI policy circular no. 17.5.82 dated 24.05.2021
13.	Section-10 Clause:-10.5.1	**Electronic Toll Collection –** To carry out, as per defined technical specifications, installation, testing, commissioning, operations and maintenance of Hybrid ETC System in all the lanes of Toll Plaza including but not limited to: i) Installation, integration, testing, commissioning, operations and maintenance of ETC RFID transceiver in all the lanes of Toll Plaza. ii) Installation, integration, testing, commissioning, operations and maintenance of Medium Speed Weigh in Motion in all lanes of Toll Plaza and one Static Weigh Bridge in each direction of traffic at Toll Plaza. Integration, testing, operations and maintenance of ETC RFID transceiver, Medium Speed Weigh	All toll lanes shall be provided with the system of payment through Hybrid Electronic Toll Collection/ETC/FASTag along with the proposals given in Schedule-B. Specifications are provided as Annexure-III, also follow/ impliment the circular/ Guidelines issued time to time and no Change of Scope shall be considered.

S. No.	Clause referred in the Manual	Item as per Manual	Modified provision
		in Motion, Static Weigh Bridge and other associated peripheral hardware into single Hybrid Toll Management System/Software.	
14.	Section-10 Clause-10.12	**Toll Plaza Complex** The size of Toll plaza office complex depends on the minimum requirements as mentioned in Clause 10.12.	Existing Toll Plaza office complex is to be retained at Daroda Toll Plaza. New Toll Plaza complex shall be constructed at proposed toll plaza at km 156+650. Facilities as mentioned in Clause 10.12, Schedule-B and NHAI/Policy Guidelines/ management of toll plaza/2021 Policy circular No. 17.5.82 dated 24th May 2021 shall be be provided with in both the Toll Plaza office Complex .

(d) IRC SP: 84:2019 clause 10.6.2 - Not less than 2 middle toll lanes shall be capable of being used as reversible lane to meet the demand of tidal flow.

2) Costing details as per new Provisions as per CA:

(a) Detailed cost estimate, cost forecast, power details are explained in the following files.

- TMS Report - TP1 - Borkhedi-Wander-Deodhari-Kelapur-MH.TS Border road project.
- TMS Report - TP2 - Borkhedi-Wander-Deodhari-Kelapur-MH.TS Border road project

Total cost estimate for TMS works as per the provisions of Schedule B is Rs. 3,83,25,306 Excluding GST

8.2 DATA COLLECTION AND REVIEW ATMS WORKS

1) Provisions as per CA and other documents are as below.

(a) Clause 9.10 - ATMS of Schedule B - Concessionaire shall provide the functional ATMS with all its components for continuous monitoring over the entire ROW without any blind spot. In this regard Traffic monitoring camera system (PTZ/Radar camera etc.) at every kilometre, Video Incident Detection System (VIDS) at every junction and Grade separator structures to detect any incident at regular interval, Vehicle speed detection system (VSDS) with ANPR system (one no. each at LHS and RHS at every 10 Kms.) other than toll plaza locations, VMS of minimum size 5000 mm x 2000mm (minimum 14 nos.) and ATCC at 01 location, independent of toll plaza, in consultation with IE / Authority as per good industry practice. In this regard, it is suggested for the technical specification concessionaire may refer "Functional and technical specification released by NHAI vide ref. No. NHAI/CO/ATMS/02-2021, February 2021". Command control centre shall be established at Toll plaza. Concessionaire shall also provide Portable VMS for each toll section (minimum 2 nos.). The minimum numbers of various ATMS items and components are given below.

S. No.	ATMS Component	Unit	Qty
1	Traffic Management Centre (TMC)		
1.1	Central Processing Server in hot standby configuration (Primary + Secondary) TMC & 1 nos. at each Sub-centre	Nos.	3
1.2	Video Recording Server with storage (minimum 360 TB) 2 nos. at TMC and 1 no. at each Sub-centre	Nos.	3
1.3	Backup Video Recording (Only Incidents) Server with 240 TB storage (1 nos. at TMC and 1 no. at each Sub-centre)	Nos.	2
1.4	Facility Monitoring System Controller (1 nos. at TMC and 1 no. at each Sub-centre)	Nos.	2
1.5	Graphic Display 2x6 (FHD Laser DLP/ 0.9mm Pixel LED) for TMC incl. Controller, Software, Video Switches	Set	2
1.6	Graphic Display 2x3 (FHD Laser DLP/ 0.9mm Pixel LED) for TMC incl. Controller, Software, Video Switches	Set	0
1.7	Internet & SMS Server	Nos.	2

S. No.	ATMS Component	Unit	Qty
1.8	Command Centre Operator Console with 4 nos. 21 inch touchscreen monitors	Nos.	8
1.9	USB joystick to control PTZ cameras	Nos.	4
1.10	Emergency Telephone (1033) console with 2 nos. 21 inch touchscreen monitors	Nos.	4
1.11	Facility Monitoring System Console with 2 nos. 21 inch touchscreen monitors	Nos.	2
1.12	Operations Laser Printer (Colour)	Nos.	2
1.13	Operations Laser Printer (Black)	Nos.	2
1.14	Firewall, IDS, IPS, Core Switch, and Network Equipment (Bidder shall attach the breakup of Network equipment with unit price of each item)	LS	2
1.15	Aadhar enabled Biometric Fingerprint machine	Nos.	4
1.16	Power Distribution Board (PDB)	LS	2
1.17	Server Rack	Nos.	4
1.18	Maintenance Equipment as per ToR and site requirement	LS	1
1.19	Surge Protection Device (SPD)	LS	10
1.20	Lighting protection	LS	10
1.21	Advance Driver Advisory System (ADAS), GPS tracker, industrial grade rugged (Waterproof) dashboard mounted 10" Tablet, Dashcam with video calling feature, body cam, rear & front view varifocal cameras with vandalproof housing (mounted on vehicle), LPU, storage, UPS, live monitoring provision of cameras from TMC & sub-centres, etc. for patrol, ambulance, and maintenance vehicles.	Set	30
1.22	Incident Monitoring System (IMS) for PIU office: Workstation (1 nos. at each location), All-in-one color A4 printer, 100" 4K UHD LED display (commercial grade), UPS as per site requirement, Networking devices, switches, CCTV camera, DG of suitable ratting as per site requirement, Connectivity with TMC & Sub-centres, etc.	Set	2
1.23	ATMS Software package at TMC for entire expressway stretch	LS	1
1.24	Uninterruptible Power Supply (UPS) For Server Rack (10KVA X 1 nos. Online Double Conversion UPS - IGBT based, arranged in parallel configuration - Warranty 5 years) (1 at TMC and 1 at each Sub-centre)	Set	2
	Battery backup -24000 VAH for Each UPS -Warranty 5 years-100AH X 20nos.	Nos.	40
	Racks Links DC cable	Nos.	2

S. No.	ATMS Component	Unit	Qty
1.25	Uninterruptible Power Supply (UPS) For TMC & Sub centre operator consoles (20KVA Online Double Conversion UPS - IGBT based arranged in parallel configuration - Warranty 5 years)	Set	2
	Battery backup -34560 VAH for Each UPS -Warranty 5 years-100AH X 20nos.	Nos.	40
	Racks Links DC cable	Nos.	2
1.26	Power Distribution Board (Essential & Critical Supply)	Set	6
1.27	Civil construction of TMC including Operation room, Server Room, UPS room, Incharge cabin, NHAI cabin, Authority Engineer cabin, pantry, toilet, etc. with interior works, complete technical furniture, raised floor, false celling, indoor and outdoor lighting, Audio/Mic system, Public Announcement / addressing system, CCTV system including PTZ cameras outside the buildings, Access Control system with smart card and biometrics, MEP works, HVAC system, power backup system including sufficient DG, Firefighting, alarm, extinguishers, etc.	Nos.	2
1.28	Any other item(s) considered necessary to comply with the Scope of Works		
2	Traffic Monitoring Camera System Equipment (TMCS) (1 no. at every 1 Km)		138
2.1	PTZ Camera 36x with 500m IR	Nos.	138
2.2	Cabinet & 12m Pole with 1m arm at 8m	Nos.	138
2.3	Motion Detection surveillance camera, hooter alarm with beacon, and all-in-one solar street light	Nos.	138
2.4	Chamber / Manhole and Pole Foundation, PCC, backfilling with sand	Nos.	138
2.5	Solar System with UPS, Li-on battery & Pole with SPD, and lighting protection	Nos	138
2.6	Industrial 5-port managed Gigabit Ethernet switch with 3x10/100/1000Base-T(X) and 2xGigabit combo ports, SFP socket	Nos.	138
2.7	Any other item(s) considered necessary to comply with the Scope of Works		
3	Video Incident Detection System Equipment (VIDS) (at every junction, merging / demerging / accident prone area / black spot)		24
3.1	VIDS Camera -(4 nos. at each Junction + 3 nos. at each interchange/flyover ramp)	Set	84
3.2	Warning amber lights with hooters and solar with at least 96 hours backup, pole and foundation (10 nos. at each junction/ location)	Set	24
3.3	Local Processing unit (LPU)	Nos.	24
3.4	Cabinet & 12m Pole with 1m arm at 8m	Nos.	24

S. No.	ATMS Component	Unit	Qty
3.5	Motion Detection surveillance camera, hooter alarm with beacon, and all-in-one solar street light	Set	24
3.6	Chamber / Manhole and Pole Foundation, PCC, backfilling with sand	Set	24
3.7	Solar System with UPS/PCU, 48 hour battery & Pole with SPD, and lighting protection	Nos.	24
3.8	Standalone Solar powered Amber Flasher Light of 500 mm Dia with at least 96 hours backup, Pole & Foundation (2 at each median opening / blackspot)	Set	
3.9	Industrial 8-port managed Gigabit Ethernet switch with 3x10/100/1000Base-T(X) and 2xGigabit combo ports, SFP socket	Nos.	24
3.10	Any other item(s) considered necessary to comply with the Scope of Works		
4	Vehicle Speed Detection System Equipment (VSDS) (1 nos. each at LHS & RHS at every 10kms / between 2 interchanges)		14
4.1	ANPR camera with IR flasher for 4 lanes (6 Cameras - one each for all lanes in each direction + shoulder)	Nos.	84
4.2	Local Processing unit (LPU)	Nos.	14
4.3	Speed Detection Radar (upto 90m range) for 4 lanes (one in each direction for all lanes + shoulder)	Nos.	28
4.4	Vehicle Actuated Speed Display (VASD) System (one each for all lanes in each direction + shoulder)	Nos.	84
4.5	Motion Detection surveillance camera, hooter alarm with beacon, and all-in-one solar street light	Set	14
4.6	Gantry (including manufacturing, galvanizing, pile foundation) (1 no. for LHS and 1 No. for RHS at each location)	Nos.	28
4.7	Cabinet	Nos.	14
4.8	Industrial 12-port managed Gigabit Ethernet switch with 3x10/100/1000Base-T(X) and 2xGigabit combo ports, SFP socket	Nos.	14
4.9	Solar System with UPS, Li-on battery, Pole, cabinet for VSDS, with SPD, and lighting protection	Set	14
4.10	Any other item(s) considered necessary to comply with the Scope of Works		
5	Digital Transmission System (DTS)		
5.1	Supply of 24 core single mode armored OFC Multitube (TEC G-652) (Loop 10-15m every MH/HH) + all accessories	Mtr	As Per Site Requirement
5.2	40 mm PLB HDPE duct as per latest TSEC specifications + all accessories	Mtr	
5.3	Trenching of 1.5 meters, Laying & Backfilling for PLB HDPE duct, cable pulling, chambers lowering, etc.	Mtr	

S. No.	ATMS Component	Unit	Qty
5.4	1m x 1m x 1.8m (depth) chambers (with concrete cover) with proper reinforcement and minimum M25 grade at every 500m	Nos.	276
5.5	24 core OFC LIU - Bamboo Type	Nos.	276
5.6	Fiber Patch Cord Single Mode – 2m Length LC to LC	Nos.	210
5.7	SFP - 20 km Transmission range	Nos.	7
5.8	Any other item(s) considered necessary to comply with the Scope of Works		
7	VMS Systems (VMS)		14
6.1	VMS (Variable Message sign - M type) (5000mm x 2000m)	Nos.	14
6.2	Gantry (including manufacturing and galvanizing)	Nos.	14
6.3	Motion Detection surveillance camera, hooter alarm with beacon, and all-in-one solar street light	Set	14
6.4	Industrial 5-port managed Gigabit Ethernet switch with 3x10/100/1000Base-T(X) and 2xGigabit combo ports, SFP socket	Nos.	14
6.5	Portable VMS with Trolley (2000mm x 1000mm) @ Rs. 3,01,600 per item	Nos.	2
6.6	Any other item(s) considered necessary to comply with the Scope of Works		

(b) Schedule C states as below:

- Engineering and safety improvements along the project highway shall conform to the IRC: SP: 84:2019, Manual of specifications & Standards for Four laning of Highways through Public Private Partnership published by IRC.
- Point 17, Clause 2 - Deviations from the manual - Section 12.14 of IRC Manual.

17.	Section – 12 Clause:- 12.14	**ATMS-** Clauses 816.1 to 816.17 of Specifications for Roads and Bridge Works of MORTH shall be applicable.	Concessionaire shall provide the functional ATMS with all its components for continuous monitoring over the entire ROW without any blind spot. In this regard Traffic Monitoring Camera System (PTZ /Radar Camera etc.) at every kilometer, Video Incident Detection System (VIDS) at every Junction and Grade separator structures to detect any incident at regular interval, Vehicle Speed Detection System (VSDS) with ANPR system (one no each at LHS & RHS at every 10km) other than toll plaza location , VMS of minimum size 5000mmx2000mm (minimum 14 nos.), and ATCC at 01 (One)no of locations, independent of toll plaza , in consultation with IE/Authority as per good industry practice. In this regard, it is suggested for the Technical
			Specification Concessionaire shall refer "Functional and Technical Specifications released by the NHAI vide Ref. No. NHAI/CO/ATMS/02-2021, February 2021", which is presented as Annexure-II. Command control center shall be estabilished at Toll Plaza and in PD office. Concessionaire shall also provide Portable VMS for Each Toll section.

2) Costing details as per new Provisions as per CA:

(a) Detailed cost estimate with BOQ calculations is shown in file "ATMS Report -Borkhedi-Wander-Deodhari-Kelapur-MH - Rev. 2".

(b) Total cost estimate for ATMS works as per the provisions of Schedule B is Rs. 47,42,53,608.

Table 48: Breakup costs ATMS Components

Sr. No.	ATMS Component	Unit	Qty.
1	CPS - Traffic Management Centre as per Section 03 of the circular		2
A	ATMS Control centre (TMC) Main		1
A.1	TMC / Central Processing Servers (one primary and one secondry server with same configuration)	Nos	2
A.2	TMCS / Video recording server with 360 TB inbuilt storage	Nos	2

Sr. No.	ATMS Component	Unit	Qty.
A.3	Backup video (only incidents) recording server with 240 TB inbuilt storage	No	1
A.4	Facility Monitoring System Controller	Nos	1
A.5	Graphic Display 2 X 6 (FHD Laser DLP/0.9 MM Pixel LED) of size suitable for the project including controller, software, video switches	Set	1
A.6	Graphic Display 2 X 3 (FHD Laser DLP/0.9 MM Pixel LED) of size suitable for the project including controller, software, video switches	Nos	0
A.7	Internet & SMS Server	Nos	1
A.8	Fiber channel host 16 GB		1
A.9	Command Centre Operator Console with 4 nos. 21 inch touchscreen monitors	Nos.	4
A.10	USB joystick to control PTZ cameras	Nos.	5
A.11	Emergency Telephone (1033) console with 2 nos. 21 inch touchscreen monitors	Nos.	2
A.12	Facility Monitoring System Console with 2 nos. 21 inch touchscreen monitors	Nos.	1
A.13	Operations Laser Printer (Colour)	Nos.	1
A.14	Operations Laser Printer (Black)	Nos.	1
A.15	Firewall, IDS, IPS, Core Switch, and Network Equipment (Bidder shall attach the breakup of Network equipment with unit price of each item)	LS	1
A.16	Aadhar enabled Biometric Fingerprint machine	Nos.	2
A.17	Power Distribution Board (PDB)	LS	1
A.18	Rack 42"	Nos.	2
A.19	Maintenance equipment as per circular	LS	1
A.20	Surge Protection Device (SPD)	LS	5
A.21	Lighting protection	LS	5
A.22	Advance Driver Advisory System (ADAS), GPS tracker, industrial grade rugged (Waterproof) dashboard mounted 10" Tablet, Dashcam with video calling feature, body cam, rear & front view varifocal cameras with vandalproof housing (mounted on vehicle), LPU, storage, UPS, live monitoring provision of cameras from TMC & sub- centres, etc. for patrol, ambulance, and maintenance vehicles.	Set	20
A.23	Incident Monitoring System (IMS) for PIU office: Workstation (1 nos. at each location), All- in-one color A4 printer, 100" 4K UHD LED display (commercial grade), UPS as per site requirement, Networking devices, switches, CCTV camera, DG of suitable ratting as per site requirement, Connectivity with TMC & Sub- centres, etc.	Set	1
A.24	Generator	Nos	1
A.25	Any other item(s) considered necessary to comply with the Scope of Works	Nos	1
B	Sub-Centre as per section 03 of the circular (one each at every 50 Kms. Approximately)		1
B.1	Sub centre server	Nos.	1
B.2	Graffic display (Laser DLP) for each sub centre with controller and software	Set	1
B.3	Emergency Telephone (1033) console with 2 nos. 21 inch touchscreen monitors	Set	1

Sr. No.	ATMS Component	Unit	Qty.
B.4	Sub Centre Operator Console with 4 nos. 21 inch touchscreen monitors	Sets	1
B.5	USB joystick to control PTZ cameras	Sets	1
B.6	Facility Monitoring System Console with 2 nos. 21 inch touchscreen monitors	Nos.	1
B.7	Operations Laser Printer (Colour)	Nos.	1
B.8	Operations Laser Printer (Black)	Nos.	1
B.9	Firewall, IDS, IPS, Core Switch, and Network Equipment (Bidder shall attach the breakup of Network equipment with unit price of each item)	LS	1
B.10	Power Distribution Board (PDB)	LS	1
B.11	Rack 19"	Nos.	1
B.12	Aadhar enabled Biometric Fingerprint machine	Nos.	1
B.13	Interior works at operation and server rooms at TMC with complete technical furniture, lighting, Audio/Mic system, CCTV, Access control, HVAC, fire alarm & extinguishers etc.	LS	1
B.14	Surge Protection Device (SPD)	LS	1
B.15	Lighting protection	LS	1
B.16	Generator	Nos	1
B.16	Any other item(s) considered necessary to comply with the Scope of Works	Nos	1
C	ATMS software		2
C.1	Central processing software	LS	2
C.2	Video analytics & Management software	LS	2
C.3	VIDS Server software	LS	2
C.4	Internet server software	LS	2
C.5	Facility monitoring system controller software	LS	2
C.6	Network management software	LS	2
C.7	Database licenses	LS	2
C.8	Antivirus licenses	LS	2
C.9	Enterprise GIS and image processing module	LS	2
C.10	Website	LS	2
C.11	Online access facility toll	LS	2
C.12	ATSC software	LS	2
C.13	Any other item(s) considered necessary to comply with the Scope of Works	LS	2
D	Power equipment		1
D.1	10 KVA UPS system with 4 Hrs. backup	set	4
D.2	20 KVA UPS system with 4 Hrs. backup	set	2
D.3	Power distribution Board (PDB) Essential and critical supply	set	3
2	Traffic Monitoring Camera System Equipment (TMCS) as per Section 04 of the circular	Nos.	139
2.1	PTZ Camera 36x with 500m IR	Nos.	139
2.2	Cabinet with camera controls, solar batteries, solar panel controls etc. along with metal protective barrier to avoid theft etc.	Nos.	139
2.3	Motion Detection surveillance camera, hooter alarm with beacon, and all-in-one solar street light	Nos.	139
2.4	12m Pole with 1m arm at 8m	Nos.	139
2.5	Chamber / Manhole and Pole Foundation, PCC, backfilling with sand as per pole manufacturer drawings.	Nos.	139

Sr. No.	ATMS Component	Unit	Qty.
2.6	Solar System with UPS, Li-on battery for 3 days power backup & Pole with SPD, and lightning protection and with panel mounting structure as required including foundation etc.	Nos.	139
2.7	Industrial 5-port managed Gigabit Ethernet switch with 3x10/100/1000Base-T(X) and 2xGigabit combo ports, SFP socket	Nos.	139
2.8	Any other item(s) considered necessary to comply with the Scope of Works		139
3	Video Incident Detection System Equipment (VIDS) as per Section 05 of the circular		97
3.1	VIDS Camera IR 4 per location	Set	301
3.2	Local warning amber flashing lights with hooter With solar system of battery back up of 96 hrs., pole, foundation etc. as required.(10 nos. at each location)	Set	970
3.3	Local Processing unit (LPU)	Nos.	97
3.4	Cabinet for LPU, other controls, solar batteries, solar panel controls etc. along with metal protective barrier to avoid theft etc.	Set	97
3.5	Motion Detection surveillance camera, hooter alarm with beacon, and all-in-one solar street light	Set	97
3.6	Chamber / Manhole and Pole Foundation, PCC, backfilling with sand etc. to above 12 mts. pole	Set	97
3.7	Solar System with UPS, Li-on battery for 3 days power backup & Pole with SPD, and lightning protection with panel mounting structure as required including foundation etc.	Nos.	97
3.8	Standalone Solar powered Amber Flasher Light of 300 mm Dia with at least 96 hours backup, Pole & Foundation (2 at each median opening / blackspot)	Nos.	
3.9	Industrial 8-port managed Gigabit Ethernet switch with 3x10/100/1000Base-T(X) and 2xGigabit combo ports, SFP socket	Nos.	97
3.10	12m Pole with 1m arm at 8m	Nos.	97
3.11	Any other item(s) considered necessary to comply with the Scope of Works		97
4	Vehicle Speed Detection System Equipment(VSDS) (1 nos. each at LHS & RHS) at every 10 kms / between 2 interchanges as per Section 06 of circular		14
4.1	ANPR camera with IR flasher for 4 lanes (one for each lanes in each direction + shoulder)	Nos.	83
4.2	Local Processing Unit (LPU)	Nos.	14
4.3	Speed Detection Radar (upto 90m range) for all lanes (one in each direction for all lanes)	Nos.	28
4.4	Vehicle Actuated Speed Display (VASD) System (one each for each lane in each direction + shoulder) with Solar system	Nos.	83
4.5	Motion Detection surveillance camera, hooter alarm with beacon, and all-in-one solar street light	Set	14
4.6	Gantry (including manufacturing and galvanizing) for mounting all above equipment and to install solar system for LHS & RHS	Nos.	14
4.7	Cabinet for LPU, other controls, solar batteries, solar panel controls etc. along with metal protective barrier to avoid theft etc.	Nos.	14

Sr. No.	ATMS Component	Unit	Qty.
4.8	Industrial 12-port managed Gigabit Ethernet switch with 3x10/100/1000Base-T(X) and 2xGigabit combo ports, SFP socket	Nos.	14
4.9	Solar System with UPS, Li-on battery, Pole, cabinet for VSDS, with SPD, and lightning protection	Set	14
4.10	Chamber / Manhole and Pole Foundation, PCC, backfilling with sand etc. to above 12 mts. pole	Set	14
4.11	Any other item(s) considered necessary to comply with the Scope of Works	Set	14
5	Adaptive Traffic signal Control System (ATSC) as per Section 07 of ATMS circular		9
5.1	Traffic signaling system (Discrete LED aspect) for entire junction / interchange	Set	9
5.2	Vehicle detector (Non intrusive)	Set	9
5.3	Red light violation detection system (RLVD) for entire junction / interchange	Set	9
5.4	Automatic pedestrian detection system (APDS) for entire junction / interchange	Set	9
5.5	ATSC controller with cabinet	Nos.	9
5.6	Pedestrian signal system (Discrete LED aspect, pole etc.) for entire junction / interchange	Nos.	9
5.7	Traffic signal poles - high poles, cantilever poles (mast arms) and gantries with civil works - foundations, manholes etc.	Nos.	9
5.8	Solar system with UPS, Li-on battery, polle, cabinet, SPD and lightning protection	Nos.	9
5.9	Cabling, installation, trenching, HDD, ducting, chamber etc.	Nos.	9
5.10	Any other item(s) considered necessary to comply with the Scope of Works	Nos.	9
5.11	Integration with NMS, FMS, smart city ITS, automatic generation of e-challan, SMS service, in case of violation detection from VSDS, VIDS.	Set	1
7	Power and other cables as per circular	Km.	139
	Include all required power cables as per your design on BOQ basis or Lumpsum		
8	DTS / Fibre cable-OFC as per circular		1
8.1	Supply of 24 core single mode armored OFC Multitube (TEC G-652) (Loop 10-15 Mtr every MH/HH) + all accessories	Km.	153
8.2	40 mm PLB HDPE duct as per latest TSEC specifications + all accessories	Km.	153
8.3	Trenching of 1.5 meters, Laying & Backfilling for PLB HDPE duct, cable pulling, chambers lowering, etc.	Km.	153
8.4	1m x 1m x 1.8m (depth) chambers (with concrete cover) with proper reinforcement and minimum M25 grade at every 250m	Nos.	278
8.5	24 core OFC LIU - Bamboo Type	Nos	278
8.6	Fiber Patch Cord Single Mode - 2 Mtr Length	Nos	306
8.7	SFP - 20 km Transmission range	Nos	5
8.8	Any other item(s) considered necessary to comply with the Scope of Works	Km.	153
9	Installation, Testing & Commissioning (FAT, SAT etc.) and trial run	LS	1
10	Building - civil, electrical, HVAC works	Set	1

Sr. No.	ATMS Component	Unit	Qty.
10.1	ATMS control centre building - civil, electrical, HVAC works - 3200 SFT	sft	3200
10.2	ATMS Sub centre building civil, electrical, HVAC works - Approx. 2000 SFT	sft	2000
	Total for equipment supply and installation (Ex tax cost)		
	GST extra		
	Spares cost per year (3% of capital cost of complete equipment)		3%
11	Services (AMC) - Operation and maintenance as per circular		Not considered
A	Technical staff		
A.1	System maintenance engineer / Manager	Members	1
A.2	System IT engineer	Members	2
A.3	System maintenance technicians	Members	4
B	Vehicles & equip.		
B.1	Maintenance vehicle	Nos.	1
B.2	Man hoist	Nos.	1
C	Control room operation staff		
C.1	Traffic management manager	Members	1
C.2	Traffic management engineer	Members	0
C.3	Assistant Manager - Operations	Members	4
C.4	Control room operators	Members	11
C.5	Support staff	Members	1
C.6	Office assistant	Members	4
C.7	ecurity guard	Members	4
C.8	ecurity guard for complete stretch	Members	12
C.9	driver	Members	2
C.10	helper	Members	2

Detailed cost estimate for ATMS is as follows:

(a) Total cost estimate for ATMS works as per the provisions of Schedule B is Rs. 33,15,60,000 Excluding GST

❖ Important Findings

1. The Project Highway is a part of NH-44 with a starting chainage at Borkedi, near km 36.600 and ends at Kelapur, near km 175.000 in the state of Maharashtra with total length of 138.400 km.

2. The project road is a 4-lane divided carriageway with flexible pavement. At Toll Plaza Locations Rigid pavement is constructed.

3. From the test pit surveys, Crust thickness has been found with asphalt layer of 230mm thick (BC+DBM) and 680mm thick Granular (WMM+GSB).

4. Pavement Condition appears to be Fair in most of the locations but is poor in certain locations where presence of BC Soil is noticed. At some locations particularly some of the BC Soil locations, long wide cracks observed and some sections paved shoulder depressed and settled and some sections part of the outer lane got depressed and settlements observed which indicating poor pavement and may require reconstruction (either partial or full depth)

5. Maintenance works done already/BC overlay done appears to be raveled/delaminated severely at some sections

6. Undulations/Depressions/Cracks on Paved Shoulder/Outer Lane/Settlements observed between Butibori-Jam (Km 42-50). Milling and filling has been intermittently done in these sections. This may be due to black cotton soils, however the same to be evaluated at detailed design stage.

7. Milling and filling has been done at some sections between 36-93. Some of the sections exhibit heavy segregation on surface. Presumably, it is a DBM layer. Some sections have BC also done with less segregation. Raveling has been initiated at several newly overlaid sections requiring immediate attention before monsoon to avoid further damage. Segregation may also be due to paver used in overlay construction.

8. Delamination is mostly observed between section 93-123. Surface layer is completely worn out at some sections requiring immediate overlay.

9. It is understood that Km 123-153 has been recently overlaid and is still in DLP. It is necessary to understand what is covered under DLP. Some sections of this stretch exhibit cracks/Raveling/Undulations

10. Border Check post exist between Km 172 and 173 and this section, the existing carriageway is blocked and traffic is getting diverted through Border check post (The Border check post is having Rigid Pavement)

11. There some sections where severe delamination/raveling has been observed. It is required to do an overlay in these sections.

12. Two types of Metal Beam Crash Barriers are noticed along the project Road, one is Single Faced Single Barrier and the other one is single faced double Barrier.

13. In General, the Corridor maintenance is poor in routine maintenance and in highway repair works. Median Cleaning, separator (between RE/RCC Walls and Service Roads and between Main Carriageway and Service Road) cleaning and ROW cleaning is required.

14. Median side Shyness requires cleaning of soil/fines which are deposited on the top layer.

15. At some locations big plants observed in RE Wall locations, same are required to be removed the same

16. Most of the locations kerb painting faded and requires Painting

17. Some of the locations, existing Pedestrian Guard Rail requires painting

18. Handrail is missing at couple of sections over the Cement Crash Barriers and replacement of the same is required.

19. At Couple of locations, Pavement is built in Cut Sections, at such locations edge drains are required

20. Bus Shelters requires repair in the form of provision of Roof sheet, cleaning and painting of the steel frames.

21. Relocation of couple of Gantries required in view of the proposed improvements such as Underpasses and provision of new service roads.

22. The Vehicle Damage Factor of MAV is high in both direction when compared to other modes. The traffic loading is almost same in either direction. At the Toll Plaza Location-km 90+200, the VDF of LCV and Buses are higher in RHS direction when compared to LHS direction. At the Toll Plaza Location-km 150+500, the VDF of MAV and 3 Axle vehicles are higher in LHS direction when compared to RHS direction.

23. From Roughness Consideration, the project road requires 3km of functional overlay on both carriageway as unevenness Index (UI) is greater than 2400 mm/km and 22km length in LHS Carriageway and 18.4km in RHS Carriageway as unevenness index (UI) is in the range of >2200 to <=2400 which may require functional overlay after 6 months.

24. From Structural (FWD) Consideration, the entire Project Road requires overlay of 100 Km in LHS carriageway and 95.4 Km of functional overlay in RHS carriageway for 10^{th} year design MSA.

25. As per schedule B, the overlay of 51.25 Km is proposed in both LHS and RHS carriageway with overlay thickness of 50mm in LHS carriageway and 40mm to 50mm in RHS carriageway.

26. In Schedule-B, no overlay suggested between Km 36.6 to 93.75 and between Km 123 to 153. However, overlay is considered in certain sections between km 123 and 153 based on latest FWD and Roughness Criteria but as per Prebid replies, no overlay is considered between Km 36.6 and 93.75 as the same would be undertaken by another EPC Contractor engaged by NHAI.

27. The maximum overlay thickness of the three Cases (case 1: FWD criteria, Case 2: Roughness Criteria and Case 3: Minimum overlay given in Schedule-B) is considered for estimating the EPC Cost.
28. In case of some sections, which do not require structural overlay as per FWD analysis, functional overlay of minimum 40mm thick BT layer is provided for improving roughness and life of pavement for those sections where the roughness values are more than the prescribed value and overlay is not considered if the section is not requiring overlay from FWD or Roughness criteria.
29. The Project Road has varieties of super structure types for various structures such as Voided slab, RCC Solid Slab, PSC Box, PSC, RCC Girder & RCC Box.
30. Pot PTFE, Elastomeric, Rocker Roller & Tar Paper Bearings are observed in Bridges.
31. Bearing distress (Elastomeric Bearings Shape out) observed in Major Bridges at Km 49+770 BHS and Bearing distress (Rocker Bearing displacement) observed on Pier Cap P-3 & Abutment Cap-A2 in Major bridge at 109+770 RHS.
32. Expansion joints damaged at couple of locations and Only Rubber sealant damaged in some of the Bridges.
33. Existing Stone Masonry Substructure Major bridge at Km 79+520 LHS is proposed for Reconstruction in Sch-B.
34. Widening proposed for Existing Minor Bridges at Km 152+298 and 170+504
35. New Construction of VUP's proposed in Sch-B at 3 locations as follows Km 59+437,144+401 and 153+060
36. Widening/Completion of balance work of existing Culverts (18 No's) given in Sch-B Clause no.3.3(Page No. B-4)
37. As per CA, Sub Structure of Minor Bridge given as Stone Masonry at165+169 given as Stone Masonry, whereas site it is RCC Wall type Sub structure seen.
38. 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.
39. Vegetation growth observed on quadrant pitching at most of the locations, Cleaning of expansion joints, drainage spouts need to be done regularly.
40. Some of the location's Spalling, Reinforcement exposed and cracks have been noticed on Soffit of deck slab, Pier caps and Inclined cracks on girders, Hair line cracks on soffit of girders. May require to undertake NDT to assess the actual structural condition.
41. NDT Would be required for 3 old major bridges and 5 Minor bridges
42. No special NDT techniques are warranted to monitor the condition. Standard tests as UPV, Half-Cell Potential, rebound hammer, cover meter survey and Carbonation depth are adequate to assess the condition.

43. The frequency of testing, test plan would be evolved on initiation of the project.

44. O&M Requirements

a) Applicable Manual is IRC: SP:84-2019

b) Applicable Schedule for O&M period is Schedule-F and (IRC: SP:84-2019)

c) Schedule F of CA species that Roughness values exceeds 2400 mm/km in a length of KM, needs to be corrected within 180 days. Roughness Surveys shall be carried out twice in a year.

d) FWD survey shall be carried out in once in a year as per IRC:115.

e) There is no mandatory overlay requirement in this project as per CA provisions

f) As per Schedule-B, The Concessionaire shall carry out the periodic maintenance in full length of project stretch including main carriageway, service/slip roads, Ramps and at facilities etc. either in every sixth year or in the year in which roughness index exceeds the limit as given in Schedule F whichever comes earlier

45. Requirements of Incident Management

a) Minimum Three number of Highway Patrol Units fitted with GPS based Vehicle Tracking system shall be provided in accordance with IRC: SP:84-2019 and operation requirements as mentioned in Schedule-F

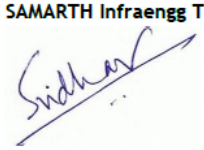
b) Minimum Three number of Ambulance Units fitted with GPS based Vehicle Tracking system shall be provided in accordance with IRC: SP:84-2019 and operation requirements as mentioned in Schedule-F

c) Minimum Three number of Mobile Cranes having Capacity to lift a gross vehicle weight of 30,000 kilograms shall be provided. These shall be fitted with GPS based Vehicle Tracking system shall be provided in accordance with IRC: SP:84-2019 and operation requirements as mentioned in Schedule-F

- Initial CAPEX Cost estimated is Rs. 458.235 Crores including GST (this Cost does not include the initial improvement Cost of Section between Km 36.6 and Km 93.75) and NHAI is getting the work done. Also, a contingent provision of Rs. 25 Crores has been taken for the same.

All the Costs presented in this report are inclusive of applicable GST.

Authorized Signatory,
SAMARTH Infraengg Technocrats Pvt. Ltd.



D V Sridhar Murthy
Managing Director

ANNEXURE C

TRAFFIC CONSULTANT REPORTS

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NATIONAL HIGHWAYS INFRA INVESTMENT MANAGERS PRIVATE LIMITED

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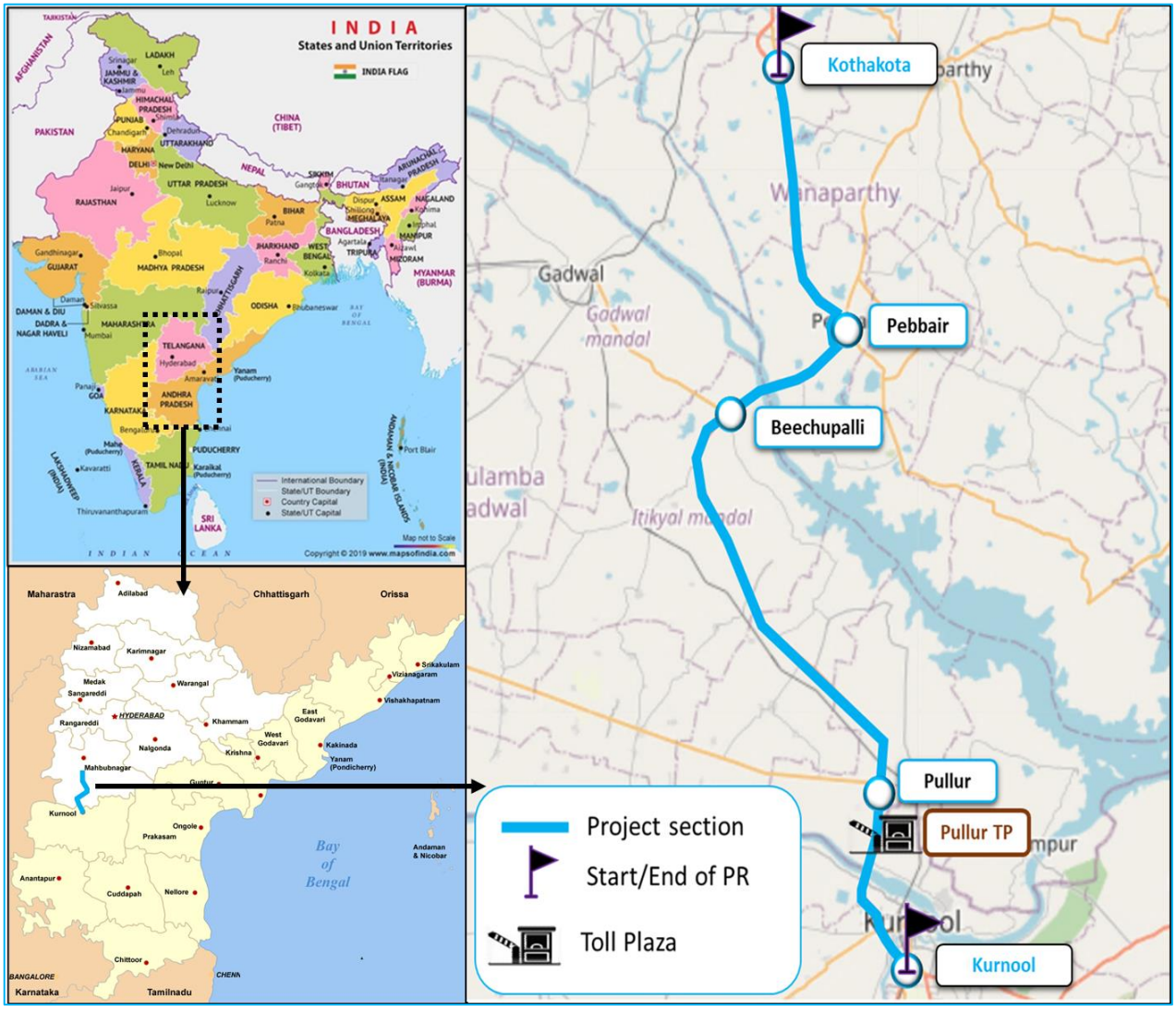
May 2022

TRAFFIC STUDY FOR KOTHAKOTA-KURNOOL SECTION OF NH-44 IN THE STATE OF TELANGANA & ANDHRA PRADESH



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ABBREVIATIONS

%	Percentage
2A	2 Axle truck
3A	3 Axle truck
AADT	Annual Average Daily Traffic
ADT	Average Daily Traffic
AR	Alternate Route
BIA	Broad Influence Area
CAGR	Compounded Annual Growth Rate
FY	Financial Year
GDP	Gross Domestic Product
GSDP	Gross State Domestic Product
IIA	Immediate Influence Area
IRC	Indian Road Congress
Km	Kilometre
LCV	Light Commercial Vehicle
M Bus	Minibus
MAV	Multi Axle Vehicle
MLCV	Mini LCV
NH	National Highway
NHAI	National Highway Authority of India
NHDP	National Highway Development Program
NHIIMPL	National Highways Infra Investment Managers Private Limited
NPV	Net Present Value
OD	Origin-Destination survey
PCU	Passenger Car Unit
PIA	Project Influence Area
PR	Project Road
PV	Present Value
Rs/₹	Rupees
SEZ	Special Economic Zone
Sq.km	Square Kilometre
TP	Toll Plaza
WPI	Wholesale Price Index
YOY	Year on Year

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APPENDICES

Appendix 2.1 Zoning

Appendix 2.2: Top 20 OD pairs

1. INTRODUCTION

1.1 General

National Highways Authority of India (NHAI) has setup NHAI InvIT to monetize its completed and operational national highways projects with the objective of mobilizing additional resources through capital markets. In this context, National Highways Infra Investment Managers Private Limited (NHIIMPL) is acting as Investment Manager of the Trust. NHAI InvIT currently has a portfolio five operating toll roads with an aggregate length of 390 kilometers located across the states of Gujarat, Karnataka, Rajasthan and Telangana.

The section viz., Kothakota-Kurnool of NH-44 in the states of Telangana and Andhra Pradesh referred to as Project Road (PR), is part of the current portfolio of InvIT.

The project highway, NH-44, is the longest highway in India connecting Srinagar with Kanyakumari and is part of North-South corridor envisaged under National Highway Development Program (Phase – II). NH-44 passes through the cities of Jammu, Jalandhar, Delhi, Faridabad, Agra, Gwalior, Jhansi, Sagar, Nagpur, Hyderabad, Bengaluru and Salem. **Figure 1-1** shows the alignment of project highway NH 44.

Figure 1-1: Project Highway – NH44

National Highways Infra Investment Managers Private Limited, has appointed Ramboll India Private Ltd as the traffic consultant to carry out a study for assessing the present traffic levels, travel pattern and future traffic & revenue estimation till FY52 duly considering the network characteristics, future economic perspective in the influence area of the project.

1.2 Scope of Services

The scope of the study includes the following:

- Undertake Traffic Survey on the highway section as per the following:
  - Seven days 24 hours Videography Traffic Counts at or near the existing toll plaza locations on the project road to derive the Average Daily Traffic (ADT)
  - One day Origin-Destination survey at or near the existing toll plaza locations to assess the existing travel pattern of vehicles plying on the project road – origin and destination
- Establish seasonality factors using available past traffic data and/or from using fuel sales data or any relevant data
- Estimation of the base year AADT using seasonality factors for conversion of ADT to AADT
- Analysis of OD data to cover:
  - Regional distribution of traffic and influence factors for different zones contributing traffic on the corridor
  - Identification of Project Influence Area from analysis of travel pattern - regional distribution of traffic,
  - Main traffic generators (industrial areas, towns, ports etc.)
  - Commodity composition- Goods type distribution
  - Top OD pairs by vehicle types
  - Travel frequency and trip purpose distribution
- Review of past traffic studies, traffic/toll data and other relevant reports as may be available to determine category wise volume of traffic for past years as well as for current year
- To identify competing route and analyse the network conditions, traffic characteristics & level of toll charged and the advantage/ disadvantage of the competing road and their impact on the project traffic
- Carry out a study of past economic performance of influence area
- Diversion analysis, wherever needed – cost ratio-based diversion analysis using spreadsheets to be carried out for respective potential OD pairs.
- Preparation of traffic projections till FY52 in three scenarios – low, most likely and high
- Capacity analysis of the road or any other requirements for potential capacity

augmentation

- Estimation of tollable traffic streams by toll category and estimation of toll revenue as per categories of traffic streams stipulated in the tolling schedule for the study period
- Review future road and transportation network developments in the area of influence of the project and identify those schemes that may impact positively or negatively traffic on the toll road
- Identify factors which may have a positive and / or negative impact on the traffic - all major developments like DFC, industrial corridors, economic corridors, ports, Bharatmala, Sagarmala
- Scenario Analysis of toll revenue – Critical parameters of diversion (if applicable) and three scenarios of traffic growth (most likely, low and high).

1.3 Structure of Report

This report is divided into four chapters, including this introduction chapter. Chapter 2 details upon the project road characteristics and socio – economic profile of the districts in the project influence area including the estimation of AADT and travel characteristics in the Project Influence Area (PIA). Chapter 3 contains the details on the derivation of traffic growth rates used for traffic forecasting and presents traffic projections for the study period. Chapter 4 presents the details regarding tolling strategy, toll rates and the revenue projections for the duration of the concession.

2. TRAFFIC SURVEY AND ANALYSIS

2.1 General

In order to understand the traffic characteristics, the volume of traffic and travel pattern of vehicles plying on the project road were collected through primary surveys. This chapter presents the details of the project road characteristics, traffic surveys carried out, their analysis and the salient findings. The results of the analysis will be utilized in assessing the traffic growth and estimation of traffic and revenue forecast on the project road for the balance concession period.

2.2 Project Road Characteristics

The project road section, Kothakota – Kurnool, a part of the NH-44 in the states of Telangana and Andhra Pradesh, starts at km 135.469 near Kothakota and ends at km 211.061 at Kurnool with a length of about 74.6 km. The project road falls under the jurisdiction of Wanaparthy, Jogulamba and Kurnool districts passing through settlements of Pebbair and Beechupalli. There is one operational toll plaza on the project road near Pullur (km 200.95) as part of the concession.

The alignment of project road and toll plaza location is shown in **Figure 2-1.**

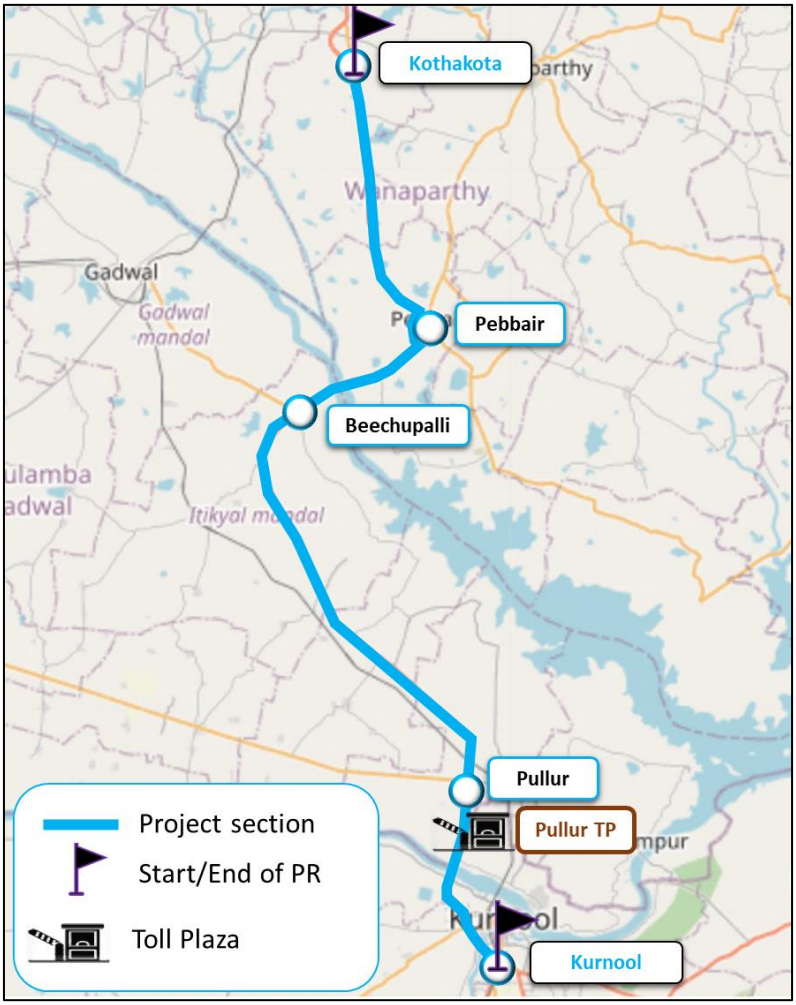


Figure 2-1: Project Road and Location of Toll Plaza

The project road, in wider context, serves for long distance traffic, which is majorly plying between Hyderabad/Nagpur/northern region and Bengaluru/Mysuru/southern region. Apart from long distance traffic, it also serves the short distance traffic which is mainly generated between Mahbubnagar/ Kothakota/ Wanaparthy/ Pebbair and Kurnool/Anantapur areas.

2.2.1 Profile of Project Influence Area Districts

The project road section passes through the districts of Wanaparthy and Jogulamba Gadwal in the state of Telangana and Kurnool in the state of Andhra Pradesh. A brief description of the profile of these districts is presented below.

Wanaparthy District

Wanaparthy district is situated in south-western part of Telangana state, sharing border with Mahabubnagar district in north, Jogulamba Gadwal district in south, Nagarkurnool district in east and Narayanpet district in west. As per 2011 census, 0.57 million people reside in the district over an area of 2,152 sq. km.

Agriculture is the main livelihood of the people in Wanaparthy district with 75% total workers engaged in agro-based labour. Red sandy soil and sandy loam soil covers 89% of the area. Paddy, groundnut, jowar, maize, red gram, castor, cotton and chili are the major crops cultivated within the district. Sri Ranganayaka Temple, Ghanpur Fort, Pangal Fort, Wanaparthy Palace, Saralasagar Project are few tourist attractions present in the district.

Jogulamba Gadwal District

Jogulamba Gadwal district is situated in south-western part of Telangana state, sharing boundaries with Wanaparthy district in north, Narayanpet district in north-west, the states of Andhra Pradesh and Karnataka in south and west respectively. The district is spread across an area of 2,575.5 sq.km. and has a population of 0.61 million as per Census of India 2011.

Gadwal is renowned all over the world for its exclusive handloom zari sarees and other useful fabrics and materials. The historic town in the state of Telangana is well-known for its quality fabrics. Jurala dam, located near Gadwal town offers a pleasant sight and has become a popular tourist attraction, attracting people from all over. Alampur, situated on the bank of the holy river of Tungabhadra is a historically significant temple.

Kurnool District

Kurnool district is situated in Western part of Andhra Pradesh. It is surrounded by Nagarkurnool, Wanaparthy districts of Telangana state in north, Kadapa and Anantapur districts in south, the Bellary district of Karnataka state in west and Prakasam district in the east. As per 2011 census, 4.05 million people reside in the district over an area of 17,658 sq. km.

Almost half of the geographical area is under agriculture use. Paddy, cotton, tomato and onion are the major crops grown in the district. Mining/quarrying is the prevailing industry in the district. District has deposits of limestone, iron ore, barites and shale within its geographical area with an annual exploitation of 32.15 lakh metric tons. The annual out turn of the other minerals in the district is 42.31 lakh metric tons during 2014-15. Belum caves, Mahanandi, Manthralayam, Srisailam and Rollapadu sanctuary are the main tourist attractions in the district.

2.3 Traffic Surveys

In order to understand the characteristics and the volume of traffic using the project road, data on road network, traffic and travel pattern of vehicles plying on the project road were collected through primary traffic surveys. Traffic volume video graphic survey for seven days and origin-destination (OD) survey as roadside interview for one day at toll plaza location was conducted on the project road. The schedule of the traffic surveys and location on the project road are given in **Table 2-1**.

Location	Chainage	Duration	Date(s)
Classified Traffic Volume Counts			
TP01-Pullur	km 200.95	7 Days	22nd March 2022 –28th March, 2022
Origin and Destination Survey			
TP01- Pullur	km 200.95	1 Day	25th March 2022

Table 2-1: Traffic Survey Locations and Schedule

Trained enumerators were engaged for conducting traffic surveys under the supervision of experienced transport planner. The vehicle classification as generally used in the traffic surveys of NHAI studies along with their PCU values, as suggested in IRC: 64 – 1990, are presented in **Table 2-2.**

Vehicle Type	PCU Factor
Motorized Vehicles	
Car, Jeep, Van &Taxi	1.0
Two –Wheeler	0.5
Three-Wheeler (Auto-Rickshaw)	1.0
Mini-Bus/ School Bus	1.5
Govt. Bus/ Private Bus	3.0
Mini LCV/Max Pick Up	1.0
Light Commercial Vehicle (LCV)	1.5
2-Axle Truck	3.0
3-Axle Truck	3.0
Multi-Axle Vehicle (MAV 4-6 Axle)	4.5
HME	4.5
Agricultural Tractor	1.5
Agricultural Tractor with Trailer	4.5
Non – Motorised Vehicles	
Cycle	0.5
Cycle Rickshaw	2.0
Animal Drawn Cart	6.0

Table 2-2: Vehicle classification and PCU factors

2.4 Traffic Characteristics

The data collected from the traffic volume count survey was analysed in order to get the results with respect to existing traffic intensity, flow pattern, hourly variation and composition of traffic on the study road network. The various traffic characteristics have been analysed under the following heads:

- Average Daily Traffic (ADT)
- Daily variation, Hourly variation and Traffic composition
- Annual Average Daily Traffic (AADT)

2.4.1 Average Daily Traffic (ADT)

The traffic volume data collected at the toll plaza location during the seven days survey has been analysed. The summary of ADT in terms of vehicles and PCUs is presented in **Table 2-3.**

Mode	TP01-Pullur Toll Plaza
Tollable vehicles	
Car/Jeep/Van/Taxi	8,838
Mini Bus	83
Standard Bus	1,300
Mini LCV	1,383
LCV	2,372
2 Axle	1,022
3 Axle	1,221
MAV(4-6 Axle)	2,720
HMV/ MAV(=>7 Axle)	6
Non Tollable vehicles	
Two Wheeler	10,318
Auto Rickshaw	1,788
Agri. Tractors	164
Total Non Motorised	9
Total Vehicles/PCUs	
Total Tollable Vehicles	**18,945**
Total Non Tollable Vehicles	**12,279**
Total Vehicles	**31,224**
Total PCU	**44,408**
Tollable PCU	**36,799**

Table 2-3: Average Daily Traffic at Pullur Toll Plaza

- The observed total vehicles are around 31,224 at the Pullur TP.
- The share of passenger and freight vehicles in total traffic is 71.5 percent (22,328 vehicles) and 28.5 percent (8,888 vehicles) respectively.
- In passenger traffic, car traffic has a share of around 28.0 percent (8,838 vehicles) followed by standard bus which has a share of around 4 percent (1,300 vehicles) of total traffic.

- In freight traffic, MAV traffic has a share of 9.0 percent (2,720 vehicles), 3A trucks and 2A trucks accounts for 4.0 percent (1,221 vehicles) and 3.0 percent (1,022vehicles) of total traffic respectively.

2.4.2 Daily variation, Hourly variation and Traffic composition

The day wise variation, hourly variation and the traffic composition at the toll plaza location is presented in **Figure 2-2**.

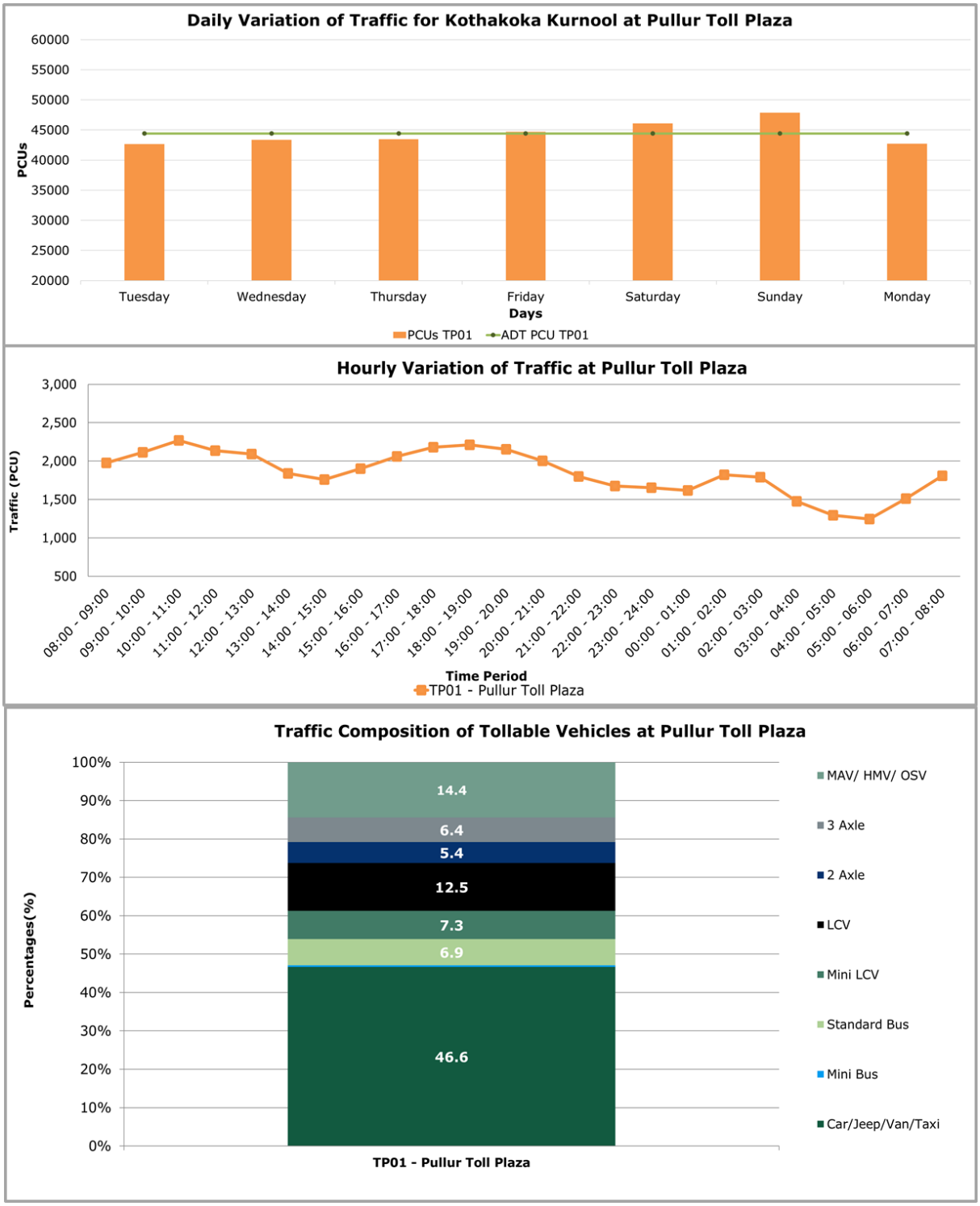


Figure 2-2: Daily Variation of Traffic at TP

- It was observed that the traffic at the toll plaza is found to be consistent during weekdays and slightly higher traffic during weekends.

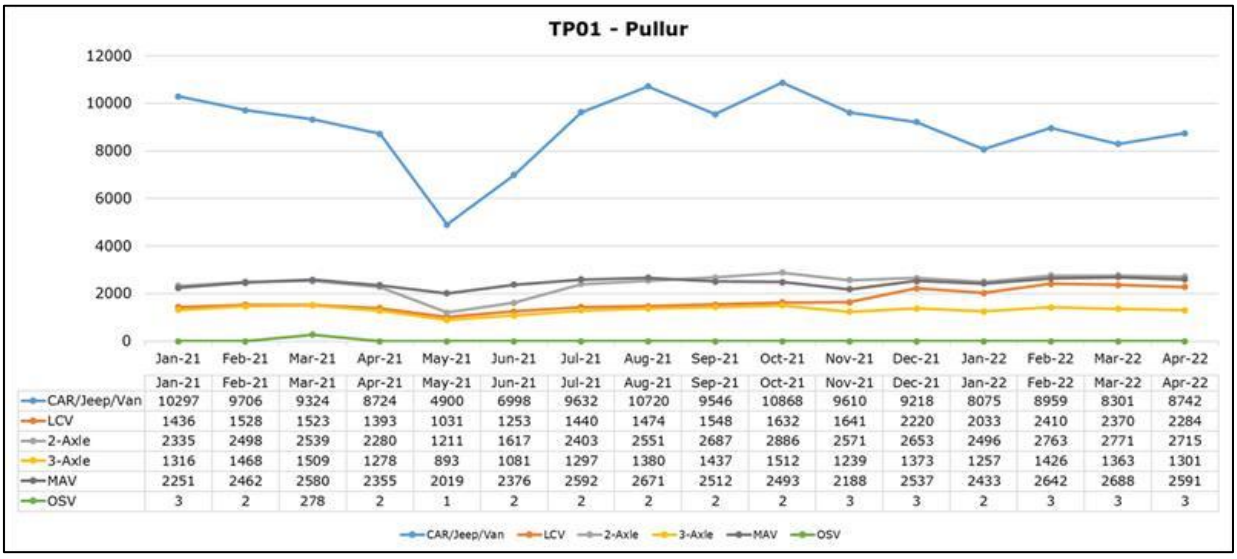
- The directional distribution at the toll plaza location is almost equal with Kothakota - Kurnool having a directional distribution of 51.6 percent.

2.4.3 Annual Average Daily Traffic (AADT)

The traffic plying on any road generally varies over different periods of the year depending on the cycle of different socio-economic activities in the regions through which it passes. Therefore, in order to have a more realistic picture of the traffic on the project road, it is required to assess its seasonal variation to estimate the annual average daily traffic (AADT).

The Seasonal Correction Factor (SCF) is generally derived from secondary data sources such as past month-wise traffic data on the project road, monthly toll revenues from existing tolled highways in the immediate influence area, sales of fuel at different filling stations along the project highway, arrival of vehicles at establishments like APMC, truck terminals, railway goods stations, etc.

The past toll traffic data for the toll plaza was made available by the client from Jan 2021-April 2022. The month-on-month mode wise traffic for this period January 21 to April 22 for Pullur toll plaza is presented in **Figure 2-3**.



	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22
CAR/Jeep/Van	10297	9706	9324	8724	4900	6998	9632	10720	9546	10868	9610	9218	8075	8959	8301	8742
LCV	1436	1528	1523	1393	1031	1253	1440	1474	1548	1632	1641	2220	2033	2410	2370	2284
2-Axle	2335	2498	2539	2280	1211	1617	2403	2551	2687	2886	2571	2653	2496	2763	2771	2715
3-Axle	1316	1468	1509	1278	893	1081	1297	1380	1437	1512	1239	1373	1257	1426	1363	1301
MAV	2251	2462	2580	2355	2019	2376	2592	2671	2512	2493	2188	2537	2433	2642	2688	2591
OSV	3	2	278	2	1	2	2	2	2	2	3	3	2	3	3	3

Figure 2-3: Month on Month Traffic Data for TP01-Pullur Toll Plaza

The onset of the second wave of Covid-19 and the lockdowns announced by the state government during April-June 2021 was a setback to the continuous recovery of traffic to normal levels. With the opening of economic activities, the traffic has started to pick up and shows a recovery from July 2021 onwards.

With that in mind, an average of July 2021 to April 2022 is taken as FY22 AADT. In the toll data Mini LCVs are merged into LCV category. For further analysis, the split for MLCV and LCV as provided by the client has been used for arriving at the AADT for Car/MLCV and LCV. The resultant mode wise AADT estimated for the project road for FY22 at the toll plaza location is presented in **Table 2-4.**

Location/Mode	Car/Jeep/ Van/Taxi	LCV	2A	3A	MAV	OSV
TP01	9,745	1,527	2,650	1,358	2,535	2

Table 2-4: AADT for FY22

The comparison of AADT for FY22 in the earlier study of March 2021 (by Ramboll) with FY22 AADT adopted in present study is presented in **Table 2-5**

Location/Mode	Car	LCV	Bus	2-axle Truck	3-axle Truck	MAV	O/size/ HME	PCU
AADT (Earlier Study - Ramboll)	8,279	2,019	970	1,552	1,278	2,579	-	34,314
AADT (Present Study)	9,745	1,527	1,477	1,172	1,358	2,535	2	35,473

Table 2-5: AADT in Earlier (March 21) and Present Study

- The Car, Bus and 3A traffic considered in the present study is marginally higher than the AADT projected for FY22 in the earlier study. Remaining all the modes are lower than the projections for FY22 in the previous study.
- In terms of PCU, traffic of Pullur TP is higher by 3.4 percent than the earlier study.

2.5 Travel Characteristics

2.5.1 Survey Methodology

In order to understand the travel demand pattern in the region and tollable traffic streams, origin and destination (OD) surveys were carried out at the toll plaza locations. The OD survey was carried out for 24 hours, by roadside interview method as described in IRC: 102-1988. Both passenger and commercial vehicles plying on the project road were stopped on a random sampling basis and interviewed.

The travel characteristics obtained by OD survey facilitate the identification of:

1. Local and through traffic on the project road.
2. Potential divertible traffic to/from project road to various alternative routes.

Trained enumerators under the supervision of transport planners collected the trip characteristics using survey forms designed for this purpose. The OD survey elicited characteristics like origin, destination, frequency, purpose of trip for passenger vehicles and commodity being transported for goods vehicles. The information pertaining to origin and destination of trips collected during roadside interviews was analysed to obtain the trip distribution based on a zoning system suitably designed for the present study.

2.5.2 Traffic Zoning System

To understand the spatial dimensions of the trip characteristics of the vehicles interviewed during the O-D survey, a detailed zoning system was developed giving due consideration to the following factors:

- The road network catering to the traffic on the project road and its generating points
- Important towns, villages, factories, and industrial centres around the project road area
- Administrative boundaries of districts and states.
- Configuration of the project road in the regional road network with respect to other roads

Two major types of areas were identified for analysis purpose: -

Immediate Influence Area (IIA): It includes the cities/towns/villages and districts along the project road and adjacent to it, which generate/attract trips to the project road. In this study, it consists of districts of Wanaparthy, Jogulamba Gadwal and Kurnool in the states of Telangana and Andhra Pradesh.

Broad Influence Area (BIA): It includes the remaining districts of Telangana, Andhra Pradesh and other neighbouring states such as Karnataka, Tamil Nadu, Kerala, Maharashtra, Odisha, Chhattisgarh and remaining states of India.

Detailed zoning system is prepared for IIA, while more aggregate or broad zoning is developed for BIA. The zoning system adopted for data collection was based on 95 zones and is presented in **Appendix 2.1.**

2.5.3 Sample Size

The toll traffic data does not provide the individual traffic volume count of all categories of vehicles. The seven-day traffic volume video count at the existing toll plaza was analysed to get the individual volume count of all categories of vehicles along with the direction split.

The vehicles during the OD surveys were interviewed on a random sample basis. **Table 2-6** shows the AADT and the sample size (both in absolute numbers and in percentage terms) captured during the exercise.

Modes	Car	M Bus	Bus	MLCV	LCV	2A	3A	MAV/ OSV
Sample	1,614	41	247	409	627	578	698	1,038
AADT	8,897	65	1,484	848	1,462	1,166	1,358	2,537
Percentage (%)	18.1	63.3	16.6	48.2	42.9	49.6	51.4	40.9

Table 2-6: Sample Size Collected in OD Survey at TP

Based on the sample size of different categories of vehicles interviewed during the OD survey, direction-wise expansion factors were calculated based on FY22 AADT. The OD matrices for all vehicle categories were generated and analysis was done in terms of regional distribution, travel pattern, commodity distribution and trip purpose for cars.

2.5.4 Regional Distribution

Based on the OD matrices, the regional distribution of tollable vehicles at the toll plaza location has been calculated. **Table 2-7** gives the distribution indicating the attraction and generation zones for the traffic on the project road.

Region/Modes	Car	M Bus	Bus	MLCV	LCV	2A	3A	MAV
Telangana	72.4	70.1	77.7	71.0	65.6	36.7	33.8	33.9
Andhra Pradesh	15.1	13.7	11.2	15.2	12.9	10.5	12.1	11.4
Karnataka	7.3	3.6	7.0	9.5	13.9	15.8	17.9	18.4
Tamil Nadu	1.4	8.0	1.0	2.8	4.9	13.0	10.7	12.2
Maharashtra	1.9	0.9	1.4	1.4	2.3	6.2	6.6	6.4
Delhi	0.4	2.7	0.2	0.0	0.0	7.7	7.3	6.6
Kerala	0.5	0.0	0.4	0.0	0.2	1.9	2.1	1.9
Uttar Pradesh	0.2	0.0	0.0	0.0	0.0	2.9	1.9	2.4
Rest of India	0.7	0.9	1.0	0.2	0.3	5.2	7.5	6.9
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Table 2-7: Regional Distribution of Tollable Traffic (in %) On Project Road

Passenger traffic:

- In case of passenger traffic, Telangana contributes about 72.4 in cars and 77.7 percent in buses followed by Andhra Pradesh and Karnataka which contributes about 7-15 percent each in cars and buses.
- Tamil Nadu and Maharashtra also contributes about 1-2 percent each in passenger traffic.

Freight Traffic

- Telangana and Karnataka are the main contributors in case of freight traffic followed by Tamil Nadu and Andhra Pradesh.
- About 33-37 percent of Trucks/MAVs each are destined to Telangana followed by Karnataka which have a share of about 16-19 percent.
- Andhra Pradesh contributes about 10-13 percent in each freight mode followed by Maharashtra and Delhi having a share of about 6-8 percent each in Trucks and MAVs.
- Kerala and Uttar Pradesh also have a significant share of freight traffic. Around 2 percent each of 2A, 3A trucks and MAVs are destined to these states.

The mode wise top 20 OD pairs are given in **Appendix 2.2**.

2.5.5 Travel Pattern

In order to assess the travel pattern of vehicles, the important streams of traffic plying on the project road are estimated. The list of the popular movements found at the toll plaza location is presented in **Table 2-8**.

Sr. No.	Traffic Streams	Car	Mini Bus	Bus	MLCV	LCV	2A	3A	MAV
1	Hyderabad/Nizamabad/Adilabad - Nandyal/Kadapa/Tirupati /Chennai	918	1	113	62	119	113	84	173
		10.3%	1.9%	7.6%	7.3%	8.1%	9.7%	6.1%	6.8%
2	Hyderabad/Nizamabad/Adilabad - Kurnool/Anantapur/Bangalore/Tamil Nadu	3,889	32	517	302	824	397	448	827
		43.7%	48.8%	34.8%	35.6%	56.3%	34.1%	33.0%	32.6%
3	Mahabubnagar/Gadwal/Rest of Telangana - Nandyal/Kadapa/Tirupati /Chennai	344	5	42	53	64	24	53	78
		3.9%	7.0%	2.8%	6.2%	4.4%	2.0%	3.9%	3.1%
4	Mahabubnagar/Gadwal/Rest of Telangana - Kurnool/Anantapur/Bangalore/Tamil Nadu	3178	21	733	404	380	119	140	325
		35.7%	33.1%	49.4%	47.7%	26.0%	10.2%	10.3%	12.8%
5	Solapur/Pune/Mumbai/Gujarat/Rajasthan - Kurnool/Nandyal/Southern Andhra Pradesh/Chennai	204	1	37	4	23	53	82	132
		2.3%	1.9%	2.5%	0.5%	1.6%	4.6%	6.0%	5.2%
6	Solapur/Pune/Mumbai/Gujarat/Rajasthan - Bangalore/Mysore/Tamil Nadu	66	0	18	0	0	42	54	113
		0.7%	0.0%	1.2%	0.0%	0.0%	3.6%	4.0%	4.5%
7	Nanded/MP/Delhi/UP/Northern India - Nandyal/Kadapa/Tirupati /Chennai - Kurnool/Anantapur/Bangalore/Tamil Nadu	22	0	0	0	5	93	107	171
		0.2%	0.0%	0.0%	0.0%	0.3%	8.0%	7.9%	6.7%
8	Nanded/MP/Delhi/UP/Northern India - Kurnool/Anantapur/Bangalore/Tamil Nadu	260	5	24	21	45	297	342	646
		2.9%	7.3%	1.6%	2.4%	3.1%	25.5%	25.2%	25.5%
9	Odisha/West Bengal/Eastern India - Nandyal/Kadapa/Tirupati /Chennai	0	0	0	0	0	8	6	12
		0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	0.4%	0.5%
10	Odisha/West Bengal/Eastern India - Kurnool/Anantapur/Bangalore/Tamil Nadu	16	0	0	2	3	19	43	58
		0.2%	0.0%	0.0%	0.2%	0.2%	1.6%	3.2%	2.3%
Total		**8,897**	**65**	**1,484**	**848**	**1,462**	**1,166**	**1,358**	**2,537**

Table 2-8: Traffic Streams at Pullur Toll Plaza

Passenger Traffic:

- Around 43.7 percent (3,889 vehicles) of car trips and 34.8 percent (517 vehicles) of bus trips originate and terminate between Hyderabad/Nizamabad/Adilabad and Nandyal/Kadapa/Tirupati/Chennai (stream 2).
- Significant amount to traffic is observed between Mahabubnagar/Gadwal/Rest of Telangana and Kurnool/Anantapur/Bangalore/TamilNadu (stream 4) which is about 35.7 percent (3,178 vehicles) of cars and 49.4 percent (733 vehicles) of Buses.
- The interaction between Hyderabad/ Nizamabad/ Adilabad and Nandyal/ Kadapa/ Tirupati/ Chennai (stream 1) in cars is around 10.3 percent and 7.6 percent in buses.

- Around 204 cars are found to be travelling between Solapur/Pune/Mumbai/Gujarat/ Rajasthan and Kurnool/Nandyal/Southern Andhra Pradesh/Chennai (stream 5) which is the potential traffic for Surat – Chennai Expressway which has a greenfield alignment from Solapur (Akkalkot) to Kurnool.
- Cars travelling between Hyderabad and beyond (including Northern India) and Nandyal/Kadapa/Tirupati/Chennai is found to be 940 cars (streams 1 and 7) which is the potential traffic for Hyderabad – Tirupati highway with greenfield alignment between Kalwakurthy and Nandyal.

Freight Traffic:

- Major interaction in freight traffic is found to be travelling between Hyderabad/ Nizamabad/Adilabad - Kurnool/Anantapur/Bangalore/Tamil Nadu (stream 2) which is about 34.1 percent in 2A (397 vehicles); 33 percent in 3A (448 vehicles) and 32.6 percent for MAVs (827 vehicles).
- The long-distance traffic between Nanded/MP/Delhi/UP/Northern India and Kurnool/ Anantapur/Bangalore/TamilNadu (stream 8) is found to be about 25.5 percent in 2A (297 vehicles); 25.2 percent in 3A (342 vehicles) and 25.5 percent (646 vehicles) in MAVs.
- Minor share of freight traffic travelling between Solapur/Pune/Mumbai/Gujarat/ Rajasthan and Kurnool/Nandyal/Southern Andhra Pradesh/Chennai (stream 5) is found to be about 6 percent in 3A (82 vehicles) and 5.2 percent (132 vehicles) in MAVs. This share of traffic is the potential traffic for Surat – Chennai Expressway which has a greenfield alignment from Solapur (Akkalkot) to Kurnool.
- About 56.3 percent (824 vehicles) of LCVs are found to be plying between Hyderabad/Nizamabad/Adilabad - Kurnool/Anantapur/Bangalore/Tamil Nadu (stream 2).
- Freight traffic travelling between Hyderabad and beyond (including Northern India) and Nandyal/Kadapa/Tirupati/Chennai is found to be about 206 2A vehicles, 191 3A vehicles and 344 MAVs (streams 1 and 7). This traffic is the potential traffic for Hyderabad – Tirupati highway with greenfield alignment between Kalwakurthy and Nandyal.

2.5.6 Commodity Distribution

Analysis was also carried out to understand the different commercial vehicles being used to transport different commodities. **Table 2-9** presents the commodity-wise share of the total commercial traffic at the toll plaza on the project road.

Commodity Type	MLCV	LCV	2 Axle	3 Axle	MAV
Food Grains and Cash Crops	12.2	9.4	10.7	9.6	11.9
Fruits & Vegetables	16.6	11.6	7.3	10.6	8.8
Building Materials	3.2	4.6	7.3	8.6	9.3

Commodity Type	MLCV	LCV	2 Axle	3 Axle	MAV
Iron & Steel Products	3.4	5.7	9.2	8.7	9.7
Petroleum Products, Chemicals and Gas	1.5	6.1	4.7	4.7	5.6
Heavy Machinery & Industrial Equipment	0.5	0.6	0.2	0.1	0.5
Industrial Products & Equipment	7.8	10.4	9.5	8.0	7.6
Consumer Items	4.9	8.1	6.9	5.0	5.6
Automobile and New Chassis	2.0	3.3	6.9	5.7	8.1
Containers	0.0	0.2	0.3	0.1	0.1
Ores & Minerals (Coal, Bauxite, limestone)	0.5	0.5	0.3	1.1	1.9
Miscellaneous Items (Medicines, Powder, Livestock, Forest products, Fertilizers, Milk, etc.)	6.6	5.9	6.9	8.7	10.3
Parcels	4.4	10.2	15.9	14.9	10.4
Empty Vehicles	36.4	23.3	13.8	13.9	10.1
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Table 2-9: Commodity Distribution on Project Road

- Major commodities being transported are parcels, food grains & cash crops, fruits and vegetables.
- Around 10.2 percent of LCVs, 15.9 percent of 2A Trucks, 14.9 percent of 3A Trucks and 10.4 percent of MAVs were found to be laden with parcels.
- MAVs are found to be carrying food grains & cash crops with a percent share of 11.9 followed by around 10 percent of miscellaneous items and parcels each.
- Freight modes of 2A/3A/MAVs are found to be transporting Iron and steel products of about 9-10 percent each.
- In case of Mini-LCVs, about 16.6 percent are found to be laden with fruits and vegetables followed by food grains & cash crops.

2.5.7 Trip Purpose Distribution

An analysis was also carried out to assess the purpose of car trips on the project road. **Table 2-10** summarises the purpose-wise share of the passenger cars at the O-D survey location.

Modes	TP01-Pullur Toll Plaza
Work & Business	81.2
Education	12.9
Social	0.6
Shopping	0.6
Religious	1.2
Others	3.5
Total	**100.0**

Table 2-10: Purpose - Wise Distribution of Car Trips at Pullur Toll Plaza

- Around 81.2 percent of the car traffic is observed to be having work & business trips.
- Education trips account for around 12.9 percent on the project road.

3. BASE TRAFFIC ASSESSMENT AND PROJECTIONS

3.1 General

The project road is a part of the NHAI InvIT portfolio and the projections of traffic and revenue have been presented till FY52. The estimation of the traffic using the tolled highway and its future growth are important elements to assess the project's economics as these are generally the main/sole source of revenue for the project This chapter details various aspects of the current traffic of the project road and its growth potential as assessed by Ramboll.

3.2 Project Road Traffic

The traffic that is likely to use the project road was estimated on the basis of the traffic and travel characteristics gathered as part of the study. The traffic on the project road would normally consist of the following components:

- Normal Traffic
- Diverted Traffic
- Induced/Developmental Traffic

3.2.1 Normal Traffic

Normal traffic is the traffic which is already plying on the project road as assessed in section 2.4.3.

3.2.2 Diverted Traffic

Diverted traffic is generally dictated by the presence of an alternative route at a lower generalised cost, which is in-turn defined by the road configuration and its condition, the type of vehicle and its operating costs, the average riding speed, the route distance and any tolling that may apply on a specific route.

In the context of the project road of Kothakota – Kurnool section, there are two proposed alternative routes which can impact the traffic plying on the project road. These two alternative route sections are:

A. Surat-Chennai Economic Corridor

B. Hyderabad – Tirupati Highway

A. Impact of Surat – Chennai Economic Corridor

The Surat-Solapur-Akkalkot-Chennai Economic Corridor is partly a brownfield and party greenfield project which is to be developed under Bharatmala Pariyojana for which detailed project report (DPR) is in progress. This Expressway will reduce the current Surat -Chennai distance by 330 km. The 1,461 km corridor will pass through Nashik, Ahmednagar, Solapur, Kalaburagi, Kurnool, Kadapa and Tirupati. The stretch between

Surat and Ahmednagar via Nasik in Gujarat and Maharashtra and Akkalkot (near Solapur) - Kurnool section that links Maharashtra with Telangana will have greenfield alignments.

With the development of greenfield section from Akkalkot near Solapur to Kurnool, in context of the project road section, the traffic between Solapur/Pune/Mumbai/Western Maharashtra/Gujarat and Kurnool/Southern Andhra Pradesh/Chennai has the two route choice options between Solapur to Kurnool. This stream of traffic is the potential traffic currently plying on the project road and maybe impacted after the development of greenfield section of Surat – Chennai Expressway.

The alignment of the route choices for the potential stream of traffic via the project road as well as via the green field alignment of Akkalkot – Kurnool section of Surat – Chennai Expressway are presented in **Figure 3-1.**

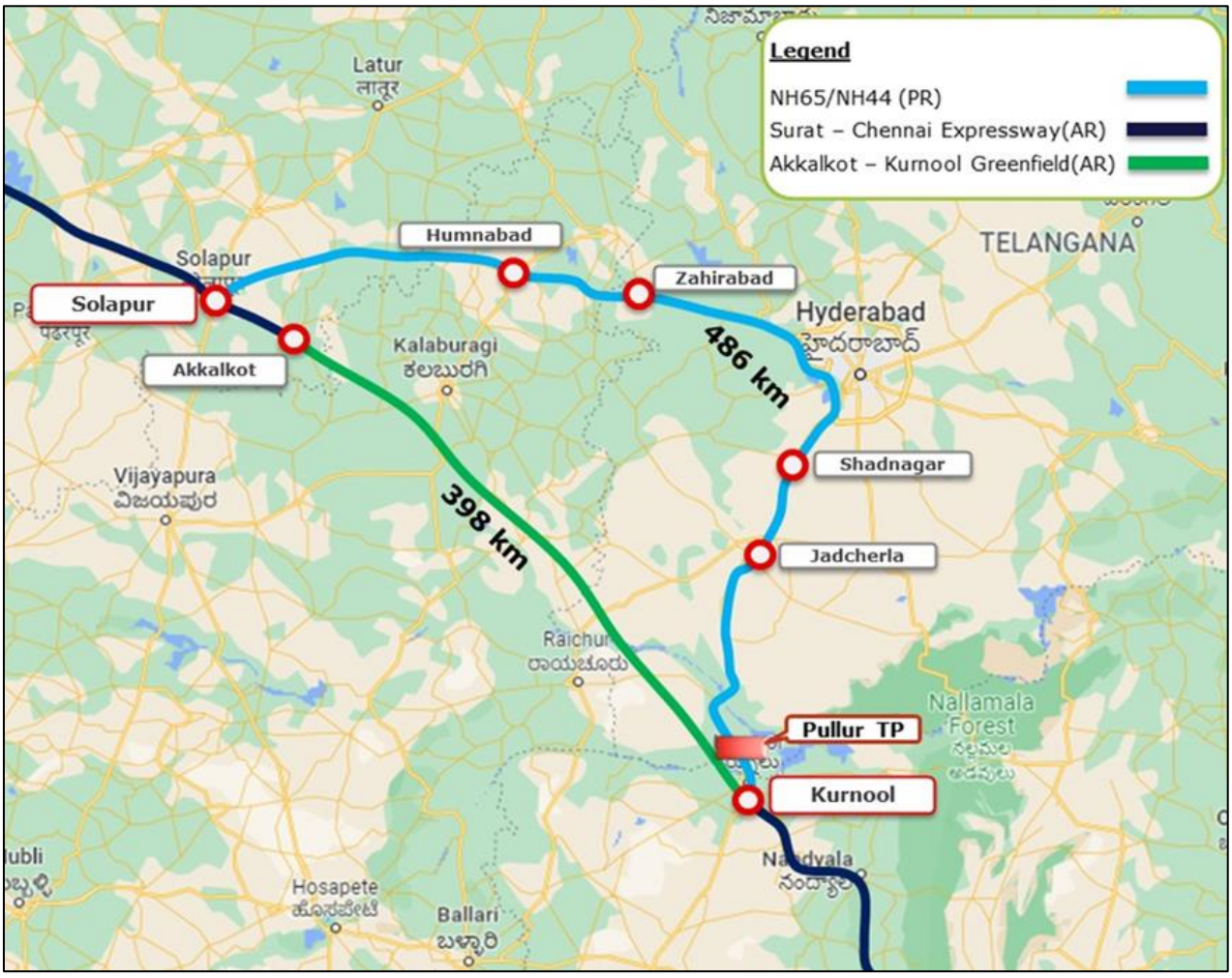


Figure 3-1: Alignment of Route Choices Between Solapur and Kurnool

The route choice via project road for this stream of traffic is via NH-65/NH-44 sections passing through Humnabad/ Zaheerabad/ Shadnagar/ Jadcherla/Kothakota measuring a distance of 486 km between Solapur and Kurnool. The route choice via greenfield alignment of Akkalkot – Kurnool section of Surat – Chennai Expressway measures a distance of 398 km between Solapur to Kurnool.

B. Impact of Kalwakurthy – Nandyal greenfield alignment (Hyderabad – Tirupati)

To cut down the distance between Hyderabad and the temple town of Tirupati, a new greenfield national highway of about 170 km is proposed to be developed between Kalwakurthy in Telangana and Nandyal (Karivena) in Andhra Pradesh. The newly sanctioned highway will pass through Nagarkurnool, Kollapur, Atmakur and Nandyal Assembly segments in the states of Telangana and Andhra Pradesh. This new National Highway Expressway will reduce the distance to reach Tirupati from Hyderabad by about 43 km.

With the development of greenfield section from Kalwakurthy in Telangana to Nandyal in Andhra Pradesh, in the context of the project road section, the traffic from Hyderabad & beyond to Nandyal/Kadapa/Tirupati/Chennai has two route choices. This stream of traffic is the potential traffic which will have impact on the project road due to the development of greenfield section of Kalwakurthy to Nandyal.

The alignment of the route choices for potential stream of traffic via project road as well as via the green field alignment of Kalwakurthy - Nandyal section is presented in **Figure 3-2.**

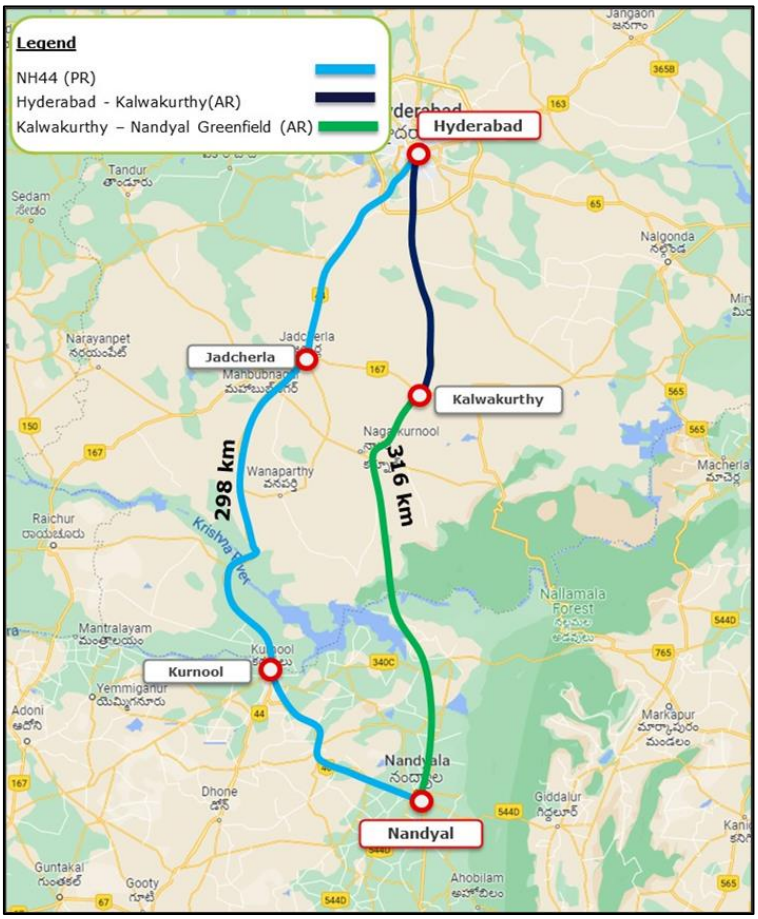


Figure 3-2: Alignment of Route Choices Between Hyderabad and Nandyal

The route choice via project road for this stream of traffic is via NH-44 sections passing through Shadnagar/ Jadcherla/Kothakota/Kurnool measuring a distance of 694 km between Hyderabad and Nandyal. The route choice via greenfield alignment of

Kalwakurthy - Nandyal measures a distance of 625 kms between Hyderabad and Nandyal.

The potential divertible traffic for the two proposed alternate routes has been estimated from the OD surveys carried out on the project road. The potential impact of both the proposed alternate routes are presented in **Table 3-1.**

Alternate Routes / Modes	Car	LCV	2A	3A	MAV
Surat – Chennai Economic Corridor	2.3%	1.6%	4.6%	6.0%	5.2%
Hyderabad – Tirupati Highway	7.5%	6.9%	16.1%	13.3%	12.3%
Total Potential Diversion	**9.8%**	**8.4%**	**20.7%**	**19.3%**	**17.5%**

Table 3-1: Impact due to Alternate Routes for Project Road

Since both the alternative routes are likely to result in a distance saving (88 km in case of Surat-Chennai route and 43 km in case of Hyderabad-Tirupathi route), the project road may lose 100 percent of the potential divertible traffic. The two proposed alternate routes will result in net potential diversion of about 8-10 percent of Cars and LCVs and about 18-21 percent of 2A & 3A Trucks and MAVs. Both these routes are in the initial stages of implementation and are likely to be completed by FY26.

To account for the gradual build-up of traffic on the alternate routes, the traffic shift is assumed to take place in phases with about 50 percent in FY27, 75 percent in FY28 and 100 percent from FY29 onwards.

3.2.3 Induced/ Development Traffic

Developmental /new generated traffic is the one which would be generated, over and above normal growth, because of lowering of transport costs or new developments in the immediate influence area of the project road. In case of the project road, there is no development envisaged in the vicinity of the project road.

Bharatmala Pariyojana is the second largest highways construction project in the country since NHDP, under which almost 50,000 km or highway roads were targeted across the country. It will look to improve connectivity particularly on economic corridors, border areas and far flung areas with an aim of quicker movement of cargo and boosting exports.

It will connect 550 district headquarters to minimum 4-lane highway by raising the number of corridors to 50 (from current 6) and move 80 percent freight traffic (currently 40 percent) to national highways by connecting 24 logistics parks and 7 north east multimodal waterway ports.

The Phase-I includes economic corridors of around 9,000 km; inter-corridor and feeder routes of around 6,000 km; 5,000 km roads under the National Corridors Efficiency Program, border and international connectivity roads of around 2,000 km; coastal and port connectivity roads of around 2,000 km; expressways of around 800 km and 10,000 km of NHDP roads. The total length in phase 1 comes to around 34,800 km.

In the context of the project influence area, there are a few economic corridors and inter corridors listed in the Telangana and Andhra Pradesh. The economic corridors planned in these states are Chennai-Kurnool, Solapur-Mahbubnagar and Pune-Vijayawada and is likely to improve connectivity with an aim to provide quicker movement of cargo.

As the project road caters to the long/ short distance traffic, it is likely to have a potential for growth in view of the developments of these economic corridors and feeder roads. This project section being a part of 4 laned tolled North-South corridor, will continue to remain an important highway for the North-South movement especially Hyderabad-Bangalore/Chennai and may see sustained growth in the future. The project road caters to the North-South traffic from Maharashtra which is around 6-7 percent in 3A and MAV trucks. The traffic generated from Gujarat and North Indian States is around 17 percent in 3A trucks and 16 percent in MAVs. Since, majority of the traffic is from North India to Kurnool and beyond, the traffic on this highway is likely to grow at a faster pace to fulfill the industrial demands from/to North India to/from Bangalore/Chennai and other parts of South India.

In addition, the state of Andhra Pradesh has finalised the tender for the development of 6,400 MW mega solar power plant across 10 parks. This plant in Kurnool district (Kolimigundla Ultra Mega Solar Park, Kolimigundla Mandal) has been developed with a capacity of 1000 MW. The proposed solar power plants will strengthen the rural economy and improve the living standards of farmers by providing energy to the agricultural sector which consumes up to 30 percent of the total power consumption.

3.3 Methodology for Traffic Growth Rate Estimation

Traffic growth for both passenger and freight vehicles has been estimated using the econometric approach as described in IRC-108, 2015. For freight traffic, due consideration has been given to the total tonnage transported and the shift in types of vehicles used for moving goods.

The econometric model applied, relates traffic growth to changes in state (or district) domestic product via an elasticity factor. According to IRC guidelines, elasticity based econometric model for highway projects should be derived in the following form:

$Log_e(P) = A0 + A1\ Log_e\ (EI)$, where:

P - Traffic Volume

EI - Economic Indicator

A0 - Regression Constant

A1 - Regression Co-efficient (Elasticity Index)

In order to estimate traffic on the project road, the methodology described below has been followed:

- Identify the influence area - From the analysis of OD survey data, the project influencing states and districts, which are likely to impact the traffic growth on the project road, were identified.
- Review Past traffic Data – Based on toll data available for the project, a review of past traffic and tonnage growth is carried out.
- Analysis of economic growth of the Project Influencing Area (PIA) - For each PIA state, an economic profile describing past performance and future outlook was prepared. This also considers India's past economic performance and its future outlook.
- Estimation of traffic elasticity to income – in order to translate economic growth into traffic growth, an elasticity factor was estimated.
- Derivation of traffic growth rates – On the basis of the weighted (based on OD shares) PIA outlook and related traffic elasticity, traffic growth rates were estimated.

The methodology thus adopted incorporates, as basic data inputs, the perspective growth envisaged in the influence area and the changes in transport demand elasticities over a period of time. The traffic growth rates by vehicle type for the project road have been determined till FY52.

3.4 Identification of PIA States

The regional distribution shows that Telangana, Andhra Pradesh and Karnataka are the main contributors of traffic on the project road in case of passenger vehicles. In case of freight traffic, states of Tamil Nadu, Maharashtra, Delhi, Kerala and Uttar Pradesh also contribute to the project road traffic in addition to the states of Telangana, Andhra Pradesh and Karnataka.

The states of Telangana, Andhra Pradesh and Karnataka have, therefore, been considered as the PIA states for passenger traffic. In case of freight traffic, states of Tamil Nadu, Maharashtra, Delhi, Kerala and Uttar Pradesh have also been considered as PIA states in addition to the states of Telangana, Andhra Pradesh, and Karnataka. The mode wise normalized regional distribution shares are presented in **Table 3-2**.

States/Mode	Car/ MLCV	LCV/ M Bus	Bus	Truck	3A	MAV
Telangana	76.1	71.3	81.0	38.7	36.6	36.4
Andhra Pradesh	15.9	14.0	11.7	11.1	13.1	12.2
Karnataka	8.0	14.7	7.3	16.7	19.4	19.7
Tamil Nadu	0.0	0.0	0.0	13.7	11.5	13.1
Maharashtra	0.0	0.0	0.0	6.6	7.1	6.8
Delhi	0.0	0.0	0.0	8.2	7.9	7.1
Kerala	0.0	0.0	0.0	2.1	2.3	2.0
Uttar Pradesh	0.0	0.0	0.0	3.0	2.0	2.6
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Table 3-2: Normalised Regional Distribution (%) for the PR

Telangana has a share of 76.1 percent in cars and 81 percent of buses followed by Andhra Pradesh and Karnataka which contributes about 15.9 percent and 8.0 percent in car traffic respectively.

In case of freight vehicles, Telangana contributes the highest around 36 - 39 percent in each major freight mode signifying the long-distance traffic on the project road. Karnataka has a share of around 16-20 percent in these categories of trucks. Around 11-13 percent is being contributed by Andhra Pradesh and Tamil Nadu each. The states of Delhi and Maharashtra contribute around 6-8 percent each followed by 2-3 percent each from Kerala and Uttar Pradesh.

3.5 Past Economic Growth of PIA

Growth of traffic on the project road depends on existing development and future growth prospects of the connecting regions. A number of economic indicators for the PIA states, as published by Central Statistical Organisation (2011-12 prices), have been studied to assess their past performance.

Telangana

- Telangana's Gross State Domestic Product (GSDP) stood at Rs 6,486.0 billion in 2019-20 and has been growing at a compounded annual growth rate of 8.3 percent since 2011-12. The GSDP estimates for the year 2020-2021 is Rs 6,446.0 billion.
- The state's growth had been between 6-12 percent since 2015-16. It has shown a growth of around 6.0 percent in FY20.
- The service sector is the largest contributor to GSDP (61.5 percent), agriculture allied activities sector at 18.3 percent and secondary sector at 20.2 per cent of the GSDP in 2019-20.

The change of sectoral composition of GSDP over the years is presented in **Figure 3-3**.

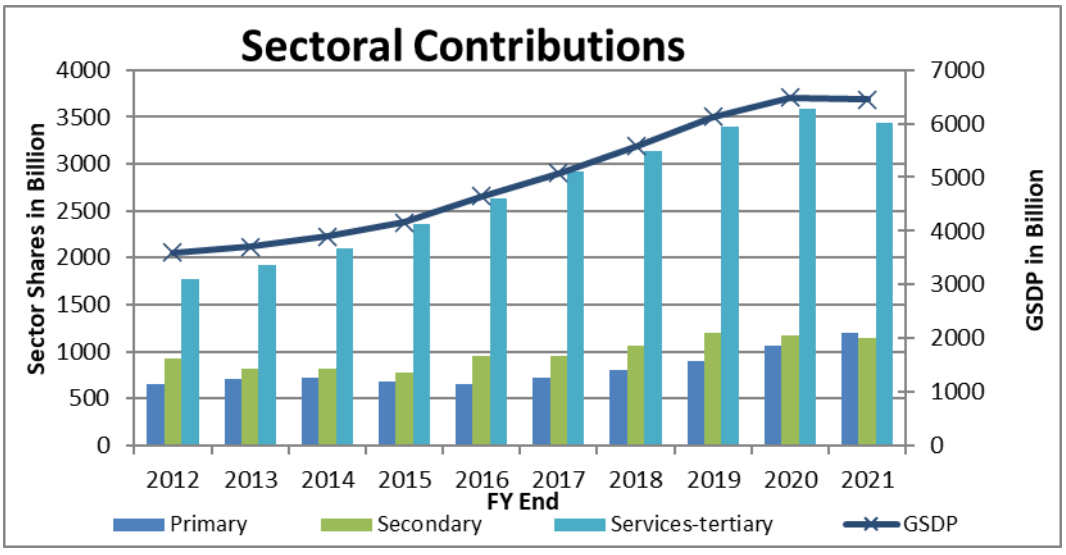


Figure 3-3: GSDP (in Rs billion) and its Sectoral Composition for Telangana

The performance of the state economy and its different sectors has been studied using time trend analysis. The average annual growth rates as obtained using regression analysis are presented in **Table 3-3**.

Particulars	2011-12 to 2019-20	2014-15 to 2019-20
GSDP	8.3	9.4
Agriculture and Allied	4.9	9.7
Industry	4.8	8.5
Services	9.7	8.7
Construction	3.4	4.6
Per Capita Income	7.6	9.1

Table 3-3: Average Annual Growth Rates (%) of State Income for Telangana

Telangana is a predominant exporter of drug formulations, biologicals, residual chemical and allied products and bulk drugs, etc.

Currently, the state has 34 operational Special Economic Zones (SEZs). Also, 63 more have been formally approved and 56 have been notified. These SEZs are dispersed over a manifold range of sectors including biotechnology, aerospace industry, electronics hardware, multi-product, gems and jewellery, IT SEZs, etc.

Telangana State Industrial Infrastructure Corporation (TSIIC) is a body set up for promoting and facilitating industrial development in the state and the body has set up 161 industrial parks in the state.

According to by Department for Promotion of Industry and Internal Trade (DPIIT), the state has enticed the Foreign Direct Investment (FDI) equity inflows worth US$ 20.2 billion during the period April 2000 to March 2021.

In order to attract high investments and catalyze growth, the state is highlighting the need to facilitate port logistics and road infrastructure development. The state has anticipated to develop six industrial corridors. The state has also planned to monetize Nehru Outer Ring Road (NORR), which is a 158 km expressway encircling the capital city of Hyderabad.

The state is also driven by agriculture. Rice, cotton, mango and tobacco are the local crops. There are many multi-state irrigation projects in development, including Godavari river basin irrigation project and Nagarjuna Sagar dam, the world's highest masonry dam.

There are extensive coal deposits in the state, which are excavated by the Singareni Collieries Company, for power generation and industrial purposes. Limestone deposits in the area are used by cement factories. Kothagudem, Jammikunta, Palwancha are amongst the industrial towns in the state.

The per capita income of Telangana is Rs 1,73,672 in the year 2019-20 and has been growing at 7.6 percent during 2011-12 to 2019-20. The growth in per capita income is presented in **Figure 3-4**.

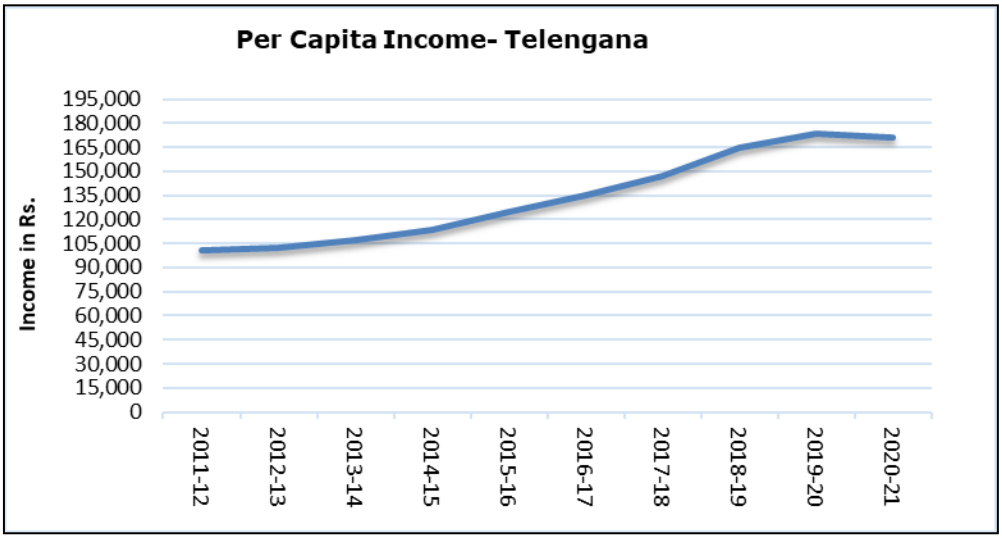


Figure 3-4: Per Capita Income of Telangana from 2011-12 to 2020-21

Other PIA States

The other PIA states contributing to the traffic on the project road are Andhra Pradesh, Karnataka, Tamil Nadu, Maharashtra, Delhi, Kerala and Uttar Pradesh.

- Andhra Pradesh's Gross State Domestic Product (GSDP) is reported to be Rs 6,688.5 billion in FY20 with an annual growth rate of 8.2 percent since FY12.
- Karnataka's Gross State Domestic Product (GSDP) is Rs 11,437.8 billion in 2019-20 and has been growing at a compounded annual growth rate of 8.9 percent since 2011-12. The GSDP estimates for the year 2020-2021 is Rs 11,138.2 billion.
- Gross State Domestic Product (GSDP) of Tamil Nadu stood at Rs 12,785.6 billion in 2019-20 and has been growing at a compounded annual growth rate of 7.1 per cent since 2011-12. The GSDP estimates for the year 2020-2021 is Rs 12,966.6 billion.
- Maharashtra's Gross State Domestic Product (GSDP) stood at Rs 21,340.7 billion in 2018-19 and has been growing at a compounded annual growth rate of 6.8 percent since 2011-12.
- Delhi's Gross State Domestic Product (GSDP) stood at Rs 6,344 billion in 2019-20 and has been growing at a compounded annual growth rate of 8.2 percent since 2011-12.
- Gross State Domestic Product (GSDP) of Kerala stood at Rs 5,686.4 billion in 2019-20 and has been growing at a compounded annual growth rate of 6.0 per cent since 2011-12.
- Uttar Pradesh's Gross State Domestic Product (GSDP) stood at Rs 11,668.2 billion in 2019-20 and has been growing at a compounded annual growth rate of 6.6 percent since 2011-12. The industrial Policy of one District one product will provide a boost to the economy of the state and has provided direct and indirect employment opportunities to many people in the state.

- The services sector is the largest contributor to GSDP of the PIA states. In FY20, Delhi has a service sector share of around 82.7 percent followed by 63 – 65 percent share in each state of Karnataka and Kerala, and 57 percent share in the state of Maharashtra. Service sector has a share of about 50-51 percent in Tamil Nadu and Uttar Pradesh while Andhra Pradesh has a share of about 42.8 percent in state GSDP.

The average annual growth rates as obtained using regression analysis for the period FY12 to FY20 are presented in **Table 3-4**.

State/ Particulars	Andhra Pradesh	Karnataka	Tamil Nadu	Maharashtra	Delhi	Kerala	Uttar Pradesh
2011-12 to 2019-20							
GSDP	8.2	8.9	7.1	6.8	7.8	6.0	6.6
Primary	9.1	3.7	5.4	2.9	5.8	-2.1	4.0
Secondary	6.4	7.2	7.3	6.3	8.0	6.3	7.5
Tertiary	7.7	9.8	6.5	7.8	7.5	6.4	7.5
Construction	3.7	3.3	4.6	3.2	5.6	4.3	5.0
Per Capita Income	7.5	7.9	6.4	5.7	5.6	5.4	5.0

Table 3-4: Average Annual Growth Rates (%) of State Income for Other PIA States

The GSDP over the years for the states of Andhra Pradesh, Karnataka, Tamil Nadu, Maharashtra, Delhi, Kerala and Uttar Pradesh are presented in **Figure 3-5.**

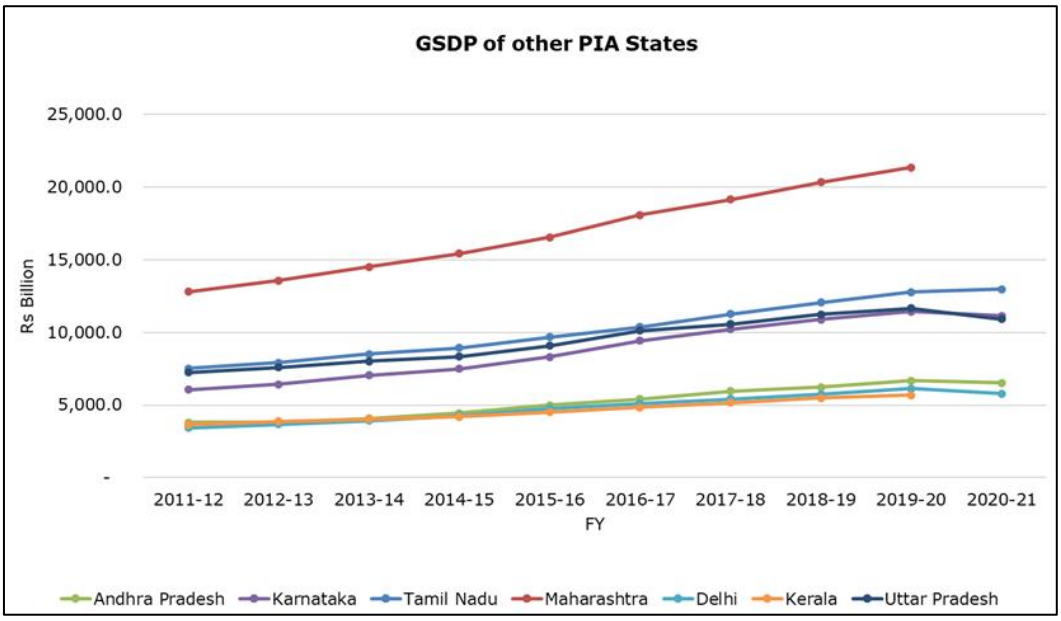


Figure 3-5: GSDP (in Rs billion) for Other PIA States

3.6 India and PIA Outlook

3.6.1 India's Past Performance and Outlook for Future

India's growth trend during the recent years has been presented in **Figure 3-6**.

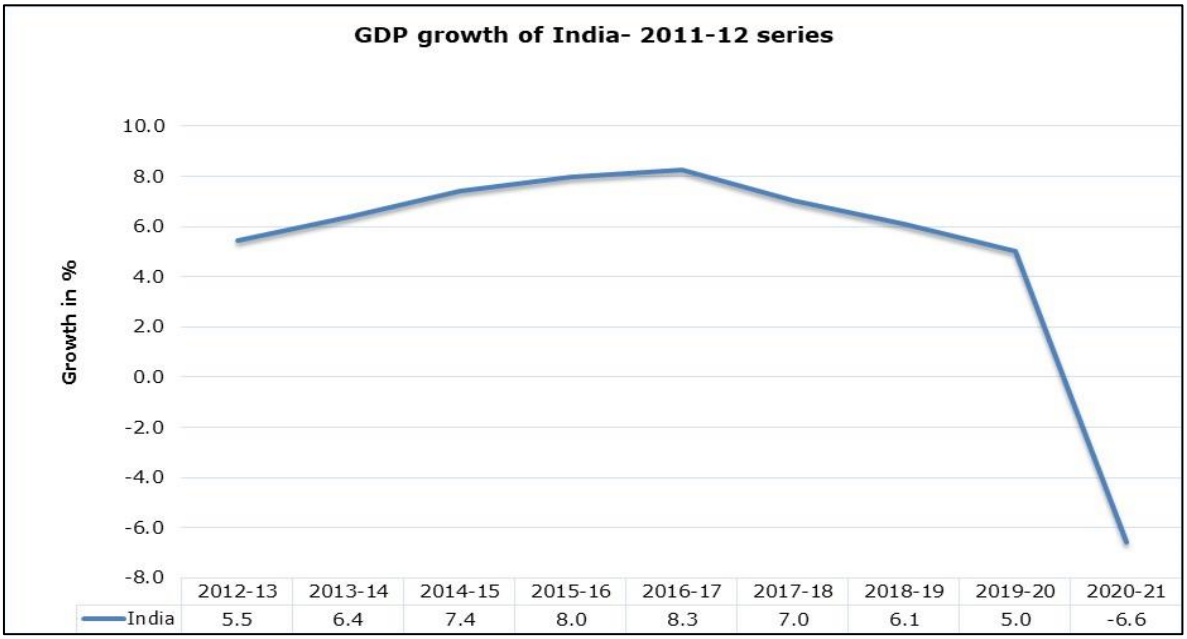


Figure 3-6: GDP Growth in India

Economic growth in India has been broadly on an accelerating path till FY18. It is likely to be the fastest growing major economy in the world in the medium-term. The growth in real GDP was 8.3 percent for FY17 and 7.0 percent in FY18, while the growth in FY19 was slightly lower at 6.1 percent. The long-term trend line growth of 7.2 percent has been achieved between FY12 to FY19. During FY20, growth has slowed down due to some structural issues and global headwinds resulting in an average GDP growth rate of 4.2 percent.

With the outbreak of COVID-19, global recession is likely to be witnessed across all the economies. The lockdown period announced by Indian government had an adverse impact on the economy. The first quarter estimated for FY21 has indicated a contraction of 23.9 percent, second quarter showed a rebound in growth by contracting 7.5 percent and third & fourth quarter grew by 0.5 percent and 1.6 percent respectively. The resultant contraction for FY21 has been around 6.6 percent.

The Indian economy is likely to see the impact of global slowdown due to COVID-19 and hence, the GDP forecast for India by various international agencies has been revised for the next two years. As per the latest update by Central Statistical Organisation (CSO), GDP in Q2 of FY22 has grown by 8.4 percent (down from 20.1 percent in Q1) and is likely to achieve a yearly growth rate of 9.5 percent (with 6.6% in Q3 and 6% in Q4). Further on, the economy is likely to grow in the range of 6.5-7.0 percent in FY23 and over 7.0 percent thereafter as per the forecast by CSO. As per Economic Survey of India for FY22, the economy is predicted to have a growth rate of 9.2 percent for FY22 and 8.0-8.5 percent in FY23. With the vaccination programme having covered the bulk of the population, economic momentum building back and the likely long-term benefits of supply-side reforms in the pipeline, the Indian economy is in a good position to witness GDP growth of 8.0-8.5 per cent in 2022-23.

The GDP forecast series provided by client as adopted in the earlier study is presented in **Figure 3-7**.

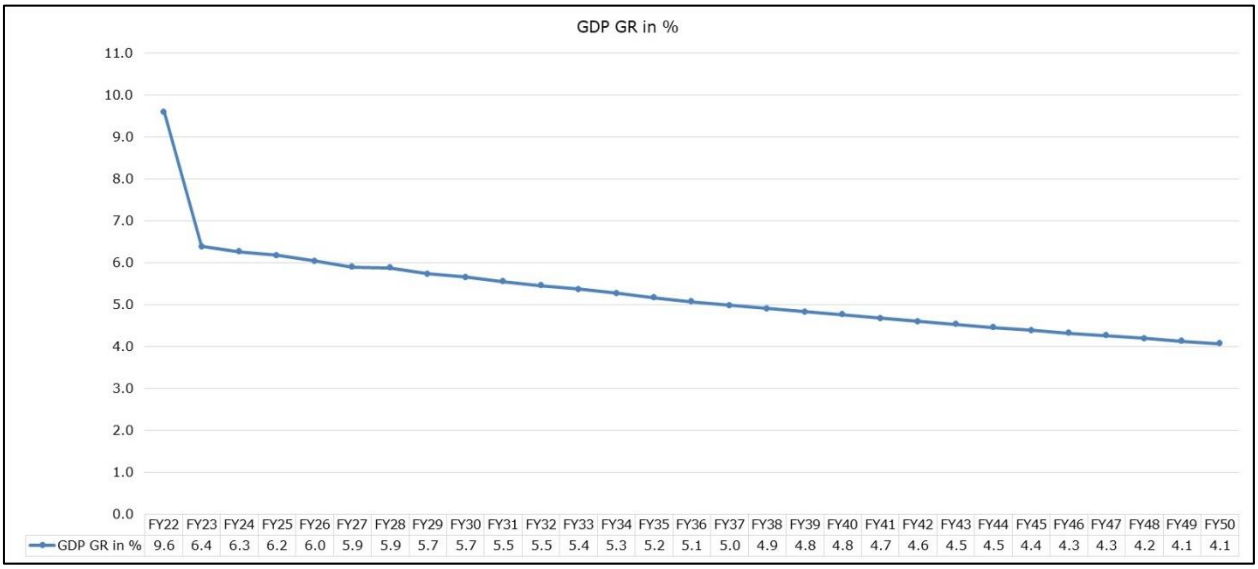


Figure 3-7: GDP Forecast of India Adopted in Earlier Study

The year-on-year growth for Indian economy as provided by the Client (based on the forecast by Consensus Economics) for the present study is presented in **Figure 3-8**.

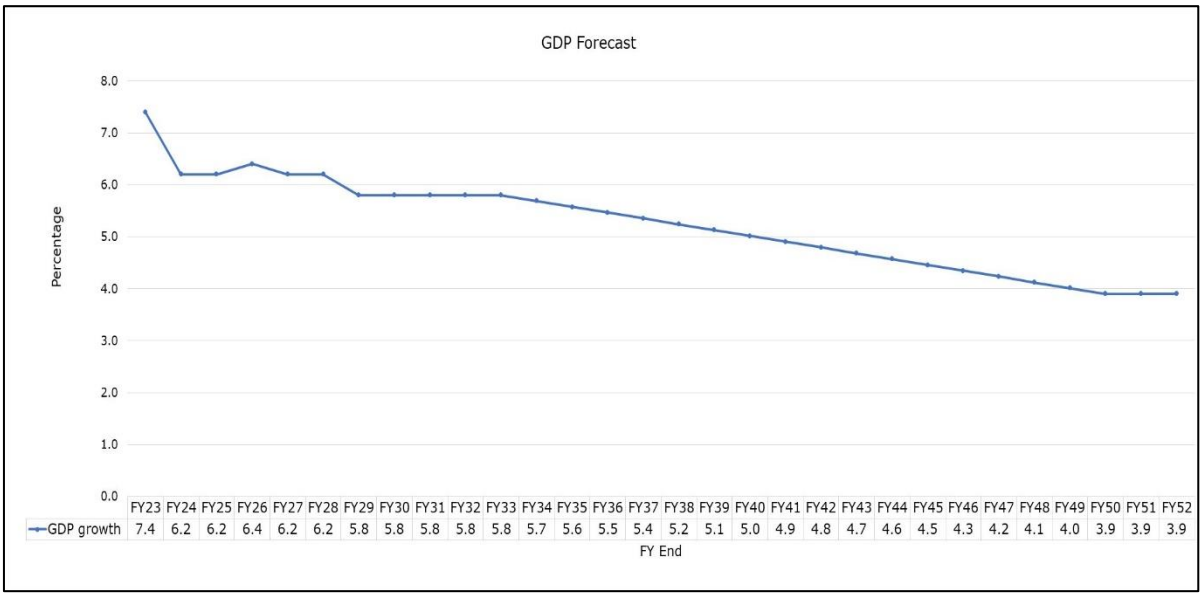


Figure 3-8: GDP Forecast of India

3.6.2 PIA States Outlook

A snapshot of the main economic indicators in the past and the growth adopted for future for the PIA state is presented in **Table 3-5**.

Indicators/ States	Telangana	Andhra Pradesh	Karnataka	Tamil Nadu	Maharashtra	Delhi	Kerala	Uttar Pradesh
GSDP in Rs. Billion	6,486.0	6,688.5	11,437.8	12,785.6	21,340.7	6,138.4	5,686.4	11,668.2
GSDP growth (2011/12 to last year) in %	8.3	8.2	8.9	7.1	6.8	7.8	6.0	6.6%

Indicators/ States	Telangana	Andhra Pradesh	Karnataka	Tamil Nadu	Maharashtra	Delhi	Kerala	Uttar Pradesh
Per capita Income in Rs (FY20)	173,672	129,516	173,028	168,449	173,757	306,385	163,216	51,255
Sector share in %, FY20								
Agriculture and allied	18.3	33.9	10.5	11.5	13.6	3.4	8.4	23.0
Industry	20.2	23.4	25.0	37.7	29.4	13.9	28.3	26.8
Services	61.5	42.8	64.5	50.9	57.0	82.7	63.3	50.2

Table 3-5: Main Economic Indicators of PIA States

In order to arrive at the forecast of the PIA states, past performance of the State GDPs vis-a-vis India GDP has been studied and the multipliers have been derived for both short term and long term. The past and adopted multipliers for PIA states to Indian economy are presented in **Table 3-6**.

Period	India	Telangana	Andhra Pradesh	Karnataka	Tamil Nadu	Maharashtra	Delhi	Kerala	Uttar Pradesh
Past growth %									
2011-12 to 2019-20	7.0	8.3	8.2	8.9	7.1	6.8	7.8	6.0	6.6
2014-15 to 2019-20	7.0	9.4	8.4	9.0	7.5	6.8	7.1	6.4	7.0
Past Multipliers vis-a-vis India									
2011-12 to 2019-20		1.2	1.2	1.3	1.0	1.0	1.1	0.8	0.9
2014-15 to 2019-20		1.3	1.2	1.3	1.1	1.0	1.0	0.9	1.0
Multipliers adopted for future									
States w.r.t. India		1.2	1.2	1.2	1.0	1.0	1.1	0.9	0.9

Table 3-6: Past Multipliers and Future Outlook of PIA States

Based on the normalised OD shares of the toll plaza and the outlooks adopted for PIA states, the mode-wise future weighted income is presented in **Table 3-7**.

Period/Modes	Car/MLCV	LCV/M Bus	Bus	Truck	3A	MAV
2023	8.9	8.9	8.9	8.2	8.3	8.3
2024	7.4	7.4	7.4	6.9	6.9	6.9
2025	7.4	7.4	7.4	6.9	6.9	6.9
2026	7.7	7.7	7.7	7.1	7.2	7.1
2027	7.4	7.4	7.4	6.9	6.9	6.9
2028	7.4	7.4	7.4	6.9	6.9	6.9
2029	7.0	7.0	7.0	6.4	6.5	6.5
2030	7.0	7.0	7.0	6.4	6.5	6.5
2031	7.0	7.0	7.0	6.4	6.5	6.5
2032	7.0	7.0	7.0	6.4	6.5	6.5
2033	7.0	7.0	7.0	6.4	6.5	6.5
2034	6.8	6.8	6.8	6.3	6.4	6.3
2035	6.7	6.7	6.7	6.2	6.2	6.2

Period/Modes	Car/MLCV	LCV/M Bus	Bus	Truck	3A	MAV
2036	6.6	6.6	6.6	6.1	6.1	6.1
2037	6.4	6.4	6.4	5.9	6.0	6.0
2038	6.3	6.3	6.3	5.8	5.9	5.8
2039	6.2	6.2	6.2	5.7	5.7	5.7
2040	6.0	6.0	6.0	5.6	5.6	5.6
2041	5.9	5.9	5.9	5.5	5.5	5.5
2042	5.8	5.8	5.8	5.3	5.4	5.3
2043	5.6	5.6	5.6	5.2	5.2	5.2
2044	5.5	5.5	5.5	5.1	5.1	5.1
2045	5.4	5.4	5.4	5.0	5.0	5.0
2046	5.2	5.2	5.2	4.8	4.9	4.8
2047	5.1	5.1	5.1	4.7	4.7	4.7
2048	4.9	4.9	4.9	4.6	4.6	4.6
2049	4.8	4.8	4.8	4.5	4.5	4.5
2050	4.7	4.7	4.7	4.3	4.4	4.4
2051	4.7	4.7	4.7	4.3	4.4	4.4
2052	4.7	4.7	4.7	4.3	4.4	4.4

Table 3-7: Future Mode-wise Weighted Income of PIA States

3.7 Review of Past Traffic Data

Past toll data was available for the toll plaza location. A comparison of the adopted AADT for FY22 with the past toll data is presented in **Table 3-8**.

FY/Mode	Car	LCV	BUS/2A	3A	MAV
FY17	6,031	1,918	2,158	1,566	1,335
FY18	6,304	1,972	1,987	1,572	1,812
FY19	5,718	1,903	2,101	1,463	2,093
FY20	6,728	1,857	2,399	1,345	2,216
FY21	7,464	1,913	2,443	1,236	2,345
FY22	9,745	1,527	2,649	1,358	2,537
YOY growth in %					
FY18 vs FY17	4.5	2.8	-7.9	0.4	35.8
FY19 vs FY18	-9.3	-3.5	5.7	-6.9	15.5
FY20 vs FY19	17.7	-2.4	14.2	-8.1	5.8
FY21 vs FY20	10.9	3.0	1.8	-8.1	5.8
FY22 vs FY21	30.6	-20.2	8.5	9.8	8.2
End Point Growth (%)					
FY20 vs FY17	5.5	-0.1	3.1	-5.7	15.1
FY22 vs FY17	10.1	-4.5	4.2	-2.8	13.7

Table 3-8: Past Traffic Comparison from Pullur Toll Plaza Data

The comparison of the past data shows a 10 percent growth in cars between FY17 and FY22 at the toll plaza location. LCVs have shown a negative growth in the past which could be due to some classification issue between MLCV and LCVs. The growth in Bus/2A trucks has been 4.0 percent in FY22 and FY17 comparison. MAVs have shown a double digit and high growth in the past with 3A trucks showing a decline. However, a combined

growth of around 6.0 percent for 3A and MAV has been observed between FY17 and FY22.

3.8 Past and Future Transport Demand Elasticity

The econometric model applied for the project, relates traffic growth to changes in state domestic product via an elasticity factor according to IRC guidelines.

A regression between weighted GSDP (as independent variable) and weighted registered vehicles (as dependant variable) of PIA states was carried out. The registered vehicle elasticity in case of cars is 1.2 during FY13 to FY17 for Telangana and 1.0 for the state of Andhra Pradesh between FY12 and FY17. In case of all trucks combined, the registered vehicle elasticity is around 1.0 during the same period for both the main PIA states. For buses, an elasticity of 0.6-0.8 has been derived for FY12/FY13 to FY17 period.

Vehicle registration data is also used as a proxy wherein operational toll data is not available. Vehicle registration data represents all vehicles registered in the state, but does not indicate actual number of vehicles plying on the road as it does not account for factors such vehicles taken off the road due to lack road worthiness, those registered in a state but mostly used elsewhere, etc. Consequently, the elasticity values based on vehicle registration may not be representative of the traffic growth trends on the project road.

Also, the elasticity values from the adjacent sections of WATL and JEPL have been assessed in forming the project road future elasticities. The end point elasticities observed in WATL and JEPL over the past years is presented in **Table 3-9** and **Table 3-10**.

FY/Mode	Car	LCV	BUS	2A	MAV	2A/3A/MAVs
FY11 to FY20	1.80	0.18	0.01	0.31	0.87	0.58
FY11 to FY15	2.13	1.16	-0.68	-1.63	0.58	0.27
FY15 to FY20	1.56	-0.34	0.57	1.54	0.71	1.06

Table 3-9: Past Elasticities on WATL

In case of WATL, Car elasticity has been around 1.56 from FY15 to FY20. 2A trucks has shown an elasticity of 1.5 during the same period. Combined elasticity value for 2A/3A/MAV is observed to be around 1.0.

FY/Mode	Car/Jeep/van	LCV/ Minibus	Truck/Bus	MAV
FY11 vs FY20	1.28	0.38	0.01	0.50
FY12 vs FY15	1.80	1.09	-1.03	0.00
FY16 vs FY20	1.08	-0.07	0.71	0.59

Table 3-10: Past Elasticities on JEPL

In case of JEPL, Car elasticity is around 1.0 from FY16 to FY20. Bus/2A trucks has shown an elasticity of 0.7 during the same period. In case of 3A/MAV combined an elasticity value of 0.6 has been observed between FY16 and FY20.

The derived elasticities on other National Highways across India have also formed the basis for choosing the recommended elasticities on PR. The elasticities derived using the operational toll data regressed with the applicable state incomes (mode wise weighted shares) for the respective projects on some of the National Highways is presented in **Table 3-11**.

NH	Period	Car	2A	3A/MAV
NH-21	FY12-FY20	1.23	-0.42	0.54
SH-25	FY15-FY20	1.28	0.26	0.47
SH-17 & SH-7	FY13-FY20	1.26	0.51	0.33
NH-19	FY15-FY20	0.78	1.36	1.40
NH-1	FY12-FY20	1.02	0.74	
NH-6	FY14-FY20	1.11	1.68	0.42
NH-8A	FY16-FY20	0.73	0.28	0.94
NH-4	FY15-FY20	0.87	0.18	0.84
NH-6	FY16 to FY19	1.25	1.28	0.78

Table 3-11: Past Elasticity on Other National Highways

The past elasticity values have been observed in the range of 1-1.3 for cars on various National Highways and around 0.5-0.9 for 3A/MAV combined. Individually, 3A trucks have shown a negative elasticity in some of the assets with MAVs showing a higher positive elasticity.

Cars

- The elasticities and the past growth levels for cars are a result of increasing income levels, increasing vehicle ownership, and higher propensity to travel on highways in India due to network level developments and higher levels of service. These levels of growth are likely to continue in the near to medium term since car ownership levels are still very low and the road network is undergoing continual development.
- Car elasticity has been considered as 1.0 for the period up to FY30 and tapered to 0.9 for the rest of years till the end of the concession period.
- The motorisation levels in India also play an important role in determining car growth. With the increasing car ownership levels, propensity to travel and network level improvements on National Highways, car growth is likely to be at a high rate as witnessed in the recent past. The low motorization rate suggests that there is room for continued growth for many years to come. The motorisation rate for cars (per 1000 population) in India has gone up from 6.6 in 2001 to 20 in 2015. Although India's car fleet has been growing at 10% for nearly 25 years, its motorization rate is low compared to other countries of similar wealth and much lower than developed countries with motorization rate of around 450. The forecasts by different agencies indicate that number of cars will increase to 35 per thousand populations by 2025. With the continual increase in motorization rate and improved road network usage by cars for inter-urban travel, car growth is expected to be robust.
- It is likely that this growth would slow down over time as the market becomes more mature and saturated, therefore elasticity to GSDP can be expected to decline over

time. With the anticipated growth momentum in the coming years, higher elasticity values have been considered for the slab up to FY30 and further tapering has been done in the next slab.

Bus/Truck

- Over the years in India, there has been a change in passenger's travel mode preferences with increasingly more people shifting from public transport systems towards personalised modes. This has resulted, in general, in elasticity of bus traffic/demand to GSDP lower than unity ranging between 0.3 to 0.7 across the operational National Highways.
- The toll plaza data shows a past elasticity of 0.34 in FY17 to FY20 comparison in combined Bus/Truck category. 2A trucks have also shown a positive growth in the past in the adjacent toll section of WATL. Going forward Bus and Truck elasticity has been recommended as 0.3 for the entire concession period.

Trucks

- For smaller axle trucks like LCV, a higher elasticity value of 0.5 has been adopted till FY30 and 0.4 for the remaining concession period. The adjacent sections of WATL and JEPL have shown an elasticity ranging between 0.2 and 0.4 during the long- term period of FY11 to FY20.
- The project road toll plaza data for 3A/MAV has shown an elasticity of 0.6 in FY17 and FY20 comparison. WATL also shows an elasticity of 0.87 over the long term of FY11 to FY20. An elasticity of 0.3 has been adopted for 3A trucks for the entire concession period. For MAV trucks, an elasticity of 0.9 has been adopted till FY30 and further tapered to 0.8 for the rest of the concession period.

It is likely that this growth would slow down over time as the market becomes more mature and saturated, therefore elasticity to GSDP can be expected to decline over time. With the anticipated growth momentum in the coming years, higher elasticity values have been considered for the slab up to FY30 for Cars, LCV & MAV and further tapering has been done in the next slab.

In India as a whole, the freight vehicle mix has been changing in the last decade favouring MAV to 2 Axle/ 3Axle vehicles for long-distance traffic, given the operational efficiencies achievable with larger vehicles. Considering the ongoing technical advancements in automobile industry, some of the standard 2 Axle/ 3 Axle trucks would gradually be replaced by MAVs. Mature national highways with tolling in operation for few years, have already witnessed the shift in 2A/3A trucks to MAV for long distance movement and some of the 2A trucks are still being used for local movements.

On an overall level, due consideration has been given to the tonnage shifts happening in the market with Mini LCV gaining importance for short distance movements over LCVs and MAVs being preferred over 2A/3A for long distance movements due to better

operational efficiencies. Some of the 2A/3A trucks are also being used for local movements.

While assigning elasticities to different modes, freight travel pattern and over all elasticity of cargo tonnage with respect to weighted GSDP has been an important consideration. The recommended elasticity values adopted for all vehicle types in line with the traffic growth being observed on other national highways and changes in freight traffic pattern observed on the project road are presented in **Table 3-12.**

Period/Modes	Car/MLCV	LCV/ Mini Bus	Bus	Truck	3A	MAV
2023-2025	1.0	0.5	0.3	0.3	0.3	0.9
2026-2030	1.0	0.5	0.3	0.3	0.3	0.9
2031-2035	0.9	0.4	0.3	0.3	0.3	0.8
2036-2040	0.9	0.4	0.3	0.3	0.3	0.8
Beyond 2040	0.9	0.4	0.3	0.3	0.3	0.8

Table 3-12: Recommended Elasticity for Project

It has been assumed that transport demand elasticity, for both freight and passenger traffic, would gradually decline over time, despite growth in per capita income, as regions becomes more mature, self-sufficient and with alternative mode of transport available to users. In the future growth forecast, the gradation in elasticity of freight over the years takes into account to cover the impact of network level changes in both rail and road networks apart from economic changes.

3.9 Projected Traffic Growth Rates

The estimated traffic growth rates for the project road in the earlier study conducted by Ramboll have been presented in **Table 3-13**.

FY/Modes	Car/MLCV	M Bus/ LCV	Bus	2A	3A	MAV	OSV
2023	7.3	3.8	2.1	2.2	2.2	6.6	6.6
2024	7.1	3.7	2.1	2.2	2.2	6.5	6.5
2025	7.0	3.6	2.1	2.1	2.1	6.4	6.4
2026	6.9	3.6	2.0	2.1	2.1	6.3	6.3
2027	6.7	3.5	2.0	2.0	2.0	6.1	6.1
2028	6.7	3.5	2.0	2.0	2.0	6.1	6.1
2029	6.5	3.4	1.9	2.0	2.0	6.0	6.0
2030	6.4	3.3	1.9	2.0	2.0	5.9	5.9
2031	5.7	2.6	1.9	1.9	1.9	5.1	5.1
2032	5.6	2.6	1.8	1.9	1.9	5.0	5.0
2033	5.5	2.5	1.8	1.9	1.9	5.0	5.0
2034	5.4	2.5	1.8	1.8	1.8	4.9	4.9
2035	5.3	2.4	1.7	1.8	1.8	4.8	4.8
2036	5.2	2.4	1.7	1.8	1.8	4.7	4.7
2037	5.1	2.3	1.7	1.7	1.7	4.6	4.6
2038	5.0	2.3	1.6	1.7	1.7	4.5	4.5
2039	4.9	2.3	1.6	1.7	1.7	4.5	4.5
2040	4.9	2.2	1.6	1.6	1.7	4.4	4.4
2041	4.8	2.2	1.6	1.6	1.6	4.3	4.3
2042	4.7	2.2	1.5	1.6	1.6	4.2	4.2
2043	4.6	2.1	1.5	1.6	1.6	4.2	4.2
2044	4.6	2.1	1.5	1.5	1.5	4.1	4.1
2045	4.5	2.1	1.5	1.5	1.5	4.1	4.1
2046	4.4	2.0	1.5	1.5	1.5	4.0	4.0

FY/Modes	Car/ML CV	M Bus/ LCV	Bus	2A	3A	MAV	OSV
2047	4.4	2.0	1.4	1.5	1.5	3.9	3.9
2048	4.3	2.0	1.4	1.5	1.5	3.9	3.9
2049	4.2	1.9	1.4	1.4	1.4	3.8	3.8
2050	4.2	1.9	1.4	1.4	1.4	3.8	3.8

Table 3-13: Projected Traffic Growth Rates for Project Road in Earlier Study (%)

Under the present study, based on the moderated perspective elasticity values and the projected growth rates of the income for PIA states, the future average annual compound traffic growth rates by vehicle type have been estimated for the project road by using the following relationship:

Tgr = (GSDPgr) x E; where,

Tgr – Traffic growth rate for mode

GSDPgr – Growth rate of GSDP

E – Elasticity value for mode

Using the year-on-year mode wise weighted income for PIA and elasticity for different time periods, traffic growth rates have been estimated for each year till FY52. The estimated traffic growth rates for the project road have been presented in **Table 3-14**.

FY/Modes	Car/MLCV	LCV/M Bus	Bus	Truck	3A	MAV
2023	8.9	4.4	2.7	2.5	2.5	7.4
2024	7.4	3.7	2.2	2.1	2.1	6.2
2025	7.4	3.7	2.2	2.1	2.1	6.2
2026	7.7	3.8	2.3	2.1	2.1	6.4
2027	7.4	3.7	2.2	2.1	2.1	6.2
2028	7.4	3.7	2.2	2.1	2.1	6.2
2029	7.0	3.5	2.1	1.9	1.9	5.8
2030	7.0	3.5	2.1	1.9	1.9	5.8
2031	6.3	2.8	2.1	1.9	1.9	5.2
2032	6.3	2.8	2.1	1.9	1.9	5.2
2033	6.3	2.8	2.1	1.9	1.9	5.2
2034	6.1	2.7	2.0	1.9	1.9	5.1
2035	6.0	2.7	2.0	1.9	1.9	5.0
2036	5.9	2.6	2.0	1.8	1.8	4.9
2037	5.8	2.6	1.9	1.8	1.8	4.8
2038	5.7	2.5	1.9	1.7	1.8	4.7
2039	5.5	2.5	1.8	1.7	1.7	4.6
2040	5.4	2.4	1.8	1.7	1.7	4.5
2041	5.3	2.4	1.8	1.6	1.6	4.4
2042	5.2	2.3	1.7	1.6	1.6	4.3
2043	5.1	2.2	1.7	1.6	1.6	4.2
2044	4.9	2.2	1.6	1.5	1.5	4.1
2045	4.8	2.1	1.6	1.5	1.5	4.0
2046	4.7	2.1	1.6	1.4	1.5	3.9
2047	4.6	2.0	1.5	1.4	1.4	3.8
2048	4.5	2.0	1.5	1.4	1.4	3.7
2049	4.3	1.9	1.4	1.3	1.3	3.6

FY/Modes	Car/MLCV	LCV/M Bus	Bus	Truck	3A	MAV
2050	4.2	1.9	1.4	1.3	1.3	3.5
2051	4.2	1.9	1.4	1.3	1.3	3.5
2052	4.2	1.9	1.4	1.3	1.3	3.5

Table 3-14: Projected Traffic Growth Rates for Project Road (%)

In derivation of above growth rates, the likely shift of buses to cars in case of passenger vehicles and the replacement/ tonnage shift of 2A/3A trucks to MAV for long distance in case of freight vehicles has been duly considered.

The implied traffic growth rates for freight vehicles of 2A/3A and MAV after considering the impact of diversion to Surat – Chennai economic corridor and Hyderabad – Tirupati corridor in FY27 to FY29 under the base case have been presented in **Table 3-15**.

FY/Modes	TP01		
	2A	3A	MAV
2027	-8.5	-7.8	-3.1
2028	-3.8	-3.4	1.1
2029	-4.3	-3.8	0.5

Table 3-15: Implied Traffic Growth Rates for Project Road After Diversion (%)

The above growth rates relate to the most likely Base Case. In addition, two sets of traffic growth rates under low and high cases have also been considered and impact on toll revenue evaluated for both these cases. Based on the risk analysis of key parameters like economic growth and elasticity of travel demand impacting traffic growth, two additional growth scenarios have been presented. Low growth scenario considers a 20 percent reduction in growth rates relating to about 10 percent decline each in elasticity and economic growth. The High growth scenario considers a 20 percent increase in growth rates signifying about 10 percent increase each in elasticity and economic parameters.

3.10 Traffic Projections and Capacity Analysis

Table 3-16 presents the projections of the total vehicles based on the most likely growth rates till FY52 as assessed in this study.

FY	Total Traffic Before Diversion	Total Traffic After Diversion
2022	35,473	35,473
2023	37,594	37,594
2024	39,499	39,499
2025	41,519	41,519
2026	43,731	43,731
2027	46,009	42,984
2028	48,426	43,652
2029	50,827	44,146
2030	53,367	46,353
2031	55,792	48,460
2032	58,343	50,677
2033	61,027	53,010
2034	63,797	55,418
2035	66,654	57,902
2036	69,595	60,459
2037	72,619	63,089

FY	Total Traffic Before Diversion	Total Traffic After Diversion
2038	75,726	65,791
2039	78,913	68,563
2040	82,177	71,403
2041	85,517	74,308
2042	88,929	77,277
2043	92,409	80,305
2044	95,954	83,391
2045	99,560	86,529
2046	103,222	89,717
2047	106,935	92,949
2048	110,693	96,221
2049	114,491	99,528
2050	118,322	102,865
2051	122,295	106,325
2052	126,413	109,912

Table 3-16: Projected Traffic at Kothakota-Kurnool

As per the latest information related to InvIT CA, the six laning augmentation is done after the traffic projections on the PR crosses 40,000 PCUs and remains above 40,000 PCUs for three more consecutive years, after which NHAI may invite bids for DPR preparation. Based on the projected traffic using the recommended Base Case growth rates, the project road traffic on Kothakotta-Kurnool is likely to reach 40,000 PCUs in FY25 and will continue to be above 40,000 PCUs for further three consecutive years till FY28 after which NHAI may invite bids for DPR preparation.

Once six laned, the projected traffic for the project road is not likely to reach designed capacity of 120,000 PCU for six-lane till FY52.

4. TOLL REVENUE PROJECTIONS

4.1 Tolling Strategy

The project road has an "Open System" of toll collection which enables the concessionaire to collect tolls from through traffic as well as from short distance one.

As mentioned earlier, one toll plaza is operational on the Kothakota-Kurnool Road with an effective tolling length of 92.432 km.

4.2 Schedule of User Fee

As per Schedule of User Fee for the project, the per km toll rates applicable from 2007-08 for normal tolling length and permanent structures, the revision basis and concessions are provided.

The concessions to traffic have been given in the form of rates as below:

Local traffic

Car / Jeep / Vans - includes local users owning a vehicle registered for non-commercial purposes, residing within a distance of 20 km from the toll plaza and crossing the same for commuting purposes.

Commercial vehicles - includes local users owning a commercial vehicle (excluding vehicles under National Permit), registered with address on the Registration Certificate of a particular district and uses such vehicle for commuting on a section of National Highway, permanent bridge, tunnel or bypass, as the case may be, which is located within that district, shall be levied user fee on all toll plazas which are located within that district at the rate of fifty per cent of the prescribed rate of fee (single journey rate). No such concession shall be provided, if a service road or alternative road is available for use by such commercial vehicles. Thus, local commercial traffic has to pay only 50 percent of the normal ticket.

Daily Pass

When the vehicle has to cross the tolled section more than once in a day, the user shall have the option to pay one and half times (1.5 times) of the fee for a single entry; this pass shall be valid for 2 entries within 24 hours of purchase.

Monthly Pass

A user, who makes use of the project road frequently during a month, may opt to purchase a monthly pass upon payment of a charge equal to two-thirds of the fee payable for 50 single journeys; this pass can be used for a maximum 50 one-way journeys over the month of validity.

Thus, the different categories of toll tickets are as follows:

(i) Traffic paying normal toll rates (single trip)
(ii) Traffic paying return journey rates
(iii) Traffic paying monthly pass rates
(iv) Traffic paying local personal rates
(v) Traffic paying local commercial rates

4.3 Tolling Streams

The tolling segmentation considered in the earlier study adopted by Ramboll is presented in **Table 4-1**.

Ticket Type/Modes	Car	LCV	Bus	2 A Truck	3 A Truck	4-6 A Truck
Single	53.3	59.3	19.6	86.3	85.0	94.0
Return	37.2	37.6	76.6	9.9	10.4	2.5
Monthly Pass						
Local personal						
Local commercial	0.7	0.0	0.0	0.0	0.0	0.2
Exempt	8.9	3.1	3.8	3.7	4.7	3.2
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Table 4-1: Tolling Distribution in Earlier Study

The tolling segmentation adopted in earlier study indicated around 8.9 percent of cars and 3.8 percent of buses under exemption category. Whereas 3–5 percent of the freight vehicles were under exemption category.

The tolling stream distribution under the present study has been derived from the toll data taking an average of ticket wise traffic from July 2021 to April 2022 and the same is presented in **Table 4-2**.

Ticket Type/Modes	Car	LCV	Bus/ 2A Truck	3A Truck	MAV	OSV
Single	49.9	58.5	56.5	86.1	90.7	97.9
Return	40.6	40.9	42.0	13.3	8.7	1.3
Monthly Pass	0.0	0.0	0.9	0.0	0.0	0.0
Local personal	0.0	0.0	0.0	0.0	0.0	0.0
Local commercial	4.3	0.0	0.0	0.0	0.0	0.0
Exempt	5.2	0.7	0.6	0.6	0.6	0.8
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Table 4-2: Tolling Distribution from Toll Data of July 2021 to April 2022 (%)

The actual segmentation observed during July 2021 to April 2022 indicates a lower exemption percentage in almost all categories. There has been a redistribution between single and return ticket categories in all the modes between earlier and present study. The return tickets are gone up by 3-5 percent in different categories of vehicles.

In case of cars, the normal toll paying traffic is likely to be about 50 percent. Daily Pass traffic has a share of 40.6 percent. Local commercial traffic is around 4.0 percent in cars. In case of LCV, around 59 percent of the traffic is paying for single ticket and 41 percent are opting for daily pass. In case of 3A/MAV, around 86-91 percent of the truck traffic is

opting for normal pass due to their long lead of travel with around 13.3 percent of 3A trucks and 8.7 percent of MAV falling under return pass category.

Trip rate for local pass users is considered as 1.0, for monthly pass it is 1.67 across all modes. For daily pass, trip rate of 2.0 has been considered for all the modes.

4.4 Toll Rates

This section presents details on the toll rates that are likely to be imposed on the users of the project road during the study period. The toll rates (Rs/km) for the base year 2007-08 for different vehicle categories as per toll fee rules are presented in **Table 4-3**.

Mode	Base rate per km (in Rs)
Car, Jeep, Van, LMV	0.65
LCV /M Bus	1.05
Bus/ 2 Axle Truck	2.20
3 Axle	2.40
MAV	3.45
Oversized	4.20

Table 4-3: Toll Rates in Rs/km for Different Vehicle Categories

The toll notification states that the 2007 toll rates shall be increased without compounding by three per cent each year with effect from the 1st day of April 2008 and such increased rate shall be deemed to be the base rate for the subsequent years.

In addition to this, the rate of fee for use of bypass forming part of a section of a National Highway constructed with a cost of Rs 10 crore or more, for the base year 2007, shall be one and a half times of the per km base rates specified above and the length of such bypass shall be excluded from the length of such section of National Highway.

In addition to this, the fee levied and collected hereunder for permanent bridge/ structures, as the case may be, having a length of 60 m or more on the basis of the equivalent length for structure as specified shall be due and payable at the toll plaza.

In case of the project road, the details of normal tolling lengths, bypass length (at 1.5 times) and equivalent structure lengths being charged at Pullur toll plaza are presented in **Table 4-4**.

	Kothakota-Kurnool
A. Normal length	69.857
B. Bypass length @ 1.5 times	2.95
C. Equivalent Structure length	18.15
D. Total tolling length=(A+1.5*B+C)	92.432

Table 4-4: Tolling Lengths at Kothakota-Kurnool

The effective tolling length is 92.432 at this toll plaza. The applicable base rates shall be revised annually with effect from April 1 each year to reflect the increase in wholesale price index for the month of December of the immediate preceding year in which sub revision is undertaken but such revision shall be restricted for 40 per cent of the increase in wholesale price index.

A WPI growth forecast of 3.5 percent was considered in the earlier study during the tenure of study period.

For the present study, actual WPI information for December 2021 of 143.3 under 2011-12 series converted into 1999-00 series (143.3*1.873*1.641=440.446) has been used. The forecast of WPI applicable for FY24 has been considered as 5.5 percent (as per the forecast by RBI for Q3 FY23) and in light of the past growth trend since 2009, 3.5 percent for future years beyond FY24 has been adopted for the period till FY52.

As per the applicable tolling notifications for six laning, during construction period, the toll rates will be charged at 75 percent of the applicable tolling length during construction and kept constant till full COD is achieved. The construction period for six laning for this project is likely to be from FY31 to FY32 during which the toll rates will be 75 percent of the applicable toll rates of FY31 and will be constant for FY32. Also, for FY33, the toll rates are capped at 25 percent higher than the toll rates in FY32.

The stream of toll rates to be charged at the toll plaza of the project road for different years till FY52 is presented in **Table 4-5.** The table also presents the constant toll rates to be charged during the construction period applicable in the scenario with six laning of the project section. The toll fee has been rounded to nearest 5 Rupees as per toll fee rules.

FY End	Car	LCV/M Bus	Bus/2A	3A	MAV	OSV	Car Local
Toll rates in Rs							
2022	115	185	385	420	605	740	285
2023	125	205	425	465	670	815	315
2024	135	215	450	490	705	855	330
2025	140	225	465	510	735	890	345
2026	145	230	485	530	765	930	360
2027	150	240	505	555	795	970	375
2028	155	250	530	575	830	1,005	390
2029	160	260	550	600	860	1,050	405
2030	170	275	570	625	895	1,090	420
2031*	130	215	445	485	700	855	330
2032*	130	215	445	485	700	855	330
2033	165	265	560	610	875	1,065	475
2034	200	320	670	735	1,055	1,285	495
2035	205	335	700	765	1,095	1,335	515
2036	215	345	730	795	1,140	1,390	535
2037	225	360	760	825	1,190	1,445	560
2038	235	375	790	860	1,235	1,505	580
2039	245	390	820	895	1,290	1,565	605
2040	255	410	855	930	1,340	1,630	630
2041	265	425	890	970	1,395	1,700	655
2042	275	440	925	1,010	1,450	1,770	685
2043	285	460	965	1,050	1,510	1,840	710
2044	295	480	1,005	1,095	1,575	1,915	740
2045	310	500	1,045	1,140	1,640	1,995	770
2046	320	520	1,085	1,185	1,705	2,075	800
2047	335	540	1,130	1,235	1,775	2,160	835

FY End	Car	LCV/M Bus	Bus/2A	3A	MAV	OSV	Car Local
2048	350	560	1,180	1,285	1,850	2,250	870
2049	360	585	1,225	1,340	1,925	2,340	905
2050	375	610	1,275	1,395	2,000	2,440	940
2051	395	635	1,330	1,450	2,085	2,540	980
2052	410	660	1,385	1,510	2,170	2,640	1,020

*-Toll Rates at 75% During Six Laning

Table 4-5: Toll Rates at Toll Plaza (in Rs)

The users purchasing return journey tickets will pay 1.5 times the above toll rates; the traffic opting for monthly passes will pay 33.3 times (two-thirds of 50 single journeys) the normal traffic toll rates. All passes have been rounded to the nearest 5 Rupees as per fee rules.

4.5 Toll Revenue Estimates

The toll revenue estimates of the earlier study are presented in **Table 4-6**.

FY End	Toll Revenue in Rs Million
2023	1,572.6
2024	1,717.5
2025	1,872.5
2026	2,044.5
2027	2,227.1
2028	2,428.0
2029	2,642.0
2030	2,876.4
2031	3,108.4
2032	3,380.3
2033	3,651.6
2034	3,964.9
2035	4,277.8
2036	4,632.9
2037	4,990.7
2038	5,398.1
2039	5,810.6
2040	6,265.7
2041	6,765.0
2042	7,293.9
2043	7,863.6
2044	8,465.3
2045	9,101.1
2046	9,794.1
2047	10,562.8
2048	11,349.8
2049	12,214.3
2050	13,108.8
PV12 FY23 till 2050	26,539.5

Table 4-6: Toll Revenue in Earlier Study

The projections of revenue under the present study for the project road have been presented till 15th December of FY52. Toll revenue streams have been calculated assuming that toll would be collected for all 365 days in a year and for 366 days in a leap year. The mode wise breakdown of toll revenue for the project road for the base case is presented in **Table 4-7.**

Toll Revenue in Rs Million								
FY End	Car	LCV	Bus	2-axle Truck	3-axle Truck	MAV	O/size/ HME	Total
2022	335.4	91.6	184.2	146.1	200.1	544.5	0.5	1,502.5
2023	401.9	106.1	208.7	165.3	226.8	647.4	0.6	1,756.8
2024	462.3	115.7	226.2	178.8	244.7	725.8	0.7	1,954.3
2025	512.0	125.2	238.6	188.4	259.3	801.6	0.8	2,125.9
2026	573.2	134.0	254.6	200.6	275.3	887.9	0.9	2,326.4
2027	608.9	138.8	271.0	191.2	265.7	894.3	1.0	2,370.9
2028	663.6	147.1	290.5	192.8	266.9	946.7	1.1	2,508.6
2029	713.4	154.2	307.7	191.4	267.1	983.5	1.2	2,618.4
2030	804.5	167.7	326.2	202.6	283.5	1,083.0	1.3	2,868.9
2031	659.9	134.7	259.8	161.1	224.5	890.8	1.1	2,331.8
2032	703.2	138.8	265.9	164.7	229.4	939.5	1.1	2,442.7
2033	932.7	176.3	340.2	210.4	293.3	1,231.9	1.5	3,186.3
2034	1,205.5	218.2	416.2	257.0	360.1	1,560.4	1.8	4,019.0
2035	1,314.8	234.1	442.7	273.0	381.8	1,700.5	2.0	4,348.9
2036	1,464.1	248.9	471.3	290.2	405.1	1,862.0	2.2	4,743.8
2037	1,605.4	266.1	498.8	306.7	427.0	2,030.5	2.4	5,136.9
2038	1,771.9	283.7	529.1	324.9	452.8	2,206.1	2.6	5,571.1
2039	1,949.9	302.7	559.3	343.0	479.5	2,409.2	2.8	6,046.4
2040	2,145.6	325.0	594.9	364.3	508.1	2,622.2	3.1	6,563.2
2041	2,341.7	344.3	628.9	384.7	537.0	2,841.8	3.4	7,081.9
2042	2,556.2	366.1	665.4	406.4	568.1	3,080.5	3.7	7,646.4
2043	2,783.4	390.4	705.0	430.1	599.9	3,341.5	4.0	8,254.2
2044	3,047.1	417.4	748.3	456.0	636.9	3,637.2	4.3	8,947.2
2045	3,338.7	442.9	788.5	479.9	671.2	3,927.0	4.6	9,652.8
2046	3,608.2	470.2	832.4	506.1	708.0	4,241.3	5.0	10,371.2
2047	3,941.3	498.2	880.6	534.8	748.1	4,582.4	5.4	11,190.8
2048	4,307.3	529.4	933.8	566.5	791.6	4,965.0	5.9	12,099.5
2049	4,641.8	561.6	982.2	595.2	834.0	5,337.0	6.3	12,958.1
2050	5,031.7	596.0	1,036.7	627.5	879.7	5,738.9	6.8	13,917.3
2051	5,501.9	631.4	1,096.0	662.8	926.4	6,190.0	7.3	15,016.0
2052*	4,242.6	476.1	823.1	497.3	695.5	4,743.8	5.6	11,484.1

* Till 15th December FY52

Table 4-7: Toll Revenue for Kothakotta-Kurnool by Mode

Cars represent around 33.3 percent share in total revenue with Buses having a share of 8.7 percent only. Amongst the freight vehicles category, MAVs represent the highest share of around 40.2 percent of total revenue. 3A trucks account for a share of 7.5 percent, LCVs and 2A trucks have a share of 4.8 percent and 5.4 respectively.

Vehicles paying normal tolls are around 76.6 percent of total toll revenues for the project road sections and around 22.4 percent of the traffic may opt for daily pass category. Remaining 1 percent may fall in monthly pass and local concession category.

4.6 Scenario Analysis

For toll road projects, revenue streams are generally based on the assessment of the traffic volume (base and future) crossing the toll plazas and the applicable toll imposed on the user of the road. There is an inherent element of uncertainty in any forecast and whilst is not possible to measure risk in a strictly statistical sense (as many of the risks are largely or partly unknown), in this section an attempt is made at quantifying the main risks that could have an impact on this forecast.

The econometric approach used to derive traffic growth, is based on the estimation of GSDP growth rates for the influence area economies and traffic demand elasticity by mode; the estimation of both variables contains a certain degree of uncertainty which can be represented in the scenario analysis. Scenario analysis has been done in the following subheadings for the base case:

High Case

The high case is based on a more optimistic economic outlook for future years as compared than the base case and therefore, based on traffic growth rates of 100 basis points (1 per cent) higher than the base case for every year and for all modes.

Low Case

A growth rate of 200 basis point (2 percent) lower than base case for all types of vehicles has been considered in the present analysis to reflect uncertainty with regard to economic performance of PIA states.

The results of different scenarios are presented in **Table 4-8**. A comparison versus base case has been presented for the Present Value (at 12 percent discount rate) of the project revenue from FY23 till 15th December of FY52.

Financial Year (FY) ending March	Base	High Growth (+20%)	Low Growth (-20%)
2023	1,756.8	1,776.2	1,737.4
2024	1,954.3	1,994.8	1,914.3
2025	2,125.9	2,191.1	2,062.3
2026	2,326.4	2,422.3	2,233.9
2027	2,370.9	2,493.5	2,254.1
2028	2,508.6	2,665.3	2,360.9
2029	2,618.4	2,809.0	2,440.7
2030	2,868.9	3,108.6	2,647.8
2031	2,331.8	2,549.6	2,133.1
2032	2,442.7	2,695.4	2,214.3
2033	3,186.3	3,548.5	2,862.3
2034	4,019.0	4,518.2	3,577.1
2035	4,348.9	4,932.9	3,836.8
2036	4,743.8	5,430.5	4,147.7
2037	5,136.9	5,933.5	4,452.0
2038	5,571.1	6,492.5	4,786.5
2039	6,046.4	7,109.0	5,150.1
2040	6,563.2	7,783.5	5,543.3
2041	7,081.9	8,470.1	5,932.0
2042	7,646.4	9,222.0	6,352.9
2043	8,254.2	10,036.7	6,803.3
2044	8,947.2	10,967.9	7,316.5
2045	9,652.8	11,929.6	7,830.9
2046	10,371.2	12,916.4	8,350.9
2047	11,190.8	14,045.6	8,943.1
2048	12,099.5	15,301.8	9,598.0
2049	12,958.1	16,506.9	10,206.8
2050	13,917.3	17,856.4	10,886.0
2051	15,016.0	19,409.8	11,660.6
2052*	11,484.1	14,952.4	8,855.1
PV12 FY23 till 15th Dec in FY52	28,143.9	31,848.2	25,035.5
PV12 till 15th Dec in FY52 vs base		13.2%	-11.0%

* Till 15th Dec

Table 4-8: Comparison of Annual Revenue Forecasts Under Different Scenarios

The low growth scenario has a negative impact on revenue PV of about 11 percent versus base case (till FY52), whilst the optimistic growth scenario would generate about 13.2 percent higher PV than the base case.

APPENDICES

APPENDIX 2.1
TRAFFIC ZONING SYSTEM

Traffic Study for Kothakota-Kurnool section of NH-44 in the state of Telangana and Andhra Pradesh
Traffic Zoning System

Zone No.	Place/Region/State/Country	District/ State/Country	State/ Country
1	**Kothakota/Kanayapally/Palem/Rajanagaram/Amadabakalu**	**Project Corridor: Kothakota-Kurnool**	Telangana
2	Mummallapalle/Natavalli/Rayanpet/Ullamkonda		
3	Pebbair/Chelimilla/Thomapalle/Kanchiraopalle/Sheripalli		
4	Rangapur/Beechupalli/Erravalli		
5	Kondair/Jinkalla Palli		
6	Putandoddi/Kodandapur/Vemula/Dharmavaram		
7	Boravalle/Jallapur/Itkyalpadu/Narayanpur/Vallur		
8	Pullur/Undavelly/Bhairapur		
9	Panchalingala/Managalapadu/Mamudala Padu		Andhra Pradesh
10	**Kurnool**		
11	Penchikalapadu/Salakapuram/Peddapadu		
12	Chinna Tekaru/Dupadu/Bastipadu	Kurnool District	Andhra Pradesh
13	Yemmiganur/Mantralayam		
14	Dhone		
15	Orvakul/Nannur		
16	**Nandyala**		
17	Atmakur/Nandikotkur		
18	Anantapur		
19	**Kadapa**	Kadapa District	
20	**Nellore**	Nellore District	
21	Tirupati	Chittoor District	
22	Ongole	Prakasam District	
23	**Vijaywada/Guntur**	Krishna/Guntur District	
24	**Vishakhapatnam/Rajahmundry/Kakinada**	Vishakhapatnam/East & West Godavari	
25	Rest of Andhra Pradesh	Rest of Andhra Pradesh	
26	Gadwal	Jogulamba Gadwal District	Telangana
27	Wanaparthy	Mahbubnagar District	
28	Mahbubnagar/Jadcheria		
29	Narayanpet	Narayanpet District	
30	**Hyderabad**	Hyderabad District	
31	Khammam/Nalgonda/Suryapet	Khammam/Nalgonda/Suryapet Districts	
32	Warangal	Warangal District	
33	Karimnagar/Jagtial	Karimnagar District	
34	**Nizamabad**	Nizamabad District	
35	Nirmal	Nirmal District	
36	Adilabad	Adilabad District	
37	Mancherial	Mancherial District	
38	Rest of Telangana	Rest of Telangana	
39	Raichur	Raichur District	Karnataka
40	Ballari	Ballari District	
41	Kalaburagi	Kalaburagi District	
42	Vijayapura	Vijayapura District	
43	Hubli/Belagavi	Dharwad/Belagavi District	
44	**Bengaluru**	Bengaluru District	
45	**Mysuru**	Mysuru District	
46	Rest of Karnataka	Rest of Karnataka	
47	**Chennai**	Chennai District	Tamil Nadu
48	Vellore	Vellore District	
49	Coimbatore	Coimbatore District	
50	Madurai	Madurai District	
51	Puducherry	Puducherry District	
52	Rest of Tamil Nadu	Rest of Tamil Nadu	
53	**Thiruvananthapuram**	Thiruvananthapuram District	Kerala
54	Kochi	Ernakulam District	
55	Rest of Kerala	Rest of Kerala	
56	Nanded	Districts of Maharashtra	Maharashtra
57	Solapur		
58	Nagpur/Yavatmal/Amravati/Chandrapur		
59	Aurangabad/Jalna/Jalgaon		
60	Ahmednagar		
61	Satara/Kolhapur		
62	**Mumbai**		
63	Mumbai JNPT		
64	**Pune**		
65	**Nashik**		
66	Rest of Maharashtra		
67	Raipur/Bilaspur	Districts of Chhattisgarh	Chhattisgarh
68	Durg/Bhilai		
69	Rest of Chhattisgarh		
70	Sambalpur/Roukela/Jharsuguda	Districts of Odisha	Odisha
71	Cuttak/Puri/Rest of Odisha		
72	Indore/Bhopal	Indore/Bhopal District	Madhya Pradesh
73	Rest of Madhya Pradesh	Rest of Madhya Pradesh	
74	Surat	Surat District	Gujarat
75	Ahmedabad	Ahemdabad District	
76	Vadodara	Vadodara District	
77	Rest of Gujarat	Rest of Gujarat	
78	Jaipur/Ajmer	Jaipur/Ajmer District	Rajasthan
79	Kota/Bhilwara	Kota/Bhilwara District	
80	Rest of Rajasthan	Rest of Rajasthan	
81	**Delhi**	Delhi	Delhi
82	Punjab	Punjab	Punjab
83	Haryana	Haryana	Haryana
84	Agra	Agra District	Uttar Pradesh
85	Kanpur	Kanpur District	
86	Lucknow	Lucknow District	
87	Rest of Uttar Pradesh	Rest of Uttar Pradesh	
88	Bihar	Bihar	Bihar
89	Jharkhand	Jharkhand	Jharkhand
90	West Bengal	West Bengal	West Bengal
91	Goa	Goa	Goa
92	Uttarakhand	Uttarakhand	Uttarakhand
93	Himachal Pradesh	Himachal Pradesh	Himachal Pradesh
94	North Eastern States	North Eastern States	North Eastern States
95	Jammu & Kashmir	Jammu & Kashmir	Jammu & Kashmir

APPENDIX 2.2
MODE WISE TOP20 OD PAIRS

Traffic Study for Kothakota-Kurnool section of NH-44 in the state of Telangana and Andhra Pradesh

TOP 20 Origin Destination Pairs at TP01-Pullur

Car

S.No.	Origin	Destination	% of total
1	Kurnool	Hyderabad	25%
2	Kurnool	Gadwal	11%
3	Hyderabad	Bengaluru	6%
4	Kurnool	Wanaparthy	4%
5	Nandyala	Hyderabad	4%
6	Pullur/Undavelly/Bhairapur	Kurnool	3%
7	Kadapa	Hyderabad	3%
8	Rest of Andhra Pradesh	Hyderabad	2%
9	Dhone	Hyderabad	2%
10	Anantapur	Hyderabad	2%
11	Tirupati	Hyderabad	2%
12	Hyderabad	Rest of Karnataka	1%
13	Kurnool	Mahbubnagar/Jadcheria	1%
14	Kurnool	Raichur	1%
15	Hyderabad	Chennai	1%
16	Pebbair/Chelimilla/Thomapalle/Kanchiraopalle/Sheripalli	Kurnool	1%
17	Gadwal	Bengaluru	1%
18	Rest of Andhra Pradesh	Gadwal	1%
19	Atmakur/Nandikotkur	Hyderabad	1%
20	Dhone	Gadwal	1%
		Total	**75%**

Mini Bus

S.No.	Origin	Destination	% of total
1	Kurnool	Hyderabad	25%
2	Kurnool	Gadwal	8%
3	Kurnool	Mahbubnagar/Jadcheria	5%
4	Atmakur/Nandikotkur	Hyderabad	5%
5	Hyderabad	Rest of Tamil Nadu	5%
6	Kurnool	Wanaparthy	3%
7	Kurnool	Nizamabad	3%
8	Anantapur	Delhi	3%
9	Rest of Andhra Pradesh	Raichur	3%
10	Khammam/Nalgonda/Suryapet	Chennai	3%
11	Warangal	Chennai	3%
12	Nizamabad	Rest of Tamil Nadu	3%
13	Pebbair/Chelimilla/Thomapalle/Kanchiraopalle/Sheripalli	Kurnool	2%
14	Rangapur/Beechupalli/Erravalli	Kurnool	2%
15	Pullur/Undavelly/Bhairapur	Atmakur/Nandikotkur	2%
16	Kurnool	Vijaywada/Guntur	2%
17	Kurnool	Rest of Maharashtra	2%
18	Kurnool	Rest of Gujarat	2%
19	Kurnool	Delhi	2%
20	Dhone	Wanaparthy	2%
		Total	**88%**

Bus

S.No.	Origin	Destination	% of total
1	Kurnool	Hyderabad	24%
2	Kurnool	Gadwal	18%
3	Kurnool	Wanaparthy	8%
4	Hyderabad	Bengaluru	4%
5	Kadapa	Hyderabad	3%
6	Pullur/Undavelly/Bhairapur	Kurnool	2%
7	Kurnool	Mahbubnagar/Jadcheria	2%
8	Nandyala	Hyderabad	2%
9	Kurnool	Raichur	2%
10	Putandoddi/Kodandapur/Vemula/Dharmavaram	Kurnool	1%
11	Dhone	Mahbubnagar/Jadcheria	1%
12	Rest of Andhra Pradesh	Hyderabad	1%
13	Tirupati	Hyderabad	1%
14	Hyderabad	Rest of Karnataka	1%
15	Kothakota/Kanayapally/Palem/Rajanagaram/Amadabakalu	Kurnool	1%
16	Kurnool	Narayanpet	1%
17	Kurnool	Warangal	1%
18	Pullur/Undavelly/Bhairapur	Dhone	1%
19	Pullur/Undavelly/Bhairapur	Kadapa	1%
20	Kurnool	Rest of Telangana	1%
		Total	**75%**

MLCV

S.No.	Origin	Destination	% of total
1	Kurnool	Gadwal	16%
2	Kurnool	Hyderabad	14%
3	Hyderabad	Bengaluru	8%
4	Pebbair/Chelimilla/Thomapalle/Kanchiraopalle/Sheripalli	Kurnool	5%
5	Anantapur	Hyderabad	4%
6	Rest of Andhra Pradesh	Hyderabad	3%
7	Kurnool	Mahbubnagar/Jadcheria	3%
8	Kadapa	Hyderabad	3%
9	Pullur/Undavelly/Bhairapur	Kurnool	2%
10	Kurnool	Wanaparthy	2%
11	Hyderabad	Chennai	2%
12	Kurnool	Raichur	2%
13	Hyderabad	Rest of Tamil Nadu	2%
14	Nandyala	Hyderabad	2%
15	Kurnool	Rest of Telangana	1%
16	Hyderabad	Ballari	1%
17	Nandyala	Gadwal	1%
18	Rest of Andhra Pradesh	Raichur	1%
19	Dhone	Hyderabad	1%
20	Tirupati	Hyderabad	1%
		Total	**73%**

Traffic Study for Kothakota-Kurnool section of NH-44 in the state of Telangana and Andhra Pradesh

TOP 20 Origin Destination Pairs at TP01-Pullur

LCV

S.No.	Origin	Destination	% of total
1	Hyderabad	Bengaluru	19%
2	Kurnool	Hyderabad	18%
3	Anantapur	Hyderabad	7%
4	Kurnool	Gadwal	5%
5	Hyderabad	Rest of Tamil Nadu	4%
6	Hyderabad	Chennai	3%
7	Pebbair/Chelimilla/Thomapalle/Kanchiraopalle/Sheripalli	Kurnool	2%
8	Kurnool	Mahbubnagar/Jadcheria	2%
9	Kadapa	Hyderabad	2%
10	Rest of Andhra Pradesh	Hyderabad	2%
11	Kurnool	Warangal	2%
12	Dhone	Hyderabad	2%
13	Hyderabad	Rest of Karnataka	1%
14	Nandyala	Hyderabad	1%
15	Kurnool	Wanaparthy	1%
16	Kurnool	Raichur	1%
17	Kurnool	Mumbai	1%
18	Kurnool	Rest of Maharashtra	1%
19	Kurnool	Rest of Telangana	1%
20	Hyderabad	Ballari	1%
		Total	**77%**

2 Axle

S.No.	Origin	Destination	% of total
1	Hyderabad	Bengaluru	10%
2	Kurnool	Hyderabad	9%
3	Bengaluru	Delhi	7%
4	Hyderabad	Chennai	6%
5	Hyderabad	Rest of Tamil Nadu	4%
6	Chennai	Delhi	3%
7	Hyderabad	Rest of Kerala	2%
8	Anantapur	Hyderabad	2%
9	Kurnool	Gadwal	2%
10	Rest of Andhra Pradesh	Hyderabad	2%
11	Chennai	Mumbai	2%
12	Kadapa	Hyderabad	1%
13	Bengaluru	Rest of Uttar Pradesh	1%
14	Hyderabad	Ballari	1%
15	Kurnool	Delhi	1%
16	Kurnool	Wanaparthy	1%
17	Nandyala	Hyderabad	1%
18	Bengaluru	Rest of Maharashtra	1%
19	Chennai	Rest of Maharashtra	1%
20	Tirupati	Hyderabad	1%
		Total	**58%**

3 Axle

S.No.	Origin	Destination	% of total
1	Hyderabad	Bengaluru	10%
2	Kurnool	Hyderabad	7%
3	Bengaluru	Delhi	7%
4	Hyderabad	Rest of Tamil Nadu	4%
5	Anantapur	Hyderabad	3%
6	Hyderabad	Chennai	3%
7	Rest of Andhra Pradesh	Hyderabad	2%
8	Chennai	Delhi	2%
9	Tirupati	Hyderabad	1%
10	Bengaluru	Rest of Uttar Pradesh	1%
11	Hyderabad	Rest of Kerala	1%
12	Chennai	Rest of Maharashtra	1%
13	Bengaluru	Rest of Maharashtra	1%
14	Chennai	Mumbai	1%
15	Dhone	Hyderabad	1%
16	Kurnool	Gadwal	1%
17	Hyderabad	Ballari	1%
18	Hyderabad	Rest of Karnataka	1%
19	Kurnool	Mahbubnagar/Jadcheria	1%
20	Kurnool	Delhi	1%
		Total	**51%**

MAV

S.No.	Origin	Destination	% of total
1	Hyderabad	Bengaluru	10%
2	Kurnool	Hyderabad	7%
3	Bengaluru	Delhi	6%
4	Hyderabad	Rest of Tamil Nadu	4%
5	Anantapur	Hyderabad	4%
6	Hyderabad	Chennai	3%
7	Chennai	Delhi	2%
8	Hyderabad	Rest of Karnataka	2%
9	Kadapa	Hyderabad	2%
10	Bengaluru	Rest of Uttar Pradesh	2%
11	Dhone	Hyderabad	1%
12	Bengaluru	Rest of Maharashtra	1%
13	Hyderabad	Rest of Kerala	1%
14	Rest of Andhra Pradesh	Hyderabad	1%
15	Chennai	Mumbai	1%
16	Tirupati	Hyderabad	1%
17	Bengaluru	Nagpur/Yavatmal/Amravati/Chandrapur	1%
18	Kurnool	Gadwal	1%
19	Nandyala	Hyderabad	1%
20	Rest of Kerala	Delhi	1%
		Total	**52%**

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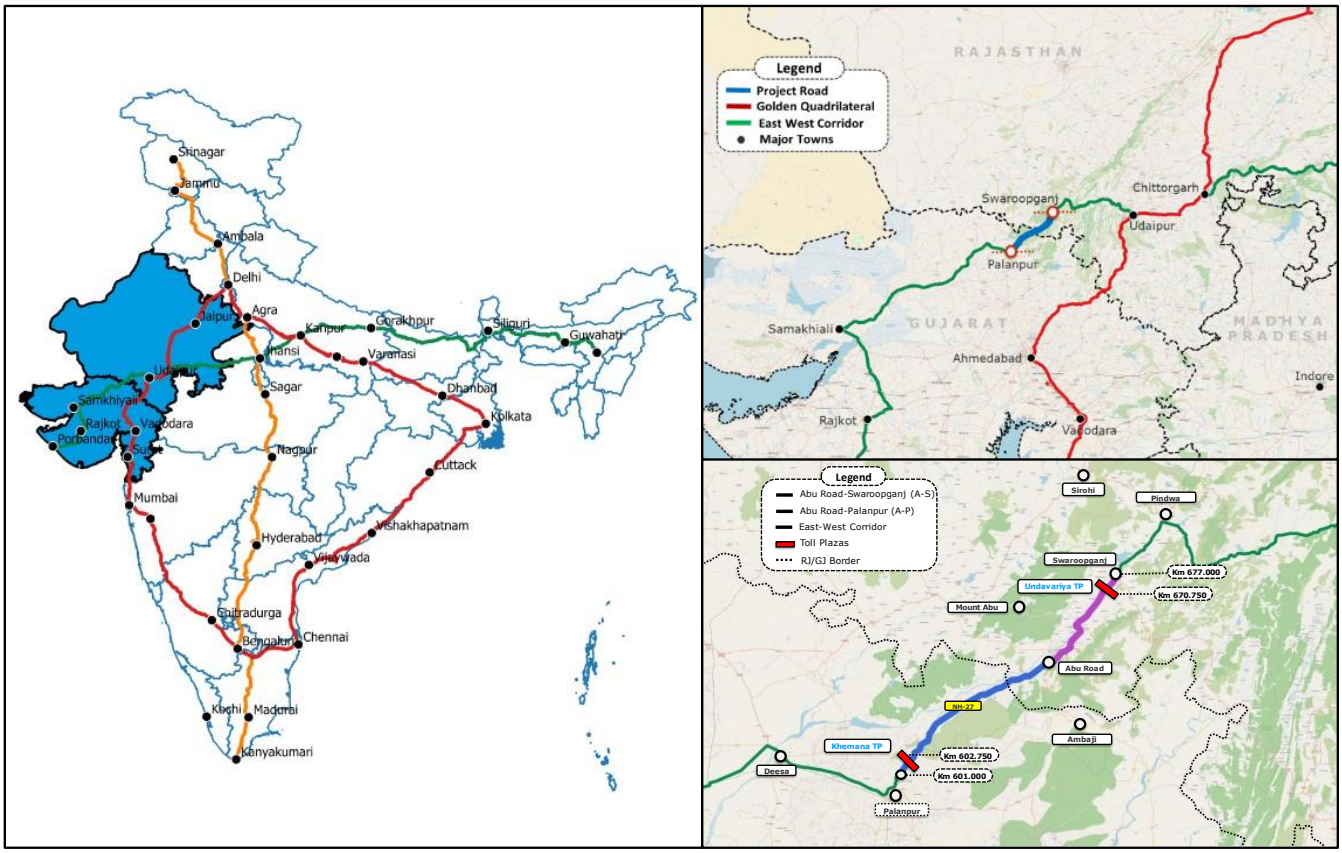

RAMBOLL

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ABBREVIATIONS

%	Percentage
2A	2 Axle truck
3A	3 Axle truck
AADT	Annual Average Daily Traffic
ADT	Average Daily Traffic
AR	Alternate Route
BIA	Broad Influence Area
CAGR	Compounded Annual Growth Rate
FY	Financial Year
GDP	Gross Domestic Product
GSDP	Gross State Domestic Product
IIA	Immediate Influence Area
IRC	Indian Road Congress
Km	Kilometre
LCV	Light Commercial Vehicle
M Bus	Minibus
MAV	Multi Axle Vehicle
MLCV	Mini LCV
NH	National Highway
NHAI	National Highways Authority of India
NHDP	National Highway Development Program
NHIIMPL	National Highways Infra Investment Managers Private Limited
NPV	Net Present Value
OD	Origin-Destination survey
PCU	Passenger Car Unit
PIA	Project Influence Area
PR	Project Road
PV	Present Value
Rs/₹	Rupees
SEZ	Special Economic Zone
Sq.km	Square Kilometre
TP	Toll Plaza
WPI	Wholesale Price Index
YOY	Year on Year

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APPENDICES

Appendix 2.1 Zoning

Appendix 2.2: Top 20 OD pairs

1. INTRODUCTION

1.1 General

National Highways Authority of India (NHAI) has setup NHAI InvIT to monetize its completed and operational national highways projects with the objective of mobilizing additional resources through capital markets. In this context, National Highways Infra Investment Managers Private Limited (NHIIMPL) is acting as Investment Manager of the Trust. NHAI InvIT currently has a portfolio of five operating toll roads with an aggregate length of 390 kilometers located across the states of Gujarat, Karnataka, Rajasthan and Telangana.

The sections viz., Abu Road-Swaroopganj (A-S) and Abu Road-Palanpur (A-P) of NH-27 in the state of Rajasthan and Gujarat referred to as Project Road(s) (PR), are part of the current portfolio of InvIT.

The project highway, NH-27, is part of the East – West corridor envisaged under National Highway Development Program (Phase – II). The total length of NH-27 is roughly 3,530 km starting from Porbandar in the state of Gujarat and ending at Silchar in the state of Assam while passing through the states of Rajasthan, Madhya Pradesh, Uttar Pradesh, Bihar and West Bengal. NH–27 connects important tourist and industrial cities and towns like Porbandar (port city), Rajkot, Palanpur, Udaipur, Chittorgarh, Jhansi, Kanpur, Lucknow, Muzaffarpur, Purnea, Siliguri, Jalpaiguri etc. **Figure 1-1** shows the alignment of NH-27 with major places along the highway.

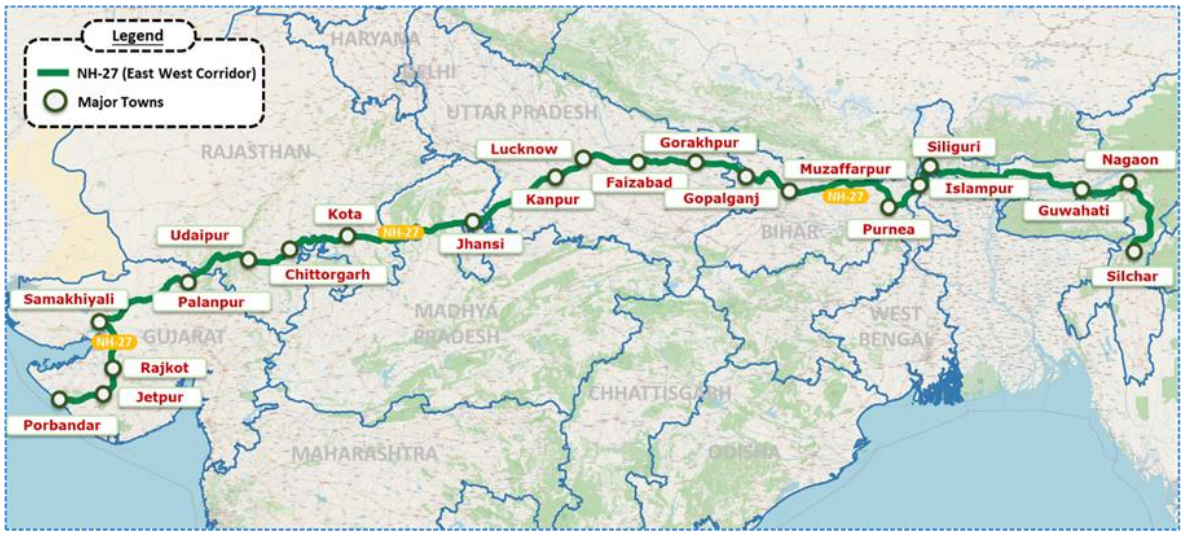


Figure 1-1: Alignment of NH-27 with Major Places

National Highways Infra Investment Managers Private Limited, has appointed Ramboll India Private Ltd as the Traffic Consultant to carry out a study for assessing the present traffic levels, travel pattern and future traffic & revenue estimation till year FY52 duly considering the network characteristics, future economic perspective in the influence area of the project.

1.2 Scope of Services

The scope of the study includes the following:

- Undertake Traffic Survey on the highway section as per the following:
  - Seven days 24 hours Videography Traffic Counts at or near the existing toll plaza locations on the project road to derive the Average Daily Traffic (ADT)
  - One day Origin-Destination survey at or near the existing toll plaza locations to assess the existing travel pattern of vehicles plying on the project road – origin and destination
- Establish seasonality factors using available past traffic data and/or from using fuel sales data or any relevant data
- Estimation of the base year AADT using seasonality factors for conversion of ADT to AADT
- Analysis of OD data to cover:
  - Regional distribution of traffic and influence factors for different zones contributing traffic on the corridor
  - Identification of Project Influence Area from analysis of travel pattern - regional distribution of traffic,
  - Main traffic generators (industrial areas, towns, ports etc.)
  - Commodity composition- Goods type distribution
  - Top OD pairs by vehicle types
  - Travel frequency and trip purpose distribution
- Review of past traffic studies, traffic/toll data and other relevant reports as may be available to determine category wise volume of traffic for past years as well as for current year
- To identify competing route and analyse the network conditions, traffic characteristics & level of toll charged and the advantage/ disadvantage of the competing road and their impact on the project traffic
- Carry out a study of past economic performance of influence area
- Diversion analysis, wherever needed – cost ratio-based diversion analysis using spreadsheets to be carried out for respective potential OD pairs.
- Preparation of traffic projections till year FY52 in three scenarios – low, most likely and high
- Capacity analysis of the road or any other requirements for potential capacity augmentation

- Estimation of tollable traffic streams by toll category and estimation of toll revenue as per categories of traffic streams stipulated in the tolling schedule for the study period
- Review future road and transportation network developments in the area of influence of the project and identify those schemes that may impact positively or negatively traffic on the toll road
- Identify factors which may have a positive and / or negative impact on the traffic - all major developments like DFC, industrial corridors, economic corridors, ports, Bharatmala, Sagarmala
- Scenario Analysis of toll revenue – Critical parameters of diversion (if applicable) and three scenarios of traffic growth (most likely, low and high).

1.3 Report Structure

This report is divided into four chapters, including this introduction chapter. Chapter 2 details upon the project road characteristics and socio – economic profile of the districts in the project influence area including the estimation of AADT and travel characteristics in the Project Influence Area (PIA). Chapter 3 contains the details on the derivation of traffic growth rates used for traffic forecasting and presents traffic projections for the study period. Chapter 4 presents the details regarding tolling strategy, toll rates and the revenue projections for the duration of the concession.

2. TRAFFIC SURVEY AND ANALYSIS

2.1 General

In order to understand the traffic characteristics, the volume of traffic and travel pattern of vehicles plying on the project road were collected through primary surveys. This chapter presents the details of the project road characteristics, traffic surveys carried out, their analysis and the salient findings. The results of the analysis will be utilized in assessing the traffic growth and estimation of traffic and revenue forecast on the project road for the concession period.

2.2 Project Road Characteristics

The project road section Abu Road-Swaroopganj (A-S), starts at Abu Road (Km 646.000) and ends at Swaroopganj (km 677.000) in Sirohi district of Rajasthan. The section Abu Road-Palanpur (A-P), starts at Abu Road (Km 646.000) and ends at Palanpur (km 601.000) in Banaskantha district in the State of Gujarat and Sirohi district in the state of Rajasthan. The above two project sections (A-S & A-P) are a part of continuous corridor measuring a length of about 75.331 km. At present there is one operational toll plaza each on A-P and A-S section.

The alignment of project road and toll plaza locations is shown in **Figure 2-1.**

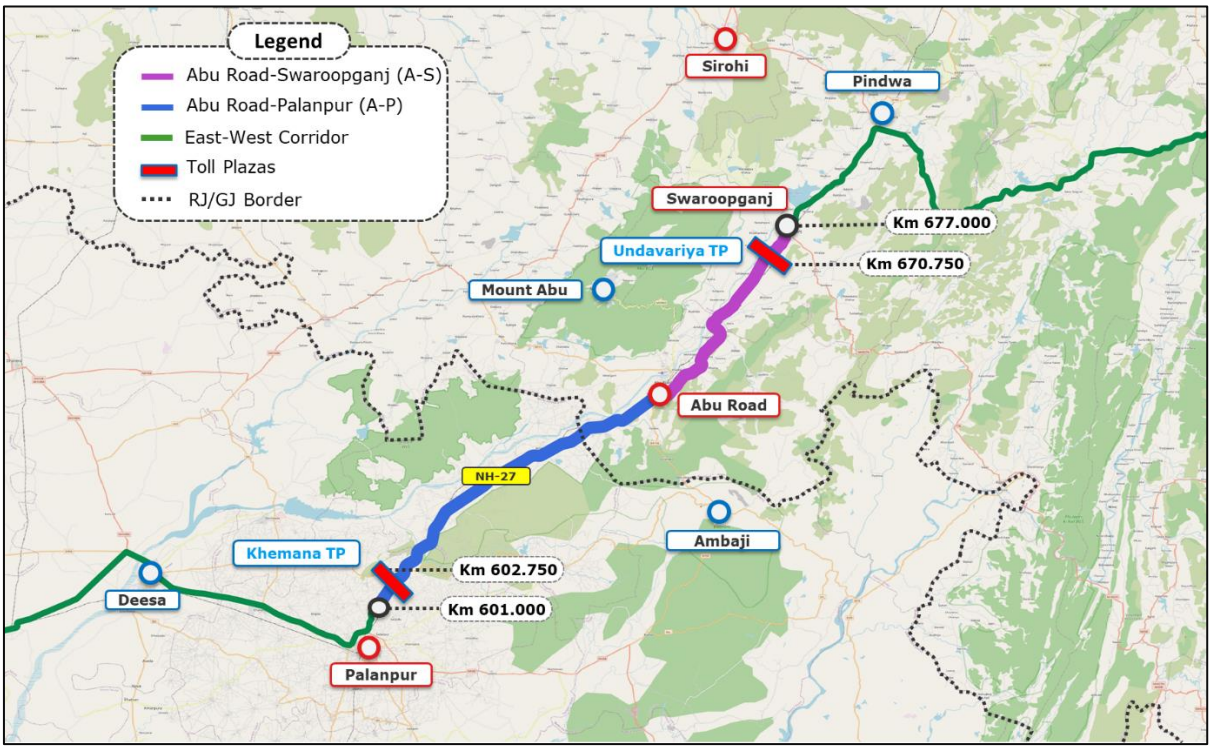


Figure 2-1: Project Road and Location of Undavariya TP (A-S) and Khemana TP (A-P)

The project road in wider context serves long-distance traffic which is majorly plying between and northern/eastern region of India and Palanpur/Rajkot/Morbi/Kandla/Mundra/ Gandhidham of western region of Gujarat. Apart from long distance traffic, it also serves the short distance traffic which is mainly

generated between Abu Road/Swaroopganj/Sirohi/Pindwara and Palanpur/Deesa/ Mehsana.

2.2.1 Profile of Project Influence Area District

The project sections A-S and A-P falls under the jurisdiction of Sirohi district in the state of Rajasthan and Banaskantha district in the State of Gujarat. A brief description of the profile of the district is presented below.

Sirohi District

Sirohi district is located on the south-western part of Rajasthan state with an area of 5,136 sq.km. It shares its borders with Gujarat state in the South. It is bounded by Pali district in the north-east, Udaipur district in the east, Jalore in the west and Banaskantha district of Gujarat in the south. The administrative headquarters of the district is at Sirohi with Abu Road being the biggest city and the main financial hub of the district.

The economy of the district is based on agriculture and mineral based industries. Major crops in the district include millets, pulses, sesame, and red chillies. The district is also rich in mineral deposits of limestone, marble, granite, calcite, quartz, tungsten, flourite etc.

The district has mineral based industries which are involved in production of portland cement, cement slabs, tiles, granite, and mineral powder.

The district is also known for Mount Abu, a popular hill station and houses the highest peak viz., Guru Shikhar of the Aravalli ranges.

According to 2011 census, the district has a population of 1.03 million with decadal growth of about 21.76 percent.

Banaskantha District

Banaskantha district is located on the north-eastern part of Gujarat state with an area of 12,703 sq.km. It shares its borders with Rajasthan state in the North. The district is surrounded by Marwad and Sirohi regions of Rajasthan State in the north, Sabarkantha District in the east, Mehshana District in the south and Patan District in the west. The administrative headquarters of the district is at Palanpur.

The economy of the district is based on agro & food processing, tourism, textile and mineral based industries (ceramics). It is the largest producer of potatoes in the state. Other major crops include bajri, maize, tobacco, castor oil, jowar, psyllium etc. The district is also rich in mineral resources which contribute in its economy to a great extent. Limestone, marble, granite, building stone, china clay. etc are the available mineral resources in the district. Food processing and textile industries are also found in the district. The district ranks first in the country in milk production and houses one of the biggest milk production dairies of Gujarat viz., Banas dairy at Palanpur.

According to 2011 census, the district has a population of 3.11 million with decadal growth of about 24.43 percent.

2.3 Traffic Surveys

In order to understand the characteristics and the volume of traffic using the project road (A-S & A-P), data on road network, traffic and travel pattern of vehicles plying on the project road were collected through primary traffic surveys. Traffic volume video graphic survey for seven days and origin-destination (OD) survey as roadside interview for one day at toll plaza locations were conducted on the project road. The schedule of the traffic surveys and locations on the project road are given in **Table 2-1.**

Location	Chainage	Duration	Date(s)
Classified Traffic Volume Counts			
Undavariya TP (A-S)	km 670.750	7 Days	8th April–14th April 2022
Khemana TP (A-P)	km 602.750		
Origin and Destination Survey			
Undavariya TP (A-S)	km 670.750	1 Day	8th April 2022
Khemana TP (A-P)	km 602.750		9th April 2022

Table 2-1: Traffic Survey Location and Schedule

Trained enumerators were engaged for conducting traffic surveys under the supervision of experienced transport planner. The vehicle classification as generally used in the traffic surveys of NHAI studies along with their PCU values, as suggested in IRC: 64 – 1990, are presented in **Table 2-2.**

Vehicle Type	PCU Factor
Motorized Vehicles	
Car, Jeep, Van &Taxi	1.0
Two –Wheeler	0.5
Three-Wheeler (Auto-Rickshaw)	1.0
Mini-Bus/ School Bus	1.5
Govt. Bus/ Private Bus	3.0
Mini LCV/Max Pick Up	1.0
Light Commercial Vehicle (LCV)	1.5
2-Axle Truck	3.0
3-Axle Truck	3.0
Multi-Axle Vehicle (MAV 4-6 Axle)	4.5
HME	4.5
Agricultural Tractor	1.5
Agricultural Tractor with Trailer	4.5
Non – Motorised Vehicles	
Cycle	0.5
Cycle Rickshaw	2.0
Animal Drawn Cart	6.0

Table 2-2: Vehicle classification and PCU factors

2.4 Traffic Characteristics

The data collected from the traffic volume count survey was analysed in order to get the results with respect to existing traffic intensity, flow pattern, hourly variation and composition of traffic on the study road network. The various traffic characteristics have been analysed under the following heads:

- Average Daily Traffic (ADT)
- Daily variation, Hourly variation and Traffic composition
- Annual Average Daily Traffic (AADT)

2.4.1 Average Daily Traffic (ADT)

The traffic volume data collected at the toll plaza locations during the seven days survey has been analysed. The summary of ADT in terms of vehicles and PCUs is presented in **Table 2-3.**

Mode	Undavariya Toll Plaza (A-S)	Khemana Toll Plaza (A-P)
Car/Jeep/Van/Taxi	5,881	7,184
Minibus	52	34
Standard Bus	491	403
Mini LCV	728	632
LCV	1,102	1,013
2 Axle	600	506
3 Axle	920	911
MAV (4-6 Axle)	5,174	4,951
HMV/ MAV (=>7 Axle)	9	10
Two-Wheeler	5,235	3,345
Auto Rickshaw	678	835
Agri. Tractors	142	130
Total Non-Motorised	14	11
Total Tollable Vehicles	**14,957**	**15,643**
Total Non Tollable Vehicles	**6,068**	**4,321**
Total Vehicles	**21,025**	**19,963**
Total PCU	**41,573**	**40,240**
Tollable PCU	**37,697**	**37,169**

Table 2-3: Average Daily Traffic at Undavariya TP (A-S) and Khemana TP (A-P)

- The observed total vehicles are around 21,025 and 19,963 at Undavariya TP (A-S) and Khemana TP (A-P) respectively.
- The share of passenger vehicles in total traffic is 58.7 percent at Undavariya TP (A-S) and 59.2 percent at Khemana TP (A-P).
- Car traffic has a share of around 28 percent (5,881 vehicles) at Undavariya TP (A-S) and 36 percent (7,184 vehicles) Khemana TP (A-P) of total traffic respectively.
- Freight vehicles account for a share of 41.3 percent at Undavariya TP (A-S) and 40.8 percent at Khemana TP (A-P). Within the freight traffic, MAV accounts for 24.7 percent (5,183 vehicles) and 24.9 percent (4,961 vehicles) at Undavariya TP (A-S) and Khemana TP (A-P) respectively.

- The tollable traffic recorded at Undavariya TP (A-S) and Khemana TP (A-P) are 71.1 percent and 78.4 percent respectively. The remaining non-tollable traffic mainly comprise of two wheelers and auto rickshaws.

2.4.2 Daily variation, Hourly variation and Traffic composition

The day wise variation, hourly variation and the traffic composition at A-S & A-P sections is presented in **Figure 2-2**

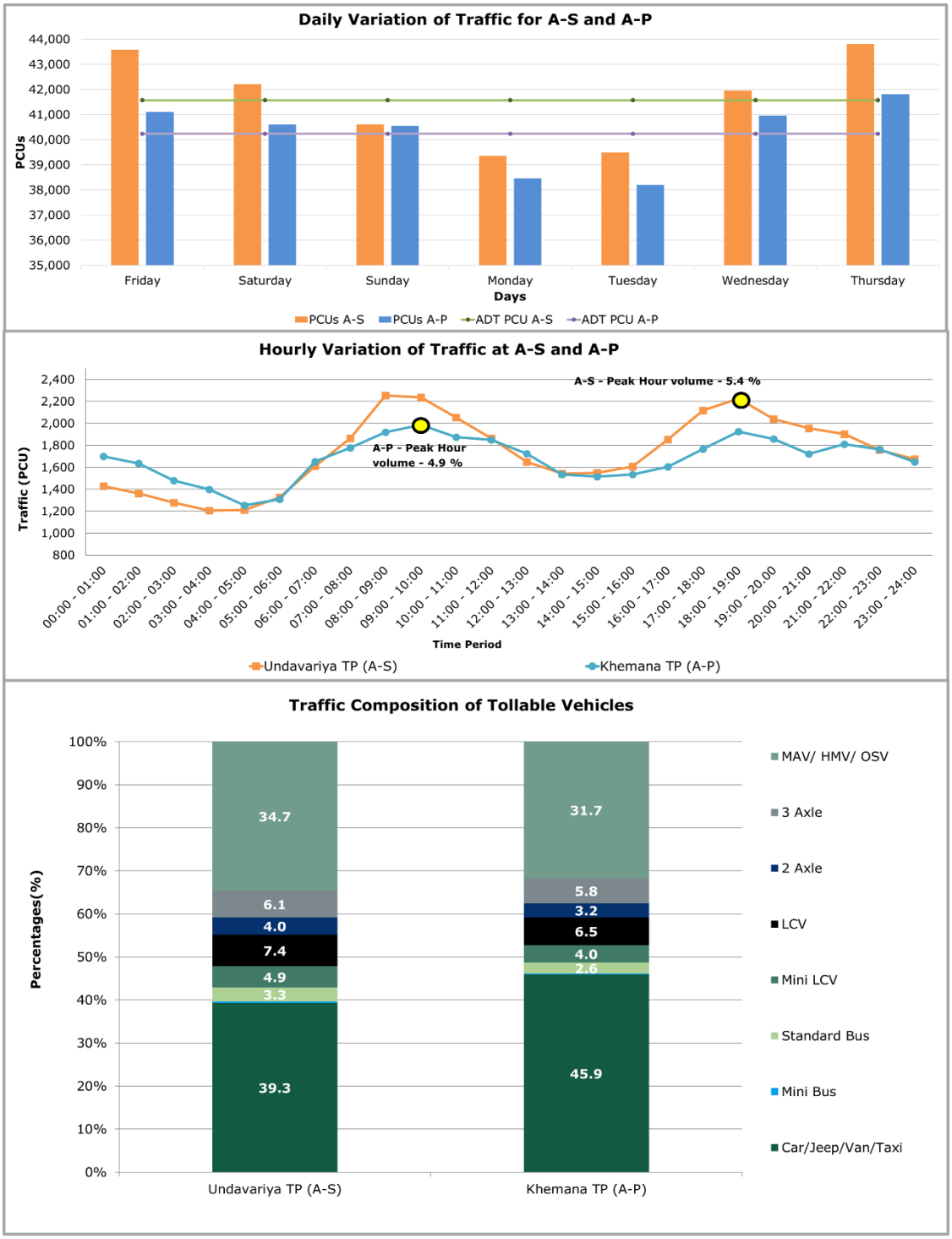


Figure 2-2: Daily Variation, Hourly Variation and Traffic Composition at A-S & A-P

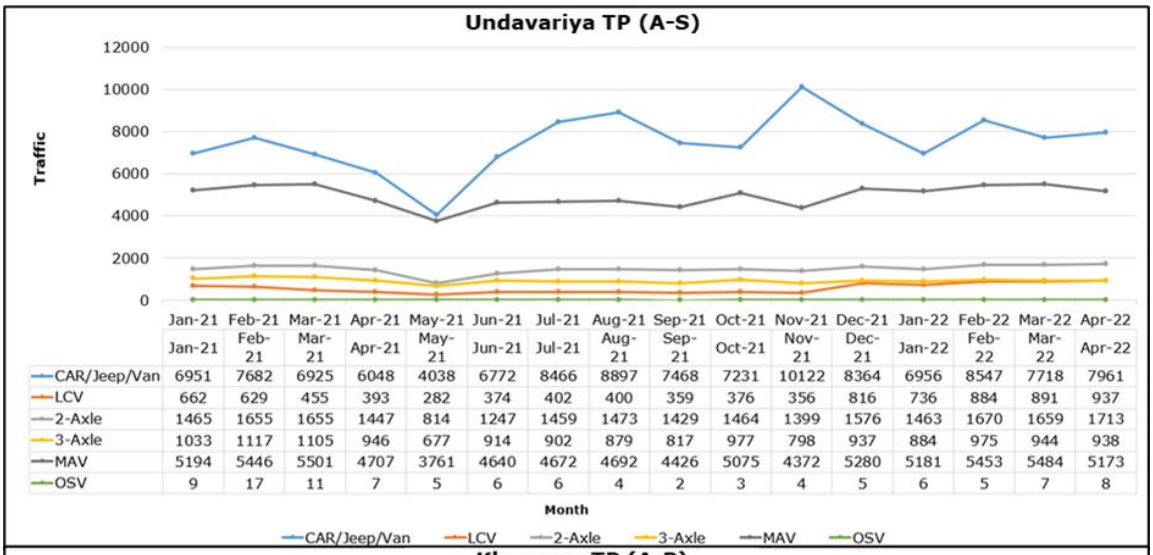
- It was observed that the traffic at both Undavariya (A-S) and Khemana (A-P) toll plaza locations is consistent with minor fluctuations during the days of volume count survey.
- The peak hour volume Undavariya TP (A-S) is 5.4 percent in PCUs which was observed during evening (18.00 - 19.00) and at Khemana TP (A-P), it was 4.9 percent which was observed during morning 09:00 – 10:00 hours.
- The directional distribution at both toll plaza locations is almost equal with Swaroopganj – Palanpur having a directional distribution of 49.7 percent at Undavariya TP (A-S) and 50.9 percent at Khemana TP (A-P).

2.4.3 Annual Average Daily Traffic (AADT)

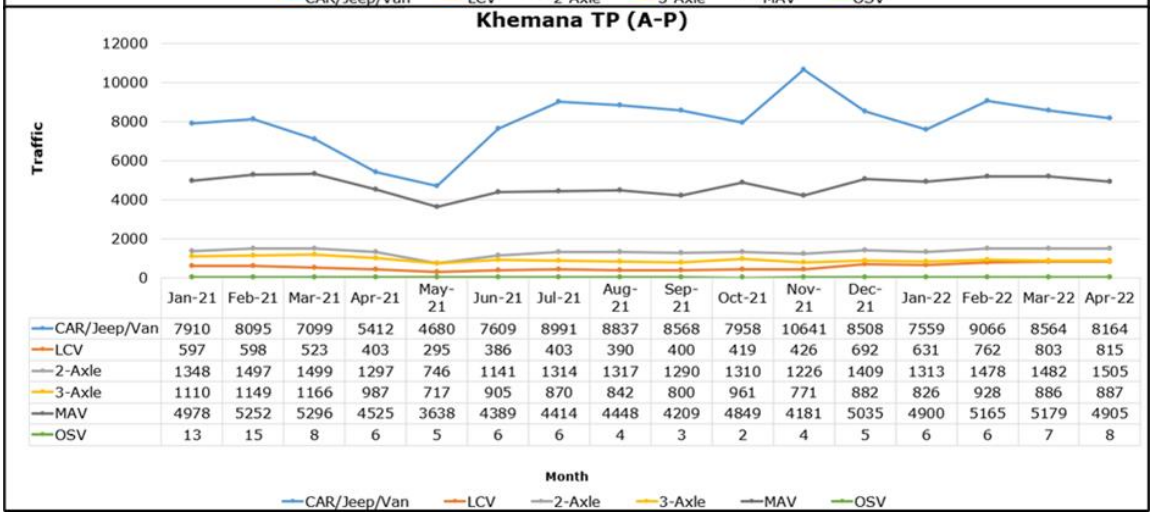
The traffic plying on any road generally varies over different periods of the year depending on the cycle of different socio-economic activities in the regions through which it passes. Therefore, in order to have a more realistic picture of the traffic on the project road, it is required to assess its seasonal variation to estimate the annual average daily traffic (AADT).

The Seasonal Correction Factor (SCF) is generally derived from secondary data sources such as past month-wise traffic data on the project road, monthly toll revenues from existing tolled highways in the immediate influence area, sales of fuel at different filling stations along the project highway, arrival of vehicles at establishments like APMC, truck terminals, railway goods stations, etc.

The past toll traffic data for the A-S and A-P sections was made available by the client from Jan 2021-April 2022. The month-on-month mode wise traffic for this period January 21 to April 22 for both the toll plazas is presented in **Figure 2-3**.



	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22
CAR/Jeep/Van	6951	7682	6925	6048	4038	6772	8466	8897	7468	7231	10122	8364	6956	8547	7718	7961
LCV	662	629	455	393	282	374	402	400	359	376	356	816	736	884	891	937
2-Axle	1465	1655	1655	1447	814	1247	1459	1473	1429	1464	1399	1576	1463	1670	1659	1713
3-Axle	1033	1117	1105	946	677	914	902	879	817	977	798	937	884	975	944	938
MAV	5194	5446	5501	4707	3761	4640	4672	4692	4426	5075	4372	5280	5181	5453	5484	5173
OSV	9	17	11	7	5	6	6	4	2	3	4	5	6	5	7	8



	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22
CAR/Jeep/Van	7910	8095	7099	5412	4680	7609	8991	8837	8568	7958	10641	8508	7559	9066	8564	8164
LCV	597	598	523	403	295	386	403	390	400	419	426	692	631	762	803	815
2-Axle	1348	1497	1499	1297	746	1141	1314	1317	1290	1310	1226	1409	1313	1478	1482	1505
3-Axle	1110	1149	1166	987	717	905	870	842	800	961	771	882	826	928	886	887
MAV	4978	5252	5296	4525	3638	4389	4414	4448	4209	4849	4181	5035	4900	5165	5179	4905
OSV	13	15	8	6	5	6	6	4	3	2	4	5	6	6	7	8

Figure 2-3: Month on Month Traffic Data for A-S & A-P

The onset of the second wave of Covid-19 and the lockdowns announced by the state government during April-June 2021 was a setback to the continuous recovery of traffic to normal levels. With the opening of economic activities, the traffic has started to pick up and shows a recovery from July 2021 onwards.

With that in mind, an average of July 2021 to April 2022 is taken as FY 22 AADT. In the toll data Mini LCVs are merged into LCV category. For further analysis, the split for MLCV and LCV as provided by the client has been used for arriving at the AADT for Car/MLCV and LCV. The resultant mode wise AADT estimated for the project road for FY22 at the toll plaza locations is presented in **Table 2-4.**

Location/Mode	Car/Jeep/ Van/Taxi	LCV	2A	3A	MAV	OSV
Undavariya TP (A-S)	8,187	602	1,530	905	4,981	5
Khemana TP (A-P)	8,583	677	1,364	865	4,728	5

Table 2-4: AADT for FY22

The comparison of AADT for FY22 in the earlier study of March 2021 (by Steer) with FY22 AADT adopted in present study is presented in **Table 2-5**

Location/Mode	Car	LCV	Bus	2-axle Truck	3-axle Truck	MAV	O/size/ HME	PCU
AADT (Earlier Study - Steer)								
Undavariya TP (A-S)	6,321	502	506	721	1,001	5,364	0	37,896
Khemana TP (A-P)	7,013	394	374	778	1,060	4,668	0	35,247
AADT (Present Study)								
Undavariya TP (A-S)	8,187	602	685	846	905	4,981	5	38,835
Khemana TP (A-P)	8,583	677	604	760	865	4,728	5	37,587

Table 2-5: AADT in Earlier (March 2021) and Present Study at Undavariya TP (A-S) and Khemana TP (A-P)

- The 3A and MAV traffic is lower than the AADT projected for FY22 in the earlier study. Remaining all the modes are higher than the projections for FY22 in the previous study.
- In terms of PCUs, traffic at Undavariya TP (A-S) is higher by 2.5 percent and at Khemana TP (A-P) is higher by 6.6 percent than the earlier study.

2.5 Travel Characteristics

2.5.1 Survey Methodology

In order to understand the travel demand pattern in the region and tollable traffic streams, origin and destination (OD) surveys were carried out at the toll plaza locations. The OD survey was carried out for 24 hours, by roadside interview method as described in IRC: 102-1988. Both passenger and commercial vehicles plying on the project road were stopped on a random sampling basis and interviewed.

The travel characteristics obtained by OD survey facilitate the identification of:

1. Local and through traffic on the project road.
2. Potential divertible traffic to/from project road to various alternative routes.

Trained enumerators under the supervision of transport planners collected the trip characteristics using survey forms designed for this purpose. The OD survey elicited characteristics like origin, destination, frequency, purpose of trip for passenger vehicles and commodity being transported for goods vehicles. The information pertaining to origin and destination of trips collected during roadside interviews was analysed to obtain the trip distribution based on a zoning system suitably designed for the present study.

2.5.2 Traffic Zoning System

To understand the spatial dimensions of the trip characteristics of the vehicles interviewed during the O-D survey, a detailed zoning system was developed giving due consideration to the following factors:

- The road network catering to the traffic on the project road and its generating points
- Important towns, villages, factories and industrial centres around the project road area

- Administrative boundaries of districts and states.
- Configuration of the project road in the regional road network with respect to other roads

Two major types of areas were identified for analysis purpose: -

Immediate Influence Area (IIA): It includes the cities/towns/villages and districts along the project road and adjacent to it, which generate/attract trips to the project road. In this study, it consists of district of Banaskantha in Gujarat and district of Sirohi in the state of Rajasthan.

Broad Influence Area (BIA): It includes the remaining districts of Gujarat and Rajasthan and other neighbouring states such as Maharashtra, Madhya Pradesh, Haryana and remaining states of India.

Detailed zoning system is prepared for IIA, while more aggregate or broad zoning is developed for BIA. The zoning system adopted for data collection was based on 97 zones and is presented in **Appendix 2.1.**

2.5.3 Sample Size

The toll traffic data does not provide the individual traffic volume count of all categories of vehicles. The seven-day traffic volume video count at the existing toll plazas was analysed to get the individual volume count of all categories of vehicles along with the direction split.

The vehicles during the OD surveys were interviewed on a random sample basis. **Table 2-6** shows the AADT and the sample size (both in absolute numbers and in percentage terms) captured during the exercise.

Modes	Car	M Bus	Bus	MLCV	LCV	2A	3A	MAV/ OSV	Total
Undavariya TP (A-S)									
Sample	2,431	26	208	300	624	374	521	3,302	2,431
AADT	7,405	28	685	782	574	846	905	4,986	7,405
Percentage (%)	32.8	93.7	30.4	38.4	108.7	44.2	57.6	66.2	32.8
Khemana TP (A-P)									
Sample	3,062	20	185	394	636	409	583	2,886	3,062
AADT	7,857	34	403	726	643	962	865	4,733	7,857
Percentage (%)	39.0	59.6	46.0	54.3	98.9	42.5	67.4	61.0	39.0

Table 2-6: Sample Size Collected in OD Survey at Undavariya TP (A-S) and Khemana TP (A-P)

Based on the sample size of different categories of vehicles interviewed during the OD survey, direction-wise expansion factors were calculated based on FY22 AADT. The OD matrices for all vehicle categories were generated and analysis was done in terms of regional distribution, travel pattern, commodity distribution and trip purpose for cars.

2.5.4 Regional Distribution

Based on the OD matrices, the regional distribution of tollable vehicles at the toll plaza locations for A-S and A-P has been calculated. **Table 2-7** gives the distribution indicating the attraction and generation zones for the traffic on the project road.

Region/Modes	Car	M Bus	Bus	MLCV	LCV	2A	3A	MAV
Undavariya TP (A-S)								
Rajasthan	68.4	75.2	62.2	74.8	38.2	37.1	36.9	40.4
Gujarat	25.2	24.8	27.0	20.3	38.4	39.1	39.3	36.7
Maharashtra	2.5	0.0	5.6	0.4	3.8	2.9	4.2	4.3
Uttar Pradesh	0.8	0.0	0.7	2.7	4.6	5.1	5.2	4.2
Delhi	0.9	0.0	0.6	0.9	5.2	3.7	3.3	3.8
Haryana	0.5	0.0	1.0	0.4	4.3	3.7	2.2	2.8
Punjab	0.6	0.0	0.0	0.0	3.2	4.8	4.8	3.7
Rest of India	1.2	0.0	2.9	0.4	2.4	3.5	4.0	4.1
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Khemana TP (A-P)								
Rajasthan	37.9	45.9	41.6	31.9	33.8	33.9	32.7	33.4
Gujarat	56.7	47.3	51.2	56.3	49.4	48.6	47.2	44.5
Maharashtra	2.1	1.4	2.5	1.4	3.2	2.4	3.6	4.3
Uttar Pradesh	1.1	2.7	1.4	1.9	4.2	3.3	3.8	2.9
Delhi	0.5	0.0	0.8	3.0	2.7	3.7	3.1	4.4
Haryana	0.2	0.0	0.6	0.7	2.3	2.2	2.3	2.4
Punjab	0.3	0.0	0.4	0.9	1.5	2.4	2.7	3.4
Rest of India	1.3	2.7	1.4	3.8	2.8	3.5	4.5	4.6
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Table 2-7: Regional Distribution of Tollable Traffic (in %) at A-S & A-P

Abu Road-Swaroopganj (A-S):

- Car traffic at the toll plaza location is majorly from Rajasthan (68.4 percent) followed by Gujarat (25.2 percent) and then Maharashtra (2.5 percent).
- Within the state of Rajasthan, Sirohi district accounts for around 44 percent followed by Jodhpur district which accounts for around 10.6 percent of the car traffic.
- In case of bus traffic, major share is from Rajasthan (62.2 percent), out of which 27.7 percent is from Sirohi district.
- The top OD pair observed at toll plaza is between Abu Road/Maval to Sirohi which is about 19 percent for car trips.
- Around 38.2 percent of the LCV traffic is from the state of Rajasthan, out of which around 16.9 percent is from Sirohi district.
- In 2A trucks, around 39.1 percent is from Gujarat followed by Rajasthan and Uttar Pradesh accounting about 37.1 and 5.1 percent respectively.
- The top OD pair for 2A observed at toll plaza is between Ahmedabad to Jodhpur.

- In case of 3A trucks, Gujarat accounts for about 39.3 percent followed by Rajasthan accounting about 36.9 percent. The top OD pair for 3A is observed to be between Ahmedabad to Jodhpur.
- In case of MAV, the top OD pair is observed to be between Abu Road/Maval and Sirohi followed by Abu Road/Maval and Udaipur.

Abu Road-Palanpur (A-P):

- Car traffic at the toll plaza location is majorly from Gujarat (56.7 percent) followed by Rajasthan (37.9 percent) and then Maharashtra (2.1 percent).
- Within the state of Gujarat, Banaskantha district accounts for around 30 percent of the car traffic.
- In case of bus traffic, major share is from Gujarat (51.2 percent), out of which 22.8 percent is from Banaskantha district.
- The top OD pair observed at toll plaza is between Abu Road/Maval to Palanpur which is about 10 percent for car trips.
- Around 49.4 percent of the LCV traffic is from the state of Gujarat, out of which around 31.2 percent is from Banaskantha district.
- In 2A trucks, around 48.6 percent is from Gujarat followed by Rajasthan and Delhi accounting about 33.9 and 3.7 percent respectively.
- The top OD pair for 2A observed at toll plaza is between Ahmedabad to Jaipur.
- In case of 3A truck, Gujarat accounts for about 47.2 percent followed by Rajasthan accounting about 32.7 percent. The top OD pair for 3A is observed to be between Ahmedabad to Jodhpur.
- In case of MAV, the top OD pair is observed to be between Gandhidham and Bhilwara followed by Ahmedabad and Jaipur.

The mode wise top 20 OD pairs are given in **Appendix 2.2**.

2.5.5 Travel Pattern

In order to assess the travel pattern of vehicles, the important streams of traffic plying on the project road are estimated.

The list of the popular movements found at Undavariya TP (A-S) and Khemana TP (A-P) is presented in **Table 2-8.**

Sr. No.	Streams	Car	Mini Bus	Bus	MLCV	LCV	2A	3A	MAV
Undavariya TP (A-S)									
1	Swaroopganj/Pindwara/ Sirohi & Surroundings-Palanpur/Mehsana/Deesa & Surroundings	396	10	16	122	27	27	19	154
		5.3%	36.4%	2.4%	15.6%	4.8%	3.2%	2.1%	3.1%
2		796	1	86	50	48	59	61	362

Sr. No.	Streams	Car	Mini Bus	Bus	MLCV	LCV	2A	3A	MAV
	Swaroopganj/Pindwara/ Sirohi & Surroundings-Ahmedabad & Beyond	10.7%	4.4%	12.6%	6.3%	8.3%	6.9%	6.8%	7.3%
3	Udaipur/Rajsamand & Surroundings-Palanpur & Beyond	371	0	56	0	19	54	55	284
		5.0%	0.0%	8.2%	0.0%	3.3%	6.4%	6.0%	5.7%
4	Jodhpur/Pali & Surroundings-Palanpur/Mehsana & Surroundings	291	0	8	41	50	27	31	216
		3.9%	0.0%	1.2%	5.2%	8.7%	3.2%	3.4%	4.3%
5	Jodhpur/Pali & Surroundings-Ahmedabad/Vadodara & Surroundings	478	1	67	7	19	41	42	95
		6.4%	4.4%	9.8%	0.9%	3.3%	4.8%	4.7%	1.9%
6	Jodhpur/Pali & Surroundings-Beyond Ahmedabad	352	0	78	14	56	81	79	364
		4.7%	0.0%	11.4%	1.8%	9.7%	9.6%	8.7%	7.3%
7	Chittorgarh/Bhilwara/Kota & Surroundings-Palanpur & Beyond	112	0	16	7	15	32	42	362
		1.5%	0.0%	2.4%	0.9%	2.6%	3.8%	4.7%	7.3%
8	Jaipur/Ajmer/Beawar & Surroundings-Palanpur/Mehsana/Deesa & Surroundings	250	0	8	30	10	41	38	254
		3.4%	0.0%	1.2%	3.8%	1.8%	4.8%	4.2%	5.1%
9	Jaipur/Ajmer/Beawar & Surroundings-Beyond Palanpur	745	1	107	7	55	81	148	598
		10.1%	4.4%	15.7%	0.9%	9.5%	9.6%	16.4%	12.0%
10	Delhi & Beyond-Palanpur/Mehsana & Surroundings	61	0	0	7	24	36	22	272
		0.8%	0.0%	0.0%	0.9%	4.1%	4.3%	2.4%	5.5%
11	Delhi & Beyond-Ahmedabad/Morbi/Gandhidham/Surat/ Rest of Gujarat	59	0	15	7	36	68	39	205
		0.8%	0.0%	2.2%	0.9%	6.2%	8.0%	4.4%	4.1%
12	Delhi & Beyond-Beyond Gujarat	151	0	8	7	92	104	140	616
		2.0%	0.0%	1.2%	0.9%	16.0%	12.2%	15.5%	12.4%
13	UP & Beyond-Palanpur & Beyond	108	0	10	28	43	86	107	450
		1.5%	0.0%	1.4%	3.5%	7.5%	10.2%	11.8%	9.0%
14	Swaroopganj & Beyond-Zones between TP01 & TP02	3236	14	208	457	82	108	82	754
		43.7%	50.5%	30.5%	58.5%	14.2%	12.8%	9.1%	15.1%
TOTAL		**7,405**	**28**	**685**	**782**	**574**	**846**	**905**	**4,986**
Khemana TP (A-P)									
1	Swaroopganj/Pindwara/ Sirohi & Surroundings-Palanpur/Mehsana/Deesa & Surroundings	381	1	25	29	28	52	47	177
		4.8%	2.7%	6.2%	4.0%	4.3%	5.4%	5.4%	3.7%
2	Swaroopganj/Pindwara/ Sirohi & Surroundings-Ahmedabad & Beyond	809	0	21	41	66	82	84	341
		10.3%	0.0%	5.3%	5.7%	10.3%	8.6%	9.7%	7.2%
3	Udaipur/Rajsamand & Surroundings-Palanpur & Beyond	260	1	13	43	17	63	28	208
		3.3%	2.7%	3.3%	5.9%	2.6%	6.6%	3.2%	4.4%
4	Jodhpur/Pali & Surroundings-Palanpur/Mehsana & Surroundings	351	17	0	19	34	38	34	206
		4.5%	51.2%	0.0%	2.6%	5.3%	3.9%	3.9%	4.4%

Sr. No.	Streams	Car	Mini Bus	Bus	MLCV	LCV	2A	3A	MAV
5	Jodhpur/Pali & Surroundings-Ahmedabad/Vadodara & Surroundings	501	0	10	30	21	14	35	91
		6.4%	0.0%	2.5%	4.1%	3.3%	1.5%	4.1%	1.9%
6	Jodhpur/Pali & Surroundings-Beyond Ahmedabad	382	1	33	22	37	52	49	368
		4.9%	2.7%	8.2%	3.0%	5.7%	5.4%	5.6%	7.8%
7	Chittorgarh/Bhilwara/Kota & Surroundings-Palanpur & Beyond	59	1	26	0	23	28	25	336
		0.8%	2.7%	6.5%	0.0%	3.6%	2.9%	2.9%	7.1%
8	Jaipur/Ajmer/Beawar & Surroundings-Palanpur/Mehsana/Deesa & Surroundings	295	4	46	96	69	73	65	301
		3.8%	10.8%	11.5%	13.2%	10.8%	7.6%	7.5%	6.4%
9	Jaipur/Ajmer/Beawar & Surroundings-Beyond Palanpur	583	3	66	67	69	155	131	748
		7.4%	8.1%	16.4%	9.2%	10.7%	16.1%	15.1%	15.8%
10	Delhi & Beyond-Palanpur/Mehsana & Surroundings	78	0	7	47	30	80	54	308
		1.0%	0.0%	1.6%	6.5%	4.7%	8.3%	6.2%	6.5%
11	Delhi & Beyond-Ahmedabad/Morbi/Gandhidham/Surat/ Rest of Gujarat	52	1	10	11	12	28	27	187
		0.7%	2.7%	2.5%	1.5%	1.8%	2.9%	3.1%	4.0%
12	Delhi & Beyond-Beyond Gujarat	80	0	5	21	52	66	74	559
		1.0%	0.0%	1.2%	2.8%	8.1%	6.8%	8.5%	11.8%
13	UP & Beyond-Palanpur & Beyond	189	2	12	27	54	68	75	311
		2.4%	5.4%	2.9%	3.8%	8.4%	7.1%	8.6%	6.6%
14	Zones between TP01 & TP02-Palanpur & Beyond	3836	4	129	274	132	162	140	591
		48.8%	10.8%	32.0%	37.7%	20.5%	16.9%	16.1%	12.5%
TOTAL		**7,857**	**34**	**403**	**726**	**643**	**962**	**865**	**4,733**

Table 2-8: Traffic Streams on Undavariya TP (A-S) and Khemana TP (A-P)

Passenger traffic:

Abu Road-Swaroopganj (A-S)

- Around 10.7 percent (796 vehicles) of car trips originate and terminate within Swaroopganj/Pindwara/Sirohi & Surroundings to Ahmedabad & Beyond (stream 2).
- Around 10.1 percent (745 vehicles) of bus trips originate and terminate within Jaipur/Ajmer/Beawar & Surroundings to Beyond Palanpur (stream 9).
- The local interaction of car and bus trips travelling from/to Swaroopganj & Beyond to/from Zones between TP01 & TP02 (stream 14) is about 43.7 percent (3,236 vehicles) and 30.5 percent (208 vehicles) respectively.

Abu Road-Palanpur (A-P)

- Around 10.3 percent (809 vehicles) of car trips originate and terminate within Swaroopganj/Pindwara/Sirohi & Surroundings to Ahmedabad & Beyond (stream 2).
- Around 7.4 percent (583 vehicles) of bus trips originate and terminate within Jaipur/Ajmer/Beawar & Surroundings to Beyond Palanpur (stream 9).
- The local interaction of car and bus trips travelling from/to Zones between TP01 & TP02 to/from Palanpur & Beyond (stream 14) is about 48.8 percent (3,836 vehicles) and 32 percent (129 vehicles) respectively.

Freight traffic:

Abu Road-Swaroopganj (A-S)

- About 15.6 percent (122 vehicles) of MLCV and around 4.8 percent (27 vehicles) of LCV were found to be plying between Swaroopganj/Pindwara/Sirohi & Surroundings and Palanpur/Mehsana/Deesa & Surroundings (stream 1).
- In case of 2A, about 9.6 percent (81 vehicles) of 2A were found to be travelling between Jaipur/Ajmer/Beawar & Surroundings and Beyond Palanpur (stream 9).
- About 16.4 percent (148 vehicles) of 3A and 12.0 percent (598 vehicles) of MAV are found to travel from/to Jaipur/Ajmer/Beawar & Surroundings to/from Beyond Palanpur (stream 9).
- Also, around 6.8 percent (61 vehicles) of 3A and 7.3 percent (362 vehicles) of MAV are found to be travelling between Swaroopganj/Pindwara/Sirohi & Surroundings and Ahmedabad & Beyond (stream 2).
- The interaction between Delhi & beyond and Beyond Gujarat (stream 12) is about 15.5 percent of 3A (140 vehicles) and around 12.4 percent of MAV (616 vehicles) respectively.
- In case of MAV, around 12 percent (593 vehicles) are found to be travelling to/from Swaroopganj & beyond from/to Gandhidham/Bhuj (Ports) & surroundings.

Abu Road-Palanpur (A-P)

- About 13.2 percent (96 vehicles) of MLCV and around 10.8 percent (69 vehicles) of LCV were found to be plying between Jaipur/Ajmer/Beawar & Surroundings and Palanpur/Mehsana/Deesa & Surroundings (stream 8).
- In case of 2A, about 16.1 percent (155 vehicles) were found to be travelling between Jaipur/Ajmer/Beawar & Surroundings and Beyond Palanpur (stream 9).
- About 15.1 percent (131 vehicles) of 3A and 15.8 percent (748 vehicles) of MAV are found to be travelling from/to Jaipur/Ajmer/Beawar & Surroundings to/from Beyond Palanpur (stream 9).

- Also, around 9.7 percent (84 vehicles) of 3A and 7.2 percent (341 vehicles) of MAV are found to be travelling between Swaroopganj/Pindwara/Sirohi & Surroundings and Ahmedabad & Beyond (stream 2).
- The interaction between Delhi & Beyond and Beyond Gujarat (stream 12) is about 8.5 percent of 3A (74 vehicles) and around 11.8 percent of MAV (559 vehicles) respectively.
- In case of MAV, around 13 percent (621 vehicles) are found to be travelling to/from Swaroopganj & beyond from/to Gandhidham/Bhuj (Ports) & surroundings.

2.5.6 Commodity Distribution

Analysis was also carried out to understand the different commercial vehicles being used to transport different commodities. **Table 2-9** and presents the commodity-wise share of the total commercial traffic at each of the toll plaza on the project road at Undavariya (A-S) and Khemana (A-P) respectively.

Commodity Type	MLCV	LCV	2 Axle	3 Axle	MAV
Undavariya TP (A-S)					
Food Grains and Cash Crops	13.0	7.1	8.6	8.6	11.9
Fruits & Vegetables	19.0	9.3	12.3	10.0	4.5
Building Materials/Tiles	4.0	4.2	7.5	8.4	10.4
Iron & Steel Products	1.0	1.6	1.1	2.1	2.6
Petroleum Products, Chemicals and Gas	4.0	5.8	4.3	5.4	8.0
Heavy Machinery & Industrial Equipment's	0.0	3.2	1.6	0.8	1.8
Industrial Products & Equipment	5.0	9.3	9.6	9.8	7.9
Consumer Items	8.0	11.5	11.8	7.7	7.2
Automobile and New Chassis	2.0	7.1	5.9	6.9	5.5
Containers	1.0	0.6	0.0	0.4	0.1
Ores & Minerals (Coal, Bauxite, limestone)	1.0	1.9	1.1	5.6	5.2
Miscellaneous Items (Medicines, Livestock, Forest products, Fertilizers, Milk, etc.)	8.0	6.4	7.0	6.5	6.2
Parcels	3.0	6.4	3.2	5.2	3.7
Powder	3.0	1.9	3.2	4.4	5.8
Cement/Fly ash	5.0	5.4	6.4	6.1	6.1
Empty Vehicles	23.0	18.3	16.6	12.1	13.1
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Khemana TP (A-P)					
Food Grains and Cash Crops	5.1	6.3	7.3	6.7	9.1
Fruits & Vegetables	17.8	11.6	11.2	12.7	9.3
Building Materials/Tiles	5.1	5.3	7.8	9.3	7.1
Iron & Steel Products	1.5	1.9	1.7	4.6	2.8
Petroleum Products, Chemicals and Gas	7.6	8.8	7.6	7.0	7.3
Heavy Machinery & Industrial Equipment's	3.0	1.6	1.2	3.3	2.4

Commodity Type	MLCV	LCV	2 Axle	3 Axle	MAV
Industrial Products & Equipment	6.1	9.7	9.5	8.1	8.5
Consumer Items	4.6	11.0	6.6	6.9	7.1
Automobile and New Chassis	4.6	5.0	4.9	3.8	4.9
Containers	1.0	1.3	1.2	1.2	0.6
Ores & Minerals (Coal, Bauxite, limestone)	2.0	3.5	4.4	3.1	3.9
Miscellaneous Items (Medicines, Livestock, Forest products, Fertilizers, Milk, etc.)	7.6	5.7	7.8	9.1	7.8
Parcels	2.0	3.5	2.7	1.9	3.2
Powder	5.6	2.2	5.6	3.9	3.4
Cement/Fly ash	6.6	5.7	4.9	7.9	7.6
Empty Vehicles	19.8	17.0	15.4	10.6	15.1
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Table 2-9: Commodity Distribution at Undavariya TP (A-S) and Khemana TP (A-P)

- Major commodities being transported across the toll plaza are Fruits and vegetables, building materials/tiles, Milk, cement/flyash, powder, industrial products & equipment's etc.
- In case of MLCVs, about 19 percent at Undavariya (A-S) and about 17.8 percent at Khemana (A-P) were found to be carrying fruits and vegetables to various demand centres of Gujarat and Rajasthan.
- About 8.4 percent of 3A and 10.4 percent of MAV at Undavariya (A-S) and about 11 percent of 3A and 10 percent of MAV at Khemana (A-P) are found to be transporting tiles and ceramic based products primarily from Morbi to parts of Rajasthan/northern states of India. It may be noted that after unloading these trucks return empty to their source point.
- About 4.4 percent of 3A trucks and 5.8 percent of MAV trucks at Undavariya (A-S) and about 3.9 percent of 3A trucks and 3.4 percent of MAV trucks at Khemana (A-P) are found to be carrying powder at the toll plaza locations. It is to be noted that this commodity is a by-product of marble/granite processing units located at RIICO industrial areas in Abu Road and Kishangarh. Also, this powder is used for manufacturing of tiles which is transported to Morbi.
- In case of all freight vehicles, around 8-9 percent each at Undavariya (A-S) and Khemana (A-P) toll plaza locations were found laden with metals (basic & fabricated), travelling from industrial clusters of Bhuj/Gandhidham/Samakhiali to parts of Rajasthan/Delhi.
- About 6 percent each of 3A and MAV trucks at Undavariya (A-S) and about 7 percent each of 3A and MAV trucks at Khemana (A-P) were found to be transporting cement and flyash based products which are mainly from/to Neemuch/Bhilwara/Sirohi to/from Palanpur/Deesa and beyond.

- Around 7 percent of 2A and 6.5 percent of 3A at Undavariya (A-S) and about 7.8 percent of 2A and 9.1 percent of 3A at Khemana (A-P) toll plaza locations were found to be transporting miscellaneous products (mainly milk). These milk tankers originate from Banas dairy located at Palanpur and Dudhsagar dairy at Mehsana and transported to Abu Road/Sirohi/Pindwara and other city centres. It may be noted that these tankers return empty after delivery to their respective dairy plants.

2.5.7 Trip Purpose Distribution

An analysis was also carried out to assess the purpose of car trips on the project road. **Table 2-10** summarises the purpose-wise share of the passenger cars at the O-D survey locations.

Modes	Undavariya TP (A-S)	Khemana TP (A-P)
Work & Business	83.6	84.4
Education	7.2	7.0
Social/Shopping	2.7	1.8
Religious	1.8	4.8
Others	2.8	1.0
Total	**100.0**	**100.0**

Table 2-10: Purpose-wise Distribution of Car Trips at A-S & A-P

- At Undavariya (A-S) about 84 percent of the car trips were found to be work and business purpose followed by educational trips having a share of about 7 percent.
- At Khemana (A-P) about 84 percent of the car trips were found to be work and business purpose followed by educational trips having a share of about 7 percent.

3. TRAFFIC GROWTH RATE AND PROJECTIONS

3.1 General

The project road is a part of the NHAI InvIT portfolio and the projections of traffic and revenue have been presented till FY52. The estimation of the traffic using the tolled highway and its future growth are important elements to assess the project's economics as these are generally the main/sole source of revenue for the project This chapter details various aspects of the current traffic of the project road and its growth potential as assessed by Ramboll.

3.2 Project Road Traffic

The traffic that is likely to use the project road was estimated on the basis of the traffic and travel characteristics gathered as part of the study. The traffic on the project road would normally consist of the following components:

- Normal Traffic
- Diverted Traffic
- Induced/Developmental Traffic

3.2.1 Normal Traffic

Normal traffic is the traffic which is already plying on the project road as assessed in section 2.4.3.

3.2.2 Diverted Traffic

Diverted traffic is generally dictated by the presence of an alternative route at a lower generalised cost, which is in-turn defined by the road configuration and its condition, the type of vehicle and its operating costs, the average riding speed, the route distance and any tolling that may apply on a specific route.

In context of the project road, there are no routes in vicinity of toll plazas to avoid the project road. The development of the under-construction western Dedicated Freight Corridor (WDFC) and the proposed Amritsar-Jamnagar Expressway may impact the project road traffic.

A. Loss to Western DFC

The Ministry of Railways has embarked upon the Dedicated Freight Corridor (DFC) project which would provide a quantum leap in the railways transportation capacity which will be enough to meet the transportation demands generated by the rapidly growing economy and industrial production for the next four to five decades. Two Dedicated Freight Corridors (DFC), i.e., between Mumbai-Delhi (Western DFC) and Delhi- Kolkata (Eastern DFC) legs of the golden quadrilateral are being implemented.

The WDFC starts at Dadri in Uttar Pradesh and ends at Mumbai (JNPT) while passing through five states of Uttar Pradesh, Haryana, Rajasthan, Gujarat and Maharashtra. The distribution of length of WDFC indicates that Rajasthan and Gujarat together constitute about three quarters of the total length of the alignment of freight corridor between Delhi and Mumbai. The alignment of the project roads and the WDFC have been presented in **Figure 3-1**.

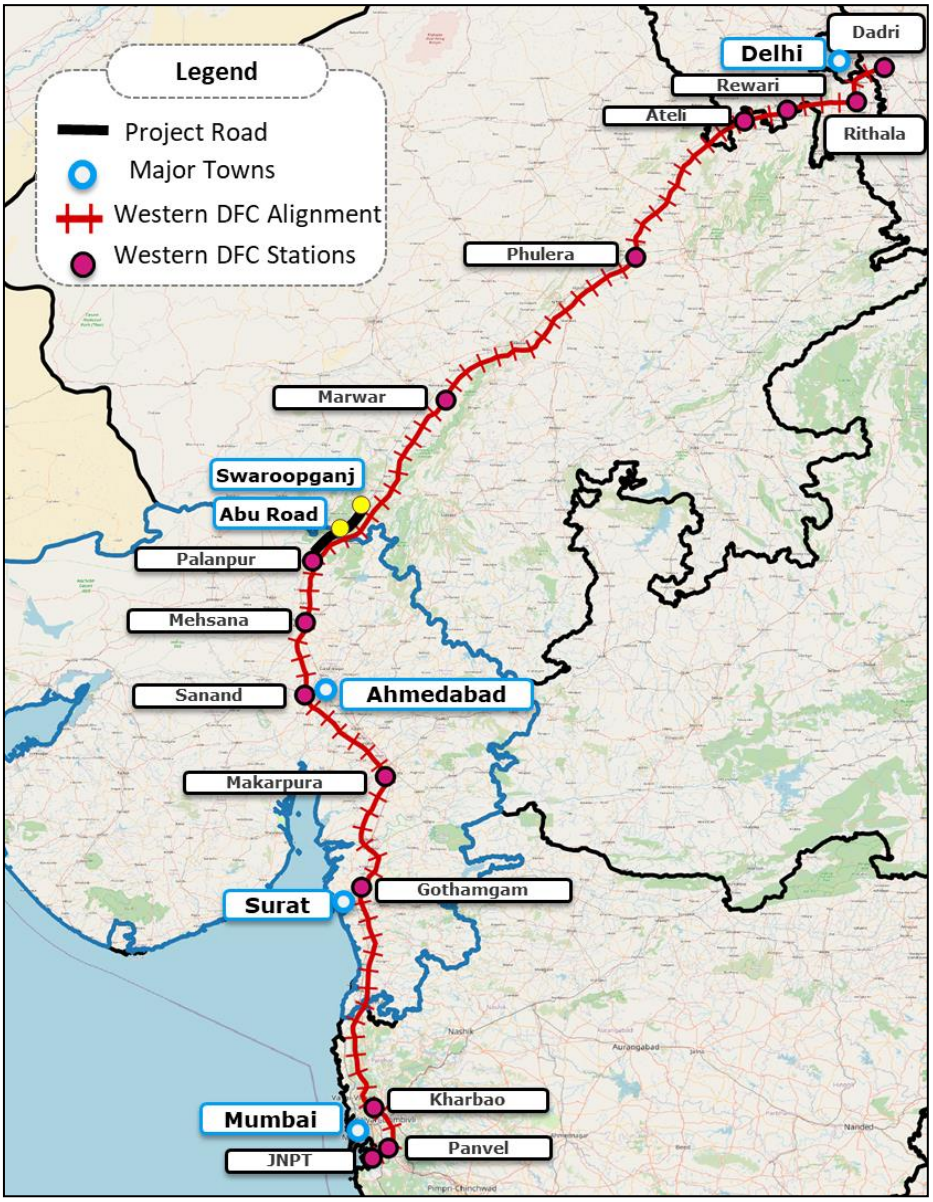


Figure 3-1: Alignment of Project Road and Western DFC

The WDFC runs parallel to PR with nearby junction station planned at Palanpur. The traffic on the Delhi-Mumbai Corridor may comprise of ISO containers, POL, fertilizers, food grains, salt, coal, iron & steel, and cement as per the details available.

The estimation process of the diverted traffic to DFC covers:

- Identification of traffic stream likely to shift to DFC - Rail traffic is usually for long distance movement and therefore, for analysis purpose the long-distance from/to Delhi and beyond to/from Palanpur and beyond has been considered as potential traffic.

- Share of DFC commodities (coal, iron & steel and containers) in the identified potential streams of traffic
- Applying the share of DFC commodities for estimation of the potential divertible traffic
- Citing that DFC corridor will attract more of the freight traffic from the existing rail network, it is assumed that 25 percent of road freight traffic is expected to shift to DFC

Once the WDFC becomes operational, there is a possibility that some of this traffic will shift to WDFC from the project road. The entire WDFC corridor is planned for completion by June 2022. As per information available from the National Rail Plan, the entire WDFC section is likely to become operational by FY24.The impact of Western DFC on the project road is presented in **Table 3-1**.

Mode	3A	MAV
Abu Road-Swaroopganj		
Potential from OD	12	13
Based on WDFC commodities -Potential Traffic	3	4
Estimated Modal Shift	1	1
Abu Road-Palanpur		
Potential from OD	13	12
Based on WDFC commodities -Potential Traffic	3	4
Estimated Modal Shift	1	1

Table 3-1: Traffic Impacts due to Western DFC (%)

The development of the WDFC is expected to result in a loss of about 1% of 3A Trucks and MAVs from the project roads of Abu Road to Palanpur and Abu Road to Swaroopganj. To consider the gradual loss of traffic from the project roads, the loss of traffic has been considered in phases with 50 percent in FY24, 75 percent in FY25 and 100 percent from FY26 onwards.

B. Loss to Amritsar Jamnagar Expressway

Amritsar – Jamnagar Expressway is a 1,224 km long, partially access-controlled expressway having 4/6 lane configuration which is being constructed under Bharatmala Phase I as the Amritsar – Jamnagar economic corridor. The expressway passes through the states of Punjab, Haryana, Rajasthan and Gujarat and is intended to connect the ports of Gujarat to the industrial centres of Punjab. About 3/4th length of the total expressway is greenfield construction. The entire corridor is expected to reduce the distance between Amritsar and Jamnagar by about 200 km and reduce the travel time from existing 26 hours to half. The project roads and the tentative alignment of the expressway is presented in **Figure 3-2.**

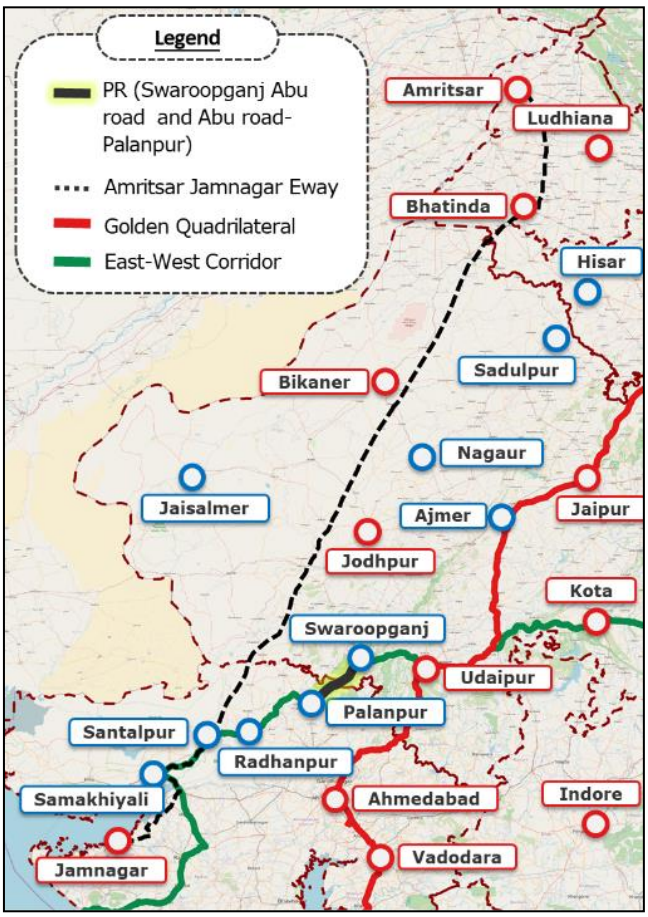


Figure 3-2: Alignment of Project Roads and Amritsar-Jamnagar Expressway

The expressway runs parallel to the project roads. The traffic plying from/to Punjab & beyond to/from Morbi & beyond is potential traffic which is likely to be impacted after the expressway becomes operational. The total potential divertible traffic is presented in **Table 3-2**.

Diversion / Modes	2A	3A	MAV
Total Diverted Traffic			
Abu Road-Swaroopganj	5.3%	6.1%	4.0%
Abu Road-Palanpur	1.7%	3.1%	3.8%

Table 3-2: Total Potential Divertible Traffic from Project Roads to Amritsar-Jamnagar Expressway

Since the expressway is likely to be shorter by 200 km, the project road may lose 100 percent of the potential divertible traffic. The upcoming Amritsar – Jamnagar Expressway is likely to have a negative impact on the project roads. The total potential divertible traffic to the expressway is about 2-4 percent of total traffic of Abu Road – Palanpur project and about 4-6 percent of total traffic of Abu Road – Swaroopganj project. As per information available in public domain, the section between Bikaner to Jodhpur is expected to become operational by the end of 2022 while the entire corridor is targeted for completion by September 2023. However, the project being largely a greenfield construction, there may be some delays in completion of the project and may become operational from FY25. Therefore, the loss of traffic owing to the expressway has been considered from FY26 onwards. Also, to consider the gradual nature in traffic shift to the

new facility, the loss of traffic from project roads have been considered in phases with 50 percent in FY26, 75 percent in FY27 and 100 percent from FY28 onwards

3.2.3 Induced/ Development Traffic

Developmental /new generated traffic is the one which would be generated, over and above normal growth, because of lowering of transport costs or new developments in the immediate influence area of the project road. In case of the project road, there is no development envisaged in the vicinity of the project road.

Bharatmala Pariyojana is the second largest highways construction project in the country since NHDP, under which almost 50,000 km or highway roads were targeted across the country. It will look to improve connectivity particularly on economic corridors, border areas and far-flung areas with an aim of quicker movement of cargo and boosting exports.

It will connect 550 district headquarters to minimum 4-lane highway by raising the number of corridors to 50 (from current 6) and move 80 percent freight traffic (currently 40 percent) to national highways by connecting 24 logistics parks and 7 north east multimodal waterway ports.

The Phase-I includes economic corridors of around 9,000 km; inter-corridor and feeder routes of around 6,000 km; 5,000 km roads under the National Corridors Efficiency Program, border and international connectivity roads of around 2,000 km; coastal and port connectivity roads of around 2,000 km; expressways of around 800 km and 10,000 km of NHDP roads. The total length in phase 1 comes to around 34,800 km.

In the context of the project influence area, there are a few economic corridors and inter corridors listed in the Rajasthan and Gujarat plan. The economic corridors are planned from Amritsar-Jamnagar, Tharad-Phalodi, Kandla-Sagar and Nagpur-Mandi-Dabwali and is likely to improve connectivity with an aim to provide quicker movement of cargo.

The project roads of Palanpur – Abu Road and Abu Road - Swaroopganj act as a connecting link and cater to the traffic generated from Udaipur, Chittorgarh, Ajmer, Jaipur & beyond on the north and the traffic generated from Palanpur, Ahmedabad, Rajkot, Kandla and surrounding areas on the south. As the project roads cater to the long-distance traffic, these are likely to remain as important highways for the north-south or east-west movement and may see sustained growth in the future.

3.3 Methodology for Traffic Growth Rate Estimation

Traffic growth for both passenger and freight vehicles has been estimated using the econometric approach as described in IRC-108, 2015. For freight traffic, due consideration has been given to the total tonnage transported and the shift in types of vehicles used for moving goods.

The econometric model applied, relates traffic growth to changes in state (or district) domestic product via an elasticity factor. According to IRC guidelines, elasticity based econometric model for highway projects should be derived in the following form:

$Log_e(P) = A0 + A1\ Log_e\ (EI)$, where:

P - Traffic Volume

EI - Economic Indicator

A0 - Regression Constant

A1 - Regression Co-efficient (Elasticity Index)

In order to estimate traffic on the project road, the methodology described below has been followed:

- Identify the influence area - From the analysis of OD survey data, the project influencing states and districts, which are likely to impact the traffic growth on the project road, were identified.
- Review Past traffic Data – Based on toll data available for the project, a review of past traffic and tonnage growth is carried out.
- Analysis of economic growth of the Project Influencing Area (PIA) - For each PIA state, an economic profile describing past performance and future outlook was prepared. This also considers India's past economic performance and its future outlook.
- Estimation of traffic elasticity to income – in order to translate economic growth into traffic growth, an elasticity factor was estimated.
- Derivation of traffic growth rates – On the basis of the weighted (based on OD shares) PIA outlook and related traffic elasticity, traffic growth rates were estimated.

The methodology thus adopted incorporates, as basic data inputs, the perspective growth envisaged in the influence area and the changes in transport demand elasticities over a period of time. The traffic growth rates by vehicle type for the project road have been determined till FY52.

3.4 Identification of PIA States

The regional distribution observed on the project road shows that Rajasthan and Gujarat are the main contributors of traffic on the project road in case of passenger vehicles. In case of freight traffic, states of Maharashtra, Uttar Pradesh, Delhi, Haryana and Punjab also contribute to the project road traffic in addition to the two states of Rajasthan and Gujarat.

The states of Rajasthan and Gujarat have, therefore, been considered as the PIA states for passenger traffic. The PIA for freight traffic includes all the seven states which are the main contributors to freight traffic. The mode wise normalized regional distribution shares are presented in **Table 3-3.**

States/Mode	Cars/ MLCV	M Bus/ LCV	Bus	2A	3A	MAV
Abu Road – Swaroopganj Section (Undavariya YP)						
Rajasthan	73.6	51.4	69.8	38.5	38.5	42.2
Gujarat	26.4	48.6	30.2	40.5	40.9	38.3
Maharashtra	0.0	0.0	0.0	3.0	4.4	4.5
Uttar Pradesh	0.0	0.0	0.0	5.3	5.4	4.3
Delhi	0.0	0.0	0.0	3.9	3.5	4.0
Haryana	0.0	0.0	0.0	3.9	2.3	2.9
Punjab	0.0	0.0	0.0	5.0	5.0	3.9
Total	100.0	100.0	100.0	100.0	100.0	100.0
Abu Road – Palanpur Section (Khemana TP)						
Rajasthan	39.7	41.1	44.8	35.1	34.3	35.0
Gujarat	60.3	58.9	55.2	50.3	49.5	46.7
Maharashtra	0.0	0.0	0.0	2.5	3.8	4.6
Uttar Pradesh	0.0	0.0	0.0	3.4	4.0	3.0
Delhi	0.0	0.0	0.0	3.8	3.2	4.7
Haryana	0.0	0.0	0.0	2.3	2.4	2.5
Punjab	0.0	0.0	0.0	2.5	2.8	3.6
Total	100.0	100.0	100.0	100.0	100.0	100.0

Table 3-3: Normalised Regional Distribution (%)

Rajasthan has a share of 39.7 percent at Khemana TP and 73.6 percent at Undavariya TP in cars and 44.8 percent at Khemana TP and 69.8 percent at Undavariya TP in buses. Gujarat contributes around 60.3 percent at Khemana TP and 26.4 percent at Undavariya TP in cars and 55.2 percent at Khemana TP and 30.2 percent at Undavariya TP in buses.

In case of Khemana toll plaza, Gujarat contributes the highest around 46-51 percent in Trucks, 3A and MAV signifying the long-distance traffic on the project road. Rajasthan has a share of around 34-36 percent in these categories of trucks. While at Undavariya toll plaza, Rajasthan contributes the highest around 38-42 percent each in truck categories.

Around 2-5 percent traffic of major freight modes is being contributed by states of Maharashtra and around 2.5- 5 percent of MAVs are destined to each state of Uttar Pradesh, Delhi, Haryana and Punjab at both toll plaza locations.

3.5 Past Economic Growth of PIA States

Growth of traffic on the project road depends on existing development and future growth prospects of the connecting regions. A number of economic indicators for the PIA states, as published by Central Statistical Organisation (2011-12 prices), have been studied to assess their past performance.

Gujarat

- Gujarat's Gross State Domestic Product (GSDP) stood at Rs 12,689.6 billion in 2019-20 and has been growing at a compounded annual growth rate of 9.6 percent since 2011-12.
- The state's growth had been between 7-11 percent since 2015-16. It has shown a growth of around 7.3 percent in FY20.
- The secondary sector is the largest contributor to GSDP (46.3 percent), agriculture allied activities sector at 17.3 percent and services sector at 36.4 per cent of the GSDP in 2019-20.

The change of sectoral composition of GSDP over the years is presented in **Figure 3-3.**

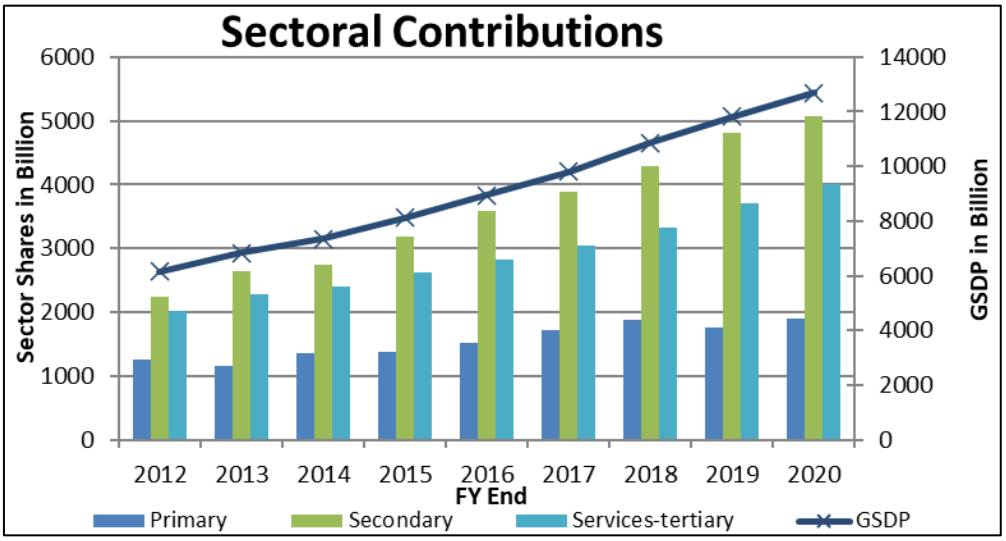


Figure 3-3: GSDP (in Rs billion) and its Sectoral Composition for Gujarat

The performance of the state economy and its different sectors has been studied using time trend analysis. The average annual growth rates as obtained using regression analysis are presented in **Table 3-4.**

Particulars	2011-12 to 2019-20	2014-15 to 2019-20
GSDP	9.6	9.5
Agriculture and Allied	6.5	6.2
Industry	10.9	10.0
Services	8.6	9.0
Construction	3.7	4.0
Per Capita Income	8.2	8.1

Table 3-4: Average Annual Growth Rates (%) of State Income for Gujarat

Being one of India's most industrialized states, Gujarat maintains a variety of industries, the principal ones being general and electrical engineering and the manufacture of textiles, vegetable oils, chemicals, soda ash, cement and also production of fertilizers and petrochemicals.

Gujarat is considered the petroleum capital of India due to presence of large refining capacity set up by private and public sector companies. The state is the world's largest

producer of processed diamonds, accounting for 72 per cent of the world's processed diamond share and 80 per cent of India's diamond exports.

The state has one of the strongest port infrastructures in India. It is the first state in India to take up port privatisation. Gujarat has 45 ports along a 1,600 km coastline, including one major port at Kandla and 44 minor ports. There are 106 product clusters and 60 notified special economic zones (SEZs). Large scale investment is expected in Gujarat as part of the US$ 90 billion Delhi-Mumbai Industrial Corridor (DMIC).

The per capita income of Gujarat is Rs 187,524.1 in the year 2019-20 and has been growing at 8.2 percent during 2011-12 to 2019-20. The growth in per capita income is presented in **Figure 3-4**.

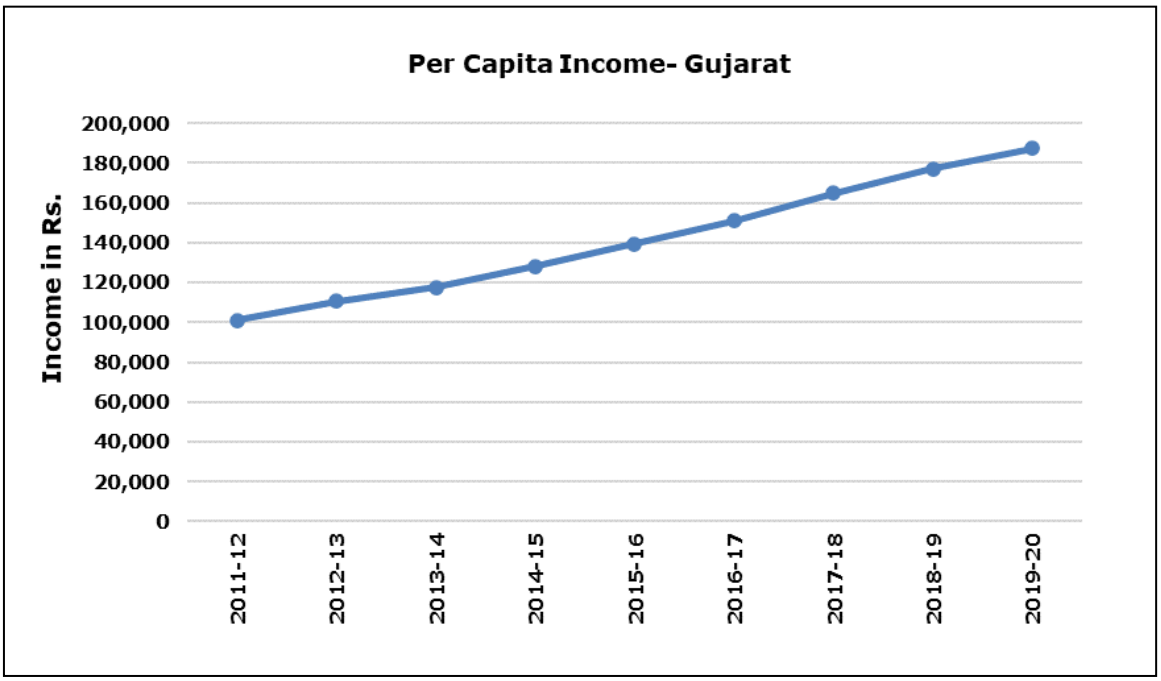


Figure 3-4: Per Capita Income of Gujarat from 2011-12 to 2019-20

Rajasthan

- Rajasthan's Gross State Domestic Product (GSDP) stood at Rs 6,887.1 billion in FY20 and has been growing at a compounded annual growth rate of 6.1 percent since FY12. The GSDP estimates for the year FY21 is Rs 6,432.2 billion.
- The state's growth has been growing between 4-8 percent since 2015-16. It has shown a growth of around 5 percent in FY20.
- The services sector is the largest contributor to GSDP (44.7 percent), agriculture allied activities sector at 33.1 percent and secondary sector at 22.2 percent of the GSDP in 2019-20.

The change of sectoral composition of GSDP over the years is presented in **Figure 3-5**.

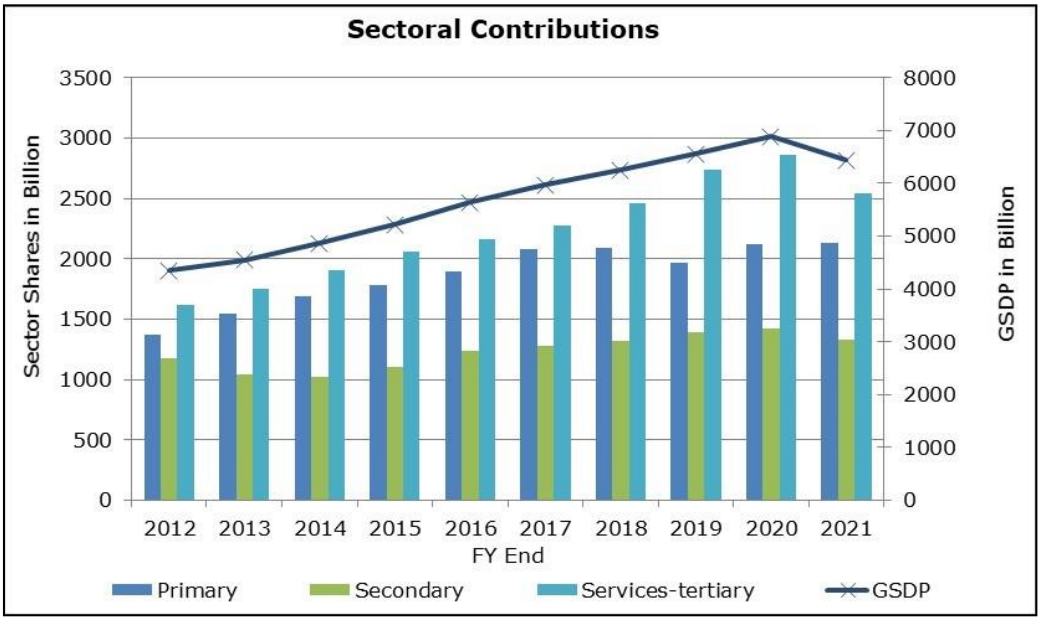


Figure 3-5: GSDP (in Rs billion) and its Sectoral Composition for Rajasthan

The performance of the state economy and its different sectors has been studied using time trend analysis. The average annual growth rates as obtained using regression analysis are presented in **Table 3-5**.

Particulars	2011-12 to 2019-20	2014-15 to 2019-20
GSDP	6.1	5.6
Agriculture and Allied	5.2	2.9
Industry	3.9	4.8
Services	7.3	7.2
Construction	2.3	3.0
Per Capita Income	4.5	3.9

Table 3-5 : Average Annual Growth Rates (%) of State Income for Rajasthan

Rajasthan is known for its textile industry and the state is the fourth largest producer of spun yarn in India. The main industries of Rajasthan include textile, rugs, woollen goods, vegetable oil and dyes. Heavy industries consist of copper and zinc smelting and the manufacture of railway rolling stock. The other industries related to private sector include steel, cement, ceramics and glass wares, electronic, leather and footwear, stone and other chemical industries.

Rajasthan has huge reserves of cement-grade and Steel Melting-Shop (SMS) grade limestone. SMS-grade limestone from Jaisalmer is supplied to various steel plants in the country. Rajasthan has 21 major cement plants, having a total capacity of 55 million tonnes per annum (MTPA). It is the largest cement-producing state in India. The state has about 17 per cent share in cement grade limestone reserves of India. Given the availability of huge cement grade limestone reserves, more than 10 cement plants would be installed in the state in near future, particularly in Chittorgarh, Jaipur, Jhunjhunu, Nagaur and Pali.

The state is a leading producer of major minerals such as lead-zinc, calcite, gypsum, rock phosphate, ochre, silver as well as minor minerals such as marble, sandstone, serpentine (green marble), etc. which contribute a major percentage to national production.

The state is developing sector specific infrastructure, such as special purpose industrial parks and special economic zones (SEZs) for exports of handicrafts, IT and electronic goods. Eight SEZs have got formal approval and eight have been notified. The primary industries for these SEZs are IT/ITES, Handicrafts, Gems and Jewellery, Engineering and related services.

The per capita income of Rajasthan is Rs 88,463 in the year 2019-20 and has been growing at 4.5 percent during 2011-12 to 2019-20. The growth in per capita income is presented in **Figure 3-6**.

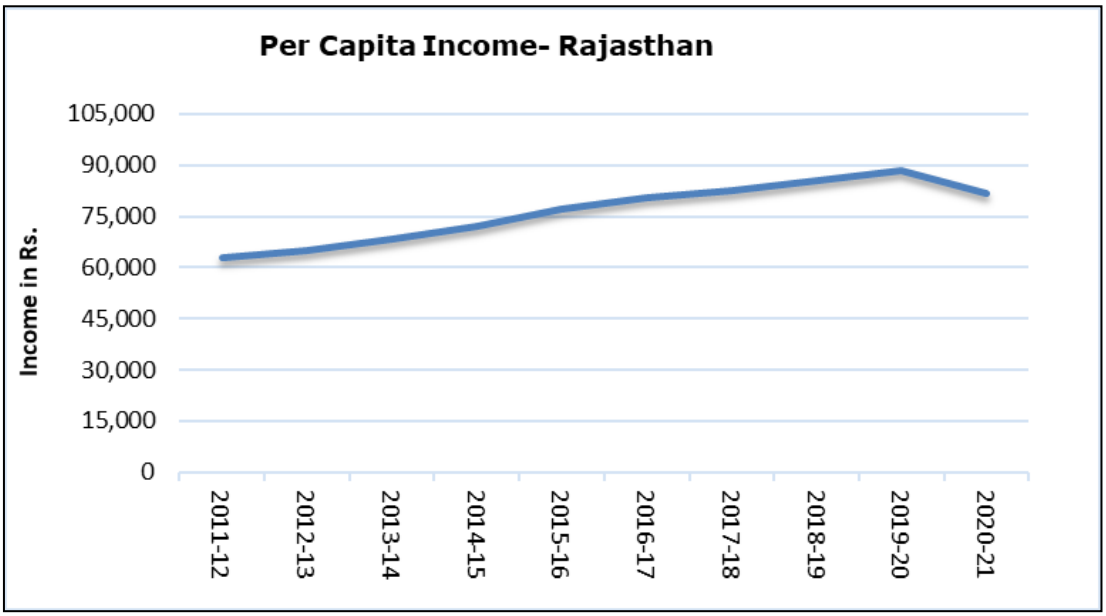


Figure 3-6: Per Capita Income of Rajasthan from 2011-12 to 2020-21

Other PIA States

The other PIA states contributing to the traffic on the project road are Maharashtra, Uttar Pradesh, Delhi, Haryana and Punjab.

- Gross State Domestic Product (GSDP) of Maharashtra stood at Rs 21,340.7 billion in 2019-20 and has been growing at a compounded annual growth rate of 6.8 percent since 2011-12.
- Gross State Domestic Product (GSDP) of Uttar Pradesh has shown a growth of around 3.8 percent in FY20 and stood at Rs 11,668.2 billion in 2019-20 and has been growing at a compounded annual growth rate of 6.6 percent since 2011-12. The GSDP estimates for the year FY21 is Rs 10,926.2 billion.
- The National Capital of Delhi has a Gross State Domestic Product (GSDP) of Rs 6,138.4 billion in 2019-20 and has been growing at a compounded annual growth

rate of 7.8 percent since 2011-12. The GSDP estimates for the year 2020-2021 is Rs 5,789.7 billion.

- Haryana's Gross State Domestic Product (GSDP) stood at Rs 5,597.1 billion in 2019-20 and has been growing at a compounded annual growth rate of 8.4 percent since 2011-12. The GSDP estimates for the year 2020-2021 is Rs 5,280.7 billion.
- Gross State Domestic Product (GSDP) of Punjab stood at Rs 4,135.8 billion in 2019-20 and has been growing at a compounded annual growth rate of 5.8 percent since 2011-12. The GSDP estimates for the year 2020-2021 is Rs 3,861.7 billion.
- The secondary sector is the largest contributor to GSDP (46.3 percent) in the PIA state of Gujarat and the services sector is the largest contributor to GSDP of the PIA states 57 percent in Maharashtra, 50.2 percent in Uttar Pradesh, 82.7 percent in Delhi, 51.1 percent in Haryana and 50.8 percent in Punjab.

The average annual growth rates as obtained using regression analysis for the period FY12 to FY20 are presented in **Table 3-6**.

Particular/States	Maharashtra	Uttar Pradesh	Delhi	Haryana	Punjab
2011-12 to 2019-20					
GSDP	6.8	6.6	7.8	8.4	5.8
Primary	2.9	4.0	5.8	3.9	2.3
Secondary	6.3	7.5	8.0	7.7	5.1
Tertiary	7.8	7.5	7.5	9.4	7.0
Construction	3.2	5.0	5.6	3.6	3.0
Per Capita Income	5.7	5.0	5.6	6.9	4.4

Table 3-6: Average Annual Growth Rates (%) of State Income for Other PIA States

The GSDP over the years for the states of Rajasthan, Gujarat, Maharashtra, Uttar Pradesh, Delhi, Haryana and Punjab are presented in **Figure 3-7.**

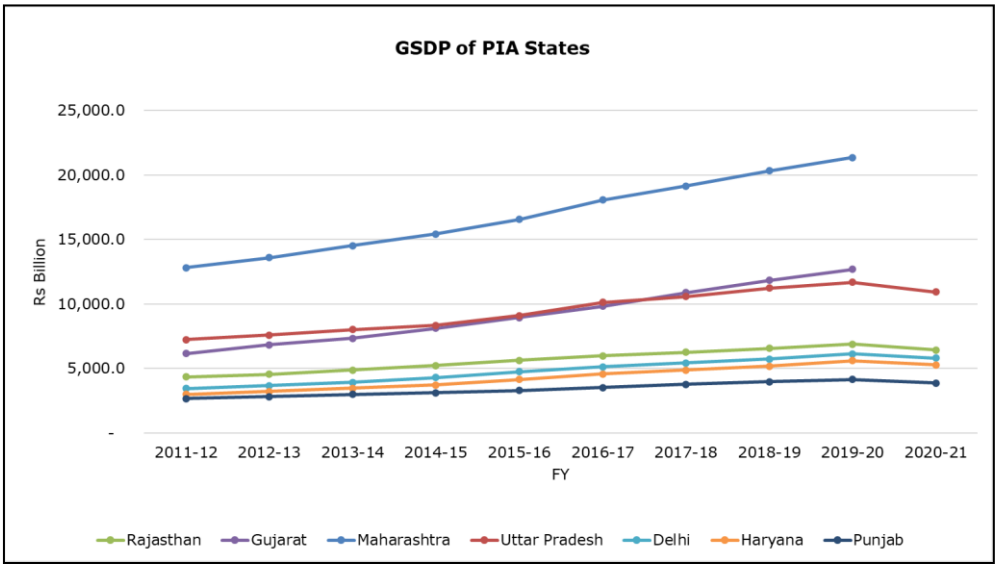


Figure 3-7: GSDP (in Rs billion) for PIA States

3.6 India and PIA Outlook

3.6.1 India's Past Performance and Outlook for Future

India's growth trend during the recent years has been presented in **Figure 3-8**.

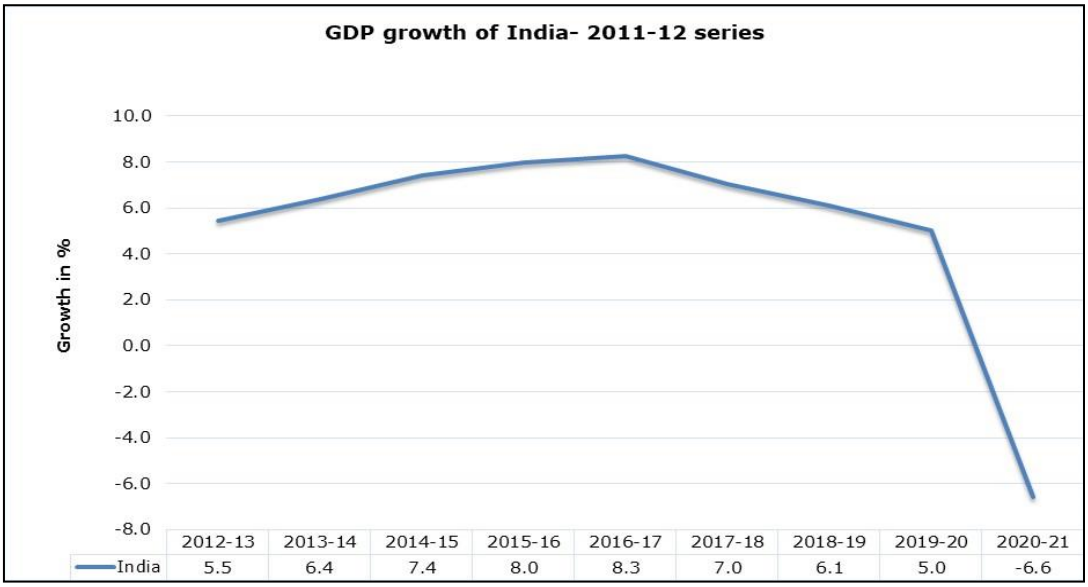


Figure 3-8: GDP Growth in India

Economic growth in India has been broadly on an accelerating path till FY18. It is likely to be the fastest growing major economy in the world in the medium-term. The growth in real GDP was 8.3 percent for FY17 and 7.0 percent in FY18, while the growth in FY19 was slightly lower at 6.1 percent. The long-term trend line growth of 7.2 percent has been achieved between FY12 to FY19. During FY20, growth has slowed down due to some structural issues and global headwinds resulting in an average GDP growth rate of 4.2 percent.

With the outbreak of COVID-19, global recession is likely to be witnessed across all the economies. The lockdown period announced by Indian government had an adverse impact on the economy. The first quarter estimated for FY21 has indicated a contraction of 23.9 percent, second quarter showed a rebound in growth by contracting 7.5 percent and third & fourth quarter grew by 0.5 percent and 1.6 percent respectively. The resultant contraction for FY21 has been around 6.6 percent.

The Indian economy is likely to see the impact of global slowdown due to COVID-19 and hence, the GDP forecast for India by various international agencies has been revised for the next two years. As per the latest update by Central Statistical Organisation (CSO), GDP in Q2 of FY22 has grown by 8.4 percent (down from 20.1 percent in Q1) and is likely to achieve a yearly growth rate of 9.5 percent (with 6.6% in Q3 and 6% in Q4). Further on, the economy is likely to grow in the range of 6.5-7.0 percent in FY23 and over 7.0 percent thereafter as per the forecast by CSO. As per Economic Survey of India for FY22, the economy is predicted to have a growth rate of 9.2 percent for FY22 and 8.0-8.5 percent in FY23. With the vaccination programme having covered the bulk of the

population, economic momentum building back and the likely long-term benefits of supply-side reforms in the pipeline, the Indian economy is in a good position to witness GDP growth of 8.0-8.5 per cent in 2022-23.

The GDP forecast series provided by client as adopted in the earlier study is presented in **Figure 3-9**.

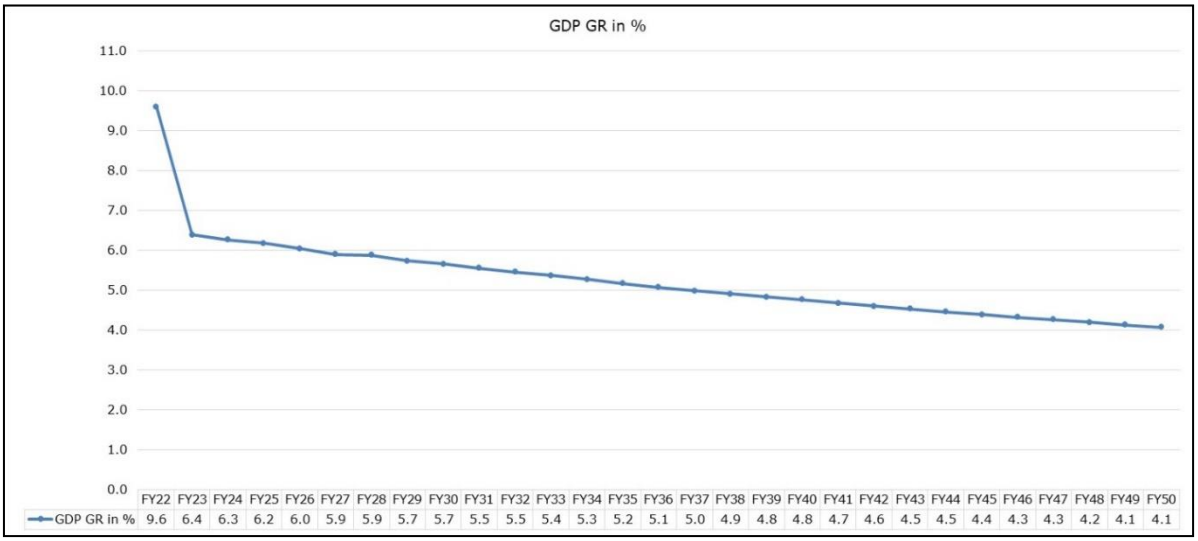


Figure 3-9: GDP Forecast of India adopted in Earlier Study

The year-on-year growth for Indian economy as provided by the Client (based on the forecast by Consensus Economics) for the present study is presented in **Figure 3-10.**

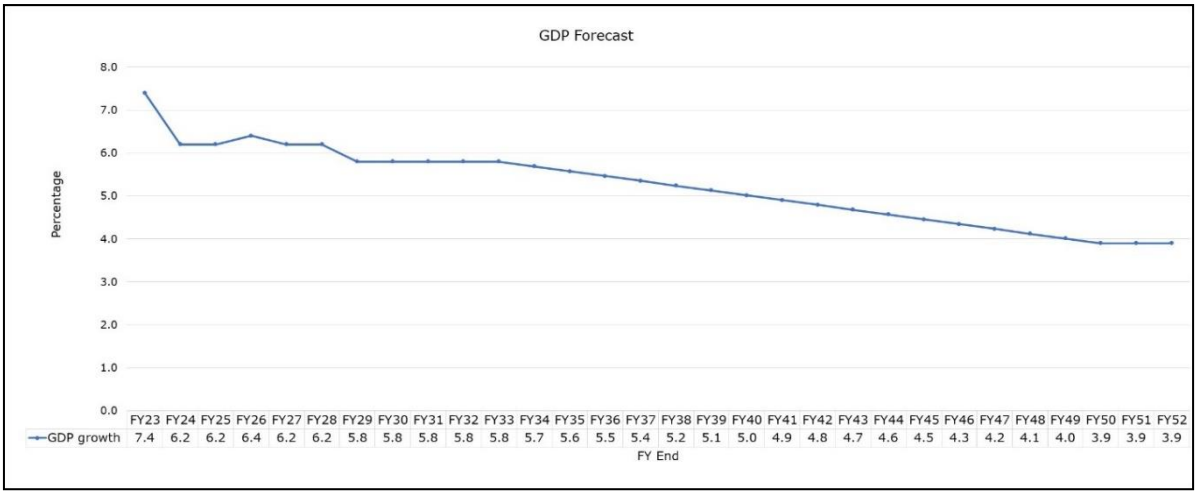


Figure 3-10: GDP Forecast of India in Present Study

3.6.2 PIA States Outlook

A snapshot of the main economic indicators in the past for the PIA states is presented in **Table 3-7**.

Indicators	Rajasthan	Gujarat	Maharashtra	Uttar Pradesh	Delhi	Haryana	Punjab
GSDP in Rs Billion	6,887.1	12,689.6	21,340.7	11,668.2	6,138.4	5,597.1	4,135.8
GSDP growth (FY12 to FY20) in %	6.1%	9.6%	6.8%	6.6%	7.8%	8.4%	5.8%
Per capita Income in Rs (FY20)	88,463	187,524	173,757	51,255	306,385	195,660	133,322

Indicators	Rajasthan	Gujarat	Maharashtra	Uttar Pradesh	Delhi	Haryana	Punjab
Sector Share in %, FY20							
Agriculture and allied	33.1	17.3	13.6	23.0	3.4	17.3	24.6
Industry	22.2	46.3	29.4	26.8	13.9	31.5	24.6
Services	44.7	36.4	57.0	50.2	82.7	51.1	50.8

Table 3-7: Main Economic Indicators of PIA States

In order to arrive at the forecast of the PIA states, past performance of the State GDPs vis-a-vis India GDP has been studied and the multipliers have been derived for both short term and long term. The past and adopted multipliers for PIA states to Indian economy are presented in **Table 3-8**.

Period	India	Rajasthan	Gujarat	Maharashtra	Uttar Pradesh	Delhi	Haryana	Punjab
Past growth %								
FY12 to FY20	7.0%	6.1%	9.6%	6.8%	6.6%	7.8%	8.4%	5.8%
FY15 to FY20	7.0%	5.6%	9.5%	6.8%	7.0%	7.1%	8.3%	6.0%
Past Multipliers vis-a-vis India								
FY12 to FY20		0.9	1.4	1.0	0.9	1.1	1.2	0.8
FY15 to FY20		0.8	1.4	1.0	1.0	1.0	1.2	0.9
Multipliers adopted for future								
States w.r.t. India		0.90	1.40	1.00	0.90	1.10	1.20	0.85

Table 3-8: Past Multipliers and Future Outlook of PIA States

Based on the normalised OD shares of the toll plaza and the outlooks adopted for PIA states, the mode-wise future weighted income of Abu Road – Palanpur section and Abu Road – Swaroopganj section is presented in **Table 3-9**.

FY/Modes	Cars/MLCV	M Bus/ LCV	Bus	2A	3A	MAV
Abu Road – Swaroopganj Section (Undavariya TP)						
2023	8.1	9.0	8.3	8.7	8.7	8.6
2024	6.8	7.6	7.0	7.3	7.3	7.2
2025	6.8	7.6	7.0	7.3	7.3	7.2
2026	7.0	7.8	7.2	7.6	7.5	7.5
2027	6.8	7.6	7.0	7.3	7.3	7.2
2028	6.8	7.6	7.0	7.3	7.3	7.2
2029	6.4	7.1	6.5	6.9	6.8	6.8
2030	6.4	7.1	6.5	6.9	6.8	6.8
2031	6.4	7.1	6.5	6.9	6.8	6.8
2032	6.4	7.1	6.5	6.9	6.8	6.8
2033	6.4	7.1	6.5	6.9	6.8	6.8
2034	6.2	6.9	6.4	6.7	6.7	6.6
2035	6.1	6.8	6.3	6.6	6.6	6.5
2036	6.0	6.7	6.1	6.5	6.4	6.4
2037	5.9	6.5	6.0	6.3	6.3	6.2
2038	5.8	6.4	5.9	6.2	6.2	6.1

FY/Modes	Cars/MLCV	M Bus/ LCV	Bus	2A	3A	MAV
2039	5.6	6.2	5.8	6.1	6.0	6.0
2040	5.5	6.1	5.6	5.9	5.9	5.9
2041	5.4	6.0	5.5	5.8	5.8	5.7
2042	5.3	5.8	5.4	5.7	5.6	5.6
2043	5.1	5.7	5.3	5.5	5.5	5.5
2044	5.0	5.6	5.1	5.4	5.4	5.3
2045	4.9	5.4	5.0	5.3	5.2	5.2
2046	4.8	5.3	4.9	5.1	5.1	5.1
2047	4.7	5.2	4.8	5.0	5.0	4.9
2048	4.5	5.0	4.6	4.9	4.9	4.8
2049	4.4	4.9	4.5	4.7	4.7	4.7
2050	4.3	4.7	4.4	4.6	4.6	4.6
2051	4.3	4.7	4.4	4.6	4.6	4.6
2052	4.3	4.7	4.4	4.6	4.6	4.6
Abu Road – Palanpur Section (Khemana TP)						
2023	9.4	9.3	9.2	9.1	9.0	8.9
2024	7.9	7.8	7.7	7.6	7.5	7.5
2025	7.9	7.8	7.7	7.6	7.5	7.5
2026	8.1	8.1	8.0	7.8	7.8	7.7
2027	7.9	7.8	7.7	7.6	7.5	7.5
2028	7.9	7.8	7.7	7.6	7.5	7.5
2029	7.4	7.3	7.2	7.1	7.1	7.0
2030	7.4	7.3	7.2	7.1	7.1	7.0
2031	7.4	7.3	7.2	7.1	7.1	7.0
2032	7.4	7.3	7.2	7.1	7.1	7.0
2033	7.4	7.3	7.2	7.1	7.1	7.0
2034	7.2	7.2	7.1	7.0	6.9	6.9
2035	7.1	7.0	7.0	6.8	6.8	6.7
2036	6.9	6.9	6.8	6.7	6.7	6.6
2037	6.8	6.8	6.7	6.6	6.5	6.5
2038	6.6	6.6	6.5	6.4	6.4	6.3
2039	6.5	6.5	6.4	6.3	6.2	6.2
2040	6.4	6.3	6.3	6.2	6.1	6.1
2041	6.2	6.2	6.1	6.0	6.0	5.9
2042	6.1	6.1	6.0	5.9	5.8	5.8
2043	5.9	5.9	5.8	5.7	5.7	5.7
2044	5.8	5.8	5.7	5.6	5.6	5.5
2045	5.7	5.6	5.6	5.5	5.4	5.4
2046	5.5	5.5	5.4	5.3	5.3	5.3
2047	5.4	5.3	5.3	5.2	5.2	5.1
2048	5.2	5.2	5.1	5.1	5.0	5.0
2049	5.1	5.1	5.0	4.9	4.9	4.8
2050	4.9	4.9	4.9	4.8	4.7	4.7

FY/Modes	Cars/MLCV	M Bus/ LCV	Bus	2A	3A	MAV
2051	4.9	4.9	4.9	4.8	4.7	4.7
2052	4.9	4.9	4.9	4.8	4.7	4.7

Table 3-9: Future Mode-wise Weighted Income of PIA States

3.7 Review of Past Traffic Data

Past DPR counts for the project road is available from Steer report for February 2018 and November 2020. A comparison of the counts with AADT under the present study is presented in **Table 3-10.**

Vehicle Type	CJV	LCV	Buses	2A	3A	MAV
Abu Road – Swaroopganj Section (Undavariya TP)						
2018 (Feb-18)	4,817	347	501	524	1,109	3,473
2021 (Nov-20)	6,938	539	568	719	1,062	5,354
2022 (AADT)	8,187	602	685	846	905	4,986
Growth (%)						
2022 VS 2018	14.2%	14.8%	8.1%	12.7%	-5.0%	9.5%
2022 VS 2021	18.0%	11.7%	20.6%	17.7%	-14.8%	-6.9%
Abu Road – Palanpur Section (Khemana TP)						
2018 (Feb-18)	6,445	685	258	569	1,455	3,418
2021 (Nov-20)	7,691	423	420	776	1,125	4,659
2022 (AADT)	8,583	677	604	760	865	4,733
Growth (%)						
2022 VS 2018	7.4%	-0.3%	23.7%	7.5%	-12.2%	8.5%
2022 VS 2021	11.6%	60.0%	43.8%	-2.1%	-23.1%	1.6%

Table 3-10 : Past Data from Steer Report

The past data compared above shows a growth rate varying between 7-18 percent in Cars at both the sections of Palapur- Abu Road-Swaroopganj. LCVs and Buses have also shown a double-digit growth for the comparison made above. 2A trucks have shown a positive growth during FY18 and FY22 at both the road sections. At Khemana TP the growth was -2.1 percent between FY21 and FY22. Negative growth in 3A trucks has been observed at both the sections with MAVs showing a growth of 8-9 percent between FY18 and FY22.

3.8 Past and Future Transport Demand Elasticity

The econometric model applied for the project, relates traffic growth to changes in state domestic product via an elasticity factor according to IRC guidelines.

The projected elasticities by Steer in the earlier study are presented in **Table 3-11**

Mode	Growth Driver	For Khemana TP & Undavariya TP
Car	Rajasthan and Gujarat GSDP	1.1
LCV/ Mini Bus		0.5
Bus		0.5
2A		0.3

Mode	Growth Driver	For Khemana TP & Undavariya TP
3A	GDP	0.4
MAV		0.9

Table 3-11 Recommended Elasticity in Earlier Study

A regression between GSDP (as independent variable) and registered vehicles (as dependant variable) of Rajasthan was carried out. The registered vehicle elasticity in case of cars is 1.6 during FY12 to FY19. In case of all trucks combined, the registered vehicle elasticity is 1.5 during the same period.

Vehicle registration data is also used as a proxy wherein operational toll data is not available. Vehicle registration data represents all vehicles registered in the state, but does not indicate actual number of vehicles plying on the road as it does not account for factors such vehicles taken off the road due to lack road worthiness, those registered in a state but mostly used elsewhere, etc. Consequently, the elasticity values based on vehicle registration may not be representative of the traffic growth trends on the project road. Past elasticity and growth trends on the nearby national highways have been the basis of growth for the project road.

The derived elasticities on other National Highways across India have also formed the basis for choosing the recommended elasticities on PR. The elasticities derived using the operational toll data regressed with the applicable state incomes (mode wise weighted shares) for the respective projects on some of the National Highways is presented in **Table 3-12**.

NH	Period	Car	2A	3A/MAV
NH-21	FY12-FY20	1.23	-0.42	0.54
SH-25	FY15-FY20	1.28	0.26	0.47
SH-17 & SH-7	FY13-FY20	1.26	0.51	0.33
NH-19	FY15-FY20	0.78	1.36	1.40
NH-1	FY12-FY20	1.02	0.74	
NH-6	FY14-FY20	1.11	1.68	0.42
NH-8A	FY16-FY20	0.73	0.28	0.94
NH-4	FY15-FY20	0.87	0.18	0.84
NH-6	FY16 to FY19	1.25	1.28	0.78

Table 3-12: Past Elasticity on Other National Highways

The past elasticity values have been observed in the range of 1-1.3 for cars on various National Highways and around 0.5-0.9 for 3A/MAV combined. Individually, 3A trucks have shown a negative elasticity in some of the assets with MAVs showing a higher positive elasticity.

Cars

- The elasticities and the past growth levels for cars are a result of increasing income levels, increasing vehicle ownership, and higher propensity to travel on highways in India due to network level developments and higher levels of service. These levels of growth are likely to continue in the near to medium term since car ownership levels are still very low and the road network is undergoing continual development.
- In case of cars, the elasticity values derived across the toll roads in the region is between 1.0 to 1.3. In case of Abu Road – Palanpur section, car elasticity has been considered as 1.0 for the period up to FY25, and thereby gradually tapered to 0.6 beyond FY40. Whereas in Abu Road – Swaroopganj section car elasticity is considered as 1.1 till FY25 and tapered to 0.7 beyond FY40.
- The motorisation levels in India also play an important role in determining car growth. With the increasing car ownership levels, propensity to travel and network level improvements on National Highways, car growth is likely to be at a high rate as witnessed in the recent past. The low motorization rate suggests that there is room for continued growth for many years to come. The motorisation rate for cars (per 1000 population) in India has gone up from 6.6 in 2001 to 20 in 2015. Although India's car fleet has been growing at 10% for nearly 25 years, its motorization rate is low compared to other countries of similar wealth and much lower than developed countries with motorization rate of around 450. The forecasts by different agencies indicate that number of cars will increase to 35 per thousand populations by 2025. With the continual increase in motorization rate and improved road network usage by cars for inter-urban travel, car growth is expected to be robust.

Bus

- Over the years in India, there has been a change in passenger's travel mode preferences with increasingly more people shifting from public transport systems towards personalised modes. This has resulted, in general, in elasticity of bus traffic/demand to GSDP lower than unity ranging between 0.3 to 0.8 across the operational National Highways.
- Going forward Bus elasticity has been recommended as 0.5 till the end of the concession period.

Trucks

- The switch between MLCV and LCV is being observed across other national highways wherein MLCVs (mostly charged in car category) have been gaining importance lately over LCV category. For LCVs, an elasticity of 0.5 has been adopted for the entire concession period.
- For 2A Trucks, elasticity has been recommended as 0.3 till the end of concession period.
- For the project road, an elasticity of 0.4 has been adopted for 3A trucks till the end of the concession period. In case of MAV trucks, an elasticity of 0.7 has been adopted for the entire concession period.

It is likely that this growth would slow down over time as the market becomes more mature and saturated. In India as a whole, the freight vehicle mix has been changing in the last decade favouring MAV to 2 Axle/ 3Axle vehicles for long-distance traffic, given the operational efficiencies achievable with larger vehicles. Considering the ongoing technical advancements in automobile industry, some of the standard 2 Axle/ 3 Axle trucks would gradually be replaced by MAVs. Mature national highways with tolling in operation for few years, have already witnessed the shift in 2A/3A trucks to MAV for long distance movement.

On an overall level, due consideration has been given to the tonnage shifts happening in the market with Mini LCV gaining importance for short distance movements over LCVs and MAVs being preferred over 2A/3A for long distance movements due to better operational efficiencies. Some of the 2A/3A trucks are also being used for local movements.

While assigning elasticities to different modes, freight travel pattern and over all elasticity of cargo tonnage with respect to weighted GSDP has been an important consideration. The recommended elasticity values adopted for all vehicle types in line with the traffic growth being observed on other national highways and changes in freight traffic pattern observed on the project road are presented in **Table 3-13**.

Period/Modes	Cars/MLCV		M Bus/ LCV	Bus	2A	3A	MAV
	Abu Road – Swaroopganj	Abu Road - Palanpur					
2023-2025	1.1	1.0	0.5	0.5	0.3	0.4	0.7
2026-2030	1.0	0.9	0.5	0.5	0.3	0.4	0.7
2031-2035	0.9	0.8	0.5	0.5	0.3	0.4	0.7
2036-2040	0.8	0.7	0.5	0.5	0.3	0.4	0.7
Beyond 2040	0.7	0.6	0.5	0.5	0.3	0.4	0.7

Table 3-13: Recommended Elasticity for Project Roads

It has been assumed that transport demand elasticity/growth, for both freight and passenger traffic, would gradually decline over time, despite growth in per capita income, as regions becomes more mature, self-sufficient and with alternative mode of transport

available to users. In the future growth forecast, the gradation in elasticity over the years takes into account to cover the impact of network level changes in both rail and road networks apart from economic changes.

3.9 Projected Traffic Growth Rates

The estimated traffic growth rates for the project road in the earlier study conducted by Steer have been presented in **Table 3-14.**

Period	Car	LCV	Bus	2-axle Truck	3-axle Truck	MAV	O/size/ HME
Abu Road – Swaroopganj Section (Undavariya TP)							
2023	8.1	3.8	3.8	2.3	2.6	5.7	5.7
2024	7.8	3.7	3.7	2.2	2.5	5.6	5.6
2025	7.6	3.6	3.6	2.1	2.5	5.6	5.6
2026	7.4	3.4	3.4	2.1	2.4	5.4	5.4
2027	7.1	3.3	3.3	2.0	2.4	5.3	5.3
2028	7.0	3.3	3.3	2.0	2.4	5.3	5.3
2029	6.7	3.1	3.1	1.9	2.3	5.2	5.2
2030	6.6	3.1	3.1	1.8	2.3	5.1	5.1
2031	6.4	3.0	3.0	1.8	2.2	5.0	5.0
2032	6.3	2.9	2.9	1.8	2.2	4.9	4.9
2033	6.2	2.9	2.9	1.7	2.1	4.8	4.8
2034	6.0	2.8	2.8	1.7	2.1	4.7	4.7
2035	5.9	2.7	2.7	1.6	2.1	4.6	4.6
2036	5.8	2.7	2.7	1.6	2.0	4.6	4.6
2037	5.6	2.6	2.6	1.6	2.0	4.5	4.5
2038	5.5	2.5	2.5	1.5	2.0	4.4	4.4
2039	5.4	2.5	2.5	1.5	1.9	4.3	4.3
2040	5.3	2.4	2.4	1.5	1.9	4.3	4.3
2041	5.1	2.4	2.4	1.4	1.9	4.2	4.2
2042	5.0	2.3	2.3	1.4	1.8	4.1	4.1
2043	4.9	2.3	2.3	1.4	1.8	4.1	4.1
2044	4.8	2.2	2.2	1.3	1.8	4.0	4.0
2045	4.7	2.2	2.2	1.3	1.8	3.9	3.9
2046	4.6	2.1	2.1	1.3	1.7	3.9	3.9
2047	4.5	2.1	2.1	1.3	1.7	3.8	3.8
2048	4.4	2.0	2.0	1.2	1.7	3.8	3.8
2049	4.3	2.0	2.0	1.2	1.7	3.7	3.7
2050	4.2	1.9	1.9	1.2	1.6	3.7	3.7
2051	4.2	1.9	1.9	1.2	1.6	3.7	3.7
2052	4.2	1.9	1.9	1.2	1.6	3.7	3.7
Abu Road – Palanpur Section (Khemana TP)							
2023	8.1	3.8	3.8	2.3	2.6	5.7	5.7
2024	7.9	3.7	3.7	2.2	2.5	5.6	5.6
2025	7.7	3.6	3.6	2.1	2.5	5.6	5.6
2026	7.4	3.4	3.4	2.1	2.4	5.4	5.4
2027	7.2	3.3	3.3	2.0	2.4	5.3	5.3
2028	7.0	3.3	3.3	2.0	2.4	5.3	5.3
2029	6.8	3.1	3.1	1.9	2.3	5.2	5.2
2030	6.6	3.1	3.1	1.8	2.3	5.1	5.1
2031	6.5	3.0	3.0	1.8	2.2	5.0	5.0
2032	6.3	2.9	2.9	1.8	2.2	4.9	4.9
2033	6.2	2.9	2.9	1.7	2.1	4.8	4.8
2034	6.1	2.8	2.8	1.7	2.1	4.7	4.7
2035	5.9	2.7	2.7	1.6	2.1	4.6	4.6

Period	Car	LCV	Bus	2-axle Truck	3-axle Truck	MAV	O/size/ HME
2036	5.8	2.7	2.7	1.6	2.0	4.6	4.6
2037	5.7	2.6	2.6	1.6	2.0	4.5	4.5
2038	5.5	2.5	2.5	1.5	2.0	4.4	4.4
2039	5.4	2.5	2.5	1.5	1.9	4.3	4.3
2040	5.3	2.4	2.4	1.5	1.9	4.3	4.3
2041	5.2	2.4	2.4	1.4	1.9	4.2	4.2
2042	5.1	2.3	2.3	1.4	1.8	4.1	4.1
2043	5.0	2.3	2.3	1.4	1.8	4.1	4.1
2044	4.8	2.2	2.2	1.3	1.8	4.0	4.0
2045	4.7	2.2	2.2	1.3	1.8	3.9	3.9
2046	4.6	2.1	2.1	1.3	1.7	3.9	3.9
2047	4.5	2.1	2.1	1.3	1.7	3.8	3.8
2048	4.4	2.0	2.0	1.2	1.7	3.8	3.8
2049	4.3	2.0	2.0	1.2	1.7	3.7	3.7
2050	4.2	1.9	1.9	1.2	1.6	3.7	3.7
2051	4.2	1.9	1.9	1.2	1.6	3.7	3.7
2052	4.2	1.9	1.9	1.2	1.6	3.7	3.7

Table 3-14 Projected Traffic Growth Rates for Project Road in Earlier Study (%)

Under the present study, based on the moderated perspective elasticity values and the projected growth rates of the income for PIA states, the future average annual compound traffic growth rates by vehicle type have been estimated for the project road by using the following relationship:

Tgr = (GSDPgr) x E; where,

Tgr – Traffic growth rate for mode

GSDPgr – Growth rate of GSDP

E – Elasticity value for mode

Using the year-on-year mode wise weighted income for PIA and elasticity for different time periods, traffic growth rates have been estimated for each year till FY52. The estimated traffic growth rates for the project road have been presented in **Table 3-15**.

FY/Modes	Cars/MLCV	M Bus/ LCV	Bus	2A	3A	MAV
Abu Road – Swaroopganj Section (Undavariya TP)						
2023	8.9	4.5	4.2	2.6	3.5	6.0
2024	7.5	3.8	3.5	2.2	2.9	5.1
2025	7.5	3.8	3.5	2.2	2.9	5.1
2026	7.0	3.9	3.6	2.3	3.0	5.2
2027	6.8	3.8	3.5	2.2	2.9	5.1
2028	6.8	3.8	3.5	2.2	2.9	5.1
2029	6.4	3.5	3.3	2.1	2.7	4.7
2030	6.4	3.5	3.3	2.1	2.7	4.7
2031	5.7	3.5	3.3	2.1	2.7	4.7
2032	5.7	3.5	3.3	2.1	2.7	4.7
2033	5.7	3.5	3.3	2.1	2.7	4.7
2034	5.6	3.5	3.2	2.0	2.7	4.6
2035	5.5	3.4	3.1	2.0	2.6	4.6
2036	4.8	3.3	3.1	1.9	2.6	4.5
2037	4.7	3.3	3.0	1.9	2.5	4.4
2038	4.6	3.2	2.9	1.9	2.5	4.3
2039	4.5	3.1	2.9	1.8	2.4	4.2

FY/Modes	Cars/MLCV	M Bus/ LCV	Bus	2A	3A	MAV
2040	4.4	3.1	2.8	1.8	2.4	4.1
2041	3.8	3.0	2.8	1.7	2.3	4.0
2042	3.7	2.9	2.7	1.7	2.3	3.9
2043	3.6	2.9	2.6	1.7	2.2	3.8
2044	3.5	2.8	2.6	1.6	2.2	3.7
2045	3.4	2.7	2.5	1.6	2.1	3.6
2046	3.3	2.6	2.4	1.5	2.0	3.6
2047	3.3	2.6	2.4	1.5	2.0	3.5
2048	3.2	2.5	2.3	1.5	1.9	3.4
2049	3.1	2.4	2.3	1.4	1.9	3.3
2050	3.0	2.4	2.2	1.4	1.8	3.2
2051	3.0	2.4	2.2	1.4	1.8	3.2
2052	3.0	2.4	2.2	1.4	1.8	3.2
Abu Road – Palanpur Section (Khemana TP)						
2023	9.4	4.7	4.6	2.7	3.6	6.3
2024	7.9	3.9	3.9	2.3	3.0	5.2
2025	7.9	3.9	3.9	2.3	3.0	5.2
2026	7.3	4.0	4.0	2.4	3.1	5.4
2027	7.1	3.9	3.9	2.3	3.0	5.2
2028	7.1	3.9	3.9	2.3	3.0	5.2
2029	6.6	3.7	3.6	2.1	2.8	4.9
2030	6.6	3.7	3.6	2.1	2.8	4.9
2031	5.9	3.7	3.6	2.1	2.8	4.9
2032	5.9	3.7	3.6	2.1	2.8	4.9
2033	5.9	3.7	3.6	2.1	2.8	4.9
2034	5.8	3.6	3.5	2.1	2.8	4.8
2035	5.7	3.5	3.5	2.1	2.7	4.7
2036	4.9	3.4	3.4	2.0	2.7	4.6
2037	4.8	3.4	3.3	2.0	2.6	4.5
2038	4.7	3.3	3.3	1.9	2.6	4.4
2039	4.6	3.2	3.2	1.9	2.5	4.3
2040	4.5	3.2	3.1	1.8	2.4	4.2
2041	3.7	3.1	3.1	1.8	2.4	4.1
2042	3.6	3.0	3.0	1.8	2.3	4.1
2043	3.6	3.0	2.9	1.7	2.3	4.0
2044	3.5	2.9	2.8	1.7	2.2	3.9
2045	3.4	2.8	2.8	1.6	2.2	3.8
2046	3.3	2.7	2.7	1.6	2.1	3.7
2047	3.2	2.7	2.6	1.6	2.1	3.6
2048	3.1	2.6	2.6	1.5	2.0	3.5
2049	3.1	2.5	2.5	1.5	2.0	3.4
2050	3.0	2.5	2.4	1.4	1.9	3.3
2051	3.0	2.5	2.4	1.4	1.9	3.3
2052	3.0	2.5	2.4	1.4	1.9	3.3

Table 3-15: Projected Traffic Growth Rates for Project Roads (%)

In derivation of above growth rates, the likely shift of buses to cars in case of passenger vehicles and the replacement/ tonnage shift of 2A/3A trucks to MAV for long distance in case of freight vehicles has been duly considered.

The implied traffic growth rates for freight vehicles of 2A/3A and MAV after considering the impact of diversion to DFC in FY24 to FY26 and Amritsar Jamnagar Expressway in FY26 to FY28 under the base case have been presented in **Table 3-16**.

FY/ Modes	Abu Road – Swaroopganj Section (Undavariya TP)			Abu Road – Palanpur Section (Khemana TP)		
	2A	3A	MAV	2A	3A	MAV
2024	2.2	2.4	4.5	2.3	2.5	4.7
2025	2.2	2.7	4.8	2.3	2.8	5.0

FY/ Modes	Abu Road – Swaroopganj Section (Undavariya TP)			Abu Road – Palanpur Section (Khemana TP)		
	2A	3A	MAV	2A	3A	MAV
2026	-0.4	-0.4	2.8	1.5	1.2	3.1
2027	0.8	1.3	4.0	1.8	2.2	4.2
2028	0.8	1.3	4.0	1.8	2.2	4.2

Table 3-16: Implied Traffic Growth Rates for Project Road After Diversion (%)

The above growth rates relate to the most likely Base Case. In addition, two sets of traffic growth rates under low and high cases have also been considered and impact on toll revenue evaluated for both these cases. Based on the risk analysis of key parameters like economic growth and elasticity of travel demand impacting traffic growth, two additional growth scenarios have been presented. Low growth scenario considers a 20 percent reduction in growth rates relating to about 10 percent decline each in elasticity and economic growth. The High growth scenario considers a 20 percent increase in growth rates signifying about 10 percent increase each in elasticity and economic parameters.

3.10 Traffic Projections and Capacity Analysis

Table 3-17 presents the projections of the total vehicles based on the most likely growth rates till FY52 as assessed in this study.

FY	Abu Road – Swaroopganj Section (Undavariya TP)		Abu Road – Palanpur Section (Khemana TP)	
	Before Diversion	After Diversion	Before Diversion	After Diversion
2022	38,835	38,835	37,584	37,584
2023	41,210	41,210	40,009	40,009
2024	43,333	43,193	42,183	42,050
2025	45,574	45,354	44,485	44,276
2026	47,944	46,918	46,914	46,052
2027	50,368	48,919	49,403	48,200
2028	52,922	51,013	52,033	50,457
2029	55,440	53,450	54,632	52,983
2030	58,085	56,010	57,369	55,643
2031	60,774	58,609	60,139	58,332
2032	63,593	61,335	63,048	61,156
2033	66,548	64,193	66,103	64,124
2034	69,587	67,133	69,251	67,180
2035	72,709	70,152	72,489	70,326
2036	75,798	73,137	75,677	73,418
2037	78,957	76,189	78,940	76,583
2038	82,183	79,306	82,277	79,820
2039	85,473	82,486	85,685	83,126
2040	88,824	85,724	89,160	86,497
2041	92,107	88,892	92,541	89,771
2042	95,436	92,105	95,973	93,096
2043	98,808	95,360	99,452	96,465
2044	102,219	98,652	102,974	99,877
2045	105,665	101,977	106,535	103,325

FY	Abu Road – Swaroopganj Section (Undavariya TP)		Abu Road – Palanpur Section (Khemana TP)	
	Before Diversion	After Diversion	Before Diversion	After Diversion
2046	109,140	105,330	110,129	106,805
2047	112,640	108,708	113,752	110,313
2048	116,159	112,104	117,397	113,843
2049	119,692	115,514	121,060	117,390
2050	123,234	118,932	124,735	120,948
2051	126,884	122,454	128,523	124,616
2052	130,643	126,082	132,429	128,397

Table 3-17: Projected Traffic on the Project Road

As per the latest information related to InvIT CA, the six laning augmentation is done after the traffic projections on the PR crosses 40,000 PCUs and remains above 40,000 PCUs for three more consecutive years, after which NHAI may invite bids for DPR preparation. Based on the projected traffic using the recommended Base Case growth rates, the project road traffic on Abu Road - Swaroopganj and Abu Road - Palanpur sections is likely to reach 40,000 PCUs in FY23 and will continue to be above 40,000 PCUs for further three consecutive years till FY26 after which NHAI may invite bids for DPR preparation.

Once six laned, the projected traffic for the project road is likely to reach designed capacity of 120,000 PCU for 6 lane in FY51 for Abu Road- Swaroopganj and in FY50 for Abu Road Palanpur.

4. TOLL REVENUE PROJECTIONS

4.1 Tolling Strategy

The project road has an "Open System" of toll collection which enables the concessionaire to collect tolls from through traffic as well as from short distance one.

As mentioned earlier, there is one operational toll plaza on each section. The section wise toll plazas and effective tolling length is presented in the **Table 4-1**.

Section	Toll Plaza	Effective Tolling Length (KM)
Abu Road – Swaroopganj Section	Undavariya TP	32.539
Abu Road – Palanpur Section	Khemana TP	50.921

Table 4-1 Section-wise Toll Plaza and Effective Tolling Length

4.2 Schedule of User Fee

As per Schedule of User Fee for the project, the per km toll rates applicable from 2007-08 for normal tolling length, bypasses and permanent structures, the revision basis and concessions are provided.

The concessions to traffic have been given in the form of rates as below:

Local traffic

Car / Jeep / Vans - includes local users owning a vehicle registered for non-commercial purposes, residing within a distance of 20 km from the toll plaza and crossing the same for commuting purposes.

Commercial vehicles - includes local users owning a commercial vehicle (excluding vehicles under National Permit), registered with address on the Registration Certificate of a particular district and uses such vehicle for commuting on a section of National Highway, permanent bridge, tunnel or bypass, as the case may be, which is located within that district, shall be levied user fee on all toll plazas which are located within that district at the rate of fifty per cent of the prescribed rate of fee (single journey rate). No such concession shall be provided, if a service road or alternative road is available for use by such commercial vehicles. Thus, local commercial traffic has to pay only 50 percent of the normal ticket.

Daily Pass

When the vehicle has to cross the tolled section more than once in a day, the user shall have the option to pay one and half times (1.5 times) of the fee for a single entry; this pass shall be valid for 2 entries within 24 hours of purchase.

Monthly Pass

A user, who makes use of the project road frequently during a month, may opt to purchase a monthly pass upon payment of a charge equal to two-thirds of the fee payable

for 50 single journeys; this pass can be used for a maximum 50 one-way journeys over the month of validity.

Thus, the different categories of toll tickets are as follows:

(i) Traffic paying normal toll rates (single trip)
(ii) Traffic paying return journey rates
(iii) Traffic paying monthly pass rates
(iv) Traffic paying local personal rates
(v) Traffic paying local commercial rates

4.3 Tolling Streams

The tolling segmentation considered in earlier study adopted by Steer in Abu Road – Swaroopganj section is presented in **Table 4-2.**

Category / Modes	Car			LCV	Bus/ 2A Truck	3 A Truck			4-6 A Truck		
	FY22	FY23	FY24 onwards			FY22	FY23	FY24 Onwards	FY22	FY23	FY24 Onwards
Single	85.1	87.8	87.8	95.8	98.7	90.6	99.2	99.2	90.5	99.0	99.0
Return	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Monthly	5.1	5.3	5.3	0.0	0.3	0.0	0.0	0.0	0.1	0.1	0.1
Local personal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Local commercial	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Exempt	9.8	6.9	6.9	4.2	0.9	9.4	0.8	0.8	9.4	0.9	0.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 4-2 Tolling Distribution in Earlier Study – Abu Road – Swaroopganj Section (%)

Exemptions of cars were considered to decline from 9.8 percent to 6.9 percent in FY23 onwards. Similarly, for 3A Truck and MAV Trucks, exemption of 9.4 percent was considered in FY22 and tapered to 0.8 and 0.9 percent respectively from FY23 onwards.

The tolling segmentation considered in earlier study adopted by Steer in Abu Road – Palanpur section is presented in **Table 4-3**

Category / Modes	Car			LCV	Bus/ 2A Truck	3 A Truck		4-6 A Truck	
	FY22	FY23	FY24 onwards			FY22	FY23 Onwards	FY22	FY23 Onwards
Single	66.5	72.5	72.5	87.4	91.2	82.8	88.9	91.2	97.5
Return	1.0	1.1	1.1	4.1	5.1	3.3	3.6	1.1	1.2
Monthly	4.9	5.3	5.3	0.0	0.2	0.0	0.0	0.0	0.0
Local personal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Local commercial	0.2	0.3	0.3	1.7	1.5	1.7	1.8	0.3	0.4
Exempt	27.4	20.9	20.9	6.8	2.0	12.2	5.7	7.4	0.9
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Table 4-3 Tolling Distribution in Earlier Study – Abu Road – Palanpur Section (%)

Around 6.8 percent of LCV and 2.0 percent of Bus/2A Trucks has been considered under exemption category throughout the study period at toll plaza location. Whereas exemption of cars has been considered as 27.4 percent in FY22 and tapered to 20.9 from FY23 onwards. Similarly, for 3A Truck and MAV Trucks, exemption of 12.2 and 7.4 is considered in FY22 and tapered to 5.7 and 0.9 respectively from FY23 onwards.

The tolling stream distribution in the present study has been derived from the toll data taking an average of ticket wise traffic from July 2021 to April 2022 and the same has been adopted for all the modes except cars. The level of exemptions in cars has been found to be high due to which a tapering has been considered in the future years. The **Table 4-4** presents the distribution considered for all the modes.

Ticket Type/Modes	Car			LCV	Bus/ 2-axle Truck	3-axle Truck	MAV	Oversized
	FY22	FY23	FY24 onwards					
Abu Road – Swaroopganj Section (Undavariya TP)								
Single	37.0	37.0	37.0	47.3	64.4	88.3	86.9	91.6
Return	25.5	36.6	43.2	45.3	34.3	10.1	11.6	3.2
Monthly	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
Local personal	0.9	8.3	12.7	0.0	0.0	0.0	0.0	0.0
Local commercial	0.1	0.1	0.1	1.4	0.4	0.9	1.0	0.0
Exempt	36.5	18.0	7.0	5.8	0.9	0.7	0.4	5.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Abu Road – Palanpur Section (Khemana TP)								
Single	33.6	33.6	33.6	51.1	68.2	86.6	90.3	94.0
Return	16.1	25.1	32.9	38.3	30.7	10.7	8.5	4.5
Monthly	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Local personal	1.4	7.3	12.5	0.0	0.0	0.0	0.0	0.0
Local commercial	0.0	0.0	0.0	0.4	0.2	0.0	0.4	0.0
Exempt	48.9	34.0	21.0	10.3	0.9	2.7	0.7	1.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 4-4: Tolling Distribution from Toll Data of July 2021 to April 2022 (%)

The actual segmentation observed during July 2021 to April 2022 indicates a lower percentage of single ticket paying traffic in almost all the modes with return ticket traffic being higher. The level of exemptions witnessed (adopted in the present study) in Cars and LCV category are on the higher side while it is in the similar range in case of other higher axle trucks.

In case of cars, the normal toll paying traffic is likely to be about 37 percent and 33.6 percent at the two toll plazas of Undavaria and Khemana. Daily Pass traffic has a share of 16.1 percent and 25.5 percent from the toll data. At Undavaria TP, 36 percent of exemptions is assumed to decline to 7 percent by FY24 and continue at the same level beyond that. The gain from reduction in exemptions has been spread over the return pass and local pass categories for cars. Similarly, exemptions in Cars at Khemana TP are considered to decrease from the current level of 48.9 percent to 34 percent in FY23 and 21 percent in FY24 onwards owing to the better toll operations in place by then.

In case of LCV around 51.1 percent of the traffic at the toll plaza is paying for single ticket. In case of 3A/MAV, around 86-90 percent of the truck traffic is opting for normal ticket at the toll plaza due to their long lead of travel and around 8-11 percent each of 3A trucks and MAVs are falling under return pass category at the toll plaza.

Trip rate for local pass users is considered as 1.0, for monthly pass it is 1.67 across all modes. For daily pass, trip rate of 2.0 has been considered for all the modes.

4.4 Toll Rates

This section presents details on the toll rates that are likely to be imposed on the users of the project road during the study period. The toll rates (Rs/km) for the base year 2007-08 for different vehicle categories as per toll fee rules are presented in **Table 4-5**.

Mode	Base rate per km (in Rs)
Car, Jeep, Van, LMV	0.65
LCV /M Bus	1.05
Bus/ 2 Axle Truck	2.20
3 Axle	2.40
MAV	3.45
Oversized	4.20

Table 4-5: Toll Rates in Rs/km for Different Vehicle Categories

The toll notification states that the 2007 toll rates shall be increased without compounding by three per cent each year with effect from the 1st day of April 2008 and such increased rate shall be deemed to be the base rate for the subsequent years.

In addition to this, the rate of fee for use of bypass forming part of a section of a National Highway constructed with a cost of Rs 10 crore or more, for the base year 2007, shall be one and a half times of the per km base rates specified above and the length of such bypass shall be excluded from the length of such section of National Highway. Also, the fee levied and collected hereunder for permanent bridge/ structures, as the case may be, having a length of 60 m or more on the basis of the equivalent length for structure as specified shall be due and payable at the toll plaza.

In case of the project road, the details of normal tolling lengths, bypass length (at 1.5 times) and equivalent structure lengths being charged at toll plazas are presented in **Table 4-6**.

Section & Toll Plaza	Abu Road – Swaroopganj Section (Undavariya TP)	Abu Road – Palanpur Section (Khemana TP)
A. Normal length	30.823	44.331
B. Bypass length @ 1.5 times	0.000	0.000
C. Equivalent Structure length	1.77	6.59
D. Total tolling length=(A+1.5*B+C)	32.593	50.921

Table 4-6: Tolling Lengths (in km) for Abu Road -Palanpur

The applicable base rates shall be revised annually with effect from April 1 each year to reflect the increase in wholesale price index for the month of December of the immediate preceding year in which such revision is undertaken but such revision shall be restricted for 40 per cent of the increase in wholesale price index.

A WPI growth forecast of 3.5 percent was considered in the earlier study during the tenure of study period.

For the present study, actual WPI information for December 2021 of 143.3 under 2011-12 series converted into 1999-00 series (143.3*1.873*1.641=440.446) has been used. The forecast of WPI applicable for FY24 has been considered as 5.5 percent (as per the forecast by RBI for Q3 FY23) and in light of the past growth trend since 2009, 3.5 percent for future years beyond FY24 has been adopted for the period till FY52.

As per the applicable tolling notifications for six laning, during construction period, the toll rates will be charged at 75 percent of the applicable tolling length during construction and kept constant till full COD is achieved. The construction period for six laning for these two assets is likely to be from FY29 to FY30 during which the toll rates will be 75 percent of the applicable toll rates of FY29 and will be constant for FY30. Also, for FY31, the toll rates are capped at 25 percent higher than the toll rates in FY30.

The stream of toll rates to be charged at two toll plazas of the project road till FY52 is presented in **Table 4-7.** The toll fee has been rounded to nearest 5 Rupees as per toll fee rules.

FY End	Car	LCV / M Bus	Bus /2A Truck	3-axle Truck	MAV	O/size/HME	Car Local
Abu Road – Swaroopganj Section (Undavariya TP)							
2022	40	65	135	150	215	260	285
2023	45	70	150	165	235	285	315
2024	45	75	160	175	250	300	330
2025	50	80	165	180	260	315	345
2026	50	80	170	185	270	330	360
2027	55	85	180	195	280	340	375
2028	55	90	185	205	290	355	390
2029*	45	70	145	160	230	275	405
2030*	45	70	145	160	230	275	405
2031	55	85	180	200	285	345	440
2032	65	105	220	240	345	415	455
2033	65	110	230	250	355	435	475
2034	70	115	235	260	370	450	495
2035	75	120	245	270	385	470	515
2036	75	125	255	280	405	490	535
2037	80	130	265	290	420	510	560
2038	80	135	280	305	435	530	580
2039	85	140	290	315	455	555	605
2040	90	145	300	330	475	575	630
2041	95	150	315	340	490	600	655

FY End	Car	LCV / M Bus	Bus /2A Truck	3-axle Truck	MAV	O/size/HME	Car Local
2042	95	155	325	355	510	625	685
2043	100	160	340	370	535	650	710
2044	105	170	355	385	555	675	740
2045	110	175	370	400	580	705	770
2046	115	185	385	420	600	730	800
2047	120	190	400	435	625	760	835
2048	125	200	415	455	650	795	870
2049	130	205	430	470	680	825	905
2050	135	215	450	490	705	860	940
2051	140	225	470	510	735	895	980
2052	145	235	490	530	765	930	1,020
Abu Road – Palanpur Section (Khemana TP)							
2022	65	100	215	230	335	405	285
2023	70	110	235	255	370	450	315
2024	75	120	245	270	390	470	330
2025	75	125	255	280	405	490	345
2026	80	130	270	290	420	510	360
2027	80	135	280	305	440	535	375
2028	85	140	290	315	455	555	390
2029*	65	110	225	250	355	435	405
2030*	65	110	225	250	355	435	405
2031	85	135	285	310	445	540	440
2032	100	165	340	375	535	650	455
2033	105	170	355	390	560	680	475
2034	110	175	370	405	580	705	495
2035	115	185	385	420	605	735	515
2036	120	190	400	440	630	765	535
2037	125	200	415	455	655	795	560
2038	130	205	435	475	680	830	580
2039	135	215	450	495	710	865	605
2040	140	225	470	515	740	900	630
2041	145	235	490	535	770	935	655
2042	150	245	510	555	800	975	685
2043	155	255	530	580	835	1,015	710
2044	165	265	555	605	865	1,055	740
2045	170	275	575	630	900	1,100	770
2046	175	285	600	655	940	1,145	800
2047	185	300	625	680	980	1,190	835
2048	190	310	650	710	1,020	1,240	870
2049	200	320	675	735	1,060	1,290	905
2050	210	335	705	765	1,105	1,345	940
2051	215	350	730	800	1,150	1,400	980
2052	225	365	760	830	1,195	1,455	1,020

*Toll rates at 75% during six laning

Table 4-7: Toll Rates at Toll Plaza (in Rs)

The users purchasing return journey tickets will pay 1.5 times the above toll rates; the traffic opting for monthly passes will pay 33.3 times (two-thirds of 50 single journeys)

the normal traffic toll rates. All passes have been rounded to the nearest 5 Rupees as per fee rules.

4.5 Toll Revenue Estimates

The toll revenue estimates of the earlier study are presented in **Table 4-8**

FY End	Abu Road – Swaroopganj Section (Undavariya TP)	Abu Road – Palanpur Section (Khemana TP)
2023	636.9	886.9
2024	693.3	957.8
2025	748.6	1,030.4
2026	815.0	1,132.7
2027	898.7	1,228.4
2028	977.0	1,350.1
2029	1,072.3	1,480.2
2030	1,158.7	1,597.9
2031	956.4	1,751.2
2032	1,004.3	1,919.3
2033	1,336.2	1,548.0
2034	1,669.1	1,618.9
2035	1,801.5	2,157.6
2036	1,977.7	2,733.8
2037	2,127.0	2,954.0
2038	2,317.6	3,207.4
2039	2,519.4	3,448.2
2040	2,708.0	3,742.1
2041	2,948.2	4,053.0
2042	3,210.8	4,401.0
2043	3,427.8	4,758.2
2044	3,727.2	5,147.9
2045	4,020.6	5528.3
2046	4,343.6	5,967.8
2047	4,667.4	6,470.1
2048	5,036.0	6,977.5
2049	5,426.4	7,496.2
2050	5,849.2	8,079.4
2051	6,298.6	8,676.0
PV12 FY23 till 2051	11,071.4	15,275.2

Table 4-8 Toll Revenue (in Rs Million) in Earlier Study

The projections of revenue under the present study for the project road have been presented till 15th December of FY52. Toll revenue streams have been calculated assuming that toll would be collected for all 365 days in a year and for 366 days in a leap year. The toll revenue by mode for the project road for the base case is presented in **Table 4-9**.

Toll Revenue in Rs Million								
FY End	Car	LCV	Bus	2-axle Truck	3-axle Truck	MAV	OSV	Total
Abu Road – Swaroopganj Section (Undavariya TP)								
2023	95.8	13.2	35.3	42.9	54.3	436.0	0.5	677.9
2024	116.4	14.9	38.8	46.6	59.1	485.2	0.6	761.6
2025	136.0	16.2	41.4	49.2	62.3	528.0	0.6	833.8
2026	145.8	17.2	44.3	50.6	63.8	563.9	0.7	886.4

Toll Revenue in Rs Million								
FY End	Car	LCV	Bus	2-axle Truck	3-axle Truck	MAV	OSV	Total
2027	168.6	18.8	48.6	54.0	68.0	608.1	0.8	966.8
2028	180.8	20.5	51.9	56.2	72.6	657.3	0.8	1,040.3
2029	158.2	16.5	42.0	44.9	58.1	543.2	0.7	863.6
2030	168.3	17.0	43.3	45.8	59.7	569.0	0.7	903.9
2031	216.9	21.6	55.3	57.8	76.6	738.9	0.9	1,168.1
2032	270.8	27.3	70.0	72.3	94.8	939.6	1.2	1,475.9
2033	292.7	29.7	75.1	76.7	101.0	1,010.8	1.3	1,587.3
2034	328.7	31.9	79.6	80.4	108.0	1,102.0	1.4	1,732.1
2035	367.5	34.3	85.6	85.5	115.1	1,199.4	1.5	1,888.9
2036	394.5	37.2	92.1	90.9	122.8	1,320.5	1.7	2,059.6
2037	434.8	39.7	98.3	96.0	130.0	1,426.0	1.8	2,226.5
2038	463.9	42.7	106.4	102.8	140.0	1,540.8	1.9	2,398.6
2039	509.8	45.5	113.7	108.8	148.2	1,677.8	2.1	2,605.9
2040	559.7	48.9	121.3	114.8	159.3	1,828.3	2.3	2,834.8
2041	606.3	52.2	130.3	122.2	167.6	1,958.2	2.5	3,039.4
2042	639.8	55.8	138.5	128.6	178.9	2,117.9	2.7	3,262.2
2043	691.8	59.5	148.4	136.5	190.5	2,304.6	2.9	3,534.3
2044	748.3	64.6	159.2	145.1	203.1	2,486.8	3.1	3,810.3
2045	814.3	68.4	169.4	153.0	214.9	2,685.6	3.4	4,109.0
2046	873.8	73.6	180.8	161.8	230.0	2,878.4	3.6	4,402.1
2047	935.9	77.9	192.5	170.9	243.2	3,102.9	3.9	4,727.2
2048	1,015.0	83.7	205.2	180.6	259.9	3,343.9	4.2	5,092.5
2049	1,079.3	88.6	217.0	189.5	273.0	3,601.4	4.5	5,453.3
2050	1,161.4	94.4	231.6	200.6	289.7	3,855.5	4.9	5,837.9
2051	1,247.7	101.2	247.1	212.4	307.0	4,147.5	5.2	6,268.2
2052*	942.2	77.0	187.0	159.4	231.3	3,169.4	4.0	4,770.3
Abu Road – Palanpur Section (Khemana TP)								
2023	128.3	23.0	49.4	61.0	78.9	657.2	0.8	998.8
2024	165.4	25.6	53.8	65.5	85.9	727.4	0.9	1,124.6
2025	181.5	27.8	58.0	69.5	91.2	791.1	1.0	1,220.2
2026	205.7	29.9	63.6	74.4	95.8	846.3	1.1	1,316.8
2027	224.3	32.4	68.7	78.8	102.8	923.4	1.2	1,431.8
2028	253.4	35.2	74.1	83.3	108.9	998.5	1.4	1,554.9
2029	208.9	28.6	59.5	66.0	88.5	815.1	1.1	1,267.7
2030	222.7	29.7	61.7	67.4	91.0	855.1	1.2	1,328.7
2031	300.6	37.9	80.7	86.9	116.1	1,124.4	1.5	1,748.1
2032	376.8	47.8	100.2	106.3	144.8	1,421.9	1.9	2,199.7
2033	420.5	51.1	108.2	113.2	154.4	1,556.1	2.1	2,405.5
2034	462.9	54.6	116.7	120.3	164.8	1,689.8	2.3	2,611.4
2035	508.1	59.4	125.7	127.9	175.6	1,845.4	2.5	2,844.7
2036	560.7	63.5	135.3	135.8	189.3	2,016.3	2.7	3,103.6
2037	606.9	68.9	144.8	143.4	200.5	2,184.8	3.0	3,352.3
2038	664.1	73.2	156.5	152.9	214.5	2,369.2	3.2	3,633.6
2039	717.5	79.2	167.5	161.6	229.1	2,581.0	3.5	3,939.5
2040	783.4	85.3	180.6	172.0	244.9	2,811.9	3.8	4,281.8
2041	835.6	91.6	193.5	182.1	259.8	3,038.9	4.1	4,605.5
2042	900.5	98.4	207.4	192.9	275.9	3,285.3	4.5	4,964.8
2043	968.0	105.5	221.8	203.9	294.8	3,564.2	4.8	5,363.0
2044	1,059.3	113.1	239.4	217.5	315.2	3,846.6	5.2	5,796.2
2045	1,130.4	120.3	254.6	228.8	334.3	4,142.2	5.7	6,216.3
2046	1,207.2	128.7	272.7	242.3	355.0	4,484.2	6.1	6,696.2
2047	1,306.8	138.2	291.3	256.2	376.3	4,841.3	6.6	7,216.8
2048	1,403.8	147.6	311.8	271.4	401.7	5,228.9	7.1	7,772.3
2049	1,507.3	156.3	331.2	285.4	423.1	5,604.1	7.6	8,315.1
2050	1,618.5	167.4	353.9	302.0	448.7	6,034.0	8.2	8,932.7
2051	1,723.8	178.8	376.1	317.8	478.1	6,487.5	8.8	9,570.9

Toll Revenue in Rs Million								
FY End	Car	LCV	Bus	2-axle Truck	3-axle Truck	MAV	OSV	Total
2052*	1,321.1	135.7	285.3	238.7	359.7	4,955.4	6.7	7,302.9

* Till 15th December FY52

Table 4-9: Toll Revenue for the Project Roads by Mode

Majority of the revenue is expected to come from MAV with about 65-66 percent of the total revenue at both the sections. Amongst other categories, Cars represent a share of around 18-19 percent of total revenue followed by around 5.5 percent and 4.0 percent each by 3 axle trucks and buses at both the toll plazas.

Vehicles paying normal tolls are around 81-84 percent of total toll revenues for the project road sections and around 15-18 percent of the traffic may opt for daily pass category. Remaining traffic may fall in monthly pass and local concession category.

4.6 Scenario Analysis

For toll road projects, revenue streams are generally based on the assessment of the traffic volume (base and future) crossing the toll plazas and the applicable toll imposed on the user of the road. There is an inherent element of uncertainty in any forecast and whilst is not possible to measure risk in a strictly statistical sense (as many of the risks are largely or partly unknown), in this section an attempt is made at quantifying the main risks that could have an impact on this forecast.

The econometric approach used to derive traffic growth, is based on the estimation of GSDP growth rates for the influence area economies and traffic demand elasticity by mode; the estimation of both variables contains a certain degree of uncertainty which can be represented in the scenario analysis. Scenario analysis has been done in the following subheadings for the base case:

High Case

The high case is based on a more optimistic economic outlook for future years and higher elasticity values as compared to the base case. Therefore, traffic growth rates of 20 percent higher than the base case for every year and for all the mode are considered.

Low Case

A growth rate of 20 percent lower than base case for all types of vehicles has been considered in the present analysis to reflect uncertainty with regard to economic performance of PIA states and lower elasticity values.

The results of different scenarios are presented in **Table 4-10.** A comparison versus base case has been presented for the Present Value of the project (at 12 per cent discount rate) of the project revenue from FY23 till 15th December of FY52.

FY End	Abu Road – Swaroopganj Section (Undavariya TP)			Abu Road – Palanpur Section (Khemana TP)		
	Base	High Growth (+20%)	Low Growth (-20%)	Base	High Growth (+20%)	Low Growth (-20%)
2023	677.9	685.4	670.4	998.8	1,010.2	987.3
2024	761.6	777.4	745.9	1,124.6	1,148.9	1,100.6
2025	833.8	859.4	808.8	1,220.2	1,258.8	1,182.3
2026	886.4	922.5	851.4	1,316.8	1,372.3	1,263.1
2027	966.8	1,015.9	919.8	1,431.8	1,506.7	1,360.0
2028	1,040.3	1,103.5	980.3	1,554.9	1,652.6	1,462.3
2029	863.6	924.6	806.2	1,267.7	1,359.9	1,181.2
2030	903.9	976.5	836.2	1,328.7	1,438.7	1,226.5
2031	1,168.1	1,273.2	1,071.2	1,748.1	1,910.4	1,598.7
2032	1,475.9	1,622.7	1,341.7	2,199.7	2,425.8	1,993.6
2033	1,587.3	1,760.7	1,430.3	2,405.5	2,677.6	2,159.9
2034	1,732.1	1,938.6	1,546.8	2,611.4	2,933.2	2,323.6
2035	1,888.9	2,132.8	1,672.1	2,844.7	3,223.9	2,508.7
2036	2,059.6	2,344.6	1,808.4	3,103.6	3,547.6	2,713.7
2037	2,226.5	2,555.6	1,938.9	3,352.3	3,863.9	2,906.8
2038	2,398.6	2,774.4	2,072.6	3,633.6	4,222.6	3,124.9
2039	2,605.9	3,038.3	2,234.0	3,939.5	4,614.9	3,361.0
2040	2,834.8	3,330.9	2,411.4	4,281.8	5,055.7	3,624.3
2041	3,039.4	3,597.5	2,566.6	4,605.5	5,478.3	3,869.5
2042	3,262.2	3,888.3	2,735.6	4,964.8	5,949.0	4,140.9
2043	3,534.3	4,242.2	2,943.1	5,363.0	6,472.3	4,441.2
2044	3,810.3	4,604.7	3,151.3	5,796.2	7,044.7	4,766.1
2045	4,109.0	4,999.7	3,375.3	6,216.3	7,607.1	5,076.7
2046	4,402.1	5,391.0	3,592.8	6,696.2	8,249.1	5,432.4
2047	4,727.2	5,826.3	3,833.7	7,216.8	8,949.3	5,816.0
2048	5,092.5	6,315.9	4,104.1	7,772.3	9,699.7	6,224.0
2049	5,453.3	6,804.7	4,368.2	8,315.1	10,442.6	6,617.0
2050	5,837.9	7,327.8	4,648.9	8,932.7	11,286.5	7,065.5
2051	6,268.2	7,914.5	4,962.1	9,570.9	12,165.8	7,524.8
2052*	4,770.3	6,058.5	3,754.4	7,302.9	9,339.9	5,706.7
PV12 FY23 till 15th Dec in FY52	11,763.9	13,243.3	10,493.4	17,649.9	19,959.6	15,675.9
PV12 till 15th Dec in FY52 vs base		12.6%	-10.8%		13.1%	-11.2%

* Till 15th Dec

Table 4-10: Comparison of Annual Revenue Forecasts Under Different Scenarios

The low growth scenario has a negative impact on revenue PV of about 11 percent versus base case (till FY52), whilst the optimistic growth scenario would generate about 13 percent higher PV than the base case at both the assets of Abu Road-Swaroopganj and Abu Road-Palanpur.

APPENDICES

APPENDIX 2.1
TRAFFIC ZONING SYSTEM

Traffic study for Abu road-Swaroopganj and Abu road-Palanpur sections of NH-27 in the state of Rajasthan and Gujarat
Traffic Zoning System

Zone	Place/Region	District/ State	State/Country/Region
1	**Swaroopganj/Naayi Dhanari/Bhavri**	Project Corridor: Swaroopganj-Abu Road	Rajasthan
2	Udvariya/Patumburi/Khakarwada/Kachholi		
3	Bhimana/Taroongi/Bharja/Bhujela		
4	Kivarali/Aamthala/Pandoori/Morthala/Akrabhatta/Manpur		
5	**Abu Road/Maval**		
6	Amirgadh/Kakwada/Kidotar	Project Corridor: Abu Road-Palanpur	Gujarat
7	Sarotra/Iqbalgadh/Laxmipura/Juni Roh Sarotri/Balundra/Jethi		
8	Chitrasani/Hebatpur/Kotda/Pirojpura/Jaspuria		
9	Khemana/Surajpura		
10	Songadh/Sadarpur/Malan		
11	**Palanpur**		
12	Chandisar/Chadotar	Banaskantha district	
13	Deesa	Banaskantha district	
14	Ambaji	Banaskantha district	
15	Siddhpur/Unjha	Patan District	
16	Patan/Radhanpur	Patan District	
17	Visnagar/Gozaria	Mehsana district	
18	Becharji/Modhera	Mehsana district	
19	**Mehsana city**	Mehsana district	
20	Himmatnagar/Prantij/Modasa/Samalaji	Sabarkantha district	
21	**Gandhinagar**	Gandhinagar district	
22	**Ahmedabad city**	Ahmedabad district	
23	Sanand/Sarkhej/Sabarmati/Nalsarovar/Bavla/Dholka/Lothal/Dhandhuka/Bharwala/Ranpur	Central Ahmedabad District	
24	Viramgam/Mandal/Rampura	North Ahmedabad District	
25	Godhra/Dahod/Halol	Panchmahal district	
26	Anand/Nadiad/Kheda	Anand/Kheda district	
27	**Vadodara**	Vadodara district	
28	**Surat/Hazira**	Surat District	
29	Bharuch/Narmada/Tapi/Navsari/Dang/Valsad	Bharuch District	
30	Samakhiali/Malia	Samakhiali/Malia	
31	Morbi	Morbi	
32	Gandhidham	Gandhidham	
33	Kandla/Mundra/Mandvi/Tuna	Kandla/Mundra/Mandvi/Tuna	
34	Bhuj/Rann of Kutchh	Bhuj/Rann of Kutchh	
35	Surendranagar	Surendranagar	
36	Rajkot/Junagadh	Rajkot/Junagadh	
37	Jamnagar	Jamnagar	
38	Porbandar	Porbandar	
39	Bhavnagar/Amreli	Bhavnagar/Amreli	
40	Rest of Gujarat	Rest of Gujarat	
41	Revdar/Anadra	Sirohi District	Rajasthan
42	Pindwara	Sirohi District	
43	Sirohi	Sirohi District	
44	Mount Abu	Sirohi District	
45	**Udaipur**	Udaipur district	
46	Rajsamand/Nathdwara	Rajsamand district	
47	**Chittorgarh**	Chittorgarh district	
48	Bhilwara	Bhilwara district	
49	**Kota/Jhalawar**	Kota district	
50	Ajmer/Kishangarh	Ajmer district	
51	Beawar	Ajmer district	
52	**Jodhpur**	Jodhpur district	
53	Pali	Jodhpur district	
54	Jaisalmer/Balotra/Barmar	Jaisalmer/Barmar district	
55	Bikaner	Bikaner district	
56	**Jaipur**	Jaipur district	
57	Sawai Madhopur/Tonk	Sawai Madhopur/Tonk Districts	
58	Dungarpur/Banswara/Pratapgarh	Sabarkantha district	
59	Rest of Rajasthan	Rest of Rajasthan	
60	**Mumbai**	Westen Maharasthra	Maharashtra
61	Mumbai JNPT	Westen Maharasthra	
62	**Nashik**	Western Maharashtra	
63	Dhule	North Eastern Maharashtra	
64	Jalgaon/Aurangabad/Jalna	North Eastern Maharashtra	
65	Buldhana/Nandurbar/Rest of East Maharashtra	North Eastern Maharashtra	
66	**Pune /Nanded/Solapur**	North Eastern Maharashtra	
67	Aurangabad/Ahmednagar/Rest of South East Maharashtra	South Eastern Maharasthra	
68	Nagpur/Amravati/Akola/Chandrapur/Rest of Western Maharashtra	Eastern Maharashtra	
69	Rest of Maharashtra	Rest of Maharashtra Districts	
70	**Indore city**	Indore City	Madhya Pradesh
71	Bhopal/Vidisha	Bhopal/Vidisha	
72	Ratlam	Ratlam	
73	Rest of Madhya Pradesh	Rest of Madhya Pradesh	
74	Noida/Ghaziabad	Noida/Ghaziabad	Uttar Pradesh
75	Agra/Mathura	Agra/Mathura	
76	**Lucknow/Kanpur**	Lucknow/Kanpur	
77	Rest of Uttar Pradesh	Rest of Uttar Pradesh	
78	**Delhi**	Delhi	Delhi
79	Gurgaon/Faridabad	Gurgaon/Faridabad	Haryana
80	Rest of Haryana	Rest of Haryana	
81	Punjab	Punjab	Punjab
82	Chandigarh	Chandigarh	Chandigarh
83	Uttarakhand	Uttarakhand	Uttarakhand
84	Himachal Pradesh	Himachal Pradesh	Himachal Pradesh
85	Jammu Kashmir & Ladakh	Jammu Kashmir & Ladakh	Jammu Kashmir & Ladakh
86	Bihar	Bihar	Bihar
87	West Bengal	West Bengal	West Bengal
88	Chhattisgarh	Chhattisgarh	Chhattisgarh
89	Odisha	Odisha	Odisha
90	Jharkhand	Jharkhand	Jharkhand
91	Andhra Pradesh	Andhra Pradesh	Andhra Pradesh
92	Telanagana	Telanagana	Telanagana
93	Karnataka	Karnataka	Karnataka
94	Tamil Nadu	Tamil Nadu	Tamil Nadu
95	Kerala	Kerala	Kerala
96	Goa	Goa	Goa
97	Assam /North eastern states	Assam /North eastern states	Assam /North eastern states

APPENDIX 2.2
MODE WISE TOP20 OD PAIRS

Traffic study for Abu road-Swarooopganj and Abu road-Palanpur sections of NH-27 in the state of Rajasthan and Gujarat

TOP 20 Origin Destination Pairs at Undavariya TP (A-S)

Car

S.No.	Origin	Destination	% of total
1	Abu Road/Maval	Sirohi	19%
2	Swarooopganj/Naayi Dhanari/Bhavri	Abu Road/Maval	5%
3	Abu Road/Maval	Pali	3%
4	Ahmedabad city	Sirohi	3%
5	Ahmedabad city	Pali	3%
6	Ahmedabad city	Jaipur	3%
7	Ahmedabad city	Jodhpur	3%
8	Abu Road/Maval	Udaipur	2%
9	Abu Road/Maval	Pindwara	2%
10	Palanpur	Sirohi	2%
11	Abu Road/Maval	Jodhpur	2%
12	Swarooopganj/Naayi Dhanari/Bhavri	Ahmedabad city	2%
13	Palanpur	Pali	1%
14	Ahmedabad city	Udaipur	1%
15	Ahmedabad city	Ajmer/Kishangarh	1%
16	Mount Abu	Udaipur	1%
17	Sirohi	Mount Abu	1%
18	Ahmedabad city	Rest of Rajasthan	1%
19	Mount Abu	Pali	1%
20	Abu Road/Maval	Jaipur	1%
		Total	**57%**

Mini Bus

1	Palanpur	Sirohi	11%
2	Sirohi	Mount Abu	11%
3	Swarooopganj/Naayi Dhanari/Bhavri	Abu Road/Maval	10%
4	Abu Road/Maval	Pindwara	10%
5	Swarooopganj/Naayi Dhanari/Bhavri	Palanpur	9%
6	Ambaji	Pindwara	9%
7	Abu Road/Maval	Sirohi	8%
8	Swarooopganj/Naayi Dhanari/Bhavri	Mehsana city	4%
9	Ahmedabad city	Jodhpur	4%
10	Ahmedabad city	Rest of Rajasthan	4%
11	Rest of Gujarat	Sirohi	4%
12	Mount Abu	Jodhpur	4%
13	Abu Road/Maval	Jodhpur	3%
14	Abu Road/Maval	Rest of Rajasthan	3%
15	Mehsana city	Pindwara	3%
		Total	**100%**

Bus

S.No.	Origin	Destination	% of total
1	Ahmedabad city	Jodhpur	6%
2	Abu Road/Maval	Jaipur	5%
3	Ahmedabad city	Jaipur	4%
4	Swarooopganj/Naayi Dhanari/Bhavri	Abu Road/Maval	4%
5	Abu Road/Maval	Udaipur	4%
6	Abu Road/Maval	Pali	4%
7	Abu Road/Maval	Jodhpur	3%
8	Ahmedabad city	Sirohi	3%
9	Abu Road/Maval	Sirohi	3%
10	Ahmedabad city	Pali	3%
11	Ahmedabad city	Udaipur	3%
12	Sirohi	Mount Abu	2%
13	Rest of Gujarat	Sirohi	2%
14	Sirohi	Pune /Nanded/Solapur	2%
15	Surat/Hazira	Jodhpur	2%
16	Surat/Hazira	Pali	2%
17	Jodhpur	Pune /Nanded/Solapur	2%
18	Pali	Mumbai	2%
19	Abu Road/Maval	Rest of Rajasthan	1%
20	Ahmedabad city	Rest of Rajasthan	1%
		Total	**57%**

MLCV

S.No.	Origin	Destination	% of total
1	Abu Road/Maval	Sirohi	26%
2	Swarooopganj/Naayi Dhanari/Bhavri	Abu Road/Maval	10%
3	Palanpur	Sirohi	6%
4	Abu Road/Maval	Pali	5%
5	Abu Road/Maval	Jodhpur	4%
6	Palanpur	Pali	3%
7	Swarooopganj/Naayi Dhanari/Bhavri	Siddhpur/Unjha	2%
8	Abu Road/Maval	Udaipur	2%
9	Abu Road/Maval	Jaipur	2%
10	Abu Road/Maval	Rest of Uttar Pradesh	2%
11	Mehsana city	Rest of Uttar Pradesh	2%
12	Ahmedabad city	Sirohi	2%
13	Swarooopganj/Naayi Dhanari/Bhavri	Deesa	1%
14	Abu Road/Maval	Chittorgarh	1%
15	Abu Road/Maval	Ajmer/Kishangarh	1%
16	Palanpur	Rest of Rajasthan	1%
17	Deesa	Pindwara	1%
18	Deesa	Sirohi	1%
19	Deesa	Jodhpur	1%
20	Mehsana city	Pindwara	1%
		Total	**74%**

LCV

S.No.	Origin	Destination	% of total
1	Abu Road/Maval	Sirohi	4%
2	Ahmedabad city	Jodhpur	3%
3	Rest of Gujarat	Punjab	3%
4	Ahmedabad city	Delhi	2%
5	Rest of Gujarat	Rest of Harvana	2%
6	Rest of Gujarat	Sirohi	2%
7	Rest of Gujarat	Jaipur	2%
8	Abu Road/Maval	Rest of Uttar Pradesh	2%
9	Palanpur	Sirohi	2%
10	Gandhidham	Pali	2%
11	Rest of Gujarat	Delhi	2%
12	Mehsana city	Jodhpur	2%
13	Abu Road/Maval	Pindwara	2%
14	Ahmedabad city	Rest of Harvana	2%
15	Palanpur	Pali	1%
16	Palanpur	Jodhpur	1%
17	Palanpur	Rest of Harvana	1%
18	Ahmedabad city	Sirohi	1%
19	Ahmedabad city	Punjab	1%
20	Swarooopganj/Naayi Dhanari/Bhavri	Abu Road/Maval	1%
		Total	**39%**

Traffic study for Abu road-Swaroopganj and Abu road-Palanpur sections of NH-27 in the state of Rajasthan and Gujarat

TOP 20 Origin Destination Pairs at Undavariya TP (A-S)

2 Axle

S.No.	Origin	Destination	% of total
1	Ahmedabad city	Jodhpur	3%
2	Ahmedabad city	Rest of Uttar Pradesh	3%
3	Rest of Gujarat	Rest of Haryana	3%
4	Ahmedabad city	Punjab	3%
5	Abu Road/Maval	Sirohi	3%
6	Ahmedabad city	Jaipur	3%
7	Ahmedabad city	Rest of Haryana	2%
8	Mehsana city	Delhi	2%
9	Ahmedabad city	Delhi	2%
10	Rest of Gujarat	Pali	2%
11	Ahmedabad city	Bikaner	2%
12	Abu Road/Maval	Rest of Uttar Pradesh	2%
13	Rest of Gujarat	Punjab	2%
14	Palanpur	Sirohi	2%
15	Palanpur	Rest of Rajasthan	2%
16	Ahmedabad city	Udaipur	2%
17	Rest of Gujarat	Rest of Uttar Pradesh	2%
18	Abu Road/Maval	Rest of Haryana	1%
19	Palanpur	Jaipur	1%
20	Palanpur	Delhi	1%
		Total	**41%**

3 Axle

S.No.	Origin	Destination	% of total
1	Rest of Gujarat	Jaipur	3%
2	Ahmedabad city	Jodhpur	3%
3	Abu Road/Maval	Sirohi	3%
4	Rest of Gujarat	Punjab	2%
5	Rest of Gujarat	Delhi	2%
6	Rest of Gujarat	Rest of Uttar Pradesh	2%
7	Ahmedabad city	Jaipur	2%
8	Ahmedabad city	Rest of Uttar Pradesh	2%
9	Ahmedabad city	Punjab	2%
10	Surat/Hazira	Punjab	2%
11	Ahmedabad city	Delhi	2%
12	Rest of Gujarat	Rest of Haryana	2%
13	Rest of Gujarat	Jodhpur	2%
14	Abu Road/Maval	Pindwara	1%
15	Rest of Gujarat	Ajmer/Kishangarh	1%
16	Mehsana city	Pali	1%
17	Rest of Maharashtra	Punjab	1%
18	Rest of Gujarat	Rest of Rajasthan	1%
19	Rest of Gujarat	Sirohi	1%
20	Palanpur	Jaipur	1%
		Total	**36%**

MAV

S.No.	Origin	Destination	% of total
1	Abu Road/Maval	Sirohi	6%
2	Abu Road/Maval	Udaipur	2%
3	Abu Road/Maval	Pali	2%
4	Ahmedabad city	Punjab	2%
5	Palanpur	Jaipur	1%
6	Palanpur	Delhi	1%
7	Ahmedabad city	Jaipur	1%
8	Gandhidham	Rest of Uttar Pradesh	1%
9	Gandhidham	Bhilwara	1%
10	Rest of Gujarat	Delhi	1%
11	Palanpur	Rest of Uttar Pradesh	1%
12	Palanpur	Punjab	1%
13	Kandla/Mundra/Mandvi/Tuna	Delhi	1%
14	Ahmedabad city	Delhi	1%
15	Palanpur	Sirohi	1%
16	Palanpur	Pali	1%
17	Morbi	Pali	1%
18	Palanpur	Ajmer/Kishangarh	1%
19	Ahmedabad city	Udaipur	1%
20	Ahmedabad city	Rest of Haryana	1%
		Total	**27%**

Traffic study for Abu road-Swaroopganj and Abu road-Palanpur sections of NH-27 in the state of Rajasthan and Gujarat

TOP 20 Origin Destination Pairs at Khemana TP (A-P)

Car

S.No.	Origin	Destination	% of total
1	Abu Road/Maval	Palanpur	10%
2	Ahmedabad city	Jodhpur	6%
3	Amirgadh/Kakwada/Kidotar	Palanpur	6%
4	Abu Road/Maval	Morbi	5%
5	Abu Road/Maval	Ahmedabad city	4%
6	Ahmedabad city	Sirohi	4%
7	Sarotra/Igbalgadh/Laxmipura/Juni Roh Sarotri/Balundra/Jethi	Palanpur	4%
8	Chitrasani/Hebatpur/Kotda/Piroipura/Jaspuria	Palanpur	4%
9	Palanpur	Jodhpur	3%
10	Ahmedabad city	Rest of Rajasthan	2%
11	Abu Road/Maval	Mehsana city	2%
12	Swaroopganj/Naayi Dhanari/Bhavri	Palanpur	2%
13	Palanpur	Sirohi	1%
14	Ahmedabad city	Aimer/Kishangarh	1%
15	Palanpur	Udaipur	1%
16	Abu Road/Maval	Deesa	1%
17	Palanpur	Jaipur	1%
18	Sarotra/Igbalgadh/Laxmipura/Juni Roh Sarotri/Balundra/Jethi	Ahmedabad city	1%
19	Palanpur	Ajmer/Kishangarh	1%
20	Surat/Hazira	Jodhpur	1%
		Total	**60%**

Mini Bus

1	Palanpur	Jodhpur	51%
2	Palanpur	Rest of Rajasthan	5%
3	Abu Road/Maval	Palanpur	3%
4	Abu Road/Maval	Ahmedabad city	3%
5	Abu Road/Maval	Vadodara	3%
6	Palanpur	Pindwara	3%
7	Palanpur	Mount Abu	3%
8	Palanpur	Jaipur	3%
9	Mehsana city	Rest of Rajasthan	3%
10	Gandhinagar	Uttarakhand	3%
11	Ahmedabad city	Rest of Rajasthan	3%
12	Surat/Hazira	Lucknow/Kanpur	3%
13	Surat/Hazira	Rest of Uttar Pradesh	3%
14	Bhuj/Rann of Kutchh	Udaipur	3%
15	Porbandar	Jaipur	3%
16	Bhavnagar/Amreli	Chittorgarh	3%
17	Jodhpur	Karnataka	3%
18	Jaipur	Jalgaon/Aurangabad/Jalna	3%
		Total	**100%**

Bus

S.No.	Origin	Destination	% of total
1	Abu Road/Maval	Palanpur	10%
2	Palanpur	Rest of Rajasthan	7%
3	Ahmedabad city	Rest of Rajasthan	5%
4	Surat/Hazira	Jodhpur	5%
5	Palanpur	Sirohi	4%
6	Surat/Hazira	Bhilwara	4%
7	Abu Road/Maval	Ahmedabad city	3%
8	Ahmedabad city	Aimer/Kishangarh	3%
9	Abu Road/Maval	Mehsana city	2%
10	Amirgadh/Kakwada/Kidotar	Palanpur	2%
11	Palanpur	Ajmer/Kishangarh	2%
12	Bharuch/Narmada/Tapi/Navsari/Dang/Valsad	Jodhpur	2%
13	Bharuch/Narmada/Tapi/Navsari/Dang/Valsad	Bhilwara	2%
14	Palanpur	Mount Abu	2%
15	Ahmedabad city	Jodhpur	2%
16	Amirgadh/Kakwada/Kidotar	Ahmedabad city	1%
17	Jaipur	Jalgaon/Aurangabad/Jalna	1%
18	Swaroopganj/Naayi Dhanari/Bhavri	Ahmedabad city	1%
19	Deesa	Udaipur	1%
20	Bhimana/Taroongi/Bharja/Bhujela	Rest of Gujarat	1%
		Total	**62%**

MLCV

S.No.	Origin	Destination	% of total
1	Abu Road/Maval	Palanpur	6%
2	Amirgadh/Kakwada/Kidotar	Palanpur	5%
3	Palanpur	Rest of Rajasthan	5%
4	Palanpur	Jaipur	3%
5	Chitrasani/Hebatpur/Kotda/Piroipura/Jaspuria	Palanpur	3%
6	Palanpur	Ajmer/Kishangarh	3%
7	Sarotra/Igbalgadh/Laxmipura/Juni Roh Sarotri/Balundra/Jethi	Palanpur	2%
8	Ahmedabad city	Pali	2%
9	Abu Road/Maval	Ahmedabad city	1%
10	Amirgadh/Kakwada/Kidotar	Ahmedabad city	1%
11	Palanpur	Sirohi	1%
12	Siddhpur/Unjha	Delhi	1%
13	Ahmedabad city	Sirohi	1%
14	Ahmedabad city	Rest of Rajasthan	1%
15	Rest of Rajasthan	Rest of Madhya Pradesh	1%
16	Abu Road/Maval	Surat/Hazira	1%
17	Abu Road/Maval	Kandla/Mundra/Mandvi/Tuna	1%
18	Chitrasani/Hebatpur/Kotda/Piroipura/Jaspuria	Khemana/Suraipura	1%
19	Palanpur	Ambaji	1%
20	Mehsana city	Revdar/Anadra	1%
		Total	**43%**

LCV

S.No.	Origin	Destination	% of total
1	Abu Road/Maval	Palanpur	2%
2	Abu Road/Maval	Ahmedabad city	2%
3	Mehsana city	Jaipur	2%
4	Mehsana city	Pali	2%
5	Amirgadh/Kakwada/Kidotar	Palanpur	2%
6	Chitrasani/Hebatpur/Kotda/Piroipura/Jaspuria	Palanpur	1%
7	Abu Road/Maval	Rest of Gujarat	1%
8	Palanpur	Pindwara	1%
9	Palanpur	Delhi	1%
10	Surat/Hazira	Rest of Haryana	1%
11	Ahmedabad city	Sirohi	1%
12	Ahmedabad city	Jodhpur	1%
13	Palanpur	Ajmer/Kishangarh	1%
14	Palanpur	Rest of Rajasthan	1%
15	Ahmedabad city	Ajmer/Kishangarh	1%
16	Ahmedabad city	Rest of Rajasthan	1%
17	Ahmedabad city	Rest of Uttar Pradesh	1%
18	Abu Road/Maval	Siddhpur/Unjha	1%
19	Amirgadh/Kakwada/Kidotar	Siddhpur/Unjha	1%
20	Amirgadh/Kakwada/Kidotar	Ahmedabad city	1%
		Total	**28%**

Traffic study for Abu road-Swaroopganj and Abu road-Palanpur sections of NH-27 in the state of Rajasthan and Gujarat

TOP 20 Origin Destination Pairs at Khemana TP (A-P)

2 Axle

S.No.	Origin	Destination	% of total
1	Ahmedabad city	Jaipur	2%
2	Palanpur	Delhi	2%
3	Palanpur	Sirohi	2%
4	Palanpur	Rest of Rajasthan	2%
5	Ahmedabad city	Sirohi	1%
6	Abu Road/Maval	Palanpur	1%
7	Abu Road/Maval	Mehsana city	1%
8	Amirgadh/Kakwada/Kidotar	Palanpur	1%
9	Ahmedabad city	Rest of Haryana	1%
10	Abu Road/Maval	Surat/Hazira	1%
11	Palanpur	Udaipur	1%
12	Palanpur	Ajmer/Kishangarh	1%
13	Gandhidham	Jaipur	1%
14	Abu Road/Maval	Ahmedabad city	1%
15	Mehsana city	Jodhpur	1%
16	Morbi	Rest of Rajasthan	1%
17	Rest of Gujarat	Jaipur	1%
18	Palanpur	Rest of Haryana	1%
19	Palanpur	Jodhpur	1%
20	Palanpur	Punjab	1%
		Total	**25%**

3 Axle

S.No.	Origin	Destination	% of total
1	Ahmedabad city	Jodhpur	2%
2	Palanpur	Delhi	1%
3	Ahmedabad city	Rest of Uttar Pradesh	1%
4	Chitrasani/Hebatpur/Kotda/Pirojpura/Jaspuria	Palanpur	1%
5	Palanpur	Jodhpur	1%
6	Rest of Gujarat	Rest of Rajasthan	1%
7	Palanpur	Rest of Rajasthan	1%
8	Palanpur	Jaipur	1%
9	Ahmedabad city	Ajmer/Kishangarh	1%
10	Abu Road/Maval	Palanpur	1%
11	Palanpur	Punjab	1%
12	Ahmedabad city	Delhi	1%
13	Ahmedabad city	Rest of Haryana	1%
14	Kandla/Mundra/Mandvi/Tuna	Rest of Haryana	1%
15	Rest of Gujarat	Sirohi	1%
16	Surat/Hazira	Rest of Rajasthan	1%
17	Mehsana city	Ajmer/Kishangarh	1%
18	Abu Road/Maval	Ahmedabad city	1%
19	Palanpur	Pindwara	1%
20	Palanpur	Sirohi	1%
		Total	**21%**

MAV

S.No.	Origin	Destination	% of total
1	Gandhidham	Bhilwara	3%
2	Ahmedabad city	Jaipur	2%
3	Abu Road/Maval	Ahmedabad city	1%
4	Palanpur	Delhi	1%
5	Abu Road/Maval	Palanpur	1%
6	Morbi	Jaipur	1%
7	Ahmedabad city	Sirohi	1%
8	Ahmedabad city	Punjab	1%
9	Ahmedabad city	Rest of Rajasthan	1%
10	Ahmedabad city	Delhi	1%
11	Rest of Gujarat	Rest of Rajasthan	1%
12	Palanpur	Jodhpur	1%
13	Ahmedabad city	Jodhpur	1%
14	Ahmedabad city	Rest of Haryana	1%
15	Gandhidham	Rest of Rajasthan	1%
16	Gandhidham	Delhi	1%
17	Mumbai	Punjab	1%
18	Kandla/Mundra/Mandvi/Tuna	Delhi	1%
19	Mehsana city	Delhi	1%
20	Kandla/Mundra/Mandvi/Tuna	Jaipur	1%
		Total	**22%**

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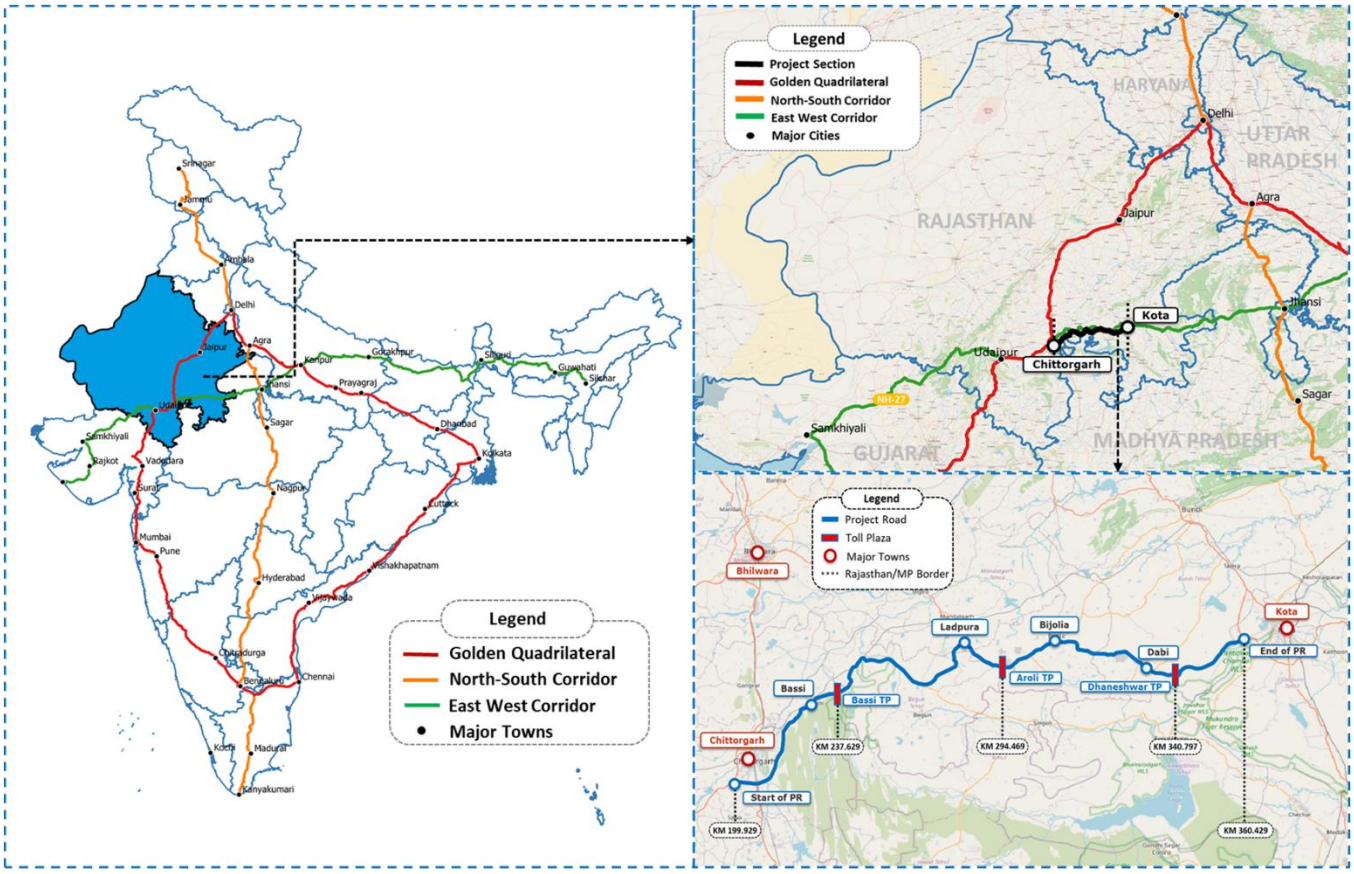
TRAFFIC STUDY FOR CHITTORGARH-KOTA SECTION OF NH-27 IN THE STATE OF RAJASTHAN



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ABBREVIATIONS

%	Percentage
2A	2 Axle truck
3A	3 Axle truck
AADT	Annual Average Daily Traffic
ADT	Average Daily Traffic
AR	Alternate Route
BIA	Broad Influence Area
CAGR	Compounded Annual Growth Rate
FY	Financial Year
GDP	Gross Domestic Product
GSDP	Gross State Domestic Product
IIA	Immediate Influence Area
IRC	Indian Road Congress
Km	Kilometre
LCV	Light Commercial Vehicle
M Bus	Minibus
MAV	Multi Axle Vehicle
MLCV	Mini LCV
NH	National Highway
NHAI	National Highway Authority of India
NHDP	National Highway Development Program
NHIIMPL	National Highways Infra Investment Managers Private Limited
NPV	Net Present Value
OD	Origin-Destination survey
PCU	Passenger Car Unit
PIA	Project Influence Area
PR	Project Road
PV	Present Value
Rs/₹	Rupees
SEZ	Special Economic Zone
Sq.km	Square Kilometre
TP	Toll Plaza
WPI	Wholesale Price Index
YOY	Year on Year

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Appendix 2.1 Zoning

Appendix 2.2: Top 20 OD pairs

1. INTRODUCTION

1.1 General

National Highways Authority of India (NHAI) has setup NHAI InvIT to monetize its completed and operational national highways projects with the objective of mobilizing additional resources through capital markets. In this context, National Highways Infra Investment Managers Private Limited (NHIIMPL) is acting as Investment Manager of the Trust. NHAI InvIT currently has a portfolio five operating toll roads with an aggregate length of 390 kilometers located across the states of Gujarat, Karnataka, Rajasthan and Telangana.

The section viz., Chittorgarh-Kota of NH-27 in the state of Rajasthan referred to as Project Road (PR) hereinafter), is part of the current portfolio of InvIT.

The project highway, NH-27, is part of the East – West corridor envisaged under National Highway Development Program (Phase – II). The total length of NH-27 is roughly 3,530 km starting from Porbandar in the state of Gujarat and ending at Silchar in the state of Assam while passing through the states of Rajasthan, Madhya Pradesh, Uttar Pradesh, Bihar and West Bengal. NH–27 connects important tourist and industrial cities and towns like Porbandar (port city), Rajkot, Palanpur, Udaipur, Chittorgarh, Jhansi, Kanpur, Lucknow, Muzaffarpur, Purnea, Siliguri, Jalpaiguri etc. **Figure 1-1** shows the alignment of NH-27 with major places along the highway.

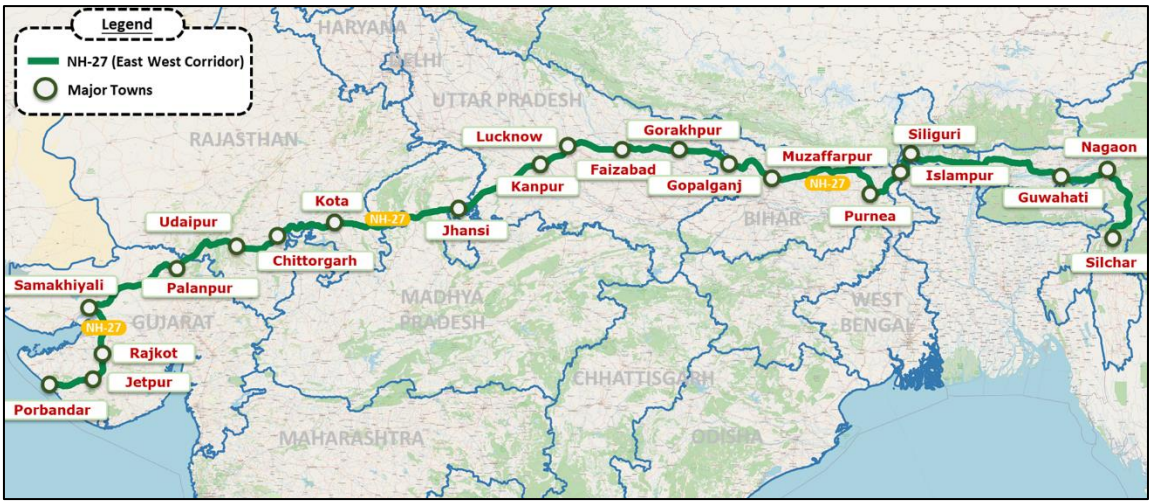


Figure 1-1: Alignment of NH-27 with Major Places

National Highways Infra Investment Managers Private Limited, has appointed Ramboll India Private Ltd as the Traffic Consultant to carry out a study for assessing the present traffic levels, travel pattern and future traffic & revenue estimation till year FY52 duly considering the network characteristics, future economic perspective in the influence area of the project.

1.2 Scope of Services

The scope of the study includes the following:

- Undertake Traffic Survey on the highway section as per the following:
    - Seven days 24 hours Videography Traffic Counts at or near the existing toll plaza locations on the project road to derive the Average Daily Traffic (ADT)
    - One day Origin-Destination survey at or near the existing toll plaza locations to assess the existing travel pattern of vehicles plying on the project road – origin and destination
- Establish seasonality factors using available past traffic data and/or from using fuel sales data or any relevant data
- Estimation of the base year AADT using seasonality factors for conversion of ADT to AADT
- Analysis of OD data to cover:
    - Regional distribution of traffic and influence factors for different zones contributing traffic on the corridor
    - Identification of Project Influence Area from analysis of travel pattern - regional distribution of traffic,
    - Main traffic generators (industrial areas, towns, ports etc.)
    - Commodity composition- Goods type distribution
    - Top OD pairs by vehicle types
    - Travel frequency and trip purpose distribution
- Review of past traffic studies, traffic/toll data and other relevant reports as may be available to determine category wise volume of traffic for past years as well as for current year
- To identify competing route and analyse the network conditions, traffic characteristics & level of toll charged and the advantage/ disadvantage of the competing road and their impact on the project traffic
- Carry out a study of past economic performance of influence area
- Diversion analysis, wherever needed – cost ratio-based diversion analysis using spreadsheets to be carried out for respective potential OD pairs.
- Preparation of traffic projections till year FY52 in three scenarios – low, most likely and high
- Capacity analysis of the road or any other requirements for potential capacity augmentation
- Estimation of tollable traffic streams by toll category and estimation of toll

revenue as per categories of traffic streams stipulated in the tolling schedule for the study period

- Review future road and transportation network developments in the area of influence of the project and identify those schemes that may impact positively or negatively traffic on the toll road
- Identify factors which may have a positive and / or negative impact on the traffic - all major developments like DFC, industrial corridors, economic corridors, ports, Bharatmala, Sagarmala
- Scenario Analysis of toll revenue – Critical parameters of diversion (if applicable) and three scenarios of traffic growth (most likely, low and high).

1.3 Report Structure

This report is divided into four chapters, including this introduction chapter. Chapter 2 details upon the project road characteristics and socio – economic profile of the districts in the project influence area including the estimation of AADT and travel characteristics in the Project Influence Area (PIA). Chapter 3 contains the details on the derivation of traffic growth rates used for traffic forecasting and presents traffic projections for the study period. Chapter 4 presents the details regarding tolling strategy, toll rates and the revenue projections for the duration of the concession.

2. TRAFFIC SURVEY AND ANALYSIS

2.1 General

In order to understand the traffic characteristics, the volume of traffic and travel pattern of vehicles plying on the project road were collected through primary surveys. This chapter presents the details of the project road characteristics, traffic surveys carried out, their analysis and the salient findings. The results of the analysis will be utilized in assessing the traffic growth and estimation of traffic and revenue forecast on the project road for the concession period.

2.2 Project Road Characteristics

The project road section, Chittorgarh-Kota, part of the NH-27 in the state of Rajasthan, starts at km 199.929 of NH-27 near Chittorgarh and ends at km 360.429 of NH- 27 at Kota with a length of about 160.5 km. The project road falls under the jurisdiction of Chittorgarh, Bhilwara, Bundi and Kota districts passing through settlements of Chittorgarh, Bassi, Aroli, Ladpura, Bijolia, Dhaneshwar, Dabi and Kota. There are three operational toll plazas on the project road, one near Bassi (km 237.629), one near Aroli (km 294.469), and other near Dhaneshwar (km 340.797).

The alignment of project road and toll plaza locations is shown in **Figure 2-1.**

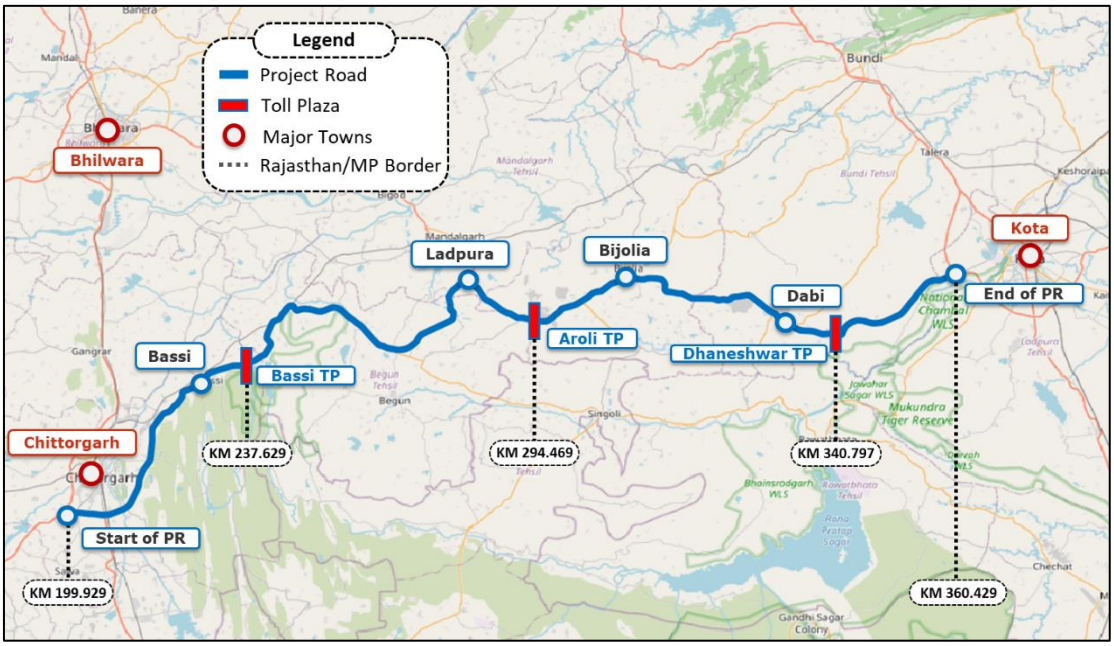


Figure 2-1: Project Road and Location of Toll Plazas

The project road in wider context serves for east-west long-distance traffic which is majorly plying between Lucknow/Gorakhpur/eastern region and Palanpur/Rajkot/ western region. Apart from long distance traffic, it also serves the short distance traffic which is mainly generated between Bundi/ Kota/ Baran and Udaipur/ Chittorgarh areas.

It is worth mentioning here that, the project section is influenced by the presence of large scale cement industries and thermal power plants in the vicinity which influence the traffic

on the corridor viz, Birla Cement, Ultratech, NUVOCO, Shree cement, JK cement, Wonder Cement etc., and thermal power plant at Kota, Jhalawar and Chhabra. Apart from the above industries, various medium scale industries related to iron/steel, agro-based and food processing units are also observed in and around the project section. The lcoation of major cement/thermal power plants located in the state of Rajasthan and in the proximity of the project corridor is presented in the **Figure 2-2.**

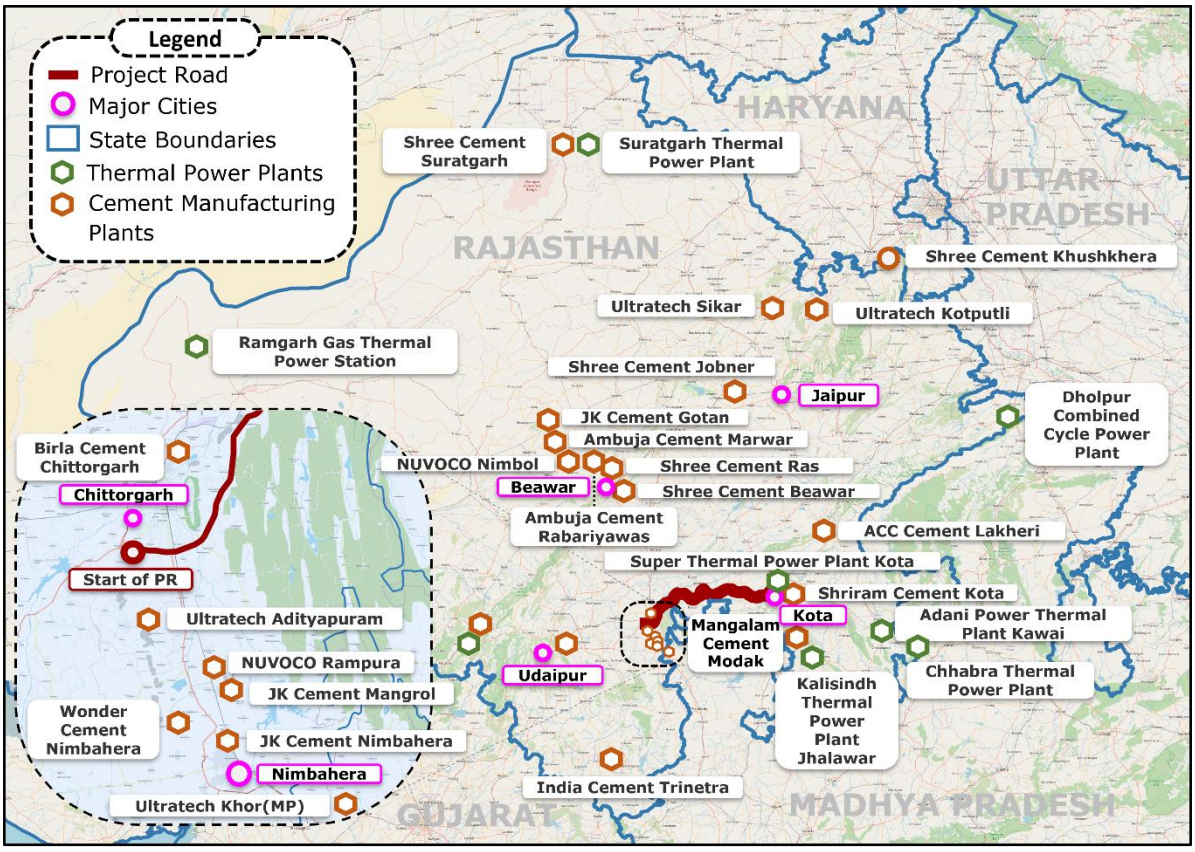


Figure 2-2: Cement Plants & Thermal Power Plants in state of Rajasthan

2.2.1 Profile of Project Influence Area District

The project section falls under the jurisdiction of Chittorgarh, Bhilwara, Bundi and Kota district in the state of Rajasthan. A brief description of the profile of these four districts is presented below.

Chittorgarh District

Chittorgarh district is situated in south-east part of Rajasthan. The economy of the district is predominated by agriculture with about 72 percent of the workers being involved in agriculture or as agricultural labourers. The major crops grown in the district are maize, soyabean, groundnut, sorghum, cotton and black gram in kharif season and wheat, mustard, gram, barley and opium in rabi season. Also, cultivation of fruits and vegetables in done in limited portions of land.

The district is rich in mineral resources like barytes, china clay, limestone, sandstone and ochre. Several industries like cement, fabric processing units, chemical and fertilizer manufacturing units, polypropylene, HDPE woven sacks and fabric manufacturing units

are present in the district. The cement plants include Birla Corporation Limited, Wonder Cement Limited, Aditya Cement Limited, Lafarge India Private Ltd. and J K Cement Works. Hindustan Zinc Limited has various plants spread across the district which produce sulphuric acid, refined zinc, refined lead etc. There is an atomic power plant and a heavy water plant located at Rawatbhata beside Rana Pratap Sagar dam. In addition to this, the presence of Chittorgarh fort and palaces makes it a famous tourist destination.

The population of Chittorgarh district as per 2011 census is 1.54 million of which 18.5 percent population is urban. The major towns are Chittorgarh, Nimbahera and Rawatbhata. The work participation rate (WPR) of the district is about 52 percent.

Bhilwara District

Bhilwara district is located in the south-eastern part of Rajasthan and its economy driven by agriculture with 62.6 percent of the total workers involved in the primary sector. The major crops grown in the district include maize, oil seeds, wheat, pulses, jowar, barley and fibres with small quantities of different spices, bajra and some fruits and vegetables. The major agro-based industries here are oil mills, flour mills, ice candy manufacturing units, dal mills and units producing biscuits, confectionary items, khandsari, masala and cattle feed.

The district is also well established in textile industry and known as Vastra Nagari and Manchester of Rajasthan. It is famous for manufacturing of synthetics and cotton mix fabric and synthetic yarn. Cotton textile industries include cotton spinning, cotton ginning, doubling yarn, cotton dying, handloom and power loom fabrics and cotton tape producing units.

The mineral resources available in the district include lead, zinc, soap stone, china clay, feldspar, quartz, mica, marble, granite, asbestos and garnet. It is one of the largest producers of raw material required for ceramic industry –quartz feldspar, china clay etc. Several units for manufacturing insulation bricks, mica grinding, marble cutting and polishing, china clay, washing powder etc., have come up attributing to these mineral resources. Rampura Agucha is a zinc and lead mine located on a massive sulphide deposit in the district.

The major products exported from the district are polyester, viscose, woollen blankets, cotton fabric, cotton yarn, woollen shoddy yarn and wool tops.

As per the 2011 Census, the district has a population of 2.40 million of which 21.3 percent population is urban. The work participation rate (WPR) of the district is 47.7 percent.

Bundi District

Agriculture contributes a major portion to the economic growth in Bundi. Major agricultural crops include pulses, wheat, gram, barley, cotton, tobacco and oil seeds. Among oil seeds, mustard and rapeseed are the mostly produced. Important fruit trees

in Bundi include orange, pomegranate, lemon, guava and mango. Textile, tourism, handicrafts and small-scale industries play a pivotal role in the economic prosperity of Bundi in Rajasthan. Polyester fibre is the major produce as a part of textiles. The district is famous for its beautiful forts and palaces which have been converted into heritage hotels and step-well reservoirs to attract more tourists.

Limestone and sandstone are important mineral resources found in Bundi district which are the source of raw materials to the cement plant at Lakheri. Other minerals found in the district include silica sand, barytes, marble, clays, granite, sandstone, red ochre and iron ore.

The district has a population of 1.11 million as per 2011 Census with a rural population share at 80 percent and Work Participation rate (WPR) of the district is about 47 percent.

Kota District

Kota is the trade centre for cotton, millet, wheat, coriander and oilseeds. Major cultivated crops include soybean, paddy and maize in kharif season while rapeseed & mustard, wheat, coriander and gram in rabi season. Ramganj mandi in Kota is famous for the stone and coriander market. It is the largest market for coriander in India.

The industries prevalent in the district include cotton and oilseed milling, textile weaving, distilling, dairying, and the manufacture of metal handcrafts. Kota city is known as the "Education hub of India" with the presence of a number of coaching institutes for engineering and medical entrance exams.

Kota is one of the industrial hubs in northern India, with chemical, cement, engineering and power plants. It is also known for Kota stone, a fine-grained variety of limestone and has an extensive industry of stone-polishing. The district is the 2nd largest producer of limestone stone after Jodhpur. There are deposits of red clay, glass sand, dolomite and kankar in the district along with reported occurrence of iron ore, fire clay, red and yellow ochre. Chambal Fertilizers, one of the largest private sector producers has two plants in the district. Kota has several industrial estates and many chemical units as well.

The district population as per 2011 census is 1.95 million of which 60.3 percent is urban and work participation rate (WPR) is about 38 percent.

2.3 Traffic Surveys

In order to understand the characteristics and the volume of traffic using the project road, data on road network, traffic and travel pattern of vehicles plying on the project road were collected through primary traffic surveys. Traffic volume video graphic survey for seven days and origin-destination (OD) survey as roadside interview for one day at toll plaza locations were conducted on the project road. The schedule of the traffic surveys and locations on the project road are given in **Table 2-1.**

Location	Chainage	Duration	Date(s)
Classified Traffic Volume Counts			
TP01-Bassi	km 237.629	7 Days	29th March–4th April 2022
TP02-Aroli	km 294.469		
TP03-Dhaneshwar	km 340.797		
Origin and Destination Survey			
TP01-Bassi	km 237.629	1 Day	29th March 2022
TP02-Aroli	km 294.469		30th March 2022
TP03-Dhaneshwar	km 340.797		31st March 2022

Table 2-1: Traffic Survey Locations and Schedule

Trained enumerators were engaged for conducting traffic surveys under the supervision of experienced transport planner. The vehicle classification as generally used in the traffic surveys of NHAI studies along with their PCU values, as suggested in IRC: 64 – 1990, are presented in **Table 2-2.**

Vehicle Type	PCU Factor
Motorized Vehicles	
Car, Jeep, Van &Taxi	1.0
Two –Wheeler	0.5
Three-Wheeler (Auto-Rickshaw)	1.0
Mini-Bus/ School Bus	1.5
Govt. Bus/ Private Bus	3.0
Mini LCV/Max Pick Up	1.0
Light Commercial Vehicle (LCV)	1.5
2-Axle Truck	3.0
3-Axle Truck	3.0
Multi-Axle Vehicle (MAV 4-6 Axle)	4.5
HME	4.5
Agricultural Tractor	1.5
Agricultural Tractor with Trailer	4.5
Non – Motorised Vehicles	
Cycle	0.5
Cycle Rickshaw	2.0
Animal Drawn Cart	6.0

Table 2-2: Vehicle classification and PCU factors

2.4 Traffic Characteristics

The data collected from the traffic volume count survey was analysed in order to get the results with respect to existing traffic intensity, flow pattern, hourly variation and composition of traffic on the study road network. The various traffic characteristics have been analysed under the following heads:

- Average Daily Traffic (ADT)
- Daily variation, Hourly variation and Traffic composition
- Annual Average Daily Traffic (AADT)

2.4.1 Average Daily Traffic (ADT)

The traffic volume data collected at the toll plaza locations during the seven days survey has been analysed. The summary of ADT in terms of vehicles and PCUs is presented in **Table 2-3.**

Mode	TP01-Bassi Toll Plaza	TP02-Aroli Toll Plaza	TP03-Dhaneshwar Toll Plaza
Tollable vehicles			
Car/Jeep/Van/Taxi	2,042	2,452	2,549
Minibus	13	10	9
Standard Bus	144	174	166
Mini LCV	221	224	235
LCV	149	175	211
2 Axle	161	276	299
3 Axle	261	314	489
MAV (4-6 Axle)	1,307	1,358	1,619
HMV/ MAV (=>7 Axle)	12	3	16
Non Tollable vehicles			
Two-Wheeler	3,537	3,828	3,084
Auto Rickshaw	73	55	56
Agri. Tractors	108	248	366
Total Non-Motorised	9	1	2
Total Vehicles/PCUs			
Total Tollable Vehicles	**4,309**	**4,986**	**5,594**
Total Non Tollable Vehicles	**3,728**	**4,131**	**3,507**
Total Vehicles	**8,037**	**9,117**	**9,101**
Total PCU	**12,446**	**14,425**	**16,563**
Tollable PCU	**10,135**	**11,370**	**13,335**

Table 2-3: Average Daily Traffic at TP01, TP02 & TP03

- The observed total vehicles are around 8,037 at TP01, about 9,117 vehicles at TP02 and around 9,101 vehicles at TP03.
- The share of passenger vehicles in total traffic is around 72.4 percent at TP01, 71.5 percent at TP02 and 64.5 percent at TP03.
- Car traffic has a share of around 25 percent (2,042 vehicles) at TP01, about 27 percent (2,452 vehicles) at TP02 and around 28 percent (2,549 vehicles) at TP03 of total traffic.
- Total freight vehicles account for a share of 27.6 percent at TP01, 28.5 percent at TP02 and 35.5 percent at TP03. Within the freight traffic, MAV accounts for 16.4 percent (1,318 vehicles) at TP01, 14.9 percent (1,361 vehicles) at TP02 and 18.0 percent (1,635 vehicles) at TP03.
- The tollable traffic recorded at TP01 is 53.6 percent, about 54.7 percent at TP02 and 61.5 percent at TP03.
- Other motorised non-tollable vehicles (two-wheeler, auto rickshaw and tractor) account for about 46.3 percent at Bassi toll plaza, about 45.3 percent at Aroli toll plaza and 38.5 percent at Dhaneshwar toll plaza.

2.4.2 Daily variation, Hourly variation, and Traffic composition

The day wise variation, hourly variation and the traffic composition at the toll plaza location is presented in **Figure 2-3.**

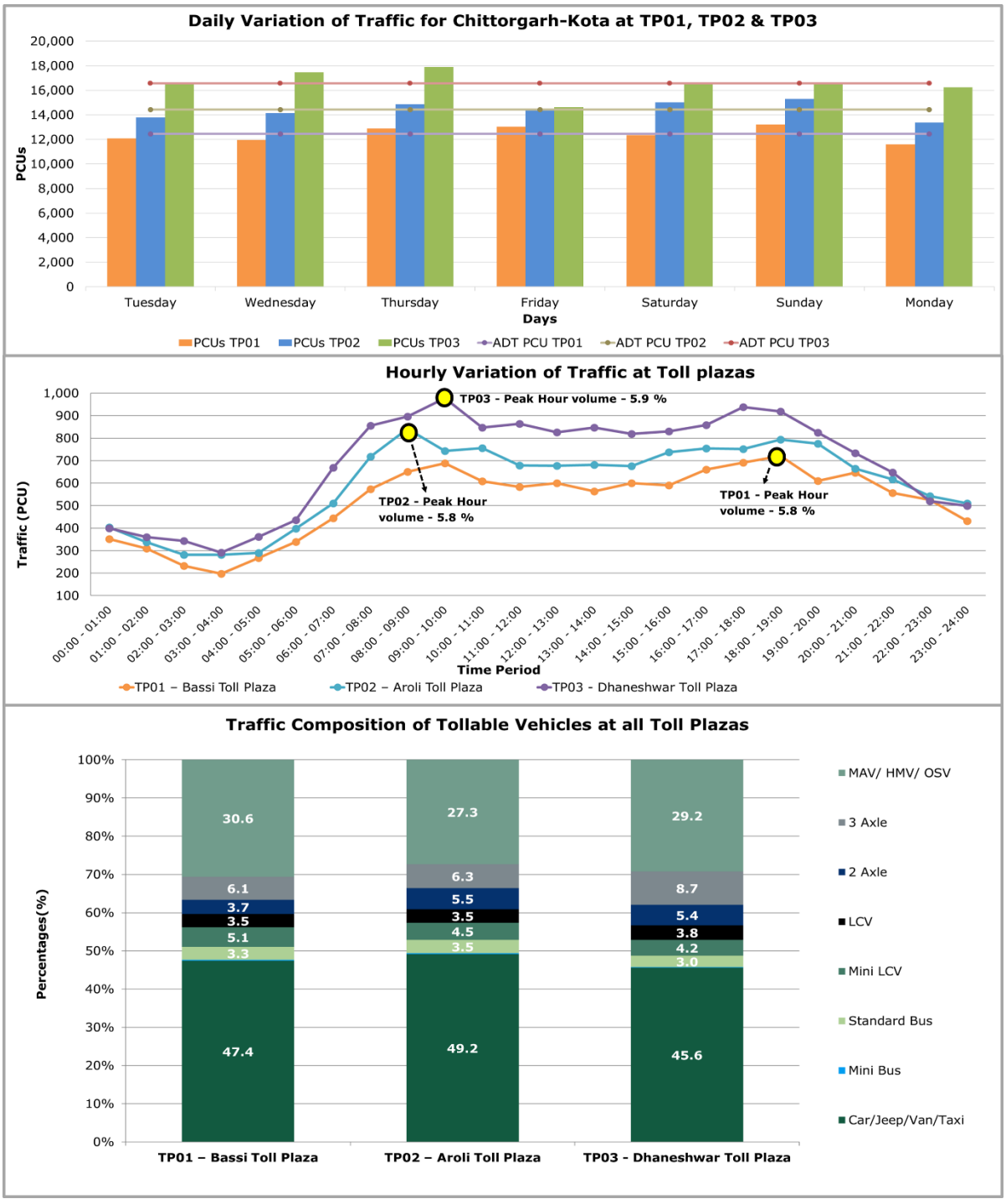


Figure 2-3: Daily & Hourly Variation and Traffic Composition

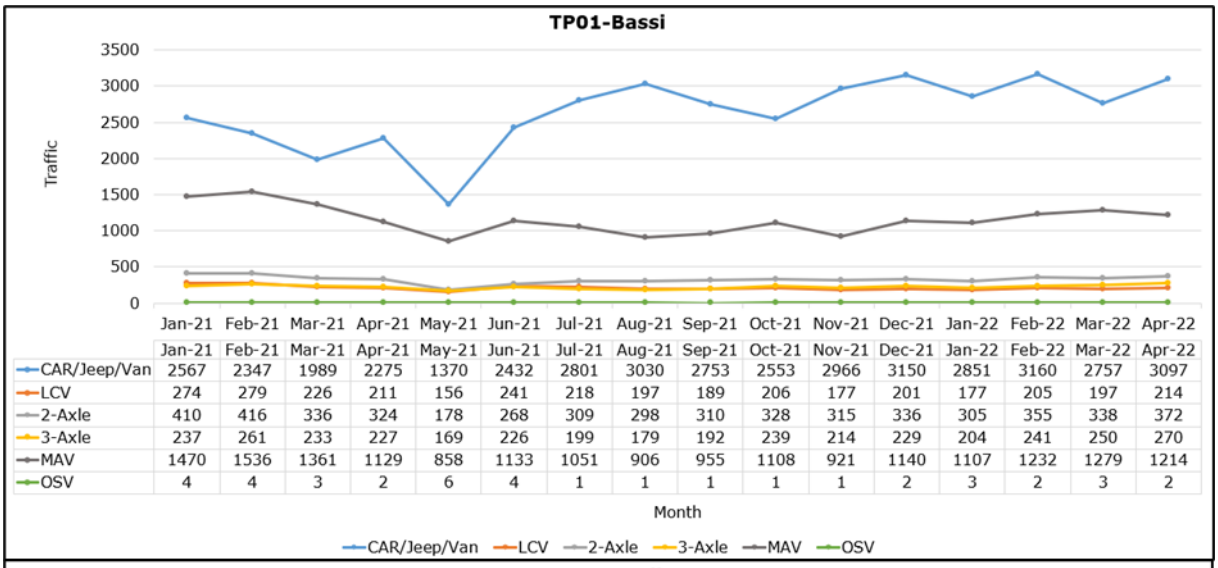
- It was observed that the traffic at the toll plazas is consistent with minor fluctuations during the days of volume count survey.
- The directional distribution at the toll plaza location is almost equal with Chittorgarh-Kota having a directional distribution of 48.1 percent each at TP01 and TP02 and 48.9 percent at TP03.

2.4.3 Annual Average Daily Traffic (AADT)

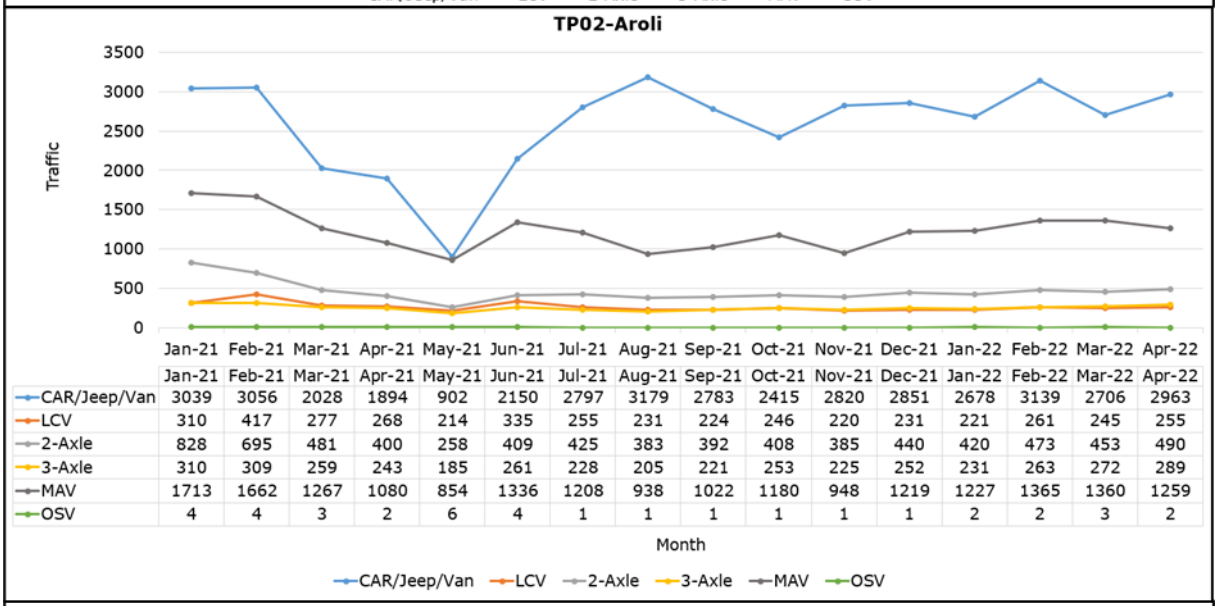
The traffic plying on any road generally varies over different periods of the year depending on the cycle of different socio-economic activities in the regions through which it passes. Therefore, in order to have a more realistic picture of the traffic on the project road, it is required to assess its seasonal variation to estimate the annual average daily traffic (AADT).

The Seasonal Correction Factor (SCF) is generally derived from secondary data sources such as past month-wise traffic data on the project road, monthly toll revenues from existing tolled highways in the immediate influence area, sales of fuel at different filling stations along the project highway, arrival of vehicles at establishments like APMC, truck terminals, railway goods stations, etc.

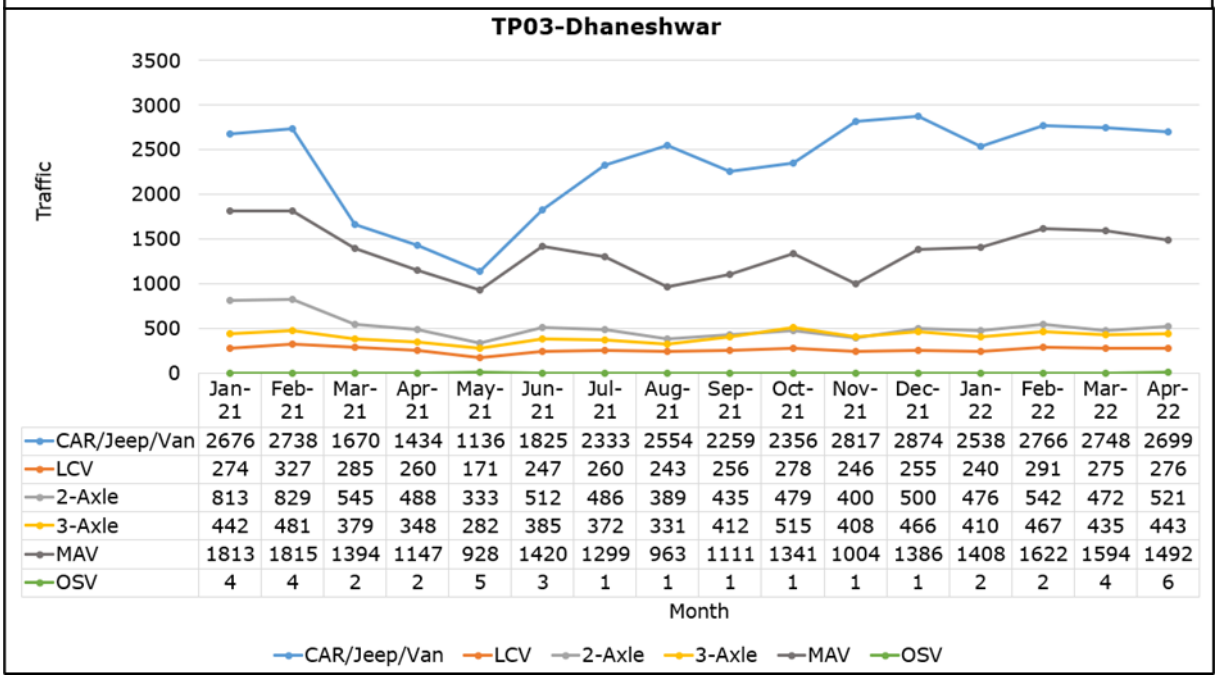
The past toll traffic data for all the toll plazas was made available by the client from Jan 2021-April 2022. The month-on-month mode wise traffic for this period January 21 to April 22 for all three toll plazas is presented in **Figure 2-4**



	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22
CAR/Jeep/Van	2567	2347	1989	2275	1370	2432	2801	3030	2753	2553	2966	3150	2851	3160	2757	3097
LCV	274	279	226	211	156	241	218	197	189	206	177	201	177	205	197	214
2-Axle	410	416	336	324	178	268	309	298	310	328	315	336	305	355	338	372
3-Axle	237	261	233	227	169	226	199	179	192	239	214	229	204	241	250	270
MAV	1470	1536	1361	1129	858	1133	1051	906	955	1108	921	1140	1107	1232	1279	1214
OSV	4	4	3	2	6	4	1	1	1	1	1	2	3	2	3	2



	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22
CAR/Jeep/Van	3039	3056	2028	1894	902	2150	2797	3179	2783	2415	2820	2851	2678	3139	2706	2963
LCV	310	417	277	268	214	335	255	231	224	246	220	231	221	261	245	255
2-Axle	828	695	481	400	258	409	425	383	392	408	385	440	420	473	453	490
3-Axle	310	309	259	243	185	261	228	205	221	253	225	252	231	263	272	289
MAV	1713	1662	1267	1080	854	1336	1208	938	1022	1180	948	1219	1227	1365	1360	1259
OSV	4	4	3	2	6	4	1	1	1	1	1	1	2	2	3	2



	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22
CAR/Jeep/Van	2676	2738	1670	1434	1136	1825	2333	2554	2259	2356	2817	2874	2538	2766	2748	2699
LCV	274	327	285	260	171	247	260	243	256	278	246	255	240	291	275	276
2-Axle	813	829	545	488	333	512	486	389	435	479	400	500	476	542	472	521
3-Axle	442	481	379	348	282	385	372	331	412	515	408	466	410	467	435	443
MAV	1813	1815	1394	1147	928	1420	1299	963	1111	1341	1004	1386	1408	1622	1594	1492
OSV	4	4	2	2	5	3	1	1	1	1	1	1	2	2	4	6

Figure 2-4: Month on Month Traffic Data for TP01, TP02 and TP03

The onset of the second wave of Covid-19 and the lockdowns announced by the state government during April-June 2021 was a setback to the continuous recovery of traffic to normal levels. With the opening of economic activities, the traffic has started to pick up and shows a recovery from July 2021 onwards.

With that in mind, an average of July 2021 to April 2022 is taken as FY 22 AADT. In the toll data Mini LCVs are merged into LCV category. For further analysis, the split for MLCV and LCV as provided by the client has been used for arriving at the AADT for Car/MLCV and LCV. The resultant mode wise AADT estimated for the project road for FY22 at all the three toll plaza locations is presented in **Table 2-4.**

Location/Mode	Car/Jeep/ Van/Taxi	LCV	2A	3A	MAV	OSV
TP01	2,974	136	326	222	1,091	2
TP02	2,939	133	427	244	1,173	1
TP03	2,736	125	470	426	1,322	2

Table 2-4: AADT for FY22

The comparison of AADT for FY22 in the earlier study of March 2021 with FY22 AADT adopted in present study is presented in **Table 2-5**

Location/Mode	Car	LCV	Bus	2-axle Truck	3-axle Truck	MAV	O/size/ HME	PCU
AADT (Earlier Study – Ramboll)								
TP01 – Bassi	3,210	213	143	271	37	1,408	2	11,225
TP02 – Aroli	4,447	335	211	515	58	1,629	3	14,646
TP03 – Dhaneshwar	4,201	213	208	637	134	1,737	3	15,284
AADT (Present Study)								
TP01 – Bassi	2,974	136	154	172	222	1,091	2	9,741
TP02 – Aroli	2,939	133	165	262	244	1,173	1	10,435
TP03 – Dhaneshwar	2,736	125	168	302	426	1,322	2	11,570

Table 2-5: AADT in Earlier (March 21) and Present Study at TP01, TP02 & TP03

- The 3A traffic is higher than the AADT projected for FY22 in the earlier study. Remaining all the modes are lower than the projections for FY22 in the previous study.
- In terms of PCUs, TP01-Bassi is lower by 13.2 percent, TP02-Aroli is lower by 28.8 percent and TP03-Dhaneshwar is lower by 24.3 percent than the earlier study.

2.5 Travel Characteristics

2.5.1 Survey Methodology

In order to understand the travel demand pattern in the region and tollable traffic streams, origin and destination (OD) surveys were carried out at the toll plaza locations. The OD survey was carried out for 24 hours, by roadside interview method as described in IRC: 102-1988. Both passenger and commercial vehicles plying on the project road were stopped on a random sampling basis and interviewed.

The travel characteristics obtained by OD survey facilitate the identification of:

1. Local and through traffic on the project road.
2. Potential divertible traffic to/from project road to various alternative routes.

Trained enumerators under the supervision of transport planners collected the trip characteristics using survey forms designed for this purpose. The OD survey elicited characteristics like origin, destination, frequency, purpose of trip for passenger vehicles and commodity being transported for goods vehicles. The information pertaining to origin and destination of trips collected during roadside interviews was analysed to obtain the trip distribution based on a zoning system suitably designed for the present study.

2.5.2 Traffic Zoning System

To understand the spatial dimensions of the trip characteristics of the vehicles interviewed during the O-D survey, a detailed zoning system was developed giving due consideration to the following factors:

- The road network catering to the traffic on the project road and its generating points
- Important towns, villages, factories and industrial centres around the project road area
- Administrative boundaries of districts and states.
- Configuration of the project road in the regional road network with respect to other roads

Two major types of areas were identified for analysis purpose: -

Immediate Influence Area (IIA): It includes the cities/towns/villages and districts along the project road and adjacent to it, which generate/attract trips to the project road. In this study, it consists of districts of Chittorgarh, Bhilwara, Bundi and Kota in the state of Rajasthan.

Broad Influence Area (BIA): It includes the remaining districts of Rajasthan and Gujarat and other neighbouring states such as Madhya Pradesh, Gujarat, and remaining states of India.

Detailed zoning system is prepared for IIA, while more aggregate or broad zoning is developed for BIA. The zoning system adopted for data collection was based on 97 zones and is presented in **Appendix 2.1.**

2.5.3 Sample Size

The toll traffic data does not provide the individual traffic volume count of all categories of vehicles. The seven-day traffic volume video count at the existing toll plazas was analysed to get the individual volume count of all categories of vehicles along with the direction split.

The vehicles during the OD surveys were interviewed on a random sample basis. **Table 2-6** shows the AADT and the sample size (both in absolute numbers and in percentage terms) captured during the exercise

Modes	Car	M Bus	Bus	MLCV	LCV	2A	3A	MAV/ OSV	Total
TP01-Bassi Toll Plaza									
Sample	878	4	99	83	75	85	235	528	1,987
AADT	2,749	15	154	225	121	172	222	1,093	4,751
Percentage (%)	31.9	26.0	64.1	36.9	62.0	49.4	106.0	48.3	41.8
TP02-Aroli Toll Plaza									
Sample	837	5	77	104	79	128	211	549	1,990
AADT	2,733	12	165	206	120	262	244	1,174	4,917
Percentage (%)	30.6	40.4	46.6	50.4	65.6	48.9	86.4	46.8	40.5
TP03-Dhaneshwar Toll Plaza									
Sample	1,216	12	120	138	197	179	389	1,276	3,527
AADT	2,520	11	168	216	115	302	426	1,324	5,081
Percentage (%)	48.3	113.8	71.6	64.0	171.4	59.2	91.3	96.4	69.4

Table 2-6: Sample Size Collected in OD Survey at TP01, TP02 & TP03

Based on the sample size of different categories of vehicles interviewed during the OD survey, direction-wise expansion factors were calculated based on FY22 AADT. The OD matrices for all vehicle categories were generated and analysis was done in terms of regional distribution, travel pattern, commodity distribution and trip purpose for cars.

2.5.4 Regional Distribution

Based on the OD matrices, the regional distribution of tollable vehicles at the toll plaza locations has been calculated. **Table 2-7** gives the distribution indicating the attraction and generation zones for the traffic on the project road.

Region/Modes	Car	M Bus	Bus	MLCV	LCV	2A	3A	MAV
TP01-Bassi Toll Plaza								
Rajasthan	90.7	100.0	82.0	95.2	92.2	74.0	76.0	84.1
Gujarat	2.8	0.0	8.2	3.5	5.8	14.9	14.3	8.7
Madhya Pradesh	2.3	0.0	1.2	1.2	1.9	5.3	3.1	3.1
Uttar Pradesh	1.7	0.0	3.3	0.0	0.0	2.8	2.7	2.2
Maharashtra	2.1	0.0	5.4	0.0	0.0	0.0	0.4	0.7
Southern Indian States	0.1	0.0	0.0	0.0	0.0	1.2	0.0	0.1
Rest of India	0.5	0.0	0.0	0.0	0.0	1.7	3.4	1.1
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
TP02-Aroli Toll Plaza								
Rajasthan	89.4	100.0	86.8	87.7	75.8	84.5	77.4	80.6
Gujarat	3.0	0.0	7.9	8.5	13.1	9.6	10.5	9.5
Madhya Pradesh	2.5	0.0	0.0	0.0	3.9	0.8	4.1	3.0
Uttar Pradesh	2.2	0.0	2.0	0.4	3.8	1.6	3.3	2.8
Maharashtra	2.4	0.0	0.6	3.3	3.3	2.3	2.4	1.7

Region/Modes	Car	M Bus	Bus	MLCV	LCV	2A	3A	MAV
Southern Indian States	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest of India	0.5	0.0	2.6	0.0	0.0	1.2	2.4	2.4
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
TP03-Dhaneshwar Toll Plaza								
Rajasthan	90.4	91.1	90.3	91.6	93.3	80.4	87.4	84.6
Gujarat	2.6	8.9	7.6	4.4	5.4	13.0	5.8	8.4
Madhya Pradesh	1.9	0.0	0.4	1.1	0.0	0.3	1.0	1.9
Uttar Pradesh	3.2	0.0	1.3	2.9	1.3	4.0	1.8	2.8
Maharashtra	1.7	0.0	0.0	0.0	0.0	0.9	0.4	0.4
Southern Indian States	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Rest of India	0.2	0.0	0.4	0.0	0.0	1.5	3.4	1.9
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Combined (Avg. TP01, TP02 & TP03)								
Rajasthan	90.2	97.5	86.5	91.7	87.0	80.4	80.6	83.0
Gujarat	2.8	2.5	7.9	5.4	8.2	12.2	9.8	8.9
Madhya Pradesh	2.2	0.0	0.5	0.8	1.9	1.6	2.6	2.7
Uttar Pradesh	2.3	0.0	2.2	1.0	1.8	2.9	2.6	2.6
Maharashtra	2.1	0.0	1.9	1.1	1.1	1.2	1.1	0.9
Southern Indian States	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.1
Rest of India	0.4	0.0	1.0	0.0	0.0	1.4	3.3	1.8
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Table 2-7: Regional Distribution of Tollable Traffic (in %) On Project Road

Passenger traffic:

- In case of car traffic, Rajasthan contributes about 90.7 percent at TP01, 89.4 percent at TP02 and 90.4 percent at TP03, followed by Gujarat which contributes about 2.6-3.0 percent each at all three toll plazas.
- In case of Bus traffic, Rajasthan contributes about 82.0 percent at TP01, 86.8 percent at TP02 and 90.3 percent at TP03, followed by Gujarat which contributes about 7.6-8.2 percent each at all three toll plazas.

Freight Traffic

- In case of Mini LCV, Rajasthan contributes about 95.2 percent at TP01, 87.7 percent at TP02 and 91.6 percent at TP03.
- In case of 3A traffic, Rajasthan contributes about 76.0 percent at TP01, 77.4 percent at TP02 and 87.4 percent at TP03.
- In case of MAVs, share of Rajasthan state at TP01 is 84.1 percent, at TP02 is 80.6 percent and at TP03 is about 84.6 percent, followed by Gujarat which contributes to about 8.4-9.5 percent each at all three toll plazas.
- The MAV traffic is observed to be having Chittorgarh-Kota as top OD pair at all three toll plazas.

The mode wise top 20 OD pairs are given in **Appendix 2.2**.

2.5.5 Travel Pattern

In order to assess the travel pattern of vehicles, the important streams of traffic plying on the project road are estimated. The list of the popular movements found at the toll plaza locations is presented in **Table 2-8**, **Table 2-9 and Table 2-10**

Sr. No.	Traffic Streams	Car	Mini Bus	Bus	MLCV	LCV	2A	3A	MAV
1	Chittorgarh & surroundings - Kota & surroundings	305	8	39	56	38	37	68	335
		11.1%	50.0%	25.1%	25.0%	31.7%	21.5%	30.8%	30.7%
2	Chittorgarh & surroundings - Indore/Guna/Nagpur & Beyond	145	0	11	2	3	8	7	56
		5.3%	0.0%	7.0%	1.1%	2.8%	4.5%	3.0%	5.1%
3	Chittorgarh & surroundings - Jaipur/Delhi & Beyond	43	0	1	2	0	4	5	12
		1.6%	0.0%	0.7%	1.1%	0.0%	2.4%	2.2%	1.1%
4	Chittorgarh & surroundings - Agra/Lucknow & Beyond	66	0	5	0	0	2	1	15
		2.4%	0.0%	2.9%	0.0%	0.0%	1.4%	0.4%	1.4%
5	Bhilwara & Surroundings-Kota & Beyond	17	0	3	0	2	2	2	4
		0.6%	0.0%	2.2%	0.0%	1.6%	1.0%	0.9%	0.4%
6	Udaipur & surroundings - Kota & surroundings	193	0	32	33	30	15	21	126
		7.0%	0.0%	20.9%	14.8%	25.1%	8.9%	9.4%	11.5%
7	Udaipur & surroundings - Indore/Guna/Nagpur & Beyond	48	0	1	0	0	0	2	12
		1.7%	0.0%	0.7%	0.0%	0.0%	0.0%	0.9%	1.1%
8	Udaipur & surroundings - Jaipur/Delhi & Beyond	24	0	3	0	0	2	6	13
		0.9%	0.0%	1.7%	0.0%	0.0%	1.0%	2.5%	1.2%
9	Udaipur & surroundings - Agra/Lucknow & Beyond	26	0	1	0	0	2	5	13
		1.0%	0.0%	0.7%	0.0%	0.0%	1.4%	2.3%	1.2%
10	Ahmedabad/Vadodara & surroundings - Kota & surroundings	59	0	8	6	1	12	13	49
		2.1%	0.0%	5.5%	2.8%	1.1%	6.9%	5.7%	4.4%
11	Beyond Ahmedabad - Beyond Kota	84	0	16	10	13	34	43	108
		3.0%	0.0%	10.1%	4.2%	10.5%	19.9%	19.2%	9.9%
12	Jodhpur/Pali & surroundings - Kota & Beyond	81	0	7	3	0	2	5	28
		3.0%	0.0%	4.4%	1.4%	0.0%	1.4%	2.0%	2.6%
13	Ajmer/Kishangarh & surroundings - Kota & Beyond	0	0	0	0	0	0	1	0
		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.0%
14	Chittorgarh & Beyond - Zones between TP01 & TP02	852	8	28	84	32	51	36	228
		31.0%	50.0%	18.2%	37.3%	26.1%	29.6%	16.2%	20.9%
15	Chittorgarh & Beyond - Zones between TP02 & TP03	806	0	0	28	1	0	9	94
		29.3%	0.0%	0.0%	12.3%	1.1%	0.0%	4.1%	8.6%
Total		**2,749**	**15**	**154**	**225**	**121**	**172**	**222**	**1,093**

Table 2-8: Traffic Streams at TP01-Bassi Toll Plaza

Sr. No.	Traffic Streams	Car	Mini Bus	Bus	MLCV	LCV	2A	3A	MAV
1	Chittorgarh & surroundings - Kota & surroundings	315	0	33	24	20	77	47	298
		11.5%	0.0%	19.9%	11.5%	16.7%	29.5%	19.4%	25.4%
2	Chittorgarh & surroundings - Indore/Gwalior/Guna/Nagpur & Beyond	154	0	0	0	3	6	2	23
		5.6%	0.0%	0.0%	0.0%	2.2%	2.4%	0.9%	2.0%
3	Chittorgarh & surroundings - Jaipur/Delhi & Beyond	10	0	0	0	0	2	1	4
		0.4%	0.0%	0.0%	0.0%	0.0%	0.8%	0.5%	0.4%
4	Chittorgarh & surroundings - Agra/Lucknow & Beyond	69	0	0	0	1	2	7	18
		2.5%	0.0%	0.0%	0.0%	1.1%	0.8%	2.8%	1.5%
5	Bhilwara & Surroundings-Kota & Beyond	313	4	59	49	17	55	37	134
		11.5%	29.9%	35.7%	23.7%	14.3%	21.0%	15.2%	11.4%
6	Udaipur & surroundings - Kota & surroundings	188	4	29	12	22	25	15	95
		6.9%	29.9%	17.2%	5.8%	17.9%	9.4%	6.2%	8.1%
7	Udaipur & surroundings - Indore/Gwalior/Guna/Nagpur & Beyond	20	0.0	2	0	0	4	1	10
		0.7%	0.0%	1.2%	0.0%	0.0%	1.5%	0.5%	0.9%
8	Udaipur & surroundings - Jaipur/Delhi & Beyond	40	0	0	0	0	0	0	2
		1.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%
9	Udaipur & surroundings - Agra/Lucknow & Beyond	32	0	2	0	2	0	0	16
		1.2%	0.0%	1.2%	0.0%	1.4%	0.0%	0.0%	1.4%
10	Ahmedabad/Vadodara & surroundings - Kota & surroundings	74	0	11	6	12	17	10	39
		2.7%	0.0%	6.4%	3.0%	9.8%	6.3%	4.3%	3.3%
11	Beyond Ahmedabad - Beyond Kota	79	0	11	20	19	29	42	158
		2.9%	0.0%	6.7%	9.7%	15.6%	11.1%	17.1%	13.4%
12	Jodhpur/Pali & surroundings - Kota & Beyond	62	0	0	2	2	6	7	29
		2.3%	0.0%	0.0%	0.9%	1.4%	2.3%	2.8%	2.4%
13	Ajmer/Kishangarh & surroundings - Kota & Beyond	24	0	0	6	3	4	3	5
		0.9%	0.0%	0.0%	3.0%	2.5%	1.6%	1.4%	0.4%
14	Zones between TP01 & TP02 - Kota & Beyond	392	2	2	25	6	10	13	118
		14.3%	13.4%	1.5%	11.9%	5.3%	3.9%	5.2%	10.1%
15	Chittorgarh & Beyond - Zones between TP02 & TP03	860	3	17	48	11	16	54	223
		31.5%	26.9%	10.2%	23.3%	9.2%	6.3%	22.3%	19.0%
16	Zones between TP01 & TP02-Zones between TP02 & TP03	103	0	0	15	3	8	3	2
		3.8%	0.0%	0.0%	7.2%	2.5%	3.1%	1.4%	0.2%
Total		**2,733**	**12**	**165**	**206**	**120**	**262**	**244**	**1,174**

Table 2-9: Traffic Streams at TP02-Aroli Toll Plaza

Sr. No.	Traffic Streams	Car	Mini Bus	Bus	MLCV	LCV	2A	3A	MAV
1	Chittorgarh & surroundings - Kota & surroundings	320	0	22	30	35	32	70	280
		12.7%	0.0%	13.1%	14.0%	30.5%	10.6%	16.3%	21.2%
2	Chittorgarh & surroundings - Indore/Gwalior/Guna/Nagpur & Beyond	157	0	0	0	0	2	1	17
		6.2%	0.0%	0.0%	0.0%	0.0%	0.6%	0.3%	1.3%
3	Chittorgarh & surroundings - Jaipur/Delhi & Beyond	52	0	0	0	0	0	0	5
		2.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%
4	Chittorgarh & surroundings - Agra/Lucknow & Beyond	99	0	1	1	0	3	5	21
		3.9%	0.0%	0.8%	0.6%	0.0%	1.1%	1.3%	1.6%
5	Bhilwara & Surroundings-Kota & Beyond	324	0	53	24	5	33	54	111
		12.9%	0.0%	31.9%	11.2%	4.7%	11.0%	12.6%	8.4%
6	Udaipur & surroundings - Kota & surroundings	176	1	34	16	7	30	44	103
		7.0%	5.8%	20.0%	7.6%	6.4%	10.0%	10.3%	7.8%
7	Udaipur & surroundings - Indore/Gwalior/Guna/Nagpur & Beyond	4	0.0	2	5	0	0	0	2
		0.2%	0.0%	0.9%	2.3%	0.0%	0.0%	0.0%	0.2%
8	Udaipur & surroundings - Jaipur/Delhi & Beyond	8	0	0	0	0	3	0	1
		0.3%	0.0%	0.0%	0.0%	0.0%	1.0%	0.0%	0.1%
9	Udaipur & surroundings - Agra/Lucknow & Beyond	33	0	3	0	0	3	8	17
		1.3%	0.0%	1.8%	0.0%	0.0%	1.1%	2.0%	1.3%
10	Ahmedabad/Vadodara & surroundings - Kota & surroundings	73	2	24	1	4	37	13	50
		2.9%	19.2%	14.1%	0.6%	3.1%	12.1%	2.9%	3.8%
11	Beyond Ahmedabad - Beyond Kota	58	0	1	17	9	45	41	178
		2.3%	0.0%	0.8%	8.1%	7.7%	14.8%	9.7%	13.5%
12	Jodhpur/Pali & surroundings - Kota & Beyond	72	0	2	8	8	17	20	78
		2.9%	0.0%	0.9%	3.7%	6.6%	5.8%	4.7%	5.9%
13	Ajmer/Kishangarh & surroundings - Kota & Beyond	0	0	2	0	0	0	0	1
		0.0%	0.0%	0.9%	0.0%	0.0%	0.0%	0.0%	0.1%
14	Zones between TP01 & TP02 - Kota & Beyond	62	0	1	2	1	14	8	54
		2.5%	0.0%	0.8%	1.0%	0.9%	4.8%	1.8%	4.1%
15	Zones between TP02 & TP03 - Kota & Beyond	1080	8	24	110	46	82	162	405
		42.9%	75.0%	14.0%	51.0%	40.2%	27.1%	38.1%	30.6%
Total		**2,520**	**11**	**168**	**216**	**115**	**302**	**426**	**1,324**

Table 2-10: Traffic Streams at TP03-Dhaneshwar Toll Plaza

Passenger Traffic:

- The car traffic originating from/to Chittorgarh & surroundings to/from Kota & surroundings (stream 1) is about 11.1 percent (305 vehicles) at TP01, 11.5 percent (315 vehicles) at TP02 and about 12.7 percent (320 vehicles) at TP03.
- In case of car traffic, about 11.5 percent (313 vehicles) at TP02 and about 12.9 percent (324 vehicles) at TP03 were found to be traveling between Bhilwara & surroundings and Kota & beyond (stream 5). It may be noted that the traffic originating/destined from/to Bhilwara takes an entry/exit from Ladpura town (located between Bassi TP and Aroli TP).
- In case of Bus, about 20.9 percent (32 vehicles) at TP01, 17.2 percent (29 vehicles) at TP02 and about 20.0 percent (34 vehicles) at TP03 were found to be travelling between Udaipur & surroundings and Kota & surroundings (stream 6).

Freight Traffic:

- In case of 2A trucks, about 21.5 percent (37 vehicles) at TP01, 29.5 percent (77 vehicles) at TP02 and about 10.6 percent (32 vehicles) at TP03 were found to be traveling from/to Chittorgarh & surroundings to/from Kota & surroundings (stream 1).
- In case of MAV, 11.4 percent (134 vehicles) of MAV at TP02 and about 8.4 percent (111 vehicles) at TP03 were found to be travelling between Bhilwara & surroundings and Kota & beyond (stream 5).
- The MAV traffic originating from/to Chittorgarh & surroundings to/from Kota & surroundings (stream 1) is about 30.7 percent (335 vehicles) at TP01, 25.4 percent (298 vehicles) at TP02 and about 21.2 percent (280 vehicles) at TP03.

2.5.6 Commodity Distribution

The location of major cement/thermal plants and sandstone source points located in and around the project road are presented in **Figure 2-5**.

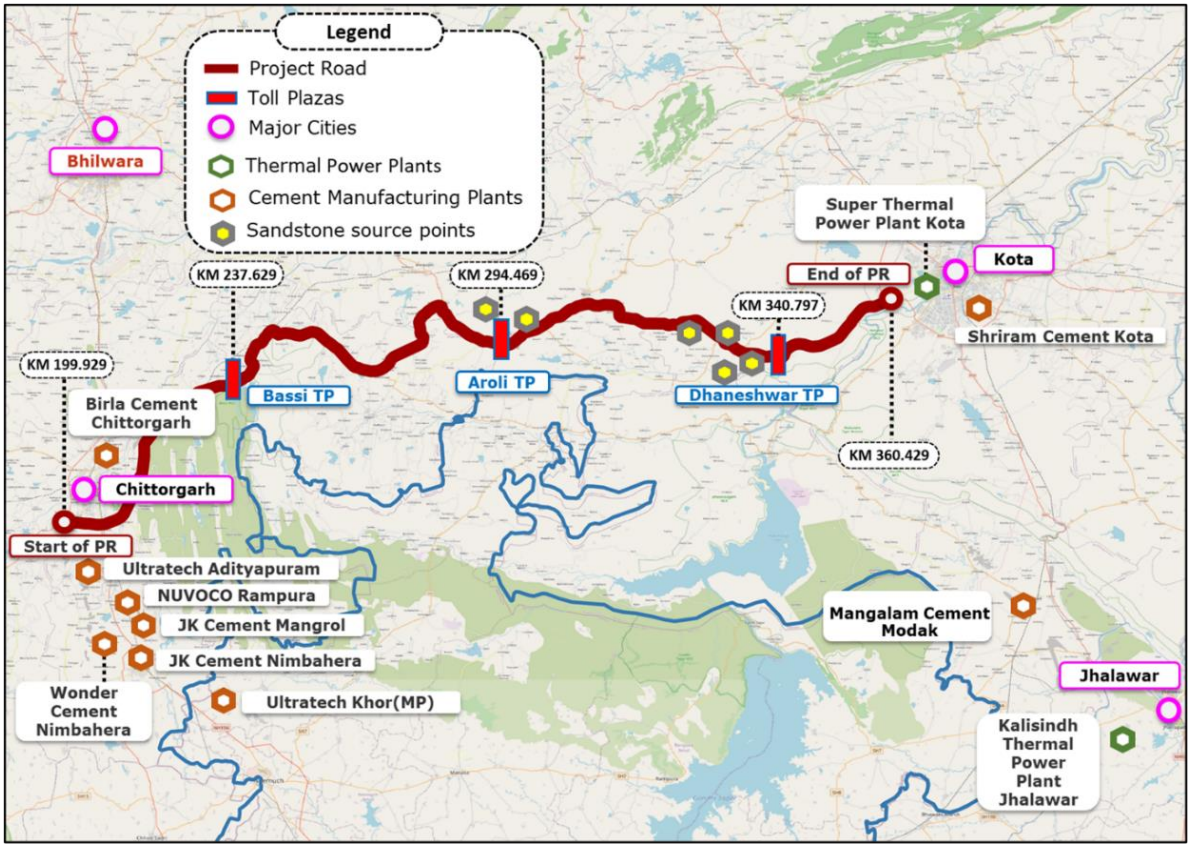


Figure 2-5: Cement Plants & Thermal Power Plants in the vicinity of the project corridor

Analysis was also carried out to understand the different commercial vehicles being used to transport different commodities. The commodity distribution for project corridor is presented in **Figure 2-6**.

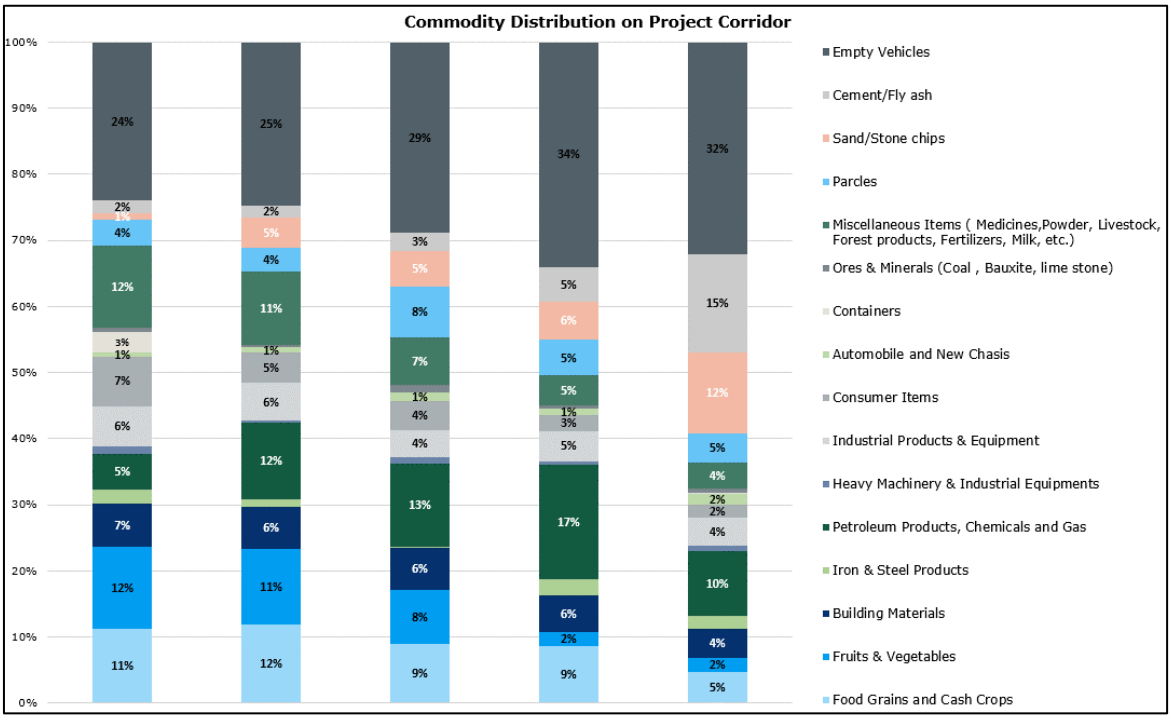


Figure 2-6: Commodity Distribution for Project Corridor

- Around 6-12 percent of 3A/MAV are found to be transporting Sand/Stone chips along the entire project corridor.

- Around 15 percent of MAV are found to be transporting Cement/Fly ash along the entire project corridor.
- Around 11-12 percent of MLCV/LCV are found to be transporting Fruits & Vegetables along the entire project corridor.

Also, commodity-wise share of the total commercial traffic at each of the toll plaza on the project road are presented in **Table 2-11**

Commodity Type	MLCV	LCV	2 Axle	3 Axle	MAV
TP01-Bassi Toll Plaza					
Food Grains and Cash Crops	10.6	12.0	7.1	9.8	6.1
Fruits & Vegetables	11.8	13.3	5.9	2.6	0.4
Building Materials	7.1	5.3	9.4	8.1	7.4
Iron & Steel Products	3.5	0.0	0.0	2.6	1.7
Petroleum Products, Chemicals and Gas	5.9	13.3	16.5	17.4	11.6
Heavy Machinery & Industrial Equipment	0.0	0.0	1.2	0.4	1.1
Industrial Products & Equipment	4.7	2.7	2.4	7.2	5.5
Consumer Items	7.1	5.3	5.9	0.4	1.5
Automobile and New Chassis	0.0	1.3	1.2	0.9	2.8
Containers	1.2	0.0	0.0	0.0	0.6
Ores & Minerals (Coal, Bauxite, limestone)	1.2	0.0	0.0	0.4	1.1
Miscellaneous Items (Medicines, Powder, Livestock, Forest products, Fertilizers, Milk, etc.)	16.5	12.0	3.5	2.6	2.8
Parcels	2.4	1.3	4.7	2.6	0.6
Sand/Stone chips	1.2	4.0	4.7	6.0	6.3
Cement/Fly ash	3.5	5.3	4.7	4.3	15.7
Empty Vehicles	23.5	24.0	32.9	34.9	34.8
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
TP02-Aroli Toll Plaza					
Food Grains and Cash Crops	11.4	12.7	10.2	6.9	5.8
Fruits & Vegetables	13.2	10.1	9.4	1.7	0.9
Building Materials	3.5	5.1	4.7	4.0	4.8
Iron & Steel Products	1.8	2.5	0.8	2.9	2.2
Petroleum Products, Chemicals and Gas	6.1	11.4	12.5	17.3	10.2
Heavy Machinery & Industrial Equipment	0.0	0.0	0.0	0.6	0.7
Industrial Products & Equipment	5.3	7.6	4.7	4.0	4.5
Consumer Items	8.8	6.3	4.7	3.5	3.0
Automobile and New Chassis	0.0	1.3	1.6	0.6	1.9
Containers	4.4	0.0	0.0	0.0	0.0
Ores & Minerals (Coal, Bauxite, limestone)	0.9	0.0	2.3	0.6	0.0

Commodity Type	MLCV	LCV	2 Axle	3 Axle	MAV
Miscellaneous Items (Medicines, Powder, Livestock, Forest products, Fertilizers, Milk, etc.)	12.3	11.4	8.6	5.2	6.1
Parcels	4.4	3.8	7.8	4.6	5.4
Sand/Stone chips	1.8	3.8	5.5	6.9	12.1
Cement/Fly ash	2.6	1.3	2.3	6.9	11.1
Empty Vehicles	23.7	22.8	25.0	34.1	31.4
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
TP03-Dhaneshwar Toll Plaza					
Food Grains and Cash Crops	11.5	11.7	8.9	8.7	3.6
Fruits & Vegetables	12.2	11.2	8.4	2.1	3.5
Building Materials	8.8	7.1	6.1	4.6	2.8
Iron & Steel Products	1.4	1.0	0.0	2.1	2.0
Petroleum Products, Chemicals and Gas	4.7	11.2	10.6	17.2	8.8
Heavy Machinery & Industrial Equipment	2.7	0.5	1.7	0.8	0.9
Industrial Products & Equipment	7.4	6.1	4.5	3.1	3.6
Consumer Items	6.8	3.6	3.4	3.3	1.6
Automobile and New Chassis	1.4	0.5	1.1	1.0	1.2
Containers	3.4	0.0	0.0	0.0	0.0
Ores & Minerals (Coal, Bauxite, limestone)	0.0	0.5	1.1	0.5	0.8
Miscellaneous Items (Medicines, Powder, Livestock, Forest products, Fertilizers, Milk, etc.)	10.1	10.7	7.8	5.4	3.3
Parcels	4.7	4.6	8.9	7.5	5.8
Sand/Stone chips	0.0	5.1	5.6	5.1	14.7
Cement/Fly ash	0.7	0.5	2.2	5.1	16.0
Empty Vehicles	24.3	25.9	29.6	33.4	31.3
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Table 2-11: Commodity Distribution on Project Road

- Major commodities being transported across all three toll plazas are food grains, fly ash/cement, sand/stone, petroleum/gas products, parcels etc.
- In case of LCV traffic, about 11-12 percent each at TP01, TP02 and TP03 respectively have been found transporting food grains and cash crops.
- Around 17 percent of 3A and about 9-12 percent of MAV across all the three toll plazas were found to be transporting petroleum products and chemicals. It may be noted that these tankers are laden from Oil Refineries/Mills located near Udaipur/ Bhilwara for distributive purposes.
- Around 12-15 percent of MAVs at TP02 and TP03 respectively are laden with sand/stone chips. It may be noted that this commodity is sourced at major mining sites located near Dabi (between Aroli TP and Dhaneshwar TP).

- About 11-16 percent of MAV were found to be transporting cement/fly ash across all the three toll plazas. It is to be mentioned that fly ash is a by-product of thermal power plant which is located at Kota, Jhalawar and Chhabra. This commodity is transported to cement plants located at Chittorgarh, Nimbahera and Dabok for the manufacture of fly ash-based products (such as bricks & pozzolana cement). After unloading, some of these trucks return empty back to thermal power plant and some are laden with cement from plants to different demand centres located across Rajasthan.

2.5.7 Trip Purpose Distribution

An analysis was also carried out to assess the purpose of car trips on the project road. **Table 2-12** summarises the purpose-wise share of the passenger cars at the O-D survey locations.

Modes	TP01-Bassi Toll Plaza	TP02-Aroli Toll Plaza	TP03-Dhaneshwar Toll Plaza
Work & Business	83.5	84.3	83.8
Education	5.7	4.2	4.5
Social/Shopping	5.7	7	6.9
Religious	1.7	1.9	2.1
Others	3.4	2.5	2.9
Total	**100.0**	**100.0**	**100.0**

Table 2-12: Purpose - Wise Distribution of Car Trips at Toll Plaza locations

- Work and business trips account for about 83-84 percent across all three toll plazas.
- Social/shopping trips were observed to be around 5-7 percent whereas education trips account for another 4-6 percent across all three toll plazas.
- Religious trips account for about 1-2 percent across all three toll plazas.

3. TRAFFIC GROWTH RATE AND PROJECTIONS

3.1 General

The project road is currently under NHAI InVIT and the projections of traffic and revenue have been presented till FY52. The estimation of the traffic using the tolled highway and its future growth are important elements to assess the project's economics as these are generally the main/sole source of revenue for the project This chapter details various aspects of the current traffic of the project road and its growth potential as assessed by Ramboll.

3.2 Project Road Traffic

The traffic that is likely to use the project road was estimated on the basis of the traffic and travel characteristics gathered as part of the study. The traffic on the project road would normally consist of the following components:

- Normal Traffic
- Diverted Traffic
- Induced/Developmental Traffic

3.2.1 Normal Traffic

Normal traffic is the traffic which is already plying on the project road as assessed in section 2.4.3.

3.2.2 Diverted Traffic

Diverted traffic is generally dictated by the presence of an alternative route at a lower generalised cost, which is in-turn defined by the road configuration and its condition, the type of vehicle and its operating costs, the average riding speed, the route distance and any tolling that may apply on a specific route.

In context of the project road, there are no routes in vicinity of toll plazas to avoid the project road. The development of the under-construction green-field Delhi-Mumbai Expressway (DME) may impact the project road traffic which has been detailed in section 3.3.

3.2.3 Induced/ Development Traffic

Developmental /new generated traffic is the one which would be generated, over and above normal growth, because of lowering of transport costs or new developments in the immediate influence area of the project road. In case of the project road, there is no development envisaged in the vicinity of the project road.

Bharatmala Pariyojana is the second largest highways construction project in the country since NHDP, under which almost 50,000 km or highway roads were targeted across the country. It will look to improve connectivity particularly on economic corridors, border

areas and far-flung areas with an aim of quicker movement of cargo and boosting exports.

It will connect 550 district headquarters to minimum 4-lane highway by raising the number of corridors to 50 (from current 6) and move 80 percent freight traffic (currently 40 percent) to national highways by connecting 24 logistics parks and 7 north east multimodal waterway ports.

The Phase-I includes economic corridors of around 9,000 km; inter-corridor and feeder routes of around 6,000 km; 5,000 km roads under the National Corridors Efficiency Program, border and international connectivity roads of around 2,000 km; coastal and port connectivity roads of around 2,000 km; expressways of around 800 km and 10,000 km of NHDP roads. The total length in phase 1 comes to around 34,800 km.

In the context of the project influence area, there are a few economic corridors and inter corridors listed in the Rajasthan. The economic corridors planned in this state are Sri Ganganagar- Samakhiayali, Agra-Indore and Jaipur-Udaipur and is likely to improve connectivity with an aim to provide quicker movement of cargo.

As the project road caters to the long/ short distance traffic, it is likely to have a potential for growth in view of the developments of these economic corridors and feeder roads. This project section being a part of 4 laned tolled East-West Corridor, will continue to remain an important highway for the East-West movement especially Kanpur & beyond to Udaipur & beyond and may see sustained growth in the future. Kota city is known as the "Education hub of India" with the presence of a number of coaching institutes. Chittorgarh is a famous tourist destination with presence of Chittorgarh Fort. The other tourist attractions in Project Influence Area are Udaipur (City of Lakes), Haldighati, Kumbalgarh, Kota, and Bundi. The travel pattern signifies that around 90 percent of the larger axle trucks (2A, 3A and MAV) are crossing all the 3 toll plazas on project road which are mainly making the trips from Chittorgarh / Udaipur and beyond to Kota and beyond.

3.3 Impact of Delhi – Mumbai Expressway

Delhi–Mumbai Expressway is an under-construction 1,380 km long controlled-access highway connecting the national capital Delhi with India's commercial capital Mumbai. The expressway is proposed on a greenfield-alignment and will be 8-lane facility (4 lanes in each direction). Being a signal-free access-controlled corridor between the two cities running across five states will cut down the travel time from 25 hours to 12 hours.

This Expressway was first announced in April 2018 by Union Minister Nitin Gadkari and as per the available update released in November 2021, sections from Delhi – Jaipur (Dausa) – Lalsot (214 km) and Vadodara – Ankleshwar (100 km) are expected to be completed by March 2022. Out of a total length of 1,380 km, construction is complete for around 389 km whereas 936 km is under construction and a small proportion is under

bidding/DPR stage. The complete expressway is expected to be opened to traffic by March 23. The alignment of proposed Delhi – Mumbai Expressway is parallel to the project section and it passes through the states of Haryana (80km), Rajasthan (375km), Madhya Pradesh (245km), Gujarat (425 km) and Maharashtra (170km). The alignment of the project road and the Delhi – Mumbai Expressway is presented in **Figure 3-1.**

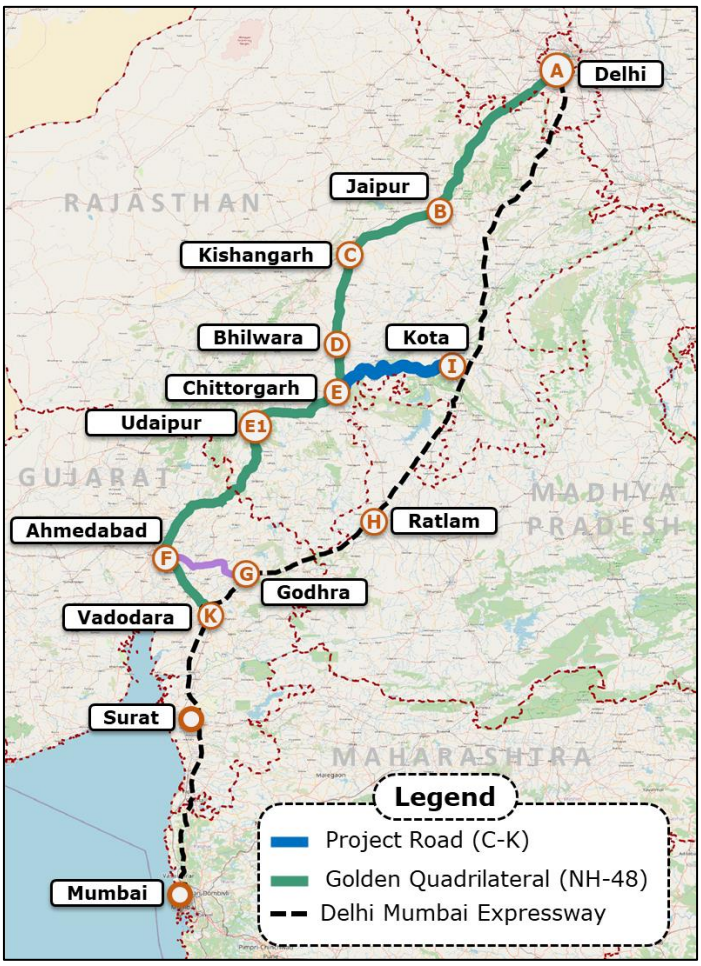


Figure 3-1: Project Road and Alternate Routes via DME

Diversion analysis considers the toll rates for DME section (I-H-G-F) as 1.5 times of the normal NHAI per km toll rates (accounting for 1.25 times for normal length of expressway and increase for the likely equivalent structure length).

The assessment of any likely traffic diversion away from the Project Road (PR) has been done using the cost ratio analysis as described below:

- Assessment of the potential divertible traffic sensitive to network improvements based on the observed travel pattern
- Calculation of road user cost of travelling on the project road and the alternative route. The road user cost includes vehicle operating cost (VOC), travel time cost (TTC) and toll cost (TC), if any.

The road user cost is estimated based on vehicle operating cost equations presented in IRC SP-30,2019 which is based on updation of Road User Cost Study (RUCS) carried out

by Central Road Research Institute in 2019 for Ministry of Road Transport and Highways. Using the likely traffic stream speeds and lane configuration, the vehicle operating, and travel time costs are estimated for each of the routes. Road user cost on the identified routes is calculated and diversion percentages are estimated using diversion curve method mainly for trucks. In this method, traffic likely to be diverted from/to the project road, was estimated using Logit model, which computes expected diversion percentage based on the ratio of perceived cost on the existing and proposed facilities. The perceived cost is the financial vehicle operating cost and the time saving cost including toll charges (if any). According to the model, a vehicle will shift if the perceived cost on an alternative route is lower in comparison to existing route. The diversion equations for estimating diversion have been adopted from Indian National Expressway Network Report, MORTH (2009) as mentioned in IRC 108:2015. These equations are presented in **Table 3-1**.

Vehicle	Cost Ratio (CR) Interval	Equations
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: IRC 108-2015

Table 3-1: Diversion Equations Used for Analysis

The diversion percentages are estimated for the future conditions keeping in view, the updated project road network and surrounding road network. The diversion percentages are then applied to the potential divertible traffic/corridor by OD pair to calculate the traffic that would divert to/from the project road.

The estimation of traffic diversion away or to the project road has been done for three different streams of traffic which are listed below:

- Diversion away from PR for the traffic plying between Gandhidham/ Ahmedabad/ rest of Gujarat to Kota & beyond (towards Jhansi/ Lucknow/ Kanpur) - Stream A
- Diversion away from PR for the traffic plying between Vadodara & surroundings to Kota & beyond (towards Jhansi/ Lucknow/ Kanpur) - Stream B
- Diversion to PR for the traffic plying between Haryana/ Delhi & beyond to Chittorgarh/ Udaipur & surroundings currently using the route via Delhi – Jaipur – Kishangarh – Chittorgarh (via NH8/NH76/NH79A)

A detailed comparison of both the cases, i.e., diversion away from PR involving two streams and diversion to PR involving one stream, are presented below.

A. Diversion away from PR

The traffic from/to Gandhidham/ Ahmedabad/ rest of Gujarat to/from Kota & beyond (towards Jhansi/ Lucknow/ Kanpur) will have two route choice options once DME is operational. The existing route via PR is along I-E-E1-F which is about 546 km whereas

the route via DME is along I-H-G-F which is about 514 km. Similarly, the traffic from/to Vadodara & surroundings to/from Kota & beyond (towards Jhansi/ Lucknow/ Kanpur) will have two route choice options in future. The existing route via PR is along I-E-E1-F-K which is about 639 km whereas the route via DME is along I-H-G-K which is about 455 km. Once DME is operational, some of the traffic plying along both the streams which is currently using the route via PR may shift to the route via DME as DME maybe more attractive from the point of view of total cost. The total potential for both the streams of traffic have been estimated from the OD surveys conducted on the project road.

B. Diversion to PR

The traffic from/to Haryana/ Delhi & beyond to Chittorgarh/ Udaipur & surroundings will have two route choice options once DME is operational. At present, traffic is primarily using the route via Delhi – Jaipur – Kishangarh – Bhilwara – Chittorgarh (A-B-C-D-E) which in future will have an option to use Delhi – Kota – Chittorgarh via PR (A-I-E). The route via PR is about 713 km whereas the route via AR is about 591 km. Once the DME section between Delhi to Kota (A-I) is completed, some of the freight traffic using the alternate route may divert to the project route. The potential traffic between Haryana/ Delhi & beyond to Chittorgarh/ Udaipur & surroundings has been derived from the OD surveys conducted in an earlier study on Kishangarh – Chittorgarh section which was available with the consultant.

The impacts for both the cases have been derived separately and their net impact has been presented in **Table 3-2.**

Modes	3A	MAV
Loss from PR- Stream A		
Potential Traffic	21	76
% Diversion from PR	59.2	61.3
Diversion from PR	-13	-47
Loss from PR- Stream B		
Potential Traffic	29	114
% Diversion from PR	96.4	96.6
Diversion from PR	-28	-110
Total Loss from PR		
Expected loss from PR (Stream A+ Stream B)	-41	-156
Gain to PR		
Potential Traffic	288	706
% Gain in PR Traffic	32.5	30.8
Expected Gain to PR	94	217
Net gain to the PR		
Net Gain to PR	53	61
As Percentage of AADT		
TP01	23.9%	5.8%

Modes	3A	MAV
TP02	21.7%	5.4%
TP03	12.4%	4.8%
Adopted – 50% gain		
TP01	11.9%	2.9%
TP02	10.9%	2.7%
TP03	6.2%	2.4%

Table 3-2: Impacts due to Delhi - Mumbai Expressway (DME)

The cost-ratio based analysis indicates a net gain of 12-23 percent in 3A and 5-6 percent in MAV category. However, adopting a conservative approach, the net gain of traffic considered in the base case is adopted as 50 percent of the gain derived from the cost ratio analysis.

The DME is likely to be operational by FY24. The adopted total divertible traffic corresponds to about 6-12 percent of 3A Trucks and 2-3 percent of MAVs across all the toll plazas. The traffic shift is likely to happen gradually and hence the traffic gain has been considered in phases with 50 percent in FY24, 75 percent in FY25 and 100 percent from FY26 onwards.

3.4 Methodology for Traffic Growth Rate Estimation

Traffic growth for both passenger and freight vehicles has been estimated using the econometric approach as described in IRC-108, 2015. For freight traffic, due consideration has been given to the total tonnage transported and the shift in types of vehicles used for moving goods.

The econometric model applied, relates traffic growth to changes in state (or district) domestic product via an elasticity factor. According to IRC guidelines, elasticity based econometric model for highway projects should be derived in the following form:

$Log_e(P) = A0 + A1\ Log_e\ (EI)$, where:

P - Traffic Volume

EI - Economic Indicator

A0 - Regression Constant

A1 - Regression Co-efficient (Elasticity Index)

In order to estimate traffic on the project road, the methodology described below has been followed:

- Identify the influence area - From the analysis of OD survey data, the project influencing states and districts, which are likely to impact the traffic growth on the project road, were identified.

- Review Past traffic Data – Based on toll data available for the project, a review of past traffic and tonnage growth is carried out.
- Analysis of economic growth of the Project Influencing Area (PIA) - For each PIA state, an economic profile describing past performance and future outlook was prepared. This also considers India's past economic performance and its future outlook.
- Estimation of traffic elasticity to income – in order to translate economic growth into traffic growth, an elasticity factor was estimated.
- Derivation of traffic growth rates – On the basis of the weighted (based on OD shares) PIA outlook and related traffic elasticity, traffic growth rates were estimated.

The methodology thus adopted incorporates, as basic data inputs, the perspective growth envisaged in the influence area and the changes in transport demand elasticities over a period of time. The traffic growth rates by vehicle type for the project road have been determined till FY52.

3.5 Identification of PIA States

The regional distribution observed on the project road shows that Rajasthan and Gujarat are the main contributors of traffic on the project road in case of passenger vehicles. In case of freight traffic, states of Madhya Pradesh and Uttar Pradesh also contribute to the project road traffic in addition to the two states of Rajasthan and Gujarat.

The states of Rajasthan and Gujarat have, therefore, been considered as the PIA states for passenger traffic. The PIA for freight traffic includes all the four states Rajasthan, Gujarat, Madhya Pradesh and Uttar Pradesh which are the main contributors to freight traffic. The mode wise normalized regional distribution shares are presented in **Table 3-3.**

States/Mode	Cars/MLCV	Bus	LCV/M Bus	2A	3A	MAV
Rajasthan	96.8	91.7	88.5	82.9	85.4	85.5
Gujarat	3.2	8.3	8.1	12.5	9.6	9.1
Madhya Pradesh	0.0	0.0	1.7	1.7	2.4	2.7
Uttar Pradesh	0.0	0.0	1.7	2.9	2.5	2.7
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Table 3-3: Normalised Regional Distribution (%) for the PR

Rajasthan has a share of 96.8 percent in cars and 91.7 percent in buses and Gujarat contributes around 3.2 percent in cars and 8.3 percent in buses.

In case of freight vehicles, Rajasthan contributes the highest around 83-86 percent in 2A, 3A and MAV trucks. Gujarat has a share of around 9-13 percent in these categories of trucks. Around 2-3 percent is being contributed by the states of Madhya Pradesh and Uttar Pradesh.

3.6 Past Economic Growth of PIA

Growth of traffic on the project road depends on existing development and future growth prospects of the connecting regions. A number of economic indicators for the PIA states, as published by Central Statistical Organisation (2011-12 prices), have been studied to assess their past performance.

Rajasthan

- Rajasthan's Gross State Domestic Product (GSDP) stood at Rs 6,887.1 billion in FY20 and has been growing at a compounded annual growth rate of 6.1 percent since FY12. The GSDP estimates for the year FY21 is Rs 6,432.2 billion.
- The state's growth has been growing between 4-8 percent since 2015-16. It has shown a growth of around 5 percent in FY20.
- The services sector is the largest contributor to GSDP (44.7 percent), agriculture allied activities sector at 33.1 percent and secondary sector at 22.2 percent of the GSDP in 2019-20.

The change of sectoral composition of GSDP over the years is presented in **Figure 3-2**.

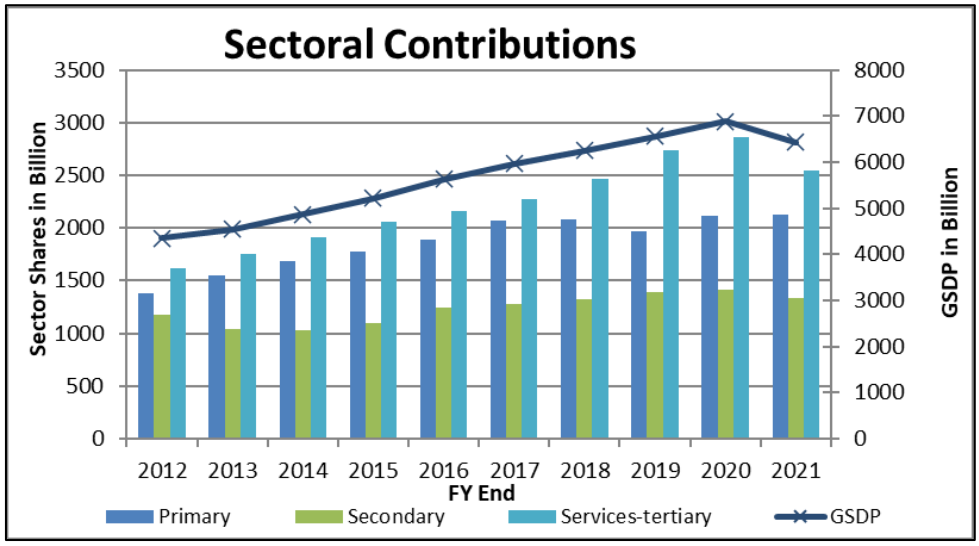


Figure 3-2: GSDP (in Rs billion) and its Sectoral Composition for Rajasthan

The performance of the state economy and its different sectors has been studied using time trend analysis. The average annual growth rates as obtained using regression analysis are presented in **Table 3-4**.

Particulars	2011-12 to 2019-20	2014-15 to 2019-20
GSDP	6.1	5.6
Agriculture and Allied	5.2	2.9
Industry	3.9	4.8
Services	7.3	7.2
Construction	2.3	3.0
Per Capita Income	4.5	3.9

Table 3-4 : Average Annual Growth Rates (%) of State Income for Rajasthan

Rajasthan is known for its textile industry and the state is the fourth largest producer of spun yarn in India. The main industries of Rajasthan include textile, rugs, woollen goods, vegetable oil and dyes. Heavy industries consist of copper and zinc smelting and the manufacture of railway rolling stock. The other industries related to private sector include steel, cement, ceramics and glass wares, electronic, leather and footwear, stone and other chemical industries.

Rajasthan has huge reserves of cement-grade and Steel Melting-Shop (SMS) grade limestone. SMS-grade limestone from Jaisalmer is supplied to various steel plants in the country. Rajasthan has 21 major cement plants, having a total capacity of 55 million tonnes per annum (MTPA). It is the largest cement-producing state in India. The state has about 17 per cent share in cement grade limestone reserves of India. Given the availability of huge cement grade limestone reserves, more than 10 cement plants would be installed in the state in near future, particularly in Chittorgarh, Jaipur, Jhunjhunu, Nagaur and Pali.

The state is a leading producer of major minerals such as lead-zinc, calcite, gypsum, rock phosphate, ochre, silver as well as minor minerals such as marble, sandstone, serpentine (green marble), etc. which contribute a major percentage to national production.

The state is developing sector specific infrastructure, such as special purpose industrial parks and special economic zones (SEZs) for exports of handicrafts, IT and electronic goods. Eight SEZs have got formal approval and eight have been notified. The primary industries for these SEZs are IT/ITES, Handicrafts, Gems and Jewellery, Engineering and related services.

The per capita income of Rajasthan is Rs 88,463 in the year 2019-20 and has been growing at 4.5 percent during FY12 to FY21. The growth in per capita income is presented in **Figure 3-3**.

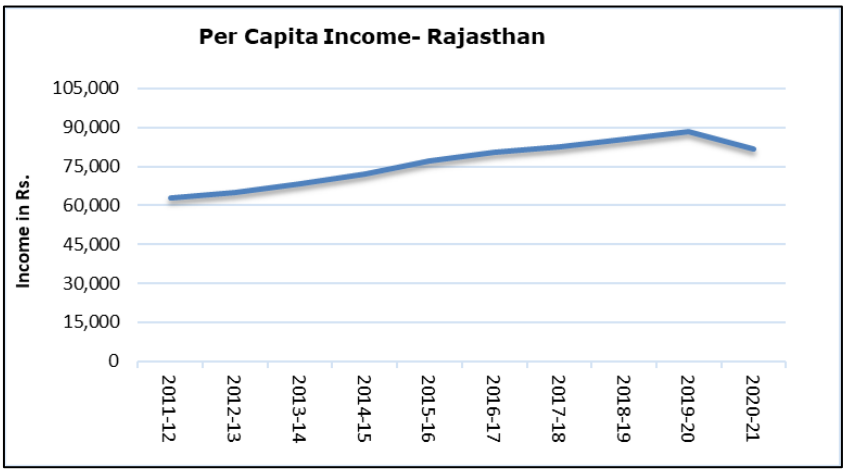


Figure 3-3: Per Capita Income of Rajasthan from 2011-12 to 2020-21

Other PIA States

The other PIA states contributing to the traffic on the project road are Gujarat, Madhya Pradesh and Uttar Pradesh.

- Gross State Domestic Product (GSDP) of Gujarat stood at Rs 12,689.6 billion in 2019-20 and has been growing at a compounded annual growth rate of 9.6 percent since 2011-12.
- Madhya Pradesh's Gross State Domestic Product (GSDP) stood at Rs 5,804.1 billion in FY20 and has been growing at a compounded annual growth rate of 7.8 percent since FY12. The GSDP estimates for the year FY21 is Rs 5,608.5 billion.
- Gross State Domestic Product (GSDP) of Uttar Pradesh has shown a growth of around 3.8 percent in FY20 and stood at Rs 11,668.2 billion in 2019-20 and has been growing at a compounded annual growth rate of 6.6 percent since 2011-12. The GSDP estimates for the year FY21 is Rs 10,926.2 billion.
- The secondary sector is the largest contributor to GSDP (46.3 percent) in the PIA state of Gujarat and the services sector is the largest contributor to GSDP of the PIA states 39.7 percent in Madhya Pradesh and 50.2 percent in Uttar Pradesh.

The average annual growth rates as obtained using regression analysis for the period FY12 to FY20 are presented in **Table 3-5**.

Particular/States	Gujarat	Madhya Pradesh	Uttar Pradesh
2011-12 to 2019-20			
GSDP	9.6	7.8	6.6
Primary	6.5	6.9	4.0
Secondary	10.9	7.3	7.5
Tertiary	8.6	7.3	7.5
Construction	3.7	4.4	5.0
Per Capita Income	8.2	6.1	5.0

Table 3-5: Average Annual Growth Rates (%) of State Income for Other PIA States

The GSDP over the years for the states of Rajasthan, Gujarat, Madhya Pradesh and Uttar Pradesh are presented in **Figure 3-4.**

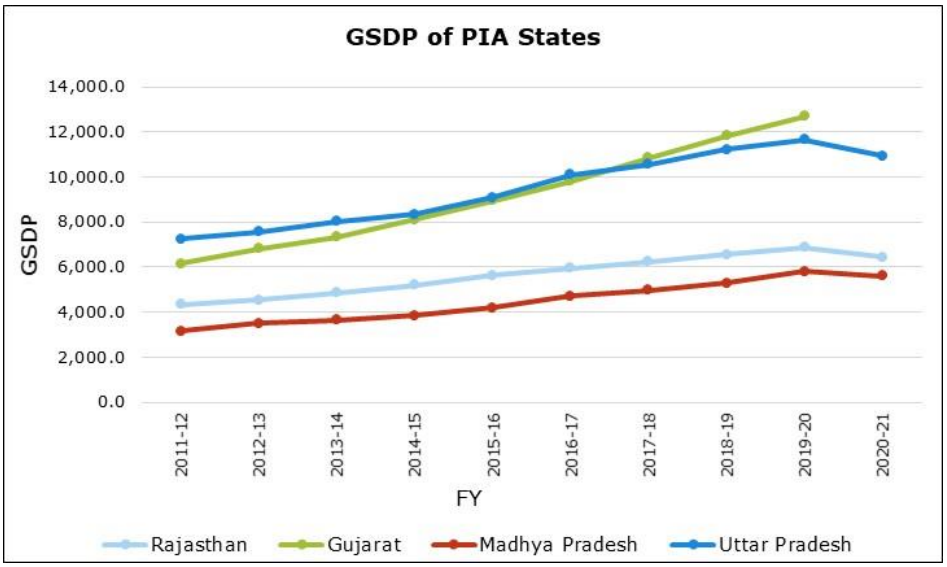


Figure 3-4 GSDP (in Rs billion) for Other PIA States

3.7 India and PIA Outlook

3.7.1 India's Past Performance and Outlook for Future

India's growth trend during the recent years has been presented in **Figure 3-5**.

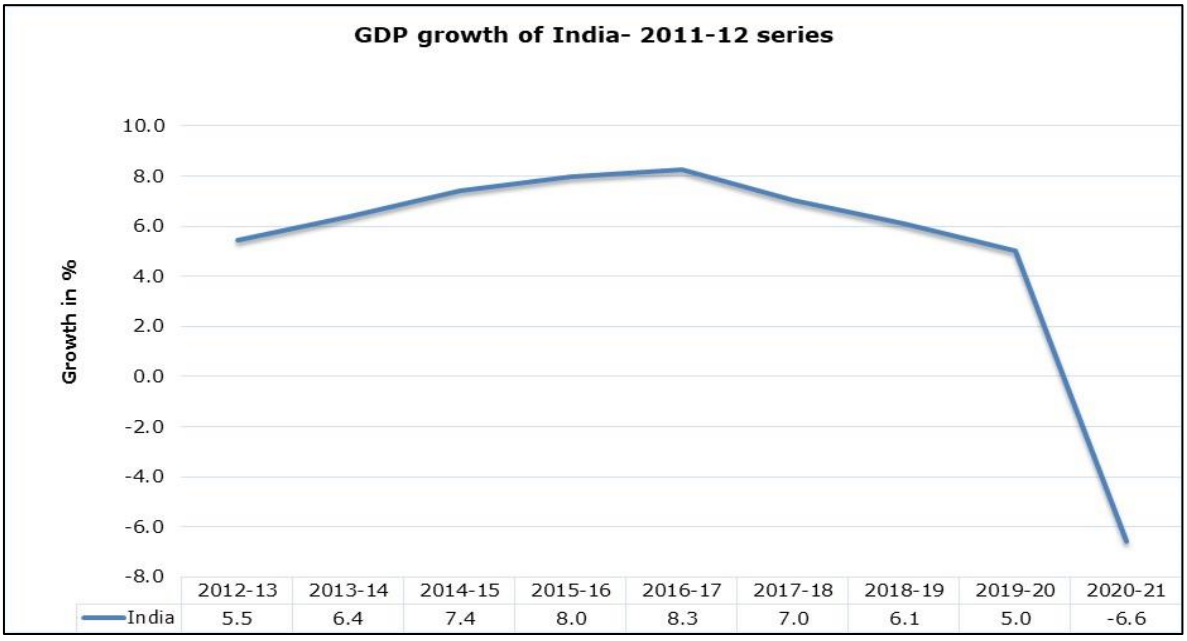


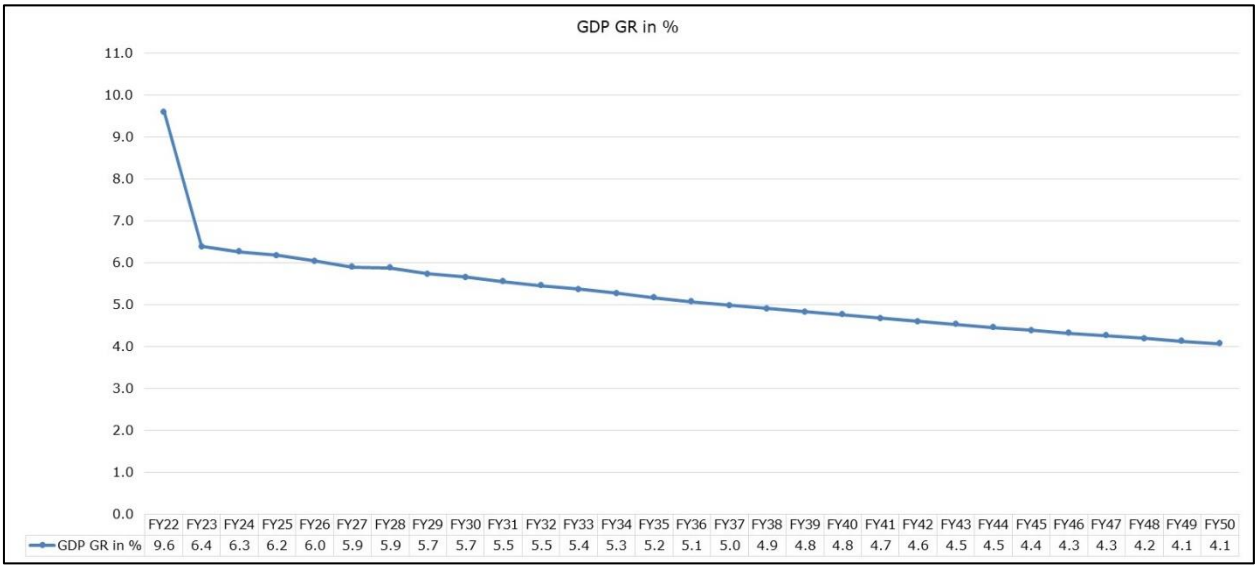
Figure 3-5: GDP Growth in India

Economic growth in India has been broadly on an accelerating path till FY18. It is likely to be the fastest growing major economy in the world in the medium-term. The growth in real GDP was 8.3 percent for FY17 and 7.0 percent in FY18, while the growth in FY19 was slightly lower at 6.1 percent. The long-term trend line growth of 7.2 percent has been achieved between FY12 to FY19. During FY20, growth has slowed down due to some structural issues and global headwinds resulting in an average GDP growth rate of 4.2 percent.

With the outbreak of COVID-19, global recession is likely to be witnessed across all the economies. The lockdown period announced by Indian government had an adverse impact on the economy. The first quarter estimated for FY21 has indicated a contraction of 23.9 percent, second quarter showed a rebound in growth by contracting 7.5 percent and third & fourth quarter grew by 0.5 percent and 1.6 percent respectively. The resultant contraction for FY21 has been around 6.6 percent.

The Indian economy is likely to see the impact of global slowdown due to COVID-19 and hence, the GDP forecast for India by various international agencies has been revised for the next two years. As per the latest update by Central Statistical Organisation (CSO), GDP in Q2 of FY22 has grown by 8.4 percent (down from 20.1 percent in Q1) and is likely to achieve a yearly growth rate of 9.5 percent (with 6.6% in Q3 and 6% in Q4). Further on, the economy is likely to grow in the range of 6.5-7.0 percent in FY23 and over 7.0 percent thereafter as per the forecast by CSO. As per Economic Survey of India for FY22, the economy is predicted to have a growth rate of 9.2 percent for FY22 and 8.0-8.5 percent in FY23. With the vaccination programme having covered the bulk of the population, economic momentum building back and the likely long-term benefits of supply-side reforms in the pipeline, the Indian economy is in a good position to witness GDP growth of 8.0-8.5 per cent in 2022-23.

The GDP forecast series provided by client as adopted in the earlier study is presented in **Figure 3-6**.



	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33	FY34	FY35	FY36	FY37	FY38	FY39	FY40	FY41	FY42	FY43	FY44	FY45	FY46	FY47	FY48	FY49	FY50
GDP GR in %	9.6	6.4	6.3	6.2	6.0	5.9	5.9	5.7	5.7	5.5	5.5	5.4	5.3	5.2	5.1	5.0	4.9	4.8	4.8	4.7	4.6	4.5	4.5	4.4	4.3	4.3	4.2	4.1	4.1

Figure 3-6 GDP Forecast of India Adopted in Earlier Study

The year-on-year growth for Indian economy as provided by the Client (based on the forecast by Consensus Economics) for the present study is presented in **Figure 3-7**.

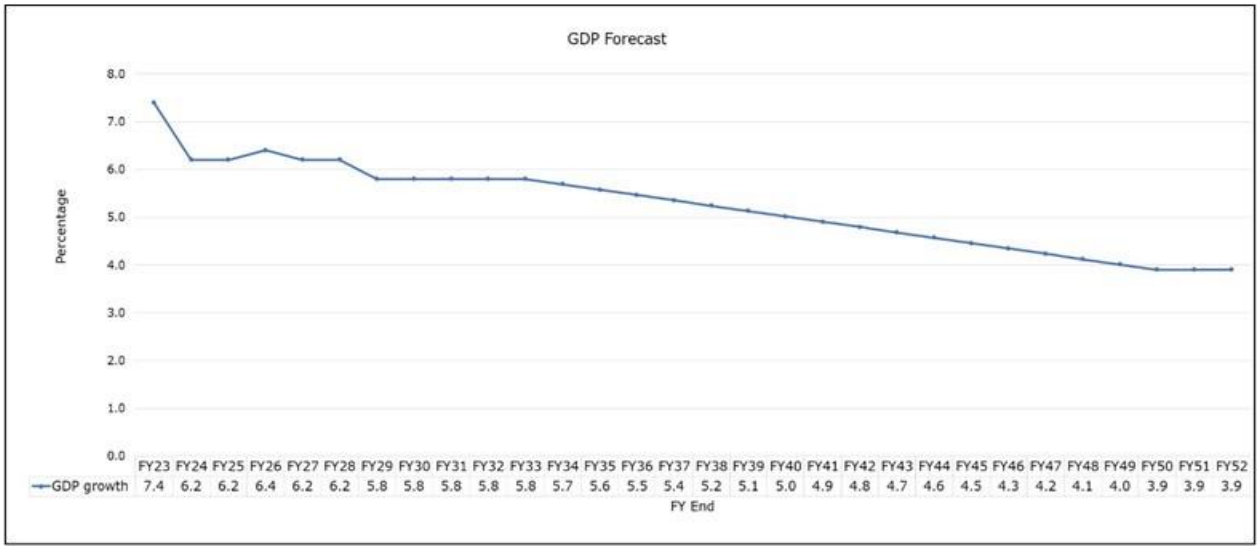


Figure 3-7: GDP Forecast of India

3.7.2 PIA States Outlook

A snapshot of the main economic indicators in the past for the PIA states is presented in **Table 3-6**.

Indicators	Rajasthan	Gujarat	Madhya Pradesh	Uttar Pradesh
GSDP in Rs Billion	6,887.1	12,689.6	5,804.1	11,668.2
GSDP growth (FY12 to FY20) in %	6.1	9.6	7.8	6.6
Per capita Income in Rs (FY20)	88,463	187,524	70,014	51,255
Sector Share in %, FY20				
Agriculture and allied	33.1	17.3	34.6	23.0
Industry	22.2	46.3	25.7	26.8
Services	44.7	36.4	39.7	50.2

Table 3-6: Main Economic Indicators of PIA States

In order to arrive at the forecast of the PIA states, past performance of the State GDPs vis-a-vis India GDP has been studied and the multipliers have been derived for both short term and long term. The past and adopted multipliers for PIA states to Indian economy are presented in **Table 3-7**.

Period	India	Rajasthan	Gujarat	Madhya Pradesh	Uttar Pradesh
Past Growth %					
FY12 to FY20	7.0%	6.1%	9.6%	7.8%	6.6%
FY15 to FY20	7.0%	5.6%	9.5%	8.4%	7.0%
Past Multipliers					
FY12 to FY20		0.9	1.4	1.1	0.9
FY15 to FY20		0.8	1.4	1.2	1.0
Adopted Multipliers					
States w.r.t. India		0.9	1.4	1.1	0.9

Table 3-7: Past Multipliers and Future Outlook of PIA States

Based on the normalised OD shares of the toll plaza and the outlooks adopted for PIA states, the mode-wise future weighted income is presented in **Table 3-8**.

FY/Modes	Cars/MLCV	Bus	LCV/M Bus	2A	3A	MAV
2023	6.9	7.2	7.2	7.4	7.3	7.3
2024	5.8	6.0	6.0	6.2	6.1	6.1
2025	5.8	6.0	6.0	6.2	6.1	6.1
2026	5.9	6.2	6.2	6.4	6.3	6.3
2027	5.8	6.0	6.0	6.2	6.1	6.1
2028	5.8	6.0	6.0	6.2	6.1	6.1
2029	5.4	5.6	5.6	5.8	5.7	5.7
2030	5.4	5.6	5.6	5.8	5.7	5.7
2031	5.4	5.6	5.6	5.8	5.7	5.7
2032	5.4	5.6	5.6	5.8	5.7	5.7
2033	5.4	5.6	5.6	5.8	5.7	5.7
2034	5.3	5.5	5.5	5.7	5.6	5.6
2035	5.2	5.4	5.4	5.6	5.5	5.5
2036	5.1	5.3	5.3	5.5	5.4	5.4
2037	5.0	5.2	5.2	5.4	5.3	5.3
2038	4.9	5.1	5.1	5.3	5.2	5.1
2039	4.8	5.0	5.0	5.2	5.1	5.0
2040	4.7	4.9	4.9	5.0	4.9	4.9
2041	4.6	4.8	4.8	4.9	4.8	4.8
2042	4.5	4.7	4.6	4.8	4.7	4.7
2043	4.3	4.5	4.5	4.7	4.6	4.6
2044	4.2	4.4	4.4	4.6	4.5	4.5
2045	4.1	4.3	4.3	4.5	4.4	4.4
2046	4.0	4.2	4.2	4.4	4.3	4.3
2047	3.9	4.1	4.1	4.3	4.2	4.2
2048	3.8	4.0	4.0	4.1	4.1	4.0
2049	3.7	3.9	3.9	4.0	4.0	3.9
2050	3.6	3.8	3.8	3.9	3.8	3.8
2051	3.6	3.8	3.8	3.9	3.8	3.8
2052	3.6	3.8	3.8	3.9	3.8	3.8

Table 3-8: Future Mode-wise Weighted Income of PIA States

3.8 Review of Past Traffic Data

The comparison of AADT of earlier studies of Avanza and Ramboll in FY18, FY19 and FY21 with present study is presented in **Table 3-9**

	Car	LCV/ Mbus	Bus/ Truck	3A/MAV/HCM
TP01 - Bassi				
2018 (Avanza)	1,566	296	343	1,504

	Car	LCV/ Mbus	Bus/ Truck	3A/MAV/HCM
2019 (Ramboll)	1,967	163	294	1,480
2021 (Avanza)	2,199	347	367	1,595
2022 (Present Study)	2,974	136	326	1,315
YOY growth (%)				
2018 VS 2019	25.6	-44.9	-14.3	-1.6
2019 VS 2021	5.7	45.9	11.8	3.8
2021 vs 2022	35.2	-60.8	-11.3	-17.5
End Point Growth (%)				
2018 VS 2022	17.4	-17.7	-1.3	-3.3
2019 VS 2022	14.8	-5.9	3.5	-3.9
TP02 - Aroli				
2018 (Avanza)	1,917	334	494	1,419
2019 (Ramboll)	2,212	140	398	1,439
2021 (Avanza)	2,620	343	542	1,842
2022 (Present Study)	2,939	133	427	1,418
YOY growth (%)				
2018 VS 2019	15.4	-58.1	-19.4	1.4
2019 VS 2021	8.8	56.6	16.7	13.1
2021 vs 2022	12.2	-61.2	-21.2	-23.0
End Point Growth (%)				
2018 VS 2022	11.3	-20.6	-3.6	0.0
2019 VS 2022	9.9	-1.7	2.4	-0.5
TP03 - Dhaneshwar				
2018 (Avanza)	2,119	367	681	1,470
2019 (Ramboll)	2,159	151	433	1,567
2021 (Avanza)	2,673	474	630	1,906
2022 (Present Study)	2,736	125	470	1,750
YOY growth (%)				
2018 VS 2019	1.9	-58.9	-36.4	6.6
2019 VS 2021	11.3	77.2	20.6	10.3
2021 vs 2022	2.4	-73.6	-25.4	-8.2
End Point Growth (%)				
2018 VS 2022	6.6	-23.6	-8.9	4.5
2019 VS 2022	8.2	-6.1	2.8	3.8

Table 3-9 Traffic Comparison of Avanza and Ramboll AADT

Comparison of 2018 study with 2022 study shows a growth in car traffic of about 17.4 percent at TP01, 11.3 percent at TP02 and 6.6 percent at TP03. Around 4.5 percent of 3A/MAVs growth has been observed at TP03 during the same period.

Whereas 2019 and 2022 comparison show a growth of about 8–15 percent in car traffic and about 2–4 percent growth in bus/truck is observed at each toll plaza location.

3.9 Past and Future Transport Demand Elasticity

The econometric model applied for the project, relates traffic growth to changes in state domestic product via an elasticity factor according to IRC guidelines. The elasticity by vehicle types have been estimated based on the regression analysis of weighted income of PIA states with the actual traffic data.

A regression between GSDP (as independent variable) and registered vehicles (as dependant variable) of Rajasthan was carried out. The registered vehicle elasticity in case of cars is 1.6 during FY12 to FY19. In case of all trucks combined, the registered vehicle elasticity is 1.5 during the same period.

Vehicle registration data is also used as a proxy wherein operational toll data is not available. Vehicle registration data represents all vehicles registered in the state, but does not indicate actual number of vehicles plying on the road as it does not account for factors such vehicles taken off the road due to lack road worthiness, those registered in a state but mostly used elsewhere, etc. Consequently, the elasticity values based on vehicle registration may not be representative of the traffic growth trends on the project road. Past elasticity and growth trends on the nearby national highways have been the basis of growth for the project road.

The derived elasticities on other National Highways across India have also formed the basis for choosing the recommended elasticities on PR. The elasticities derived using the operational toll data regressed with the applicable state incomes (mode wise weighted shares) for the respective projects on some of the National Highways is presented in **Table 3-10**.

NH	Period	Car	2A	3A/MAV
NH-21	FY12-FY20	1.23	-0.42	0.54
SH-25	FY15-FY20	1.28	0.26	0.47
SH-17 & SH-7	FY13-FY20	1.26	0.51	0.33
NH-19	FY15-FY20	0.78	1.36	1.40
NH-1	FY12-FY20	1.02	0.74	
NH-6	FY14-FY20	1.11	1.68	0.42
NH-8A	FY16-FY20	0.73	0.28	0.94
NH-4	FY15-FY20	0.87	0.18	0.84
NH-6	FY16 to FY19	1.25	1.28	0.78

Table 3-10: Past Elasticity on Other National Highways

The past elasticity values have been observed in the range of 1-1.3 for cars on various National Highways and around 0.5-0.9 for 3A/MAV combined. Individually, 3A trucks have shown a negative elasticity in some of the assets with MAVs showing a higher positive elasticity.

Cars

- The elasticities and the past growth levels for cars are a result of increasing income levels, increasing vehicle ownership, and higher propensity to travel on highways in India due to network level developments and higher levels of service. These levels of growth are likely to continue in the near to medium term since car ownership levels are still very low and the road network is undergoing continual development.
- In case of cars, the elasticity values derived across the toll roads in the region is between 1.0 to 1.3. Car elasticity has been considered as 1.1 for the period up to FY25, tapered to 1.0 beyond FY30 in view of the tourism activities in the region and presence of educational hub in Kota.
- The motorisation levels in India also play an important role in determining car growth. With the increasing car ownership levels, propensity to travel and network level improvements on National Highways, car growth is likely to be at a high rate as witnessed in the recent past. The low motorization rate suggests that there is room for continued growth for many years to come. The motorisation rate for cars (per 1000 population) in India has gone up from 6.6 in 2001 to 20 in 2015. Although India's car fleet has been growing at 10% for nearly 25 years, its motorization rate is low compared to other countries of similar wealth and much lower than developed countries with motorization rate of around 450. The forecasts by different agencies indicate that number of cars will increase to 35 per thousand populations by 2025. With the continual increase in motorization rate and improved road network usage by cars for inter-urban travel, car growth is expected to be robust.

Bus

- Over the years in India, there has been a change in passenger's travel mode preferences with increasingly more people shifting from public transport systems towards personalised modes. This has resulted, in general, in elasticity of bus traffic/demand to GSDP lower than unity ranging between 0.3 to 0.8 across the operational National Highways.
- Going forward Bus elasticity has been recommended as 0.7 till the end of the concession period.

Trucks

- The switch between MLCV and LCV is being observed across other national highways wherein MLCVs (mostly charged in car category) have been gaining importance lately over LCV category. For LCVs, an elasticity of 0.5 has been adopted for the entire concession period.
- For 2A Trucks, elasticity has been recommended as 0.5 till the end of concession period.
- For the project road, an elasticity of 0.7 has been adopted for 3A trucks till the end of the concession period. In case of MAV trucks, an elasticity of 1.0 has been adopted till FY30, tapered to 0.9 beyond FY30.

It is likely that this growth would slow down over time as the market becomes more mature and saturated, therefore elasticity to GSDP can be expected to decline over time. With the anticipated growth momentum in the coming years, higher elasticity values have been considered in the initial slabs and further tapering has been done in the future.

In India as a whole, the freight vehicle mix has been changing in the last decade favouring MAV to 2 Axle/ 3Axle vehicles for long-distance traffic, given the operational efficiencies achievable with larger vehicles. Considering the ongoing technical advancements in automobile industry, some of the standard 2 Axle/ 3 Axle trucks would gradually be replaced by MAVs. Mature national highways with tolling in operation for few years, have already witnessed the shift in 2A/3A trucks to MAV for long distance movement.

On an overall level, due consideration has been given to the tonnage shifts happening in the market with Mini LCV gaining importance for short distance movements over LCVs and MAVs being preferred over 2A/3A for long distance movements due to better operational efficiencies. Some of the 2A/3A trucks are also being used for local movements.

While assigning elasticities to different modes, freight travel pattern and over all elasticity of cargo tonnage with respect to weighted GSDP has been an important consideration. The recommended elasticity values adopted for all vehicle types in line with the traffic growth being observed on other national highways and changes in freight traffic pattern observed on the project road are presented in **Table 3-11**.

Period/Modes	Cars/MLCV	Bus	LCV/M Bus	2A	3A	MAV
TP01 Bassi , TP02 Aroli and TP03 Dhaneshwar						
2023-2025	1.1	0.7	0.5	0.5	0.7	1.0
2026-2030	1.1	0.7	0.5	0.5	0.7	1.0
2031-2035	1.0	0.7	0.5	0.5	0.7	0.9
2036-2040	1.0	0.7	0.5	0.5	0.7	0.9
Beyond 2040	1.0	0.7	0.5	0.5	0.7	0.9

Table 3-11: Recommended Elasticity for Project Road

It has been assumed that transport demand elasticity, for both freight and passenger traffic, would gradually decline over time, despite growth in per capita income, as regions becomes more mature, self-sufficient and with alternative mode of transport available to users. In the future growth forecast, the gradation in elasticity of freight over the years takes into account to cover the impact of network level changes in both rail and road networks apart from economic changes.

3.10 Projected Traffic Growth Rates

The estimated traffic growth rates for the project road in the earlier study conducted by Ramboll have been presented in **Table 3-12**

FY/Modes	Car/ML CV	LCV	Bus	2A	3A	MAV	O/size/ HME
2023	6.4	4.4	3.2	3.0	4.3	6.3	6.3
2024	6.3	4.3	3.1	2.9	4.3	6.2	6.2
2025	6.2	4.2	3.1	2.9	4.2	6.1	6.1
2026	6.1	4.2	3.0	2.8	4.1	6.0	6.0
2027	6.0	4.1	2.9	2.8	4.0	5.8	5.8
2028	5.9	4.0	2.9	2.8	4.0	5.8	5.8
2029	5.8	3.9	2.9	2.7	3.9	5.7	5.7
2030	5.7	3.9	2.8	2.7	3.8	5.6	5.6
2031	5.1	3.8	2.8	2.6	3.8	5.0	5.0
2032	5.0	3.7	2.7	2.6	3.7	4.9	4.9
2033	4.9	3.7	2.7	2.5	3.6	4.8	4.8
2034	4.8	3.6	2.6	2.5	3.6	4.7	4.7
2035	4.7	3.5	2.6	2.4	3.5	4.6	4.6
2036	4.7	3.5	2.5	2.4	3.4	4.5	4.5
2037	4.6	3.4	2.5	2.3	3.4	4.4	4.4
2038	4.5	3.4	2.4	2.3	3.3	4.4	4.4
2039	4.4	3.3	2.4	2.3	3.3	4.3	4.3
2040	4.4	3.3	2.4	2.2	3.2	4.2	4.2
2041	4.3	3.2	2.3	2.2	3.2	4.2	4.2
2042	4.2	3.2	2.3	2.2	3.1	4.1	4.1
2043	4.2	3.1	2.3	2.1	3.1	4.0	4.0
2044	4.1	3.1	2.2	2.1	3.0	4.0	4.0
2045	4.0	3.0	2.2	2.1	3.0	3.9	3.9
2046	4.0	3.0	2.2	2.0	2.9	3.9	3.9
2047	3.9	2.9	2.1	2.0	2.9	3.8	3.8
2048	3.8	2.9	2.1	2.0	2.9	3.7	3.7
2049	3.8	2.8	2.1	1.9	2.8	3.7	3.7
2050	3.7	2.8	2.0	1.9	2.8	3.6	3.6

Table 3-12 Projected Traffic Growth Rates for Project Road in Earlier Study (%)

Under the present study, based on the moderated perspective elasticity values and the projected growth rates of the income for PIA states, the future average annual compound traffic growth rates by vehicle type have been estimated for the project road by using the following relationship:

Tgr = (GSDPgr) x E; where,

Tgr – Traffic growth rate for mode

GSDPgr – Growth rate of GSDP

E – Elasticity value for mode

Using the year-on-year mode wise weighted income for PIA and elasticity for different time periods, traffic growth rates have been estimated for each year till FY52. The estimated traffic growth rates for the project road have been presented in **Table 3-13**.

FY/Modes	Cars/MLCV	LCV/ M Bus	Bus	2A	3A	MAV
TP01 Bassi, TP02 Aroli and TP03 Dhaneshwar						
2023	7.6	3.6	5.0	3.7	5.1	7.3
2024	6.3	3.0	4.2	3.1	4.3	6.1
2025	6.3	3.0	4.2	3.1	4.3	6.1
2026	6.5	3.1	4.4	3.2	4.4	6.3
2027	6.3	3.0	4.2	3.1	4.3	6.1
2028	6.3	3.0	4.2	3.1	4.3	6.1
2029	5.9	2.8	3.9	2.9	4.0	5.7
2030	5.9	2.8	3.9	2.9	4.0	5.7
2031	5.4	2.8	3.9	2.9	4.0	5.1
2032	5.4	2.8	3.9	2.9	4.0	5.1
2033	5.4	2.8	3.9	2.9	4.0	5.1
2034	5.3	2.8	3.9	2.9	3.9	5.0
2035	5.2	2.7	3.8	2.8	3.8	4.9
2036	5.1	2.7	3.7	2.7	3.8	4.8
2037	5.0	2.6	3.6	2.7	3.7	4.7
2038	4.9	2.5	3.6	2.6	3.6	4.6
2039	4.8	2.5	3.5	2.6	3.5	4.5
2040	4.7	2.4	3.4	2.5	3.5	4.4
2041	4.6	2.4	3.3	2.5	3.4	4.3
2042	4.5	2.3	3.3	2.4	3.3	4.2
2043	4.3	2.3	3.2	2.4	3.2	4.1
2044	4.2	2.2	3.1	2.3	3.2	4.0
2045	4.1	2.2	3.0	2.2	3.1	3.9
2046	4.0	2.1	3.0	2.2	3.0	3.8
2047	3.9	2.1	2.9	2.1	2.9	3.7
2048	3.8	2.0	2.8	2.1	2.8	3.6
2049	3.7	1.9	2.7	2.0	2.8	3.5
2050	3.6	1.9	2.7	2.0	2.7	3.4
2051	3.6	1.9	2.7	2.0	2.7	3.4
2052	3.6	1.9	2.7	2.0	2.7	3.4

Table 3-13: Projected Traffic Growth Rates for Project Road (%)

In derivation of above growth rates, the likely shift of buses to cars in case of passenger vehicles and the replacement/ tonnage shift of 2A/3A trucks to MAV for long distance in case of freight vehicles has been duly considered.

The implied traffic growth rates for freight vehicles of 2A/3A and MAV after considering the impact of diversion from DME in FY24 to FY26 under the base case have been presented in **Table 3-14**.

FY/Modes	TP01			TP02			TP03		
	2A	3A	MAV	2A	3A	MAV	2A	3A	MAV
2024	3.1	10.5	7.6	3.1	9.9	7.5	3.1	7.5	7.3
2025	3.1	7.2	6.8	3.1	7.0	6.8	3.1	5.8	6.7
2026	3.2	7.3	7.0	3.2	7.0	7.0	3.2	6.0	6.9

Table 3-14: Implied Traffic Growth Rates for Project Road After Diversion to DME (%)

The above growth rates relate to the most likely Base Case. In addition, two sets of traffic growth rates under low and high cases have also been considered and impact on toll

revenue evaluated for both these cases. Based on the risk analysis of key parameters like economic growth and elasticity of travel demand impacting traffic growth, two additional growth scenarios have been presented. Low growth scenario considers a 20 percent reduction in growth rates relating to about 10 percent decline each in elasticity and economic growth. The High growth scenario considers a 20 percent increase in growth rates signifying about 10 percent increase each in elasticity and economic parameters.

3.11 Traffic Projections and Capacity Analysis

Table 3-15 presents the projections of the total vehicles based on the most likely growth rates till FY52 as assessed in this study.

FY	Before Diversion				After Diversion			
	TP1 - Bassi	TP2 - Aroli	TP3 - Dhaneshwar	Average	TP1 - Bassi	TP2 - Aroli	TP3 - Dhaneshwar	Average
2022	9,741	10,435	11,570	10,582	9,741	10,435	11,570	10,582
2023	10,406	11,139	12,340	11,295	10,406	11,139	12,340	11,295
2024	11,003	11,770	13,030	11,934	11,127	11,894	13,154	12,059
2025	11,635	12,438	13,760	12,611	11,832	12,635	13,956	12,808
2026	12,326	13,169	14,557	13,351	12,603	13,445	14,833	13,627
2027	13,037	13,919	15,375	14,110	13,328	14,211	15,667	14,402
2028	13,789	14,713	16,241	14,914	14,097	15,021	16,549	15,222
2029	14,534	15,500	17,098	15,711	14,858	15,824	17,422	16,034
2030	15,321	16,330	18,002	16,551	15,661	16,670	18,342	16,891
2031	16,080	17,132	18,877	17,363	16,436	17,488	19,233	17,719
2032	16,877	17,973	19,794	18,215	17,250	18,346	20,167	18,588
2033	17,715	18,857	20,758	19,110	18,106	19,248	21,148	19,501
2034	18,577	19,767	21,749	20,031	18,986	20,176	22,158	20,440
2035	19,465	20,703	22,769	20,979	19,893	21,131	23,197	21,407
2036	20,377	21,665	23,816	21,952	20,824	22,112	24,263	22,400
2037	21,313	22,651	24,889	22,951	21,780	23,118	25,356	23,418
2038	22,272	23,662	25,989	23,974	22,759	24,149	26,476	24,461
2039	23,254	24,697	27,113	25,021	23,761	25,204	27,621	25,529
2040	24,257	25,753	28,262	26,091	24,786	26,282	28,790	26,619
2041	25,281	26,832	29,433	27,182	25,831	27,381	29,983	27,732
2042	26,324	27,930	30,627	28,294	26,896	28,502	31,198	28,865
2043	27,386	29,048	31,840	29,425	27,980	29,641	32,434	30,018
2044	28,465	30,183	33,073	30,574	29,081	30,799	33,689	31,190
2045	29,560	31,335	34,322	31,739	30,198	31,973	34,961	32,377
2046	30,668	32,501	35,587	32,919	31,330	33,163	36,249	33,580
2047	31,790	33,680	36,866	34,112	32,475	34,365	37,551	34,797
2048	32,922	34,871	38,157	35,317	33,630	35,579	38,865	36,025
2049	34,063	36,071	39,457	36,530	34,795	36,803	40,189	37,262
2050	35,212	37,278	40,765	37,752	35,967	38,033	41,520	38,507
2051	36,400	38,527	42,117	39,015	37,179	39,306	42,897	39,794
2052	37,628	39,818	43,515	40,320	38,433	40,622	44,319	41,125

Table 3-15: Projected Traffic on the Project Road

The projected traffic for the project road is not likely to reach the designed capacity of 60,000 PCU till FY52.

4. TOLL REVENUE PROJECTIONS

4.1 Tolling Strategy

The project road has an "Open System" of toll collection which enables the concessionaire to collect tolls from through traffic as well as from short distance one.

As mentioned earlier, there are three operational toll plazas on the project road - TP01-Bassi, TP02- Aroli and TP03-Dhaneshwar with effective tolling lengths of 64.1785 km, 54.819 km and 53.5 km respectively being charged.

4.2 Schedule of User Fee

As per Schedule of User Fee for the project, the per km toll rates applicable from 2007-08 for normal tolling length, bypasses and permanent structures, the revision basis and concessions are provided.

The concessions to traffic have been given in the form of rates as below:

Local traffic

Car / Jeep / Vans - includes local users owning a vehicle registered for non-commercial purposes, residing within a distance of 20 km from the toll plaza and crossing the same for commuting purposes.

Commercial vehicles - includes local users owning a commercial vehicle (excluding vehicles under National Permit), registered with address on the Registration Certificate of a particular district and uses such vehicle for commuting on a section of National Highway, permanent bridge, tunnel or bypass, as the case may be, which is located within that district, shall be levied user fee on all toll plazas which are located within that district at the rate of fifty per cent of the prescribed rate of fee (single journey rate). No such concession shall be provided, if a service road or alternative road is available for use by such commercial vehicles. Thus, local commercial traffic has to pay only 50 percent of the normal ticket.

Daily Pass

When the vehicle has to cross the tolled section more than once in a day, the user shall have the option to pay one and half times (1.5 times) of the fee for a single entry; this pass shall be valid for 2 entries within 24 hours of purchase.

Monthly Pass

A user, who makes use of the project road frequently during a month, may opt to purchase a monthly pass upon payment of a charge equal to two-thirds of the fee payable for 50 single journeys; this pass can be used for a maximum 50 one-way journeys over the month of validity.

Thus, the different categories of toll tickets are as follows:

(i) Traffic paying normal toll rates (single trip)

(ii) Traffic paying return journey rates

(iii) Traffic paying monthly pass rates

(iv) Traffic paying local personal rates

(v) Traffic paying local commercial rates

4.3 Tolling Streams

The tolling segmentation considered in the earlier study adopted by Ramboll is presented in **Table 4-1**.

Ticket Type/Modes	Car	LCV	Bus	2-axle Truck	3-axle Truck	MAV
TP01-Bassi						
Single	69.1	61.3	50.2	50.2	77.0	78.7
Return	25.4	22.5	18.8	18.8	11.0	8.6
Monthly				0.0		
Local personal				0.0		
Local commercial	1.0	8.6	19.9	19.9	8.3	12.6
Exempt	4.5	7.6	11.1	11.1	3.8	0.2
Total	100.0	100.0	100.0	100.0	100.0	100.0
TP02-Aroli						
Single	66.3	63.7	54.2	54.2	80.0	90.8
Return	30.2	23.2	24.0	24.0	15.7	8.8
Monthly						
Local personal						
Local commercial	0.9	6.8	12.4	12.4	0.8	0.3
Exempt	2.6	6.3	9.4	9.4	3.5	0.2
Total	100.0	100.0	100.0	100.0	100.0	100.0
TP03-Dhaneshwar						
Single	61.9	55.9	40.7	40.7	71.3	87.8
Return	26.8	32.9	33.7	33.7	21.5	11.7
Monthly				0.0		
Local personal				0.0		
Local commercial	8.5	6.0	14.8	14.8	4.6	0.3
Exempt	2.8	5.2	10.8	10.8	2.7	0.1
Total	100.0	100.0	100.0	100.0	100.0	100.0

Table 4-1: Tolling Distribution in Earlier Study (%)

The tolling stream distribution in the present study has been derived from the toll data taking an average of ticket wise traffic from July 2021 to April 2022 and the same has been adopted for all the modes except cars. The level of exemptions in cars has been found to be high due to which a tapering has been considered in the future years. The **Table 4-2** presents the distribution considered for all the modes.

Ticket Type/Modes	Car			LCV	Bus/ 2A Truck	3A Truck	MAV	OSV
	FY22	FY23	FY24 onwards					
TP01-Bassi								
Single	28.9	28.9	28.9	45.1	44.4	60.5	73.4	88.1
Return	28.9	39.2	48.2	51.7	49.0	38.5	16.3	7.8
Monthly	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
Local personal	0.0	6.9	12.9					
Local commercial	0.0	0.0	0.0	1.5	6.3	0.8	10.2	1.0
Exempt	42.2	25.0	10.0	1.4	0.2	0.2	0.2	3.2
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
TP02-Aroli								
Single	34.8	34.8	34.8	41.3	40.2	58.7	67.2	89.1
Return	37.9	45.3	48.3	57.0	59.7	41.2	32.7	8.9
Monthly	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Local personal	0.0	4.9	6.9					
Local commercial	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0
Exempt	27.3	15.0	10.0	0.6	0.1	0.1	0.0	2.0
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
TP03-Dhaneshwar								
Single	31.9	31.9	31.9	36.2	34.7	33.8	51.7	62.1
Return	36.4	40.4	49.4	63.5	62.6	64.0	47.8	37.6
Monthly	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Local personal	0.0	2.7	8.7					
Local commercial	0.0	0.0	0.0	0.2	2.7	2.1	0.5	0.0
Exempt	31.7	25.0	10.0	0.1	0.0	0.0	0.0	0.4
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Table 4-2: Tolling Distribution from Toll Data of July 2021 to April 2022 (%)

The actual segmentation observed during July 2021 to April 2022 indicates a lower percentage of single ticket paying traffic with return ticket traffic and exemptions being higher for cars as against what was adopted in earlier study.

In case of cars, the normal toll paying traffic is likely to be about 29 percent, 35 percent and 32 percent at TP01, TP02 and TP03 respectively. Exemptions in Cars are found to be higher in the recent toll data being around 42 percent, 27 percent and 32 percent at the three toll plazas respectively. The level of exemptions are envisaged to taper down in FY23 and stabilise by FY24 owing to the better toll operations in place by then. The exemptions at TP01 are around 42 percent and assumed to go down to 10 percent by FY24 onwards. Similarly, at TP02 and TP02 the exemptions levels are in the range of 27-32 percent which is assumed to taper to a level of 10 percent by FY24 and continue with the same level in future years. The gain from reduction in exemptions has been spread over the return pass and local pass categories for cars.

In case of LCV around 36-45 percent of the traffic at the three toll plazas is paying for single ticket. In case of 3A/MAV, around 50-60 percent of the truck traffic is opting for normal ticket at the three toll plazas due to their long lead of travel and higher percentage each of 3A trucks and MAV falling under return pass category at both the toll plazas. This

could be due to shorter lead of travel between the three toll plazas and presence of stone quarries in the region.

Trip rate for local pass users is considered as 1.0, for monthly pass it is 1.67 across all modes. For daily pass, trip rate of 2.0 has been considered for all the modes.

4.4 Toll Rates

This section presents details on the toll rates that are likely to be imposed on the users of the project road during the study period. The toll rates (Rs/km) for the base year 2007-08 for different vehicle categories as per toll fee rules are presented in **Table 4-3**.

Mode	Base rate per km (in Rs)
Car, Jeep, Van, LMV	0.65
LCV /M Bus	1.05
Bus/ 2 Axle Truck	2.20
3 Axle	2.40
MAV	3.45
Oversized	4.20

Table 4-3: Toll Rates in Rs/km for Different Vehicle Categories

The toll notification states that the 2007 toll rates shall be increased without compounding by three per cent each year with effect from the 1st day of April 2008 and such increased rate shall be deemed to be the base rate for the subsequent years.

In addition to this, the rate of fee for use of bypass forming part of a section of a National Highway constructed with a cost of Rs 10 crore or more, for the base year 2007, shall be one and a half times of the per km base rates specified above and the length of such bypass shall be excluded from the length of such section of National Highway. Also, the fee levied and collected hereunder for permanent bridge/ structures, as the case may be, having a length of 60 m or more on the basis of the equivalent length for structure as specified shall be due and payable at the toll plaza.

In case of the project road, the details of normal tolling lengths, bypass length (at 1.5 times) and equivalent structure lengths being charged at toll plazas are presented in **Table 4-4**.

Toll Plazas	TP01-Bassi	TP02-Aroli	TP03-Dhaneshwar
A. Normal length	36.627	53.909	53.5
B. Bypass length @ 1.5 times	16.021	0	0
C. Equivalent Structure length	3.52	0.91	0
D. Total tolling length=(A+1.5*B+C)	64.1785	54.819	53.5

Table 4-4: Tolling Lengths (in km) for Chittorgarh-Kota

The applicable base rates shall be revised annually with effect from April 1 each year to reflect the increase in wholesale price index for the month of December of the immediate preceding year in which such revision is undertaken but such revision shall be restricted for 40 per cent of the increase in wholesale price index.

A WPI growth forecast of 3.5 percent was considered in the earlier study during the tenure of study period.

For the present study, actual WPI information for December 2021 of 143.3 under 2011-12 series converted into 1999-00 series (143.3*1.873*1.641=440.446) has been used. The forecast of WPI applicable for FY24 has been considered as 5.5 percent (as per the forecast by RBI for Q3 FY23) and in light of the past growth trend since 2009, 3.5 percent for future years beyond FY24 has been adopted for the period till FY52.

The stream of toll rates to be charged at three toll plazas of the project road till FY52 is presented in **Table 4-5.** The toll fee has been rounded to nearest 5 Rupees as per toll fee rules.

FY End	Car	LCV / M Bus	Bus /2A Truck	3-axle Truck	MAV	O/size/HME	Car Local
TP01-Bassi							
2022	80	130	270	295	420	510	285
2023	85	140	295	325	465	565	315
2024	90	150	310	340	490	595	330
2025	95	155	325	355	510	620	345
2026	100	160	340	370	530	645	360
2027	105	170	350	385	550	670	375
2028	110	175	365	400	575	700	390
2029	115	180	380	415	600	730	405
2030	115	190	395	435	625	760	420
2031	120	195	415	450	650	790	440
2032	125	205	430	470	675	820	455
2033	130	215	450	490	705	855	475
2034	140	225	465	510	730	890	495
2035	145	230	485	530	760	925	515
2036	150	240	505	550	795	965	535
2037	155	250	525	575	825	1,005	560
2038	160	260	550	595	860	1,045	580
2039	170	270	570	620	895	1,090	605
2040	175	285	595	645	930	1,135	630
2041	180	295	620	675	970	1,180	655
2042	190	305	645	700	1,010	1,225	685
2043	200	320	670	730	1,050	1,280	710
2044	205	330	695	760	1,090	1,330	740
2045	215	345	725	790	1,135	1,385	770
2046	225	360	755	825	1,185	1,440	800
2047	230	375	785	855	1,230	1,500	835
2048	240	390	820	890	1,285	1,560	870
2049	250	405	850	930	1,335	1,625	905
2050	260	425	885	965	1,390	1,695	940
2051	275	440	925	1,005	1,445	1,760	980
2052	285	460	960	1,050	1,505	1,835	1,020
TP02-Aroli							
2022	70	110	230	250	360	440	285
2023	75	120	255	275	395	480	315
2024	80	125	265	290	415	510	330
2025	80	130	275	300	435	530	345

FY End	Car	LCV / M Bus	Bus /2A Truck	3-axle Truck	MAV	O/size/HME	Car Local
2026	85	140	290	315	455	550	360
2027	90	145	300	330	470	575	375
2028	90	150	315	340	490	600	390
2029	95	155	325	355	510	620	405
2030	100	160	340	370	530	650	420
2031	105	170	355	385	555	675	440
2032	110	175	370	400	575	700	455
2033	115	185	385	420	600	730	475
2034	120	190	400	435	625	760	495
2035	125	200	415	455	650	790	515
2036	130	205	430	470	675	825	535
2037	135	215	450	490	705	860	560
2038	140	225	470	510	735	895	580
2039	145	230	485	530	765	930	605
2040	150	240	505	555	795	970	630
2041	155	250	530	575	825	1,005	655
2042	160	260	550	600	860	1,050	685
2043	170	275	570	625	895	1,090	710
2044	175	285	595	650	935	1,135	740
2045	185	295	620	675	970	1,185	770
2046	190	310	645	705	1,010	1,230	800
2047	200	320	670	730	1,055	1,280	835
2048	205	335	700	760	1,095	1,335	870
2049	215	345	725	795	1,140	1,390	905
2050	225	360	755	825	1,190	1,445	940
2051	235	375	790	860	1,235	1,505	980
2052	245	390	820	895	1,285	1,565	1,020
TP03-Dhaneshwar							
2022	65	105	225	245	350	425	285
2023	75	120	245	270	385	470	315
2024	75	125	260	285	405	495	330
2025	80	130	270	295	425	515	345
2026	85	135	280	305	440	540	360
2027	85	140	295	320	460	560	375
2028	90	145	305	335	480	585	390
2029	95	150	320	345	500	605	405
2030	100	160	330	360	520	630	420
2031	100	165	345	375	540	660	440
2032	105	170	360	390	565	685	455
2033	110	180	375	410	585	715	475
2034	115	185	390	425	610	740	495
2035	120	195	405	440	635	775	515
2036	125	200	420	460	660	805	535
2037	130	210	440	480	690	835	560
2038	135	220	455	500	715	870	580
2039	140	225	475	520	745	905	605
2040	145	235	495	540	775	945	630
2041	150	245	515	560	805	985	655
2042	160	255	535	585	840	1,025	685
2043	165	265	560	610	875	1,065	710
2044	170	275	580	635	910	1,110	740
2045	180	290	605	660	950	1,155	770

FY End	Car	LCV / M Bus	Bus /2A Truck	3-axle Truck	MAV	O/size/HME	Car Local
2046	185	300	630	685	985	1,200	800
2047	195	315	655	715	1,025	1,250	835
2048	200	325	680	745	1,070	1,300	870
2049	210	340	710	775	1,115	1,355	905
2050	220	355	740	805	1,160	1,410	940
2051	225	365	770	840	1,205	1,470	980
2052	235	380	800	875	1,255	1,530	1,020

Table 4-5: Toll Rates at Toll Plaza (in Rs)

The users purchasing return journey tickets will pay 1.5 times the above toll rates; the traffic opting for monthly passes will pay 33.3 times (two-thirds of 50 single journeys) the normal traffic toll rates. All passes have been rounded to the nearest 5 Rupees as per fee rules.

4.5 Toll Revenue Estimates

The toll revenue estimates of the earlier study are presented in **Table 4-6.**

FY End	Toll Revenue in Rs Million
2023	1,170.2
2024	1,292.3
2025	1,415.1
2026	1,550.6
2027	1,698.2
2028	1,878.0
2029	2,048.7
2030	2,248.5
2031	2,437.4
2032	2,665.2
2033	2,890.0
2034	3,142.4
2035	3,418.7
2036	3,698.4
2037	4,007.0
2038	4,353.7
2039	4,717.9
2040	5,107.2
2041	5,525.7
2042	5,973.3
2043	6,449.4
2044	6,966.4
2045	7,514.9
2046	8,106.6
2047	8,738.6
2048	9,456.4
2049	10,144.7
2050	10,933.0
PV12 FY23 till 2050	20,992.1

Table 4-6 Toll Revenue in Earlier Study

The projections of revenue under the present study for the project road have been presented till 15th December of FY52. Toll revenue streams have been calculated assuming that toll would be collected for all 365 days in a year and for 366 days in a leap year. The toll revenue by mode for the project road for the base case is presented is presented in **Table 4-7**.

Toll Revenue in Rs Million								
FY End	Car	Bus	LCV	2-axle Truck	3-axle Truck	MAV	OSV	Total
2023	168.6	15.9	41.5	61.0	84.5	521.8	0.9	894.2
2024	208.0	17.4	45.6	66.3	97.1	591.9	1.0	1,027.2
2025	229.2	18.6	49.3	70.9	107.4	658.1	1.1	1,134.7
2026	255.9	19.9	53.8	76.6	119.1	733.4	1.3	1,260.0
2027	282.4	21.4	58.3	82.0	129.6	807.8	1.4	1,382.9
2028	311.6	23.0	63.5	88.4	141.0	896.4	1.6	1,525.5
2029	345.2	24.6	68.4	94.3	152.0	984.6	1.7	1,670.7
2030	377.9	26.3	74.0	101.0	164.7	1,083.1	1.9	1,828.8
2031	415.6	28.1	80.2	108.4	178.4	1,185.5	2.1	1,998.2
2032	458.0	30.2	87.1	116.5	193.3	1,300.5	2.2	2,187.9
2033	501.4	32.3	94.0	124.6	209.6	1,419.4	2.5	2,383.8
2034	549.4	34.6	101.7	133.4	226.3	1,549.6	2.7	2,597.7
2035	605.3	36.9	109.5	142.3	244.6	1,691.8	2.9	2,833.4
2036	661.1	39.4	118.6	152.6	264.7	1,852.5	3.2	3,092.1
2037	722.5	42.0	127.9	163.1	285.6	2,015.6	3.5	3,360.2
2038	783.3	44.9	137.7	174.1	307.2	2,195.8	3.8	3,646.8
2039	858.1	47.8	148.3	185.8	331.5	2,389.2	4.1	3,964.8
2040	935.6	51.3	160.0	198.6	358.0	2,601.3	4.5	4,309.3
2041	1,012.2	54.4	171.8	211.5	384.3	2,815.4	4.9	4,654.5
2042	1,105.0	57.9	184.8	225.7	412.8	3,057.0	5.3	5,048.4
2043	1,199.7	61.9	198.1	240.0	444.4	3,312.9	5.7	5,462.8
2044	1,300.1	65.7	213.3	256.4	478.2	3,597.6	6.2	5,917.4
2045	1,414.7	70.0	228.3	272.3	511.2	3,880.4	6.7	6,383.6
2046	1,527.1	74.3	244.5	289.5	548.4	4,195.2	7.3	6,886.2
2047	1,651.6	79.1	261.9	307.8	586.5	4,530.9	7.8	7,425.5
2048	1,784.3	84.1	281.3	328.2	630.0	4,906.6	8.5	8,022.9
2049	1,921.0	88.9	299.3	346.9	672.9	5,272.1	9.1	8,610.3
2050	2,084.4	94.4	320.2	368.6	718.5	5,680.5	9.8	9,276.4
2051	2,246.5	99.9	342.8	391.9	768.7	6,107.8	10.6	9,968.1
2052*	1,724.0	75.6	260.0	295.3	585.0	4,680.6	8.1	7,628.6

* Till 15th December FY52

Table 4-7: Toll Revenue for the Project Road by Mode

Majority of the revenue is expected to come from MAV with about 60.5 percent of the total revenue. Amongst other categories, 2 axle trucks represent a share of around 4.5 percent of total revenue followed by 22 percent and 8.2 percent by Cars and 3 axle trucks. LCV category and Bus category is likely to generated about 1.2 percent and 3.7 percent revenue respectively.

Vehicles paying normal tolls are around 62.1 percent of total toll revenues for the project road sections and around 36.1 percent of the traffic may opt for daily pass category. Remaining 1.8 percent may fall in monthly pass and local concession category.

4.6 Scenario Analysis

For toll road projects, revenue streams are generally based on the assessment of the traffic volume (base and future) crossing the toll plazas and the applicable toll imposed on the user of the road. There is an inherent element of uncertainty in any forecast and whilst is not possible to measure risk in a strictly statistical sense (as many of the risks are largely or partly unknown), in this section an attempt is made at quantifying the main risks that could have an impact on this forecast.

The econometric approach used to derive traffic growth, is based on the estimation of GSDP growth rates for the influence area economies and traffic demand elasticity by mode; the estimation of both variables contains a certain degree of uncertainty which can be represented in the scenario analysis. Scenario analysis has been done in the following subheadings for the base case:

High Case

The high case is based on a more optimistic economic outlook for future years and higher elasticity values as compared to the base case. Therefore, traffic growth rates of 20 percent higher than the base case for every year and for all the mode are considered.

Low Case

A growth rate of 20 percent lower than base case for all types of vehicles has been considered in the present analysis to reflect uncertainty with regard to economic performance of PIA states and lower elasticity values.

The results of different scenarios are presented in **Table 4-8**. A comparison versus base case has been presented for the Present Value (at 12 percent discount rate) of the project revenue from FY23 till 15th December of FY52.

FY End	Toll Revenue in Rs Million		
	Base Case	High Case (+20%)	Low Case (-20%)
2023	894.2	905.4	883.0
2024	1,027.2	1,051.3	1,003.5
2025	1,134.7	1,173.7	1,096.6
2026	1,260.0	1,317.7	1,204.3
2027	1,382.9	1,461.8	1,307.6
2028	1,525.5	1,630.0	1,426.8
2029	1,670.7	1,803.3	1,546.7
2030	1,828.8	1,994.2	1,675.9
2031	1,998.2	2,199.4	1,814.0
2032	2,187.9	2,430.8	1,967.5
2033	2,383.8	2,673.4	2,123.6
2034	2,597.7	2,940.3	2,292.7
2035	2,833.4	3,236.4	2,478.1
2036	3,092.1	3,563.5	2,680.2
2037	3,360.2	3,906.6	2,887.2
2038	3,646.8	4,276.2	3,106.5
2039	3,964.8	4,688.5	3,348.9

FY End	Toll Revenue in Rs Million		
	Base Case	High Case (+20%)	Low Case (-20%)
2040	4,309.3	5,138.1	3,609.8
2041	4,654.5	5,594.7	3,867.6
2042	5,048.4	6,116.6	4,161.6
2043	5,462.8	6,670.2	4,468.4
2044	5,917.4	7,280.3	4,803.6
2045	6,383.6	7,912.4	5,143.5
2046	6,886.2	8,597.4	5,508.4
2047	7,425.5	9,336.6	5,897.9
2048	8,022.9	10,157.5	6,328.6
2049	8,610.3	10,974.9	6,746.4
2050	9,276.4	11,901.9	7,220.6
2051	9,968.1	12,873.3	7,708.5
2052*	7,628.6	9,916.8	5,860.6
PV12 FY23 till 15th Dec in FY52	17,944.1	20,488.7	15,785.2
PV12 till 15th Dec in FY52 vs base		14.2%	-12.0%

* Till 15th Dec

Table 4-8: Comparison of Annual Revenue Forecasts Under Different Scenarios

The low growth scenario has a negative impact on revenue PV of about 12.0 percent versus base case (till FY52), whilst the optimistic growth scenario would generate about 14.2 percent higher PV than the base case.

APPENDICES

APPENDIX 2.1
TRAFFIC ZONING SYSTEM

Traffic Study for Chittorgarh-Kota section of NH-27 in the state of Rajasthan
Traffic Zoning System

Zone	Place/Region	District/ State	State/Country/Region
1	Chittorgarh	Project Corridor - Chittorgarh District	Rajasthan
2	Anvalhera	Project Corridor - Chittorgarh District	
3	Bassi	Project Corridor - Chittorgarh District	
4	Parsoli	Project Corridor - Chittorgarh District	
5	Bichhor	Project Corridor - Chittorgarh District	
6	Katoda	Project Corridor - Chittorgarh District	
7	Padampura	Project Corridor - Bhilwara District	
8	Ladpura	Project Corridor - Bhilwara District	
9	Menal	Project Corridor - Chittorgarh District	
10	Golam Garh	Project Corridor - Bhilwara District	
11	Salawatiya	Project Corridor - Bhilwara District	
12	Bijolia	Project Corridor - Bhilwara District	
13	Budhpura	Project Corridor - Bundi District	
14	Dabi	Project Corridor - Bundi District	
15	Sootra	Project Corridor - Bundi District	
16	Shambhoopura	Project Corridor - Bundi District	
17	Kota	Project Corridor - Kota District	
18	Nimbahera	Rest of Chittorgarh District	
19	Rawatbhata	Rest of Chittorgarh District	
20	Mangalwad	Rest of Chittorgarh District	
21	Rest of Chittorgarh district	Rest of Chittorgarh District	
22	Bhilwara	Rest of Bhilwara District	
23	Rest of Bhilwara district	Rest of Bhilwara District	
24	Bundi	Rest of Bundi District	
25	Rest of Bundi district	Rest of Bundi District	
26	Ramganj Mandi	Rest of Kota District	
27	Rest of Kota district	Rest of Kota District	
28	Udaipur	Udaipur District	
29	Gogunda	Udaipur District	
30	Rest of Udaipur	Udaipur District	
31	Rajsamand	Rajsamand district	
32	Deogarh	Rajsamand district	
33	Rest of Rajsamand district	Rajsamand district	
34	Baran	Baran District	
35	Rest of Baran district	Baran District	
36	Jhalawar	Jhalawar District	
37	Ajmer / Kishangarh	Ajmer district	
38	Beawar	Ajmer district	
39	Rest of Ajmer district	Ajmer district	
40	Jaipur	Jaipur district	
41	Rest of Jaipur	Jaipur district	
42	Tonk	Tonk District	
43	Deoli	Tonk District	
44	Pratapgarh	Pratapgarh District	
45	Jaisalmer	North western Rajasthan	
46	Bikaner	North western Rajasthan	
47	Jodhpur	North western Rajasthan	
48	Nagaur	North western Rajasthan	
49	Mount Abu	Southern Rajasthan	
50	Banswara	Southern Rajasthan	
51	Sawai Madhopur	Eastern Rajasthan	
52	Alwar	Eastern Rajasthan	
53	Rest of Rajasthan	Rest of Rajasthan	
54	Ahmedabad	Northern & Eastern Gujarat	Gujarat
55	Vadodara	Northern & Eastern Gujarat	
56	Mehsana	Northern & Eastern Gujarat	
57	Godhra	Northern & Eastern Gujarat	
58	Anand	Northern & Eastern Gujarat	
59	Surat	Southern Gujarat	
60	Rajkot	Central & Western Gujarat	
61	Palanpur	Central & Western Gujarat	
62	Kandla / Mundra / Mandvi / Tuna	Central & Western Gujarat	
63	Bhavnagar	Central & Western Gujarat	
64	Kachh / Bhuj	Central & Western Gujarat	
65	Rest of Gujarat	Rest of Gujarat	
66	Neemuch	Northern Madhya Pradesh	Madhya Pradesh
67	Shivpuri	Northern Madhya Pradesh	
68	Guna	Northern Madhya Pradesh	
69	Biaora / Rajgarh	Northern Madhya Pradesh	
70	Gwalior / Morena / Bhind	Northern Madhya Pradesh	
71	Indore	Western Madhya Pradesh	
72	Ujjain	Western Madhya Pradesh	
73	Bhopal	Central Madhya Pradesh	
74	Jabalpur / Chhindwara	Central Madhya Pradesh	
75	Rest of Madhya Pradesh	Rest of Madhya Pradesh	
76	Gurugram / Manesar / Rewari	Southern Haryana	Haryana
77	Rest of Haryana	Northern Haryana	
78	Mumbai	Mumbai	Maharashtra
79	Pune	Pune	
80	Nagpur	Nagpur	
81	Rest of Maharashtra	Rest of Maharashtra	
82	Agra	Western Uttar Pradesh	Uttar Pradesh
83	Jhansi	Western Uttar Pradesh	
84	Lucknow	Central Uttar Pradesh	
85	Kanpur / Allahabad / Varanasi	Central Uttar Pradesh	
86	Rest of Uttar pradesh (Moradabad/Bareily)	Rest of Uttar Pradesh	
87	Delhi	Delhi	Delhi
88	Punjab / Chandigarh	Punjab	Punjab
89	Uttrakhand / Jammu & Kashmir / Himachal Pradesh	Northern Indian States	Northern Indian States
90	West Bengal / Orissa / Chattisgarh / Bihar /Jharkhand	Eastern Indian States	Eastern Indian States
91	Meghalaya / Sikkim / Tripura / Mizoram / Manipur / Nagaland / Assam / Arunachal Pradesh	North Eastern Indian States	North Eastern Indian States
92	Goa	Goa	Goa
93	Andhra Pradesh	Southern Indian States	Southern Indian States
94	Telangana	Southern Indian States	
95	Kerala	Southern Indian States	
96	Tamilnadu	Southern Indian States	
97	Karnataka	Southern Indian States	

APPENDIX 2.2
MODE WISE TOP20 OD PAIRS

Traffic Study for Chittorgarh-Kota section of NH-27 in the state of Rajasthan

TOP 20 Origin Destination Pairs at TP01-BASSI

Car

S.No.	Origin	Destination	% of total
1	Chittorgarh	Bijolia	21%
2	Chittorgarh	Katoda	12%
3	Chittorgarh	Rawatbhata	6%
4	Kota	Udaipur	6%
5	Chittorgarh	Kota	5%
6	Bassi	Katoda	4%
7	Chittorgarh	Parsoli	3%
8	Bassi	Parsoli	3%
9	Kota	Nimbahera	3%
10	Kota	Rest of Rajasthan	2%
11	Bassi	Biaora / Rajgarh	2%
12	Katoda	Udaipur	1%
13	Kota	Ahmedabad	1%
14	Kota	Rest of Gujarat	1%
15	Chittorgarh	Bundi	1%
16	Chittorgarh	Rest of Maharashtra	1%
17	Chittorgarh	Jaipur	1%
18	Bassi	Bichhor	1%
19	Udaipur	Rest of Maharashtra	1%
20	Udaipur	Jaipur	1%
		Total	**77%**

Mini Bus

S.No.	Origin	Destination	% of total
1	Chittorgarh	Kota	50%
2	Chittorgarh	Katoda	28%
3	Katoda	Udaipur	22%
		Total	**100%**

Bus

S.No.	Origin	Destination	% of total
1	Kota	Udaipur	21%
2	Chittorgarh	Kota	14%
3	Chittorgarh	Katoda	11%
4	Bassi	Kota	5%
5	Kota	Ahmedabad	4%
6	Kota	Nimbahera	4%
7	Kota	Rest of Rajasthan	4%
8	Bassi	Parsoli	3%
9	Kota	Rest of Gujarat	3%
10	Chittorgarh	Rest of Maharashtra	2%
11	Ahmedabad	Rest of Maharashtra	2%
12	Rajkot	Rest of Maharashtra	2%
13	Chittorgarh	Parsoli	2%
14	Chittorgarh	Jhalawar	2%
15	Chittorgarh	Biaora / Rajgarh	2%
16	Udaipur	Jaipur	2%
17	Chittorgarh	Jhansi	1%
18	Bassi	Rest of Maharashtra	1%
19	Bassi	Agra	1%
20	Kota	Bhilwara	1%
		Total	**88%**

MLCV

S.No.	Origin	Destination	% of total
1	Chittorgarh	Katoda	28%
2	Chittorgarh	Kota	15%
3	Kota	Udaipur	15%
4	Chittorgarh	Bijolia	12%
5	Bassi	Kota	5%
6	Chittorgarh	Parsoli	3%
7	Chittorgarh	Bundi	3%
8	Kota	Ahmedabad	3%
9	Bassi	Parsoli	2%
10	Chittorgarh	Ladpura	1%
11	Kota	Rest of Gujarat	1%
12	Bundi	Rest of Gujarat	1%
13	Jhalawar	Rest of Rajasthan	1%
14	Rest of Gujarat	Rest of Madhya Pradesh	1%
15	Bassi	Katoda	1%
16	Bassi	Bundi	1%
17	Bassi	Tonk	1%
18	Bassi	Biaora / Rajgarh	1%
19	Parsoli	Udaipur	1%
20	Kota	Nimbahera	1%
		Total	**100%**

Traffic Study for Chittorgarh-Kota section of NH-27 in the state of Rajasthan

TOP 20 Origin Destination Pairs at TP01-BASSI

LCV

S.No.	Origin	Destination	% of total
1	Kota	Udaipur	22%
2	Chittorgarh	Kota	17%
3	Kota	Nimbahera	10%
4	Kota	Rest of Gujarat	9%
5	Chittorgarh	Katoda	9%
6	Chittorgarh	Parsoli	3%
7	Bassi	Parsoli	3%
8	Bassi	Katoda	3%
9	Bassi	Kota	3%
10	Katoda	Nimbahera	3%
11	Chittorgarh	Ladpura	3%
12	Chittorgarh	Rest of Madhya Pradesh	3%
13	Chittorgarh	Bundi	2%
14	Kota	Rest of Rajsamand district	2%
15	Kota	Mount Abu	2%
16	Katoda	Udaipur	1%
17	Bijolia	Udaipur	1%
18	Kota	Ahmedabad	1%
19	Bundi	Udaipur	1%
20	Rest of Gujarat	Rest of Madhya Pradesh	1%
		Total	**100%**

2 Axle

S.No.	Origin	Destination	% of total
1	Chittorgarh	Kota	16%
2	Chittorgarh	Katoda	11%
3	Kota	Rest of Gujarat	7%
4	Kota	Udaipur	6%
5	Rest of Gujarat	Rest of Madhya Pradesh	6%
6	Kota	Nimbahera	4%
7	Kota	Ahmedabad	4%
8	Chittorgarh	Parsoli	3%
9	Katoda	Nimbahera	2%
10	Parsoli	Nimbahera	2%
11	Ladpura	Ahmedabad	2%
12	Chittorgarh	Ladpura	1%
13	Chittorgarh	Kanpur / Allahabad / Varanasi	1%
14	Bassi	Katoda	1%
15	Katoda	Bhilwara	1%
16	Kota	Kandla / Mundra / Mandvi / Tuna	1%
17	Nimbahera	Shivpuri	1%
18	Nimbahera	Rest of Haryana	1%
19	Bundi	Udaipur	1%
20	Mount Abu	Kanpur / Allahabad / Varanasi	1%
		Total	**77%**

3 Axle

S.No.	Origin	Destination	% of total
1	Chittorgarh	Kota	19%
2	Kota	Udaipur	9%
3	Kota	Nimbahera	8%
4	Kota	Rest of Gujarat	6%
5	Kota	Ahmedabad	4%
6	Chittorgarh	Parsoli	3%
7	Chittorgarh	Rest of Madhya Pradesh	3%
8	Chittorgarh	Bundi	2%
9	Chittorgarh	Katoda	2%
10	Ahmedabad	West Bengal / Orissa / Chattisgarh / Bihar /Jharkhand	2%
11	Rest of Gujarat	Rest of Madhya Pradesh	2%
12	Bundi	Rest of Gujarat	2%
13	Rest of Gujarat	West Bengal / Orissa / Chattisgarh / Bihar /Jharkhand	2%
14	Katoda	Rajsamand	1%
15	Rajsamand	Jhansi	1%
16	Rest of Gujarat	Jhansi	1%
17	Katoda	Nimbahera	1%
18	Katoda	Udaipur	1%
19	Chittorgarh	Ladpura	1%
20	Chittorgarh	Bijolia	1%
		Total	**73%**

MAV

S.No.	Origin	Destination	% of total
1	Chittorgarh	Kota	13%
2	Kota	Nimbahera	10%
3	Kota	Udaipur	10%
4	Chittorgarh	Katoda	10%
5	Chittorgarh	Bijolia	4%
6	Kota	Rest of Gujarat	3%
7	Chittorgarh	Parsoli	3%
8	Chittorgarh	Bundi	3%
9	Nimbahera	Jhalawar	3%
10	Kota	Ahmedabad	2%
11	Kota	Rest of Rajasthan	2%
12	Katoda	Udaipur	1%
13	Bijolia	Nimbahera	1%
14	Chittorgarh	Rest of Madhya Pradesh	1%
15	Bijolia	Udaipur	1%
16	Kota	Kandla / Mundra / Mandvi / Tuna	1%
17	Chittorgarh	Ladpura	1%
18	Chittorgarh	Jhalawar	1%
19	Udaipur	Jhalawar	1%
20	Katoda	Rest of Gujarat	1%
		Total	**71%**

Traffic Study for Chittorgarh-Kota section of NH-27 in the state of Rajasthan

TOP 20 Origin Destination Pairs at TP02-AROLI

Car

S.No.	Origin	Destination	% of total
1	Ladpura	Kota	11%
2	Chittorgarh	Bijolia	10%
3	Salawatiya	Bhilwara	7%
4	Bijolia	Bhilwara	7%
5	Chittorgarh	Kota	6%
6	Kota	Udaipur	6%
7	Kota	Bhilwara	4%
8	Bhilwara	Bundi	3%
9	Chittorgarh	Rest of Uttar pradesh	2%
10	Bassi	Kota	2%
11	Chittorgarh	Rest of Maharashtra	2%
12	Chittorgarh	Bijaora / Rajgarh	2%
13	Kota	Rest of Rajasthan	2%
14	Ladpura	Bijolia	2%
15	Dabi	Bhilwara	2%
16	Chittorgarh	Bundi	1%
17	Chittorgarh	Dabi	1%
18	Kota	Rest of Gujarat	1%
19	Bhilwara	Rest of Maharashtra	1%
20	Udaipur	Rest of Uttar pradesh	1%
		Total	**74%**

Mini Bus

S.No.	Origin	Destination	% of total
1	Kota	Bhilwara	30%
2	Kota	Udaipur	30%
3	Padampura	Kota	13%
4	Salawatiya	Bhilwara	13%
5	Bijolia	Bhilwara	13%
		Total	**100%**

Bus

S.No.	Origin	Destination	% of total
1	Kota	Bhilwara	30%
2	Chittorgarh	Kota	18%
3	Kota	Udaipur	17%
4	Kota	Ahmedabad	6%
5	Bijolia	Bhilwara	4%
6	Ahmedabad	Kanpur / Allahabad / Varanasi	3%
7	Ahmedabad	Punjab / Chandigarh	2%
8	Ladpura	Kota	1%
9	Dabi	Kachh / Bhuj	1%
10	Bhilwara	Baran	1%
11	Bhilwara	Jhalawar	1%
12	Bhilwara	West Bengal / Orissa / Chattisgarh / Bihar /Jharkhand	1%
13	Ahmedabad	West Bengal / Orissa / Chattisgarh / Bihar /Jharkhand	1%
14	Chittorgarh	Salawatiya	1%
15	Chittorgarh	Bijolia	1%
16	Chittorgarh	Bundi	1%
17	Chittorgarh	Jhalawar	1%
18	Salawatiya	Bhilwara	1%
19	Bijolia	Rest of Gujarat	1%
20	Bhilwara	Bundi	1%
		Total	**98%**

MLCV

S.No.	Origin	Destination	% of total
1	Kota	Bhilwara	19%
2	Chittorgarh	Kota	9%
3	Bijolia	Bhilwara	8%
4	Kota	Rest of Gujarat	8%
5	Kota	Udaipur	5%
6	Bijolia	Rest of Gujarat	4%
7	Chittorgarh	Bijolia	4%
8	Padampura	Rest of Maharashtra	4%
9	Padampura	Kota	3%
10	Kota	Ajmer / Kishangarh	3%
11	Ladpura	Salawatiya	3%
12	Ladpura	Kota	2%
13	Ladpura	Rest of Maharashtra	2%
14	Dabi	Bhilwara	2%
15	Dabi	Udaipur	2%
16	Kota	Nimbahera	2%
17	Kota	Ahmedabad	2%
18	Bhilwara	Bundi	2%
19	Ladpura	Bijolia	2%
20	Ladpura	Dabi	1%
		Total	**86%**

Traffic Study for Chittorgarh-Kota section of NH-27 in the state of Rajasthan

TOP 20 Origin Destination Pairs at TP02-AROLI

LCV

S.No.	Origin	Destination	% of total
1	Kota	Udaipur	22%
2	Chittorgarh	Kota	17%
3	Kota	Nimbahera	10%
4	Kota	Rest of Gujarat	9%
5	Chittorgarh	Katoda	9%
6	Chittorgarh	Parsoli	3%
7	Bassi	Parsoli	3%
8	Bassi	Katoda	3%
9	Bassi	Kota	3%
10	Katoda	Nimbahera	3%
11	Chittorgarh	Ladpura	3%
12	Chittorgarh	Rest of Madhya Pradesh	3%
13	Chittorgarh	Bundi	2%
14	Kota	Rest of Rajsamand district	2%
15	Kota	Mount Abu	2%
16	Katoda	Udaipur	1%
17	Bijolia	Udaipur	1%
18	Kota	Ahmedabad	1%
19	Bundi	Udaipur	1%
20	Rest of Gujarat	Rest of Madhya Pradesh	1%
		Total	**100%**

2 Axle

S.No.	Origin	Destination	% of total
1	Chittorgarh	Kota	23%
2	Kota	Bhilwara	16%
3	Kota	Udaipur	8%
4	Kota	Rest of Gujarat	6%
5	Kota	Ahmedabad	3%
6	Chittorgarh	Bundi	3%
7	Kota	Nimbahera	2%
8	Bhilwara	Baran	2%
9	Chittorgarh	Rest of Madhya Pradesh	2%
10	Baran	Ahmedabad	2%
11	Bhilwara	Bundi	2%
12	Baran	Ajmer / Kishangarh	2%
13	Bijolia	Rest of Gujarat	2%
14	Kota	Rest of Rajasthan	2%
15	Udaipur	Rest of Maharashtra	2%
16	Chittorgarh	Salawatiya	1%
17	Chittorgarh	Sootra	1%
18	Chittorgarh	Uttrakhand / Jammu & Kashmir / Himachal Pradesh	1%
19	Bassi	Rest of Uttar pradesh	1%
20	Katoda	Rest of Maharashtra	1%
		Total	**80%**

3 Axle

S.No.	Origin	Destination	% of total
1	Chittorgarh	Bijolia	19%
2	Chittorgarh	Kota	9%
3	Kota	Bhilwara	8%
4	Kota	Nimbahera	5%
5	Kota	Rest of Gujarat	5%
6	Kota	Udaipur	4%
7	Kota	Ahmedabad	4%
8	Bhilwara	Bundi	2%
9	Chittorgarh	Bundi	2%
10	Bhilwara	Baran	2%
11	Rest of Gujarat	Rest of Maharashtra	1%
12	Bijolia	Rest of Gujarat	1%
13	Kota	Rest of Rajasthan	1%
14	Bhilwara	Rest of Uttar pradesh	1%
15	Rest of Gujarat	West Bengal / Orissa / Chattisgarh / Bihar /Jharkhand	1%
16	Ahmedabad	Lucknow	1%
17	Rest of Gujarat	Gwalior / Morena / Bhind	1%
18	Rest of Gujarat	Rest of Madhya Pradesh	1%
19	Chittorgarh	Jhansi	1%
20	Ladpura	Bijolia	1%
		Total	**73%**

MAV

S.No.	Origin	Destination	% of total
1	Chittorgarh	Kota	16%
2	Chittorgarh	Bijolia	9%
3	Kota	Bhilwara	8%
4	Kota	Udaipur	6%
5	Ladpura	Kota	4%
6	Kota	Nimbahera	4%
7	Kota	Rest of Gujarat	3%
8	Ahmedabad	West Bengal / Orissa / Chattisgarh / Bihar /Jharkhand	2%
9	Padampura	Kota	2%
10	Chittorgarh	Jhalawar	2%
11	Kota	Rest of Rajasthan	2%
12	Bijolia	Rest of Gujarat	2%
13	Bijolia	Bhilwara	2%
14	Kota	Ahmedabad	2%
15	Udaipur	Baran	1%
16	Rest of Gujarat	West Bengal / Orissa / Chattisgarh / Bihar /Jharkhand	1%
17	Chittorgarh	Bundi	1%
18	Bijolia	Udaipur	1%
19	Chittorgarh	Baran	1%
20	Bhilwara	Rest of Madhya Pradesh	1%
		Total	**68%**

Traffic Study for Chittorgarh-Kota section of NH-27 in the state of Rajasthan

TOP 20 Origin Destination Pairs at TP03-DHANESHWAR

Car

S.No.	Origin	Destination	% of total
1	Dabi	Kota	14%
2	Chittorgarh	Kota	10%
3	Kota	Bhilwara	10%
4	Sootra	Kota	7%
5	Bijolia	Kota	5%
6	Kota	Udaipur	4%
7	Chittorgarh	Rest of Uttar pradesh	4%
8	Budhpura	Kota	3%
9	Chittorgarh	Rest of Maharashtra	3%
10	Chittorgarh	Biaora / Rajgarh	3%
11	Dabi	Bundi	3%
12	Kota	Rest of Rajasthan	2%
13	Dabi	Baran	2%
14	Kota	Ahmedabad	2%
15	Chittorgarh	Tonk	2%
16	Bijolia	Baran	2%
17	Menal	Kota	2%
18	Kota	Rest of Gujarat	2%
19	Udaipur	Lucknow	1%
20	Bhilwara	Baran	1%
		Total	**82%**

Mini Bus

S.No.	Origin	Destination	% of total
1	Dabi	Kota	32%
2	Kota	Ahmedabad	19%
3	Bijolia	Kota	18%
4	Sootra	Kota	13%
5	Dabi	Bundi	6%
6	Dabi	Rest of Kota district	6%
7	Kota	Udaipur	6%
		Total	**100%**

Bus

S.No.	Origin	Destination	% of total
1	Kota	Bhilwara	29%
2	Kota	Ahmedabad	14%
3	Chittorgarh	Kota	12%
4	Kota	Udaipur	9%
5	Kota	Rest of Udaipur	8%
6	Bijolia	Kota	4%
7	Budhpura	Kota	2%
8	Dabi	Kota	2%
9	Sootra	Kota	2%
10	Bijolia	Baran	1%
11	Budhpura	Bundi	1%
12	Dabi	Baran	1%
13	Dabi	West Bengal / Orissa / Chattisgarh / Bihar /Jharkhand	1%
14	Kota	Rajsamand	1%
15	Bhilwara	Baran	1%
16	Bundi	Rajsamand	1%
17	Rest of Udaipur	Baran	1%
18	Rest of Udaipur	Shivpuri	1%
19	Rest of Udaipur	Jhansi	1%
20	Rest of Udaipur	Rest of Uttar pradesh	1%
		Total	**92%**

MLCV

S.No.	Origin	Destination	% of total
1	Dabi	Kota	18%
2	Bijolia	Kota	14%
3	Kota	Bhilwara	11%
4	Chittorgarh	Kota	10%
5	Budhpura	Kota	6%
6	Kota	Rest of Gujarat	5%
7	Kota	Udaipur	5%
8	Kota	Rest of Rajasthan	4%
9	Sootra	Kota	3%
10	Kota	Nimbahera	2%
11	Ahmedabad	Kanpur / Allahabad / Varanasi	2%
12	Chittorgarh	Jhalawar	2%
13	Salawatiya	Kota	2%
14	Dabi	Bundi	2%
15	Bijolia	Baran	1%
16	Budhpura	Bundi	1%
17	Dabi	Rest of Uttar pradesh	1%
18	Udaipur	Rest of Madhya Pradesh	1%
19	Mount Abu	Rest of Madhya Pradesh	1%
20	Padampura	Kota	1%
		Total	**90%**

Traffic Study for Chittorgarh-Kota section of NH-27 in the state of Rajasthan

TOP 20 Origin Destination Pairs at TP03-DHANESHWAR

LCV

S.No.	Origin	Destination	% of total
1	Chittorgarh	Kota	29%
2	Dabi	Kota	13%
3	Sootra	Kota	13%
4	Kota	Rest of Rajasthan	6%
5	Budhpura	Kota	6%
6	Kota	Udaipur	4%
7	Kota	Rest of Gujarat	4%
8	Kota	Bhilwara	4%
9	Bijolia	Kota	4%
10	Kota	Ahmedabad	3%
11	Ahmedabad	Kanpur / Allahabad / Varanasi	2%
12	Dabi	Bundi	2%
13	Bijolia	Baran	1%
14	Kota	Rest of Udaipur	1%
15	Baran	Rest of Gujarat	1%
16	Chittorgarh	Jhalawar	1%
17	Kota	Rajsamand	1%
18	Kota	Bikaner	1%
19	Kota	Surat	1%
20	Chittorgarh	Bundi	0%
		Total	**96%**

2 Axle

S.No.	Origin	Destination	% of total
1	Kota	Ahmedabad	11%
2	Kota	Bhilwara	9%
3	Kota	Udaipur	8%
4	Chittorgarh	Kota	7%
5	Kota	Rest of Gujarat	7%
6	Bijolia	Kota	7%
7	Dabi	Kota	6%
8	Budhpura	Kota	5%
9	Kota	Rest of Rajasthan	5%
10	Kota	Nimbahera	3%
11	Padampura	Kota	2%
12	Budhpura	Jhalawar	1%
13	Dabi	Baran	1%
14	Sootra	Kota	1%
15	Kota	Mumbai	1%
16	Bhilwara	Bundi	1%
17	Jhalawar	Rest of Gujarat	1%
18	Ahmedabad	Jhansi	1%
19	Kota	Rajsamand	1%
20	Udaipur	Jaipur	1%
		Total	**79%**

3 Axle

S.No.	Origin	Destination	% of total
1	Dabi	Kota	13%
2	Chittorgarh	Kota	11%
3	Budhpura	Kota	10%
4	Kota	Bhilwara	10%
5	Kota	Udaipur	8%
6	Bijolia	Kota	5%
7	Sootra	Kota	5%
8	Kota	Rest of Rajasthan	4%
9	Ahmedabad	West Bengal / Orissa / Chattisgarh / Bihar /Jharkhand	3%
10	Kota	Rest of Gujarat	3%
11	Chittorgarh	Baran	2%
12	Chittorgarh	Jhalawar	2%
13	Kota	Ahmedabad	1%
14	Rest of Gujarat	West Bengal / Orissa / Chattisgarh / Bihar /Jharkhand	1%
15	Kota	Rest of Udaipur	1%
16	Chittorgarh	Jhansi	1%
17	Bhilwara	Baran	1%
18	Kota	Mumbai	1%
19	Udaipur	West Bengal / Orissa / Chattisgarh / Bihar /Jharkhand	1%
20	Salawatiya	Kota	1%
		Total	**84%**

MAV

S.No.	Origin	Destination	% of total
1	Chittorgarh	Kota	14%
2	Dabi	Kota	14%
3	Kota	Rest of Gujarat	6%
4	Kota	Bhilwara	6%
5	Kota	Rest of Rajasthan	5%
6	Bijolia	Kota	5%
7	Sootra	Kota	4%
8	Kota	Udaipur	4%
9	Kota	Ahmedabad	3%
10	Kota	Nimbahera	2%
11	Budhpura	Kota	2%
12	Chittorgarh	Jhalawar	2%
13	Chittorgarh	Baran	2%
14	Kota	Rajsamand	1%
15	Jhalawar	Rest of Gujarat	1%
16	Kota	Rest of Udaipur	1%
17	Padampura	Kota	1%
18	Ahmedabad	West Bengal / Orissa / Chattisgarh / Bihar /Jharkhand	1%
19	Rest of Gujarat	Rest of Uttar pradesh	1%
20	Udaipur	Jhalawar	1%
		Total	**75%**

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NATIONAL HIGHWAYS INFRA INVESTMENT MANAGERS PRIVATE LIMITED

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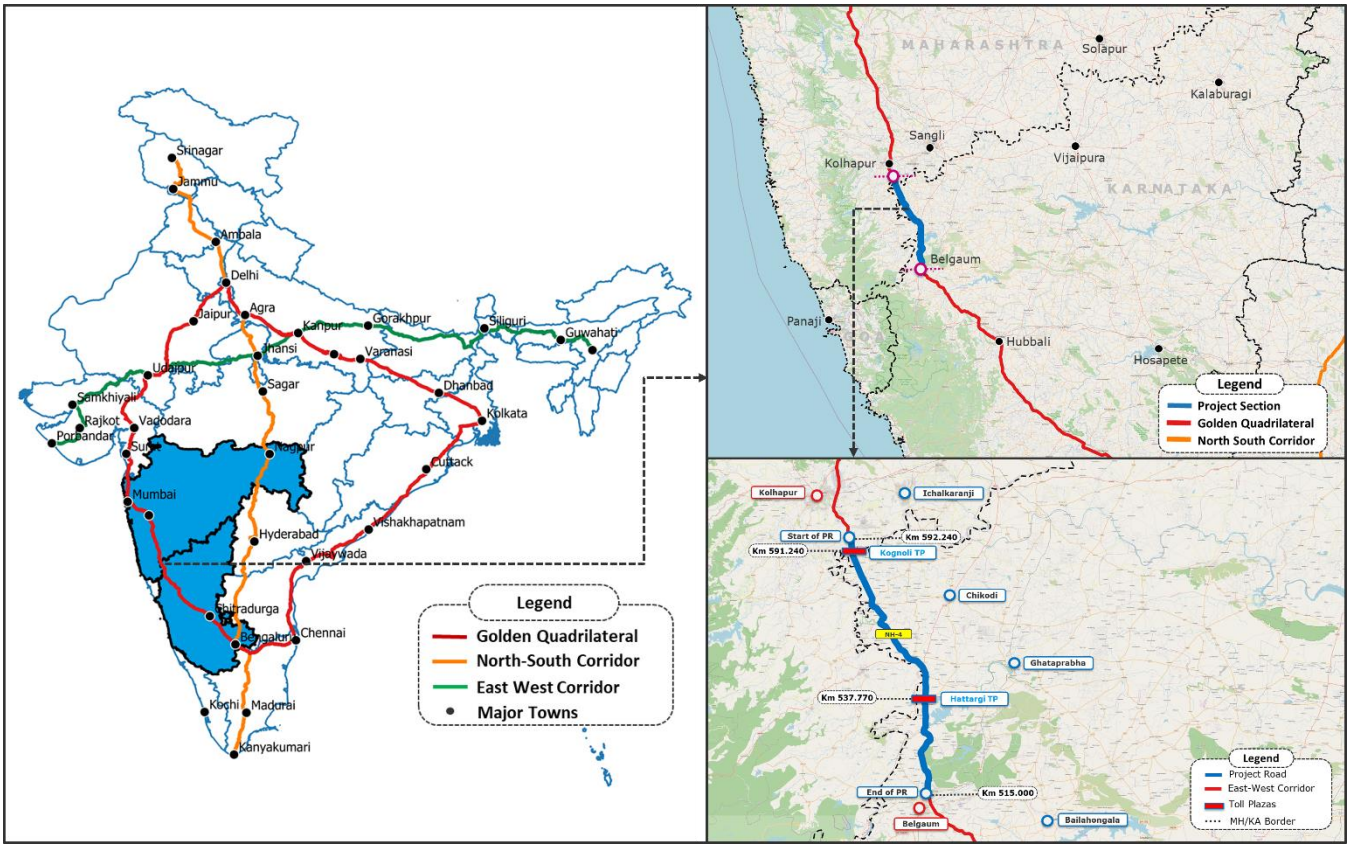
TRAFFIC STUDY FOR KAGAL-BELGAUM SECTION OF NH-4 IN THE STATE OF MAHARASHTRA AND KARNATAKA



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ABBREVIATIONS

%	Percentage
2A	2 Axle truck
3A	3 Axle truck
AADT	Annual Average Daily Traffic
ADT	Average Daily Traffic
AR	Alternate Route
BIA	Broad Influence Area
CAGR	Compounded Annual Growth Rate
FY	Financial Year
GDP	Gross Domestic Product
GSDP	Gross State Domestic Product
IIA	Immediate Influence Area
IRC	Indian Road Congress
Km	Kilometre
LCV	Light Commercial Vehicle
M Bus	Minibus
MAV	Multi Axle Vehicle
MLCV	Mini LCV
NH	National Highway
NHAI	National Highway Authority of India
NHDP	National Highway Development Program
NHIIMPL	National Highways Infra Investment Managers Private Limited
NPV	Net Present Value
OD	Origin-Destination survey
PCU	Passenger Car Unit
PIA	Project Influence Area
PR	Project Road
PV	Present Value
Rs/₹	Rupees
SEZ	Special Economic Zone
Sq.km	Square Kilometre
TP	Toll Plaza
WPI	Wholesale Price Index
YOY	Year on Year
%	Percentage

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APPENDICES

Appendix 2.1 Zoning

Appendix 2.2: Top 20 OD pairs

1. INTRODUCTION

1.1 General

National Highways Authority of India (NHAI) has setup NHAI InvIT to monetize its completed and operational national highways projects with the objective of mobilizing additional resources through capital markets. In this context, National Highways Infra Investment Managers Private Limited (NHIIMPL) is acting as Investment Manager of the Trust. NHAI InvIT currently has a portfolio five operating toll roads with an aggregate length of 390 kilometers located across the states of Gujarat, Karnataka, Rajasthan and Telangana.

The section viz., Kagal-Belgaum of NH-4 in the state of Maharashtra and Karnataka referred to as Project Road (PR), is part of the current portfolio of InvIT.

The project highway, NH-4, is part of the Golden Quadrilateral connecting many of the major industrial, agricultural, and cultural centres of India. The total length of NH-4 is roughly 1,235 km starting from Chennai in the state of Tamil Nadu and ending at Mumbai in the state of Maharashtra. NH-4 acts as a primary conduit for transportation of freight as well as passenger traffic in these states as well as various other important states in India. NH–4 connects important cities and towns like Pune, Satara, Karad, Sangli, Kolhapur, Belgaum, Dharwad, Hubli, Bangalore etc. **Figure 1-1** shows the alignment of NH-4 with major places along the highway.

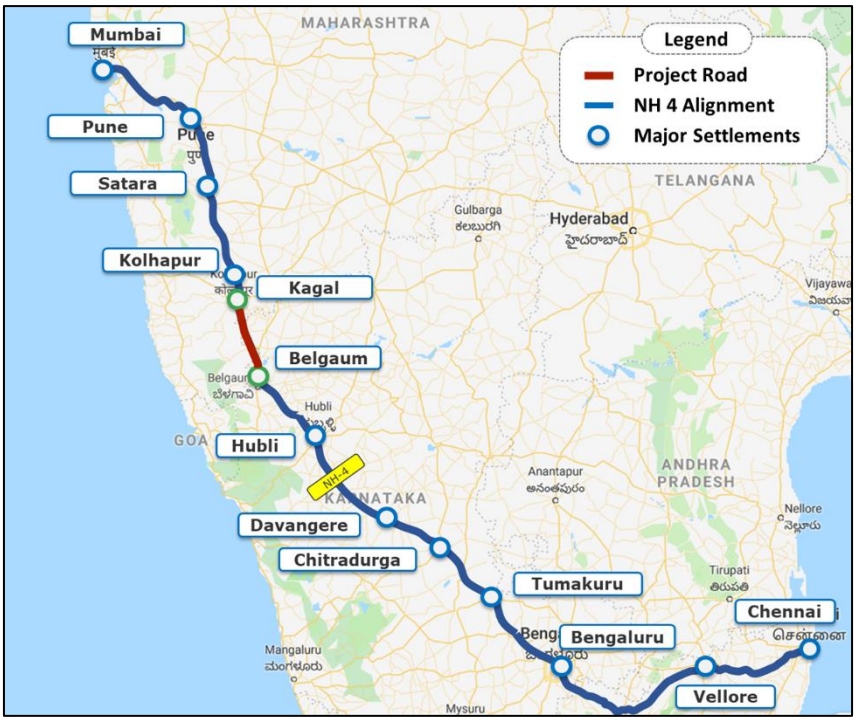


Figure 1-1: Alignment of NH-4 with Major Places

National Highways Infra Investment Managers Private Limited, has appointed Ramboll India Private Ltd as the Traffic Consultant to carry out a study for assessing the present traffic levels, travel pattern and future traffic & revenue estimation till year FY52 duly

considering the network characteristics, future economic perspective in the influence area of the project.

1.2 Scope of Services

The scope of the study includes the following:

- Undertake Traffic Survey on the highway section as per the following:
  - Seven days 24 hours Videography Traffic Counts at or near the existing toll plaza locations on the project road to derive the Average Daily Traffic (ADT)
  - One day Origin-Destination survey at or near the existing toll plaza locations to assess the existing travel pattern of vehicles plying on the project road – origin and destination
- Establish seasonality factors using available past traffic data and/or from using fuel sales data or any relevant data
- Estimation of the base year AADT using seasonality factors for conversion of ADT to AADT
- Analysis of OD data to cover:
  - Regional distribution of traffic and influence factors for different zones contributing traffic on the corridor
  - Identification of Project Influence Area from analysis of travel pattern - regional distribution of traffic,
  - Main traffic generators (industrial areas, towns, ports etc.)
  - Commodity composition- Goods type distribution
  - Top OD pairs by vehicle types
  - Travel frequency and trip purpose distribution
- Review of past traffic studies, traffic/toll data and other relevant reports as may be available to determine category wise volume of traffic for past years as well as for current year
- To identify competing route and analyse the network conditions, traffic characteristics & level of toll charged and the advantage/ disadvantage of the competing road and their impact on the project traffic
- Carry out a study of past economic performance of influence area
- Diversion analysis, wherever needed – cost ratio-based diversion analysis using spreadsheets to be carried out for respective potential OD pairs.
- Preparation of traffic projections till year FY52 in three scenarios – low, most

likely and high

- Capacity analysis of the road or any other requirements for potential capacity augmentation
- Estimation of tollable traffic streams by toll category and estimation of toll revenue as per categories of traffic streams stipulated in the tolling schedule for the study period
- Review future road and transportation network developments in the area of influence of the project and identify those schemes that may impact positively or negatively traffic on the toll road
- Identify factors which may have a positive and / or negative impact on the traffic - all major developments like DFC, industrial corridors, economic corridors, ports, Bharatmala, Sagarmala.
- Scenario Analysis of toll revenue – Critical parameters of diversion (if applicable) and three scenarios of traffic growth (most likely, low and high).

1.3 Report Structure

This report is divided into four chapters, including this introduction chapter. Chapter 2 details upon the project road characteristics and socio – economic profile of the districts in the project influence area including the estimation of AADT and travel characteristics in the Project Influence Area (PIA). Chapter 3 contains the details on the derivation of traffic growth rates used for traffic forecasting and presents traffic projections for the study period. Chapter 4 presents the details regarding tolling strategy, toll rates and the revenue projections for the duration of the concession.

2. TRAFFIC SURVEY AND ANALYSIS

2.1 General

In order to understand the traffic characteristics, the volume of traffic and travel pattern of vehicles plying on the project road were collected through primary surveys. This chapter presents the details of the project road characteristics, traffic surveys carried out, their analysis and the salient findings. The results of the analysis will be utilized in assessing the traffic growth and estimation of traffic and revenue forecast on the project road for the concession period.

2.2 Project Road Characteristics

The project road section, Kagal-Belgaum, a part of the NH-4 in the state of Maharashtra/Karnataka, starts at km 592.240 of NH-4 near Kagal and ends at km 515.000 of NH-4 near Belgaum with a length of about 77.24 km. The project road falls under the jurisdiction of Kolhapur district of Maharashtra and Belagavi district of Karnataka passing through settlements of Kagal, Kognoli, Nippani, Sankeshwar, Hattargi and Belgaum. There are two operational toll plazas on the project road, one near Kognoli (km 591.240) and other near Hattargi (km 537.770).

The alignment of project road and toll plaza locations is shown in **Figure 2-1.**

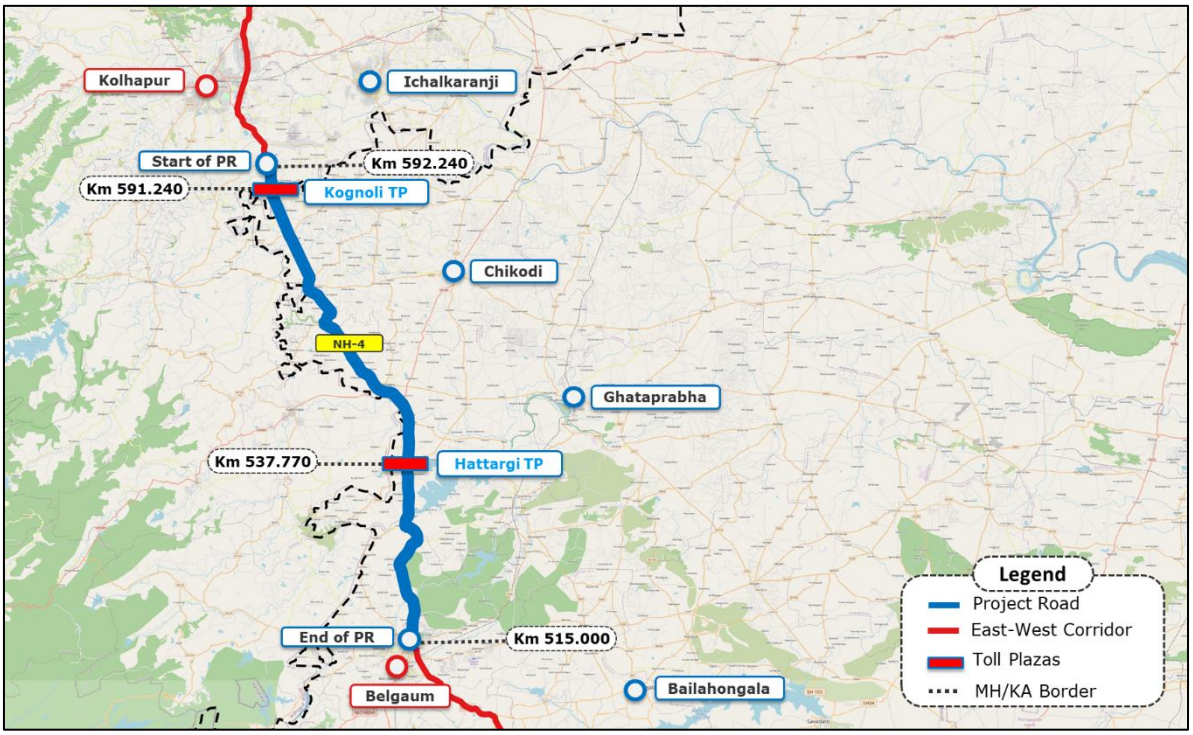


Figure 2-1: Project Road and Location of Toll Plazas

The project road, in wider context, serves the long-distance traffic for the freight vehicles, which is majorly plying between Mumbai/Pune/Delhi and Goa/Bangalore/Chennai/Vellore. Apart from long distance traffic, it also serves the short

distance traffic for both passenger and freight which is mainly generated between Kolhapur/Sangli/Goa/Belgaum/Khanapur/Hubbali/Dharwad and nearby places.

2.2.1 Profile of Project Influence Area District

Kolhapur District

Kolhapur district is situated in the southern side of the Maharashtra state with an area of 7,692 sq.km. It is bounded by Sindhudurg district in the west, Sangli district in the north, Bijapur district of Karnataka in the east and Belgaum district of Karnataka in the south. The administrative headquarters of the district is at Kolhapur. Kolhapur is known as `Dakshin Kashi' or Kashi of the South because of its spiritual history and its Mahalaxmi shrine.

It is one of the industrialised districts in Maharashtra. Due to the presence of abundant water and fertile soil, the district is prominent in cultivation of sugarcane, paddy, banana, soyabean and several vegetables. It is the major producer of jaggery and sugar. The district also houses many dairy and poultry farms. It is one of the prime centres of the textile industry, cotton mills and arts and handicrafts industry. The district also has the highest number of sugar refineries in the country and is also known as the sugar bowl of India. The district has emerged to be one of the highest per capita income districts in India.

According to 2011 census, the district has a population of 3.87 million with decadal growth of about 10.01 percent.

Belagavi (Belgaum) District

Belagavi district is situated in northwest of Karnataka State with an area of 13,433 sq. km, sharing borders with Goa and Maharashtra states. Belagavi district is surrounded by Dharwad and Uttara Kannada districts on the south, Bagalkot and Bijapur districts in the east, and Kolhapur district of Maharashtra state in the north. The administrative headquarters of the district is at Belgaum.

The district with different agro climatic conditions and soil types has vast agricultural potential. Major crops grown in the district are paddy, maize, jowar, oil seeds, cotton, onion, tomato and sugarcane. Belgaum has 16 industrial estates, 6 industrial areas and 1 SEZ. District is important centre for manufacturing of valves, pumps, and its accessories, heavy machine tools and high-pressure oil hydraulics. It has 58 export-oriented units and 22 sugar industries in different parts of district. Rich deposits of natural resources like bauxite, uranium, silica sand, aluminium, laterite, limestone, dolomite, quartzite and china clay are also found in the district.

According to 2011 census, the district has a population of 4.78 million with decadal growth of about 13.41 percent.

2.3 Traffic Surveys

In order to understand the characteristics and the volume of traffic using the project road, data on road network, traffic and travel pattern of vehicles plying on the project road were collected through primary traffic surveys. Traffic volume video graphic survey for seven days and origin-destination (OD) survey as roadside interview for one day at toll plaza locations were conducted on the project road. The schedule of the traffic surveys and locations on the project road are given in **Table 2-1.**

Location	Chainage	Duration	Date(s)
Classified Traffic Volume Counts			
TP01 – Kognoli Toll Plaza	km 591.240	7 Days	10th April–16th April 2022
TP02 – Hattargi Toll Plaza	km 537.770		
Origin and Destination Survey			
TP01 – Kognoli Toll Plaza	km 591.240	1 Day	11th April 2022
TP02 – Hattargi Toll Plaza	km 537.770		

Table 2-1: Traffic Survey Locations and Schedule

Trained enumerators were engaged for conducting traffic surveys under the supervision of experienced transport planner. The vehicle classification as generally used in the traffic surveys of NHAI studies along with their PCU values, as suggested in IRC: 64 – 1990, are presented in **Table 2-2.**

Vehicle Type	PCU Factor
Motorized Vehicles	
Car, Jeep, Van &Taxi	1.0
Two –Wheeler	0.5
Three-Wheeler (Auto-Rickshaw)	1.0
Mini-Bus/ School Bus	1.5
Govt. Bus/ Private Bus	3.0
Mini LCV/Max Pick Up	1.0
Light Commercial Vehicle (LCV)	1.5
2-Axle Truck	3.0
3-Axle Truck	3.0
Multi-Axle Vehicle (MAV 4-6 Axle)	4.5
HME	4.5
Agricultural Tractor	1.5
Agricultural Tractor with Trailer	4.5
Non – Motorised Vehicles	
Cycle	0.5
Cycle Rickshaw	2.0
Animal Drawn Cart	6.0

Table 2-2: Vehicle classification and PCU factors

2.4 Traffic Characteristics

The data collected from the traffic volume count survey was analysed in order to get the results with respect to existing traffic intensity, flow pattern, hourly variation and

composition of traffic on the study road network. The various traffic characteristics have been analysed under the following heads:

- Average Daily Traffic (ADT)
- Daily variation, Hourly variation and Traffic composition
- Annual Average Daily Traffic (AADT)

2.4.1 Average Daily Traffic (ADT)

The traffic volume data collected at the toll plaza locations during the seven days survey has been analysed. The summary of ADT in terms of vehicles and PCUs is presented in **Table 2-3.**

Mode	TP01- Kognoli Toll Plaza	TP02- Hattargi Toll Plaza
Tollable vehicles		
Car/Jeep/Van/Taxi	12,088	10,636
Minibus	92	115
Standard Bus	773	974
Mini LCV	1,052	1,385
LCV	2,077	2,498
2 Axle	1,217	1,454
3 Axle	921	1,061
MAV (4-6 Axle)	1,800	1,981
HMV/ MAV (=>7 Axle)	6	7
Non Tollable vehicles		
Two-Wheeler	16,243	8,364
Auto Rickshaw	179	100
Agri. Tractors	91	70
Total Non-Motorised	57	22
Total Vehicles/PCUs		
Total Tollable Vehicles	**20,027**	**20,112**
Total Non Tollable Vehicles	**16,569**	**8,556**
Total Vehicles	**36,596**	**28,667**
Total PCU	**41,956**	**39,913**
Tollable PCU	**33,255**	**35,354**

Table 2-3: Average Daily Traffic at TP01 & TP02

- The observed total vehicles are around 36,596 and 28,667 at TP01 and TP02 respectively.
- The share of passenger vehicles in total traffic is 80.4 and 70.5 percent at TP01 and TP02 respectively. Within the passenger traffic, the car share is around 33 percent (12,088 vehicles) and 37 percent (10,636 vehicles) at TP01 and TP02 respectively.
- Total freight vehicles account for a share of 19.6 percent at TP01 and 29.5 percent at TP02. Within the freight traffic, MAV accounts for 5.0 percent (1,800 vehicles) and 6.9 percent (1,981 vehicles) at TP01 and TP02 respectively.
- The tollable traffic recorded at TP01 and TP02 are 54.7 percent and 70.2 percent respectively.

- Other motorised non-tollable vehicles (two-wheeler, auto rickshaw and tractor) account for about 45.3 percent at Kognoli toll plaza and 29.8 percent at Hattargi toll plaza.

2.4.2 Daily variation, Hourly variation and Traffic composition

The day wise variation, hourly variation and the traffic composition at the toll plaza location is presented in **Figure 2-2**

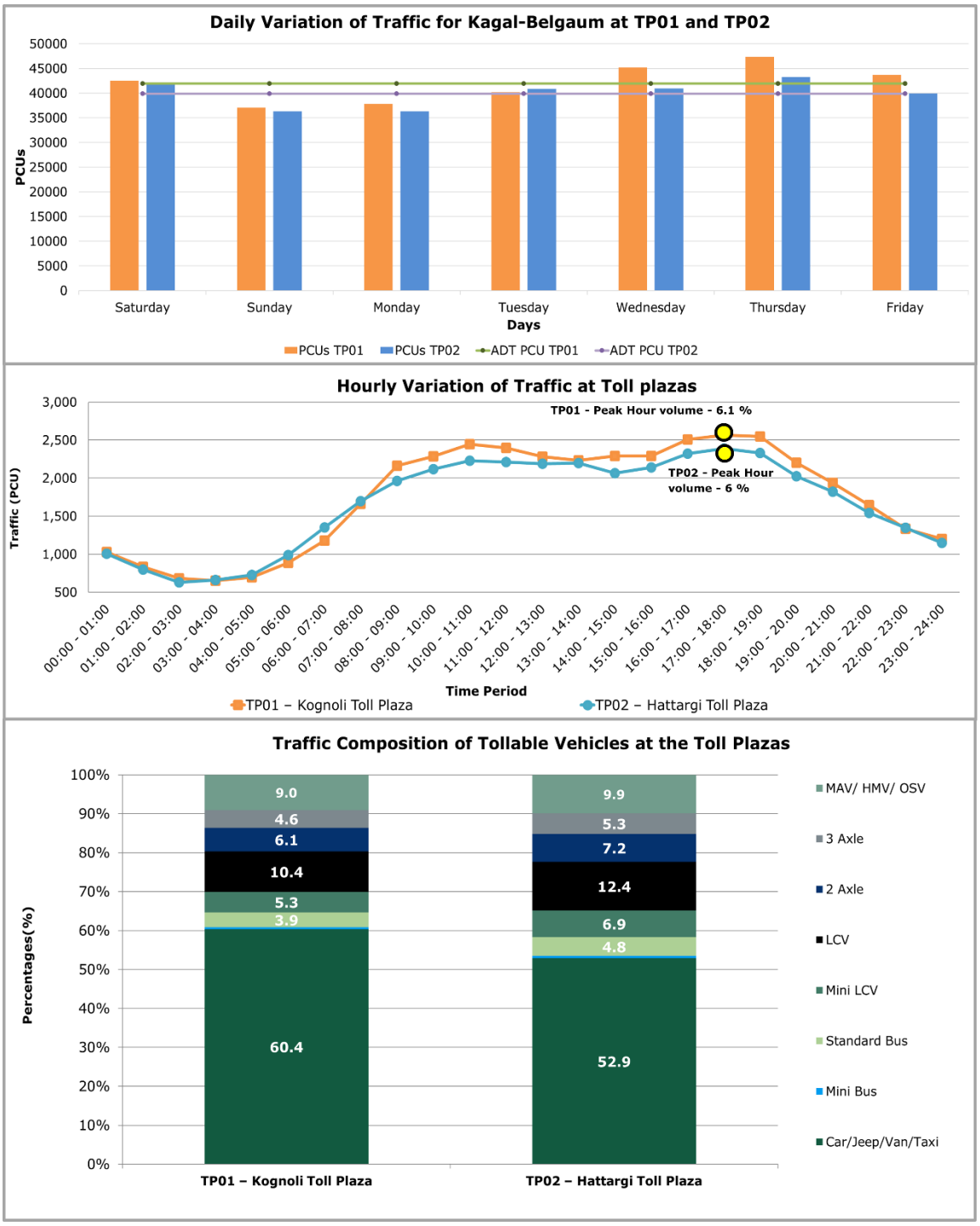


Figure 2-2: Daily Variation, Hourly Variation and Traffic Composition at TP01 & TP02

- It was observed that the traffic at the toll plazas is consistent with minor fluctuations during the days of volume count survey.

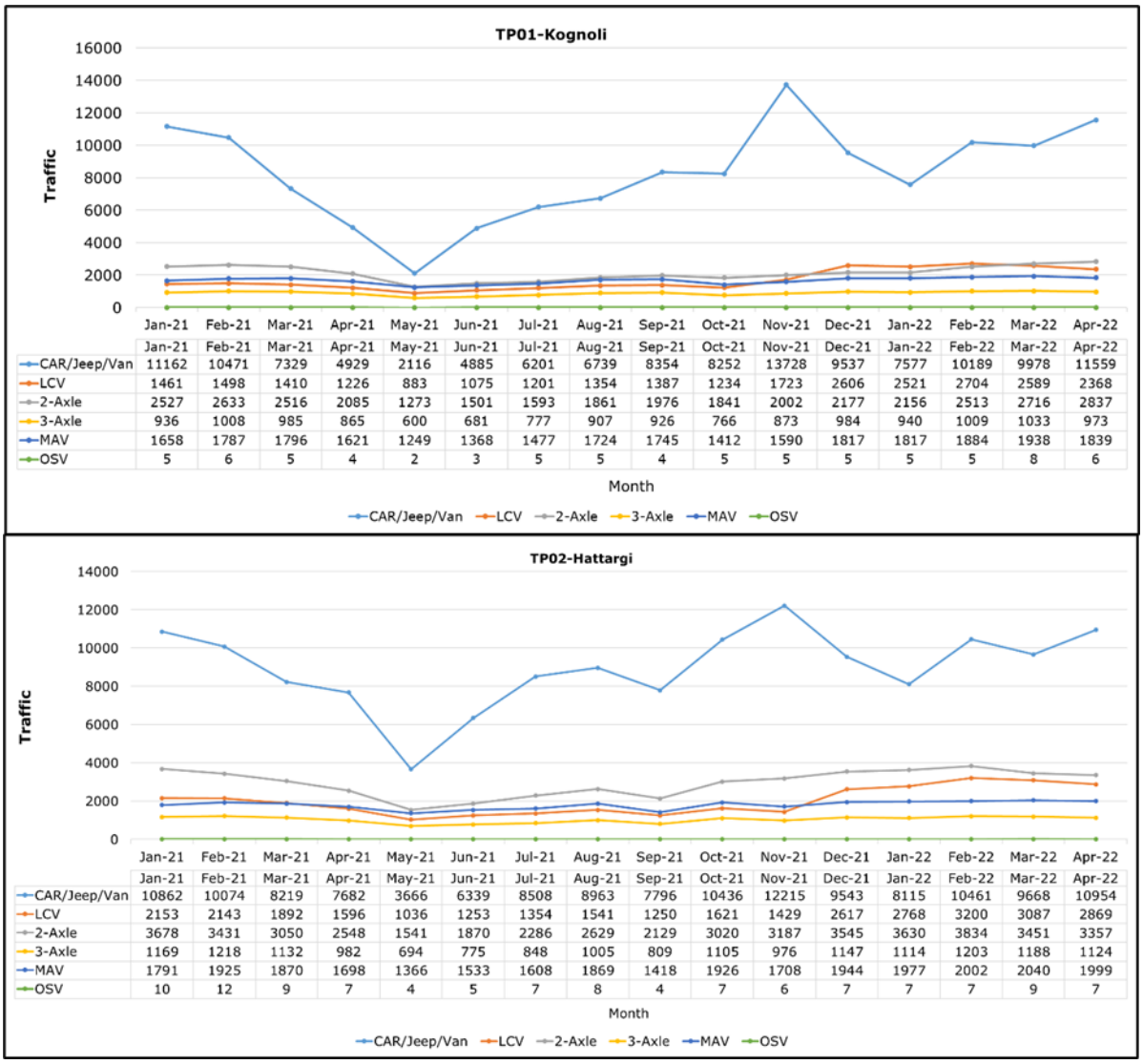
- The directional distribution at the toll plaza location is almost equal with Kagal-Belgaum having a directional distribution of 50.5 percent at TP01 and 51.6 percent at TP02.

2.4.3 Annual Average Daily Traffic (AADT)

The traffic plying on any road generally varies over different periods of the year depending on the cycle of different socio-economic activities in the regions through which it passes. Therefore, in order to have a more realistic picture of the traffic on the project road, it is required to assess its seasonal variation to estimate the annual average daily traffic (AADT).

The Seasonal Correction Factor (SCF) is generally derived from secondary data sources such as past month-wise traffic data on the project road, monthly toll revenues from existing tolled highways in the immediate influence area, sales of fuel at different filling stations along the project highway, arrival of vehicles at establishments like APMC, truck terminals, railway goods stations, etc.

The past toll traffic data for both the toll plazas was made available by the client from Jan 2021-April 2022. The month-on-month mode wise traffic for this period January 21 to April 22 for both the toll plazas is presented in **Figure 2-3**



	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22
CAR/Jeep/Van	11162	10471	7329	4929	2116	4885	6201	6739	8354	8252	13728	9537	7577	10189	9978	11559
LCV	1461	1498	1410	1226	883	1075	1201	1354	1387	1234	1723	2606	2521	2704	2589	2368
2-Axle	2527	2633	2516	2085	1273	1501	1593	1861	1976	1841	2002	2177	2156	2513	2716	2837
3-Axle	936	1008	985	865	600	681	777	907	926	766	873	984	940	1009	1033	973
MAV	1658	1787	1796	1621	1249	1368	1477	1724	1745	1412	1590	1817	1817	1884	1938	1839
OSV	5	6	5	4	2	3	5	5	4	5	5	5	5	5	8	6

	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22
CAR/Jeep/Van	10862	10074	8219	7682	3666	6339	8508	8963	7796	10436	12215	9543	8115	10461	9668	10954
LCV	2153	2143	1892	1596	1036	1253	1354	1541	1250	1621	1429	2617	2768	3200	3087	2869
2-Axle	3678	3431	3050	2548	1541	1870	2286	2629	2129	3020	3187	3545	3630	3834	3451	3357
3-Axle	1169	1218	1132	982	694	775	848	1005	809	1105	976	1147	1114	1203	1188	1124
MAV	1791	1925	1870	1698	1366	1533	1608	1869	1418	1926	1708	1944	1977	2002	2040	1999
OSV	10	12	9	7	4	5	7	8	4	7	6	7	7	7	9	7

Figure 2-3: Month on Month Traffic Data for TP01 and TP02

The onset of the second wave of Covid-19 and the lockdowns announced by the state government during April-June 2021 was a setback to the continuous recovery of traffic to normal levels. With the opening of economic activities, the traffic has started to pick up and shows a recovery from July 2021 onwards.

With that in mind, an average of July 2021 to April 2022 is taken as FY22 AADT. In the toll data Mini LCVs are merged into LCV category. For further analysis, the split for MLCV and LCV as provided by the client has been used for arriving at the AADT for Car/MLCV and LCV. The resultant mode wise AADT estimated for the project road for FY22 at both the toll plaza locations is presented in **Table 2-4.**

Location/ Mode	Car/Jeep/ Van/Taxi	LCV	2A	3A	MAV	OSV
TP01	9,839	1,341	2,167	919	1,724	5
TP02	10,154	1,685	3,107	1,052	1,849	7

Table 2-4: AADT for FY22

The comparison of AADT for FY22 in the earlier study of March 2021 (by Steer) with FY22 AADT adopted in present study is presented in **Table 2-5.**

Location/ Mode	Car	LCV	Bus	2-axle Truck	3-axle Truck	MAV	O/size/ HME	PCU
AADT (Earlier Study – Steer)								
TP01 – Kognoli	10,531	2,171	795	1,189	1,062	1,716	1	30,651
TP02 – Hattargi	10,192	2,390	876	2,095	1,258	1,781	2	34,485
AADT (Present Study)								
TP01 – Kognoli	9,839	1,341	915	1,252	919	1,724	5	28,889
TP02 – Hattargi	10,154	1,685	1,246	1,861	1,052	1,849	7	33,511

Table 2-5: AADT in Earlier (March 2021) and Present Study at TP01 & TP02

- The MAV traffic considered in the present study is marginally higher than the AADT projected for FY22 in the earlier study. Remaining all the modes are lower than the projections for FY22 in the previous study.
- In terms of PCUs, TP01-Kognoli is lower by 5.7 percent and TP02-Hattargi is lower by 2.8 percent than the earlier study.

2.5 Travel Characteristics

2.5.1 Survey Methodology

In order to understand the travel demand pattern in the region and tollable traffic streams, origin and destination (OD) surveys were carried out at the toll plaza locations. The OD survey was carried out for 24 hours, by roadside interview method as described in IRC: 102-1988. Both passenger and commercial vehicles plying on the project road were stopped on a random sampling basis and interviewed.

The travel characteristics obtained by OD survey facilitate the identification of:

1. Local and through traffic on the project road.
2. Potential divertible traffic to/from project road to various alternative routes.

Trained enumerators under the supervision of transport planners collected the trip characteristics using survey forms designed for this purpose. The OD survey elicited characteristics like origin, destination, frequency, purpose of trip for passenger vehicles and commodity being transported for goods vehicles. The information pertaining to origin and destination of trips collected during roadside interviews was analysed to obtain the trip distribution based on a zoning system suitably designed for the present study.

2.5.2 Traffic Zoning System

To understand the spatial dimensions of the trip characteristics of the vehicles interviewed during the O-D survey, a detailed zoning system was developed giving due consideration to the following factors:

- The road network catering to the traffic on the project road and its generating points

- Important towns, villages, factories and industrial centres around the project road area
- Administrative boundaries of districts and states.
- Configuration of the project road in the regional road network with respect to other roads

Two major types of areas were identified for analysis purpose: -

Immediate Influence Area (IIA): It includes the cities/towns/villages and districts along the project road and adjacent to it, which generate/attract trips to the project road. In this study, it consists of districts of Kolhapur and Belagavi in the state of Maharashtra and Karnataka.

Broad Influence Area (BIA): It includes the remaining districts of Karnataka and Maharashtra and other neighbouring states such as Telangana, Tamil Nadu, and remaining states of India.

Detailed zoning system is prepared for IIA, while more aggregate or broad zoning is developed for BIA. The zoning system adopted for data collection was based on 95 zones and is presented in **Appendix 2.1.**

2.5.3 Sample Size

The toll traffic data does not provide the individual traffic volume count of all categories of vehicles. The seven-day traffic volume video count at the existing toll plazas was analysed to get the individual volume count of all categories of vehicles along with the direction split.

The vehicles during the OD surveys were interviewed on a random sample basis. **Table 2-6** shows the AADT and the sample size (both in absolute numbers and in percentage terms) captured during the exercise.

Modes	Car	M Bus	Bus	MLCV	LCV	2A	3A	MAV/ OSV	Total
TP01- Kognoli Toll Plaza									
Sample	4,775	37	281	576	725	508	473	666	8,041
AADT	8,987	84	842	851	1,258	1,326	919	1,730	15,995
Percentage (%)	53.1	44.2	33.4	67.7	57.6	38.3	51.5	38.5	50.3
TP02- Hattargi Toll Plaza									
Sample	3,548	71	489	740	1,140	638	521	628	7,775
AADT	8,852	95	1,246	1,302	1,590	1,861	1,052	1,856	17,854
Percentage (%)	40.1	74.4	39.2	56.8	71.7	34.3	49.5	33.8	43.5

Table 2-6: Sample Size Collected in OD Survey at TP01 & TP02

Based on the sample size of different categories of vehicles interviewed during the OD survey, direction-wise expansion factors were calculated based on FY22 AADT. The OD

matrices for all vehicle categories were generated and analysis was done in terms of regional distribution, travel pattern, commodity distribution and trip purpose for cars.

2.5.4 Regional Distribution

Based on the OD matrices, the regional distribution of tollable vehicles at the toll plaza locations has been calculated. **Table 2-7** gives the distribution indicating the attraction and generation zones for the traffic on the project road.

Region/Modes	Car	M Bus	Bus	MLCV	LCV	2A	3A	MAV
TP01- Kognoli Toll Plaza								
Maharashtra	83.0	91.7	84.1	84.3	66.2	57.3	55.6	52.9
Karnataka	11.1	8.3	13.7	14.5	20.7	23.8	25.6	20.7
Tamil Nadu	0.3	0.0	0.0	0.0	5.2	5.9	6.8	7.7
Kerala	0.1	0.0	0.0	0.0	1.3	3.1	2.3	4.8
Goa	4.9	0.0	2.2	0.9	1.7	1.5	1.2	2.2
Gujarat	0.2	0.0	0.0	0.0	3.2	5.8	5.6	8.9
Rajasthan	0.1	0.0	0.0	0.0	0.2	0.7	0.7	1.1
Rest of India	0.4	0.0	0.0	0.2	1.5	1.8	2.2	1.7
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
TP02- Hattargi Toll Plaza								
Maharashtra	73.6	80.8	72.2	77.2	68.2	65.6	61.4	56.1
Karnataka	21.7	18.6	26.7	21.6	20.3	20.6	18.8	20.2
Tamil Nadu	0.2	0.0	0.2	0.0	5.1	5.6	8.9	9.0
Kerala	0.1	0.6	0.0	0.0	2.2	3.0	3.7	4.0
Goa	4.1	0.0	0.4	1.2	1.7	1.5	1.1	0.7
Gujarat	0.3	0.0	0.4	0.0	1.8	2.7	4.7	6.6
Rajasthan	0.0	0.0	0.0	0.0	0.2	0.3	0.4	1.3
Rest of India	0.1	0.0	0.0	0.0	0.6	0.8	1.0	2.2
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Combined (Avg. TP01 & TP02)								
Madhya Pradesh	78.2	85.6	77.2	80.1	67.3	62.3	58.7	54.5
Maharashtra	16.5	14.0	21.3	18.8	20.5	21.9	22.0	20.4
Delhi	0.2	0.0	0.1	0.0	5.1	5.7	8.0	8.4
Uttar Pradesh	0.1	0.4	0.0	0.0	1.8	3.1	3.0	4.4
Haryana	4.5	0.0	1.2	1.1	1.7	1.5	1.1	1.4
Rajasthan	0.2	0.0	0.2	0.0	2.4	3.9	5.1	7.7
Karnataka	0.1	0.0	0.0	0.0	0.2	0.4	0.5	1.2
Rest of India	0.2	0.0	0.0	0.1	1.1	1.2	1.5	2.0
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Table 2-7: Regional Distribution of Tollable Traffic (in %) On Project Road

Passenger traffic:

- Car traffic at both the toll plaza locations is majorly from Maharashtra (83 percent at TP01 and 73.6 percent at TP02) followed by Karnataka (11.1 percent at TP01 and 21.7 percent at TP02).
- In case of Bus traffic, Maharashtra contributes about 84.1 percent and 72.2 percent at TP01 and TP02 respectively.

- The car traffic is observed to be having Belagavi-Kolhapur as top OD pair at both toll plazas.

Freight Traffic

- Around 84.3 percent of MLCV at TP01 and 77.2 percent of MLCV at TP02 is from Maharashtra, followed by Karnataka accounting for around 14.5 percent at TP01 and 21.6 at TP02 respectively.
- In case of MAVs, Maharashtra accounts for about 52.9 percent at TP01 and about 56.1 percent at TP02. Also, Karnataka contributes around 20.7 percent at TP01 and 20.2 percent at TP02, followed by Tamil Nadu accounting to about 7.7 percent and 9 percent at TP01 and TP02 respectively.
- The MAV traffic is observed to be having Belagavi-Mumbai as top OD pair at both the toll plazas.

The mode wise top 20 OD pairs are given in **Appendix 2.2**.

2.5.5 Travel Pattern

In order to assess the travel pattern of vehicles, the important streams of traffic plying on the project road are estimated. The list of the popular movements found at the toll plaza locations is presented in **Table 2-8** and **Table 2-9**.

Sr. No.	Traffic Streams	Car	Mini Bus	Bus	MLCV	LCV	2A	3A	MAV
1	Kagal/Kolhapur/Sangli & surroundings-Belgaum & surroundings	2,008	27	303	128	184	91	59	60
		22.3%	32.7%	36.0%	15.0%	14.6%	6.9%	6.4%	3.4%
2	Kagal/Kolhapur/Sangli & surroundings-Hubli/Dharwad & surroundings	254	0	26	17	30	44	28	31
		2.8%	0.0%	3.1%	2.0%	2.4%	3.3%	3.0%	1.8%
3	Kagal/Kolhapur/Sangli & surroundings-Goa & surroundings	443	0	25	3	15	13	10	18
		4.9%	0.0%	3.0%	0.4%	1.2%	1.0%	1.1%	1.0%
4	Kagal/Kolhapur/Sangli & surroundings-Bangalore & surroundings	827	10	132	102	105	94	89	94
		9.2%	11.5%	15.7%	11.9%	8.4%	7.1%	9.7%	5.4%
5	Kagal/Kolhapur/Sangli & surroundings-Beyond Bangalore	62	0	6	0	38	60	35	119
		0.7%	0.0%	0.7%	0.0%	3.0%	4.5%	3.8%	6.9%
6	Mumbai/Pune/Nashik & surroundings-Belgaum & surroundings	552	0	36	82	144	146	87	280
		6.1%	0.0%	4.3%	9.6%	11.4%	11.0%	9.5%	16.2%
7	Mumbai/Pune/Nashik & surroundings-Hubli/Dharwad & surroundings	126	0	0	40	70	68	71	75
		1.4%	0.0%	0.0%	4.7%	5.6%	5.1%	7.7%	4.3%
8	Mumbai/Pune/Nashik & surroundings-Goa & surroundings	413	0	12	13	22	26	6	39
		4.6%	0.0%	1.4%	1.5%	1.8%	2.0%	0.6%	2.2%

Sr. No.	Traffic Streams	Car	Mini Bus	Bus	MLCV	LCV	2A	3A	MAV
9	Mumbai/Pune& surroundings-Bangalore & beyond	297	0	28	28	309	413	287	492
		3.3%	0.0%	3.3%	3.3%	24.6%	31.2%	31.3%	28.4%
10	Gujarat/Rajasthan & beyond-Belgaum & surroundings	24	0	0	0	25	36	19	44
		0.3%	0.0%	0.0%	0.0%	2.0%	2.7%	2.1%	2.6%
11	Gujarat/Rajasthan & beyond-Hubli/Dharwad & surroundings	0	0	0	0	9	13	13	16
		0.0%	0.0%	0.0%	0.0%	0.7%	1.0%	1.4%	0.9%
12	Gujarat/Rajasthan & beyond-Goa & surroundings	27	0	0	0	5	0	6	18
		0.3%	0.0%	0.0%	0.0%	0.4%	0.0%	0.6%	1.1%
13	Gujarat/Rajasthan & beyond-Bangalore & beyond	12	0	0	0	68	143	85	293
		0.1%	0.0%	0.0%	0.0%	5.4%	10.8%	9.3%	17.0%
14	Nagpur/Hyderabad & Surroundings- Belgaum & beyond	4	0	0	0	3	5	8	8
		0.0%	0.0%	0.0%	0.0%	0.2%	0.4%	0.9%	0.5%
15	Kagal/Kolhapur/Sangli & beyond-Zones between TP01 & TP02	3939	47	273	440	230	172	116	143
		43.8%	55.7%	32.5%	51.6%	18.3%	13.0%	12.7%	8.3%
Total		**8,987**	**84**	**842**	**851**	**1,258**	**1,326**	**919**	**1,730**

Table 2-8: Traffic Streams at TP01

Sr. No.	Traffic Streams	Car	Mini Bus	Bus	MLCV	LCV	2A	3A	MAV
1	Kagal/Kolhapur/Sangli & surroundings-Belgaum & surroundings	2,177	36	313	191	255	107	126	144
		24.6%	37.9%	25.1%	14.7%	16.0%	5.8%	11.9%	7.8%
2	Kagal/Kolhapur/Sangli & surroundings-Hubli/Dharwad & surroundings	332	2	30	11	22	42	11	26
		3.8%	2.6%	2.4%	0.8%	1.4%	2.3%	1.1%	1.4%
3	Kagal/Kolhapur/Sangli & surroundings-Goa & surroundings	407	0	3	12	17	13	2	0
		4.6%	0.0%	0.3%	0.9%	1.1%	0.7%	0.2%	0.0%
4	Kagal/Kolhapur/Sangli & surroundings-Bangalore & surroundings	783	4	135	100	78	66	53	56
		8.8%	3.9%	10.9%	7.7%	4.9%	3.6%	5.0%	3.0%
5	Kagal/Kolhapur/Sangli & surroundings-Beyond Bangalore	25	1	3	0	28	57	45	96
		0.3%	1.3%	0.3%	0.0%	1.8%	3.1%	4.3%	5.2%
6	Mumbai/Pune/Nashik & surroundings-Belgaum & surroundings	551	14	127	13	275	183	149	334
		6.2%	14.9%	10.2%	1.0%	17.3%	9.8%	14.2%	18.0%
7	Mumbai/Pune/Nashik & surroundings-Hubli/Dharwad & surroundings	67	1	26	0	33	43	34	53
		0.8%	1.5%	2.1%	0.0%	2.1%	2.3%	3.2%	2.9%
8	Mumbai/Pune/Nashik & surroundings-Goa & surroundings	257	0	4	0	20	26	19	21
		2.9%	0.0%	0.3%	0.0%	1.2%	1.4%	1.8%	1.1%
9		169	8	111	0	345	436	299	553

Sr. No.	Traffic Streams	Car	Mini Bus	Bus	MLCV	LCV	2A	3A	MAV
	Mumbai/Pune& surroundings-Bangalore & beyond	1.9%	8.0%	8.9%	0.0%	21.7%	23.4%	28.4%	29.8%
10	Gujarat/Rajasthan & beyond-Belgaum & surroundings	27	0	10	0	11	47	39	76
		0.3%	0.0%	0.8%	0.0%	0.7%	2.5%	3.7%	4.1%
11	Gujarat/Rajasthan & beyond-Hubli/Dharwad & surroundings	2	0	0	0	6	14	2	13
		0.0%	0.0%	0.0%	0.0%	0.4%	0.7%	0.2%	0.7%
12	Gujarat/Rajasthan & beyond-Goa & surroundings	8	0	0	0	3	3	0	0
		0.1%	0.0%	0.0%	0.0%	0.2%	0.2%	0.0%	0.0%
13	Gujarat/Rajasthan & beyond-Bangalore & beyond	22	0	0	0	59	64	83	266
		0.3%	0.0%	0.0%	0.0%	3.7%	3.5%	7.9%	14.4%
14	Nagpur/Hyderabad & Surroundings- Belgaum & beyond	72	0	5	6	20	16	6	10
		0.8%	0.0%	0.4%	0.5%	1.2%	0.9%	0.6%	0.5%
15	Zones between TP01 & TP02- Belgaum & beyond	3952	29	477	969	419	743	183	208
		44.6%	30.0%	38.3%	74.4%	26.4%	39.9%	17.4%	11.2%
Total		**8,852**	**95**	**1,246**	**1,302**	**1,590**	**1,861**	**1,052**	**1,856**

Table 2-9: Traffic Streams at TP02

Passenger Traffic:

- The car traffic originating from Kagal/Kolhapur/Sangli & surroundings to Belgaum & surroundings (stream 1) is about 22.3 percent (2,008 vehicles) at TP01 and about 24.6 percent (2,177 vehicles) at TP02.
- In case of Bus, about 36.0 percent (303 vehicles) at TP01 and 25.1 percent (313 vehicles) at TP02 were found to be travelling from/to Kagal/Kolhapur/Sangli & surroundings to/from Belgaum & surroundings (stream 1).
- About 9.2 percent (827 vehicles) and 8.8 percent (783 vehicles) of cars at TP01 and TP02 respectively were found to be travelling between Kagal/Kolhapur/Sangli & surroundings and Bangalore & surroundings (stream 4).
- The local car traffic (crossing single toll plaza-stream 15) is found to be 43.8 percent (3,939 vehicles) at TP01 and about 44.6 percent (3,952 vehicles) at TP02.

Freight Traffic:

- Around 24.6 percent (309 vehicles) of LCV at TP01 and 21.7 percent (345 vehicles) at TP02 were found to be plying between Mumbai/Pune & surroundings and Bangalore & beyond (stream 9).
- In case of 2A, about 31.2 percent (413 vehicles) at TP01 and about 23.4 percent (436 vehicles) at TP02 were found to be traveling between Mumbai/Pune & surroundings and Bangalore & beyond (stream 9).

- In case of MAV, around 17.0 percent (293 vehicles) at TP01 and 14.4 percent (266 vehicles) at TP02 were found to be plying from/to Gujarat/Rajasthan & beyond to/ from Bangalore & beyond (stream 13).
- The MAV traffic originating from/to Mumbai/Pune & surroundings to/from Bangalore & beyond is about 28.4 percent (492 vehicles) at TP01 and about 29.8 percent (553 vehicles) at TP02 (stream 9).

2.5.6 Commodity Distribution

Analysis was also carried out to understand the different commercial vehicles being used to transport different commodities. The commodity distribution for project corridor is presented in **Figure 2-4**.

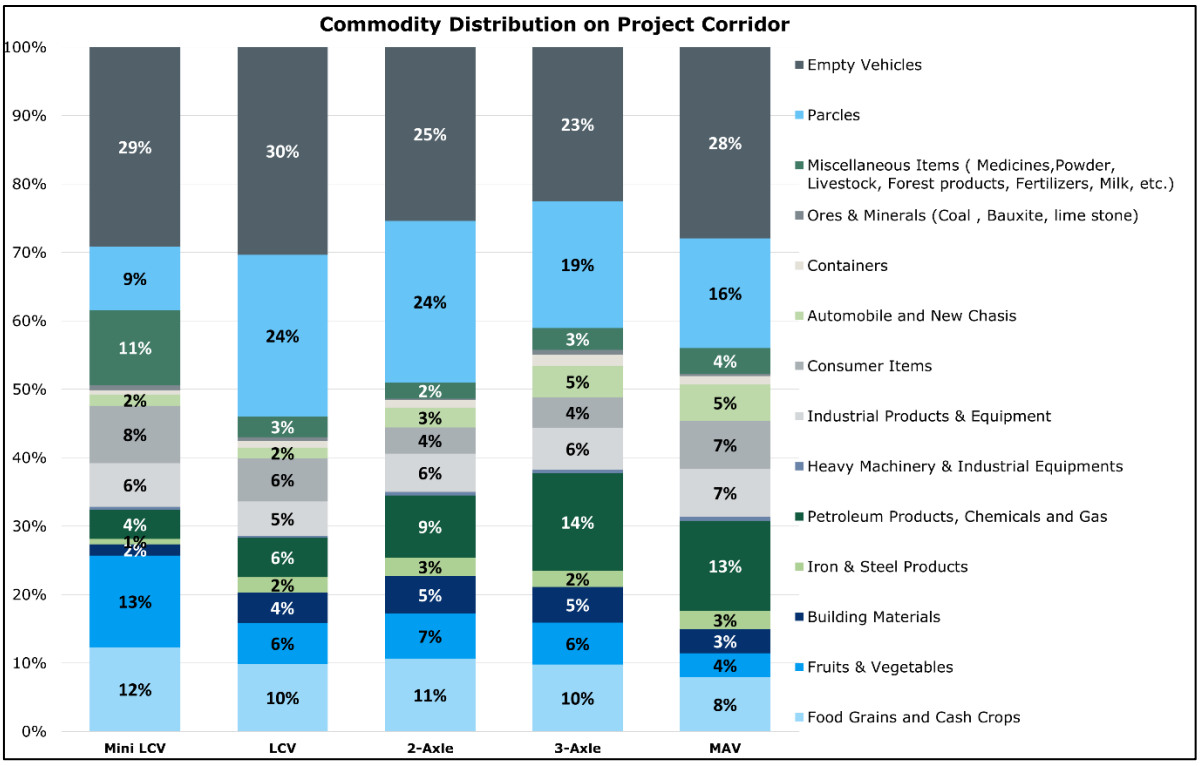


Figure 2-4: Commodity Distribution for Project Corridor

- About 14 percent of 3A and 13 percent of MAV are found to be transporting petroleum products and chemicals along the entire project corridor.
- Also, around 16-19 percent of 3A/MAV are found to be transporting parcels along the entire project corridor.
- Around 10-11 percent of MLCVs and LCVs are transporting miscellaneous items along the entire project corridor.

Table 2-10 presents the commodity-wise share of the total commercial traffic at each of the toll plaza on the project road.

Commodity Type	MLCV	LCV	2 Axle	3 Axle	MAV
TP01-Kognoli Toll Plaza					
Food Grains and Cash Crops	13.2	8.0	9.1	9.5	8.7
Fruits & Vegetables	13.5	4.4	5.7	5.5	3.9
Building Materials	1.4	3.0	3.9	3.2	2.9
Iron & Steel Products	1.4	1.1	3.0	3.2	3.6
Petroleum Products, Chemicals and Gas	5.2	5.8	8.9	12.9	11.7
Heavy Machinery & Industrial Equipment	0.3	0.3	0.4	0.2	0.9
Industrial Products & Equipment	5.6	5.7	6.9	7.0	8.4
Consumer Items	7.3	7.6	3.0	2.3	2.4
Automobile and New Chassis	2.4	2.3	5.1	4.4	6.0
Containers	0.7	1.2	1.2	0.2	0.9
Ores & Minerals (Coal, Bauxite, limestone)	0.7	0.3	0.0	0.2	0.2
Miscellaneous Items (Medicines, Powder, Livestock, Forest products, Fertilizers, Milk, etc.)	10.8	11.3	1.4	4.0	3.9
Parcels	9.7	26.9	26.4	20.1	16.4
Empty Vehicles	27.8	22.1	25.2	27.3	30.2
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
TP02-Hattargi Toll Plaza					
Food Grains and Cash Crops	11.6	11.1	11.9	10.0	7.0
Fruits & Vegetables	13.2	7.0	7.2	6.7	3.2
Building Materials	1.9	5.3	6.7	7.1	4.1
Iron & Steel Products	0.3	3.0	2.5	1.5	1.8
Petroleum Products, Chemicals and Gas	3.5	5.8	9.2	15.5	14.6
Heavy Machinery & Industrial Equipment	0.5	0.2	0.6	0.8	0.3
Industrial Products & Equipment	7.0	4.7	4.5	5.4	5.4
Consumer Items	9.2	5.4	4.5	6.3	11.9
Automobile and New Chassis	1.1	1.1	1.1	4.8	4.6
Containers	0.5	0.9	1.1	2.9	1.6
Ores & Minerals (Coal, Bauxite, limestone)	0.8	0.7	0.3	1.2	0.5
Miscellaneous Items (Medicines, Powder, Livestock, Forest products, Fertilizers, Milk, etc.)	11.1	10.4	3.1	2.5	3.7
Parcels	8.9	21.6	21.5	17.1	15.6
Empty Vehicles	30.3	23.0	25.5	18.2	25.6
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Table 2-10: Commodity Distribution on Project Road

- Major commodities being transported across both the toll plazas are fruits and vegetables, food grains, consumer items, industrial products and equipments, petroleum/gas products, parcels etc.

- About 13 percent each of MLCV at TP01 and TP02, were found to be transporting fruits and vegetables.
- Around 9-12 percent of 2A and 9-10 percent of 3A trucks at TP01 and TP02 were found to be transporting food grains and cash crops.
- Around 12-16 percent of 3A trucks and 11-15 percent of MAVs and at TP01 and TP02 were found to be carrying petroleum/gas products and chemicals. The higher share of petroleum/gas products can be attributed to the presence of IOCL LPG bottling plant at Kanagala present along the project corridor as well as HPCL and BPCL bottling plants present at Belur industrial area near Dharwad.
- Around 11 percent each of LCV at TP01 and TP02 were found to be transporting miscellaneous items (majorly milk). It may be noted that the major commodity observed was milk tankers which was transported from KMF (Karnataka Milk Federation) unit at Belgaum as well as Gokul milk processing unit present at Gokul Shirgaon MIDC near Kolhapur. These tankers return empty after dropping off milk to the distribution centres.
- About 15-17 percent of MAVs & 17-20 percent of 3A trucks across both the toll plazas were found be to be laden with parcels carrying ecommerce goods and couriers. These parcels are significantly high due to the influence of major metropolitan cities like Mumbai, Bangalore, Pune and Chennai.

2.5.7 Trip Purpose Distribution

An analysis was also carried out to assess the purpose of car trips on the project road. **Table 2-11** summarises the purpose-wise share of the passenger cars at the O-D survey locations.

Modes	TP01-Kognoli Toll Plaza	TP02-Hattargi Toll Plaza
Work & Business	86.8	85.1
Education	2.6	2.9
Social/Shopping	6.5	5.7
Religious	2.0	2.8
Others	2.1	3.5
Total	**100.0**	**100.0**

Table 2-11: Purpose-wise Distribution of Car Trips at Toll Plaza locations

- Work and business trips account for about 85-87 percent across both the toll plazas.
- Social/shopping trips were observed to be around 5-7 percent whereas education trips account for another 2.5-3 percent across the two toll plazas.
- Religious trips account for about 2-4 percent across both the toll plazas.

3. TRAFFIC GROWTH RATE AND PROJECTIONS

3.1 General

The project road is a part of the NHAI InvIT portfolio and the projections of traffic and revenue have been presented till FY52. The estimation of the traffic using the tolled highway and its future growth are important elements to assess the project's economics as these are generally the main/sole source of revenue for the project This chapter details various aspects of the current traffic of the project road and its growth potential as assessed by Ramboll.

3.2 Project Road Traffic

The traffic that is likely to use the project road was estimated on the basis of the traffic and travel characteristics gathered as part of the study. The traffic on the project road would normally consist of the following components:

- Normal Traffic
- Diverted Traffic
- Induced/Developmental Traffic

3.2.1 Normal Traffic

Normal traffic is the traffic which is already plying on the project road as assessed in section 2.4.3.

3.2.2 Diverted Traffic

Diverted traffic is generally dictated by the presence of an alternative route at a lower generalised cost, which is in-turn defined by the road configuration and its condition, the type of vehicle and its operating costs, the average riding speed, the route distance and any tolling that may apply on a specific route.

In context of the project road, there are no existing routes in vicinity of toll plazas to avoid the project road. However, the proposed Pune- Bangalore Expressway may act as an alternate route for the long-distance traffic.

Impact of Pune – Bangalore Expressway

Pune – Bangalore Expressway is a proposed 8 lane access-controlled highway connecting Pune, Maharashtra and Bengaluru, Karnataka via Satara, Sangli, Belgavi (Belgaum), Dharwad, Hubli, Devanagere and Tumakuru with a length of 700 km as against the existing distance via NH-48 of around 840 km. The new expressway will provide an alternative route to the traffic between Pune and Bangalore. The expressway is proposed to counter the issue of submergence of the existing NH-48 during monsoon and hence remove the issue of traffic bottlenecks in those areas. Presently, DPR for the project is being prepared and the exact alignment details are not yet known. In the absence of the

same, the potential divertible traffic is the traffic plying between Pune and beyond to Bangalore and beyond which has been estimated from the OD survey conducted during the present study. Since the expressway is likely to be shorter by 140 km, the project road may lose 100 percent of the potential divertible traffic. The estimated loss of project road traffic due to the proposed expressway is presented in **Table 3-1.**

Toll Plazas/ Mode	2A	3A	MAV
TP01	31.20 %	31.30 %	28.40 %
TP02	23.40 %	28.40 %	29.80 %

Table 3-1: Impact of Pune - Bangalore Expressway

It can be seen that the proposed expressway may take away about 28-31 percent of the freight traffic from TP01 and about 23-30 percent from TP02. The proposed expressway will be a greenfield alignment and considering the usual timelines for a long greenfield expressway project, the diversion impact is considered from FY30 onwards. Owing to the gradual shift of traffic away from the project road, the traffic impacts have been assumed to take place in phases with about 50 percent in FY30, 75 percent in FY31 and 100 percent from FY32 onwards.

3.2.3 Induced/ Development Traffic

Developmental /new generated traffic is the one which would be generated, over and above normal growth, because of lowering of transport costs or new developments in the immediate influence area of the project road. In case of the project road, there is no development envisaged in the vicinity of the project road.

Bharatmala Pariyojana is the second largest highways construction project in the country since NHDP, under which almost 50,000 km or highway roads were targeted across the country. It will look to improve connectivity particularly on economic corridors, border areas and far-flung areas with an aim of quicker movement of cargo and boosting exports.

It will connect 550 district headquarters to minimum 4-lane highway by raising the number of corridors to 50 (from current 6) and move 80 percent freight traffic (currently 40 percent) to national highways by connecting 24 logistics parks and 7 north east multimodal waterway ports.

The Phase-I includes economic corridors of around 9,000 km; inter-corridor and feeder routes of around 6,000 km; 5,000 km roads under the National Corridors Efficiency Program, border and international connectivity roads of around 2,000 km; coastal and port connectivity roads of around 2,000 km; expressways of around 800 km and 10,000 km of NHDP roads. The total length in phase 1 comes to around 34,800 km.

In the context of the project influence area, there are a few economic corridors and inter corridors listed in the Maharashtra and Karnataka plan. The economic corridors are

planned from Pune-Vijayawada, Mumbai-Kolkata and Solapur-Bellary-Gooty and are likely to improve connectivity with an aim to provide quicker movement of cargo.

The project road is a connecting link between large cities/ industrial hubs of Pune and Mumbai on the north and Bengaluru and Chennai on the south. As the project road is part of the golden quadrilateral highway network and caters to the long-distance traffic movement, it is likely to remain an important highway for the north-south movement and may see sustained growth in the future.

3.3 Methodology for Traffic Growth Rate Estimation

Traffic growth for both passenger and freight vehicles has been estimated using the econometric approach as described in IRC-108, 2015. For freight traffic, due consideration has been given to the total tonnage transported and the shift in types of vehicles used for moving goods.

The econometric model applied, relates traffic growth to changes in state (or district) domestic product via an elasticity factor. According to IRC guidelines, elasticity based econometric model for highway projects should be derived in the following form:

$Log_e(P) = A0 + A1\ Log_e\ (EI)$, where:

P - Traffic Volume

EI - Economic Indicator

A0 - Regression Constant

A1 - Regression Co-efficient (Elasticity Index)

In order to estimate traffic on the project road, the methodology described below has been followed:

- Identify the influence area - From the analysis of OD survey data, the project influencing states and districts, which are likely to impact the traffic growth on the project road, were identified.
- Review Past traffic Data – Based on toll data available for the project, a review of past traffic and tonnage growth is carried out.
- Analysis of economic growth of the Project Influencing Area (PIA) - For each PIA state, an economic profile describing past performance and future outlook was prepared. This also considers India's past economic performance and its future outlook.
- Estimation of traffic elasticity to income – in order to translate economic growth into traffic growth, an elasticity factor was estimated.
- Derivation of traffic growth rates – On the basis of the weighted (based on OD shares) PIA outlook and related traffic elasticity, traffic growth rates were estimated.

The methodology thus adopted incorporates, as basic data inputs, the perspective growth envisaged in the influence area and the changes in transport demand elasticities over a period of time. The traffic growth rates by vehicle type for the project road have been determined till FY52.

3.4 Identification of PIA States

The regional distribution observed on the project road shows that Maharashtra and Karnataka are the main contributors of traffic on the project road in case of passenger vehicles. In case of freight traffic, states of Tamil Nadu, Kerala and Gujarat also contribute to the project road traffic in addition to the two states of Maharashtra and Karnataka.

The states of Maharashtra and Karnataka have, therefore, been considered as the PIA states for passenger traffic. The PIA for freight traffic includes all the five states which are the main contributors to freight traffic. The mode wise normalized regional distribution shares are presented in **Table 3-2.**

States/Mode	Car/ MLCV	M Bus/ LCV	Bus	2A	3A	MAV
Maharashtra	82.5	77.1	78.5	64.3	60.7	57.1
Karnataka	17.5	22.9	21.5	22.6	22.7	21.4
Tamil Nadu	0.0	0.0	0.0	5.9	8.2	8.8
Kerala	0.0	0.0	0.0	3.2	3.1	4.6
Gujarat	0.0	0.0	0.0	4.1	5.3	8.1
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Table 3-2: Normalised Regional Distribution (%) for the PR

Maharashtra has a share of 82.5 percent in cars and 78.5 percent in buses and the state of Karnataka contributes around 17.5 percent in cars and 21.5 percent in buses.

In case of freight vehicles, Maharashtra contributes the highest around 57-64 percent in 2A & 3A Trucks and MAVs signifying the long-distance traffic on the project road. Karnataka has a share of around 21-23 percent in these categories of trucks followed by 6-9 percent from Tamil Nadu. Around 8.1 percent of MAVs are being contributed by state of Gujarat.

3.5 Past Economic Growth of PIA

Growth of traffic on the project road depends on existing development and future growth prospects of the connecting regions. A number of economic indicators for the PIA states, as published by Central Statistical Organisation (2011-12 prices), have been studied to assess their past performance.

Maharashtra

- Maharashtra's Gross State Domestic Product (GSDP) stood at Rs 21,340.7 billion in 2019-20 and has been growing at a compounded annual growth rate of 6.8 per cent since 2011-12.

- The state's growth had been between 6-7 per cent since 2012-16 and picked up to 9.2 per cent in 2016-17. It has shown a growth of around 6.2 percent in FY19 and 5.0 percent in FY20.
- The services sector is the largest contributor to GSDP (57.0 percent), agriculture allied activities sector at 13.6 percent, secondary sector at 29.4 per cent of the GSDP in 2019-20.

The change of sectoral composition of GSDP over the years is presented in **Figure 3-1.**

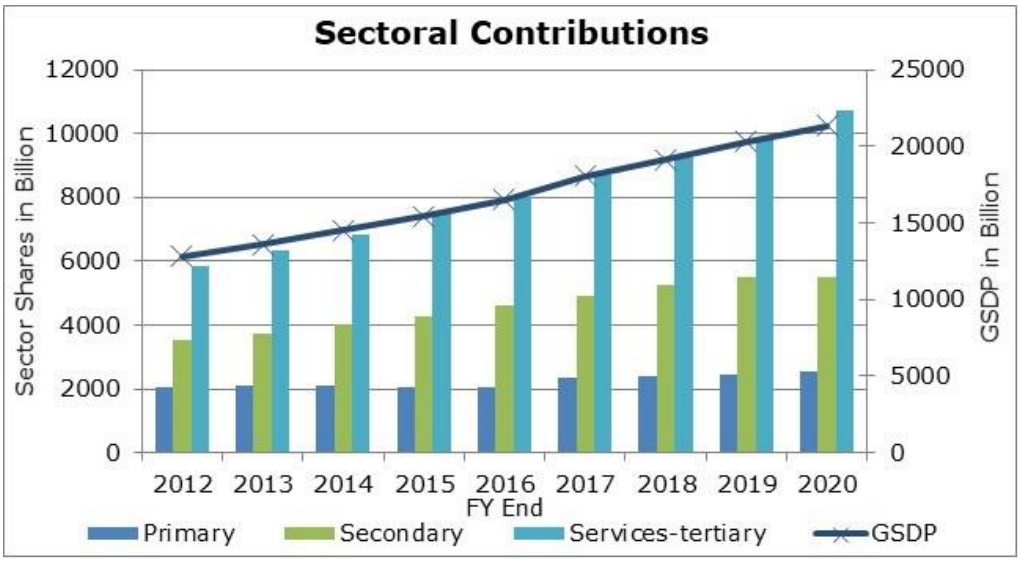


Figure 3-1: GSDP (in Rs billion) and its Sectoral Composition for Maharashtra

The performance of the state economy and its different sectors has been studied using time trend analysis. The average annual growth rates as obtained using regression analysis are presented in **Table 3-3.**

Particulars	2011-12 to 2019-20	2014-15 to 2019-20
GSDP	6.8%	6.8%
Primary	2.9%	4.8%
Secondary	6.3%	5.6%
Tertiary	7.8%	7.4%
Construction	3.2%	2.6%
Per Capita Income	5.7%	5.7%

Table 3-3 : Average Annual Growth Rates (%) of State Income for Maharashtra

Maharashtra is a predominant exporter of pearls, precious and semi-precious stones, gold, drug formulations and biologicals, ships, motor vehicles, cars, boats and structures and iron and steel.

Currently, the state has 37 operating Special Economic Zones (SEZs). Also, 51 more have been formally approved and 45 have been notified. These SEZs are dispersed over a manifold range of sectors including textiles & apparel, food processing, footwear & leather products, multi-product, pharma, IT SEZs, etc.

According to by Department for Promotion of Industry and Internal Trade (DPIIT), the state has enticed the Foreign Direct Investment (FDI) equity inflows worth US$ 157.08 billion during the period FY01 to FY21.

The dedicated freight corridor, the Delhi-Mumbai Industrial Corridor (DMIC), passes through and finally terminates in the state. Aurangabad Industrial City (AURIC), (10,000 acre), a Greenfield smart Industrial City located in one of the prominent project influence areas of the corridor, in the state, is expected to develop to facilitate investments in an aim to provide conducive business environment.

Also, in order to attract high investments and catalyze growth, the state has facilitated the investments in developing world-class road infrastructure. Mumbai -Pune Expressway is a 94.5 km expressway that has been constructed to connect the financial hub and state capital Mumbai with Pune thereby facilitating the seamless connectivity across the two influential cities.

Maharashtra is the most industrialised state in India and has maintained the leading position in the industrial sector in the country. The state is a pioneer in small scale industries and boasts of the largest number of special export promotion zones. Maharashtra has emerged as a key hub for IT and ITeS, electronics and captive business outsourcing industries. Maharashtra's infrastructure sector has grown significantly over the last decade, with a substantial rise in the number of industrial clusters and Public Private Partnership (PPP) projects.

The per capita income of Maharashtra is Rs 167,108 in the year 2018-19 and has been growing at 5.9 percent during 2011-12 to 2018-19. The growth in per capita income is presented in **Figure 3-2.**

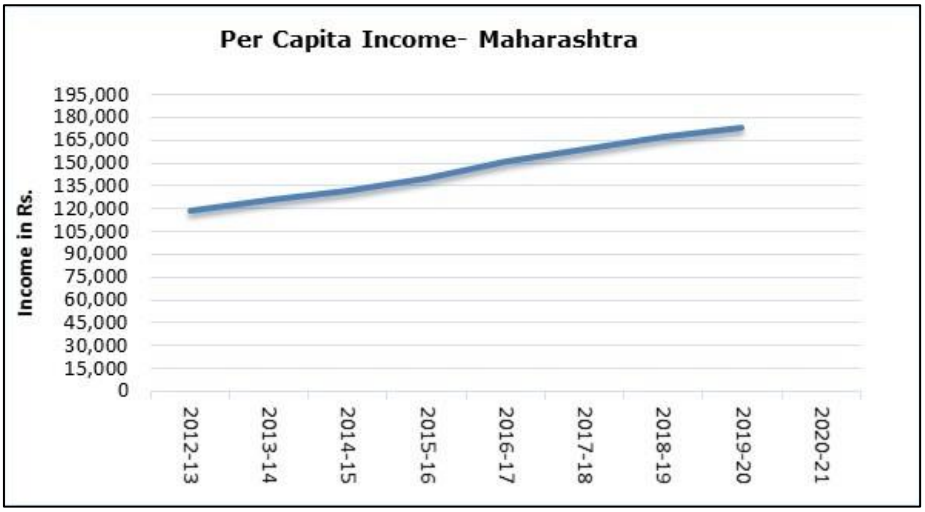


Figure 3-2 Per Capita Income of Maharashtra

Other PIA States

The other PIA states contributing to the traffic on the project road are Karnataka, Tamil Nadu, Kerala and Gujarat.

- Karnataka's Gross State Domestic Product (GSDP) stood at Rs 11,437.8 billion in FY20 and has been growing at a compounded annual growth rate of 8.9 percent since FY12. The GSDP estimates for the year FY21 is Rs 11,138.2 billion.
- Gross State Domestic Product (GSDP) of Tamil Nadu has shown a growth of around 6.1 percent in FY20 and stood at Rs 12,785.6 billion in 2019-20 and has been growing at a compounded annual growth rate of 7.1 percent since 2011-12. The GSDP estimates for the year FY21 is Rs 12,966.6 billion.
- The State of Kerala's Gross State Domestic Product (GSDP) stood at Rs 5,686.4 billion in FY20 and has been growing at a compounded annual growth rate of 6.0 percent since FY12.
- Gross State Domestic Product (GSDP) of Gujarat stood at Rs 12,689.6 billion in 2019-20 and has been growing at a compounded annual growth rate of 9.6 percent since 2011-12.
- The secondary sector is the largest contributor to GSDP (46.3 percent) in the PIA state of Gujarat and the services sector is the largest contributor to GSDP of in the remaining PIA states, 64.5 percent in Karnataka, 50.9 percent in Tamil Nadu and 63.3 percent in Kerala.

The average annual growth rates as obtained using regression analysis for the period FY12 to FY20 are presented in **Table 3-4**.

Particular/States	Karnataka	Tamil Nadu	Kerala	Gujarat
2011-12 to 2019-20				
GSDP	8.9	7.1	6.0	9.6
Primary	3.7	5.4	-2.1	6.5
Secondary	7.2	7.3	6.3	10.9
Tertiary	9.8	6.5	6.4	8.6
Construction	3.3	4.6	4.3	3.7
Per Capita Income	7.9	6.4	5.4	8.2

Table 3-4: Average Annual Growth Rates (%) of State Income for Other PIA States

The GSDP over the years for the states of Karnataka, Tamil Nadu, Kerala and Gujarat are presented in **Figure 3-3.**

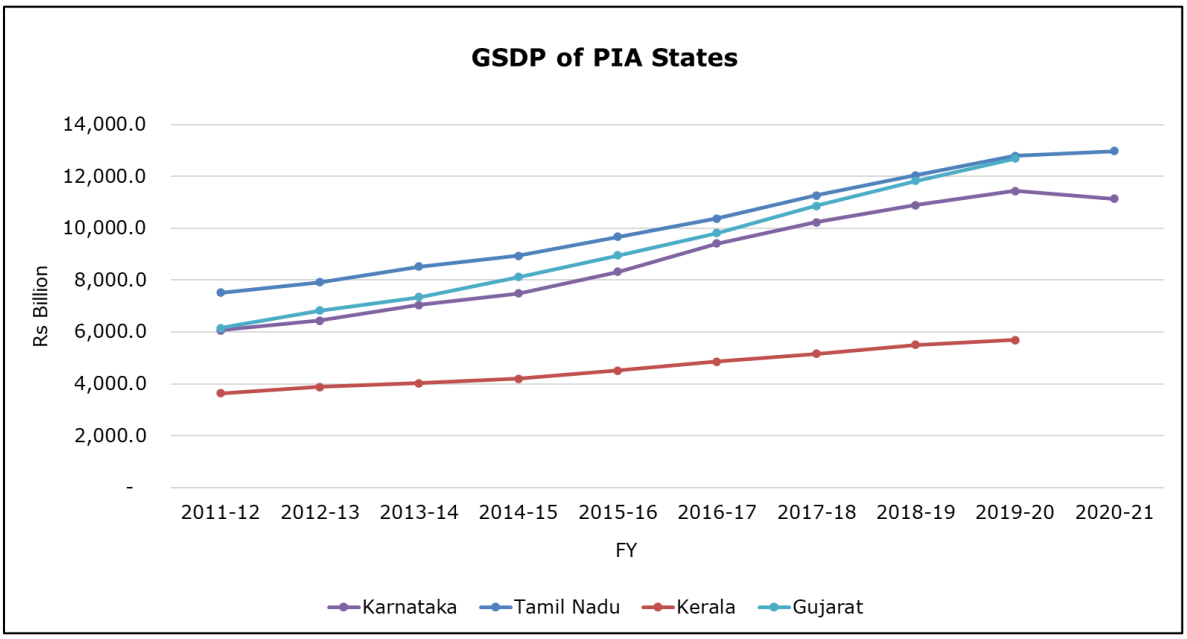


Figure 3-3: GSDP (in Rs billion) for PIA States

3.6 India and PIA Outlook

3.6.1 India's Past Performance and Outlook for Future

India's growth trend during the recent years has been presented in **Figure 3-4**.

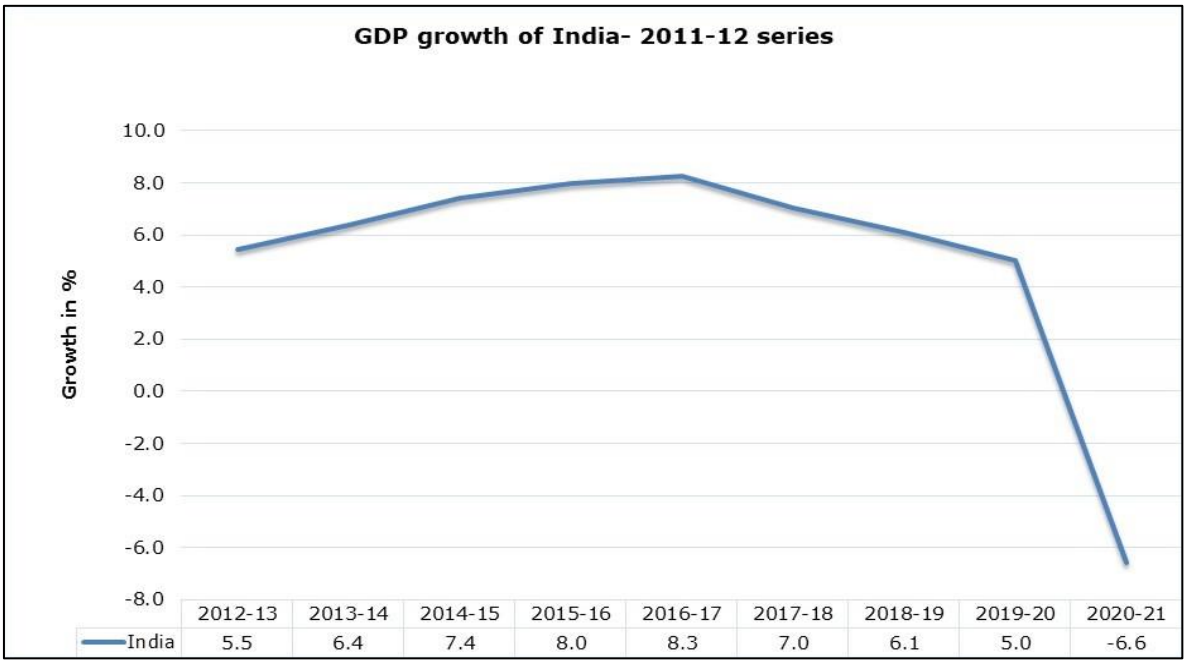


Figure 3-4: GDP Growth in India

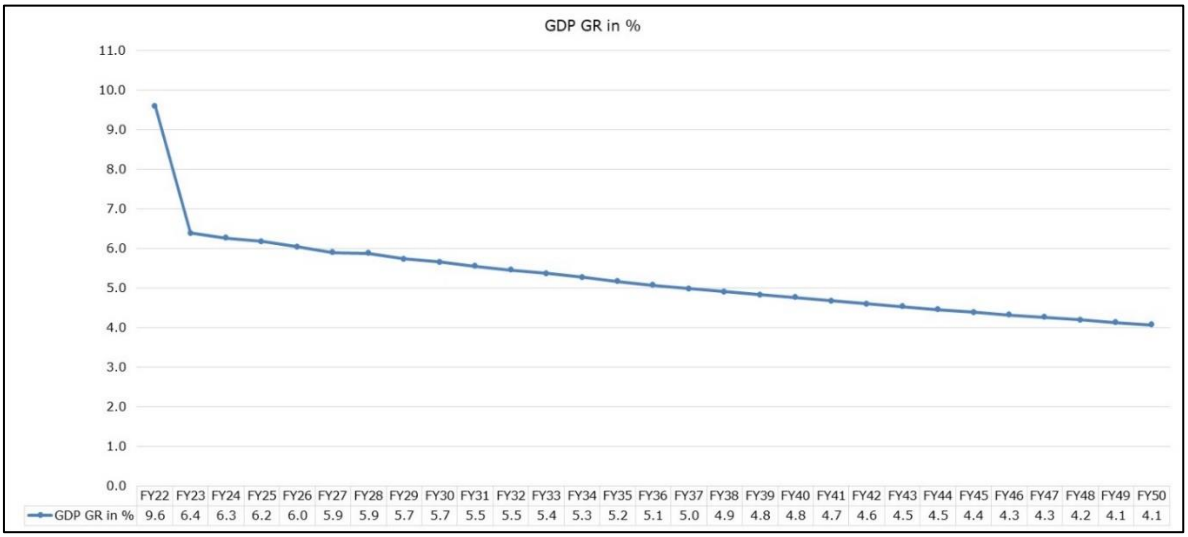
Economic growth in India has been broadly on an accelerating path till FY18. It is likely to be the fastest growing major economy in the world in the medium-term. The growth in real GDP was 8.3 percent for FY17 and 7.0 percent in FY18, while the growth in FY19 was slightly lower at 6.1 percent. The long-term trend line growth of 7.2 percent has been achieved between FY12 to FY19. During FY20, growth has slowed down due to some

structural issues and global headwinds resulting in an average GDP growth rate of 4.2 percent.

With the outbreak of COVID-19, global recession is likely to be witnessed across all the economies. The lockdown period announced by Indian government had an adverse impact on the economy. The first quarter estimated for FY21 has indicated a contraction of 23.9 percent, second quarter showed a rebound in growth by contracting 7.5 percent and third & fourth quarter grew by 0.5 percent and 1.6 percent respectively. The resultant contraction for FY21 has been around 6.6 percent.

The Indian economy is likely to see the impact of global slowdown due to COVID-19 and hence, the GDP forecast for India by various international agencies has been revised for the next two years. As per the latest update by Central Statistical Organisation (CSO), GDP in Q2 of FY22 has grown by 8.4 percent (down from 20.1 percent in Q1) and is likely to achieve a yearly growth rate of 9.5 percent (with 6.6% in Q3 and 6% in Q4). Further on, the economy is likely to grow in the range of 6.5-7.0 percent in FY23 and over 7.0 percent thereafter as per the forecast by CSO. As per Economic Survey of India for FY22, the economy is predicted to have a growth rate of 9.2 percent for FY22 and 8.0-8.5 percent in FY23. With the vaccination programme having covered the bulk of the population, economic momentum building back and the likely long-term benefits of supply-side reforms in the pipeline, the Indian economy is in a good position to witness GDP growth of 8.0-8.5 per cent in 2022-23.

The GDP forecast series provided by client as adopted in the earlier study is presented in **Figure 3-5**.



	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33	FY34	FY35	FY36	FY37	FY38	FY39	FY40	FY41	FY42	FY43	FY44	FY45	FY46	FY47	FY48	FY49	FY50
GDP GR in %	9.6	6.4	6.3	6.2	6.0	5.9	5.9	5.7	5.7	5.5	5.5	5.4	5.3	5.2	5.1	5.0	4.9	4.8	4.8	4.7	4.6	4.5	4.5	4.4	4.3	4.3	4.2	4.1	4.1

Figure 3-5 GDP Forecast of India Adopted in Earlier Study

The year-on-year growth for Indian economy as provided by the Client (based on the forecast by Consensus Economics) for the present study is presented in **Figure 3-6**.

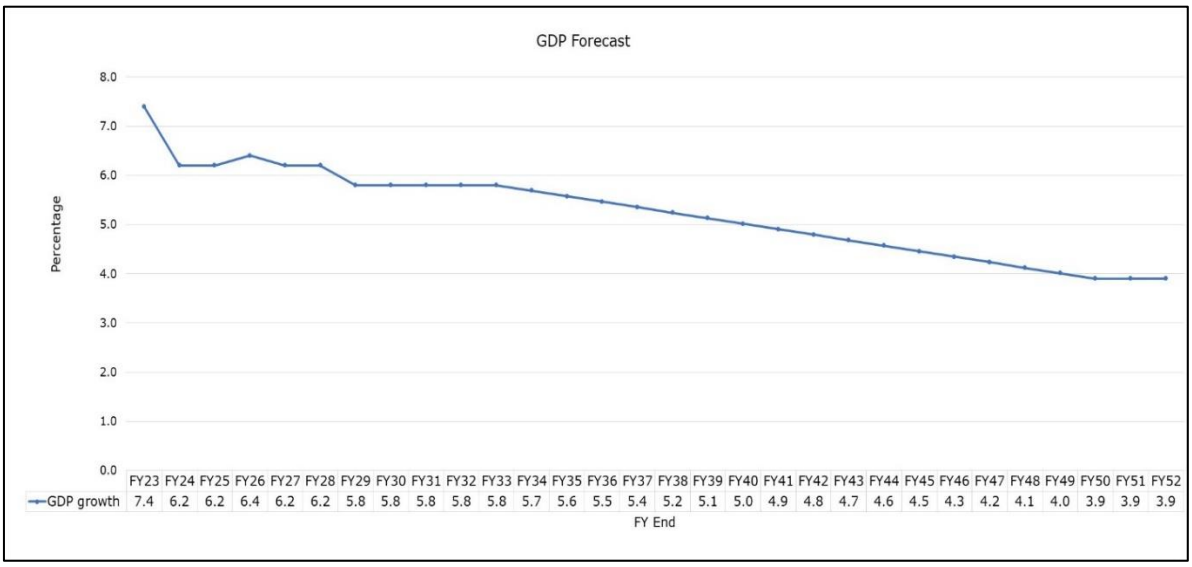


Figure 3-6: GDP Forecast of India in Present Study

3.6.2 PIA States Outlook

A snapshot of the main economic indicators in the past for the PIA states is presented in **Table 3-5**.

Indicators	Maharashtra	Karnataka	Tamil Nadu	Kerala	Gujarat
GSDP in Rs Billion	21,340.7	11,437.8	12,785.6	5,686.4	12,689.6
GSDP growth (FY12 to FY20) in %	6.8%	8.9%	7.1%	6.0%	9.6%
Per capita Income in Rs (FY20)	173,757	173,028	168,449	163,216	187,524
Sector Share in %, FY20					
Agriculture and allied	13.6	10.5	11.5	8.4	17.3
Industry	29.4	25.0	37.7	28.3	46.3
Services	57.0	64.5	50.9	63.3	36.4

Table 3-5: Main Economic Indicators of PIA States

In order to arrive at the forecast of the PIA states, past performance of the State GDPs vis-a-vis India GDP has been studied and the multipliers have been derived for both short term and long term. The past and adopted multipliers for PIA states to Indian economy are presented in **Table 3-6**.

Period	India	Maharashtra	Karnataka	Tamil Nadu	Kerala	Gujarat
Past Growth %						
FY12 to FY20	7.0	6.8	8.9	7.1	6.0	9.6
FY15 to FY20	7.0	6.8	9.0	7.5	6.4	9.5
Past Multipliers						
FY12 to FY20		1.0	1.3	1.0	0.8	1.4
FY15 to FY20		1.0	1.3	1.1	0.9	1.4
Adopted Multipliers						
States w.r.t. India		1.0	1.2	1.0	0.9	1.4

Table 3-6: Past Multipliers and Future Outlook of PIA States

Based on the normalised OD shares of the toll plaza and the outlooks adopted for PIA states, the mode-wise future weighted income is presented in **Table 3-7**.

FY/Modes	Car/MLCV	M Bus/ LCV	Bus	2A	3A	MAV
2023	7.6	7.6	7.6	7.7	7.7	7.8
2024	6.3	6.4	6.4	6.4	6.5	6.5
2025	6.3	6.4	6.4	6.4	6.5	6.5
2026	6.5	6.6	6.6	6.7	6.7	6.7
2027	6.3	6.4	6.4	6.4	6.5	6.5
2028	6.3	6.4	6.4	6.4	6.5	6.5
2029	5.9	6.0	5.9	6.0	6.1	6.1
2030	5.9	6.0	5.9	6.0	6.1	6.1
2031	5.9	6.0	5.9	6.0	6.1	6.1
2032	5.9	6.0	5.9	6.0	6.1	6.1
2033	5.9	6.0	5.9	6.0	6.1	6.1
2034	5.8	5.8	5.8	5.9	5.9	6.0
2035	5.7	5.7	5.7	5.8	5.8	5.9
2036	5.6	5.6	5.6	5.7	5.7	5.7
2037	5.5	5.5	5.5	5.6	5.6	5.6
2038	5.3	5.4	5.4	5.4	5.5	5.5
2039	5.2	5.3	5.3	5.3	5.4	5.4
2040	5.1	5.2	5.1	5.2	5.2	5.3
2041	5.0	5.0	5.0	5.1	5.1	5.2
2042	4.9	4.9	4.9	5.0	5.0	5.0
2043	4.8	4.8	4.8	4.9	4.9	4.9
2044	4.7	4.7	4.7	4.8	4.8	4.8
2045	4.6	4.6	4.6	4.6	4.7	4.7
2046	4.4	4.5	4.5	4.5	4.5	4.6
2047	4.3	4.4	4.3	4.4	4.4	4.5
2048	4.2	4.2	4.2	4.3	4.3	4.3
2049	4.1	4.1	4.1	4.2	4.2	4.2
2050	4.0	4.0	4.0	4.1	4.1	4.1
2051	4.0	4.0	4.0	4.1	4.1	4.1
2052	4.0	4.0	4.0	4.1	4.1	4.1

Table 3-7: Future Mode-Wise Weighted Income of PIA States

3.7 Review of Past Traffic Data

DPR study of the project corridor is made accessible to the consultant during secondary data collection. A comparison of DPR counts and AADT adopted for the present study is presented in the **Table 3-8**.

Vehicle Type	CJV	LCV	Buses	2A	3A	MAV	PCU
TP01 - Kognoli							
2021 (Nov 2020)	8,361	1,915	503	942	973	1,628	25,832

Vehicle Type	CJV	LCV	Buses	2A	3A	MAV	PCU
2022	9,839	1,341	915	1,252	919	1,729	28,889
Growth	17.7%	-30.0%	81.9%	32.9%	-5.5%	6.2%	11.8%
TP02 - Hattargi							
DPR ADT (Nov 2020)	8,712	2,061	723	1,266	1,025	1,663	28,347
2022	10,154	1,685	1,246	1,861	1,052	1,849	33,479
Growth	16.6%	-18.2%	72.3%	47.0%	2.6%	11.2%	18.1%

Table 3-8 DPR Count ADT vs Ramboll ADT

A growth of about 17-18 percent has been observed in the case of car traffic at TP01 and TP02 respectively. 3A trucks have shown a subdued growth during these two years of comparison. MAV trucks have shown a growth of around 6 percent at TP01 and 11 percent at TP02. PCU growth of 12 percent and 18 percent is observed at the two toll plazas.

3.8 Past and Future Transport Demand Elasticity

The econometric model applied for the project, relates traffic growth to changes in state domestic product via an elasticity factor according to IRC guidelines.

The projected elasticities by Steer in the earlier study are presented in **Table 3-9**.

Modes	Growth Driver	For Kognoli TP & Hattargi TP
Car	Karnataka and Maharashtra GSDP	0.8 ramping up to 1.0 by FY27
LCV/ Mini-Bus		0.4
Bus		0.3
2A		0.3
3A	GDP	0.5
MAV		0.8

Table 3-9: Recommended Elasticity in Earlier Study

A regression between GSDP (as independent variable) and registered vehicles (as dependant variable) of Maharashtra and Karnataka was carried out. The registered vehicle elasticity in case of cars is 1.27 during FY12 to FY19 for the state of Maharashtra and 1.11 for Karnataka. In case of all trucks combined, the registered vehicle elasticity is 0.9 during the same period for both the states.

Vehicle registration data is also used as a proxy wherein operational toll data is not available. Vehicle registration data represents all vehicles registered in the state, but does not indicate actual number of vehicles plying on the road as it does not account for factors such vehicles taken off the road due to lack road worthiness, those registered in a state but mostly used elsewhere, etc. Consequently, the elasticity values based on vehicle registration may not be representative of the traffic growth trends on the project road. Past elasticity and growth trends on the nearby national highways have been the basis of growth for the project road.

The derived elasticities on other National Highways across India have also formed the basis for choosing the recommended elasticities on PR. The elasticities derived using the operational toll data regressed with the applicable state incomes (mode wise weighted shares) for the respective projects on some of the National Highways is presented in **Table 3-10**.

NH	Period	Car	2A	3A/MAV
NH-21	FY12-FY20	1.23	-0.42	0.54
SH-25	FY15-FY20	1.28	0.26	0.47
SH-17 & SH-7	FY13-FY20	1.26	0.51	0.33
NH-19	FY15-FY20	0.78	1.36	1.40
NH-1	FY12-FY20	1.02	0.74	
NH-6	FY14-FY20	1.11	1.68	0.42
NH-8A	FY16-FY20	0.73	0.28	0.94
NH-4	FY15-FY20	0.87	0.18	0.84
NH-6	FY16 to FY19	1.25	1.28	0.78

Table 3-10: Past Elasticity on Other National Highways

The past elasticity values have been observed in the range of 1-1.3 for cars on various National Highways and around 0.5-0.9 for 3A/MAV combined. Individually, 3A trucks have shown a negative elasticity in some of the assets with MAVs showing a higher positive elasticity.

Cars

- The elasticities and the past growth levels for cars are a result of increasing income levels, increasing vehicle ownership, and higher propensity to travel on highways in India due to network level developments and higher levels of service. These levels of growth are likely to continue in the near to medium term since car ownership levels are still very low and the road network is undergoing continual development.
- In case of cars, the elasticity values derived across the toll roads in the region is between 1.0 to 1.3. Car elasticity has been considered as 1.1 for the period up to FY25 and tapered thereafter.
- The motorisation levels in India also play an important role in determining car growth. With the increasing car ownership levels, propensity to travel and network level improvements on National Highways, car growth is likely to be at a high rate as witnessed in the recent past. The low motorization rate suggests that there is room for continued growth for many years to come. The motorisation rate for cars (per 1000 population) in India has gone up from 6.6 in 2001 to 20 in 2015. Although India's car fleet has been growing at 10% for nearly 25 years, its motorization rate is low compared to other countries of similar wealth and much lower than developed countries with motorization rate of around 450. The forecasts by different agencies indicate that number of cars will increase to 35 per thousand populations by 2025. With the continual increase in motorization rate and improved road network usage by cars for inter-urban travel, car growth is expected to be robust.

Bus

- Over the years in India, there has been a change in passenger's travel mode preferences with increasingly more people shifting from public transport systems towards personalised modes. This has resulted, in general, in elasticity of bus traffic/demand to GSDP lower than unity ranging between 0.3 to 0.8 across the operational National Highways.
- Bus elasticity has been recommended as 0.5 till the end of the concession period.

Trucks

- The switch between MLCV and LCV is being observed across other national highways wherein MLCVs (mostly charged in car category) have been gaining importance lately over LCV category. For LCVs, an elasticity of 0.4 has been adopted for the entire concession period.
- For 2A Trucks, elasticity has been recommended as 0.3 till the end of concession period.
- For the project road, an elasticity of 0.4 has been adopted for 3A trucks till the end of the concession period. In case of MAV trucks, an elasticity of 0.9 has been adopted till FY25, tapered to 0.7 beyond FY30.

It is likely that this growth would slow down over time as the market becomes more mature and saturated, therefore elasticity to GSDP can be expected to decline over time. With the anticipated growth momentum in the coming years, higher elasticity values have been considered in the initial slabs and further tapering has been done in the future.

In India as a whole, the freight vehicle mix has been changing in the last decade favouring MAV to 2 Axle/ 3Axle vehicles for long-distance traffic, given the operational efficiencies achievable with larger vehicles. Considering the ongoing technical advancements in automobile industry, some of the standard 2 Axle/ 3 Axle trucks would gradually be replaced by MAVs. Mature national highways with tolling in operation for few years, have already witnessed the shift in 2A/3A trucks to MAV for long distance movement.

On an overall level, due consideration has been given to the tonnage shifts happening in the market with Mini LCV gaining importance for short distance movements over LCVs and MAVs being preferred over 2A/3A for long distance movements due to better operational efficiencies. Some of the 2A/3A trucks are also being used for local movements.

While assigning elasticities to different modes, freight travel pattern and over all elasticity of cargo tonnage with respect to weighted GSDP has been an important consideration. The recommended elasticity values adopted for all vehicle types in line with the traffic growth being observed on other national highways and changes in freight traffic pattern observed on the project road are presented in **Table 3-11**.

Period/ Modes	Car/ MLCV	M Bus/ LCV	Bus	2A	3A	MAV
TP01 & TP02						
2023-2025	1.1	0.4	0.5	0.3	0.4	0.9
2026-2030	1.0	0.4	0.5	0.3	0.4	0.8
2031-2035	1.0	0.4	0.5	0.3	0.4	0.7
2036-2040	0.9	0.4	0.5	0.3	0.4	0.7
Beyond 2040	0.9	0.4	0.5	0.3	0.4	0.7

Table 3-11: Recommended Elasticity for Project Road

It has been assumed that transport demand elasticity, for both freight and passenger traffic, would gradually decline over time, despite growth in per capita income, as regions becomes more mature, self-sufficient and with alternative mode of transport available to users. In the future growth forecast, the gradation in elasticity of freight over the years takes into account to cover the impact of network level changes in both rail and road networks apart from economic changes.

3.9 Projected Traffic Growth Rates

The estimated traffic growth rates for the project road in the earlier study conducted by Steer have been presented in **Table 3-13**.

FY/ Modes	Car/ MLCV	M Bus/ LCV	Bus	2A	3A	MAV	Car/ MLCV	M Bus/ LCV	Bus	2A	3A	MAV
	TP01-Kognoli						TP02-Hattargi					
2023	5.6	2.8	2.1	2.1	3.2	5.1	5.5	2.8	2.1	2.1	3.2	5.1
2024	5.7	2.7	2.0	2.0	3.1	5.0	5.6	2.7	2.0	2.0	3.1	5.0
2025	5.8	2.6	2.0	2.0	3.1	4.9	5.7	2.6	2.0	2.0	3.1	4.9
2026	5.9	2.6	1.9	1.9	3.0	4.8	5.8	2.5	1.9	1.9	3.0	4.8
2027	5.9	2.5	1.9	1.9	2.9	4.7	5.8	2.5	1.9	1.9	2.9	4.7
2028	5.8	2.4	1.8	1.8	2.9	4.7	5.7	2.4	1.8	1.8	2.9	4.7
2029	5.6	2.3	1.8	1.8	2.9	4.6	5.5	2.3	1.8	1.8	2.9	4.6
2030	5.5	2.3	1.7	1.7	2.8	4.5	5.5	2.3	1.7	1.7	2.8	4.5
2031	5.4	2.3	1.7	1.7	2.8	4.4	5.4	2.2	1.7	1.7	2.8	4.4
2032	5.3	2.2	1.7	1.7	2.7	4.4	5.3	2.2	1.7	1.7	2.7	4.4
2033	5.2	2.2	1.6	1.6	2.7	4.3	5.2	2.2	1.6	1.6	2.7	4.3
2034	5.1	2.1	1.6	1.6	2.6	4.2	5.1	2.1	1.6	1.6	2.6	4.2
2035	5.0	2.1	1.6	1.6	2.6	4.1	4.9	2.1	1.6	1.6	2.6	4.1
2036	4.9	2.0	1.5	1.5	2.5	4.1	4.8	2.0	1.5	1.5	2.5	4.1
2037	4.8	2.0	1.5	1.5	2.5	4.0	4.7	2.0	1.5	1.5	2.5	4.0
2038	4.7	1.9	1.5	1.5	2.5	3.9	4.7	1.9	1.5	1.5	2.5	3.9
2039	4.6	1.9	1.4	1.4	2.4	3.9	4.6	1.9	1.4	1.4	2.4	3.9
2040	4.6	1.9	1.4	1.4	2.4	3.8	4.5	1.9	1.4	1.4	2.4	3.8
2041	4.5	1.8	1.4	1.4	2.3	3.7	4.4	1.8	1.4	1.4	2.3	3.7
2042	4.4	1.8	1.4	1.4	2.3	3.7	4.4	1.8	1.4	1.4	2.3	3.7
2043	4.3	1.8	1.3	1.3	2.3	3.6	4.3	1.8	1.3	1.3	2.3	3.6
2044	4.3	1.8	1.3	1.3	2.2	3.6	4.2	1.7	1.3	1.3	2.2	3.6
2045	4.2	1.7	1.3	1.3	2.2	3.5	4.2	1.7	1.3	1.3	2.2	3.5
2046	4.2	1.7	1.3	1.3	2.2	3.5	4.1	1.7	1.3	1.3	2.2	3.5
2047	4.1	1.7	1.3	1.3	2.1	3.4	4.1	1.7	1.3	1.3	2.1	3.4
2048	4.0	1.7	1.2	1.2	2.1	3.4	4.0	1.6	1.2	1.2	2.1	3.4
2049	4.0	1.6	1.2	1.2	2.1	3.3	3.9	1.6	1.2	1.2	2.1	3.3
2050	3.9	1.6	1.2	1.2	2.0	3.3	3.9	1.6	1.2	1.2	2.0	3.3

Table 3-12: Projected Traffic Growth Rates for Project Road in Earlier Study (%)

Under the present study, based on the moderated perspective elasticity values and the projected growth rates of the income for PIA states, the future average annual compound traffic growth rates by vehicle type have been estimated for the project road by using the following relationship:

Tgr = (GSDPgr) x E; where,

Tgr – Traffic growth rate for mode

GSDPgr – Growth rate of GSDP

E – Elasticity value for mode

Using the year-on-year mode wise weighted income for PIA and elasticity for different time periods, traffic growth rates have been estimated for each year till FY52. The estimated traffic growth rates for the project road have been presented in **Table 3-13**.

FY/Modes	Car/MLCV	M Bus/ LCV	Bus	2A	3A	MAV
TP01 & TP02						
2023	8.3	3.0	3.8	2.3	3.1	7.0
2024	7.0	2.5	3.2	1.9	2.6	5.9
2025	7.0	2.5	3.2	1.9	2.6	5.9
2026	6.5	2.6	3.3	2.0	2.7	5.4
2027	6.3	2.5	3.2	1.9	2.6	5.2
2028	6.3	2.5	3.2	1.9	2.6	5.2
2029	5.9	2.4	3.0	1.8	2.4	4.9
2030	5.9	2.4	3.0	1.8	2.4	4.9
2031	5.9	2.4	3.0	1.8	2.4	4.3
2032	5.9	2.4	3.0	1.8	2.4	4.3
2033	5.9	2.4	3.0	1.8	2.4	4.3
2034	5.8	2.3	2.9	1.8	2.4	4.2
2035	5.7	2.3	2.9	1.7	2.3	4.1
2036	5.0	2.2	2.8	1.7	2.3	4.0
2037	4.9	2.2	2.7	1.7	2.2	3.9
2038	4.8	2.2	2.7	1.6	2.2	3.9
2039	4.7	2.1	2.6	1.6	2.1	3.8
2040	4.6	2.1	2.6	1.6	2.1	3.7
2041	4.5	2.0	2.5	1.5	2.0	3.6
2042	4.4	2.0	2.5	1.5	2.0	3.5
2043	4.3	1.9	2.4	1.5	2.0	3.4
2044	4.2	1.9	2.3	1.4	1.9	3.4
2045	4.1	1.8	2.3	1.4	1.9	3.3
2046	4.0	1.8	2.2	1.4	1.8	3.2
2047	3.9	1.7	2.2	1.3	1.8	3.1
2048	3.8	1.7	2.1	1.3	1.7	3.0
2049	3.7	1.6	2.1	1.3	1.7	3.0
2050	3.6	1.6	2.0	1.2	1.6	2.9
2051	3.6	1.6	2.0	1.2	1.6	2.9
2052	3.6	1.6	2.0	1.2	1.6	2.9

Table 3-13: Projected Traffic Growth Rates for Project Road (%)

In derivation of above growth rates, the likely shift of buses to cars in case of passenger vehicles and the replacement/ tonnage shift of 2A/3A trucks to MAV for long distance in case of freight vehicles has been duly considered.

The implied traffic growth rates for freight vehicles of 2A/3A and MAV after considering the impact of diversion to Pune-Bangalore Expressway in FY30 to FY32 under the base case have been presented in **Table 3-14**.

FY/Modes	TP01			TP02		
	2A	3A	MAV	2A	3A	MAV
2030	-14.1	-13.6	-10.0	-10.1	-12.1	-10.7
2031	-7.6	-7.1	-4.4	-4.9	-6.1	-4.9
2032	-8.6	-8.1	-5.1	-5.4	-6.8	-5.7

Table 3-14: Implied Traffic Growth Rates for Project Road After Diversion to Pune-Bangalore Expressway (%)

The above growth rates relate to the most likely Base Case. In addition, two sets of traffic growth rates under low and high cases have also been considered and impact on toll revenue evaluated for both these cases. Based on the risk analysis of key parameters like economic growth and elasticity of travel demand impacting traffic growth, two additional growth scenarios have been presented. Low growth scenario considers a 20 percent reduction in growth rates relating to about 10 percent decline each in elasticity and economic growth. The High growth scenario considers a 20 percent increase in growth rates signifying about 10 percent increase each in elasticity and economic parameters.

3.10 Traffic Projections and Capacity Analysis

Table 3-15 presents the projections of the total vehicles based on the most likely growth rates till FY52 as assessed in this study.

FY	Traffic Before Diversion			Traffic After Diversion		
	TP01-Kognoli	TP02-Hattargi	Average	TP01-Kognoli	TP02-Hattargi	Average
2022	28,889	33,511	31,200	28,889	33,511	31,200
2023	30,588	35,384	32,986	30,588	35,384	32,986
2024	32,110	37,058	34,584	32,110	37,058	34,584
2025	33,719	38,826	36,272	33,719	38,826	36,272
2026	35,334	40,604	37,969	35,334	40,604	37,969
2027	36,983	42,418	39,700	36,983	42,418	39,700
2028	38,719	44,325	41,522	38,719	44,325	41,522
2029	40,429	46,200	43,315	40,429	46,200	43,315
2030	42,224	48,167	45,195	39,314	44,945	42,130
2031	44,035	50,151	47,093	39,524	45,155	42,340
2032	45,934	52,228	49,081	39,716	45,342	42,529
2033	47,925	54,403	51,164	41,497	47,284	44,390
2034	49,972	56,638	53,305	43,331	49,280	46,306
2035	52,076	58,931	55,503	45,217	51,332	48,275
2036	54,112	61,155	57,633	47,033	53,311	50,172
2037	56,191	63,425	59,808	48,889	55,332	52,111
2038	58,313	65,739	62,026	50,784	57,394	54,089
2039	60,474	68,094	64,284	52,717	59,494	56,105
2040	62,674	70,490	66,582	54,685	61,631	58,158
2041	64,910	72,922	68,916	56,687	63,803	60,245
2042	67,180	75,390	71,285	58,720	66,008	62,364
2043	69,480	77,889	73,685	60,783	68,242	64,513
2044	71,809	80,418	76,114	62,873	70,505	66,689
2045	74,164	82,973	78,568	64,988	72,791	68,889

FY	Traffic Before Diversion			Traffic After Diversion		
	TP01-Kognoli	TP02-Hattargi	Average	TP01-Kognoli	TP02-Hattargi	Average
2046	76,541	85,550	81,045	67,123	75,100	71,112
2047	78,937	88,146	83,541	69,278	77,427	73,352
2048	81,348	90,758	86,053	71,447	79,769	75,608
2049	83,772	93,381	88,576	73,629	82,122	77,876
2050	86,204	96,011	91,107	75,820	84,483	80,152
2051	88,711	98,722	93,717	78,080	86,918	82,499
2052	91,297	101,516	96,407	80,412	89,430	84,921

Table 3-15: Projected Traffic in PCUs on the Project Road

The project road is being upgraded to a six-lane section starting FY23 as part of six laning of Golden Quadilateral. The projected traffic for the project road is not reaching the designed capacity of 1,20,000 PCUs till FY52.

4. TOLL REVENUE PROJECTIONS

4.1 Tolling Strategy

The project road has an "Open System" of toll collection which enables the concessionaire to collect tolls from through traffic as well as from short distance one.

As mentioned earlier, there are two operational toll plazas on the project road - TP01- Kognoli and TP02- Hattargi with an effective tolling length of 60.730 km and 23.74 km respectively being charged. Post completion of six laning, the revised effective tolling lengths would be 79.39 km and 41.83 km at the two respective toll plazas.

4.2 Schedule of User Fee

As per Schedule of User Fee for the project, the per km toll rates applicable from 2007-08 for normal tolling length, bypasses and permanent structures, the revision basis and concessions are provided.

The concessions to traffic have been given in the form of rates as below:

Local traffic

Car / Jeep / Vans - includes local users owning a vehicle registered for non-commercial purposes, residing within a distance of 20 km from the toll plaza and crossing the same for commuting purposes.

Commercial vehicles - includes local users owning a commercial vehicle (excluding vehicles under National Permit), registered with address on the Registration Certificate of a particular district and uses such vehicle for commuting on a section of National Highway, permanent bridge, tunnel or bypass, as the case may be, which is located within that district, shall be levied user fee on all toll plazas which are located within that district at the rate of fifty per cent of the prescribed rate of fee (single journey rate). No such concession shall be provided, if a service road or alternative road is available for use by such commercial vehicles. Thus, local commercial traffic has to pay only 50 percent of the normal ticket.

Daily Pass

When the vehicle has to cross the tolled section more than once in a day, the user shall have the option to pay one and half times (1.5 times) of the fee for a single entry; this pass shall be valid for 2 entries within 24 hours of purchase.

Monthly Pass

A user, who makes use of the project road frequently during a month, may opt to purchase a monthly pass upon payment of a charge equal to two-thirds of the fee payable for 50 single journeys; this pass can be used for a maximum 50 one-way journeys over the month of validity.

Thus, the different categories of toll tickets are as follows:

(i) Traffic paying normal toll rates (single trip)
(ii) Traffic paying return journey rates
(iii) Traffic paying monthly pass rates
(iv) Traffic paying local personal rates
(v) Traffic paying local commercial rates

4.3 Tolling Streams

The tolling segmentation considered in the earlier study adopted by Steer is presented in **Table 4-1** and **Table 4-2**.

Category/ Modes	Car FY22	LCV		Bus/ 2A Truck		3 A Truck		4-6 A Truck		OSV	
		FY22	FY23 Onwards	FY22	FY23 Onwards	FY22	FY23 Onwards	FY22	FY23 Onwards	FY22	FY23 Onwards
Single	71.2	74.6	78.3	81.5	83.9	96.1	96.9	96.9	98.3	99.4	99.9
Return	21.8	15.7	16.5	6.1	6.3	2.6	2.6	1.5	1.5	0.1	0.1
Monthly	0.0	0.0		0.0		0.0		0.0		0.0	
Local personal	0.0	0.0		0.0		0.0		0.0		0.0	
Local commercial	0.0	3.2	3.4	8.1	8.4	0.1	0.1	0.0	0.0	0.0	
Exempt	7.0	6.4	1.8	4.2	1.4	1.2	0.3	1.6	0.1	0.5	
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Table 4-1 Tolling Distribution in Earlier Study- Kognoli Toll Plaza (%)

Ticket Type/ Modes	Car	LCV	Bus/ 2A Truck	3 A Truck	4-6 A Truck	OSV
TP02 - Hattargi						
Single	62.4	63.3	73.3	86.9	90.7	92.4
Return	31.4	19.1	11.2	7.1	4.3	5.4
Monthly	0.3	0.0	0.0	0.0	0.0	0.0
Local personal	0.0	0.0	0.0	0.0	0.0	0.0
Local commercial	0.8	13.1	14.6	5.4	5.0	0.0
Exempt	5.0	4.5	0.9	0.6	0.1	2.3
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Table 4-2: Tolling Distribution in Earlier Study- Hattargi Toll Plaza (%)

In case of Kognoli toll plaza, a reduction in exemption percentage for all the categories except Cars has been considered over FY22 and FY23.

The tolling stream distribution under the present study has been derived from the toll data taking an average of ticket wise traffic from July 2021 to April 2022 and the same is presented in **Table 4-3**.

Ticket Type/ Modes	Car	LCV	Bus/ 2A Truck	3 A Truck	4-6 A Truck	OSV
TP01 - Kognoli						
Single	50.7	57.8	74.7	89.6	91.3	98.1
Return	38.2	29.7	21.7	10.0	8.4	0.5
Monthly	0.0	0.0	0.0	0.0	0.0	0.0
Local personal	2.5	0.0	0.0	0.0	0.0	0.0
Local commercial	0.0	0.0	2.8	0.0	0.0	0.0
Exempt	8.5	12.6	0.9	0.3	0.3	1.4
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
TP01 - Hattargi						
Single	40.4	57.0	56.3	84.5	88.2	93.3
Return	50.0	35.9	29.3	14.6	11.2	0.8
Monthly	0.0	0.0	0.1	0.0	0.0	0.0
Local personal	0.7	0.0	0.0	0.0	0.0	0.0
Local commercial	0.3	1.4	13.5	0.4	0.1	0.0
Exempt	8.6	5.7	0.7	0.5	0.5	5.9
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Table 4-3: Tolling Distribution from Toll Data of July 2021 to April 2022 (%)

The actual segmentation observed during July 2021 to April 2022 indicates a lower percentage of single ticket paying traffic in almost all the modes with return ticket traffic being higher. The level of exemptions witnessed (adopted in the present study) in Cars and LCV category are on the higher side while it is in the similar range in case of other higher axle trucks.

In case of cars, the normal toll paying traffic is likely to be about 50.7 percent and 40.4 percent at TP01 and TP02 respectively. Daily Pass traffic has a share of 38.2 percent at TP01 whereas on TP02 it is 50.0 percent in case of cars. In case of LCV around 57.8 and 57 percent of the traffic at the two toll plazas is paying for single ticket. In case of 3A/MAV, around 85-91 percent of the truck traffic is opting for normal ticket at both the toll plazas due to their long lead of travel and around 8-15 percent each of 3A trucks and MAV falling under return pass category at both the toll plazas.

Trip rate for local pass users is considered as 1.0, for monthly pass it is 1.67 across all modes. For daily pass, trip rate of 2.0 has been considered for all the modes.

4.4 Toll Rates

This section presents details on the toll rates that are likely to be imposed on the users of the project road during the study period. The toll rates (Rs/km) for the base year 2007-08 for different vehicle categories as per toll fee rules are presented in **Table 4-4**.

Mode	Base rate per km (in Rs)
Car, Jeep, Van, LMV	0.65
LCV /M Bus	1.05
Bus/ 2 Axle Truck	2.20
3 Axle	2.40
MAV	3.45
Oversized	4.20

Table 4-4: Toll Rates in Rs/km for Different Vehicle Categories

The toll notification states that the 2007 toll rates shall be increased without compounding by three per cent each year with effect from the 1st day of April 2008 and such increased rate shall be deemed to be the base rate for the subsequent years.

In addition to this, the rate of fee for use of bypass forming part of a section of a National Highway constructed with a cost of Rs 10 crore or more, for the base year 2007, shall be one and a half times of the per km base rates specified above and the length of such bypass shall be excluded from the length of such section of National Highway. Also, the fee levied and collected hereunder for permanent bridge/ structures, as the case may be, having a length of 60 m or more on the basis of the equivalent length for structure as specified shall be due and payable at the toll plaza.

In case of the project road, the details of normal tolling lengths, bypass length (at 1.5 times) and equivalent structure lengths being charged at toll plazas are presented in **Table 4-5** along with the length which will be charged post augmentation to six lane configurations.

Toll Plazas	TP01	TP02
Existing Tolling Length till FY24	60.73	23.74
Tolling Length post six laning from FY25	79.39	41.83

Table 4-5: Tolling Lengths (in km) for Kagal-Belgaum

The applicable base rates shall be revised annually with effect from April 1 each year to reflect the increase in wholesale price index for the month of December of the immediate preceding year in which such revision is undertaken but such revision shall be restricted for 40 per cent of the increase in wholesale price index.

A WPI growth forecast of 3.5 percent was considered in the earlier study during the tenure of study period.

For the present study, actual WPI information for December 2021 of 143.3 under 2011-12 series converted into 1999-00 series (143.3*1.873*1.641=440.446) has been used. The forecast of WPI applicable for FY24 has been considered as 5.5 percent (as per the forecast by RBI for Q3 FY23) and in light of the past growth trend since 2009, 3.5 percent for future years beyond FY24 has been adopted for the period till FY52.

As per the applicable tolling notifications for six laning, during construction period, the toll rates will be charged at 75 percent of the applicable tolling length during construction and kept constant till full COD is achieved. The construction period for six laning for this project is from FY23 to FY24 during which the toll rates will be 75 percent of the applicable toll rates of FY23 and will be constant for FY24. Also, for FY25, the toll rates are capped at 25 percent higher than the toll rates in FY24.

The stream of toll rates to be charged at two toll plazas of the project road till FY52 is presented in **Table 4-6.** The toll fee has been rounded to nearest 5 Rupees as per toll fee rules.

FY End	Car	LCV/ M Bus	Bus/ 2A Truck	3-axle Truck	MAV	O/size/HME	Car Local
TP01							
2022	75	120	255	275	400	485	285
2023*	60	100	210	230	330	400	315
2024*	60	100	210	230	330	400	315
2025	100	165	345	375	540	655	345
2026	125	200	420	455	655	800	360
2027	130	210	435	475	685	830	375
2028	135	215	455	495	710	865	390
2029	140	225	470	515	740	900	405
2030	145	235	490	535	770	940	420
2031	150	245	510	560	800	975	440
2032	155	255	535	580	835	1015	455
2033	165	265	555	605	870	1060	475
2034	170	275	575	630	905	1100	495
2035	175	285	600	655	940	1145	515
2036	185	300	625	680	980	1195	535
2037	190	310	650	710	1020	1,245	560
2038	200	325	680	740	1065	1,295	580
2039	210	335	705	770	1105	1,345	605
2040	215	350	735	800	1150	1,400	630
2041	225	365	765	835	1200	1,460	655
2042	235	380	795	870	1245	1,520	685
2043	245	395	830	905	1300	1,580	710
2044	255	410	860	940	1350	1,645	740
2045	265	430	895	980	1405	1,715	770
2046	275	445	935	1020	1,465	1,785	800
2047	285	465	970	1060	1,525	1,855	835
2048	300	485	1,010	1,105	1,585	1,930	870
2049	310	505	1,055	1,150	1,650	2,010	905
2050	325	525	1,095	1,195	1,720	2,095	940
2051	335	545	1,140	1,245	1,790	2,180	980
2052	350	565	1,190	1,295	1,865	2,270	1,020
TP02							
2022	20	35	75	80	115	140	285
2023*	25	40	80	90	130	155	315
2024*	25	40	80	90	130	155	315
2025	55	85	180	195	285	345	345
2026	65	105	220	240	345	420	360
2027	70	110	230	250	360	440	375
2028	70	115	240	260	375	455	390
2029	75	120	250	270	390	475	405
2030	75	125	260	280	405	495	420
2031	80	130	270	295	425	515	440
2032	85	135	280	305	440	535	455
2033	85	140	290	320	460	560	475
2034	90	145	305	330	475	580	495
2035	95	150	315	345	495	605	515
2036	95	155	330	360	515	630	535

FY End	Car	LCV/ M Bus	Bus/ 2A Truck	3-axle Truck	MAV	O/size/HME	Car Local
2037	100	165	345	375	540	655	560
2038	105	170	355	390	560	680	580
2039	110	175	370	405	585	710	605
2040	115	185	385	420	605	740	630
2041	120	190	405	440	630	770	655
2042	125	200	420	455	655	800	685
2043	130	210	435	475	685	835	710
2044	135	215	455	495	710	865	740
2045	140	225	475	515	740	900	770
2046	145	235	490	535	770	940	800
2047	150	245	510	560	805	980	835
2048	160	255	535	580	835	1,020	870
2049	165	265	555	605	870	1,060	905
2050	170	275	580	630	905	1,105	940
2051	180	285	600	655	945	1,150	980
2052	185	300	625	685	980	1,195	1,020

*Toll rates at 75% during six laning

Table 4-6: Toll Rates at Toll Plaza (in Rs)

The users purchasing return journey tickets will pay 1.5 times the above toll rates; the traffic opting for monthly passes will pay 33.3 times (two-thirds of 50 single journeys) the normal traffic toll rates. All passes have been rounded to the nearest 5 Rupees as per fee rules.

4.5 Toll Revenue Estimates

The toll revenue estimates of the earlier study are presented in **Table 4-7.**

FY End	Toll Revenue in Rs Million
2023	960.7
2024	1,000.6
2025	1,924.0
2026	2,403.3
2027	2,612.8
2028	2,821.2
2029	3,048.1
2030	3,281.0
2031	3,554.2
2032	3,834.3
2033	4,128.2
2034	4,460.7
2035	4,805.1
2036	5,193.8
2037	5,568.0
2038	5,990.6
2039	6,435.9
2040	6,965.8
2041	7,450.4
2042	8,023.2
2043	8,629.4

FY End	Toll Revenue in Rs Million
2044	9,225.4
2045	9,870.0
2046	10,610.8
2047	11,402.5
2048	12,275.0
2049	13,148.8
2050	14,051.6
2051	15,045.6
PV12 FY23 till 2051	28,785.7

Table 4-7 Toll Revenue in Earlier Study

The projections of revenue under the present study for the project road have been presented till 15th December of FY52. Toll revenue streams have been calculated assuming that toll would be collected for all 365 days in a year and for 366 days in a leap year. The toll revenue by mode for the project road for the base case is presented in **Table 4-8**.

Toll Revenue in Rs Million								
FY End	Car	LCV	Bus	2-axle Truck	3-axle Truck	MAV	O/size/ HME	Total
2023	266.1	61.8	99.7	138.5	111.3	307.6	1.2	986.3
2024	285.4	63.5	103.2	141.6	114.5	326.6	1.2	1,036.0
2025	549.2	118.1	194.4	265.2	210.3	620.5	2.4	1,960.1
2026	721.3	148.2	244.8	329.8	263.4	793.1	3.1	2,503.7
2027	799.9	158.6	262.9	350.0	281.8	871.7	3.4	2,728.4
2028	878.7	168.8	284.0	373.5	301.9	954.8	3.7	2,965.3
2029	972.6	180.5	302.7	393.6	320.6	1,040.2	4.0	3,214.2
2030	1,064.9	192.0	324.4	358.8	289.6	970.6	4.4	3,204.6
2031	1,171.8	205.1	347.3	349.0	283.2	966.0	4.8	3,327.1
2032	1,297.5	218.6	374.3	338.9	271.8	954.2	5.2	3,460.6
2033	1,429.9	232.1	399.0	357.2	290.2	1,034.7	5.7	3,748.8
2034	1,572.2	247.2	427.4	378.5	308.4	1,118.9	6.1	4,058.7
2035	1,724.4	261.5	457.6	400.8	328.7	1,211.3	6.6	4,390.9
2036	1,885.8	280.2	492.2	426.5	350.7	1,316.1	7.2	4,758.6
2037	2,050.6	297.8	524.9	450.1	372.8	1,423.2	7.8	5,127.2
2038	2,257.1	316.9	560.9	475.8	396.8	1,539.8	8.4	5,555.8
2039	2,473.0	334.3	598.0	502.3	421.5	1,662.0	9.1	6,000.3
2040	2,673.6	358.0	640.9	533.0	448.1	1,794.6	9.8	6,458.2
2041	2,920.0	378.5	683.8	563.4	476.4	1,933.1	10.6	6,965.8
2042	3,163.2	403.0	728.5	594.5	504.9	2,078.5	11.4	7,484.0
2043	3,444.6	428.2	776.4	627.6	536.3	2,245.6	12.3	8,071.0
2044	3,735.4	452.6	828.1	663.6	570.0	2,416.2	13.2	8,679.1
2045	4,047.5	481.0	880.1	699.2	603.2	2,591.1	14.2	9,316.2
2046	4,373.2	508.5	936.1	737.0	638.7	2,785.8	15.3	9,994.6
2047	4,696.3	539.5	994.0	776.2	677.3	2,994.7	16.4	10,694.4
2048	5,143.2	573.3	1,061.6	822.4	718.3	3,214.2	17.6	11,550.6
2049	5,501.5	604.7	1,126.2	865.5	758.8	3,436.3	18.8	12,311.9
2050	5,941.1	639.4	1,194.7	911.2	802.0	3,682.1	20.2	13,190.5
2051	6,398.3	673.9	1,266.3	958.2	848.5	3,946.1	21.6	14,112.9

Toll Revenue in Rs Million								
FY End	Car	LCV	Bus	2-axle Truck	3-axle Truck	MAV	O/size/ HME	Total
2052*	4,915.7	508.3	958.7	719.9	639.4	3,004.8	16.4	10,763.2

* Till 15th December FY52

Table 4-8: Toll Revenue for the Project Road by Mode

Majority of the revenue is expected to come from cars with about 41.5 percent of the total revenue. About 48.9 percent of the total revenue is likely to be generated by freight vehicles. MAVs/OSVs represent a share of around 28.2 percent of total revenue followed by 7.0 percent and 8.2 percent by 2 axle trucks and 3 axle trucks. LCV category and Bus category is likely to generate about 5.3 percent and 9.6 percent revenue respectively.

Vehicles paying normal tolls are around 74.4 percent of total toll revenues for the project road sections and around 24.7 percent of the traffic may opt for daily pass category. Remaining 0.9 percent may fall in monthly pass and local concession category.

4.6 Scenario Analysis

For toll road projects, revenue streams are generally based on the assessment of the traffic volume (base and future) crossing the toll plazas and the applicable toll imposed on the user of the road. There is an inherent element of uncertainty in any forecast and whilst is not possible to measure risk in a strictly statistical sense (as many of the risks are largely or partly unknown), in this section an attempt is made at quantifying the main risks that could have an impact on this forecast.

The econometric approach used to derive traffic growth, is based on the estimation of GSDP growth rates for the influence area economies and traffic demand elasticity by mode; the estimation of both variables contains a certain degree of uncertainty which can be represented in the scenario analysis. Scenario analysis has been done in the following subheadings for the base case:

High Case

The high case is based on a more optimistic economic outlook for future years and higher elasticity values as compared to the base case. Therefore, traffic growth rates of 20 percent higher than the base case for every year and for all the mode are considered.

Low Case

A growth rate of 20 percent lower than base case for all types of vehicles has been considered in the present analysis to reflect uncertainty with regard to economic performance of PIA states and lower elasticity values.

The results of different scenarios are presented in **Table 4-9**. A comparison versus base case has been presented for the Present Value (at 12 percent discount rate) of the project revenue from FY23 till 15th December of FY52.

FY End	Toll Revenue in Rs Million		
	Base Case	High Case (+20%)	Low Case (-20%)
2023	986.3	996.8	975.7
2024	1,036.0	1,056.7	1,015.6
2025	1,960.1	2,017.7	1,903.8
2026	2,503.7	2,600.5	2,410.0
2027	2,728.4	2,859.0	2,603.3
2028	2,965.3	3,134.8	2,804.6
2029	3,214.2	3,426.8	3,014.3
2030	3,204.6	3,448.0	2,978.1
2031	3,327.1	3,611.4	3,065.2
2032	3,460.6	3,790.4	3,159.6
2033	3,748.8	4,141.9	3,393.5
2034	4,058.7	4,522.8	3,643.1
2035	4,390.9	4,934.5	3,908.7
2036	4,758.6	5,389.7	4,203.4
2037	5,127.2	5,852.4	4,494.5
2038	5,555.8	6,391.4	4,832.7
2039	6,000.3	6,956.2	5,179.8
2040	6,458.2	7,541.5	5,535.6
2041	6,965.8	8,194.9	5,927.3
2042	7,484.0	8,867.7	6,323.7
2043	8,071.0	9,631.8	6,771.9
2044	8,679.1	10,429.5	7,232.8
2045	9,316.2	11,272.1	7,711.8
2046	9,994.6	12,173.8	8,219.5
2047	10,694.4	13,109.7	8,740.2
2048	11,550.6	14,253.5	9,378.7
2049	12,311.9	15,285.8	9,937.6
2050	13,190.5	16,478.0	10,582.6
2051	14,112.9	17,739.1	11,254.6
2052*	10,763.2	13,612.1	8,532.0
PV12 FY23 till 15th Dec in FY52	28,109	31,490	25,205
PV12 till 15th Dec in FY52 vs base		12.0%	-10.3%

* Till 15th Dec

Table 4-9: Comparison of Annual Revenue Forecasts Under Different Scenarios

The low growth scenario has a negative impact on revenue PV of about 10.3 percent versus base case, whilst the optimistic growth scenario would generate about 12.0 percent higher PV than the base case.

APPENDICES

APPENDIX 2.1
TRAFFIC ZONING SYSTEM

Traffic Study for Kagal-Belgaum section of NH-4 in the state of Maharashtra and Karnataka
Traffic Zoning System

Zone	Place/Region	District/ State	State/Country/Region
1	**Kagal**	Project Corridor:Kagal-Belagavi	Maharashtra
2	Karnoor/Vandur/Shankarwadi/Sulgaon		
3	Koganoli/Dattawade/Hanabarawadi/Hanchinal		Karnataka
4	Soundalga/Appachiwadi/Kurli		
5	Yamagarni/Shripewadi/Naganur		
6	**Nipani/Pattankudi**		
7	Kanagala/Hitani/Karajaga		
8	Sankeshwar/Ganganagar		
9	Hebbal/Gotur/Chikkalgud		
10	U. Khanapur/Hanchinal/Halkarni		
11	Hattargi/Anandpur/Yamakanmardi		
12	Gudagunahatti/Manahatti/Nagalotimath/Dadabanahatti		
13	Kataballi/Sutabatti		
14	Vantmuri/Ramdurg		
15	Ghugrenhatti/Bhutramhatti/Kattanbhavi		
16	**Belagavi**		
17	Desur/Khanapur	Belagavi district	
18	Hirebagewai/MK Hubli	Belagavi district	
19	Baihongal	Belagavi district	
20	Gokak/Nabapur/Hidkal/Pachapur	Belagavi district	
21	Ghatprabha/Konnur	Belagavi district	
22	Hukkeri	Belagavi district	
23	Shamanewadi/Chikodi	Belagavi district	
24	Raibag/Kudachi	Belagavi district	
25	Sadalga/Donage Tota	Belagavi district	
26	Gokul Shirgaon	Kolhapur District	Maharashtra
27	**Kolhapur**	Kolhapur District	
28	Ichalkaranji	Kolhapur District	
29	Peth Vadgaon/Vathar Tarf Vadgaon	Kolhapur District	
30	**Sangli/Miraj**	Sangli District	
31	Karad/Malkapur	Satara District	
32	**Satara**	Satara District	
33	Ratnagiri/Ganpatipule	Ratnagiri District	
34	Padharpur	Padharpur District	
35	**Solapur**	Solapur District	
36	**Pune/Lonavala/Mahabaleshwar**	Pune District	
37	**Mumbai**	Mumbai Suburban	
38	Mumbai JNPT	Mumbai Suburban	
39	Latur/Nanded	Latur/Nanded District	
40	**Aurangabad/Jalna/Ahmednagar**	Aurangabad District	
41	Dhule/Jalgaon/Nandurbar	Dhule District	
42	**Nashik**	Nashik District	
43	**Nagpur/Akola/Amravati/Yavatmal/Wardha/ Gondia/Chandrapur**	Nagpur/Akola/Amravati/Yavatmal/Wardha/ Gondia/Chandrapur	
44	Rest of Maharashtra	Rest of Maharashtra	
45	**Hubli/Dharwad**	Hubli/Dharwad district	Karnataka
46	Bagalkote	Bagalkote district	
47	**Vijaypura**	Vijaypura district	
48	Kalaburagi	Kalaburagi district	
49	Ballari/Hosapete	Ballari district	
50	Devanagere	Devanagere district	
51	Udupi/Mangaluru	Udupi district	
52	Hassan/Chikmangalur	Hassan/Chikmanglur district	
53	**Bengaluru city**	Bengaluru district	
54	**Mysore city**	Mysore district	
55	Rest of Karnataka	Rest of Karnataka	
56	**Hyderabad city**	Hyderabad city	Telangana
57	Nizamabad/Nirmal/Adilabad/Warangal	Nizamabad/Nirmal/Adilabad/Warangal	
58	Rest of Telangana	Rest of Telangana	
59	Vishakhapatnam/Vijayawada	Vishakhapatnam/Vijayawada	Andhra Pradesh
60	Tirupati/Nellore/Kadapa	Tirupati/Nellore/Kadapa	
61	Rest of Andhra Pradesh	Rest of Andhra Pradesh	
62	**Chennai city**	Chennai city	Tamil Nadu
63	Madurai/Coimbatore/Tiruppur	Madurai/Coimbatore/Tiruppur	
64	Rest of Tamil Nadu	Rest of Tamil Nadu	
65	**Thiruvananthapuram/Kochi**	Thiruvananthapuram/Kochi	Kerala
66	Rest of Kerala	Rest of Kerala	
67	**Jaipur/Ajmer/Kota**	Jaipur/Ajmer/Kota	Rajasthan
68	Jodhpur/Bikaner/Udaipur	Jodhpur/Bikaner/Udaipur	
69	Rest of Rajasthan	Rest of Rajasthan	
70	**Ahmedabad/Vadodara**	Ahmedabad/Vadodara	Gujarat
71	Surat/Hazira	Surat/Hazira	
72	Rajkot/Morbi	Rajkot/Morbi	
73	Rest of Gujarat	Rest of Gujarat	
74	**Indore city**	Indore City	Madhya Pradesh
75	Bhopal	Bhopal	
76	Rest of Madhya Pradesh	Rest of Madhya Pradesh	
77	Noida/Ghaziabad	Noida/Ghaziabad	Uttar Pradesh
78	Agra/Mathura	Agra/Mathura	
79	**Lucknow/Kanpur**	Lucknow/Kanpur	
80	Rest of Uttar Pradesh	Rest of Uttar Pradesh	
81	**Delhi**	Delhi	Delhi
82	Gurgaon/Faridabad	Gurgaon/Faridabad	Haryana
83	Rest of Haryana	Rest of Haryana	
84	Punjab	Punjab	Punjab
85	Chandigarh	Chandigarh	Chandigarh
86	Uttarakhand	Uttarakhand	Uttarakhand
87	Himachal Pradesh	Himachal Pradesh	Himachal Pradesh
88	Jammu Kashmir & Ladakh	Jammu Kashmir & Ladakh	Jammu Kashmir & Ladakh
89	Bihar	Bihar	Bihar
90	West Bengal	West Bengal	West Bengal
91	Chhattisgarh	Chhattisgarh	Chhattisgarh
92	Odisha	Odisha	Odisha
93	Jharkhand	Jharkhand	Jharkhand
94	Goa	Goa	Goa
95	Assam /North eastern states	Assam /North eastern states	Assam /North eastern states

APPENDIX 2.2
MODE WISE TOP20 OD PAIRS

Traffic Study for Kagal-Belgaum section of NH-4 in the state of Maharashtra and Karnataka

TOP 20 Origin Destination Pairs at TP01-KOGNOLI

Car

S.No.	Origin	Destination	% of total
1	Belagavi	Kolhapur	19%
2	Nipani/Pattankudi	Kolhapur	19%
3	Kagal	Nipani/Pattankudi	8%
4	Kolhapur	Rest of Karnataka	5%
5	Kolhapur	Goa	4%
6	Kolhapur	Bengaluru city	3%
7	Belagavi	Pune/Lonavala/Mahabaleshwar	3%
8	Shamanewadi/Chikodi	Kolhapur	2%
9	Kolhapur	Hubli/Dharwad	2%
10	Nipani/Pattankudi	Pune/Lonavala/Mahabaleshwar	2%
11	Pune/Lonavala/Mahabaleshwar	Goa	2%
12	Kagal	Belagavi	2%
13	Nipani/Pattankudi	Rest of Maharashtra	2%
14	Kagal	Rest of Karnataka	1%
15	Belagavi	Mumbai	1%
16	Mumbai	Goa	1%
17	Belagavi	Satara	1%
18	Soundalga/Appachiwadi/Kurli	Kolhapur	1%
19	Kagal	Soundalga/Appachiwadi/Kurli	1%
20	Sankeshwar/Ganganagar	Kolhapur	1%
		Total	**82%**

Mini Bus

S.No.	Origin	Destination	% of total
1	Belagavi	Kolhapur	30%
2	Kagal	Nipani/Pattankudi	19%
3	Nipani/Pattankudi	Kolhapur	11%
4	Kagal	Soundalga/Appachiwadi/Kurli	6%
5	Kolhapur	Rest of Karnataka	6%
6	Nipani/Pattankudi	Pune/Lonavala/Mahabaleshwar	5%
7	Kagal	Bengaluru city	3%
8	Kagal	Rest of Karnataka	3%
9	Soundalga/Appachiwadi/Kurli	Kolhapur	3%
10	Kagal	Belagavi	3%
11	Soundalga/Appachiwadi/Kurli	Rest of Maharashtra	3%
12	Nipani/Pattankudi	Gokul Shirgaon	3%
13	Nipani/Pattankudi	Rest of Maharashtra	3%
14	Gokak/Nabapur/Hidkal/Pachapur	Ichalkaranji	3%
15	Hukkeri	Pune/Lonavala/Mahabaleshwar	3%
		Total	**100%**

Bus

S.No.	Origin	Destination	% of total
1	Belagavi	Kolhapur	32%
2	Nipani/Pattankudi	Kolhapur	17%
3	Kolhapur	Rest of Karnataka	11%
4	Kagal	Nipani/Pattankudi	5%
5	Kagal	Belagavi	4%
6	Kolhapur	Bengaluru city	4%
7	Kolhapur	Hubli/Dharwad	3%
8	Kolhapur	Goa	3%
9	Soundalga/Appachiwadi/Kurli	Kolhapur	3%
10	Belagavi	Pune/Lonavala/Mahabaleshwar	2%
11	Shamanewadi/Chikodi	Kolhapur	2%
12	Pune/Lonavala/Mahabaleshwar	Bengaluru city	1%
13	Nipani/Pattankudi	Pune/Lonavala/Mahabaleshwar	1%
14	Gokak/Nabapur/Hidkal/Pachapur	Kolhapur	1%
15	Nipani/Pattankudi	Rest of Maharashtra	1%
16	Pune/Lonavala/Mahabaleshwar	Rest of Karnataka	1%
17	Kagal	Soundalga/Appachiwadi/Kurli	1%
18	Kagal	Rest of Karnataka	1%
19	Belagavi	Padharpur	1%
20	Belagavi	Rest of Maharashtra	1%
		Total	**92%**

MLCV

S.No.	Origin	Destination	% of total
1	Nipani/Pattankudi	Kolhapur	18%
2	Kagal	Nipani/Pattankudi	13%
3	Belagavi	Kolhapur	11%
4	Kolhapur	Rest of Karnataka	5%
5	Kolhapur	Bengaluru city	4%
6	Sankeshwar/Ganganagar	Kolhapur	4%
7	Pune/Lonavala/Mahabaleshwar	Hubli/Dharwad	3%
8	Belagavi	Pune/Lonavala/Mahabaleshwar	3%
9	Kagal	Belagavi	3%
10	Nipani/Pattankudi	Mumbai	3%
11	Belagavi	Rest of Maharashtra	3%
12	Belagavi	Mumbai	2%
13	Mumbai	Rest of Karnataka	2%
14	Kagal	Rest of Karnataka	2%
15	Nipani/Pattankudi	Pune/Lonavala/Mahabaleshwar	2%
16	Kolhapur	Hubli/Dharwad	2%
17	Shamanewadi/Chikodi	Kolhapur	2%
18	Kagal	Shamanewadi/Chikodi	1%
19	Soundalga/Appachiwadi/Kurli	Kolhapur	1%
20	Mumbai	Hubli/Dharwad	1%
		Total	**86%**

Traffic Study for Kagal-Belgaum section of NH-4 in the state of Maharashtra and Karnataka

TOP 20 Origin Destination Pairs at TP01-KOGNOLI

LCV

S.No.	Origin	Destination	% of total
1	Belagavi	Kolhapur	13%
2	Pune/Lonavala/Mahabaleshwar	Bengaluru city	5%
3	Belagavi	Mumbai	5%
4	Kolhapur	Bengaluru city	5%
5	Mumbai	Bengaluru city	5%
6	Nipani/Pattankudi	Kolhapur	5%
7	Mumbai	Rest of Karnataka	4%
8	Belagavi	Pune/Lonavala/Mahabaleshwar	4%
9	Nipani/Pattankudi	Mumbai	4%
10	Mumbai	Hubli/Dharwad	3%
11	Mumbai	Chennai city	2%
12	Mumbai	Rest of Tamil Nadu	2%
13	Pune/Lonavala/Mahabaleshwar	Hubli/Dharwad	2%
14	Kolhapur	Hubli/Dharwad	2%
15	Kolhapur	Rest of Karnataka	2%
16	Kagal	Nipani/Pattankudi	2%
17	Bengaluru city	Rest of Gujarat	1%
18	Kolhapur	Rest of Tamil Nadu	1%
19	Kolhapur	Goa	1%
20	Mumbai	Goa	1%
		Total	**71%**

2 Axle

S.No.	Origin	Destination	% of total
1	Mumbai	Bengaluru city	9%
2	Belagavi	Kolhapur	6%
3	Pune/Lonavala/Mahabaleshwar	Bengaluru city	6%
4	Belagavi	Pune/Lonavala/Mahabaleshwar	4%
5	Belagavi	Mumbai	4%
6	Nipani/Pattankudi	Kolhapur	4%
7	Kolhapur	Bengaluru city	4%
8	Mumbai	Rest of Karnataka	3%
9	Pune/Lonavala/Mahabaleshwar	Hubli/Dharwad	3%
10	Kolhapur	Hubli/Dharwad	2%
11	Mumbai	Hubli/Dharwad	2%
12	Pune/Lonavala/Mahabaleshwar	Chennai city	2%
13	Kolhapur	Chennai city	2%
14	Belagavi	Rest of Gujarat	2%
15	Kolhapur	Rest of Karnataka	1%
16	Nipani/Pattankudi	Mumbai	1%
17	Mumbai	Rest of Kerala	1%
18	Bengaluru city	Rest of Gujarat	1%
19	Rest of Kerala	Rest of Gujarat	1%
20	Pune/Lonavala/Mahabaleshwar	Rest of Karnataka	1%
		Total	**60%**

3 Axle

S.No.	Origin	Destination	% of total
1	Pune/Lonavala/Mahabaleshwar	Bengaluru city	7%
2	Mumbai	Bengaluru city	6%
3	Kolhapur	Bengaluru city	5%
4	Belagavi	Kolhapur	5%
5	Belagavi	Pune/Lonavala/Mahabaleshwar	4%
6	Mumbai	Hubli/Dharwad	3%
7	Belagavi	Mumbai	3%
8	Pune/Lonavala/Mahabaleshwar	Hubli/Dharwad	3%
9	Kolhapur	Hubli/Dharwad	3%
10	Kolhapur	Rest of Karnataka	3%
11	Mumbai	Rest of Karnataka	2%
12	Pune/Lonavala/Mahabaleshwar	Rest of Karnataka	2%
13	Nipani/Pattankudi	Kolhapur	2%
14	Mumbai	Rest of Tamil Nadu	2%
15	Mumbai	Chennai city	2%
16	Kagal	Belagavi	1%
17	Bengaluru city	Ahmedabad/Vadodara	1%
18	Kagal	Bengaluru city	1%
19	Nipani/Pattankudi	Mumbai	1%
20	Kolhapur	Chennai city	1%
		Total	**61%**

MAV

S.No.	Origin	Destination	% of total
1	Belagavi	Mumbai	13%
2	Pune/Lonavala/Mahabaleshwar	Bengaluru city	6%
3	Mumbai	Bengaluru city	5%
4	Bengaluru city	Rest of Gujarat	4%
5	Kolhapur	Bengaluru city	4%
6	Belagavi	Kolhapur	3%
7	Mumbai	Chennai city	3%
8	Belagavi	Pune/Lonavala/Mahabaleshwar	2%
9	Pune/Lonavala/Mahabaleshwar	Rest of Karnataka	2%
10	Mumbai	Hubli/Dharwad	2%
11	Kolhapur	Rest of Tamil Nadu	2%
12	Belagavi	Rest of Gujarat	2%
13	Pune/Lonavala/Mahabaleshwar	Hubli/Dharwad	2%
14	Mumbai	Rest of Kerala	2%
15	Nipani/Pattankudi	Kolhapur	2%
16	Kolhapur	Chennai city	2%
17	Kolhapur	Hubli/Dharwad	2%
18	Kolhapur	Rest of Karnataka	1%
19	Chennai city	Rest of Gujarat	1%
20	Mumbai	Rest of Tamil Nadu	1%
		Total	**60%**

Traffic Study for Kagal-Belgaum section of NH-4 in the state of Maharashtra and Karnataka

TOP 20 Origin Destination Pairs at TP02-HATTARGI

Car

S.No.	Origin	Destination	% of total
1	Belagavi	Kolhapur	21%
2	Sankeshwar/Ganganagar	Belagavi	15%
3	Belagavi	Shamanewadi/Chikodi	6%
4	Belagavi	Hukkeri	5%
5	Kolhapur	Rest of Karnataka	5%
6	Kolhapur	Goa	4%
7	Belagavi	Pune/Lonavala/Mahabaleshwar	4%
8	Kolhapur	Bengaluru city	4%
9	Kolhapur	Hubli/Dharwad	3%
10	Nipani/Pattankudi	Belagavi	2%
11	Pune/Lonavala/Mahabaleshwar	Goa	2%
12	Belagavi	Gokak/Nabapur/Hidkal/Pachapur	2%
13	Belagavi	Sangli/Miraj	2%
14	Belagavi	Mumbai	1%
15	Sankeshwar/Ganganagar	Hubli/Dharwad	1%
16	Hattargi/Anandpur/Yamakanmardi	Hukkeri	1%
17	Shamanewadi/Chikodi	Hubli/Dharwad	1%
18	Sankeshwar/Ganganagar	Hattargi/Anandpur/Yamakanmardi	1%
19	Hebbal/Gotur/Chikkalgud	Belagavi	1%
20	Pune/Lonavala/Mahabaleshwar	Bengaluru city	1%
		Total	**83%**

Mini Bus

S.No.	Origin	Destination	% of total
1	Belagavi	Kolhapur	35%
2	Belagavi	Shamanewadi/Chikodi	12%
3	Belagavi	Pune/Lonavala/Mahabaleshwar	10%
4	Sankeshwar/Ganganagar	Belagavi	8%
5	Kolhapur	Rest of Karnataka	4%
6	Pune/Lonavala/Mahabaleshwar	Rest of Karnataka	4%
7	Kagal	Belagavi	3%
8	Mumbai	Rest of Karnataka	3%
9	Belagavi	Mumbai	3%
10	Kolhapur	Hubli/Dharwad	3%
11	Nipani/Pattankudi	Belagavi	2%
12	Sankeshwar/Ganganagar	Hattargi/Anandpur/Yamakanmardi	2%
13	Hirebagewai/MK Hubli	Shamanewadi/Chikodi	2%
14	Pune/Lonavala/Mahabaleshwar	Hubli/Dharwad	2%
15	Hattargi/Anandpur/Yamakanmardi	Gokak/Nabapur/Hidkal/Pachapur	1%
16	Belagavi	Ghatprabha/Konnur	1%
17	Belagavi	Hukkeri	1%
18	Belagavi	Satara	1%
19	Belagavi	Rest of Maharashtra	1%
20	Gokak/Nabapur/Hidkal/Pachapur	Rest of Karnataka	1%
		Total	**97%**

Bus

S.No.	Origin	Destination	% of total
1	Belagavi	Kolhapur	22%
2	Belagavi	Shamanewadi/Chikodi	16%
3	Kolhapur	Rest of Karnataka	9%
4	Sankeshwar/Ganganagar	Belagavi	7%
5	Belagavi	Mumbai	4%
6	Mumbai	Bengaluru city	4%
7	Belagavi	Pune/Lonavala/Mahabaleshwar	4%
8	Sankeshwar/Ganganagar	Hattargi/Anandpur/Yamakanmardi	3%
9	Pune/Lonavala/Mahabaleshwar	Bengaluru city	2%
10	Belagavi	Raibag/Kudachi	2%
11	Belagavi	Ichalkaranji	2%
12	Belagavi	Hukkeri	2%
13	Belagavi	Sangli/Miraj	2%
14	Nipani/Pattankudi	Belagavi	1%
15	Hattargi/Anandpur/Yamakanmardi	Gokak/Nabapur/Hidkal/Pachapur	1%
16	Kolhapur	Hubli/Dharwad	1%
17	Pune/Lonavala/Mahabaleshwar	Hubli/Dharwad	1%
18	Mumbai	Hubli/Dharwad	1%
19	Belagavi	Ahmedabad/Vadodara	1%
20	Sangli/Miraj	Hubli/Dharwad	1%
		Total	**85%**

MLCV

S.No.	Origin	Destination	% of total
1	Sankeshwar/Ganganagar	Belagavi	18%
2	Belagavi	Shamanewadi/Chikodi	10%
3	Belagavi	Kolhapur	9%
4	Sankeshwar/Ganganagar	Hattargi/Anandpur/Yamakanmardi	8%
5	Nipani/Pattankudi	Belagavi	8%
6	Kolhapur	Bengaluru city	8%
7	Belagavi	Hukkeri	5%
8	Belagavi	Gokak/Nabapur/Hidkal/Pachapur	4%
9	Hattargi/Anandpur/Yamakanmardi	Hukkeri	3%
10	Hebbal/Gotur/Chikkalgud	Belagavi	3%
11	Belagavi	Ghatprabha/Konnur	2%
12	Hebbal/Gotur/Chikkalgud	Hattargi/Anandpur/Yamakanmardi	2%
13	Belagavi	Sangli/Miraj	2%
14	Hattargi/Anandpur/Yamakanmardi	Kolhapur	1%
15	Hattargi/Anandpur/Yamakanmardi	Shamanewadi/Chikodi	1%
16	Sankeshwar/Ganganagar	Desur/Khanapur	1%
17	Nipani/Pattankudi	Hattargi/Anandpur/Yamakanmardi	1%
18	Belagavi	Ratnagiri/Ganpatipule	1%
19	Shamanewadi/Chikodi	Goa	1%
20	Kolhapur	Goa	1%
		Total	**89%**

Traffic Study for Kagal-Belgaum section of NH-4 in the state of Maharashtra and Karnataka

TOP 20 Origin Destination Pairs at TP02-HATTARGI

LCV

S.No.	Origin	Destination	% of total
1	Belagavi	Kolhapur	12%
2	Belagavi	Mumbai	8%
3	Belagavi	Pune/Lonavala/Mahabaleshwar	7%
4	Nipani/Pattankudi	Belagavi	5%
5	Mumbai	Bengaluru city	5%
6	Belagavi	Shamanewadi/Chikodi	4%
7	Sankeshwar/Gangananagar	Belagavi	4%
8	Pune/Lonavala/Mahabaleshwar	Bengaluru city	4%
9	Mumbai	Chennai city	3%
10	Kolhapur	Bengaluru city	2%
11	Mumbai	Rest of Tamil Nadu	2%
12	Mumbai	Rest of Kerala	2%
13	Kagal	Belagavi	1%
14	Pune/Lonavala/Mahabaleshwar	Chennai city	1%
15	Kolhapur	Goa	1%
16	Pune/Lonavala/Mahabaleshwar	Hubli/Dharwad	1%
17	Belagavi	Sangli/Miraj	1%
18	Satara	Bengaluru city	1%
19	Shamanewadi/Chikodi	Bengaluru city	1%
20	Nipani/Pattankudi	Bengaluru city	1%
		Total	**66%**

2 Axle

S.No.	Origin	Destination	% of total
1	Sankeshwar/Gangananagar	Belagavi	17%
2	Belagavi	Pune/Lonavala/Mahabaleshwar	6%
3	Mumbai	Bengaluru city	6%
4	Belagavi	Shamanewadi/Chikodi	5%
5	Nipani/Pattankudi	Belagavi	4%
6	Pune/Lonavala/Mahabaleshwar	Bengaluru city	4%
7	Mumbai	Chennai city	3%
8	Mumbai	Rest of Tamil Nadu	3%
9	Belagavi	Sangli/Miraj	3%
10	Kolhapur	Bengaluru city	3%
11	Belagavi	Mumbai	2%
12	Belagavi	Hukkeri	2%
13	Kolhapur	Hubli/Dharwad	2%
14	Pune/Lonavala/Mahabaleshwar	Hubli/Dharwad	2%
15	Mumbai	Rest of Kerala	1%
16	Kagal	Belagavi	1%
17	Kolhapur	Rest of Kerala	1%
18	Belagavi	Ahmedabad/Vadodara	1%
19	Pune/Lonavala/Mahabaleshwar	Chennai city	1%
20	Belagavi	Rest of Gujarat	1%
		Total	**68%**

3 Axle

S.No.	Origin	Destination	% of total
1	Belagavi	Kolhapur	10%
2	Belagavi	Mumbai	9%
3	Mumbai	Bengaluru city	8%
4	Mumbai	Rest of Tamil Nadu	5%
5	Sankeshwar/Gangananagar	Belagavi	4%
6	Kolhapur	Bengaluru city	4%
7	Mumbai	Chennai city	4%
8	Mumbai	Rest of Kerala	3%
9	Belagavi	Rest of Gujarat	3%
10	Belagavi	Pune/Lonavala/Mahabaleshwar	2%
11	Pune/Lonavala/Mahabaleshwar	Hubli/Dharwad	2%
12	Nipani/Pattankudi	Belagavi	2%
13	Pune/Lonavala/Mahabaleshwar	Chennai city	2%
14	Belagavi	Shamanewadi/Chikodi	2%
15	Bengaluru city	Rest of Gujarat	1%
16	Mumbai	Rest of Karnataka	1%
17	Mumbai	Hubli/Dharwad	1%
18	Pune/Lonavala/Mahabaleshwar	Rest of Tamil Nadu	1%
19	Hattargi/Anandpur/Yamakanmardi	Mumbai	1%
20	Kanagala/Hitani/Karajaga	Belagavi	1%
		Total	**65%**

MAV

S.No.	Origin	Destination	% of total
1	Belagavi	Mumbai	10%
2	Belagavi	Kolhapur	6%
3	Mumbai	Bengaluru city	5%
4	Bengaluru city	Rest of Gujarat	5%
5	Pune/Lonavala/Mahabaleshwar	Bengaluru city	5%
6	Belagavi	Pune/Lonavala/Mahabaleshwar	4%
7	Mumbai	Rest of Tamil Nadu	4%
8	Mumbai	Chennai city	3%
9	Pune/Lonavala/Mahabaleshwar	Rest of Kerala	2%
10	Kolhapur	Bengaluru city	2%
11	Kolhapur	Rest of Tamil Nadu	2%
12	Belagavi	Shamanewadi/Chikodi	2%
13	Nipani/Pattankudi	Belagavi	2%
14	Pune/Lonavala/Mahabaleshwar	Rest of Tamil Nadu	2%
15	Pune/Lonavala/Mahabaleshwar	Hubli/Dharwad	2%
16	Hattargi/Anandpur/Yamakanmardi	Mumbai	1%
17	Mumbai	Rest of Kerala	1%
18	Kolhapur	Chennai city	1%
19	Pune/Lonavala/Mahabaleshwar	Chennai city	1%
20	Mumbai	Rest of Karnataka	1%
		Total	**62%**

Research

CRISIL
An S&P Global Company

Assessment and projection of traffic and revenue for Shivpuri-Jhansi section of NH-27

July 2022

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1 Objective and background

National Highways Infra Investment Managers Pvt Ltd (NHIIMPL) appointed CRISIL Research to undertake a study to analyse investment attractiveness of the Shivpuri-Jhansi road stretch (NH-27), formerly part of TOT Bundle 6. In this regard, CRISIL Research conducted a detailed traffic study, and provided traffic and revenue projections for the road stretch under consideration for fiscals 2023-42. CRISIL also conducted a 7-day total volume count and 1-day origin-destination (O-D) traffic survey to understand traffic movement on the national highway road stretch.

CRISIL Research's report intends to facilitate investment decisions based on a detailed assessment of the road stretch, using derived yearly toll revenue and revenue risk for the road stretch.

Table 1: Details of the road stretch

Project stretch	State	Toll plaza	Length (km)
Four-lane Shivpuri-Jhansi km 1305.000 to km 1380.387 of NH-27 in Madhya Pradesh and Uttar Pradesh	Madhya Pradesh and Uttar Pradesh	Raksha	75.3

The report is divided into the following sections:

- Section I: Detailed assessment of the project stretch
- Section II: Growth and impact factor assessment
- Section III: Traffic and revenue projections for the project stretch

2 Approach and methodology

CRISIL Research conducted a detailed traffic assessment to understand the composition of current traffic for the stretch and various growth drivers and impact factors for this traffic, and arrive at traffic projections. Traffic for the stretch has been projected by factoring in traffic composition (vehicle category share, commodity carried by freight traffic vehicle categories, and origin-destination locations), outlook on production and consumption centres, alternative routes, and other factors impacting road traffic. This study helped us assess the project's traffic growth against key macro- and socio-economic parameters, and thus comment on the future prospects of the stretch.

Figure 1: Overview of approach and methodology for the study

Traffic survey and data

- CRISIL Research appointed an external agency to conduct the following traffic surveys:
  - ✓*7-day traffic volume count survey*
  - ✓*1-day origin-destination (OD) survey*
- Historical traffic data shared by the client
- Electronic Toll Collection (ETC) data for March-May 2022 shared by Indian Highways Management Company Limited (IHMCL) in the public domain

1. Detailed assessment of the national highway

- Details of the highway
- Location and mapping of consumption and production clusters of eastern/western states and study of the topography of the catchment area
- Identification of commodity distribution/transportation on the highway
- Identification and mapping of existing infrastructure
- Mapping of alternative routes
- Trend in vehicle registration growth

2. Impact assessment

- For goods traffic
  - Dedicated Freight Corridor/Delhi-Mumbai Industrial Corridor
  - Natural shifts/GST
  - Coastal shipping (major ports) along southern/western states
  - Axle load norms
  - Truck aggregator
  - Alternative routes
  - Government regulations
- For passenger traffic
  - Leisure places/existing parks around the region
  - Population/macroeconomic trends
- For both
- Upcoming infrastructure projects such as industrial clusters

3. Traffic projections

- Estimation of average annual daily traffic (AADT) and seasonality factors on the project stretch
- Estimation of category-wise annual toll traffic and revenue
- Projection of year-wise toll revenue for the project stretch
- Revenue risk, sensitivity and revenue projections

Source: CRISIL Research

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.

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's methodology is appropriate for the traffic study of Jhansi-Shivpuri stretch

Agri produce commodity accounts for nearly 20-30% of the total traffic on the project stretch

Agri produce is the largest commodity observed on the project stretch. The commodity is composed of food grains, fruits and vegetables. As per the survey conducted during the course of this traffic study, in terms of vehicle wise composition, the category is made up of 25.9% LCVs, 18.6% of 2-axle, 13.8% of 3-axle and 18.7% of MAVs. In total, the agri produce accounts for 19.2% of the traffic on the stretch. The share noticed in DPR of TOT bundle-6 is even higher. DPR data shows, 23.2% MAVs account for food grains and cash crops traffic and 20.5% of MAVs account for fruits & vegetables traffic. Such higher share is noticed across vehicle categories in the DPR.

CRISIL's methodology considers the growth of the agri produce commodity at the regional level to derive the traffic growth of each vehicle category. Growth in agri produce is highly volatile as it depends on the positive outcome of the monsoon season. Hence on a long term period, it grows at low rate compared to the aggregate GDP. Given the high proportion of the agri produce on the stretch, it's imperative to assess it at a regional and commodity level, compared to a macroeconomic level. This is evident, considering only the macro level growth. The India GVA (constant prices) from agriculture, forestry & fishing has grown at a CAGR of 3.5% over FY12-22 while the GDP growth of India during the same period has been 5.4% CAGR. For this reason, CRISIL's method is more appropriate for the road stretch.

Origin-destination of the freight traffic of the stretch is limited to few specific states

The freight traffic is largely concentrated across Uttar Pradesh, Madhya Pradesh, Gujarat and Maharashtra. In the direction of Shivpuri, nearly 70% of the freight traffic originates in Uttar Pradesh. This traffic is largely destined for Madhya Pradesh (41%), Gujarat (24%) and Maharashtra (26%). In the opposite direction, the shares remain similar with ~70% of the traffic destined for Uttar Pradesh having origin across MP, Gujarat and Maharashtra.

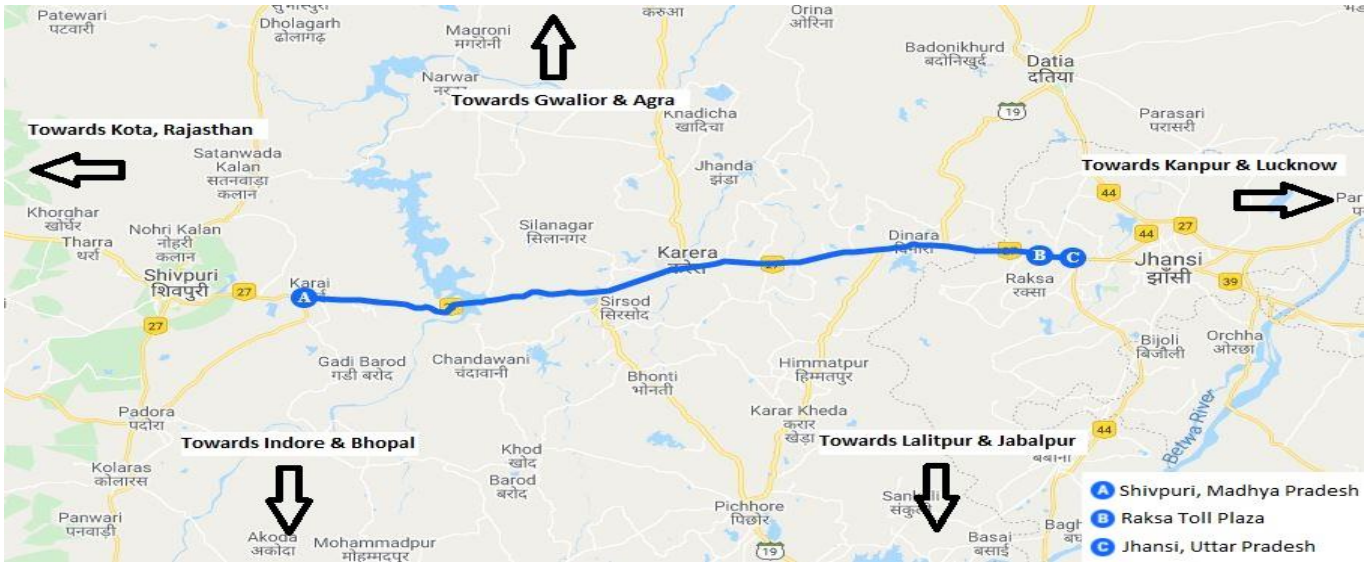
It is evident for the project stretch that the growth of the freight traffic is highly influenced by the regional and state-level growth drivers as against national level factors. As mentioned earlier, CRISIL's traffic forecasting method incorporates its coverage of 80+ sectors and the MSME industry. This knowledge base is used to understand the growth of industries and demand across various regions and clusters which influences the traffic growth. Hence, CRISIL's method is appropriate for this stretch as the growth drivers are concentrated in terms of region and commodities.

3 Overview of project stretch

Project stretch delineation

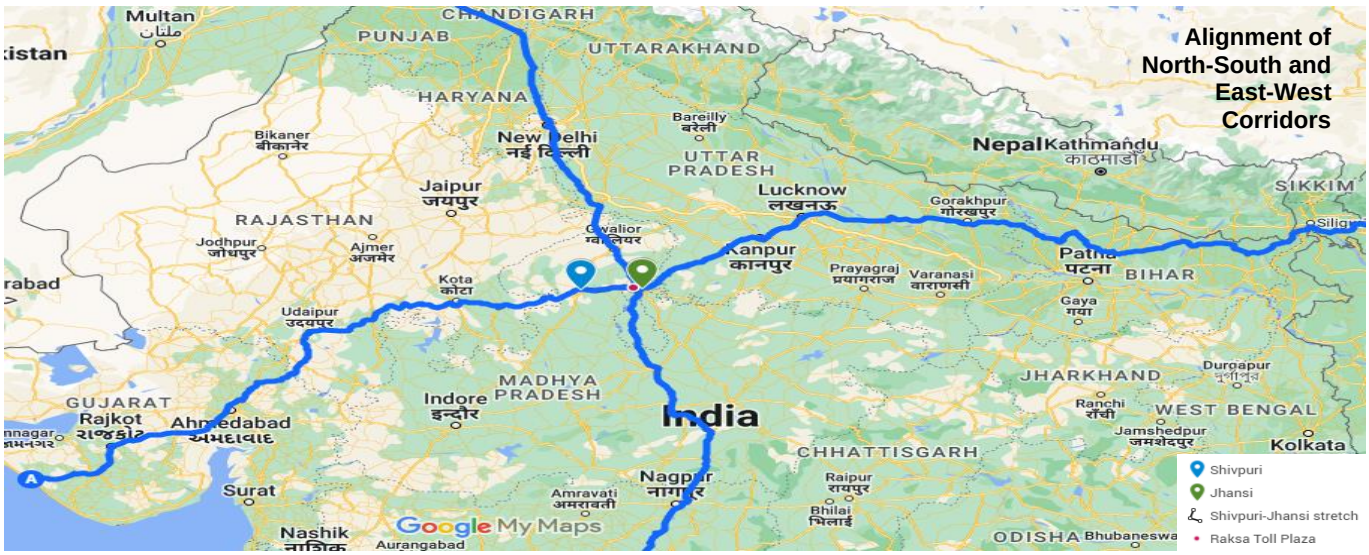
The Jhansi-Shivpuri section of NH-27 connects the districts of Jhansi and Shivpuri in Uttar Pradesh and Madhya Pradesh, respectively. These are the two key project stretch influence states. The project stretch has one toll plaza — Raksha — that lies at the chainage of km 1374+650 near Jhansi. In the larger road network, the project stretch is a part of East-West Corridor (NH-27), which connects Porbandar in Gujarat to Silchar in Assam. Hence, the project stretch witnesses high long-route traffic between the eastern and western regions.

Figure 2: Project stretch alignment



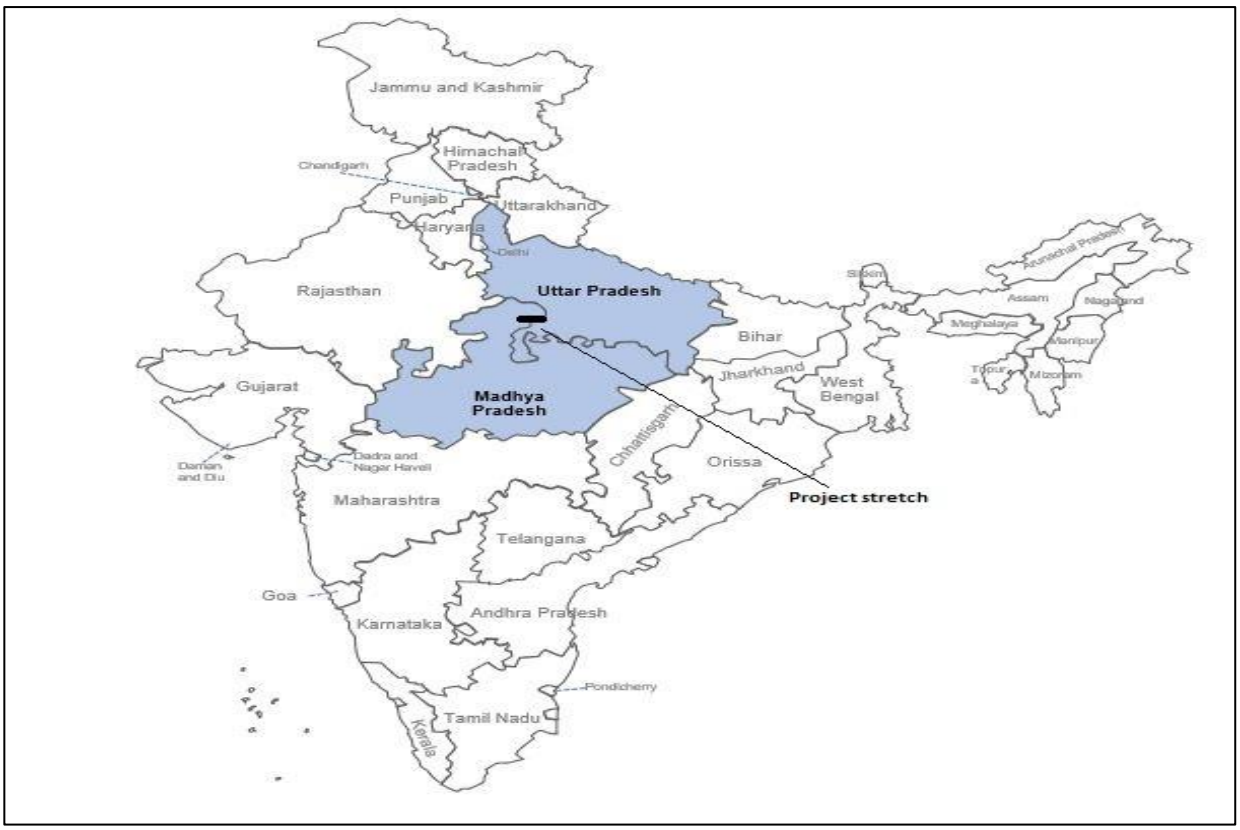
Source: NHAI, Google Maps, CRISIL Research

Figure 3: Project stretch alignment with regard to key freight corridors



Source: NHAI, Google Maps, CRISIL Research

Figure 4: Key project stretch influence states



Source: CRISIL Research

Table 2: Key details of project stretch

Project stretch	NH-27 - km 1305+000 to km 1380+300
Authority	National Highways Authority of India
No. of lanes	4-lane configuration
Length of project stretch	75.30 km
No. of toll plazas	01
Name of toll plaza(s)	Raksha (km 1374+650)
Commercial operation date	July 21, 2009
Current toll collection agency	Inderdeep Construction Co.

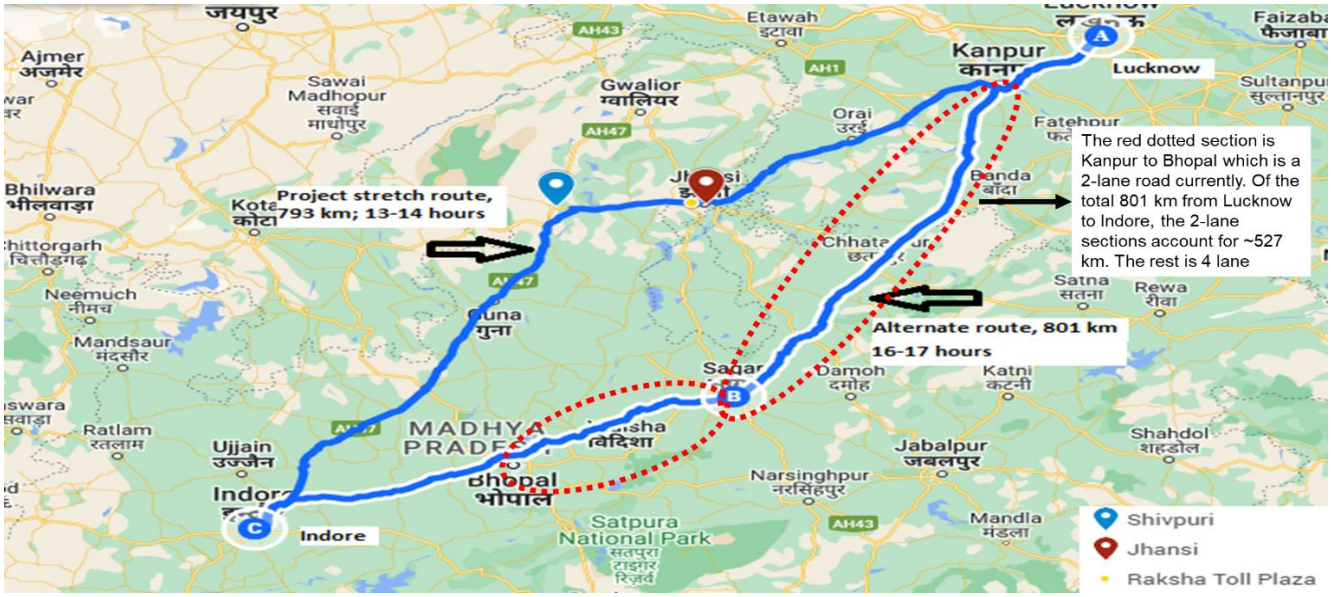
Source: NHAI, CRISIL Research

Current alternative routes to project stretch

The project stretch is used by the traffic originating and destined in regions such as the Kanpur-Lucknow cluster, the Indore cluster, Maharashtra and Gujarat. Lucknow/Kanpur and Indore are the key regions where the east-west traffic converges. Currently, the traffic travelling between Indore cluster and Lucknow/Kanpur cluster uses the project stretch which takes them 13-14 hours and travels ~793 km. There exists an alternative route between Lucknow and Indore that passes through Chhatarpur and Sagar. This route takes 16-17 hours, and the distance is 801 km. The key reason for this longer travel time is that the alternative route is a mix of two and four lanes. The

Kanpur-Bhopal section of the alternative route, which is nearly 527 km, is 2-lane. Hence currently, the route is not a feasible alternative against the project stretch.

Figure 5: Alignment of current alternative routes and project stretch

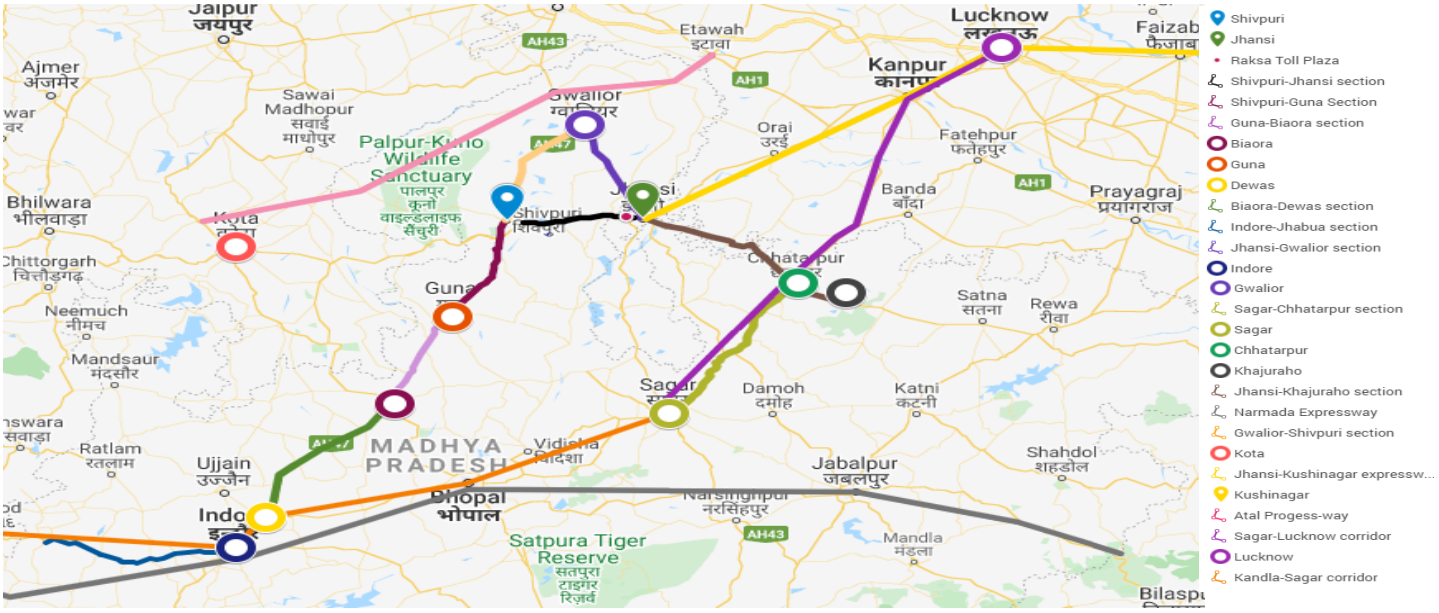


Source: NHAI, Google Maps, CRISIL Research

Network in the vicinity of project stretch

Stretches in the vicinity of the Shivpuri-Jhansi stretch are 4-lane, brownfield-upgraded. The stretches include Shivpuri-Gwalior, Gwalior-Jhansi, Jhansi-Khajuraho, Shivpuri-Guna, Guna-Biaora, and Biaora-Dewas. The region's better connectivity will lead to stronger traffic growth in the area, and this has been incorporated in the study's traffic projection.

Figure 6: Road network in the vicinity of project stretch



Source: NHAI, Google Maps, CRISIL Research

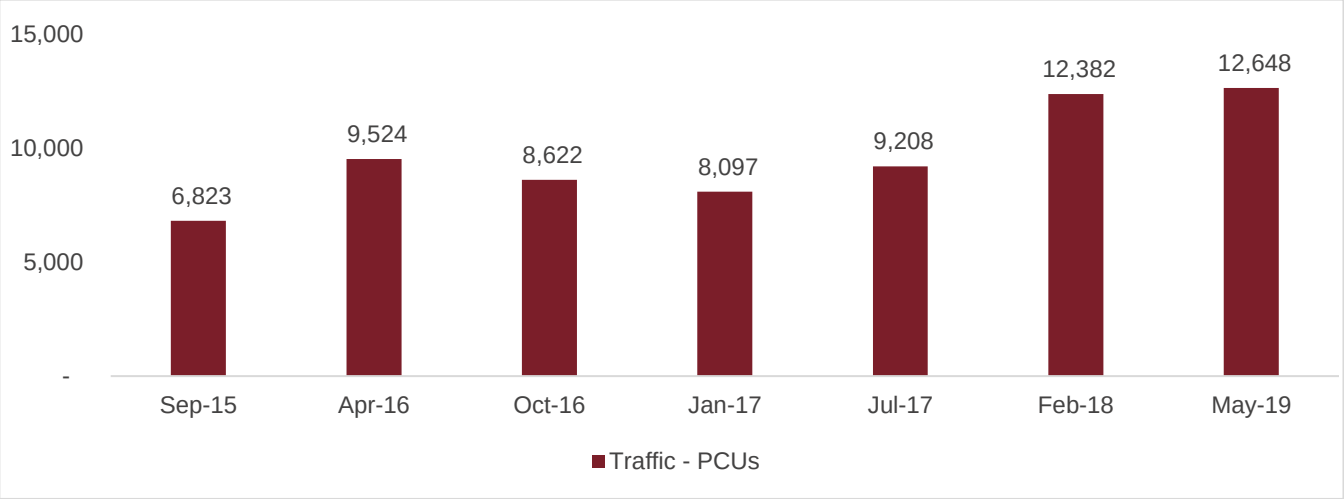
4 Traffic assessment of project stretch

Review of traffic at Raksha toll plaza

Project stretch saw strong traffic volume growth over 2015-19, as per IHMCL 7-day survey, driven by diverted traffic

The 7-day survey conducted by Indian Highways Management Company Ltd (IHMCL) indicated strong growth in traffic volume at the project stretch over calendar year 2015-19. This growth is expected to have been driven by diverted traffic from the adjoining Gwalior-Shivpuri section, which was under construction during 2014-19. The traffic from North used Gwalior-Jhansi and then the project stretch to go towards Indore, avoiding Gwalior-Shivpuri.

Figure 7: ADT from IHMCL 7-day traffic volume survey over 2015-19 (total PCUs)



Source: IHMCL, CRISIL Research

Table 3: ADT from IHMCL 7-day traffic volume survey over 2015-19

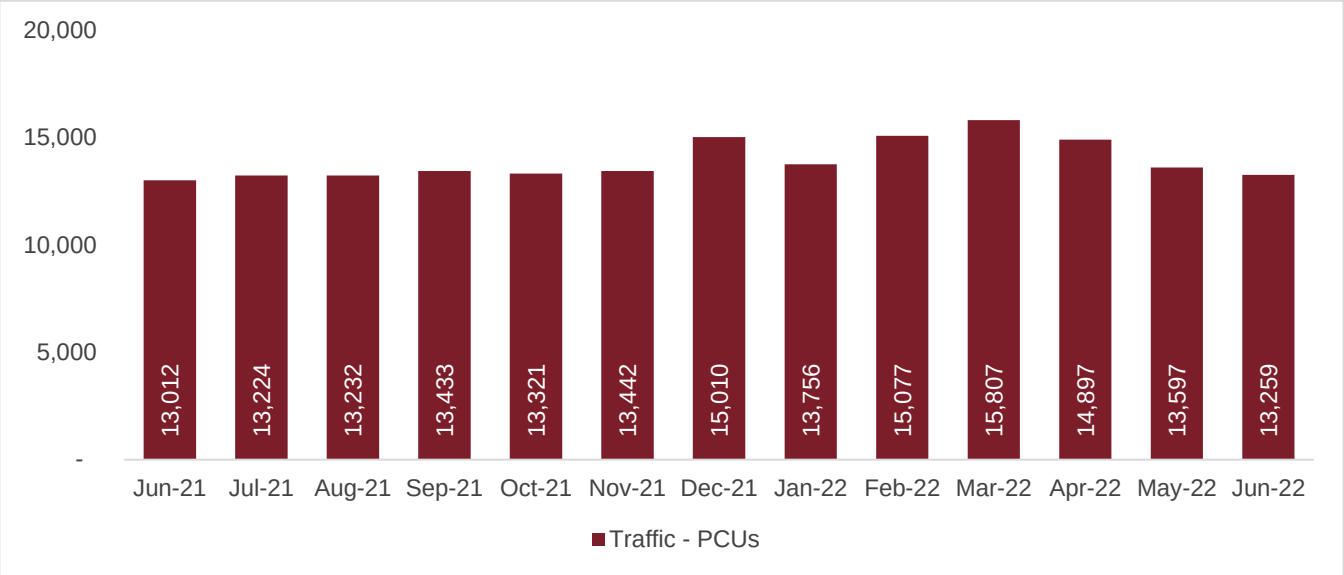
From	To	Car/jeep/van	LCV	2-axle	3-axle	MAV	OSV	Total	Total (PCUs)
Sep 26, 2015	Oct 2, 2015	1,249	188	275	400	726	0	2,838	6,823
Apr 5, 2016	Apr 11, 2016	1,413	228	332	667	1,059	1	3,701	9,524
Oct 2, 2016	Oct 8, 2016	1,406	246	298	466	1,012	0	3,428	8,622
Jan 27, 2017	Feb 2, 2017	1,325	186	270	423	981	0	3,184	8,097
Jul 22, 2017	Jul 28, 2017	1,289	255	281	402	1,217	2	3,447	9,208
Feb 9, 2018	Feb 15, 2018	1,861	305	373	533	1,632	1	4,704	12,382
May 26, 2019	Jun 1, 2019	2,028	296	410	554	1,619	1	4,907	12,648

Source: IHMCL, CRISIL Research

MAVs contribute 52% to the stretch's traffic in PCUs; ETC is the dominant payment method across vehicle categories, except 2-axle

The project stretch recorded 13,259 PCUs in June 2022. In terms of PCUs, the traffic mainly comprised MAVs (52%), followed by 2- and 3-axle vehicles (19% and 11%, respectively). Cars accounted for 15% of the traffic. Traffic data before June 2021 was not available from the toll plaza.

Figure 8: Total ADT (PCUs) on project stretch over June 2021-June 2022



Source: Toll plaza data, CRISIL Research

Table 4: ADT volume recorded on project stretch in June 2022

Vehicle category	Traffic volume (vehicles)	Traffic volume (PCUs)	Share (%) - PCUs
Car/jeep/van	2,012	2,012	**15%**
LCV	161	241	**2%**
2-axle	856	2,569	**19%**
3-axle	493	1,480	**11%**
MAV	1,544	6,948	**52%**
OSV	2	8	**0%**
Total	**5,069**	**13,259**	**100%**

Source: Toll plaza data, CRISIL Research

ETC collection over March 2022-June 2022 accounted for ~99.4% of the total toll collection. Toll plaza data shows vehicle categories are using cash to pay toll and paying double the toll fee. The cash component is lower for categories such as cars (3.2% vehicles use cash), 3-axles (1%) and MAVs (0.3%). It is largely prevalent in the LCV and 2-axle category, where nearly 7% of LCVs and 20% of 2-axle vehicles use cash and pay the non-ETC penalty.

Table 5: Share (%) of vehicles using various payment methods

Vehicle category	ETC	Cash	Exemption
Car/jeep/van	90.9%	3.2%	5.9%
LCV	90.6%	7.4%	2.0%
2-axle	77.9%	20.2%	1.9%
3-axle	97.6%	1.0%	1.4%
MAV	99.0%	0.3%	0.7%
OSV	100.0%	0.0%	0.0%

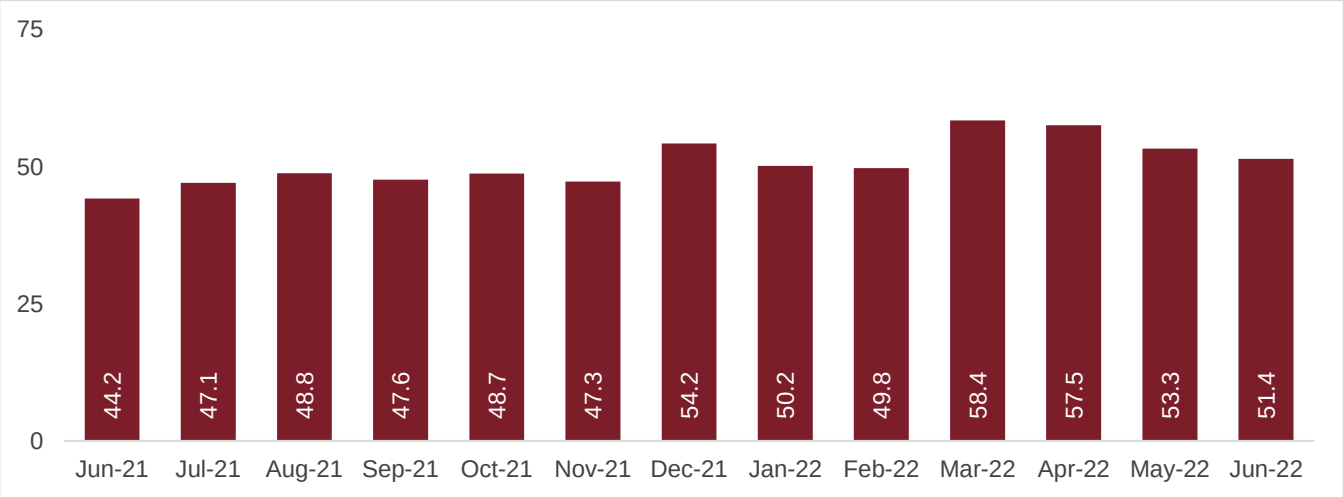
Note: The percentages are the average of each month's share (%) of vehicles using ETC, cash and are exempted over June 2021-May 2022, across vehicle categories

Source: Toll plaza data, CRISIL Research

Project stretch collected Rs 1.71 million on average per day in June 2022, with MAVs as the largest contributor

The project stretch collected Rs 618.2 million (including cash and ETC component) for the July 2021 to June 2022 period. Its average per day collection was Rs 1.71 million in June 2022. As per the weekly remittance decided by NHAI, the full year (FY23) remittance is estimated to be Rs 669.9 million for the stretch. The toll collection was largely driven by commercial vehicles; MAVs formed ~58% of the toll collection, followed by two- and three-axle vehicles, with ~17% and ~12% share.

Figure 9: Total toll collection of the project stretch over June 2021 to June 2022 (Rs million)



Source: Toll plaza data, CRISIL Research

Table 6: Per day total toll collection of the project stretch from June 2021 to June 2022

Month-Year	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22
Per day toll collection (Rs million)	1.47	1.52	1.57	1.59	1.57	1.58	1.75	1.62	1.78	1.89	1.92	1.72	1.71

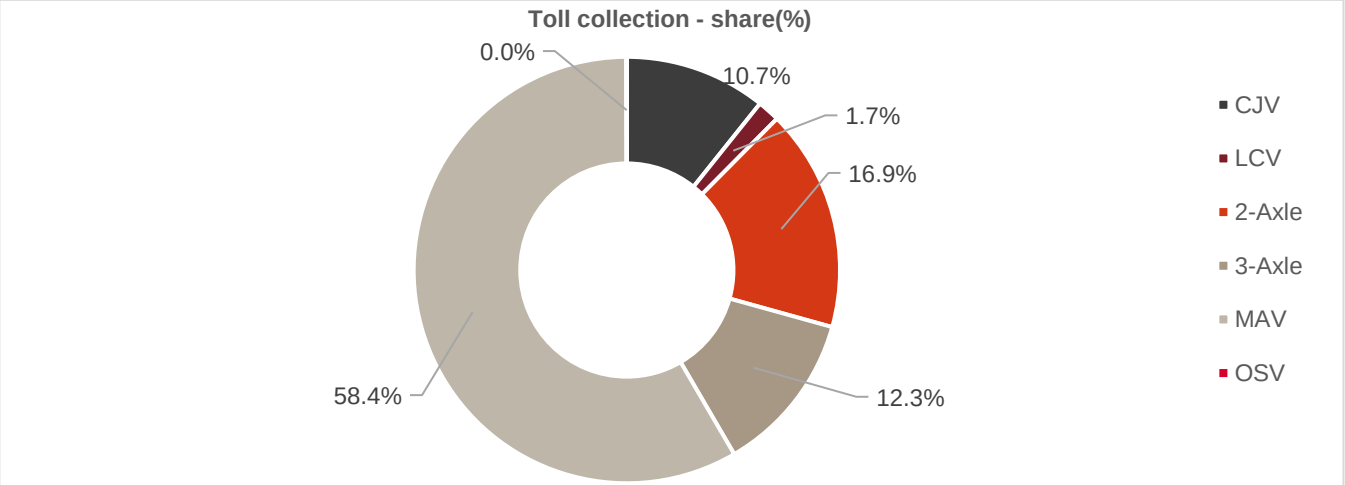
Source: Toll plaza data, CRISIL Research

Table 7: Remittance collection for the project stretch for the years available

Fiscal	Sept '17 to Oct '18	Oct '18 to Jan '20	Jan '20 to Jan '21	FY22	FY23	Per day remittance in period* Sept '17 to Oct '18	Per day remittance in FY23
Toll remittance (Rs million)	360.2	466.4	463.5	608.9	669.9	0.92	1.84

Note: *The period has 393 days; Source: NHAI, CRISIL Research

Figure 10: Share (%) of vehicle categories in the toll collection of the project stretch



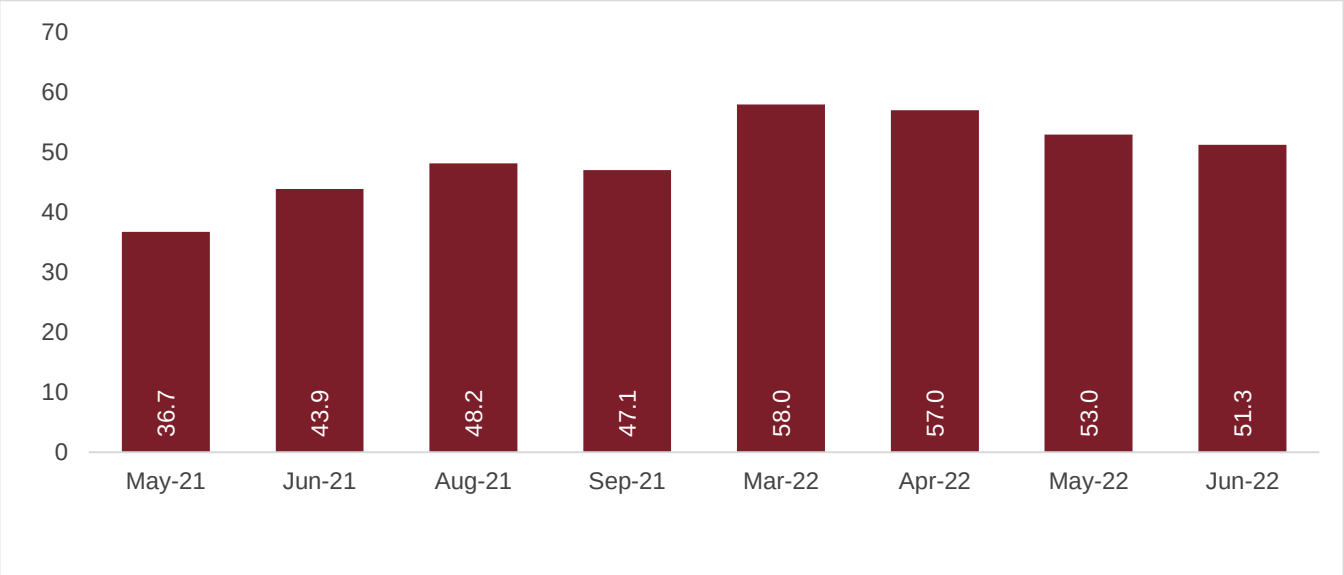
Note: The percentages are the average of revenue share of vehicles over June 2021 to May 2022;
Source: Toll plaza data, CRISIL Research

As per ETC data, MAVs contribute ~54% to the stretch's traffic in PCUs; per day ETC collection in June 2022 was Rs 1.71 million

The project stretch collected an average Rs 1.19 million per day in May 2021, which increased ~44% to Rs 1.71 million in May 2022. This was largely driven by the strong increase in the WPI, which led to a rise in the toll rates. The per day ETC toll collection for June 2022 was also Rs 1.71 million.

As per the ETC data made available in the public domain by IHMCL, there were an average 12,967 PCUs on the project stretch over April-June 2022. MAVs were the largest contributor to the traffic, with 54% share, followed by 2- and 3-axles at 15% and 12%, respectively. Some 18% of the traffic was composed of passenger vehicles. i.e., cars and buses. ETC collection over March-June 2022 accounted for ~99.4% of the total toll collection.

Figure 11: ETC toll collection of the project stretch for the months available (Rs million)



Source: IHMCL, CRISIL Research

Table 8: Per day ETC toll collection of the project stretch for the months available

Month-Year	May-21	Jun-21	Aug-21	Sep-21	Mar-22	Apr-22	May-22	Jun-22
ETC per day toll collection (Rs million)	1.19	1.46	1.55	1.57	1.87	1.90	1.71	1.71

Source: IHMCL, CRISIL Research

Table 9: Average daily traffic (ETC) recorded on the project stretch during Q1FY23

Average daily traffic (ETC) volume (April-June 2022)			
Vehicle category	**Traffic volume (vehicles)**	**Traffic volume (PCUs)**	**Share (%) - PCUs**
Car	1,905	1,905	15%
Bus	110	330	3%
Minibus	4	6	0%
LCV	173	259	2%
2-axle	629	1,888	15%
3-axle	506	1,518	12%
MAV	1,569	7,061	54%
Total	**4,896**	**12,967**	**100%**

Source: IHMCL, CRISIL Research

Review of traffic survey results

CRISIL Research appointed a traffic consultant who conducted traffic surveys on the following dates,

Table 10: Details of traffic surveys conducted for the assessment

Survey details			
Survey name	**Survey location**	**Duration**	**Date**
Traffic volume count survey	Raksha toll plaza	7 days	June 18-24, 2022
Origin-destination survey	Raksha toll plaza	1 day	June 20, 2022

Source: CRISIL Research

Traffic volume count (TVC) survey recorded 5,505 vehicles in total; recorded survey traffic volume shows discrepancy with the actual data

The ADT numbers were obtained by taking the average of the volume count numbers of seven days of the traffic survey. For the period, the actual traffic has been compared. There is a noticeable difference across the LCV/minibus and 2-axles between the data, which can be attributed to the difference in the vehicle classification methodology since the survey video is manually counted. Except for the cars category, in terms of the total daily traffic, the difference is small across the vehicle categories.

Table 11: Details of traffic recorded in the TVC survey conducted for the assessment

Date	Car	Bus	Minibus	LCV	2-axle	3-axle	MAV	OSV	Total	Total (PCUs)
June 18, 2022	2,340	189	10	457	347	532	1,650	-	5,525	13,670
June 19, 2022	2,625	177	9	487	388	552	1,699	1	5,938	14,370
June 20, 2022	2,699	189	10	360	356	495	1,509	-	5,618	13,165
June 21, 2022	2,761	203	14	402	281	461	1,451	-	5,573	12,750
June 22, 2022	2,487	180	12	417	348	450	1,444	-	5,338	12,563
June 23, 2022	2,343	170	12	449	346	536	1,643	-	5,499	13,584
June 24, 2022	2,016	150	9	406	353	519	1,592	1	5,046	12,873
ADT	**2,467**	**180**	**11**	**425**	**346**	**506**	**1,570**	**0**	**5,505**	**13,282**

Source: CRISIL Research

The TVC survey data and the actual traffic are similar, except for the Cars/Jeep/Van (CJV) category. The LCV and 2-axles are to be looked at together since the survey data has a classification error between the two vehicle categories. The ADT of the LCV + 2-axle category in the survey is 961, compared with the actuals recorded of 1,021 vehicles.

There is a substantial difference in the car traffic. To analyse this difference, we compared the daily car traffic for the days on which the survey was conducted and the difference was noted across all days. Survey data was also validated by cross-checking the survey video for random hours of random days. Through this analysis, it appears the difference in the cars traffic volume is not getting recorded in the toll plaza system.

Table 12: Comparison of actual traffic and the TVC survey recoded traffic

Month-Year	CJV	LCV	2-axle	3-axle	MAV	OSV	Total	Total PCUs
March-22 (actual)	1,675	189	1,214	565	1,890	2	5,535	15,808
April-22 (actual)	1,840	176	1,119	561	1,722	2	5,419	14,897
May-22 (actual)	2,308	159	899	505	1,519	1	5,390	13,597
June-22 (actual)	2,012	161	856	493	1,544	2	5,069	13,259
June-22, 7-day (actuals; same 7 days as TVC survey)	1,931	162	859	492	1,541	1	4,986	13,164
June-22, 7-day TVC	2,467	436	525	506	1,570	0	5,505	13,282

Source: CRISIL Research

Annual average daily traffic for fiscal 2023 estimated based on actual traffic volume data of fiscal 2022 and the first quarter of this fiscal

In order to derive to derive the annual average daily traffic (AADT) for fiscal 2023, we have considered actual 9-month traffic volume (July 2021 to March 2022) as the base for estimation. We applied on-year expected growth rates onto this actual traffic volume at a vehicle category level. Subsequently, we added the actual 3-month fiscal 2023 traffic to this value to derive the AADT for the fiscal (without car adjustment). The segregation of buses from 2-axles and minibuses from LCVs was derived on the basis of the share of these vehicles as per March-May 2022 ETC traffic volume data.

As noticed in the earlier section, there is a difference between the cars volume recorded in the toll plaza data and the TVC survey data. To account for this difference in volume, we have added 350 cars to this fiscal's AADT (without car adjustment) and thus derived the final AADT for the fiscal. As a check, we have compared the fiscal's estimated revenue based on this AADT and compared it with the remittance for the fiscal. The projected toll collection for fiscal 2023 is Rs 728.9 million and the estimated FY23 remittance is Rs 669.9 million. This denotes a margin of nearly 9%. The average gross profit margin (accounting for all toll collection related cost) of these contactors is broadly in the range of 7-10%. Hence, this comparison validates the projected toll collection and the base AADT of this study.

Table 13: Projected FY23 AADT for the project stretch

Vehicle category	ADT (June 2022 7-day TVC survey)	July 2021 to June 2022 – Average daily traffic volume	AADT – FY23 (without car adjustment)	AADT - FY23
Car	2,467	1,874	1,989	**2,339**
Bus	180	Part of 2-axle	Part of 2-axle	**120**
Minibus	11	Part of LCV	Part of LCV	**4**
LCV	425	176	185	**181**
2-axle	346	946	985	**865**
3-axle	506	510	531	**531**

Vehicle category	ADT (June 2022 7-day TVC survey)	July 2021 to June 2022 – Average daily traffic volume	AADT – FY23 (without car adjustment)	AADT - FY23
MAV	1,570	1,666	1723	**1,723**
Total	**5,505**	5,173	5,392	**5,763**

Source: CRISIL Research

Origin-destination survey

CRISIL Research appointed a traffic consultant to conduct a 24-hour (O-D) survey at Raksha toll plaza. The survey was undertaken on June 20, 2022. The total size of the sample collected is a minimum of 70% across each vehicles category

Table 14: Details of sample collected in the O-D survey conducted for the assessment

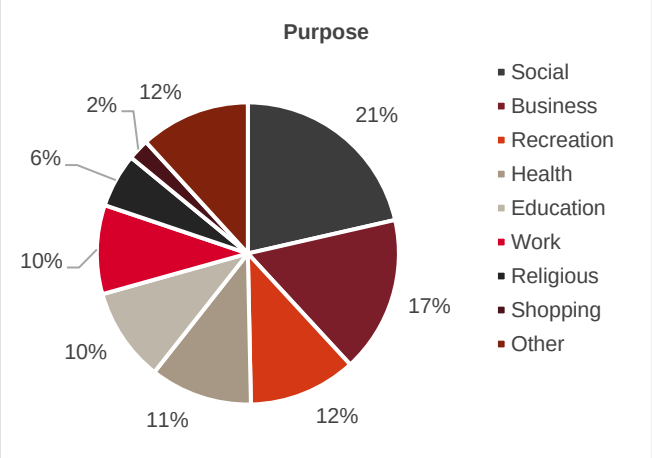
O-D survey sample			
Vehicle category	**OD sample captured**	**Actual ADT- June 2022**	**Sample (%)**
Cars/Jeep/Van	1,544	2,012	76%
LCV + 2-axle	801	1,017	78%
3-axle	355	493	72%
MAV	1,080	1,546	70%
Total	3,780	5,069	74%

Source: CRISIL Research

Project stretch and its vicinity such as Kanpur, Lucknow and Indore are the key origin-destination for the passenger traffic

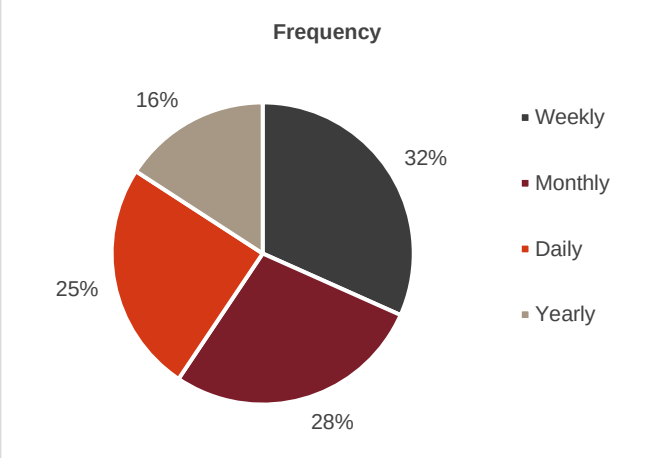
The O-D survey noted responses of the passengers on the traffic plying on the project stretch. These queries included purpose of the visit, frequency of travelling, origin point, and destination point. In terms of the purpose of travelling, passengers of 21% of the vehicles cited social reasons, followed by business (17%) and recreation (12%). In terms of frequency, 32% cited weekly travel, 28% monthly travel, 25% daily travel, and the rest cited yearly travel.

Figure 12: Trip purpose of the passenger traffic at toll plaza as per O-D survey



Source: CRISIL Research

Figure 13: Trip frequency of the passenger traffic at toll plaza as per O-D survey



Source: CRISIL Research

The O-D survey revealed the key origin point and destination points for the passenger traffic are Shivpuri, Jhansi, Kanpur, Lucknow, Indore, and regions such as Raksha, which lie on the project stretch. The same pattern is noted in both directions, i.e., towards Shivpuri and towards Jhansi.

Table 15: Key O-D regions for passenger traffic at toll plaza in Jhansi to Shivpuri direction

Origin	%	Destination	%
Jhansi	55%	Shivpuri	28%
Kanpur	12%	Karera	14%
Lucknow	8%	Indore	10%
Raksha	4%	Pichhore	8%
Orai	2%	Kota	6%
Banda	1%	Anta	5%
Harpalpur	1%	Dinara	5%
Orchha	1%	Guna	3%
Chhatarpur	1%	Ujjain	3%
Gorakhpur	1%	Dabardehi	2%
Others	15%	Others	17%

Source: CRISIL Research

Table 16: Key O-D regions for passenger traffic at toll plaza in Shivpuri to Jhansi direction

Origin	%	Destination	%
Shivpuri	31%	Jhansi	58%
Karera	15%	Kanpur	12%
Dinara	9%	Lucknow	4%
Pichhore	6%	Raksha	4%
Kota	5%	Panwari	2%
Indore	4%	Delhi	2%
Guna	3%	Orchha	1%
Anta	3%	Harpalpur	1%
Ujjain	2%	Orai	1%
Mumbai	2%	Babina	1%
Others	20%	Others	14%

Source: CRISIL Research

Kanpur, Lucknow, Jhansi, Indore, Mumbai, and Rajkot are the major contributors to the goods traffic on the project stretch

The Jhansi-Shivpuri section is a part of the NH-27, which is the East-West Corridor. Hence, the traffic here largely plies between the eastern and western regions of the country. The key O-D region is Uttar Pradesh. Within the state, Kanpur, Lucknow and Jhansi are the key locations. Other key regions include Madhya Pradesh, Gujarat and Maharashtra. Within these states, the key cities noted in the survey are Indore, Mumbai, and Rajkot, among others.

Table 17: Key O-D regions for goods traffic at toll plaza in Jhansi to Shivpuri direction

Origin	%	Destination	%
Uttar Pradesh	**72%**	**Madhya Pradesh**	**41%**
Kanpur	*31%*	*Indore*	*44%*
Jhansi	*25%*	*Shivpuri*	*29%*
Lucknow	*15%*	*Guna*	*5%*
Varanasi & Prayagraj	*7%*	*Ujjain*	*3%*
Gorakhpur	*4%*	**Maharashtra**	**26%**
Kannauj	*3%*	*Mumbai*	*50%*
West Bengal	**12%**	*Pune*	*25%*
Bihar	**5%**	*Nashik*	*6%*
Assam	**4%**	**Gujarat**	**24%**
Jharkhand	**3%**	*Rajkot*	*31%*
Madhya Pradesh	**2%**	*Ahmedabad*	*31%*
Other states	**2%**	*Surat*	*18%*
		Rajasthan	**7%**
		Other states	**2%**

Source: CRISIL Research

Table 18: Key O-D regions for goods traffic at toll plaza in Shivpuri to Jhansi direction

Origin	%	Destination	%
Madhya Pradesh	**37%**	**Uttar Pradesh**	**73%**
Indore	*39%*	*Kanpur*	*27%*
Shivpuri	*24%*	*Jhansi*	*25%*
Bhopal	*6%*	*Lucknow*	*23%*
Ujjain	*3%*	*Varanasi & Prayagraj*	*8%*
Maharashtra	**27%**	*Gorakhpur*	*6%*
Mumbai	*51%*	**Bihar**	**10%**
Pune	*29%*	**West Bengal**	**9%**
Nashik	*9%*	**Assam**	**6%**
Gujarat	**25%**	**Other states**	**2%**
Rajkot	*35%*		
Ahmedabad	*25%*		
Surat	*6%*		
Rajasthan	**10%**		
Other states	**2%**		

Source: CRISIL Research

Agri produce forms the key commodity travelling on the project stretch, followed by courier and parcels, construction material, consumer items, and iron and steel

The O-D survey recorded the key commodities travelling the road stretch. The survey provides the share of vehicles for each commodity. The largest commodity is agri produce as per the survey, accounting for ~19% of the goods vehicles (LCV, 2-axle, 3-axle, and MAV) travelling the project stretch. This comprises food grain, fruits, vegetables, and other cash crops. This is followed by iron and steel, which comprises 14% goods vehicles. Other key commodities are courier and parcel at 11%, consumer products at 8.3%, foods at 4.9%, and construction materials at 6.2%. Empty vehicles are only 9.5% of the total goods vehicles as per the O-D survey.

Table 19: Commodity share (%) based on O-D survey

Commodity	LCV	2-axle	3-axle	MAV	Total
Agri produce	25.9%	18.6%	13.8%	18.7%	19.2%
Iron and steel products	2.0%	3.2%	20.0%	19.1%	14.0%
Courier an parcel	12.1%	25.7%	14.1%	6.1%	11.0%
Empty	17.7%	7.1%	5.4%	8.3%	9.5%
Consumer products	18.0%	6.7%	6.5%	5.6%	8.3%
Construction materials	2.5%	4.7%	7.0%	7.6%	6.2%
Plastic products	5.7%	6.7%	6.2%	6.1%	6.1%
Consumer foods	4.4%	7.1%	6.8%	4.0%	4.9%
Textile and footwear	2.7%	2.0%	3.9%	3.3%	3.2%
Automobiles	1.2%	2.4%	3.9%	3.7%	3.1%
Petroleum products	0.0%	4.3%	0.6%	4.5%	3.0%
Chemical products	0.7%	0.4%	2.5%	3.1%	2.2%
Tiles and ceramic products	1.2%	0.4%	1.4%	3.1%	2.1%
Plywood and timber products	0.7%	4.7%	1.4%	1.7%	1.8%
Machinery	0.7%	2.0%	2.0%	1.9%	1.7%
Paper products	2.0%	1.6%	0.3%	0.6%	1.0%
Pharmaceuticals	1.2%	0.8%	1.1%	0.6%	0.8%
Coal	0.0%	0.4%	1.1%	0.9%	0.7%
Others	1.2%	1.2%	2.0%	1.0%	1.2%
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Note: Green highlighted cells represent the top 5 commodity in each vehicle category;

Source: CRISIL Research

The stretch has a high proportion of seasonal agri-produce traffic. The region's harvest cycle begins in March and April. To normalise the agri-produce share, a weighted average was taken across data from two surveys, i.e., September 2021 and June 2022. The same was reconciled with the commodity shares in the DPR (TOT bundle-6)

Similarly, iron and steel in the current survey was an outlier when compared across three data points, i.e., O-D survey of June 2022, September 2021 and the DPR O-D survey. This commodity was normalised on the basis of the share observed in the DPR and O-D survey of September 2021. The following shares have been considered for the traffic projections.

Table 20: Estimated commodity share (%) based on O-D survey conducted in September 2021 and June 2022

Commodity	LCV	2-axle	3-axle	MAV	Total
Agri produce	26.3%	20.5%	16.8%	22.0%	21.9%
Iron and steel products	0.7%	1.2%	8.7%	8.0%	5.7%
Courier and parcel	9.4%	21.6%	13.1%	5.5%	9.6%
Empty	18.9%	8.2%	6.8%	10.3%	11.4%
Consumer products	19.8%	8.0%	8.5%	7.1%	10.2%
Construction materials	2.5%	5.2%	8.5%	8.9%	7.0%
Plastic products	4.4%	5.7%	5.8%	5.5%	5.3%
Consumer foods	4.1%	7.0%	7.4%	4.2%	5.0%
Textile and footwear	2.7%	2.1%	4.6%	3.8%	3.5%
Automobiles	1.5%	3.1%	5.6%	5.1%	4.2%
Petroleum products	0.0%	4.5%	0.6%	5.0%	3.2%
Chemical products	0.7%	0.4%	2.8%	3.2%	2.2%
Tiles and ceramic products	1.1%	0.4%	1.5%	3.3%	2.2%
Plywood and timber products	0.7%	5.0%	1.7%	1.9%	2.0%
Machinery	0.7%	2.0%	2.2%	2.1%	1.8%
Paper products	2.3%	2.0%	0.4%	0.9%	1.3%
Pharmaceuticals	1.1%	0.8%	1.2%	0.6%	0.8%
Coal	0.0%	0.4%	1.2%	1.0%	0.7%
Others	3.1%	1.8%	2.5%	1.5%	2.0%
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Note: *The commodity share used for traffic projections is based on weighted average of commodity shares derived from the O-D survey of September 2021 and June 2022;

Source: CRISIL Research

Review of commodity growth rate assumptions

CRISIL Research's traffic projections are based on volume growth of commodities being transported on the road stretch. The below listed growth rates are assumed for the traffic study. These growth rates are applied to the traffic volume of vehicle categories based on the share of each vehicle category across various commodity categories (mentioned earlier in the report). Based on the growth rates for fiscal 2024, traffic AADT growth in fiscal 2024 over fiscal 2023 is 5.2% for LCV, 4.5% for 2-axle, 4.4% for 3-axle, and 4.9% for MAVs.

Agri produce is the largest category on the stretch, comprising mostly vegetables (including onions). The origin states are Uttar Pradesh, Madhya Pradesh, Gujarat, and Maharashtra. Wheat and paddy are the next largest commodities originating from Uttar Pradesh, Madhya Pradesh, and Maharashtra. The key destination for these commodities is Uttar Pradesh - specifically Jhansi, Kanpur, and Lucknow districts.

The consumer product and foods category largely comprises processed food, FMCG and other grocery items, driven by consumption demand across Uttar Pradesh and Madhya Pradesh. Other key destinations are Gujarat, Maharashtra, and West Bengal.

The courier and parcel category largely originates in Gujarat (Ahmedabad) and Maharashtra (Bhiwandi and Pune), and is largely bound for Uttar Pradesh. Smaller warehousing hubs that have a fair amount of origination on the stretch include Vadodara and Indore. The proximity of large clusters and connectivity of consumption centres will lead to strong growth for this category.

Construction materials constitute bricks, cement, stone, and tiles. The origin points for these commodities are Uttar Pradesh, Rajasthan, and Gujarat. Kota and its nearby regions have cement clusters. Gujarat has a major tiles cluster in Morbi. Uttar Pradesh has grinding cement plants. The destinations are Uttar Pradesh and Madhya Pradesh owing to strong growth in housing development under Pradhan Mantri Awas Yojana (PMAY) - Urban and Rural. Iron and steel demand is also driven by the strong infra project pipeline and housing demand in the region. Kolkata is the largest origin point, while destination centres are Indore, Jhansi, Lucknow, and Mumbai. The key sub-commodity is iron as noticed in the survey.

Table 21: Growth rates of key commodities (volume terms) – excluding diversion impacts

Commodity	Share (%)*	FY24	FY25-29	FY30-42
Agri produce	21.9%	3.0%	2.7%	2.3%
Iron and steel products	5.7%	6.5%	6.4%	5.6%
Courier and parcel	9.6%	9.0%	8.7%	7.5%
Consumer products	10.2%	4.0%	3.7%	3.3%
Construction materials	7.0%	6.0%	5.7%	5.1%
Plastic products	5.3%	5.0%	5.2%	4.7%
Consumer foods	5.0%	3.5%	3.6%	3.3%
Textile and footwear	3.5%	5.0%	4.7%	4.2%
Automobiles	4.2%	7.0%	6.5%	5.6%
Petroleum products	3.2%	3.0%	2.7%	1.0%

Commodity	Share (%)*	FY24	FY25-29	FY30-42
Chemical products	2.2%	4.0%	4.2%	3.7%
Tiles and ceramic products	2.2%	7.0%	6.5%	5.6%
Plywood and timber products	2.0%	5.0%	5.2%	4.7%
Machinery	1.8%	3.0%	3.2%	2.8%
Paper products	1.3%	6.0%	6.2%	5.6%
Pharmaceuticals	0.8%	7.0%	6.7%	5.6%
Coal	0.7%	4.0%	3.7%	3.3%
Others	1.1%	6.0%	5.5%	4.7%
Rubber products	0.4%	6.0%	6.2%	5.6%
Milk and animal food	0.4%	4.0%	4.2%	3.7%

Note: *The commodity share used for traffic projections is based on weighted average of commodity shares derived from the O-D survey of September 2021 and June 2022;

Source: Census data, CRISIL Research

Agri produce largely constitutes vegetables and food grains

Agri produce dominates the project stretch with ~19% share as per the OD survey conducted during the course of this study. The key sub-category is vegetables (including onion), originating from Madhya Pradesh, Maharashtra, and Gujarat. The stretch also has a big proportion of food grains such as wheat and paddy from Uttar Pradesh and Madhya Pradesh.

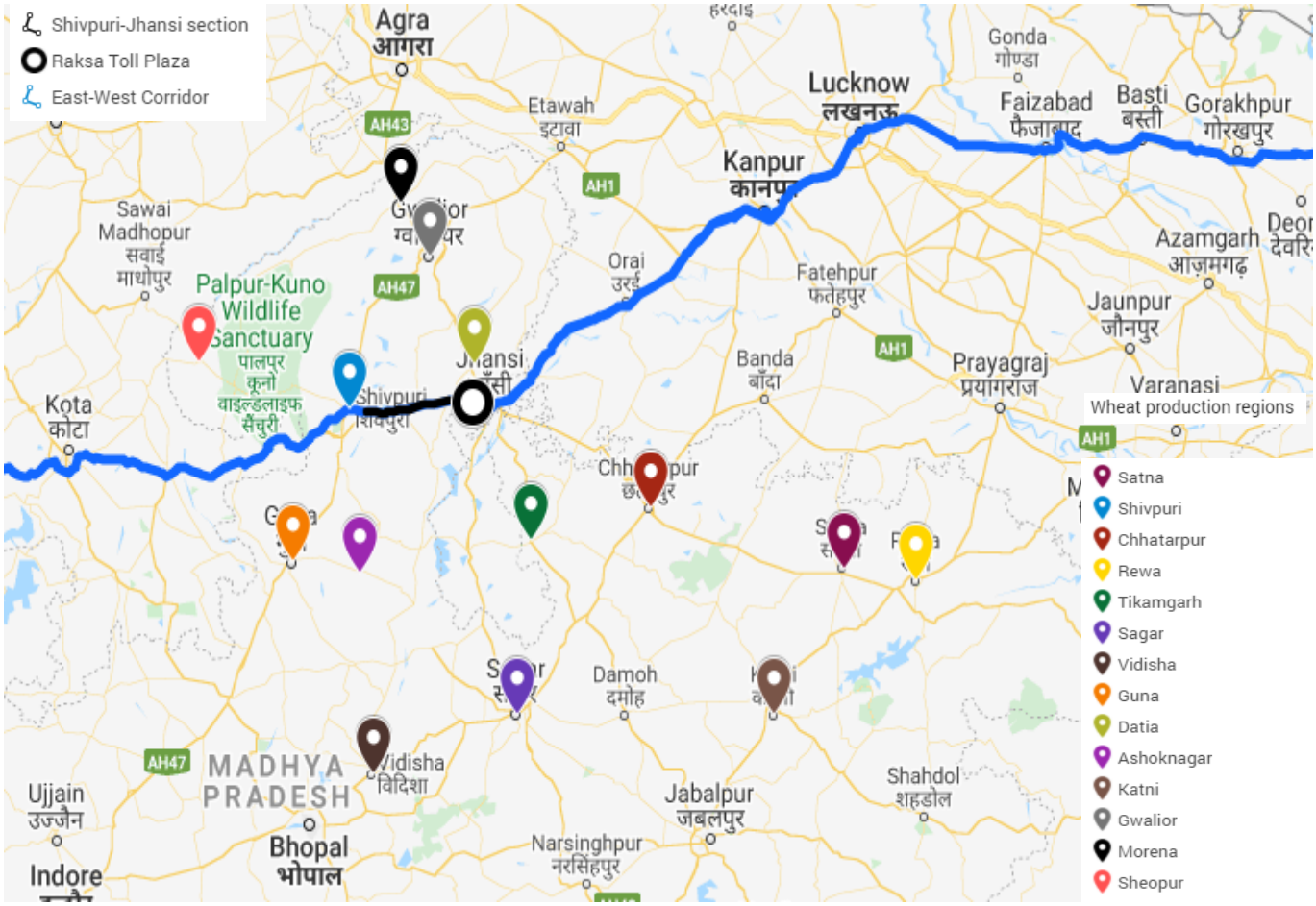
The major kharif horticulture crops grown in Madhya Pradesh are tomato, chilli, onion, okra, and brinjal. Vegetable production (volume) increased at 6% CAGR between fiscals 2015 and 2020 in Madhya Pradesh. Indore, Ujjain, Chhindwara, Sagar, and Dewas clusters grow onions. Dewas, Ujjain, Indore, and Sagar are the key regions for potato production. Shivpuri, Sagar, Chhindwara, and Jhabua are the key tomato producing regions.

Tomato, onion, okra, and banana are the key crops of Maharashtra. In Gujarat, the key vegetable crops are tomato, brinjal, banana, and okra. Gujarat and Maharashtra saw vegetable production volume increase CAGR of 1% and 11%, respectively, during fiscals 2015-20.

Madhya Pradesh and Uttar Pradesh are major wheat producers in the country. Wheat production in Madhya Pradesh and Uttar Pradesh increased at 4% and 10% CAGR between fiscals 2014 and 2019, respectively. The top five vegetable growing states, as of fiscal 2019, are Uttar Pradesh (26 MMT), West Bengal (12.8 MMT), Madhya Pradesh (15.6 MMT), Bihar (14.4 MMT), and Gujarat (13.4 MMT).

Madhya Pradesh accounts for 20-25% of India’s wheat production. In marketing year (January to December) (MY) 22, it produced 22% of the country’s total wheat. In the same year, Uttar Pradesh produced 29%, while Gujarat and Rajasthan produced 4% and 8%, respectively. The wheat producing regions marked in the map account for 35-40% of total wheat production in Madhya Pradesh. Each region produces 2-4% of wheat in the state; Shivpuri ranked third in fiscal 2019. Paddy (kharif) is a prominent crop in Madhya Pradesh and Uttar Pradesh. In MY21, these states produced 5% and 15% of India's total paddy (kharif), respectively.

Figure 14: Key wheat producing regions in Madhya Pradesh close to the project stretch



Source: Google Maps, CRISIL Research

The Indian agriculture sector is highly volatile as it is still dependent on the monsoon. Historical trends across key states close to the project stretch (Uttar Pradesh and Madhya Pradesh) have shown volatile production of agri commodities. In order to account for such volatility, agri produce traffic is expected to grow 3% in fiscal 2024. In the long term, 2-3% growth is expected.

Consumer products and foods category comprises FMCG, groceries and processed food

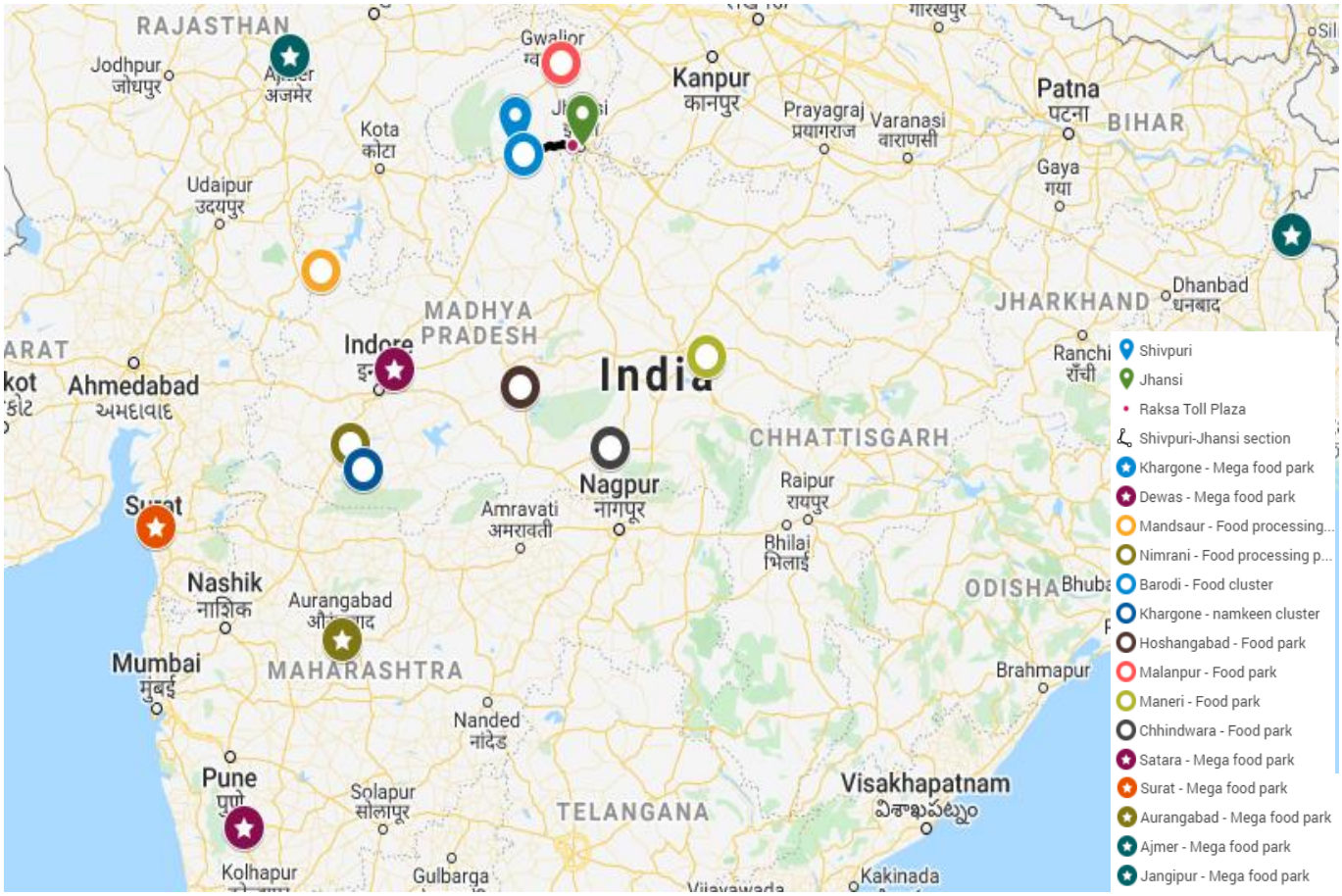
The consumer products and foods category transported on the project stretch constitutes grocery items, FMCG, and processed food. Uttar Pradesh, Madhya Pradesh, Maharashtra, Gujarat, and West Bengal are the key destinations for this category.

The consumer foods industry is set for healthy growth in the short term due to increased investments in the industry backed by favourable economic and demographic conditions in the key destination states. Madhya Pradesh, the main origin point, has several strong food processing clusters. Indore, Ujjain, and Bhopal have processing clusters of fruit, vegetables, spices, pulse, rice milling, flour milling, dairy, and ready-to-eat food. Several food parks exist in the vicinity of Indore and Bhopal that aid traffic on the stretch. We expect traffic of this commodity to grow 3-4% in the short term and 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. This will benefit the food processing cluster in Madhya Pradesh. The key destination states of Uttar Pradesh,

Madhya Pradesh, Maharashtra, Gujarat, and West Bengal are witnessing a rise in urbanisation, change in consumer lifestyles, and an increase in disposable incomes.

Figure 15: Alignment of operational and upcoming mega food parks along the key O-D regions



Source: Google Maps, CRISIL Research

Table 22: Upcoming mega food parks along the key O-D regions

Upcoming mega food park	State	Project cost (Rs million)
Pristine Mega Food Park	Bihar	1,201.3
BIADA, Muzaffarpur	Bihar	1,805.7
Fanidhar Mega Food Park, Mehsana	Gujarat	1,510.5
Wardha Mega Food Park, Wardha	Maharashtra	923.6
Shree Ram Mega Food Park, Bikaner	Rajasthan	1,328.1
Operational = 22; under implementation = 19		

Source: MOFPI, CRISIL Research

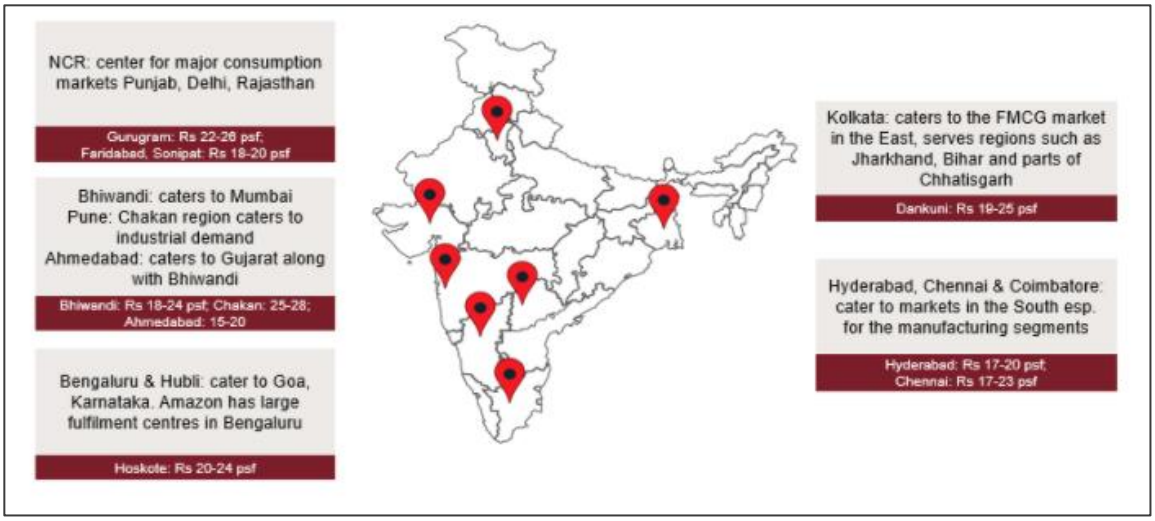
Key warehousing cluster and connectivity to key cities drive courier and parcel traffic

Maharashtra, Gujarat, and Madhya Pradesh are the key origination states for the courier and parcel category. The key destination is Uttar Pradesh, followed by West Bengal and Madhya Pradesh. Outlook for the courier and parcel category is associated with the established presence of its origination points as key warehousing clusters.

Bhiwandi, Pune, and Ahmedabad are the key warehousing clusters catering to the respective states and the neighbouring regions. Demand is driven by the key consumption centres of Kanpur, Lucknow, Jhansi, and eastern states of West Bengal and Bihar. We expect traffic to grow 9% over the short term and at ~8% CAGR over the long term.

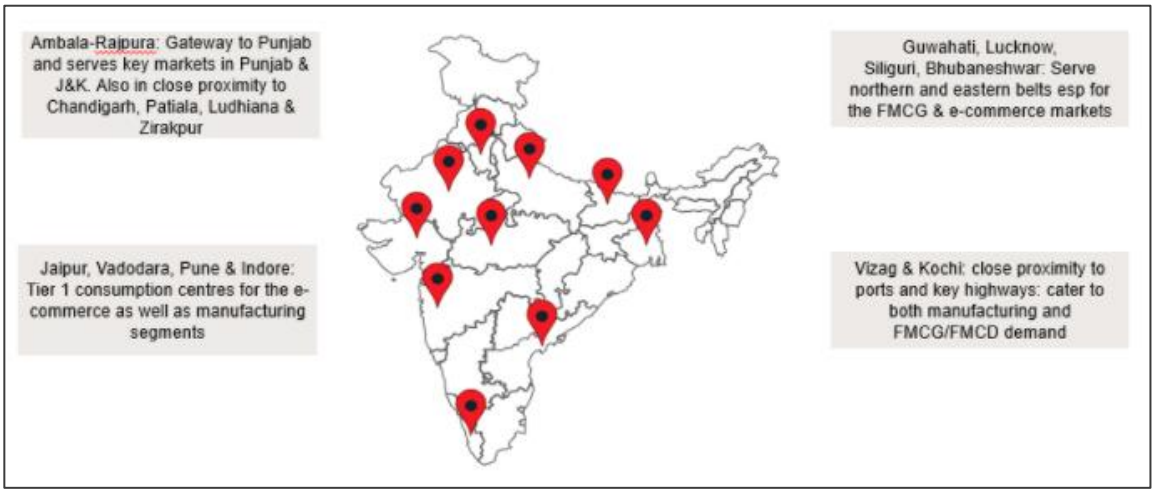
Demand will be driven by robust consumption demand potential in Uttar Pradesh, Gujarat, and Maharashtra, along with the optimistic outlook for Kanpur, Lucknow, Ahmedabad, Mumbai, Pune, Indore, and Jhansi.

Figure 16: Key hubs of warehousing in India



Source: CRISIL Research

Figure 17: Emerging small warehousing hubs in India



Source: CRISIL Research

Housing, infrastructure push to goad transport of iron & steel and construction materials

The project stretch is used to transport iron and steel and construction materials such as bricks, cement, stone and tiles. The origin points for these commodities are Uttar Pradesh, Rajasthan, and Gujarat. Kolkata is the key origin point for iron and steel. Other key origin points are Kota in Rajasthan and regions in close proximity having clusters of cement and stone manufacturing. Gujarat has a major tiles cluster in Morbi. Uttar Pradesh has grinding cement manufacturing units. Madhya Pradesh also has a strong cement manufacturing cluster.

In the past five years, the central (Uttar Pradesh and Madhya Pradesh) and eastern (Odisha, Bihar and West Bengal) regions exhibited strong demand led by a surge in infrastructure, construction, and rural housing. These two regions were less impacted by pandemic-induced demand disruptions in fiscal 2021, due to higher rural penetration. West Bengal, Madhya Pradesh, Bihar, Odisha, and Uttar Pradesh form almost 65% of under-construction houses under PMAY-Rural. We expect traffic to grow ~6% in the short term.

As seen in the past decade, the eastern and central regions are expected to continue to drive demand for construction materials in India in the medium term on the back of continued government thrust on infra and housing in the region. A plethora of infrastructure projects and pickup in urban housing in Uttar Pradesh, as well as healthy rural housing demand in Madhya Pradesh will aid traffic of construction materials. Key infrastructure projects in the region such as metro projects in Bhopal, Meerut, Agra and Indore; smart city-related development in Madhya Pradesh (Bhopal, Indore, and Jabalpur) and Uttar Pradesh (Lucknow); and several road and highway projects will boost demand.

During fiscals 2023-27, cement capacity additions in the central region (Uttar Pradesh and Madhya Pradesh) are projected at ~29 million tonne. Rising income levels and rural consumers' growing preference for ceramic tiles will drive long-term growth of construction material traffic on the stretch. Government initiatives such as 100 smart cities, Housing for All by 2022, increase in deduction limit for housing loan, and relaxed norms for issuing long-term bonds by banks for financing affordable housing will aid growth. We expect construction material traffic to increase 5-6% in the long term.

Strong pipeline of infrastructure projects to boost growth in the region

Top 100 projects across Indore, Shivpuri, Jhansi, Kanpur (Dehat), Kanpur (Nagar), and Lucknow have been considered at a total project cost of Rs 2,931 billion. Railways, coal-based power plants, real estate, roadways, and airways sectors account for nearly 78% of the project cost.

Table 23: Key upcoming infrastructure projects in the influence area of the project stretch

Key upcoming projects in Indore, Shivpuri, Jhansi, Kanpur, and Lucknow	Implementation stage	Project cost (Rs billion)
Light Metro Rail (Indore) Project	Under execution	222.8
Coal Based Power (Ghatampur) Project	Under execution	172.4
Metro Rail (Kanpur) Project	Under execution	137.2
Airport (Lucknow) Project - Modernisation	Planning	107.0
Indore-Manmad Railway Line Project	Planning	99.7
Anpara Coal Based Power (Bhognipur) Project - Phase II	Planning	71.9
Coal Based Power (Bhognipur) Project	Planning	71.9
Lucknow Metro Rail Project (Phase-IA)	Under execution	69.3
Mega Leather Park (Ramaipur)	Under execution	58.5
Panki Coal Based Power Project - Extension	Under execution	58.2
Outer Ring Road (Lucknow) Project	Planning	52.1

Key upcoming projects in Indore, Shivpuri, Jhansi, Kanpur, and Lucknow	Implementation stage	Project cost (Rs billion)
Smart City (Indore) Project	Under execution	51.1
Jhansi-Khairar-Manickpur Railway Line Project	Under execution	49.6
Dholpur-Jhansi 4th Railway Line Project	Nascent	48.7
Solar Park (Jalaun, Allahabad, Mirzapur and Kanpur)	Under execution	48.0
Prabandh Nagar Residential Scheme	Planning	47.9
Mathura-Jhansi 3rd Railway Line Project	Under execution	43.8
Indore-Jabalpur Railway Line Project	Planning	43.2
Residential Township (Lucknow) Project (Paarth Republic)	Under execution	40.0
Automotive Testing Facility (Multi State) Project	Under execution	38.3

Source: Projects Today, CRISIL Research

Table 24: Sectors in the influence area of the project stretch

Sectors of upcoming projects in Indore, Shivpuri, Jhansi, Kanpur, and Lucknow	Project cost (Rs billion)
Services and utilities	2,931
Electricity and non-conventional energy	2,300
Manufacturing	437
Irrigation	102
Mining	91

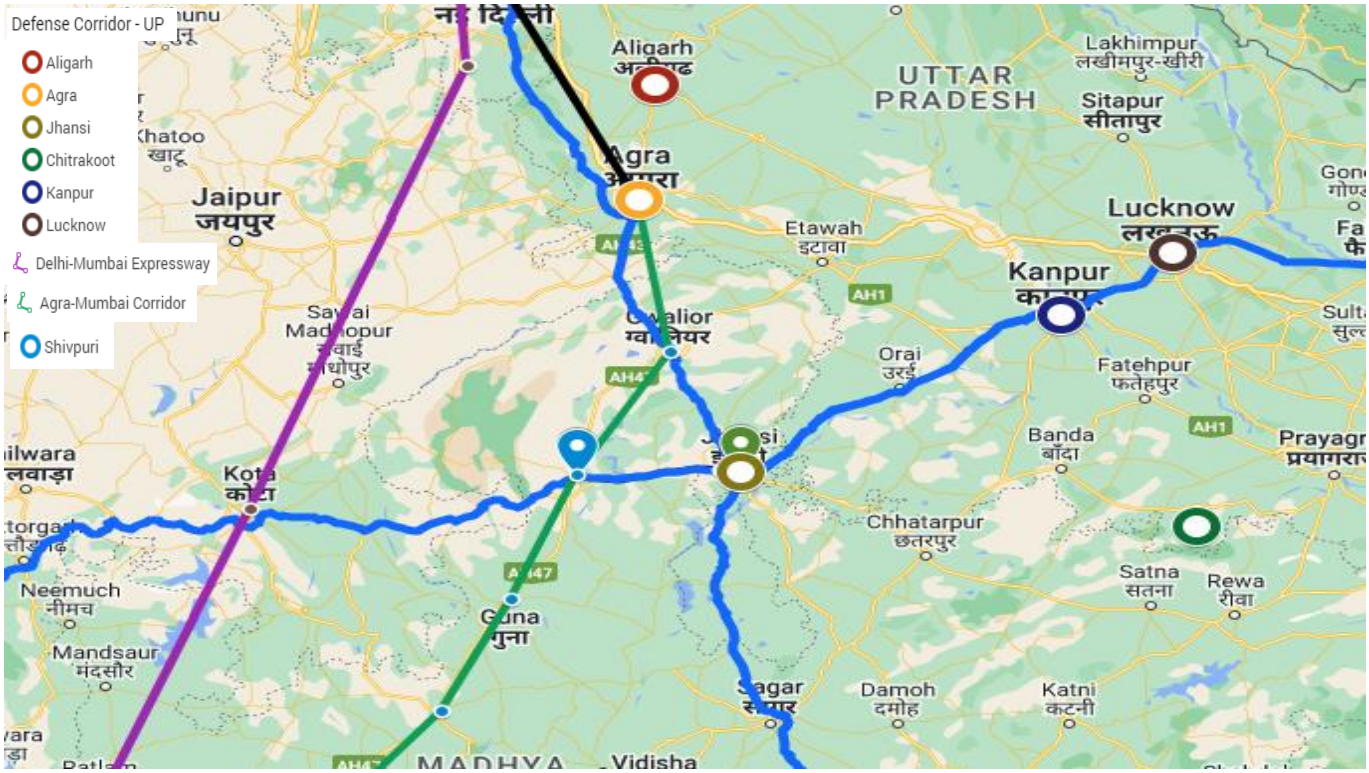
Source: Projects Today, CRISIL Research

Regional growth in infra projects and better connectivity positive for the project stretch

The region's connectivity is expected to improve with the upcoming Agra-Mumbai Economic Corridor and Delhi-Mumbai Expressway (DME). The project stretch will be a major feeder route to these upcoming road projects. The East-West Corridor will be named National Corridor and work on lane expansion and de-congestion of the East-West Corridor through rings roads, bypass, elevated corridors etc. is progressing under Bharatmala Pariyojana. The proposed Jhansi-Kanpur-Lucknow-Gorakhpur-Kushinagar Expressway, which will connect the two border points of Uttar Pradesh, will directly connect to the project stretch and boost traffic.

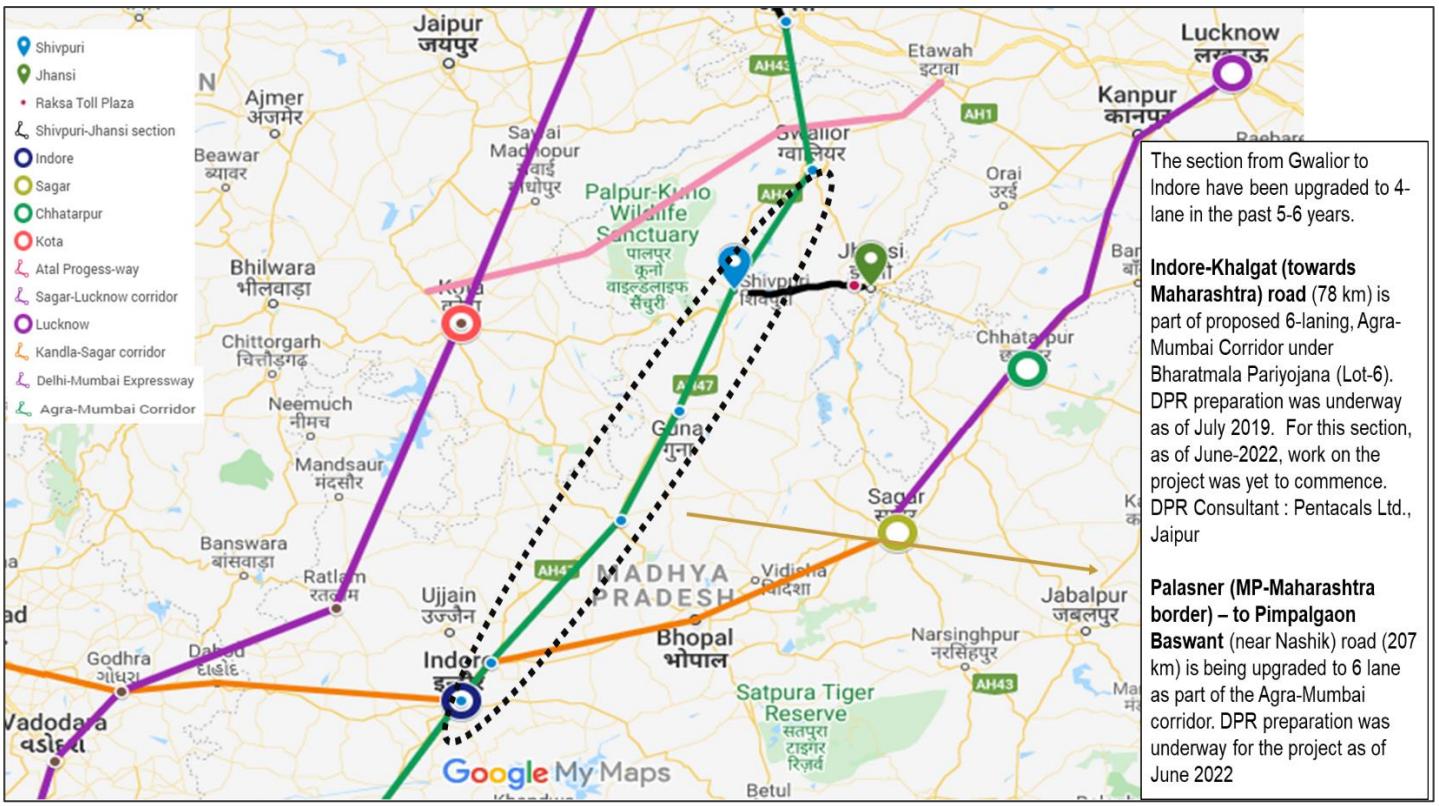
The upcoming Defence Industrial Corridor in Jhansi, Kanpur, Lucknow, Chitrakoot, Agra, and Aligarh will augment the region's industrial profile and boost traffic on the stretch. Uttar Pradesh Expressways Industrial Development Authority (UPEIDA) has been appointed as the key authority for project execution. The land acquisition process is currently underway. The authority created a land bank of 1,546 ha already and has a target of 5,000 ha. It has also signed 68 MOUs with various private players, as of date. The 2020 Uttar Pradesh Electronics Manufacturing Policy, proposes to establish a medical electronic manufacturing cluster in the Lucknow-Unnao-Kanpur zone.

Figure 18: Map of defence corridor and other key upcoming road stretches in the influence region of project stretch



Source: NHAI, UPEIDA, Google Maps, CRISIL Research

Figure 19: Alignment of and update on the Agra-Mumbai Corridor under the Bharatmala programme



The section from Gwalior to Indore have been upgraded to 4-lane in the past 5-6 years.

Indore-Khalgat (towards Maharashtra) road (78 km) is part of proposed 6-laning, Agra-Mumbai Corridor under Bharatmala Pariyojana (Lot-6). DPR preparation was underway as of July 2019. For this section, as of June-2022, work on the project was yet to commence. DPR Consultant : Pentacals Ltd., Jaipur

Palasner (MP-Maharashtra border) – to Pimpalgaon Baswant (near Nashik) road (207 km) is being upgraded to 6 lane as part of the Agra-Mumbai corridor. DPR preparation was underway for the project as of June 2022

Note: *Atal Progressway and the Lucknow-Kandla Corridor are under planning stage; Green coloured alignment from Gwalior to Indore is 4-lane; Proposed 6-laning of Agra-Mumbai Corridor under the Bharatmala project is under planning stage

Source: Projects Today, NHAI, Google Maps, CRISIL Research

5 Assessment of impact factors

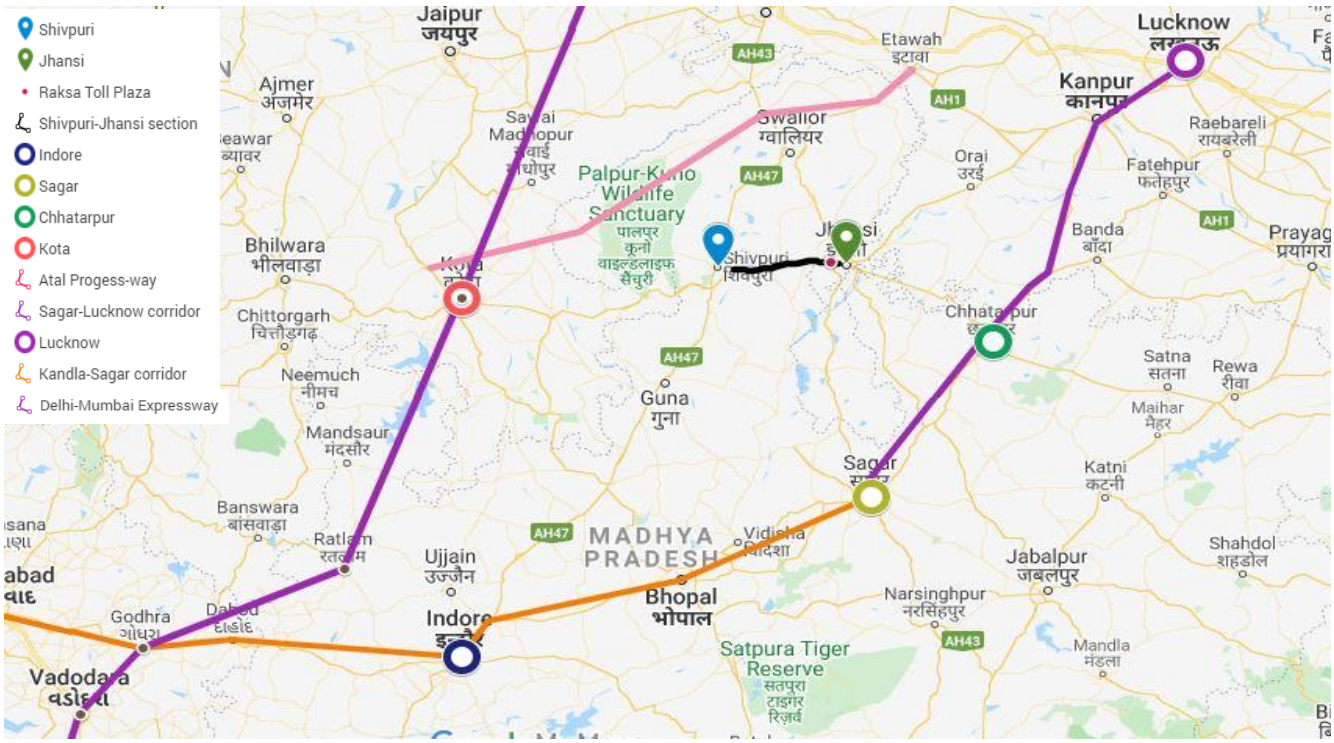
Atal Progressway and Lucknow-Kandla Economic Corridor pose long term risks to the project stretch, as they offer comparable speed and distance benefits

As discussed earlier, there exists an alternative route between Lucknow and Indore which passes through Chhatarpur and Sagar. This route takes 16-17 hours and the distance is 801 km. The key reason for this longer travel time is that the alternative route is a mix of two and four lanes. Kanpur to Bhopal section of the alternative route, of nearly 527 km, is 2-lane. The Maharashtra and Gujarat traffic can also use this road, as they converge at Indore, where they will have the option to go towards the project stretch or towards Sagar and use the alternative road.

Under the Bharatmala programme, the sections from Lucknow to Sagar and Sagar to Kandla are proposed for augmentation. Hence, in the future, when the augmentation gets completed, the alternative route will be a feasible route in competition to the project stretch. We have assumed the impact of this augmented road to begin in fiscal 2033.

Further, there is a greenfield expressway coming up in the region. The 4-lane access controlled Atal Progressway (Chambal Expressway) will connect Etawah (Uttar Pradesh) to Kota (Rajasthan). The connection point is likely to be the Agra-Lucknow Expressway on one end and the Delhi-Mumbai Expressway on the Kota side. Thus, the traffic from the eastern region converging at Lucknow will have an alternative to the project stretch. The traffic can travel on the Agra-Lucknow Expressway and Atal Progressway to reach Rajasthan. They also have the Delhi-Mumbai Expressway connectivity to Gujarat and Maharashtra, which is expected to begin operations in mid-2024. For the Atal Progressway, we have assumed fiscal 2029 to be start year for the road stretch.

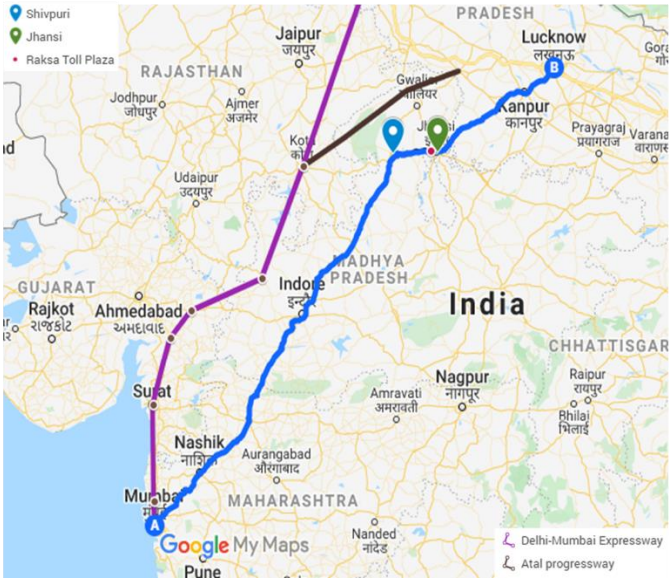
Figure 20: Alignment of key alternative routes to the project stretch



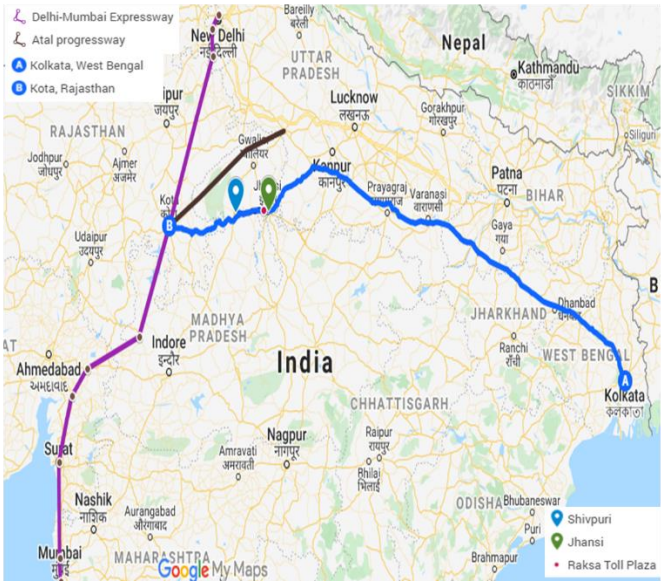
Source: NHAI, Google Maps, CRISIL Research

Figure 21: Traffic movement between east and west using the project stretch vs DME and Atal Progressway

Traffic from Gujarat-Maharashtra to Kanpur-Lucknow could divert to DME and Atal progress-way



Traffic from Kanpur-Lucknow and Eastern states to Rajasthan could divert to Atal progress-way



Source: NHAI, Google Maps, CRISIL Research

The generalised cost ratio has been defined by calculating the vehicle operating time cost, vehicle operating cost and toll rates. The toll rates considered for cost analysis are for fiscal 2023. Toll rates for the upcoming augmented Lucknow-Sagar Corridor and Sagar-Kandla Corridor are based on actual DME rates, after dividing by 1.25 as per NHAI rules. The toll rates for Atal Progressway are based on per km rates of DME. Based on the cost assessment, diversion percentages are derived as per IRC norms. A generalised cost ratio (GCR) greater than one indicates that the cost of travelling on the project stretch is cheaper than the alternative. A GCR of one denotes ~50% diversion to the alternative stretch.

The traffic at risk of diversion to Atal Progressway is calculated from the OD survey where traffic between 1) Rajasthan, and Uttar Pradesh, West Bengal, Assam, Bihar, Jharkhand and Delhi, 2) Maharashtra and Uttar Pradesh (selected regions), and 3) Gujarat and Uttar Pradesh (selected regions) have been considered.

To assess the at-risk traffic for Lucknow-Sagar and Sagar-Kandla corridors, traffic between 1) Madhya Pradesh (selected regions) and all states included in the OD survey, 2) Maharashtra, and Uttar Pradesh, Assam, Bihar, Jharkhand and West Bengal, and 3) Gujarat, and West Bengal, Assam, Bihar and Jharkhand have been considered. The at-risk traffic is then multiplied with the diversion percentage, which is defined based on IRC-defined formulae and considering that the project stretch as part of a national corridor. This process yields the percentage of diverted traffic. We have considered a lower diversion percentage than calculated, as the project stretch is part of the National Corridor i.e., the East-West Freight Corridor. For this reason, we believe the project stretch will continue to remain the preferred route for east-west traffic.

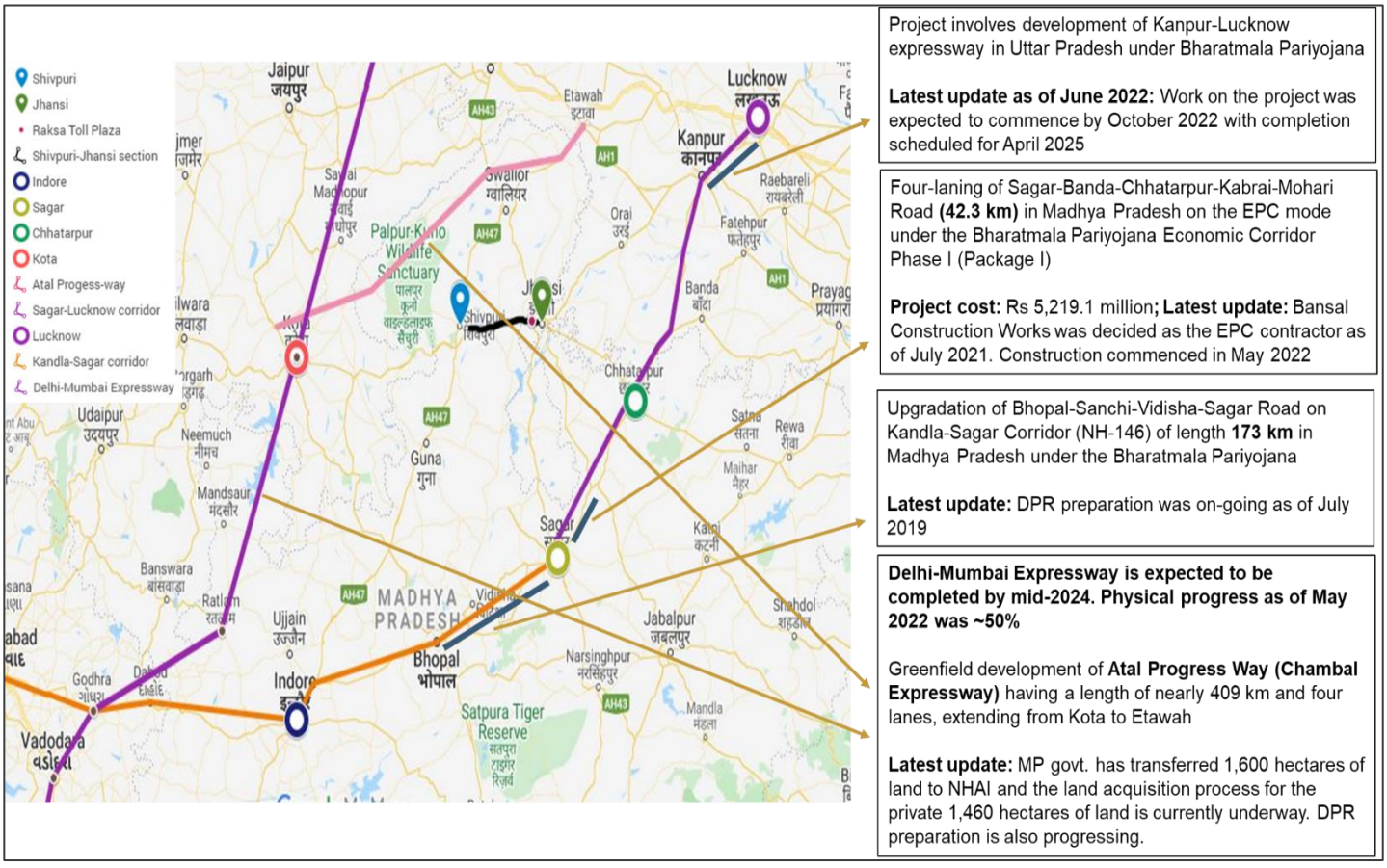
Table 25: GCR for the project stretch

Vehicle type	Post upgradation scenario Lucknow-Indore (via Sagar)	Post upgradation scenario Lucknow-Mumbai (via Sagar)	Post upgradation scenario Lucknow-Ahmedabad (via Sagar	Lucknow-Kota (via Atal Progress way)	Lucknow-Mumbai (via DME and Atal Progress way)	Lucknow-Ahmedabad (via DME and Atal Progress way)
Car	1.04	1.01	1.04	0.98	1.01	1.03
Bus	1.04	1.01	1.03	1.01	1.01	1.05
LCV	1.02	1.01	1.03	1.01	1.01	1.02
2-axle	1.04	1.02	1.04	1.01	1.01	1.03
3-axle	1.03	0.99	1.03	1.01	0.99	1.00
MAV	1.04	1.02	1.04	1.01	1.02	1.02

Note: GCR > 1 indicates cost of travelling on project stretch is cheaper than the alternative and the GCR = 1 denotes ~50% diversion to the alternative stretch

Source: NHAI, Google Maps, CRISIL Research

Figure 22: Alignment of and update on the alternative routes considered in the traffic assessment



Project involves development of Kanpur-Lucknow expressway in Uttar Pradesh under Bharatmala Pariyojana

Latest update as of June 2022: Work on the project was expected to commence by October 2022 with completion scheduled for April 2025

Four-laning of Sagar-Banda-Chhatarpur-Kabrai-Mohari Road **(42.3 km)** in Madhya Pradesh on the EPC mode under the Bharatmala Pariyojana Economic Corridor Phase I (Package I)

Project cost: Rs 5,219.1 million; **Latest update:** Bansal Construction Works was decided as the EPC contractor as of July 2021. Construction commenced in May 2022

Upgradation of Bhopal-Sanchi-Vidisha-Sagar Road on Kandla-Sagar Corridor (NH-146) of length **173 km** in Madhya Pradesh under the Bharatmala Pariyojana

Latest update: DPR preparation was on-going as of July 2019

Delhi-Mumbai Expressway is expected to be completed by mid-2024. Physical progress as of May 2022 was ~50%

Greenfield development of **Atal Progress Way (Chambal Expressway)** having a length of nearly 409 km and four lanes, extending from Kota to Etawah

Latest update: MP govt. has transferred 1,600 hectares of land to NHAI and the land acquisition process for the private 1,460 hectares of land is currently underway. DPR preparation is also progressing.

Source: Projects today, NHAI, Google Maps, CRISIL Research

Project stretch will continue to be a preferred route on account of preference for industrial corridors and law and order issues on alternate routes

Project stretch vs Atal Progressway

Atal Progressway passes through the Chambal region and historically, the region has been known for law and order issues. Furthermore, it has been observed that expressways have lower preference across commercial traffic compared to national highways. Commercial traffic also prefer wider roads and on account of expected augmentation of Kanpur Jhansi stretch to 6 Lane (228Kms), Project stretch will continue to be preferred route as compared to Atal Progressway which is a 4 Lane route. With augmentation to 6L the preference of Atal Progressway will be lower. Project stretch is likely to be preferred over Atal Progressway on account of key industrial clusters present on project route stretch. Empty truck traffic prefers road stretches which pass through industrial corridors.

Commercial vehicles' preference of national highways

This preference is visible in the traffic composition of two parallel routes between Delhi and Agra i.e NH-2 and the Yamuna expressway. Yamuna expressway's traffic is composed of ~80% passenger vehicles. While ~70% of the traffic on NH-2 is commercial. NH-2 provides connectivity to key freight aggregation points such as ICD Tughlakabad and industrial regions such as Okhla, Badarpur, Saidabad, Faridabad, Ballabhgarh and Palwal. NH-2 is preferred over Yamuna Expressway as for travel time of 4-5 hours (saving of 1 hour), truckers prefer paying lower toll than paying higher toll rates on Yamuna expressway.

Detailed below is an example of traffic travelling between Delhi to Lucknow and have two options between Agra and Lucknow that is NH19 and Agra Lucknow expressway. Gurau toll plaza exists on NH-19, between Agra and Lucknow. Fatehabad toll plaza is located on the Agra Lucknow Expressway. The Delhi-Lucknow commercial traffic existing on both the plazas is as follows,

Table 26: Comparison of traffic between Agra and Lucknow on NH-19 and Agra-Lucknow expressway

Vehicle category	ADT at Gurau TP – NH19 (Delhi-Lucknow)	ADT at Fatehabad TP – AL expressway (Delhi-Lucknow)	Share (%) on AL exp	Diversion % per VOC-VOT cost analysis
LCV	48	32	40%	72%
2-axle	26	12	32%	65%
3- axle	4	5	53%	57%
MAV	28	23	46%	63%
Total MAV (ADT) – both toll plazas	51		As per the 63% diversion, the MAV traffic on AL Exp should be 32 vehicles	

Source: Projects today, NHAI, Google Maps, CRISIL Research

On Agra-Lucknow highway (NH-19) diversion to Agra-Lucknow expressway is lower than estimated diversion. The share of currently existing MAV traffic on the expressway is lower by ~28% than the calculated share as per the cost analysis.

Project stretch v/s Lucknow Indore Via Chhatarpur –Sagar

The project stretch is likely to be preferred over Lucknow –Indore via Chhatarpur on account of key industrial clusters present on project route stretch. Empty truck traffic prefers industrial corridors due to possibility of availing cargo. Also, the Kanpur Jhansi stretch (228 km) is likely to undergo capacity augmentation from 4 Lane to 6 Lane. Hence, project stretch will continue to be preferred routes as compared to Lucknow Indore Via Chhatarpur –Sagar route which will be 4 Lane. Wider routes are preferred by freight traffic.

Project stretch is part of Golden Quadrilateral

The project stretch forms part of the golden quadrilateral route connecting east and west region and provide connectivity to Delhi-Mumbai Expressway at Kota. The route is among the key national highway routes in the country and is considered preferred routes for road traffic on account of connectivity to other key highways while passing through high consumption centres in India. Going forward as well, on account of being key GQ routes, the project stretch will continue to remain a preferred route for road traffic.

NH-27 i.e the East-West corridor will see capacity augmentation under the Bharatmala program in the future. The road from Kanpur to Jhansi currently has ~30,000 PCUs and capacity augmentation (4-lane to 6-lane) is likely to happen over the medium term, considering 40,000 PCUs is the capacity augmentation threshold for the project stretch. Wider roads will be preferred by the freight traffic compared to the alternatives which will be 4 lane roads.

Under the Bharatmala program, the Golden-Quadrilateral and North South-East West, corridors would be declared as National corridors as they carry nearly 35% of India's freight. Lane expansion, and de-congestion of these National Corridors is proposed through Ring Roads and bypasses/ elevated corridors. Around 5,000 kms are being taken up under this category in Phase-I of the program.

Commercial traffic's preference of road stretch passing through Industrial clusters

To travel between Kanpur/Lucknow and Indore using the project stretch, traffic crosses Shivpuri, Datia, Guna, Ashoknagar, Shajapur, Rajgarh, Ujjain, Dewas and Indore districts. These districts together account for ~27% of MP state's net value added for secondary economic activities (manufacturing). Commercial traffic prefers to travel through industrial areas to ensure full truck load travel to pick-up and delivery goods on the way. Also while travelling back empty truck take the routes through industrial clusters to ensure they can pick up goods on way back. Given the presence of manufacturing industries, the project stretch offers strong freight aggregation centres along the route wherein the commercial vehicles can pick up freight.

The Atal Progressway passes through Sheopur, Bhind, and Morena districts form the Chambal region. These three districts account for only ~3% of MP state's net value added for secondary economic activities (manufacturing). Also, the Chambal region has lagged in terms of economic growth and historically law and order issues have been prevalent.

The other alternative road i.e Lucknow/Kanpur to Indore via Chhatarpur and Sagar passes through Hamirpur, Mahoba and Chhatarpur districts. Chhatarpur accounts for only 2% of MP state's net value added for secondary economic activities (manufacturing). Hamirpur and Mahoba districts together account for only ~0.4% of UP state's gross value added for secondary economic activities (manufacturing).

Thus, in both cases the lack of manufacturing activity, the alternate routes do not offer strong freight aggregation centres which commercial traffic prefers.

Upcoming industrial clusters and better connectivity near project stretch will led to lower diversion

The upcoming Defence Industrial Corridor in Jhansi, Kanpur, Lucknow, Chitrakoot, Agra, and Aligarh will augment the region's industrial profile and boost traffic on the stretch. Uttar Pradesh Expressways Industrial Development Authority (UPEIDA) has been appointed as the key authority for project execution. The land acquisition process is currently underway. The authority created a land bank of 1,546 hectares already and has a target of 5,000 hectares. It has also signed 68 MOUs with various private players, as of date. This will boost the industrial profile of the region and strengthen the preference for Kanpur-Jhansi route and the project stretch route .

The UPEIDA has proposed Jhansi-Kanpur-Lucknow-Gorakhpur-Kushinagar Expressway. This will connect the two border points of Uttar Pradesh and will directly connect to the project stretch, boosting traffic of the stretch. Under the 2020 UP Electronics Manufacturing policy, a medical electronic manufacturing cluster in the Lucknow-Unnao-Kanpur zone, is proposed to be established.

Service Road + access control is planned at Shivpuri to reduce congestion of traffic on the E-W corridor under the Bharatmala program. Shivpuri also has 2 proposed Ring Roads. Shivpuri also has a proposed logistics park which is under planning stage and will be located in Deherwara (Dist. Shivpuri). Kanpur is also a location for Multi-modal logistics park.

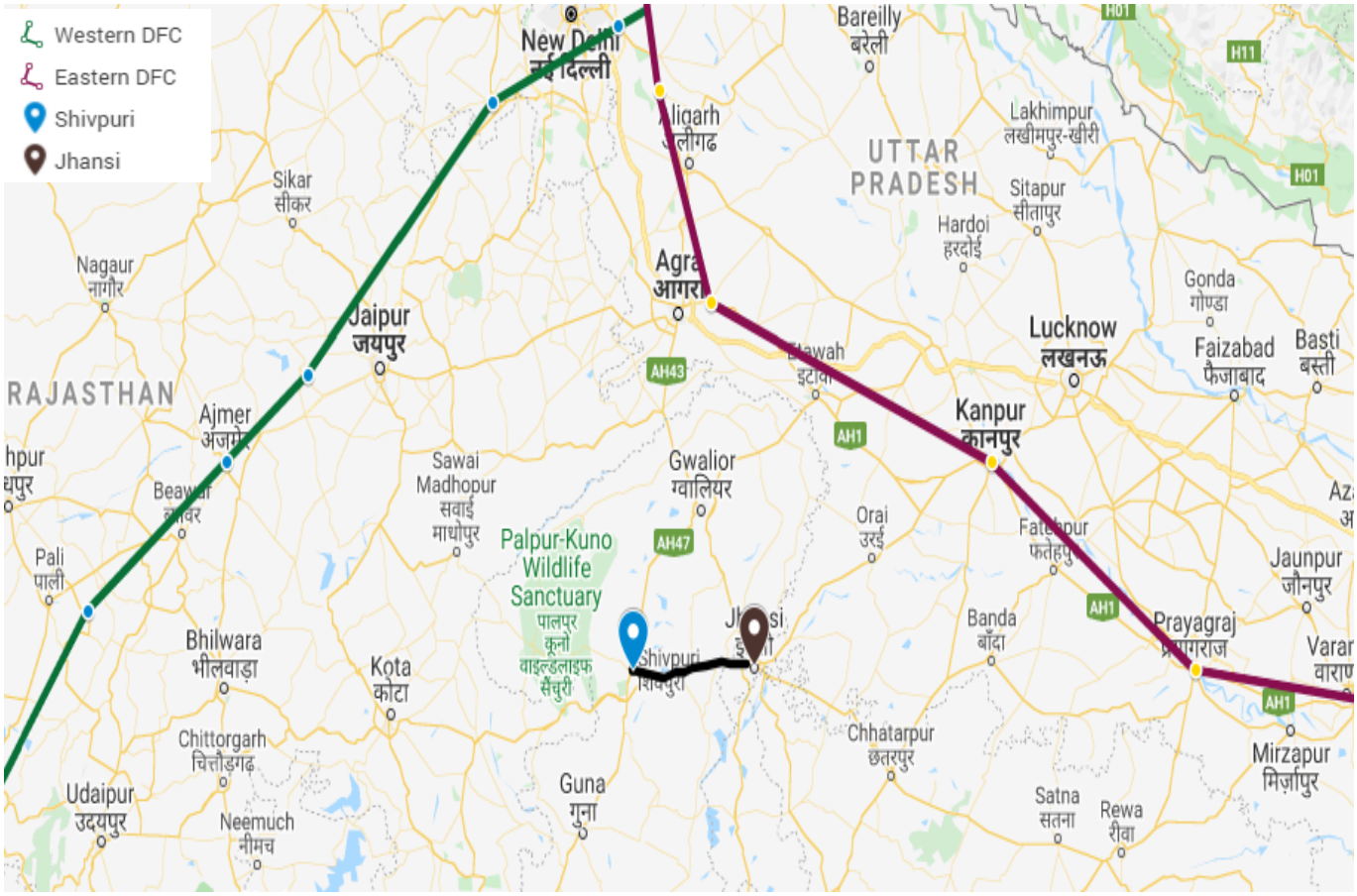
For the above reasons, the projects stretch will witness lower diversions to the alternate routes. CRISIL Research has assumed lower diversion rate by -42.9% for LCVs, -43.9% for 2-Axle, -47.2% for 3-Axle and -42.8% for MAV

Shivpuri-Jhansi section traffic to remain unaffected by the DFCs

Dedicated freight corridors (DFCs) are constructed exclusively for movement of goods. The first phase of the project includes construction of the Western DFC from Mumbai to Dadri, near Delhi, and the Eastern DFC from Dankuni in West Bengal to Ludhiana in Punjab. The former will mainly cater to containers as 60% of container traffic originates from this region. The later will cater to dry bulk cargo. The DFCs aim to regain railway's lost share in handling of key commodities such as coal, steel, iron ore, cement, food grains, fertilisers, petroleum products, and containers.

The project stretch has a very small proportion of the aforementioned commodities, with none travelling on to the stretch from the northern region. Given the high proportion of agri produce on the stretch originating in Madhya Pradesh, the same could be transported to eastern parts of the country via DFCs. Thus, West Bengal and Bihar could benefit from this arrangement to a limited extent.

Figure 23: Alignment of DFCs with regard to the project stretch



Source: DFCCIL, Google Maps, CRISIL Research

Diversion to alternative routes could lead to ~17-18% loss in traffic

The impact of the alternative routes shown below represent a loss of traffic for the project stretch. We have calculated an impact of -17.4% PCUs, denoting that the traffic would have been higher by 17.4% in fiscal 2042 had there been zero diversions. The impact presented here is inclusive of the qualitative views given earlier on the preference of the project stretch corridor compared to the alternate routes.

The upcoming Atal Progressway and planned economic corridors pose a threat of traffic loss across major origin-destination regions. Atal Progressway is expected to take away ~5.2% of the overall PCU of the project stretch, and the Lucknow-Kandla Economic Corridor, 12.9%. We have assumed the Atal Progressway to impact the stretch starting fiscal 2029, and Kandla-Sagar and Lucknow-Sagar corridors from fiscal 2033

Table 27: Impact of various factors on the project stretch traffic

Factors	GST impact	Natural shifts	Truck aggregation	Atal Progressway	Lucknow-Kandla Economic Corridor	Cumulative impact of the alternate routes	Average annual daily traffic (AADT)	
				FY29 onwards	FY33 onwards		FY42 (without diversions)	FY42 (with diversions)
Raksha toll plaza								
LCV*	1.5%	-0.8%	-0.3%	-4.8%	-14.1%	-18.3%	408	333
2-axle*	-1.4%	-1.6%	-0.2%	-5.1%	-13.7%	-18.0%	2,154	1,766
3- axle*	-1.6%	-1.2%	0.0%	-5.0%	-12.5%	-16.9%	1,307	1,087
MAV*	0.6%	0.6%	0.0%	-5.3%	-12.7%	-17.3%	4,023	3,326
Overall PCU	-0.1%	-0.2%	-0.1%	-5.2%	-12.9%	-17.4%	**29,098**	**24,025**

*Note: The impact is based on traffic volume in vehicle terms

Source: CRISIL Research

Traffic on the project stretch is commodity-specific, and there are no major warehousing hubs on the stretch where the impact of GST is prominent. Hence, we do not expect GST to affect traffic on the project stretch significantly. Truck aggregation will majorly impact LCVs and 2-axle vehicles on the stretch. We do not expect MAV traffic to be impacted by truck aggregation. The share of LCVs in total PCU is low, and hence, it would also have a small impact overall. A natural shift towards heavy vehicle categories in the long term to meet higher demand as economy grows, could lead to increase in the proportion of heavy vehicles.

6 Traffic and revenue projection for the remaining concession

Traffic projections

The traffic (PCU) on the project stretch is expected to grow at 3.9% CAGR between fiscals 2023 and 2042 (remaining concession period). The traffic will be negatively impacted by the two upcoming road stretches — the Atal Progressway, and the Sagar-Lucknow and Kandla-Sagar Corridor. Impact of the Atal Progressway will begin in fiscal 2029, with full impact seen in fiscal 2030. The impact of the corridors will begin in fiscal 2033, with full impact in the following fiscal. With these getting operational, the impact of the Atal Progressway will lessen on the project stretch

The stretch will undergo capacity augmentation when the traffic exceeds 40,000 PCU for three consecutive years. As per our projections, there is no risk of capacity augmentation till end of fiscal 2042.

Table 28: Projected AADT, FY23-43

Year	Car	Bus	LCV + minibus	2-axle	3-axle	MAV	Total	Total PCU	On-year growth (%)
FY23P	2,339	120	185	865	531	1,723	5,763	14,919	
FY24P	2,526	125	194	904	555	1,807	6,112	15,702	5.3%
FY25P	2,718	130	205	946	581	1,901	6,481	16,550	5.4%
FY26P	2,914	135	216	996	611	2,005	6,877	17,485	5.6%
FY27P	3,114	139	226	1,050	643	2,105	7,277	18,421	5.4%
FY28P	3,317	144	235	1,101	675	2,200	7,672	19,329	4.9%
FY29P	3,522	148	234	1,098	679	2,208	7,889	19,585	1.3%
FY30P	3,730	153	231	1,092	681	2,213	8,099	19,810	1.1%
FY31P	3,938	157	240	1,145	714	2,311	8,505	20,744	4.7%
FY32P	4,147	161	250	1,201	748	2,413	8,921	21,712	4.7%
FY33P	4,356	165	255	1,235	762	2,427	9,201	22,148	2.0%
FY34P	4,565	169	246	1,201	745	2,363	9,289	21,912	-1.1%
FY35P	4,772	173	256	1,260	781	2,468	9,711	22,904	4.5%
FY36P	4,979	177	266	1,323	819	2,577	10,140	23,928	4.5%
FY37P	5,183	180	277	1,388	859	2,690	10,578	24,987	4.4%
FY38P	5,385	184	289	1,457	900	2,809	11,024	26,083	4.4%
FY39P	5,585	187	301	1,528	943	2,930	11,475	27,198	4.3%
FY40P	5,782	191	313	1,603	989	3,056	11,934	28,353	4.2%
FY41P	5,975	194	326	1,683	1,036	3,188	12,401	29,547	4.2%
FY42P	6,165	197	339	1,766	1,087	3,326	12,880	30,790	4.2%
FY43P	6,351	200	354	1,855	1,139	3,471	13,370	32,084	4.2%

Year	Car	Bus	LCV + minibus	2-axle	3-axle	MAV	Total	Total PCU	On-year growth (%)
CAGR (FY23-42)	5.2%	2.6%	3.3%	3.8%	3.8%	3.5%	4.3%	3.9%	

Source: CRISIL Research

Traffic volume CAGR (FY23-42) excluding diversions would have been higher by ~0.8%

Table 29: Traffic growth rates without considering diversions to expressway and other alternative routes

CAGR	FY23-25	FY25-30	FY30-35	FY35-42	FY23-42
Car	7.8%	6.5%	5.1%	3.7%	5.2%
Bus	3.9%	3.3%	2.5%	1.9%	2.6%
Minibus	3.9%	3.3%	2.5%	1.9%	2.6%
LCV	5.3%	4.5%	4.1%	4.2%	4.4%
2-axle	4.6%	5.0%	4.9%	4.9%	4.9%
3-axle	4.6%	5.0%	4.8%	4.8%	4.9%
MAV	5.0%	4.8%	4.4%	4.4%	4.6%
Total PCU	**5.3%**	**5.1%**	**4.6%**	**4.3%**	**4.7%**
Revenue growth	**9.8%**	**9.0%**	**8.2%**	**7.6%**	**8.4%**

Source: CRISIL Research

Table 30: Traffic growth rates considering diversions to expressway and other alternative routes

CAGR	FY23-25	FY25-30	FY30-35	FY35-42	FY23-42
Car	7.8%	6.5%	5.1%	3.7%	5.2%
Bus	3.9%	3.3%	2.5%	1.9%	2.6%
Minibus	3.9%	3.3%	2.5%	1.9%	2.6%
LCV	5.3%	2.4%	2.0%	4.2%	3.3%
2-axle	4.6%	2.9%	2.9%	4.9%	3.8%
3-axle	4.6%	3.2%	2.8%	4.8%	3.8%
MAV	5.0%	3.1%	2.2%	4.4%	3.5%
Total PCU	**5.3%**	**3.7%**	**2.9%**	**4.3%**	**3.9%**
Revenue growth	**9.8%**	**7.4%**	**6.3%**	**7.6%**	**7.4%**

Source: CRISIL Research

Revenue assumptions

For revenue and traffic assessment, we have assumed the commercial operation date for the Atal Progressway to be in fiscal 2029. Further, we have assumed the augmentation of Kanpur-Chhatarpur-Sagar-Bhopal section gets completed by fiscal 2033. The traffic assessment has considered an additional volume of 350 cars in the base AADT. A comparison of TVC survey data and actual daily traffic data shared with us reveals that ~350 cars are not being recorded in the toll system daily. In the revenue calculations, we have assumed that the concessionaire will be able to convert this volume into toll-paying traffic. For these cars, we have assumed half under local monthly pass and the rest equally divided into single and return journey.

Trip segmentation

Trip segmentation has been derived based on the average share of a single journey, return journey and categories over June 2021 to June 2022. For revenue calculation, the trip factor used for a return journey is two, and for a monthly pass it is 45. The trip segmentation has been assumed to remain constant throughout the projection period i.e., over fiscals 2023 to 2042.

Table 31: Details of trip segmentation across vehicle categories

Vehicle category	Single journey	Return journey	Monthly pass	Exemption
Car, jeep, van or LMV	61.0%	25.9%	7.0% (local category)	6.1%
LCV, light goods vehicle or minibus	90.0%	7.5%	0.5%	2.0%
Bus or truck (2-axle)	90.7%	7.5%	0.0%	1.8%
3-axle CV	94.7%	4.0%	0.0%	1.3%
HCM, EME or MAV (4-6 axle)	97.2%	2.1%	0.0%	0.7%

Source: Toll plaza data, CRISIL Research

Wholesale Price Index projections

The projected toll rates are dependent on Wholesale Price Index (WPI) assumptions for fiscals 2023 to 2043. For WPI projection, CRISIL Research has relied on inputs from CRISIL's economic research team.

Table 32: WPI projections till December 2041

Month-year	WPI	Expected on-year growth
Dec-2020 (actual)	385.4	
Dec-2021 (actual)	440.4	14.3%
Dec-2022	458.1	4.0%
Dec-2023	474.1	3.5%
Dec-2024	488.3	3.0%
Dec-2025	503.0	3.0%
Dec-2026	518.1	3.0%
Dec-2027	533.6	3.0%
Dec-2028	549.6	3.0%
Dec-2029	564.0	2.6%
Dec-2030	578.8	2.6%
Dec-2031	594.0	2.6%
Dec-2032	609.5	2.6%
Dec-2033	625.5	2.6%
Dec-2034	641.0	2.5%
Dec-2035	656.5	2.4%
Dec-2036	671.4	2.3%

Month-year	WPI	Expected on-year growth
Dec-2037	686.1	2.2%
Dec-2038	699.9	2.0%
Dec-2039	713.9	2.0%
Dec-2040	728.1	2.0%
Dec-2041	742.7	2.0%

Source: CRISIL Research

Other details for revenue calculations

The following details have been used for the toll rate calculations which have been sourced from the technical schedules,

Table 33: Base rates for toll calculation

Vehicle category	Base rate of fee per km (base year = FY08), in Rs
Car, jeep, van or LMV	0.65
LCV, light goods vehicle or minibus	1.05
Bus or truck (2-axle)	2.20
3-axle CV	2.40
HCM, EME or MAV (4-6 axles)	3.45
Oversized vehicles (seven or more axles)	4.20

Source: Technical schedules, CRISIL Research

Table 34: Details of toll rate calculation for multiple journeys

Amount payable	Maximum number of one-way journeys allowed	Period of validity
One-and-a-half times of the fee for one-way journey	Two	Twenty-four hours from the time of payment
Two-thirds of amount of the fee payable for 50 single journeys or more	50 or more	One month from date of payment
Rate of monthly pass for a person who owns a mechanical vehicle registered for non-commercial purposes and resides within a distance of 20 km from the toll plaza is Rs 315.00 for FY23, subject to revision as per NHAI rules		
Fee for CVs (excluding vehicles plying under national permit) registered in the district where the fee plaza falls will be 50% of the prescribed rate for that category of vehicle		

Source: Technical schedules, CRISIL Research

Table 35: Details of road length, structures and bypass on the project stretch

Location of toll plaza (chainage)	Length (in km) for which fee is payable	Length of bypass (in km) for which additional fee is payable	Length of structures (in km) converted into equivalent road length	Tollable length
Km 1374+650 near Raksha village	73.7074 km	Nil	15.926 km	89.6554 km

Source: Technical schedules, CRISIL Research

Revenue projections

Table 36: Projected revenue (Rs million) for FY23-43

Year	Car	LCV + minibus	Bus + 2-axle	3-axle	MAV	Total	On-year growth (%)
FY23P	83.4	12.6	143.7	85.2	403.9	728.9	
FY24P	93.5	14.0	155.6	92.9	440.1	796.0	9.2%
FY25P	108.0	15.4	170.3	101.5	483.3	878.4	10.3%
FY26P	119.7	17.0	184.9	111.0	527.9	960.6	9.4%
FY27P	132.9	18.2	202.7	121.5	576.9	1,052.3	9.5%
FY28P	146.8	19.8	221.0	132.3	626.8	1,146.7	9.0%
FY29P	160.7	20.5	227.8	137.9	653.1	1,200.0	4.6%
FY30P	176.1	21.0	236.3	143.2	678.3	1,255.0	4.6%
FY31P	192.2	22.3	256.3	155.2	733.4	1,359.5	8.3%
FY32P	208.0	24.1	277.7	168.1	792.1	1,470.0	8.1%
FY33P	225.5	25.5	295.5	177.8	823.0	1,547.2	5.3%
FY34P	248.6	25.4	298.7	179.3	830.9	1,583.0	2.3%
FY35P	267.6	27.3	322.6	195.0	894.5	1,707.1	7.8%
FY36P	287.1	29.4	350.5	211.7	966.5	1,845.2	8.1%
FY37P	307.2	31.6	377.8	229.5	1,043.2	1,989.2	7.8%
FY38P	333.7	33.9	406.7	247.1	1,124.8	2,146.2	7.9%
FY39P	355.0	36.8	440.3	267.4	1,210.1	2,309.6	7.6%
FY40P	376.7	39.5	473.1	289.1	1,295.3	2,473.7	7.1%
FY41P	404.1	42.3	508.1	312.2	1,391.3	2,657.9	7.4%
FY42P	426.8	45.2	548.6	335.1	1,493.6	2,849.3	7.2%
FY43P	451.3	48.4	592.3	361.6	1,608.7	3,062.2	7.5%

CAGR (FY23-42)	**9.0%**	**6.9%**	**7.3%**	**7.5%**	**7.1%**	**7.4%**	

Source: CRISIL Research

7 Annexure

Traffic projections scenario based on econometric model

We have projected the traffic based on an econometric model where the traffic growth is linked to GDP growth of India and the respective states. For the current assessment, we have used a traffic growth to GDP growth multiple methodology based on an internal study. The multiple used is 1.0 for car, 0.6 for bus, 0.66 for minibus/LCV, 0.66 for 2-axle, 0.66 for 3-axle and 0.6 for MAV. We have used this multiple along with India and state GDP forecasts to derive the traffic growth rate for fiscals 2023 to 2042.

We have considered two scenarios i.e., with diversions and without diversions. The traffic projection as per the econometric method is lower as compared with original PCU projections (without diversion impact). Overall PCU growth is higher for CRISIL's AADT projections at 4.7% as compared with econometric model's projections at 4.4%, in case of zero diversions. In terms of revenue growth, the original projections are higher by 0.5% for the projection period.

In the other scenario considering diversions, overall PCU growth is higher for CRISIL's AADT projections at 3.9% as compared with econometric model projections at 3.6%. In terms of revenue growth, CRISIL's projections are higher by 0.3% for the projection period.

Table 37: AADT projections as per econometric method (no diversions) for FY23-43

Year	Car	Bus	LCV + Minibus	2-axle	3-axle	MAV	Total PCU	On-year growth (%)	Econometric model's PCU – CRISIL's projected PCU
FY23P	2,318	120	183	859	528	1,721	14,856		(63)
FY24P	2,476	125	191	897	551	1,788	15,526	4.5%	(176)
FY25P	2,647	130	199	936	576	1,861	16,244	4.6%	(306)
FY26P	2,834	135	208	979	602	1,938	17,017	4.8%	(468)
FY27P	3,022	141	217	1,021	628	2,014	17,780	4.5%	(641)
FY28P	3,221	146	226	1,065	655	2,093	18,577	4.5%	(752)
FY29P	3,432	152	236	1,111	683	2,174	19,410	4.5%	(859)
FY30P	3,655	158	246	1,159	712	2,259	20,279	4.5%	(962)
FY31P	3,888	164	257	1,207	742	2,345	21,165	4.4%	(1,075)
FY32P	4,136	170	267	1,258	773	2,434	22,090	4.4%	(1,187)
FY33P	4,398	177	278	1,310	805	2,526	23,057	4.4%	(1,295)
FY34P	4,676	183	290	1,364	839	2,621	24,067	4.4%	(1,399)
FY35P	4,971	190	302	1,421	874	2,721	25,122	4.4%	(1,500)
FY36P	5,280	197	314	1,479	909	2,822	26,209	4.3%	(1,606)

Year	Car	Bus	LCV + Minibus	2-axle	3-axle	MAV	Total PCU	On-year growth (%)	Econometric model's PCU – CRISIL's projected PCU
FY37P	5,608	205	327	1,540	947	2,927	27,344	4.3%	(1,709)
FY38P	5,955	212	341	1,603	985	3,036	28,530	4.3%	(1,805)
FY39P	6,323	220	355	1,669	1,026	3,149	29,768	4.3%	(1,873)
FY40P	6,712	228	369	1,737	1,068	3,266	31,061	4.3%	(1,936)
FY41P	7,121	237	384	1,807	1,111	3,385	32,394	4.3%	(2,006)
FY42P	7,554	245	399	1,880	1,155	3,509	33,786	4.3%	(2,077)
FY43P	8,014	254	416	1,955	1,202	3,638	35,242	4.3%	(2,149)
CAGR (FY23-42)	**6.4%**	**3.8%**	**4.2%**	**4.2%**	**4.2%**	**3.8%**	**4.4%**		
CRISIL's projections CAGR* (FY23-42)	**5.2%**	**2.6%**	**4.3%**	**4.9%**	**4.9%**	**4.6%**	**4.7%**		

Note: *The CAGR given is based on a scenario where there are no diversions;

Source: CRISIL Research

Table 38: Revenue projections (no diversions) based on econometric method for FY23-43 (Rs million)

Year	Cars	LCV + Minibus	Bus + 2-axle	3-axle	MAV	Total	Econometric model's revenue – CRISIL's projected revenue
FY23P	82.6	12.5	142.8	84.7	403.3	726.0	(2.9)
FY24P	91.6	13.7	154.4	92.3	435.4	787.5	(8.5)
FY25P	105.1	15.0	168.7	100.5	473.1	862.5	(15.9)
FY26P	116.4	16.4	182.3	109.4	510.3	934.8	(25.8)
FY27P	128.9	17.5	198.1	118.6	552.1	1,015.2	(37.1)
FY28P	142.6	19.0	215.1	128.4	596.2	1,101.3	(45.4)
FY29P	156.6	20.7	230.9	138.8	643.1	1,190.1	(54.1)
FY30P	172.6	22.4	250.0	149.8	692.7	1,287.5	(63.4)
FY31P	189.8	23.8	270.0	161.4	744.3	1,389.3	(74.0)

Year	Cars	LCV + Minibus	Bus + 2-axle	3-axle	MAV	Total	Econometric model's revenue – CRISIL's projected revenue
FY32P	207.5	25.8	291.1	173.6	798.8	1,496.8	(85.5)
FY33P	227.6	27.8	313.6	188.0	856.4	1,613.4	(97.7)
FY34P	254.7	30.0	337.4	201.8	921.9	1,745.8	(110.8)
FY35P	278.7	32.3	362.7	218.0	986.2	1,877.9	(124.5)
FY36P	304.5	34.7	392.0	235.0	1,058.6	2,024.8	(140.2)
FY37P	332.3	37.3	420.3	253.1	1,134.9	2,177.8	(157.0)
FY38P	369.0	40.0	450.0	270.5	1,215.5	2,345.0	(173.8)
FY39P	401.9	43.5	484.8	290.7	1,300.4	2,521.3	(190.4)
FY40P	437.4	46.6	518.2	312.1	1,384.1	2,698.4	(206.9)
FY41P	481.6	49.8	553.4	334.5	1,477.5	2,896.8	(225.4)
FY42P	523.0	53.2	593.9	356.3	1,575.9	3,102.2	(246.4)
FY43P	569.5	56.8	636.9	381.4	1,686.0	3,330.5	(270.3)
CAGR (FY23-42)	10.2%	7.9%	7.8%	7.9%	7.4%	7.9%	
CRISIL's projections CAGR* (FY23-42)	9.0%	8.1%	8.3%	8.5%	8.2%	8.4%	

Note: *The CAGR given is based on a scenario where there are no diversions;

Source: CRISIL Research

Table 39: AADT projections as per econometric method (considering diversions) for FY23-43

Year	Car	Bus	LCV + Minibus	2-axle	3-axle	MAV	Total PCU	On-year growth (%)	Econometric model's PCU – CRISIL's projected PCU
FY23P	2,318	120	183	859	528	1,721	14,856		(63)
FY24P	2,476	125	191	897	551	1,788	15,526	4.5%	(176)
FY25P	2,647	130	199	936	576	1,861	16,244	4.6%	(306)
FY26P	2,834	135	208	979	602	1,938	17,017	4.8%	(467)

Year	Car	Bus	LCV + Minibus	2-axle	3-axle	MAV	Total PCU	On-year growth (%)	Econometric model's PCU – CRISIL's projected PCU
FY27P	3,022	141	217	1,021	628	2,014	17,780	4.5%	(641)
FY28P	3,221	146	226	1,065	655	2,093	18,577	4.5%	(752)
FY29P	3,432	152	225	1,057	655	2,088	18,758	1.0%	(827)
FY30P	3,655	158	223	1,045	654	2,081	18,923	0.9%	(886)
FY31P	3,888	164	232	1,089	681	2,160	19,755	4.4%	(988)
FY32P	4,136	170	242	1,134	709	2,241	20,625	4.4%	(1,087)
FY33P	4,398	177	247	1,159	717	2,240	21,009	1.9%	(1,140)
FY34P	4,676	183	238	1,119	697	2,167	20,783	-1.1%	(1,129)
FY35P	4,971	190	248	1,165	726	2,249	21,709	4.5%	(1,195)
FY36P	5,280	197	258	1,213	756	2,333	22,665	4.4%	(1,263)
FY37P	5,608	205	269	1,263	787	2,420	23,663	4.4%	(1,324)
FY38P	5,955	212	280	1,314	819	2,510	24,707	4.4%	(1,376)
FY39P	6,323	220	291	1,368	853	2,603	25,797	4.4%	(1,400)
FY40P	6,712	228	303	1,424	888	2,700	26,937	4.4%	(1,416)
FY41P	7,121	237	315	1,481	923	2,799	28,113	4.4%	(1,434)
FY42P	7,554	245	328	1,541	961	2,901	29,343	4.4%	(1,447)
FY43P	8.014	254	341	1.603	999	3,007	30,629	4.4%	(1,455)
CAGR (FY23-42)	6.4%	3.8%	3.1%	3.1%	3.2%	2.8%	3.6%		
CRISIL's projections CAGR* (FY23-42)	5.2%	2.6%	3.3%	3.8%	3.8%	3.5%	3.9%		

Note: *The CAGR given is based on a scenario where there are diversions onto alternative routes

Source: CRISIL Research

Table 40: Revenue projections (considering diversions) based on econometric method for FY23-43 (Rs million)

Year	Cars	LCV + Minibus	Bus + 2-axle	3-axle	MAV	Total	Econometric model's revenue – CRISIL's projected revenue
FY23P	82.6	12.5	142.8	84.7	403.3	726.0	(3)
FY24P	91.6	13.7	154.4	92.3	435.4	787.5	(9)
FY25P	105.1	15.0	168.7	100.5	473.1	862.5	(16)
FY26P	116.4	16.4	182.3	109.4	510.3	934.8	(26)
FY27P	128.9	17.5	198.1	118.6	552.1	1,015.2	(37)
FY28P	142.6	19.0	215.1	128.4	596.2	1,101.3	(45)
FY29P	156.6	19.7	221.0	133.1	617.7	1,148.0	(52)
FY30P	172.6	20.3	228.4	137.5	637.9	1,196.7	(58)
FY31P	189.8	21.6	246.6	148.1	685.5	1,291.5	(68)
FY32P	207.5	23.3	265.9	159.3	735.7	1,391.8	(78)
FY33P	227.6	24.7	281.7	167.5	759.6	1,461.1	(86)
FY34P	254.7	24.6	283.8	167.8	762.1	1,493.1	(90)
FY35P	278.7	26.5	305.1	181.2	815.3	1,606.9	(100)
FY36P	304.5	28.5	329.7	195.4	875.1	1,733.2	(112)
FY37P	332.3	30.6	353.4	210.4	938.3	1,865.0	(124)
FY38P	369.0	32.9	378.4	224.9	1,004.9	2,010.1	(136)
FY39P	401.9	35.7	407.6	(200)	1,075.1	2,162.0	(148)
FY40P	437.4	38.2	435.7	259.5	1,144.3	2,315.1	(159)
FY41P	481.6	40.9	465.2	278.1	1,221.5	2,487.4	(171)
FY42P	523.0	43.7	499.2	296.2	1,302.9	2,665.0	(184)
FY43P	569.5	46.6	535.5	317.1	1,393.9	2,862.4	(200)
CAGR (FY23-42)	10.2%	6.8%	6.8%	6.8%	6.4%	7.1%	
CRISIL's projections CAGR* (FY23-42)	9.0%	6.9%	7.3%	7.5%	7.1%	7.4%	

Note: *The CAGR given is based on a scenario where there are diversions onto alternative routes;

Source: CRISIL Research

Table 41: AADT projections as per detailed project report (DPR) of TOT bundle-6

Year	Car	Bus	Mini LCV	LCV + Minibus	2-axle	3-axle	MAV	Total PCU	On-year growth (%)	DPR's PCU – CRISIL's projected PCU
FY23P	2,154	160	232	477	300	564	1,642	13,565		(1,354)
FY24P	2,331	169	245	494	312	587	1,767	14,474	6.7%	(1,228)
FY25P	2,522	178	258	511	326	611	1,903	15,454	6.8%	(1,096)
FY26P	2,711	187	271	529	339	637	2,036	16,421	6.3%	(1,064)
FY27P	2,915	196	284	548	353	664	2,176	17,449	6.3%	(972)
FY28P	3,130	205	297	566	368	691	2,324	18,529	6.2%	(800)
FY29P	3,356	215	311	585	383	719	2,480	19,653	6.1%	68
FY30P	3,594	224	325	604	398	747	2,641	20,819	5.9%	1,009
FY31P	3,817	233	337	623	410	771	2,792	21,899	5.2%	1,155
FY32P	4,046	241	350	643	423	795	2,946	23,002	5.0%	1,290
FY33P	4,268	250	361	661	435	817	3,096	24,066	4.6%	1,918
FY34P	4,490	258	373	679	446	839	3,244	25,115	4.4%	3,203
FY35P	4,710	265	384	696	457	860	3,390	26,150	4.1%	3,246
FY36P	4,932	273	395	712	468	881	3,536	27,180	3.9%	3,252
FY37P	5,153	280	406	729	479	901	3,685	28,217	3.8%	3,230
FY38P	5,380	288	417	745	490	921	3,836	29,269	3.7%	3,186
FY39P	5,612	295	427	762	500	941	3,989	30,334	3.6%	3,136
FY40P	5,847	303	438	778	511	961	4,145	31,412	3.6%	3,059
FY41P	6,087	310	449	794	522	981	4,302	32,502	3.5%	2,955
FY42P	6,330	318	460	810	532	1,000	4,461	33,602	3.4%	2,812
CAGR (FY23-42)	**5.8%**	**3.7%**	**3.7%**	**2.8%**	**3.1%**	**3.1%**	**5.4%**	**4.9%**		
CRISIL's projections CAGR* (FY23-42)	**5.2%**	**2.6%**	**-**	**Minibus: 2.6% LCV: 3.3%**	**3.8%**	**3.8%**	**3.5%**	**3.9%**		

Note: *The CAGR given is based on a scenario where there are diversions onto alternate routes.

Source: NHAI – DPR TOT Bunlde-6, CRISIL Research

Table 42: Historical WPI data (December 2001 to December 2021)

Month-year	All commodities - WPI series (base: FY12)	On-year growth
Dec-2001	55.3	
Dec-2002	57.2	3.3%
Dec-2003	60.5	5.7%
Dec-2004	64.6	6.8%
Dec-2005	67.2	4.1%
Dec-2006	71.9	7.0%
Dec-2007	74.8	4.0%
Dec-2008	79.8	6.7%
Dec-2009	85.5	7.1%
Dec-2010	93.5	9.4%
Dec-2011	100.8	7.7%
Dec-2012	107.1	6.3%
Dec-2013	113.4	5.9%
Dec-2014	112.1	-1.1%
Dec-2015	109.4	-2.4%
Dec-2016	111.7	2.1%
Dec-2017	115.7	3.6%
Dec-2018	119.7	3.5%
Dec-2019	123.0	2.8%
Dec-2020	125.4	2.0%
Dec-2021	143.3	14.3%

Linking factor for WPI (base FY05 to FY12) is 1.561; linking factor for WPI (base FY94 to FY05) is 1.873

Source: Office of the Economic Adviser, CRISIL Research

Table 43: Pan-India historical growth rate of various industries

Commodity	Remark
Agri produce	Production (volume terms): CAGR (FY12-22), Rice: ~2.2%, Wheat: ~1.2%, Fruits: ~3.4%, Vegetables: ~2.7%
Iron and steel products	Steel domestic demand growth trend (volume-wise) CAGR (FY17-22) = ~5%
Courier and parcel	Market size of Indian e-commerce industry (value-wise) CAGR (FY19-22) = ~7%
Consumer products	Organised retailing industry market size, value terms CAGR(FY17-22): ~8%

Commodity	Remark
Construction materials	Cement demand in UP and MP (volume terms) CAGR (FY17-22) = ~5-6%
Plastic products	PVC demand (volume terms), CAGR(FY17-22) = ~0-1%
Consumer foods	Organised consumer food industry (value terms), CAGR(FY16-20) = ~14%
Textile and footwear	Domestic readymade garment (value terms), CAGR (FY16-20) = ~5-6%
Automobiles	• Cars & utility vehicles (volume terms), CAGR (FY12-22) = ~1-2% • Two-wheeler segment (volume-terms), CAGR (FY17-22) = ~(-5)%
Chemical products	Total chemicals industry (value-terms), CAGR (FY15-20) = ~4%
Tiles and ceramic products	Domestic ceramic tile market (volume terms), CAGR (FY18-21) = ~7%
Paper products	Paper demand (volume terms), CAGR (FY17-22) = ~4-5%
Pharmaceuticals	Domestic formulations (value terms), CAGR (FY17-22) = ~9%
Coal	Non-coking coal domestic consumption (volume terms), CAGR (FY17-22) = ~4%
Rubber products	Tyre demand (volume terms), CAGR (FY17-22) = ~2%
Milk and animal food	Milk production (volume terms), CAGR (FY18-22) = ~7%

Source: MOSPI, CRISIL Research

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Report
August 2022

Project Drone: Traffic and Revenue due diligence

National Highway Infra Investment Managers Private Limited
August 2022
Our ref: 2425601/02

steer

Report
August 2022

Project Drone: Traffic and Revenue due diligence

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Appendices

A **Data collection exercise**
B **Traffic and revenue forecasts**
C **Vehicle Classification**

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Traffic Consultant developed the relationships in the models used to produce the forecasts for this Project based on data collected through June 2022. Since March 2020, the outbreak of the virus known as COVID- 19 has spread throughout the world and has been defined by the World Health Organization as a "pandemic". As of the date of distribution of this Report, the COVID-19 outbreak is having a material impact on global economic and political affairs including having a significant impact on all the transportation industries, including toll road traffic, where in particular vehicle volumes have fallen in response to quarantine and self-care measures that governments have imposed. The situation remains dynamic and is subject to significant change. In this challenging context, Traffic Consultant has produced base forecasts (directly produced from models using a combination of pre-COVID-19 and post-COVID-19 views) with a view on a possible scenario for the traffic forecasts based on an assumption of recovery from the COVID-19-related traffic decrease. For the purposes of these forecasts, we have also incorporated other possible impacts of COVID-19 related scenarios. However, it is important to note that this is only one view, and there continues to remain uncertainty as to the short-term, intermediate or prolonged effects of and responses to the COVID-19 pandemic on the Project. All of these effects could impact the COVID-19-related aspects of the Report. As a result, no assurance can be provided by Traffic Consultant that the scenarios and assumptions Traffic Consultant has identified will prove to be accurate. Given the uncertainty inherent in this unprecedented pandemic, Traffic Consultant advises that all readers of the Report consider the Report in the context of their own assessment of the COVID-19 outbreak and its current and potential impacts before making final decisions related to this Project

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Glossary Items

Acronym	Meaning
AADT	Annual Average Daily Traffic
ADT	Average Daily Traffic
AB	Agra Bypass
CAGR	Compound Annual Growth Rate
CAGR	Compound Annual Growth Rate
CJV	Cars / Jeeps / Vans
COD	Commercial Operations Date
DPR	Detailed Project Report
DME	Delhi Mumbai Expressway
EDFC	Eastern Dedicated Freight corridor
ETC	Electronic Toll Collection
FY	Financial Year
GDP	Gross Domestic Product
GJC	Generalised Journey Cost
GQ	Golden Quadrilateral
GSDP	Gross State Domestic Product
HCM	Heavy Commercial Vehicles
IAOI	Immediate Area of Influence
LCV	Light Commercial Vehicles
LoS	Level of Service
MAV	Multi Axle Vehicle
MLCV	Mini LCV
NE	National Expressway
NH	National Highway
NHAI	National Highways Authority of India
NHDP	National Highways Development Project
NSDP	Net State Domestic Product
OD	Origin Destination
PCI	Per Capita Income
PCOD	Partial Commercial Operations Date
PCU	Passenger Car Unit
RNP	Registered Number Plate

Acronym	Meaning
RoS	Rest of State
SCF	Seasonality Correction Factors
SH	State Highway
T&R	Traffic and Revenue
TMS	Traffic Management System
TP	Toll plaza
TVC	Traffic Volume Count
VOC	Vehicle Operating Costs
VOT	Value of Time
WADT	Weekly Average Daily Traffic
WDFC	Western Dedicated Freight corridor
YTD	Year to Date

1 Introduction

1.1 National Highways Infra Investment Managers Private Limited (**'NHIIMPL'** or the '**Client'**) has commissioned Steer Davies Gleave India Private Limited (hereafter called '**Steer**') for a traffic assessment study for the following two Assets **('Assets').** These Assets include a total of three toll plazas.

- **Asset 1**: Agra Bypass section connecting NH19 (old NH2) to NH44 (old NH7) in Uttar Pradesh with one toll plaza
- **Asset 2:** Borkhedi-Kelapur-Maharashtra/Telangana border on NH44 (old NH7) in the state of Maharashtra with two toll plazas

1.2 The National Highways Authority of India (**'NHAI'**) has set up an Infrastructure Investment Trust ('**InvIT**') namely National Highways Infra Trust and is acting as its Sponsor to the said InvIT. The NHIIMPL has been incorporated and appointed as the Investment Manager for the proposed InvIT by NHAI.

Table 1.1: Description of Assets

Asset ID	A1 AB	A2 BK
Asset name	Agra Bypass	Borkhedi-Kelapur-MH/TS Border section of NH44
State	Uttar Pradesh	Maharashtra
Length (km)	32.8 km	138.150 km
Chainage	Km. 00.000 to Km. 32.800	km 36.600 to km 175.000
Nos. of toll plaza	1	2
Toll plaza locations	Raibha at Km 32.800	Darodha (km 92.500) Kelapur (km 150.000) which is to be relocated at proposed location of km 156.650
Operating since*	March 2017	April 2011
Proposed concession period	20 years	20 years
Tollable length (km)	Current Length: 8.050 km + 31.995 (bypass) = 56.043 Post Appointment date (FY23) length: 6.558 km + 32.144 (bypass) = 54.774	Current length: 148.6 (existing) Post Appointment date (FY23) 155.2320 (during construction period) 155.3364 (post completion of major bridge)

Source: NHAI

Scope of work

1.3 Our scope of work for carrying out a T&R due diligence exercise covered:

- Review of available data, concession agreements and bid documents.
- Primary traffic survey and analysis as per the schedule presented in the table below
  - 1 week video based classified traffic volume count (TVC) in July 2022.
  - 24 hours origin-destination (OD) survey and commodity analysis
- Assembly of the toll plaza level base data from PIU, where available, and review of the recent growth trends.
- Identify appropriate benchmarks for historical performance, seasonality, ticket type segmentation for the asset.
- Estimate the base traffic and revenue position utilising the above information.
- Establishing traffic growth estimates based on key economic growth drivers such as GDP, GSDP, commodity, etc. and estimating underlying growth elasticities based on these growth drivers.
- Assessing impacts from exogenous factors, including network change impacts.
- Developing traffic forecasts by vehicle class and segmentation categories; and
- Toll revenue estimation for entire concession period.

Table 1.2: Data collection schedule

	AB - Raibha	BK - Darodha	BK - Kelapur	BK – Kelapur (new location)
TVC survey	1– 8 July 2022	4– 10 July 2022	4– 10 July 2022	6– 8 July 2022
OD survey	1 July 2022	5 July 2022	7 July 2022	-

Source: Steer

Our approach

1.4 The approach employed by Steer in the preparation of the traffic and revenue forecasts was developed to take advantage of the existing knowledge of the Asset and of the available data. It follows normal practices well established in addressing the issue of forecasting on-going traffic growth on a brownfield project. The key difference in this exercise as compared to a typical secondary market transaction, where the vendor provides detailed information on the historical performance of their asset, is that the historical traffic and revenue information provided by the client was very limited and therefore less reliable than what could be expected. Therefore, significant efforts had to be put into developing a credible base year position and growth expectations through benchmarking with other asset in close vicinity of the asset under consideration.

1.5 The analysis focused on two sets of issues:

- understanding and verifying the traffic which is, at present, using the Asset; and
- identifying how and why that traffic will change in the future.

1.6 Regarding the former (i.e. current traffic on the asset), independent primary data collection was commissioned as part of this study and then compared against the available traffic data from various sources (as discussed in the table below).

1.7 To arrive at the base position, we have utilised information from various sources – including from the Client, data shared in NHAI tabled traffic report, toll plaza data shared by NHAI and

client, Steer independent primary surveys to validate the network understanding and ensure quality in the data collection process, and our context knowledge, to assess a reasonable demand on the corridor for the base year which formed the basis of future year forecasts.

1.8 A detailed benchmarking exercise, using Steer experience from asset lying in close vicinity to the Asset under bid consideration, has also been undertaken to validate traffic assumptions. Further base year revenue validation exercise has been undertaken to ensure both base traffic and segmentation assumptions are robust.

1.9 This approach is be-spoke for such projects where long time series consistent historical data is not available. Therefore, significant efforts had to be put into developing a credible base year position and growth expectations.

1.10 The estimation of future traffic demand on the Asset is driven by:

- Growth of 'background' traffic: this depends to a certain extent on the on-going socio-economic and demographic development of the area served by the Asset;
- Change in the local and international industry: which drives heavy goods traffic on the Asset; and
- Change in the competitive position of the Asset: this reflects changes in highway capacity of competing roads and the relative changes in service levels (time, congestion, price, etc.) for the Asset, and their competitors.

1.11 The information related to the concession agreements, toll notifications, toll calculations and target revenue and designed capacity along with NHAI traffic counts was provided by the NHAI as part of the bid documents.

1.12 Apart from the data provided by NHAI as part of the bidding process, we have analysed traffic data from multiple independent sources as well to understand the current traffic on the Asset. The list of data sources available and discussed in later chapters in detail are presented below:

Table 1.3: List of data sources available

Data sources	Provided by	Agra Bypass (AB)	Borkhedi - Kelapur (BK)
NHAI Traffic Report	Client	The NHAI provides AADT vehicle type-wise for BK and total traffic estimates for AB. The report contains the results of the independent counts and OD conducted by the Vendor.	
Monthly toll plaza data sourced by Client	Client	Monthly level traffic and revenue starting April 2021 upto Jul-2022	Monthly level traffic and revenue starting Jan 2021 for Kelapur and April 2021 for Darodha upto Jul-2022
Reference Asset data	Client	ETC data for feeder asset on Delhi-Agra road- Mahuvan toll plaza from January'21 to June'22	ETC data for Nagpur Bypass-Borkhedi toll plaza from January'21 to June'22
IHMCL counts	Client	Weekly counts conducted by IHMCL for various months from FY2017 to FY2021	Weekly counts conducted by IHMCL for various months from FY2016 to FY2021
Toll Notifications	Publicly sourced from	Historical and latest toll notification detailing toll computations. Also, verified toll lengths on both plazas based on responses on queries received from Client	

Data sources	Provided by	Agra Bypass (AB)	Borkhedi - Kelapur (BK)
	NHAI website		
Steer TVC counts	Steer	Commissioned by Steer, 7 days TVC counts from 1-7 July 2022	Commissioned by Steer, 7 days TVC counts from 4-10 July 2022
Origin-Destination (OD) survey	Steer	Commissioned by Steer, 24 hours on 1 July 2022	Commissioned by Steer, 24 hours on 5 July 2022 for Darodha and 7 July 2022 for Kelapur

Source: Steer's review of data points

Evolution of Covid19 pandemic in India in FY21 and FY22

1.13 On 24th March 2020, the Central government announced a nationwide 21-day lockdown which was extended for another three weeks until May 3rd. Further extensions until May 17th and again until May 31 featured relaxations in 'green' and 'orange' zones. Starting 8th June 2020, 'Unlock' phases began. States have also taken their own measures, with Central guidelines being the minimum expected restrictions from States. The tolling across all national highways in India was stopped between 25th March 2020 and 20th April 2020. These lockdowns resulted in significant disruptions to traffic, with a reduction of both commuting trips to work (as people were required to work from home or stay at home) and leisure trips (due to the closure of various entertainment venues, places of worship, tourist destinations, etc.). Goods movements, while still impacted, continued to a lesser extent due to a need to supply essential goods such as food, etc.

1.14 The traffic volumes since then gradually started recovering on most Asset in India, with varying extent. By Q3 of FY21 traffic levels were already at par FY20 AADT numbers and even higher in some cases. The traffic trends observed on most of the India toll roads during Q4FY21, showed sustained traffic levels as were witnessed in Q3FY21, which reflected sustained demand revival in the Indian economy. These traffic levels reflected the longer-term trends of a strong economic recovery, in segments like auto manufacturing, road construction, energy consumption /production etc., are more stable and are driving the growth over and above FY20 levels and are expected to continue as more segments of the economy, like hospitality, tourism, etc., recover fully from the pandemic.

1.15 This second wave of Covid19 was accompanied by various local and state level night curfews and lockdowns starting from April until end of June. The second wave of Covid19, although had a higher infection rate, the movement of traffic and goods was not impacted by the same magnitude as the first wave when whole country went under strict lockdown for two quarters. This can be attributed to the fact that almost all the restrictions were localised or at state level. Moreover, there was no restriction on movement of goods vehicles and other services. As the industries and agricultural activities continued to operate, the truck traffic did not fall as steeply as it did in Q1 FY21. The second half of the year from October'21 showed sustained traffic levels and therefore have been considered for base estimation for FY22 which is explained in detail in Chapter 5.

1.16 There is also a behavioural shift of passengers towards personal mobility due to perceptions of safety and reduction of public transport services which we have been observed across the

road network. This shift is expected to sustain and continue in the short term as such perception shifts for longer periods of time could result in more permanent changes in passenger choices. For example, once a family starts using a personal CJV for inter-urban travel to avoid public transport during the pandemic period over 1-2 years, it is likely that they continue using their personal vehicles even as the pandemic recedes. In our analysis, we have included these assumptions around the short/medium-term impact of this pandemic.

Contents of this Report

1.17 The report has been divided into 6 chapters, including

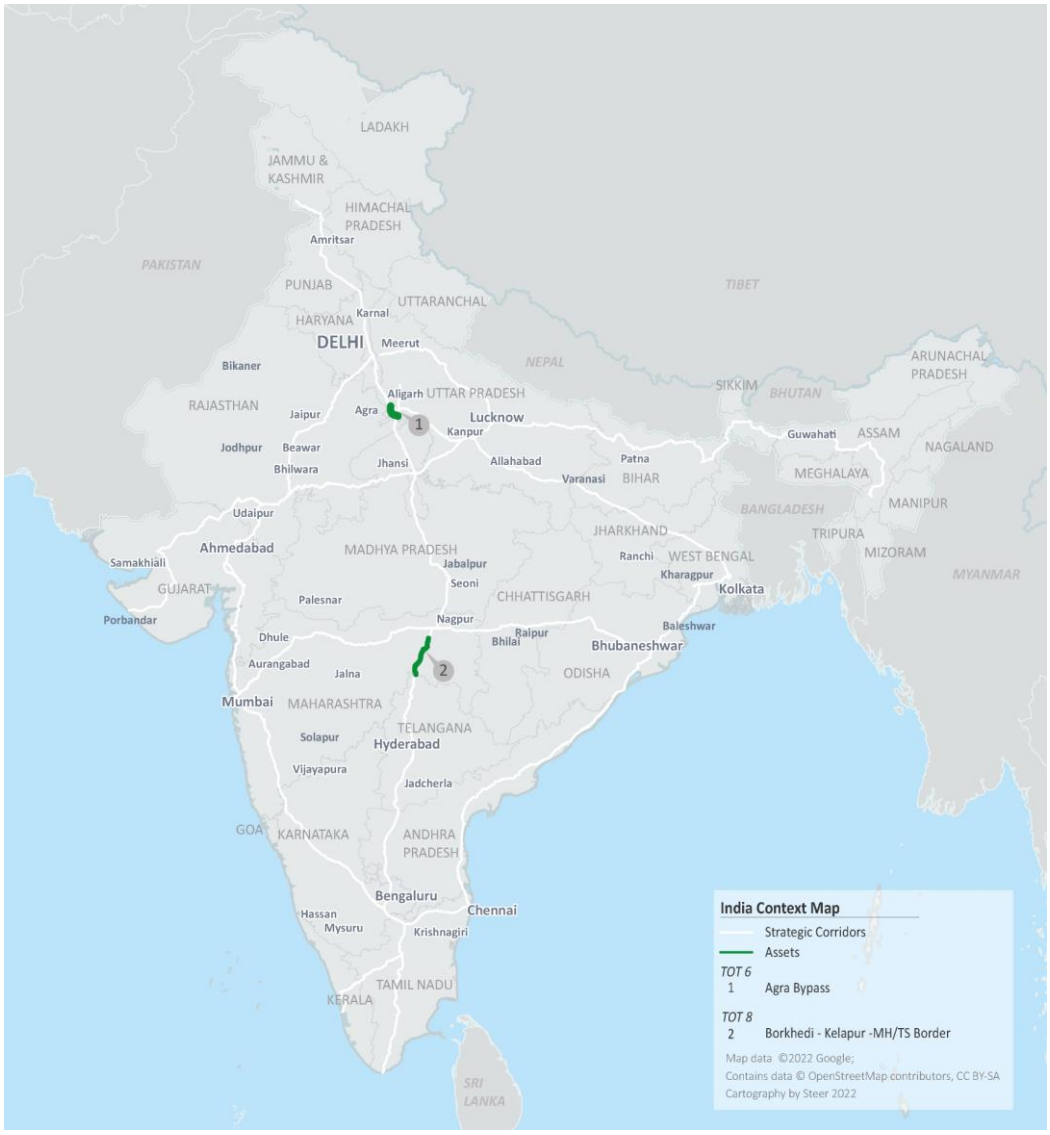
- Chapter 2 describes the key features of the Asset based on site visits.
- Chapter 3 presents all the survey data collection, analysis, and base year traffic estimates for the Asset.
- Chapter 4 discusses the socio-economic context in the corridors containing the Asset.
- Chapter 5 presents our base year traffic estimates and forecasting assumptions; and
- Chapter 6 summarises our key forecasting assumptions, assessment of network impacts, and presents our traffic and revenue forecasts for the Asset.

2 The Asset

Introduction

2.1 This chapter provides a description of the Assets, based on primary data (from site visits), our understanding of the region and network surrounding the Assets. We cover the strategic network context, followed by key economic activities and network developments around the Assets.

Figure 2.1: Asset location



Source: Steer cartography

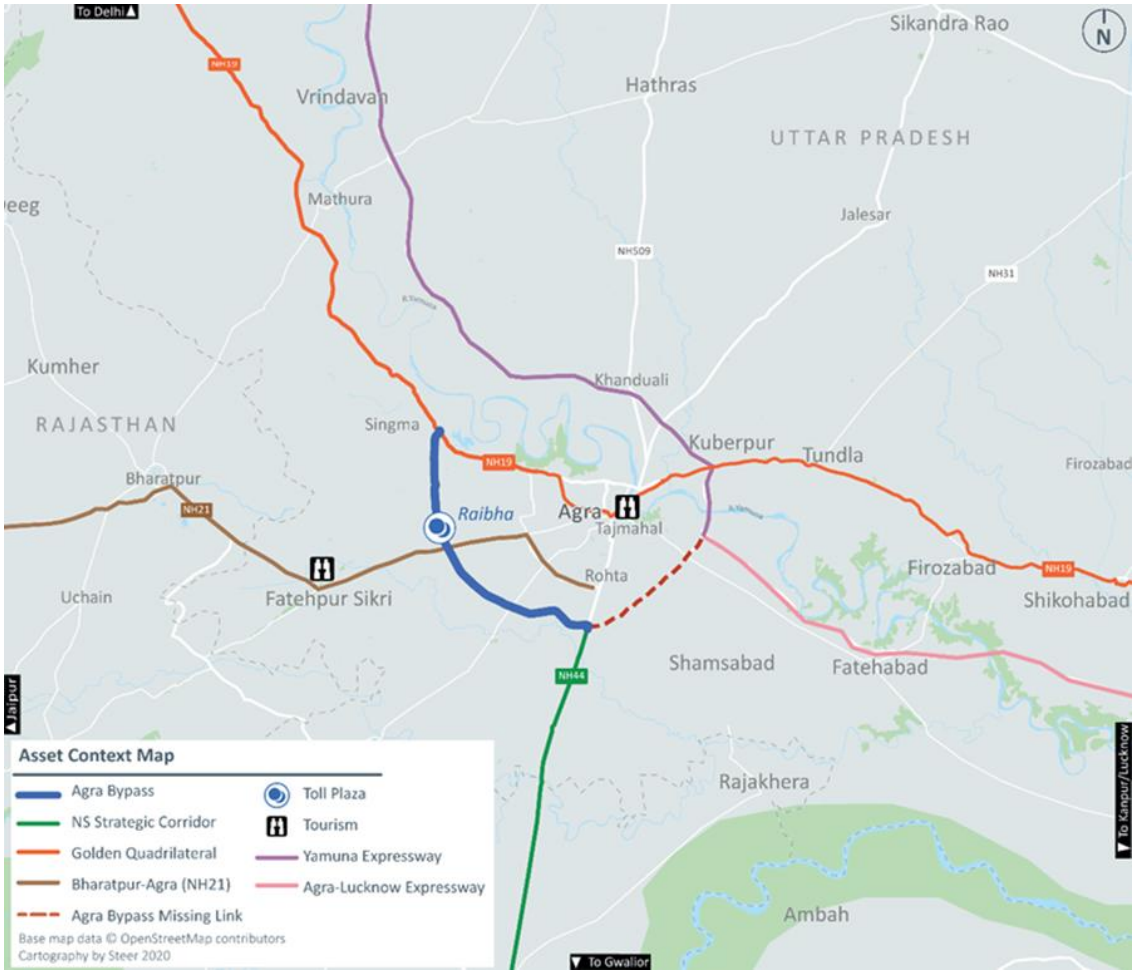
Asset context

Agra Bypass (AB)

2.2 The Asset is a 32.8 km four-lane road, forming part of the section connecting NH19 (old NH2) to NH44 (old NH7) in Uttar Pradesh, branches out to NH52 (old NH3) and NH44 (old NH7) at Gwalior. As per available information the Asset is in operations since March 2017. As this Asset acts as a bypass to the city of Agra, a majority of approach roads and structures on the Asset are already 6 laned as this was required as per the construction requirements when the Asset's construction was completed by NHAI's contractors. There is one toll plaza on the asset and is located at and is shown in the map below:

- TP1 Raibha (KM 10.800)

Figure 2.2 Asset context - AB: Raibha



Source: Steer cartography using OpenStreetMap data

2.3 The Asset lies on the outskirts of Agra, bypassing the city and acting as a key connection between Delhi to the regions of Gwalior and south. It further connects the traffic originating from west from areas such as Gujarat and Jaipur to the cities in the East (Kanpur, Lucknow and beyond), thereby supporting the east-west movement.

2.4 As per the figure above, a small section of Agra Bypass is currently incomplete. As per the available information gathered from stakeholders during the site visit, it is understood that due to land acquisition issues and financing hurdles, the work to complete the ring is currently

on hold. Also, there are no publicly available documents available which confirm the alignment of the missing link of the bypass. However, we do believe that this link will get completed in the due course of time, as pressure on local government and NHAI increases, due to growing urban settlements within Agra.

2.5 Agra has also been in the news for environmental and pollution related reasons impacting Taj Mahal. Similar concerns have been raised for Delhi and Jaipur as well. Two expressways namely Eastern Peripheral Expressway (EPE) and Western Peripheral expressways (KMPE) were built for trucks to bypass Delhi and similarly Jaipur ring road is almost complete now. Once these ring roads have been built the through goods traffic have been forced to take these ring roads to bypass the city. Therefore, we believe there is enough evidence and precedence available that the missing link of the Agra bypass will be built.

2.6 Steer team visited the asset as part the site visit exercise to understand the traffic movement on the and its surrounding network and in addition spoke to the users of the road and undertook a detailed reconnaissance of the Asset, including identification of any micro-diversions. The figures below show a typical cross-section of the Asset and its toll plazas as captured during site visits.

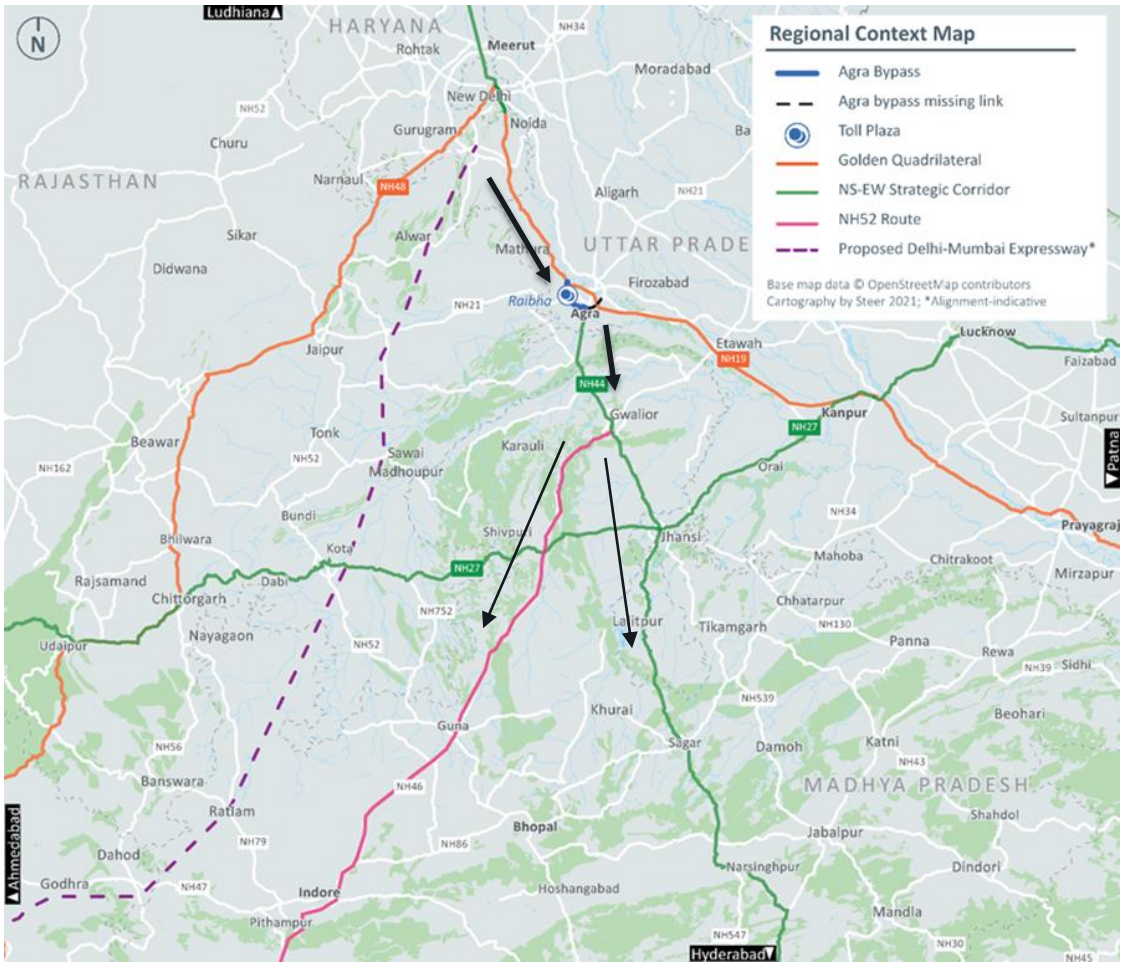
Figure 2.3: Typical cross-sections and toll plazas on the Asset-AB: Raibha

Source: Steer site visit

2.7 The major commodities observed during surveys are manufacturing, petroleum products, courier/parcel, agricultural, and building material. Average trip lengths of more than 500 kms were observed on the toll plaza, this is validated by the analysis of the OD data.

2.8 The Asset location in the regional context is shown in map below.

Figure 2.4: Asset location in the regional network context- AB: Raibha



Source: Steer cartography using OpenStreetMap data

2.9 The Asset serves the

- NH19/NH2 – North to Central/Eastern movements originating from Delhi and northern parts of the country (Punjab, Haryana, Himachal Pradesh, Jammu and Kashmir) to the central (UP, Bihar) and eastern (West Bengal, Jharkhand, Chhattisgarh, North-Eastern region) of the country.
- NH2/19 – NH52 and NH44 connection. This is the traditional north south movement between Delhi (and northern states) to destination such as Indore (Madhya Pradesh), Maharashtra, and all southern states. The traffic having OD's to south of the Asset split at Gwalior to use NH52 and NH44 depending on the destination.
  - NH52 (old NH3): predominantly serves the Indore, Nashik, Mumbai movement in addition to movements between Delhi-Bangalore, Goa, and other destinations
  - NH44 (old NH7): serves the Karnataka, Telangana, Andhra Pradesh, Tamil Nadu and Kerala movements.
- East-West movements NH21 traffic between Gujarat, Rajasthan, and Kanpur/Lucknow in addition to the Gujarat – Delhi (and north) movements.

2.10 The traffic profile is predominantly goods vehicles undertaking long distance movements between the locations discussed above. The commodity mix carried by the vehicles observed at the toll plaza during site visit was mix of manufacturing, courier/parcel, automobile, and agriculture confirming the long-distance nature of the traffic.

2.11 Proportion of local traffic observed on the toll plaza was low, this is also validated by the OD survey, however some local village movement was observed for light vehicles. Mathura refinery and Faridabad automobile cluster are a key contributor to regional movement on the Asset. Overall, the Asset serves national long distance strategic traffic.

2.12 This Asset primarily caters to three different types of traffic movements:

- **Short-distance trips** undertaken by passenger vehicles for work/business and tourism trips between Agra, Mathura, Vrindavan towards Morena, Bad, Dhaulpur. Some of the local consumption demand generated by these towns is met by the short distance goods movement on the Asset.
- **Medium-distance trips** undertaken between the urban and industrial centres in vicinity of the Asset in state of Uttar Pradesh as well as in the neighbouring states such as Delhi NCR, Jaipur, Kishangarh, Gwalior, etc. A significant number of medium distance trips are catering to the manufacturing, parcels and couriers related demand from the neighbouring states and the states along NH44 (old NH7).
- **Long-distance trips**, by 3A and MAVs, catering to the movement between urban and industrial centres connecting the northern states of Haryana, Punjab, Uttar Pradesh with the states of Madhya Pradesh (Indore), Maharashtra, Andhra Pradesh, Telangana etc.

Concession and tolling details

2.13 As discussed in chapter 1, the tolling length as per the latest technical schedules available from NHAI refer to a tolling length change. The concession and tolling details are provided in the email below.

Table 2.1: Summary of concession

Asset ID	A1 AB
Asset name	Agra Bypass
State	Uttar Pradesh
Length (km)	32.8 km
Chainage	Km. 00.000 of NH – 2/19 to Km. 32.800
Nos. of toll plaza	1
Toll plaza locations	Raibha at Km 32.800
Operating since*	March 2017
Proposed concession period	20 years
Tollable length (km)	Current Length: 8.050 km + 31.995 (bypass) = 56.043 Post Appointment date (FY23) length: 6.558 km + 32.144 (bypass) =54.774

Source: Information provided in NHAI technical schedules

Micro Diversion

2.14 There is a micro diversion near the Raibha flyover just before the toll plaza while coming from Mathura, which can be used by users to avoid paying toll. However, toll plaza guards were deployed to divert the traffic taking the NH21 and bypassing the toll booth. Site visit confirmed good quality road, however only used by local LCVs and very few MAVs with Rajasthan number plates. This has also been confirmed by the traffic report shared by NHAI.

This is not seen as a traffic risk to the Asset; however, we believe this continues to remain an issue which the bidder will need to manage while operating the toll plaza.

Figure 2.5: Typical cross-sections of the micro diversion near Raibha TP

Source: Steer site visit

Toll plazas and toll rates

2.15 As discussed earlier in section, the Asset has one toll plaza. The toll plaza on the Asset has 5+5 lane configuration on each side for FASTag collection on all lanes for mandatory electronic tolling.

2.16 The road users having valid FASTag installed on their respective vehicles approach the ETC lanes where the installed RFID readers detect the tag and deduct toll charges equalling single trip or for Local/monthly pass/discounts wherever applicable. In case, the RFID reader is not able to detect the FASTag, handheld devices are used to read the vehicle's tag. Further, in cases where FASTag is blacklisted or not working, the user can only buy single cash ticket and are charged twice the single trip fare. The users crossing toll plaza twice within 24 hours automatically get return discount.

2.17 Like the other National Highway plazas, the Asset has Single, Return, Local Commercial, Local Personal, Monthly and Local Monthly tickets. Single toll rates and categories on each of the toll plaza are presented in the table below.

Table 2.2: Single toll rates on the Asset (INR), applicable April 2022 to March 2023

Type of Vehicle	AB: Raibha
CJV	75
LCV	125
Bus/Truck	260
3A	280
MAV/ HCM/EME	405
OSV	495

Source: NHAI Revision of User fee Rate w.e.f 01.04.2022

Borkhedi-Kelapur (BK)

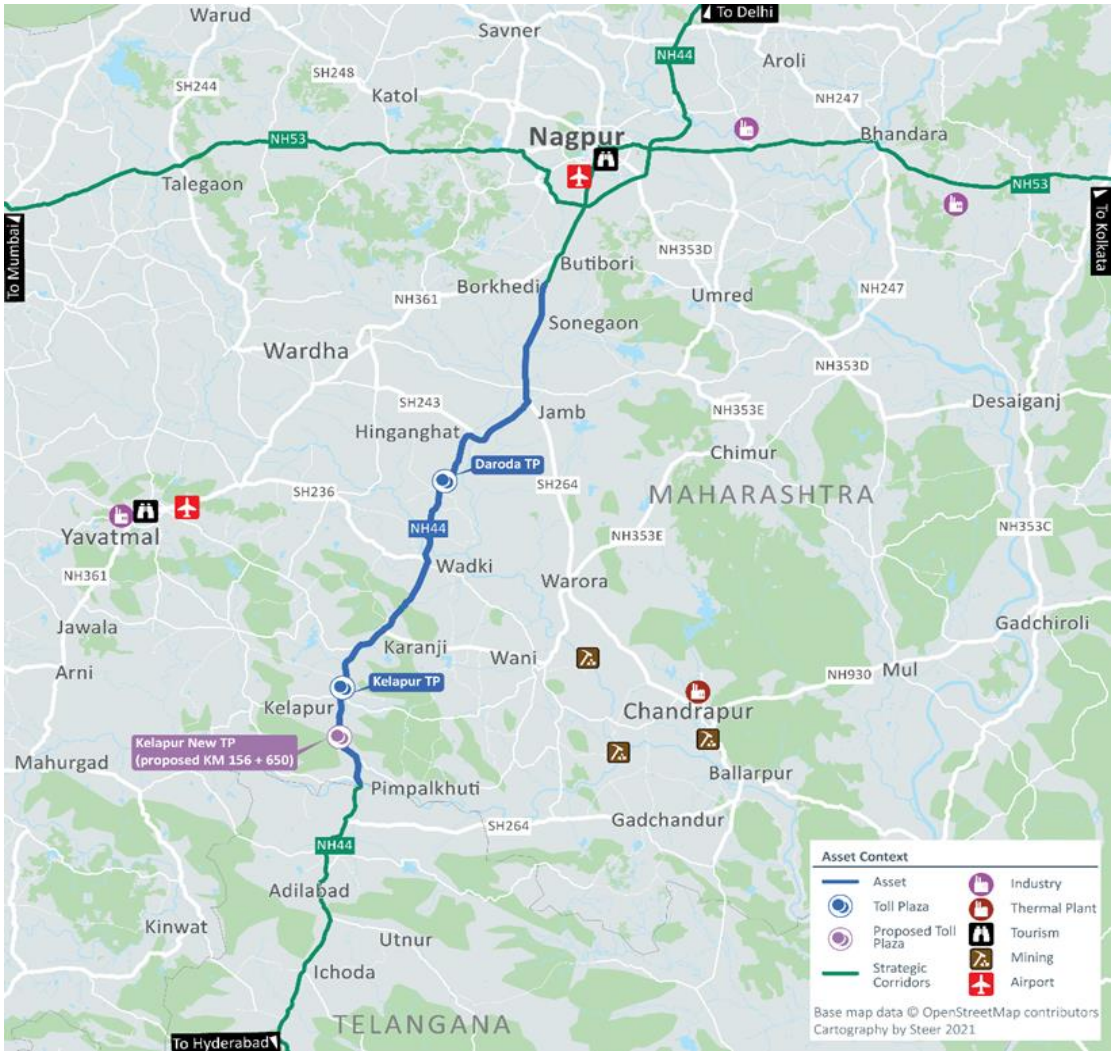
2.18 The second Asset, Borkhedi – Kelapur, is located on NH44 and is about 139 km long section between Borkhedi and Maharashtra/ Telangana Border (at Penganga River bridge) traversing through the districts of Nagpur, Wardha and Yavatmal in the state of Maharashtra.

2.19 There are two toll plazas on the Asset and are located at:

- Darodha (KM 92.500)
- Kelapur (KM 150.450, to be shifted to KM 156.650)

2.20 The Asset has two plazas located as shown in map below.

Figure 2.6 Asset context - BK



Source: Steer cartography using OpenStreetMap data

2.21 Kelapur toll plaza is proposed to be relocated to a new location, ~6 km south of the existing location in absence of adequate land to construct proper toll plaza at the present location. This is named as kelpaur New TP (KM 156 +250) in the map above.

2.22 The Asset is in vicinity of Nagpur as the city is home to several manufacturing hubs, food processing units, and CONCOR's multi modal logistics logistic hub. Yavatmal (textile/cotton), Butibori (MIDC), and Chandrapur (coal) are some of key traffic generators for the Asset.

2.23 Steer team visited the Asset as part the site visit exercise to understand the traffic movement on the and its surrounding network and in addition spoke to the users of the road and undertook a detailed reconnaissance of the Asset, including identification of any micro-diversions. The images below show a typical cross-section of the Asset and its toll plazas as captured during site visit.

2.24 The Darodha plaza has a 5+5 lane configuration, whereas the existing Kelapur plaza has a 2+2 lane configuration. Further, as observed during the site visit the Kelapur plaza is operating only 1 lane on each side and the plaza is in generally poor condition. Land availability is citied as a key reason for this and therefore the requirement of the new toll plaza has been considered by NHAI.

Figure 2.7: Typical cross-sections and toll plazas on the Asset

Source: Steer site visit

2.25 During our site visit, it was observed that a significant share of CJV/LCV users cross the toll plaza without paying on each of Darodha and Kelapur toll plazas. On Darodha, a higher percentage of non-paying CJV/LCV users can be attributed to the fact that the Asset is influenced by the local nature of CJV/LCV traffic as the Asset is in vicinity of Nagpur. However, for Kelapur in addition to the local nature of traffic, the detoriated condition of the toll plaza also results in low compliance for light vehicles. These trends are further validated by our TVC vs toll plaza data comparison, explained in later sections.

2.26 The major commodities observed during surveys are manufacturing, courier/parcel, agricultural products, and groceries. Average trip lengths of more than 1,500 kms were observed on the toll plaza, this is validated by the analysis of the OD data as well.

2.27 The Asset location in the long-distance regional context is shown in map below.

Figure 2.8: Asset location in the regional network context- BK

Source: Steer cartography using OpenStreetMap data

2.28 The Asset caters to the following traffic movements:

- **Long-distance** traffic:
  - The Asset forms part of NH19/NH7 (new NH44) north-south long-distance strategic corridor connecting Srinagar in Kashmir (northernmost state) to Kanyakumari in Tamil Nadu (southernmost state).
  - It directly connects national capital Delhi and northern states with state capitals of Hyderabad (Telangana), Bengaluru (Karnataka) including other major cities/industrial nodes/ junctions along the way like Agra (Uttar Pradesh), Gwalior and Jhansi (Madhya Pradesh), Nagpur (Maharashtra), Selam, Madurai, Tirunelveli (Tamil Nadu).
  - The Asset also provides strategic linkage between Delhi and Chennai via Hyderabad-Kadapa and Hyderabad-Ongole routes.
- **Medium-distance** traffic:

- In addition to role as national connector, the Asset provides important regional connectivity between neighbouring states i.e., Maharashtra and Telangana.

- **Short-distance** traffic:
  - Nagpur, being centrally located in the country, acts as a strategic junction within immediate influence area in Maharashtra.
  - The Asset provides fair condition round the year connectivity to various urban/ semi-urban centres of eastern Maharashtra i.e., Chandrapur, Wadner, Padharkawada, Yavatmal among each other and with regional commercial centre of Nagpur.

2.29 Similar to Agra Bypass, the traffic profile is predominantly goods vehicles undertaking long distance movements between the locations discussed above. The commodity mix carried by the vehicles observed at the toll plaza during site visit was mix of manufacturing, courier/parcel, automobile, and agriculture confirming the long-distance nature of the traffic.

2.30 The Asset has seen an increase in proportion of the long-distance goods traffic in recent years as compared to past performance which may be attributed to shift of long-distance traffic from other corridors to NH44 (old NH7) corridor as NH44 observed continuous Level of Service (LoS) upgrades. Being the shortest route between Delhi and Hyderabad/Bengaluru, the increased LoS on the corridor attracted traffic on NH44 post improvement.

Concession and tolling details

Table 2.3: Summary of concession

	Particulars
State	Maharashtra
Highway and lane configuration	NH44
Toll plazas	• Darodha (KM 92.500) • Kelapur (KM 150.450, to be shifted to KM 156.650)
Tollable length (km) as per concession agreement, applicable	• Darodha: 80.0766 km (during construction), 80.1810 (after construction) • Kelapur: 75.1554 km (same for new TP location as well)
Commencement of operations*	April 2011

Source: NHAI DPR

2.31 The change in Darodha's tolling length is due to reconstruction of a major bridge on the Asset. As per our discussion with the Client as well as our review of available documents, it was found out that the construction must be completed within 18 months of the appointed date. Hence, we have assumed the post-construction tolling length of 80.1810 km for Darodha FY25 onwards.

Toll plazas and toll rates

2.32 As discussed earlier in section, the Asset has two toll plazas. Darodha toll plaza on the Asset has 5+5 lane configuration whereas Kelapur plaza has 2+2 configuration. FASTag[1] is enabled on each side of the plaza for electronic collection of tolls.

2.33 The road users having valid FASTag installed on their respective vehicles approach the ETC lanes where the installed RFID readers detect the tag and deduct toll charges equalling single trip or for Local/monthly pass/discounts wherever applicable. In case, the RFID reader is not able to detect the FASTag, handheld devices are used to read the vehicle's tag. Further, in cases where FASTag is blacklisted or not working, the user can only buy single cash ticket and are charged twice the single trip fare. The users crossing toll plaza twice within 24 hours automatically get return discount.

2.34 Like the other National Highway plazas, the Asset has Single, Return, Local Commercial, Local Personal, Monthly and Local Monthly tickets. Single toll rates and categories on each of the toll plaza are presented in the table below.

Table 2.4: Single toll rates on the Asset (INR), applicable April 2022 to March 2023

Type of Vehicle	Darodha	Kelapur
CJV	100	100
LCV	165	165
Bus/Truck	340	340
3A	375	375
MAV/ HCM/EME	535	535
OSV	655	655

Source: NHAI Revision of User fee Rate w.e.f 01.04.2022

Key economic activities

Agra Bypass

Industrial Influence

2.35 The Asset is present in the agrarian state of Uttar Pradesh, the most populous state in India with a population of nearly 200 million people. AB forms part of the section connecting NH19 to NH44, later branching out to NH52 and NH44 at Gwalior.

2.36 The Asset caters to the demands generated by the states connected through the above-mentioned highways. NH19 runs over 1,465 kms completing the east – west movement and connects some of the major states and industrial centres of Delhi, Haryana, Uttar Pradesh with the eastern states of Bihar, Jharkhand, and West Bengal. On the contrary, NH44 completes the north-south movement of the country as it connects the northern states/UTs of Jammu and Kashmir, Punjab, Haryana, Delhi, Uttar Pradesh, Rajasthan, Madhya Pradesh, Maharashtra

[1] FASTag is a device that employs Radio Frequency Identification (RFID) technology for making toll payments directly while the vehicle is in motion. FASTag (RFID Tag) is affixed on the windscreen of the vehicle and enables a customer to make the toll payments directly from the account which is linked to FASTag.

with the southern states of Telangana, Andhra Pradesh, Karnataka, and Tamil Nadu. Following a parallel route with NH44, NH52 starts in Punjab and ends in Karnataka.

2.37 The Asset lies on the outskirts of Agra which has several small and medium-scale industries and is one of the prime centres of the handloom, plastic pallets, and automotive spares, in addition to being a key tourist destination because of the Taj Mahal. Numerous major tourist attractions also exist in the vicinity of the Asset. Agra, Mathura, Fatehpur Sikri and other towns in the region are home to several historical monuments, places of worship and heritage sites.

2.38 Mathura, in north of the Asset, is a popular tourist place because of its religious importance. There are several industries in Mathura in the sectors of chemicals, manufacturing, production. It also has a refinery which is owned and operated by the state-run Indian Oil Corporation (IOCL) in Uttar Pradesh since 1982. IOCL has recently announced a future strategic plan to use the wind power generated electricity from Rajasthan to produce green hydrogen units in Mathura refinery. The refinery is a vital source of petroleum and related commodities carrying traffic on the Asset.

2.39 The Asset acts as a key connection between Delhi NCR and cities in Madhya Pradesh such as Gwalior and Indore, a city in south of the Asset in the state of Madhya Pradesh. Gwalior has an existing industrial area where the economy is driven by textile mills, artificial silk manufacturing plants, handicraft, and hand loom industries, tanning industries, and chemical industries. The city is also home to Gwalior Chemical Industries Limited. The group is primarily into the business of manufacturing and marketing of specialty chemicals, catering to both the domestic and exports customers in the agrochemical, paints and coatings, dyes, and flavour & fragrance industries. Indore has large industrial cluster for automobile and other ancillary industries. Pithampur industrial area is one of the biggest industrial clusters in the country and support large industrial activity.

Tourism Influence

2.40 Several major tourist attractions exist in and around the Asset, with both Delhi and Agra being two of the three nodes part of the Golden Triangle (Delhi, Agra, Jaipur) – one of India's most popular tourist packages for international tourists. Delhi, Agra, Fatehpur Sikri and other towns in the region are home to several historical monuments and heritage sites, including the famed Taj Mahal (Agra).

2.41 Religious tourism and pilgrimage sites include Surajkund, Badkhal Lake, ISKON temple (all in and around Central NCR), and Banke Bihari, and other major temples of Mathura and Vrindavan.

Borkhedi-Kelapur (BK)

Industrial Influence

2.42 The Asset is present in the state of Maharashtra, the second-most populous state in India with a population of nearly 124 million people. The Asset forms part of the strategic NH44 corridor catering to the north-south movement.

2.43 The Asset caters to the demands generated by the states connected through the above-mentioned highway. NH44 runs over 4,112 kms completing the north-south movement and connects some of the major states and industrial centres of northern states/UTs of Jammu and Kashmir, Punjab, Haryana, Delhi, Uttar Pradesh, Rajasthan, Madhya Pradesh, Maharashtra

with the southern states of Telangana, Andhra Pradesh, Karnataka, and Tamil Nadu. The strategic nature of the project corridor can be attributed as a reason behind average trip length of 1,500+ km of 3A/MAV as observed during the site visit and as validated by our survey data results.

2.44 The Asset lies on the outskirts of Nagpur which is the third largest city in Maharashtra. It is known for medium to large scale industries alongside agriculture. The key industries are manufacturing and food processing as described below.

- **Manufacturing** segment includes products ranging from agriculture equipment, aluminum products, castings, cement, chemicals, paper and packaging, electrical equipment and fittings, textile engineering goods, tools manufacturing, fabrication and machining, ferro alloys, paints, furniture, plastic and moulding products, etc.
- **Food processing** giants having presence at Nagpur includes Haldiram, Dinshaw, Patanjali and other medium scales orange and spices processing units, etc.

2.45 Apart from the above-mentioned industrial segments present in Nagpur, the following are some additional developments announced by the government for the region:

- Government of Maharashtra has set-up Multi-Modal International Passenger and Cargo Hub Airport at Nagpur (MIHAN). That will upgrade existing domestic airport along with a Special Economic Zone which is abutting to the boundary of the airport. MIHAN houses plant of Tata Aeronautics which manufactures parts for Boeing and Air India and Dassault's assembly plants.
- Container Corporations of India Limited (CONCOR) constructed Multi Modal Logistic Park along with a rail terminal connecting MIHAN with different ports in country.

2.46 **Butibori industrial area** established by Maharashtra Industrial Development Corporation (MIDC), north of the Asset, is one of the country's largest industrial hubs. It houses textile, machine and metal fabrication and manufacturing units and is home to industrial giants like KEC, Hyundai, and Unitech. Koradi Thermal Power Station and Khaparkheda Thermal Power Station are the two major thermal power stations located in vicinity of the hub.

2.47 **Yavatmal industrial area**, in west of the Asset, has textile and cotton processing industries including Raymond India's garment plant. The industrial hub is also home to export units of machineries, cement, medicines, limestones, and clothes.

2.48 **Chandrapur** is key coal mining centre in close vicinity of the Asset and has thermal plant, cement, paper and ferro alloy manufacturing industries.

Agricultural influence

2.49 The agricultural stretches present along the Asset as well as in Nagpur generate a considerable share of traffic on the Asset. Nagpur, also known as Orange City, is famous for the production of oranges in addition to being home to large number of paddy, jowar, cotton, tur and soyabean fields. The same is observed in our 'commodity analysis', a part of survey results, as well as ~13% of the MAVs were found to carry agricultural products.

Network developments

2.50 The section below details the impacts which we believe would influence the traffic levels on the Assets during the concession period.

Agra Bypass

2.51 The subsections below include a narrative of each of the network and infrastructure improvements which are expected to impact the traffic on the Asset.

Western Dedicated Freight Corridor

2.52 The Government of India has plans to develop two Dedicated Freight Rail Corridors: The Western Dedicated Freight Corridor (WDFC) linking Dadri, east of Delhi, to Mumbai and the Eastern Dedicated Freight Corridor (EDFC) linking Ludhiana to Dhankuni in West Bengal.

2.53 We estimate that on completion of WDFC, the relevant goods carried via roads will shift to rail, causing a reduction in traffic volume on the corridor. As per the DFC website, base commodities which are expected to be carried on WDFC include containers, POL, fertilizers, iron & steel and cement, groceries, agricultural products such as food grains, among other bulk commodities and travelling more than 750Kms to Rail from Road. Additional commodities such as manufacturing, chemicals, courier/parcel and other ecommerce related commodities will also have an alternate to shift to the DFC. However, these commodities may take a longer duration to shift since related first mile and last mile connectivity infrastructure needs to be developed for seamless loading/unloading process. The Rewari to Palanpur section of the DFC commissioned in April 2021 and first RO-RO service from Palanpur was flagged off in August 2021. The impact of WDFC on Agra Bypass will be negative.

Delhi Mumbai Expressway

2.54 NHAI is building a greenfield expressway connecting Delhi and Mumbai. The Delhi-Mumbai Expressway (DME) will connect Delhi to Mumbai with a dual carriageway with six lanes per direction. At 1,350km long, it will drastically reduce travel length and times from Delhi to Mumbai. With this alignment, it is expected that once it's completed the Delhi-Mumbai Expressway could attract long-distance traffic from the north including Delhi/North of Delhi regions and going that is presently using the asset.

2.55 DME will be the longest high-speed grade separated expressway road corridor in the country. It is expected to have significant impact on the road logistics sector with new options of moving goods across the major economic activity centres of Maharashtra (e.g., JNPT, Mumbai, Navi Mumbai, Bhiwandi) Gujarat (e.g., Surat, Vadodara, Godhra), Madhya Pradesh (e.g., Indore, Ratlam), Rajasthan (e.g., Kota, Jaipur, Bhiwadi), Haryana (e.g., Manesar, Sohna) and Delhi.

2.56 The time and operating cost savings offered by such an expressway is expected to result in significant shifts in operating patterns adopted by truck operators who would look to take benefit of reliable journey times offered by such an expressway. This would include deploying their fleet on long distance movements with faster turnaround times which enables better fleet utilisation therefore more competitive position in a very cost sensitive market.

Agra Bypass missing link

2.57 A small section of 8-10 kms on the southern end of Agra Bypass is currently incomplete and as per the information gathered from stakeholders during the site visit, it is understood that due to land acquisition issues and financing hurdles, the work to complete the ring is currently on hold. Also, there are no publicly available documents available which confirm the alignment of the missing link of the bypass.

2.58 However, we do believe that this link will get completed in the due course of time, as pressure on local government and NHAI increases, due to growing urban settlements within Agra. As the city of Agra grows and the bypass is completed, similar to Jaipur and Delhi, NGT bans due to pollution and general traffic congestion is expected to result in the NH19 section passing through the city being closed during daytime for truck traffic. This will result in in the shift of traffic plying on NH19 and crossing the city to the newly constructed bypass. This share of traffic will then appear at Raibha plaza in order to bypass the city of Agra and hence, the traffic levels are believed to increase once the construction of missing link is completed.

Agra Bypass diversion

2.59 The opening of the missing link will result in a new route for east-west traffic between Gujarat/Southern states and Kanpur and Lucknow/beyond. This share of traffic currently uses the NH21/NH44 – Asset – NH19 (through Agra city) – NH19 route to traverse the east/south-west movement. Once the construction of the missing link is completed, the above-mentioned traffic will have the option to avoid crossing Raibha plaza. The new route choice will be NH21/NH44 – missing link - Agra-Lucknow Expressway/NH19. Hence, the completion of missing link is expected to result in a decrease of traffic levels.

Borkhedi-Kelapur

Delhi Mumbai Expressway & Surat Chennai Expressway

2.60 As mentioned previously, Delhi Mumbai Expressway will connect Delhi to Mumbai with a dual carriageway with six lanes per direction. At 1,350km long, it will drastically reduce travel length and times. Similar to DME, 1,461 km long Surat Chennai Expressway will connect Surat and Chennai via Solapur, Kurnool, Kadappa, and Tirupati. Once both these expressways are constructed, traffic coming from Delhi/ north and travelling to Kurnool/south will have the option to use DME till Indore followed by NH52 till Solapur followed by SCE from Solapur to Kurnool and beyond. This new alternative will provide the option of using expressways for ~60% of the total journey distance and hence, a share of Delhi-Kurnool traffic is expected to have an alternate route choice.

2.61 Further, DME provides a faster access to Indore and post which the users can reach Solapur via Dhule – Aurangabad. After Solapur, the route to reach Bangalore can either be via Kurnool or via Vijaypura – Hospete.

Nagpur Vijayawada Expressway

2.62 A 457 km long Nagpur – Vijayawada Expressway is being developed as Economic Corridor by National Highways Authority of India (NHAI) under Bharatmala Pariyojna. This development is mix of existing alignment to be widened and greenfield section between Warangal- Khammam and is expected to be completed by FY28.

2.63 The proposed expressway will establish new competing route for NH44 as the users will have the option to use the expressway from Nagpur to travel to Vijaywada and south. The existing distance between Nagpur and Vijayawada using Asset is 773 kms which will get reduced to 596 kms after the expressway is operational. The expressway is still in the planning phase, the exact status of the project has been raised as a query with NHAI and is pending clarification.

3 Traffic description

Introduction

3.1 This Chapter outlines the historical and current traffic and revenues on the Asset and how these are used to establish the current/base year demand (in terms of AADTs), which forms the basis of our forecasts. We then use our independent traffic volume counts (TVC) to validate the AADTs and estimate shares of toll violations and unreported exemptions.

3.2 For a traffic and revenue due diligence exercise, the data provided by the toll plaza is typically the primary source of establishing a road asset's base position, in terms of vehicle level AADT and PCU levels, as well as historical performance in terms of growth trends by vehicle type. However due to the unique nature of the asset under consideration in this assignment, being operated under different Operate Manage and Transfer (OMT) contracts, basically independent contractors, the toll plaza based historical data available was very limited for the Asset. Therefore, it was important to validate the toll plaza data against other independent data sources to entrust confidence in the data used for base position estimation.

3.3 An independent traffic count is often a good way to validate the toll plaza information which has been used in combination with data shared by the Client team. A fresh set forecasting approach was also developed using this independent data and benchmarks available from other studies. These data sources, described in detail below, were helpful in establishing the base position as well as the historical trends that could be relied upon for developing a robust set of forecasts.

Historical traffic and revenue analysis from various sources

3.4 This section below presents the current and historical traffic and revenue position of the Assets. For this study, traffic data is made available from different sources shared by the Client, namely:

- IHMCL counts;
- Schedule-M and/ or Schedule V;
- Toll plaza data (ETC+cash) sourced from Client;
- Benchmark Asset data

3.5 The following section outlines the current and historical traffic and revenue datasets available on the Asset, as well as our analysis of primary traffic count data, collected as a part of this project. In addition to the data available through secondary sources we have conducted our own independent Traffic Volume Counts (TVC) counts to validate the AADT and estimate shares of vehicle classes, where data are not available or aggregated.

3.6 The sections below discuss each data source in detail that was analysed to estimate the base AADT and revenue position.

Historical traffic

Agra Bypass

IHMCL data

3.7 IHMCL or Indian Highways Management Company Limited undertakes 7-day traffic volume counts on NHAI toll plazas. The counts are classified by vehicle type and present a reasonable position of the traffic that appears on the Asset for that time period. These counts are undertaken by IHMCL at different times of the year and over multiple years. These counts can be analysed to represent a traffic profile of different vehicle types over the years and their evolution.

3.8 IHMCL 7-day traffic counts are available on the Asset toll plaza for different months from December 2016 (FY17) to September 2020 (FY21). The weekly counts available for six different time periods (not adjusted for seasonality) are shown in the table below.

Table 3.1: Historical counts (IHMCL) at AB: Raibha

	Dec-16	May-17	Sep-17	Mar-18	Apr-19	Sep-20
CJV	5617	4364	3422	3925	5479	3873
LCV	519	424	387	303	443	357
Bus	492	433	507	666	549	353
3A	411	313	320	303	318	227
MAV	329	263	307	252	352	317
Total	7368	5797	4943	5449	7141	5127
PCU	10585	8422	7865	8421	10329	7575

Source: Client data, these are Average of 7-day counts undertaken by IHMCL during different years

3.9 In order to observe the correct characteristics of the Asset, the IHMCL WADTs were corrected for seasonality using an SCF factor. In absence of reliable historical toll plaza data, the SCF were benchmarked from the toll plazas located in close vicinity of the Asset which we have studied in the past and where a reasonable long-term historical data was available. The converted AADTs and the corresponding long-term CAGR is shown below.

Table 3.2: AADT based on from SCF Adjusted IHMCL counts-AB: Raibha

	FY17	FY18	FY20	FY21	FY20-21	FY18-21
CJV	5,339	4,143	5,514	4,642		
LCV	498	369	421	361		
Bus	504	517	552	345		
3A	382	307	321	228		
MAV	306	270	355	318		
AADT	**7,029**	**5,607**	**7,163**	**5,893**	(17.7%)	1.7%
PCU	**10,120**	**8,387**	**10,362**	**8,329**		

Source: Steer analysis

3.10 As observed from the table above and our observations from the site visit, there seems to be overreporting in CJV while heavy trucks (3A/MAV) seem to be significantly underreported. This was validated by analysing other data points provided by the client. Therefore, we have not considered this data for undertaking any analysis for the Asset.

Schedule M data

3.11 Schedule M data shared by the Client includes historical traffic data for FY20. In absence of recent monthly data from Schedule V, we haven't used this data to analyse traffic growth on the Asset.

Figure 3.1: Schedule M MADT - AB: Raibha

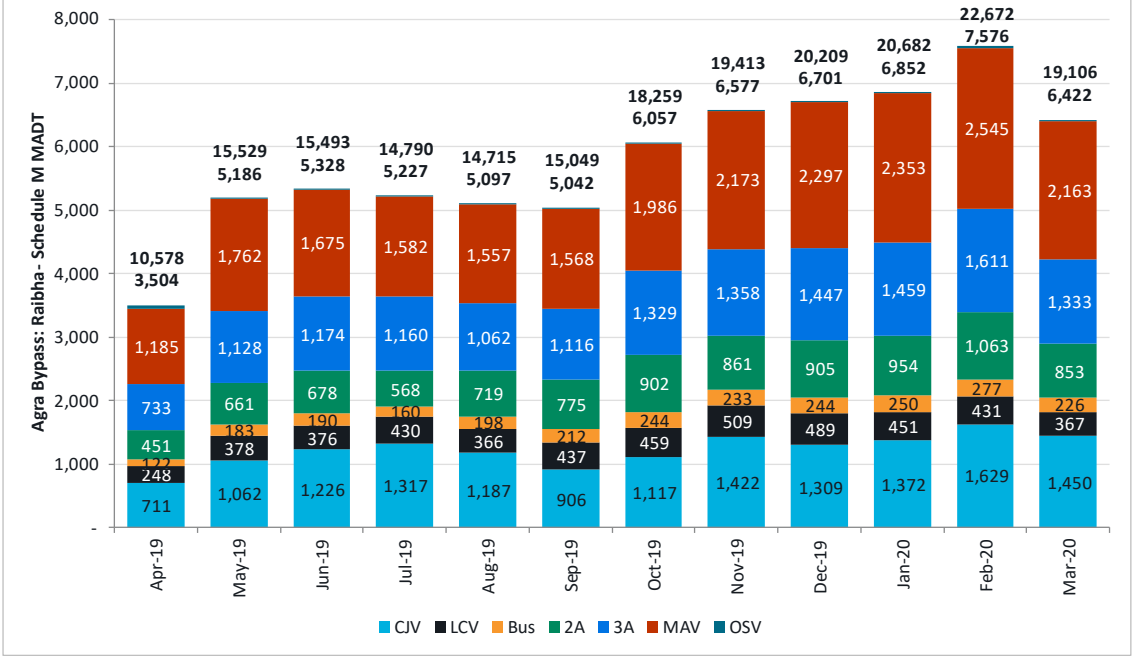


Table 3.3: AADT from Schedule M data-AB: Raibha

Vehicle Class	Schedule M AADT
CJV	1,221
LCV	413
Bus	211
2A	781
3A	1,240
MAV	1,898
OSV	19
Total	**5,783**
PCU	**17,163**

Source: Steer analysis; To estimate AADT for FY20, we have only considered 25 days in March'20 to exclude the days for nationwide lockdown

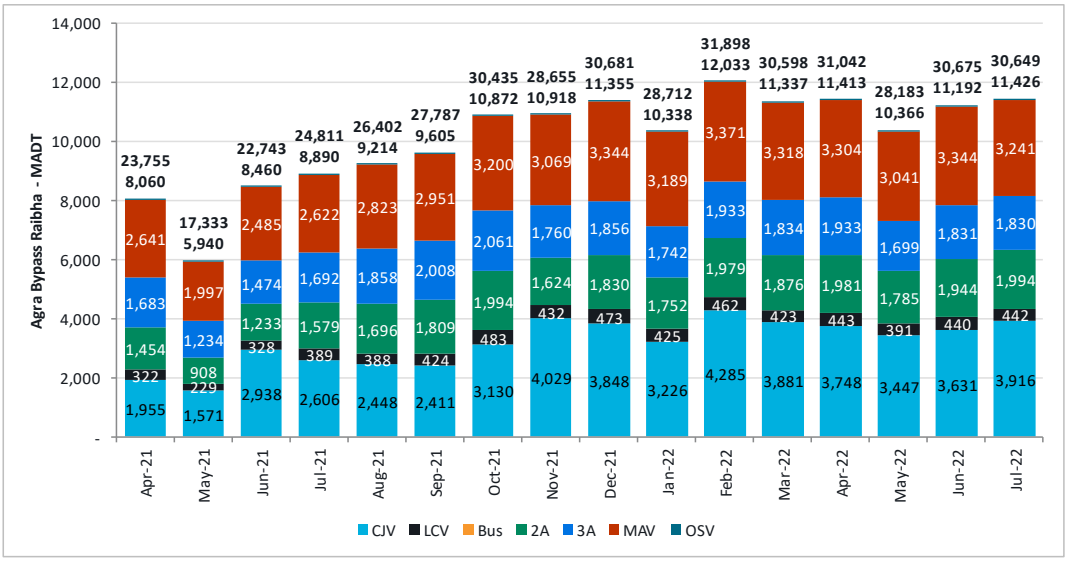
3.12 Schedule M data also confirms that the IHMCL counts presented earlier vary significantly in their split among various vehicle types. Further, there are no overlapping time periods between the two datasets to validate these datasets. Hence both datasets have not been

considered in the analysis. However, Schedule M data appears to be closer to the actual split of traffic across vehicle types (basis the ETC data for FY22)

Toll plaza data (ETC+cash) as shared by client

3.13 In case for Agra Bypass, the toll plaza data was available from 1st April 2021 till 31st July 2022. The corresponding revenue for these months is also available. Figure below shows the MADT reported for Agra Bypass Asset.

Figure 3.2: Historical MADT- AB: Raibha



Source: Steer analysis of client toll plaza data;

3.14 The Asset trends is trending at 28,000-30,000 PCU levels Q3 FY22 onwards with robust truck performance continuing in Q1 FY23, with the Asset trending at 29,000 PCUs. The month-on-month performance is in line with the benchmark Asset as discussed in the next sections. ETC proportion of reported traffic exceeds 95% in the recent months of FY23

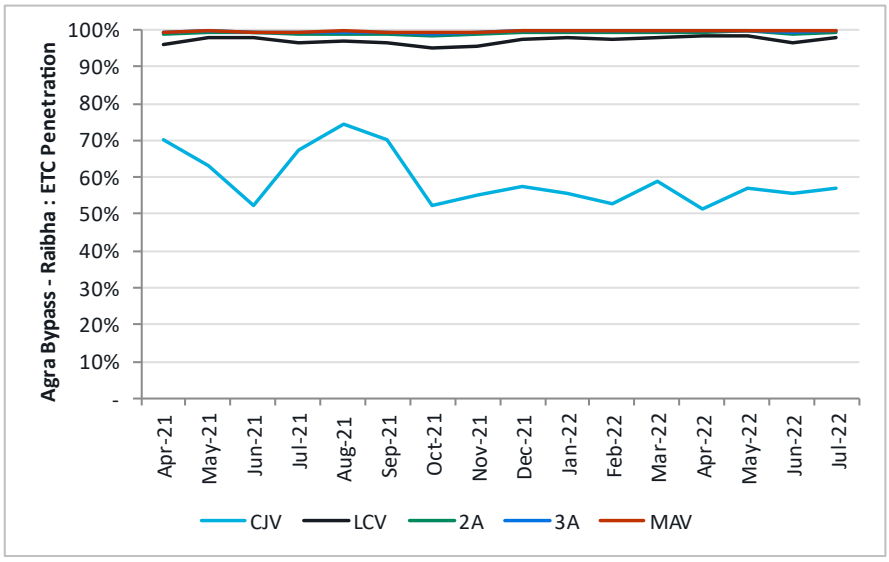
3.15 In FY22, the Asset observed ~9,738 traffic daily which was dominated by 3A/MAV trucks. The Asset observes a significant share of trucks (3A/MAV) as it acts as a key connector between Delhi NCR and Gwalior/south on NH3. In FY22-23, 3A/MAVs contributed ~47% to the total traffic. The CJV, reported starting Oct-21 show a sudden increase from an average 2400 levels to 3000, increasing to 3500-4000 levels in Q4FY22 and Q1/Q2FY23. We belove that these volumes are higher than observed and will be validated by the independent counts undertaken by Steer. This is discussed in the later sections.

3.16 The traffic in FY22 was affected by the travel restrictions related to the 2nd wave of Covid19 infections in April-May'21 where the traffic in May dropped to ~60% of the annual levels. The reported TMS data shows a significant increase in CJV exemptions starting Oct'21. We have verified the traffic volumes by conducting our own independent TVC counts. The difference between TVC counts and the 'paying' traffic (cash + ETC) is being treated as 'exemptions/violations' (non-paying traffic) in our forecasts explained in detail in TVC comparison section.

3.17 To understand the proportion of traffic that has moved to payment via FASTag/ETC, %age transactions have been calculated by comparing the share of traffic using FASTag for payment

with the total traffic. It should be noted that TMS traffic data provided by the Client had details of both, users paying via FASTag as well as users paying via cash.

Figure 3.3: Historical ETC penetration- AB: Raibha



Source: Steer analysis of client toll plaza data

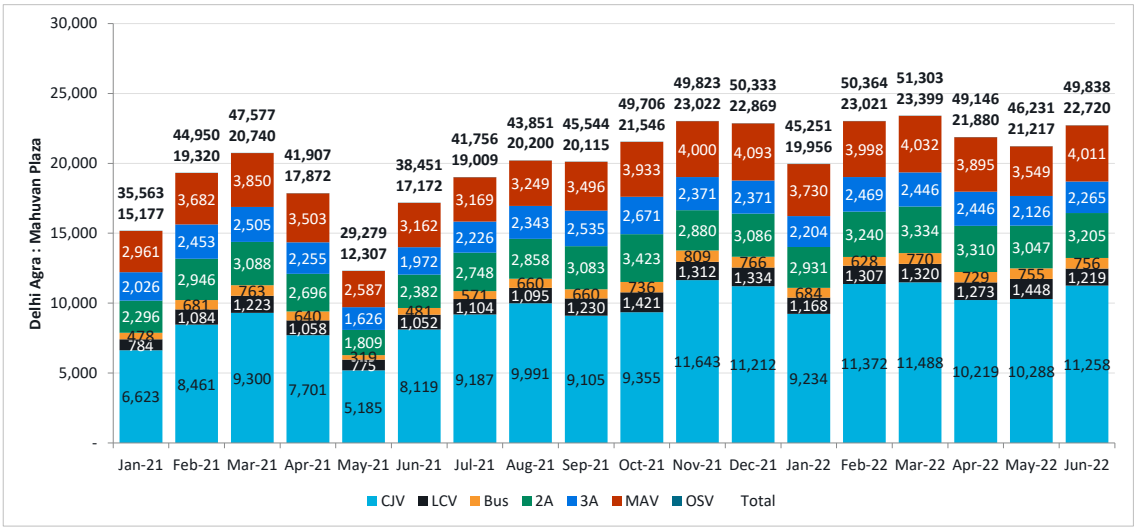
3.18 As observed in the chart above, more than 95% of the 2A/3A/MAV traffic pay tolls via FASTag. This is in line with our understanding of the traffic characteristics on the Asset where the Asset caters to long-distance north-south and east-west movements. Generally, a valid FASTag on a vehicle facilitates smooth movement through tolls and hence, becomes time-efficient in case of long-distance travel. Such benefits of FASTag leads to higher penetration levels as being observed on the Asset.

3.19 CJVs do not show a clear trend % of FASTag transactions. We believe that the exemptions/ violations reported in the TMS data overestimate the levels being observed on the Asset leading to erratic traffic trends. To estimate the true levels of exemptions/violations, we have compared the daily level TVC counts with the ETC reported traffic (total traffic excluding the reported cash exemptions/violations) for the same dates, the difference between TVC and ETC traffic is assumed to be the level of exemptions in our forecasts. The same is discussed in detail in the later sections.

Reference asset historical trends: Mahuvan toll plaza

3.20 Client provided the ETC data for the feeder Asset Mahuvan toll plaza. The traffic volumes on the toll plaza are trending at around 50,000 PCU levels in FY23. The toll plaza caters to 10,500 trucks (including LCV) and around similar levels of CJV and Buses.

Figure 3.4: MADT from ETC data: Mahuvan toll plaza



Source: Steer analysis of data shared by Client

3.21 The toll plaza shows very similar month on month traffic trends as reflected on the Asset. Full year data for this plaza is available only for FY22, however it was also impacted by 2nd wave of Covid19 infections which resulted in lower traffic levels during April to June'21 followed by subsequent recovery in Q2 FY22.

3.22 As per the data available, both Raibha plaza and Mahuwan plaza have observed a drop in traffic in May 2022 with subsequent recovery in June 2022. However, there is no specific reason for this drop in traffic. June and July traffic volumes trend in line with April 22 MADT volumes on the Asset.

Borkhedi-Kelapur

IHMCL data

3.23 IHMCL 7-day traffic counts are available from March 2015 – November 2020 for Darodha and from September 2015 – September 2020 for Kelapur. The weekly counts available for different time periods (not adjusted for seasonality) are shown in the table below.

Table 3.4: BK: Darodha - Historical weekly counts (IHMCL)

	Sep-15	May-16	Oct-16	Jun-17	Mar-18	Sep-18	Feb-19	Jan-20	Sep-20
CJV	732	1,167	904	851	1,112	899	1,470	1,295	1,830
LCV	249	402	346	390	562	557	612	590	709
Bus/2A	415	367	439	427	544	582	616	725	871
3A	910	799	773	843	1,057	1,205	1,221	1,367	1,508
MAV	444	447	700	657	1,028	1,221	1,032	1,323	1,241
Total	**2,750**	**3,182**	**3,162**	**3,168**	**4,303**	**4,464**	**4,951**	**5,300**	**6,159**
PCU	**7,079**	**7,280**	**8,209**	**8,203**	**11,384**	**12,590**	**12,543**	**14,410**	**15,615**

Source: Client data, these are Average of 7-day counts undertaken by IHMCL during different years

Table 3.5: BK: Kelapur - Historical weekly counts (IHMCL)

	Mar-15	Jan-17	Oct-16	Jun-17	Feb-18	Aug-18	Feb-19	Nov-20
CJV	1,169	1,670	1,144	1,608	1,488	1,267	1,924	1,855
LCV	399	560	405	294	551	531	695	881
Bus/2A	594	764	627	522	673	653	834	1,386
3A	1,145	1,171	889	613	1,117	1,286	1,187	1,638
MAV	460	739	691	379	924	1,330	1,079	1,692
Total	**3,767**	**4,904**	**3,756**	**3,416**	**4,753**	**5,067**	**5,719**	**7,452**
PCU	**9,055**	**11,641**	**9,409**	**7,160**	**11,843**	**13,866**	**13,885**	**19,863**

Source: Client data, these are Average of 7-day counts undertaken by IHMCL during different years

3.24 In order to observe the correct characteristics of the Asset, the IHMCL WADTs were corrected for seasonality using an SCF factor. In absence of reliable historical toll plaza data, the SCF were benchmarked from the toll plazas located in close vicinity of the Asset on NH44 which we have studied in the past and where a reasonable long-term historical data was available. The converted AADTs and the corresponding long-term CAGR is shown below.

Table 3.6: BK: Darodha - Historical counts (IHMCL) at Asset

	FY16	FY17	FY18	FY19	FY20	FY21	FY16-18	FY18-20	FY16-21
CJV	840	982	945	1,194	1,299	2,101	6.0%	17.2%	20.1%
LCV	282	359	462	615	646	802	28.0%	18.2%	23.3%
Bus/2A	432	402	473	605	713	907	4.6%	22.8%	16.0%
3A	934	788	933	1,212	1,394	1,547	(0.0%)	22.3%	10.6%
MAV	456	582	825	1,129	1,349	1,273	34.6%	27.9%	22.8%
Total	**2,943**	**3,113**	**3,638**	**4,755**	**5,401**	**6,630**	**11.2%**	**21.8%**	**17.6%**
PCU	**7,409**	**7,709**	**9,569**	**12,647**	**14,660**	**16,394**	**13.6%**	**23.8%**	**17.2%**

Source: Client data

Table 3.7: BK: Kelapur - Historical counts (IHMCL) at Asset

	FY15	FY17	FY18	FY19	FY21	FY15-18	FY19-21	FY15-21
CJV	1,140	1,424	1,447	1,523	1,806	8.3%	8.9%	8.0%
LCV	391	509	411	635	772	1.7%	10.2%	12.0%
Bus/2A	580	691	584	736	1,380	0.3%	37.0%	15.6%
3A	1,103	1,065	851	1,235	1,640	(8.3%)	15.3%	6.8%
MAV	443	741	640	1,205	1,694	13.0%	18.6%	25.0%
Total	**3,657**	**4,430**	**3,933**	**5,334**	**7,293**	**2.5%**	**16.9%**	**12.2%**
PCU	**8,770**	**10,789**	**9,249**	**13,809**	**19,649**	**1.8%**	**19.3%**	**14.4%**

Source: Client data

3.25 As observed in the tables above, both the plazas of the Asset observed a healthy long-term traffic CAGR (15-17%). The healthy growth on the Asset can partially be explained due to the shift of long-distance traffic (Delhi/north-Bangalore/Hyderabad) from NH48 and NH3/52 to NH44 as several sections got upgraded to 4/6-lanes leading to a better Level of Service on the project corridor.

3.26 Since, the IHMCL data has neither long-term historical monthly trends nor short-term FY22 data, it isn't being used to compute the base traffic position. However, it provides a reasonable basis for evaluating the historical trajectory of the traffic profile using the Asset and therefore, is being used as one of the benchmarks to estimate the underlying growth potential of the Asset.

Schedule M data

3.27 As discussed above, Schedule M data is available on monthly basis starting November 2017 till September 2020 for Darodha plaza and from February 2020 till June 2021 for Kelapur plaza. The data is presented in the figure below.

3.28 The following tables showcase the AADT calculated from the provided Schedule M data.

Table 3.8: BK: Darodha – Schedule M AADT

	FY18	FY19	FY20	FY21	FY18-19	FY19-20	FY20-21	FY18-20
CJV	847	1,032	1,042	746	21.7%	1.0%	(28.4%)	10.9%
LCV	531	546	516	364	2.9%	(5.4%)	(29.5%)	(1.4%)
Bus/2A	629	843	888	528	34.0%	5.4%	(40.5%)	18.8%
3A	752	952	1,118	750	26.5%	17.4%	(32.9%)	21.9%
MAV	703	997	1,338	1,067	41.9%	34.2%	(20.3%)	38.0%
Total	**3,462**	**4,370**	**4,902**	**3,455**	**26.2%**	**12.2%**	**(29.5%)**	**19.0%**
PCU	**8,950**	**11,723**	**13,856**	**9,927**	**31.0%**	**18.2%**	**(28.4%)**	**24.4%**

Source: Client data

3.29 Similar to the growth trends observed in the IHMCL data, traffic on Darodha plaza grew by ~24-25% on a PCU level in FY18-20. The growth on the plaza can be partially due to better reporting of the traffic on the Asset as OMT contractors changed in every 6-12 months or due to the shift of long-distance traffic from NH48 and NH3 to NH44 as several sections got upgraded to 4/6-lanes leading to a better Level of Service. The plaza saw a drop in traffic in FY21 due to national and state lockdowns imposed in the corridor due to Covid19 pandemic.

Table 3.9: BK: Kelapur – Schedule M AADT

	FY20	FY21	FY20-21
CJV	704	645	(8.4%)
LCV	513	428	(16.6%)
Bus/2A	1,143	1,053	(7.8%)
3A	1,157	1,107	(4.3%)
MAV	1,303	1,372	5.3%
Total	**4,819**	**4,604**	(4.5%)

	FY20	FY21	FY20-21
PCU	**14,235**	**13,939**	(2.1%)

Source: Client data

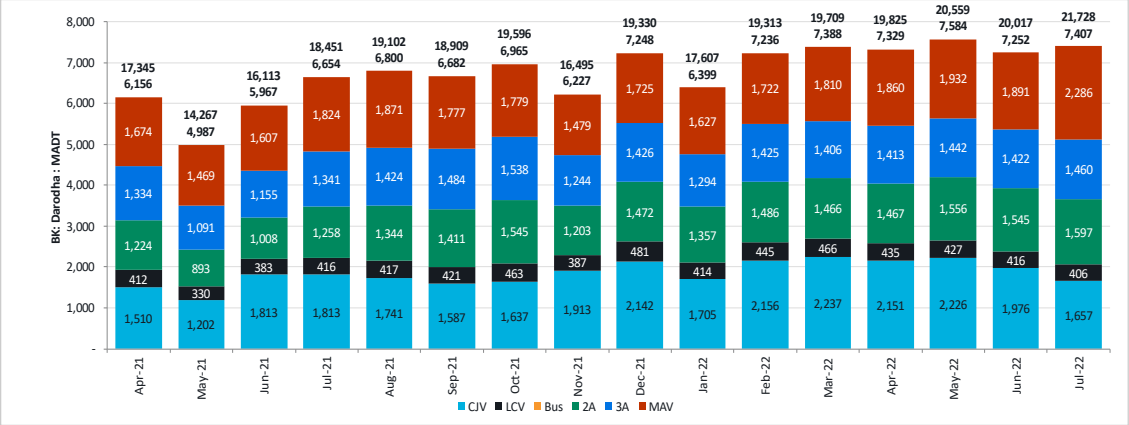
3.30 As compared to Darodha plaza where the data was available from FY18-21, data from FY20-21 is available for Kelapur plaza. As mentioned above, the drop in traffic in FY21 is due to national and state lockdowns imposed in the corridor due to Covid19 pandemic.

3.31 To validate the reliability of the Schedule M data, we have compared the traffic levels with the traffic levels provided in the toll plaza data for the months common in both the datasets. The same is explained in detailed in the next sections.

Toll Plaza data (ETC + cash) as shared by client

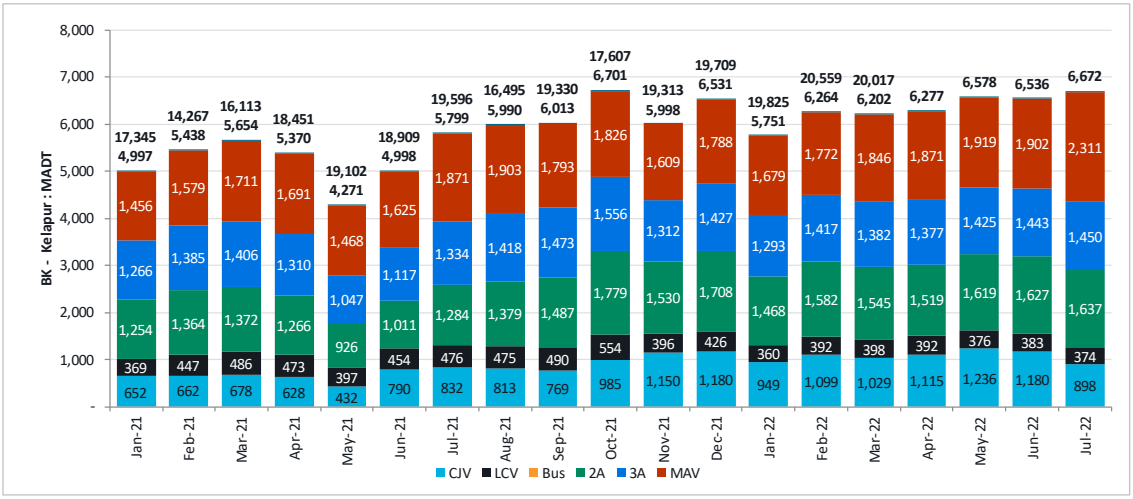
3.32 Daily level TMS data from 01st April to 31st July 2022 for Darodha and from 01st January 2021 to 31st July 2022 Kelapur was shared by the Client. This was averaged on a monthly level to MADT and is presented in the charts below:

Figure 3.5: BK: Darodha –MADT and PCU



Source: Steer analysis

Figure 3.6: BK: Kelapur –MADT and PCU



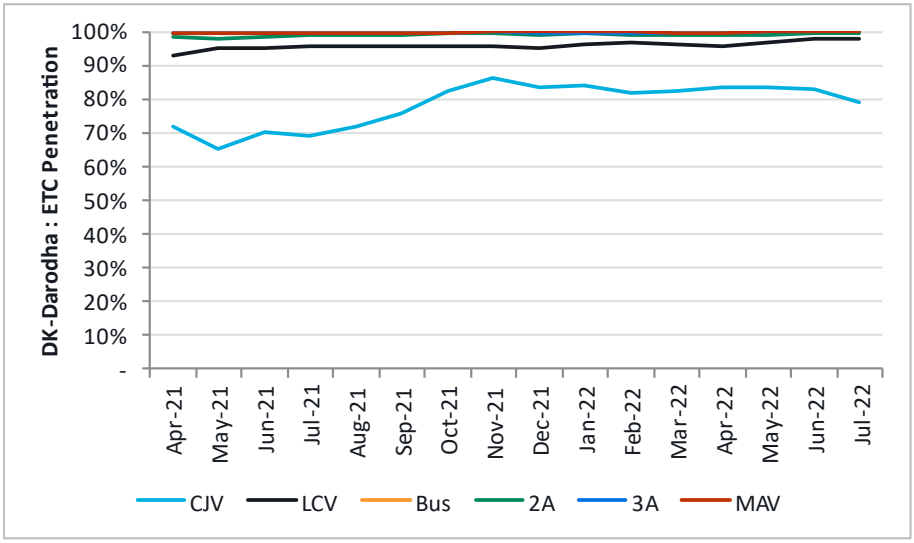
Source: Steer analysis

3.33 The Asset observed 19,000 PCU levels Q3 FY22 onwards with robust truck performance continuing in Q1 FY23 where the Asset started observing ~20,000 PCUs. The traffic in FY22 was affected by the travel restrictions related to the 2nd wave of Covid19 infections in April-May 2021 where the traffic in May dropped to ~40% of the annual levels.

3.34 Darodha plaza observed ~6,557 AADT in FY22 as compared to ~5,818 AADT on Kelapur. On both the plazas, traffic composition was majorly dominated by trucks with ~66% trucks on Darodha and ~84% trucks on Kelapur as it primarily serves long-distance north-south traffic movement with majority of the truck traffic crossing both the plazas leading to similar truck volumes throughout the Asset. The difference in AADT on both the plazas is majorly due to lower traffic levels of CJVs on the Kelapur.

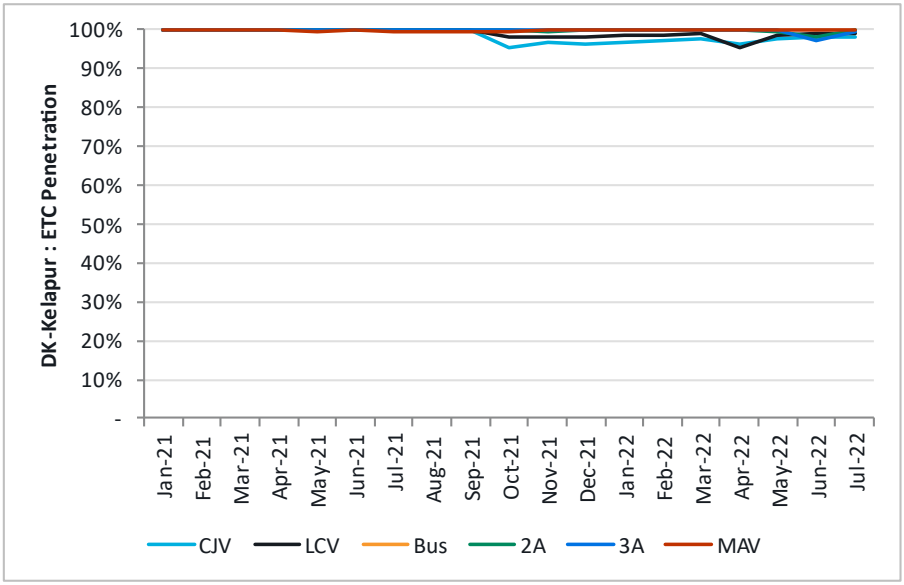
3.35 To understand the proportion of traffic that has moved to payment via FASTag, % FASTag transactions has been calculated by comparing the share of traffic using FASTag for payment with the total traffic. It should be noted that toll plaza data provided by the Client had details of both, users paying via FASTag as well as users paying via cash.

Figure 3.7: BK: Darodha - ETC penetration



Source: Steer analysis

Figure 3.8: BK: Kelapur - ETC penetration



Source: Steer analysis

3.36 As observed in the charts above, more than 95% of the 2A/3A/MAV traffic pay tolls via FASTag. This is in line with our understanding of the traffic characteristics on the Asset where the Asset caters to long-distance north-south movement. Generally, a valid FASTag on a vehicle facilitates smooth movement through tolls and hence, becomes time-efficient in case of long-distance travel. Such benefits of FASTag leads to higher penetration levels as being observed on the Asset.

3.37 The % of transactions via FASTag for CJVs has increased significantly over the months at Darodha plaza. This can be attributed to the fact that in order to avail toll discounts, the users must have a valid FASTag installed in the vehicle. However, the penetration levels are still lower than trucks as a share of CJV traffic crosses the plaza as 'exemptions/violations' and hence, doesn't have FASTag installed. The difference in CJV trend is due to the Asset's vicinity to Nagpur leading to a 'local' nature of CJV traffic.

3.38 The % of transactions via FASTag for CJVs on Kelapur plaza is significantly higher than the penetration observed on Darodha plaza as the traffic data provided by the Client for Kelapur plaza includes a negligible share of cash-paying traffic as well as CJVs crossing as exemptions/violations. We believe that the actual share of exemptions/violation is higher than the reported data and hence, have compared the reported toll plaza data with our independent TVC counts for validation, the same is explained in detail in later sections.

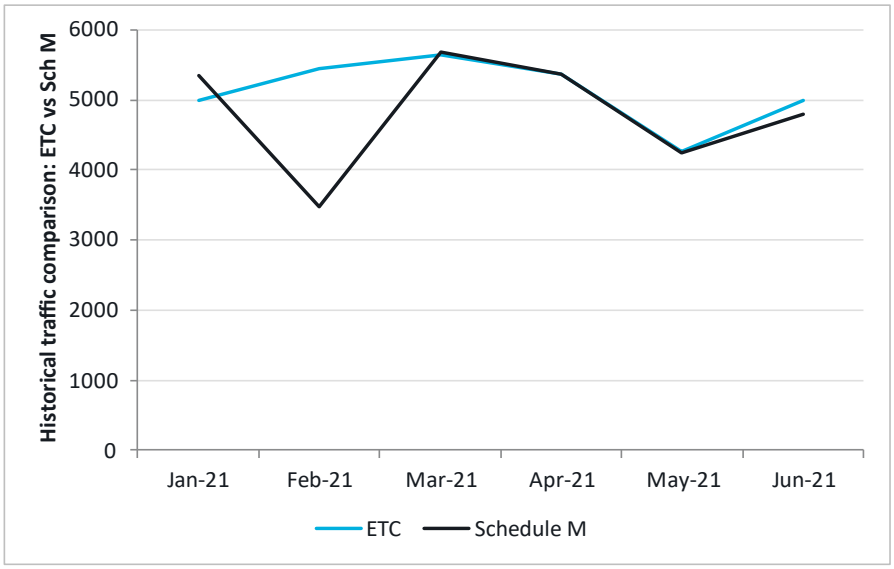
Historical data validation

3.39 As the base traffic of our forecasts is based on the historical traffic data provided by the Client (IHMCL, Schedule M, and toll plaza data), it becomes imperative to validate the provided datasets against each other as well as with other independent sources.

3.40 Since, the IHMCL data has neither long-term historical monthly trends nor short-term FY22 data, it isn't being used to compute the base traffic position. Therefore, we have compared the ETC traffic in toll plaza data with the total traffic in Schedule M data below to validate their reliability of these two data sets by comparing them for common overlapping periods. Data for

the months common in both datasets was only available for Kelapur (January'21-June-21). The comparison is shown below:

Figure 3.9: Historical data validation



Source: Steer analysis

3.41 A comparison between these two datasets shows that the difference between these two is higher in Feb-21 and June-21, with ETC being higher than schedule M. It should be noted that Schedule M dataset includes ETC as well as cash transactions and hence, is expected to report higher traffic levels than the ETC data reported in toll plaza dataset. Therefore, this casts a doubt on Schedule M dataset and hence have not been included in our analysis for traffic volumes.

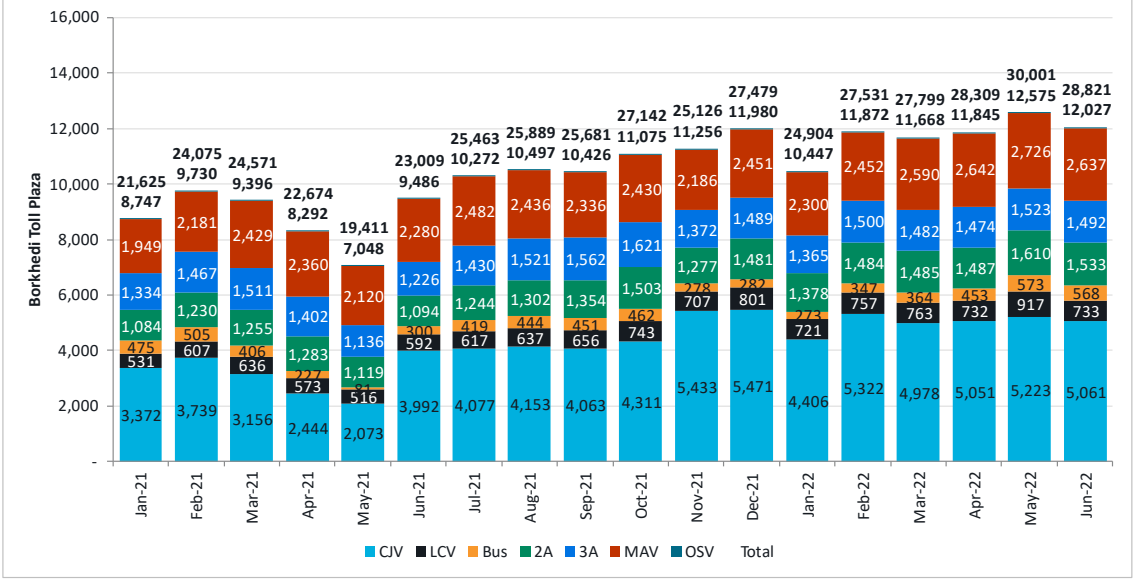
3.42 Based on our experience of studying toll roads across the country, tolling via FASTag has significantly improved the methods of reporting as the traffic, apart from getting recorded by the toll plaza, also gets recorded by centrally monitored bank servers. The toll plaza data shared by the client is a combination of ETC + Cash and has >95% of transactions via FASTag in commercial traffic.

3.43 Therefore, we believe toll plaza (ETC+cash) dataset is reliable and has been used for our base traffic estimation. To further enhance the confidence on our base traffic position, we have compared the daily level toll plaza data traffic for each vehicle category with Steer's independent TVC counts for the same dates. The difference in the datasets is being accounted for in the base traffic, explained in detail in the later sections.

Reference asset historical trends: Borkhedi plaza

3.44 The client provided the ETC traffic data for Borkhedi toll plaza, located ~60 km north of our Asset. Traffic on a MADT level from January 2021 till June 2022 is shown below.

Figure 3.10: Borkhedi toll plaza: ETC MADT



Source: Steer analysis

3.45 The traffic volumes on the toll plaza are trending at around 30,000 PCU levels in FY23. The toll plaza caters to 7,500 trucks (including LCV) and 6,000 CJV and Buses. The traffic trends observed on Borkhedi plaza are similar to the trends observed on our Asset.

Historical Revenue

Agra Bypass

3.46 Revenue details were available split by vehicle category and ticket in the toll plaza (ETC+cash) dataset. The dataset reported revenue on a daily level split by payment via FASTag and via cash. The revenue details from the datasets are shown in the charts below.

3.47 The difference between ETC and cash payment is primarily the penalty revenue for users who pay via cash for buying tickets in addition to the single ticket. As observed in the traffic data, more than 98% of revenue generated on the Asset is collected via ETC/FASTag.

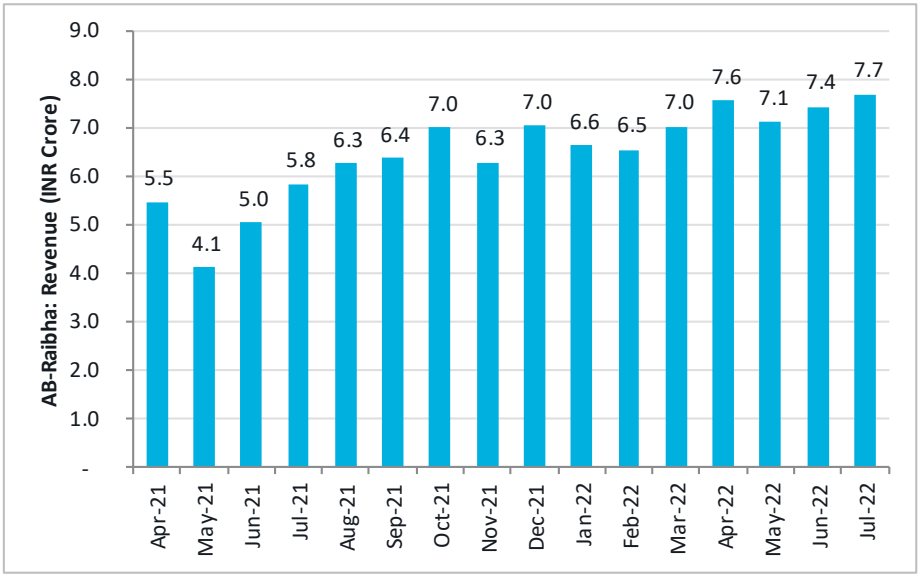
Table 3.10: AB: plaza wise annual revenue (INR Cr)

	AB: Raibha	
	FY22	**FY23 YTD**
CJV	4	2
LCV	1	1
Bus/2A	14	6
3A	16	6
MAV	38	15
OSV	0	0
Total	**74**	**30**

Source: Steer analysis, FY23 revenue till 31st July 2022

3.48 The average monthly collection for 2022 is presented below

Figure 3.11: AB: Raibha - Monthly revenue reported in toll plaza data (INR Cr)



Source: Steer analysis of client data

3.49 The below showcases the historical remittance amounts from March 2017 to October 2022 as shared by the client.

Table 3.11: Remittance data- AB: Raibha

Period	Remittance (INR Cr)	Days	Monthly (INR Cr)
16.10.2021-16.10.2022*	84.20	365	6.9
16.10.2020-16.10.2021	64.06	365	5.3
11.07.2020-16.10.2020	12.06	95	3.8
12.04.2019-11.07.2020	37.00	456	2.4
05.01.2018-12.04.2019	23.83	462	1.5
02.11.2017-05.01.2018	3.69	64	1.7
15.07.2017-02.11.2017	5.51	110	1.5
14.03.2017-15.07.2017	7.39	123	1.8

Source: Steer analysis of client data, *Revised remittance post April'22 revision in toll rates

Borkhedi-Kelapur (BK)

3.50 Revenue details were available split by vehicle category and ticket in the ETC+cash dataset. The ETC+cash dataset reported revenue on a daily level split by payment via FASTag and via cash. The revenue details from the datasets are shown in the charts below.

Table 3.12: BK: plaza wise annual revenue (INR Cr)

	BK: Darodha		BK: Kelapur	
	FY22	FY23 YTD	FY22	FY23 YTD
CJV	4	1	3	1
LCV	2	1	2	1
Bus/2A	14	5	16	5

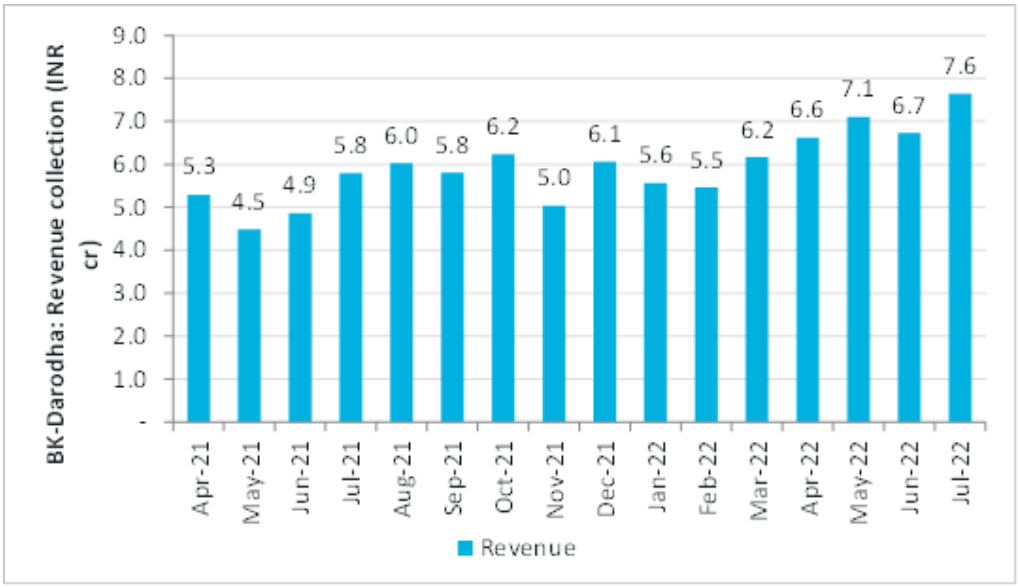
	BK: Darodha		BK: Kelapur	
3A	16	5	17	5
MAV	30	9	31	9
OSV	0	0	0	0
Total	**67**	**21**	**68**	**20**

Source: Steer analysis

3.51 Similar to commercial traffic volumes, both the plazas observe similar revenue levels as well. In FY22, the Darodha collected INR 67 crores whereas Kelapur collected INR 68 crores. On both the plazas, >90% of revenue is being collected from the commercial traffic where 3A/MAV alone accounts for 70% of the total revenue. ~99% of the total revenue is being collected via FASTag.

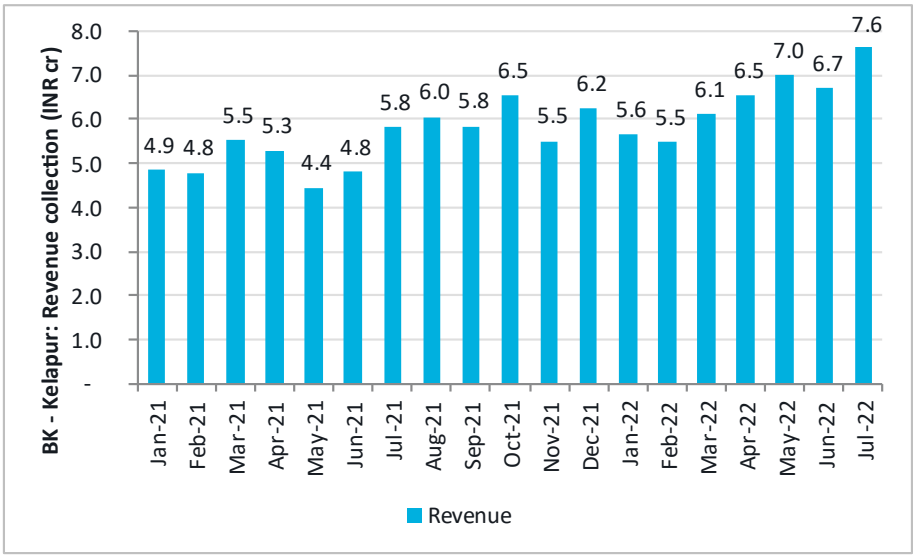
3.52 The monthly revenue collection (ETC+cash) for the plazas is shown in the charts below.

Figure 3.12: BK: Darodha - Monthly revenue reported in toll plaza data (INR Cr)



Source: Steer analysis

Figure 3.13: BK: Kelapur - Monthly revenue reported in toll plaza data (INR Cr)



Source: Steer analysis

3.53 The drop in revenue collection in May'21-June'21 was due to drop in traffic as travel restrictions were imposed with the rise of infections in the 2nd wave of Covid19 pandemic. On an average, the plazas reported ~INR 6 crores per month.

3.54 The following table showcase the remittance amounts of the toll plazas as per the details provided by the Client.

Table 3.13: BK: Darodha – Revenue remittance details

Period	Remittance (INR Cr)	Days	Monthly collection (INR Cr)
24.12.2021 - 24.12.2022*	72.29	365	5.5
21.12.2020 - 24.12.2021	60.51	368	5.0
23.09.2020 - 23.12.2020	51.68	91	4.3
17.09.2019 - 23.09.2020	38.36	372	3.2
24.05.2019 - 17.09.2019	33.25	116	2.8
29.01.2019 - 24.05.2019	29.6	115	2.5

Source: Steer analysis of client data, *Revised remittance post April'22 revision in toll rates

Table 3.14: BK: Kelapur – Revenue remittance details

Period	Remittance (INR Cr)	Days	Monthly collection (INR Cr)
20.11.2021 – 20.12.2022*	80.95	395	6.7
11.09.2021 - 20.11.2021	68.43	70	5.7
05.08.2021 - 11.09.2021	64.89	37	5.4
09.02.2021 - 12.06.2021	63.4	123	5.3
28.01.2020 - 09.02.2021	49.68	378	4.1
31.10.2019 - 28.01.2020	21.09	89	1.8

Source: Steer analysis of client data, *Revised remittance post April'22 revision in toll rates

3.55 As seen in the tables above, the FY23 remittance is INR 84.2 Cr for AB and INR 153.2 Cr for BK. The remittance amounts have been sourced from the Client. The comparison of remittance amount with Steer estimated FY23 revenue is shown below.

Table 3.15: Remittance vs revenue comparison

Asset	FY23 remittance amount (INR Cr)	FY23 Steer revenue (INR Cr)
Agra Bypass	84.20	92.09
Borkhedi Kelapur	153.24	164.69

Source: Steer analysis

3.56 FY23 Steer revenue has been calculated using Steer's FY23 base traffic, base segmentation, trip factors, and the current toll rates. The inputs used for revenue calculation are explained in in Chapter 5- Base traffic, revenue validation and forecasting assumptions.

3.57 As mentioned in the previous sections, the tolling lengths are proposed to be amended for AB: Raibha and BK: Kelapur post the appointment date. In the above FY23 Steer revenue, the amended lengths for both the plazas have not been accounted for to show the comparisons with FY23 remittance. The revenue projections presented in the later chapters account for the change in tolling lengths.

Toll Frequencies

3.58 Toll frequency or segmentation is typically the share of each ticket category recorded for a particular vehicle type. Each vehicle category has different segmentation. As a part of historical analysis, we calculate the toll frequency for each vehicle category from the monthly data shared by the client. The most common ticket categories observed on a typical national highway concession are: Single, Return, Monthly, Local and Exempt. Given the local nature of traffic, the Asset offers bespoke local passes to attract the local commuters to opt for these category passes instead of evading toll. Brief description of different ticket-types is given in table below.

3.59 Understanding the toll frequency gives insights into the nature of traffic. CJVs (Cars) generally have higher shares of return passes or monthly passes as the CJV users on Indian national highways tend to make shorter distance and more frequent trips. However heavy trucks mostly have single tickets since they travel long distance. This varies from asset to asset or even toll plaza to toll plaza. The asset catering to short distance local traffic generally observes high share of return or other local monthly passes while the asset catering to strategic long-distance traffic generally observes high share of single ticket traffic.

3.60 The following are the types of tickets are assumed to be sold at the plazas of both the Asset as per the concession agreement.

Table 3.16: Typical ticket types sold at NHAI plazas

Category	Description
Single	Allows the vehicle to cross the toll plaza once
Return	Daily pass for crossing the toll plaza multiple times within 24 hours. Charged 1.5 times the single toll
Monthly	Monthly pass

Category	Description
Local Personal	Discounted monthly pass only for private cars of residents within 20km radius of toll plaza
Local Commercial	50% discount on single trips for commercial vehicles registered in the local district
Exemptions	Officially exempted vehicles like ambulance, police cars, key political personnel etc.

FASTag implementation

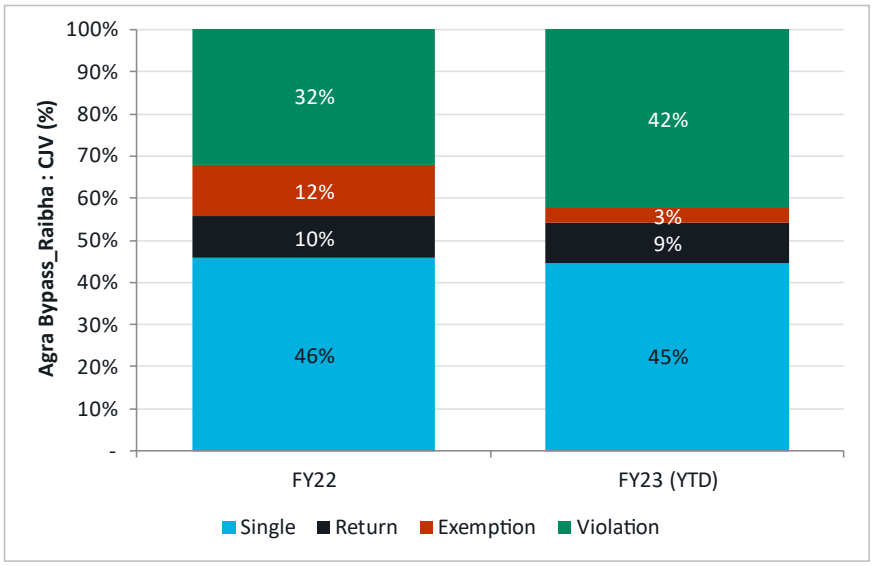
3.61 Generally, over the period the shares of single/return/monthly tickets tend to stabilise within 2-3 years from start of an asset operation. This is related to the stability of trip patterns are not expected to change significantly in absence of any major external events. During the last two years, two key events impacted the traffic patterns throughout the country: Covid19 and FASTag implementation.

3.62 With the FASTag implementation in December 2019, it was ensured that only FASTag users benefited from discounted tickets such as return/monthly and cash users were only allowed to buy single tickets, thus leading to a drastic increase in single ticket users between January 2020 till Feb- 2021. The removal of discounts for cash users and significant push by NHAI and toll plaza operators to promote use of FASTag has resulted in significant increase in %age transactions via FASTag. This in turn has resulted in ticket type use patterns have begun to return to their previous segmentation levels as observed prior to the FASTag implementation.

Agra Bypass (AB)

3.63 This section presents the toll segmentation for Raibha toll plaza. The observed ticket segmentation on the Asset is presented in the chart below. CJV's report high number of exemptions/violations. As discusses in earlier sections, starting Oct'21 the toll plaza reports higher CJV volumes, and categorizes them under non-paying traffic. Therefore, the proportion of non-paying CJV reported trends around 40% in both FY22 and FY23. However, we have validated this CJV volume number against our TVC and is discussed in the later section.

Figure 3.14: Ticket segmentation (%) CJV- AB: Raibha

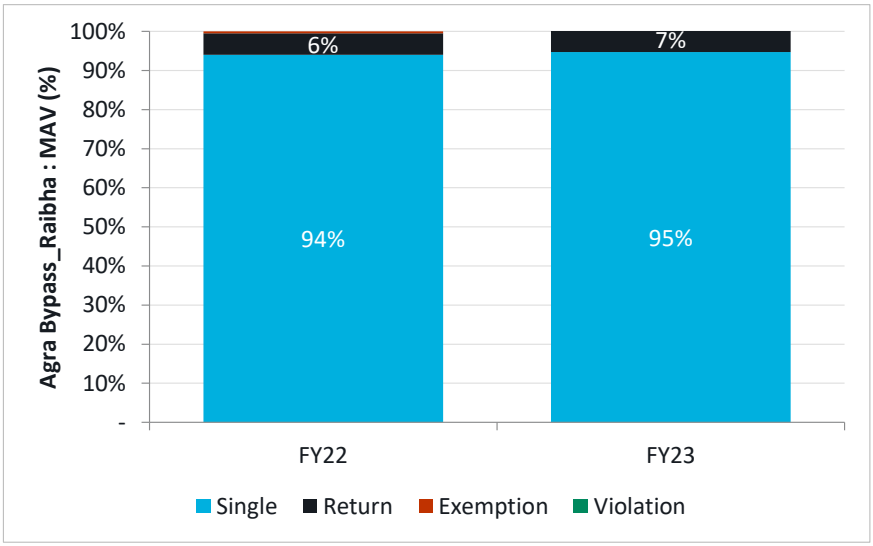


Source: Steer analysis of client data

3.64 CJVs observed ~30-40% exemptions/violations in FY22-23 YTD. There has been a significant increase in exemptions/violation from FY22-23 which may be due to change of tolling operator. We have verified the levels of exemptions by comparing the independent TVC counts with the reported paying traffic (ETC+ Cash). This has resulted in revised segmentation which is described in TVC section

3.65 MAV's report high proportion of single trips, this is further validated by the long trip length of the vehicles as observed in our OD data.

Figure 3.15: Ticket segmentation (%) MAV- AB: Raibha



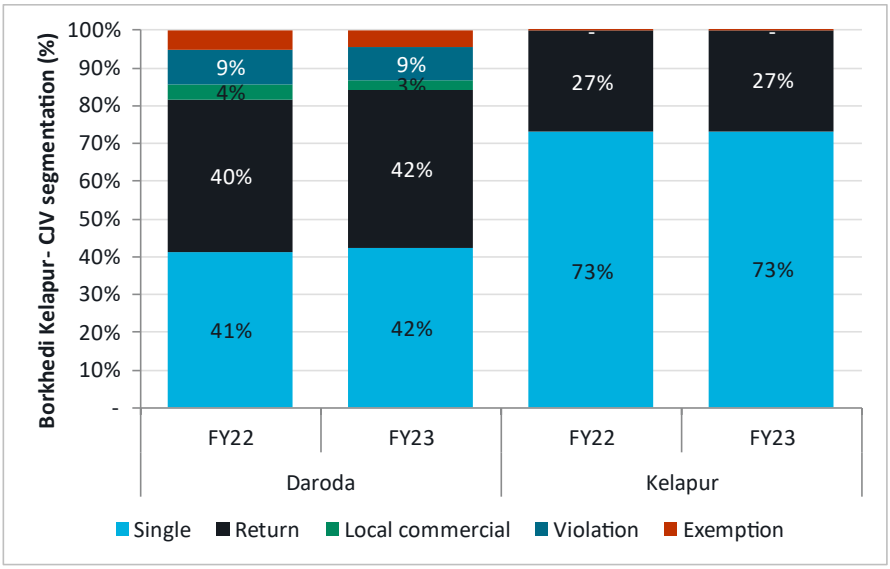
Source: Steer analysis of client data

3.66 ~90%-95% of the commercial vehicles plying on the Asset are observed to buy single tickets as the Asset caters to strategic long-distance movements. Return trips are primarily attributed to the short distance trips in the vicinity of the Asset

Borkhedi-Kelapur (BK)

3.67 This section presents the toll segmentation used for Asset. As discussed in the earlier sections toll plaza data provided by the Client incudes traffic level at a ticket level for each of the transactions undertaken. The segmentation as per toll plaza data for 1st April 2021– 31st July 2022 for CJVs and MAVs is presented below for the Asset:

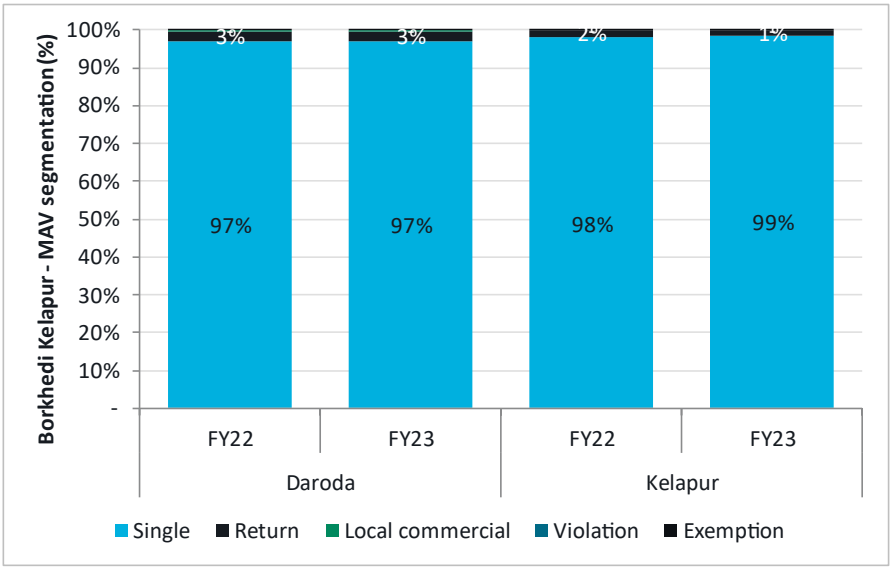
Figure 3.16: BK: Ticket segmentation (%) – CJV



Source: Steer analysis

3.68 CJVs observe approximately equal split between single and return tickets on Darodha as the plaza caters to inter-urban movement influenced by Nagpur. The same is the reason behind high share of violations on Darodha due to the high urban characteristic of the plaza as the residents in the vicinity tend not to pay. The share of exemptions and violations at Kelapur is negligible as we believe that the data provided by the Client doesn't include the true exempted traffic. For validation of these traffic levels, we have compared the data provided by our own independent Steer TVC counts, explained in detail in the next section

Figure 3.17: BK: Ticket segmentation (%) – MAV



Source: Steer analysis

3.69 ~98% of the commercial vehicles (2A/3A/MAVs) plying on the Asset are observed to buy single tickets suggesting through-movement on the Asset. The observation is in line with the fact that the Asset is key connector for Delhi/NCR and Maharashtra/neighbouring zones and hence

caters to long-distance traffic. The Asset observed negligible level of exemptions and violations for trucks.

Survey data analysis

3.70 As mentioned earlier, to validate and inform various inputs used in our forecasting, we undertook primary data collection on the Asset, comprising the surveys listed below. OD survey data was collected on behalf of the Client, TVC surveys were commissioned by Steer with a third party. OD data collection typically involves manual data entry by enumerators based on oral surveys with road users crossing toll plazas, which Steer also commissioned with a third party. TVC data collection involves video-graphic capture of traffic passing crossing the toll plazas, followed by manual counting.

3.71 It should be noted that, in our experience, traffic on national highways shows variation across the week due to the economic activities surrounding each road. To derive a representative TVC count considering daily variation, three-day to seven-day traffic counts are generally recommended, and hence, in order to fully understand the impact of this weekly fluctuation on the Asset, we collected seven-day counts at each toll plaza.

3.72 Steer commissioned the following primary data collection at the Asset:

- 7-day 24-hour Traffic Volume Count (TVC)
- 24-hour Origin-Destination (OD) survey

3.73 This chapter presents the analysis of the primary data collected and its use thereof.

Key findings of the TVC data analysis

WADT estimates

3.74 As mentioned earlier, camera based Total Vehicle Counts (TVC) forms a key part of our primary data collection exercise. Using the TVC data and taking a simple average of the seven-day TVC counts, we obtained the Weekly Average Daily Traffic (WADT) for each toll plaza. The WADT excludes non-tollable vehicle such as tractors, two-wheelers, bullock-carts, etc., but includes officially exempt vehicles such as police cars, ambulances, emergency response vehicle, government vehicle and other vehicle types officially allowed as 'exempted' under the concession agreement.

3.75 During the site visits, our team makes sure that the cameras are located at a location where complete tollable traffic is captured. Additionally, emphasis is laid on positioning camera at such a location that the traffic from local leakages or bypass is also captured, if any.

3.76 In order to check the reliance of the TVC data, several checks are applied before using it in our analysis. Directional counts are verified by matching the sum of both the directions with the total counts. The table below present the 7-day average (WADT) of independent counts undertaken by Steer.

Table 3.17: WADT at Asset arrived using TVC counts

Vehicle Category	AB : Raibha	BK: Darodha	BK: Kelapur
CJV	2,226	1,364	1,227
Mini LCV	223	323	400
LCV	951	606	578
Bus	37	184	226

Vehicle Category	AB : Raibha	BK: Darodha	BK: Kelapur
2 Axle	1,634	1,195	1,225
3 Axle	1,807	1,368	1,410
MAV	3,217	2,050	2,082
OSV	3	2	3
Total	**10,098**	**7,091**	**7,151**
PCU	**28,797**	**20,067**	**20,461**

Source: Steer analysis of TVC data

TVC (Total Volume Count) analysis

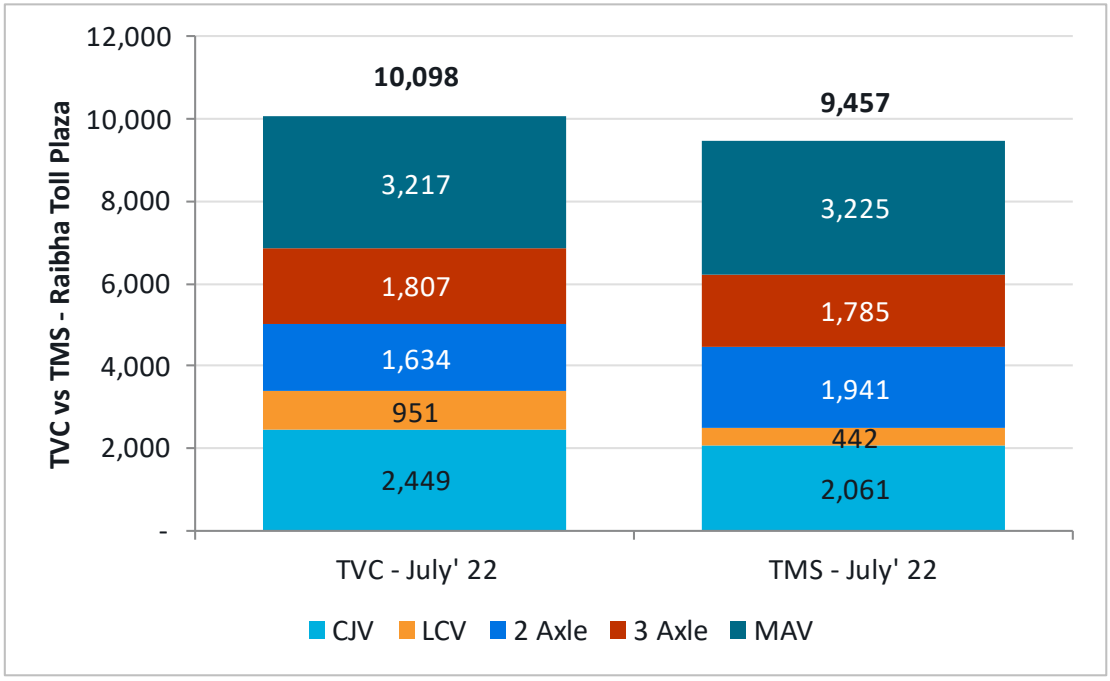
3.77 The below analysis presents the following source of data based on independent 7-day video-based counts (TVC) undertaken by Steer.

3.78 Our TVC data is directly used for validating our base year AADT and benchmarked with respect to traffic volumes on the sections in close vicinity of the Asset (discussed in Chapter 6).

Agra Bypass

3.79 The figure below compares the vehicle wise shares as recorded by TVC on Raibha toll plaza.

Figure 3.18: Vehicle TVC comparison

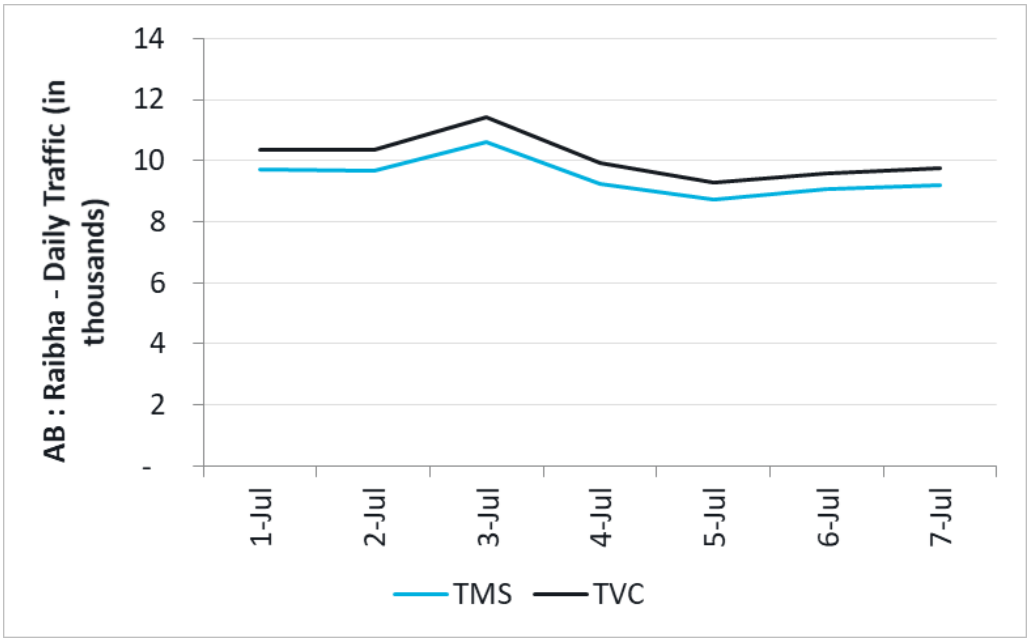


Source: Steer analysis of TVC counts, and TMS data

3.80 The TVC counts conducted in the month of July 2022 were observed to be 10,098 ADT. Moreover, the Asset was dominated by the traffic shares of MAVs followed by CJVs. The higher 3A/MAV volume is attributed to the long-distance strategic movement on the Asset in both directions i.e. east-west (NH19) and north-south (NH44).

3.81 The following figure shows the daily traffic observed in our TVC-TMS (ETC only) counts for the toll plaza.

Figure 3.19 Daily TVC counts – AB



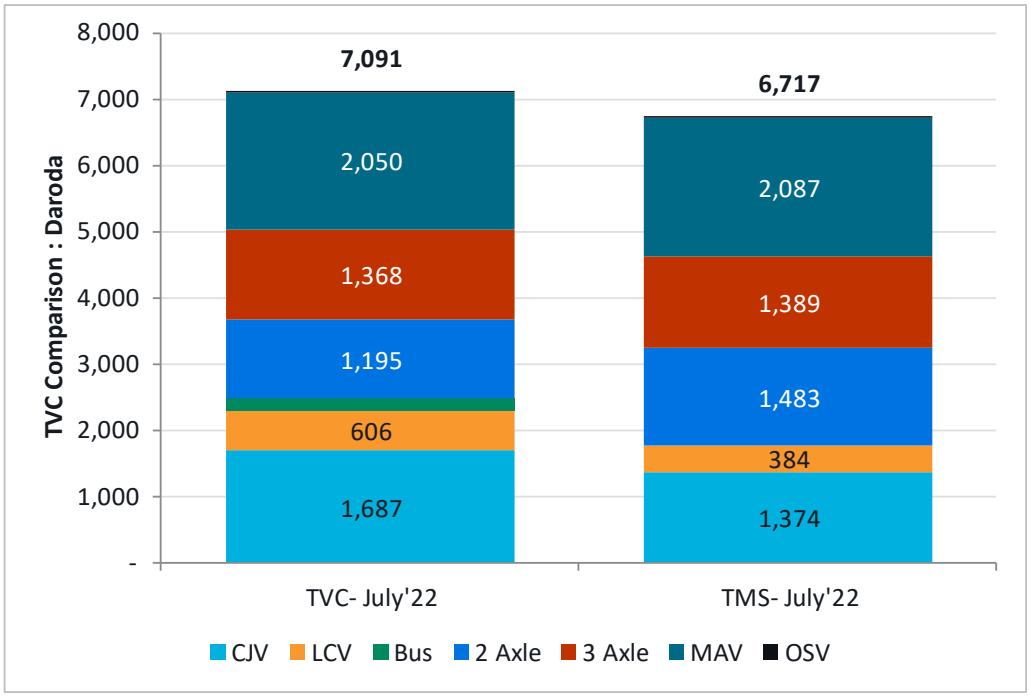
Source: Steer analysis of TVC counts, and TMS (ETC only) data

3.82 TVC and TMS (ETC only) traffic data on the Asset follows similar trend on all days, the difference in the two sources may be due to some vehicles which pay in cash or are not paying at the toll plaza.

Borkhedi-Kelapur

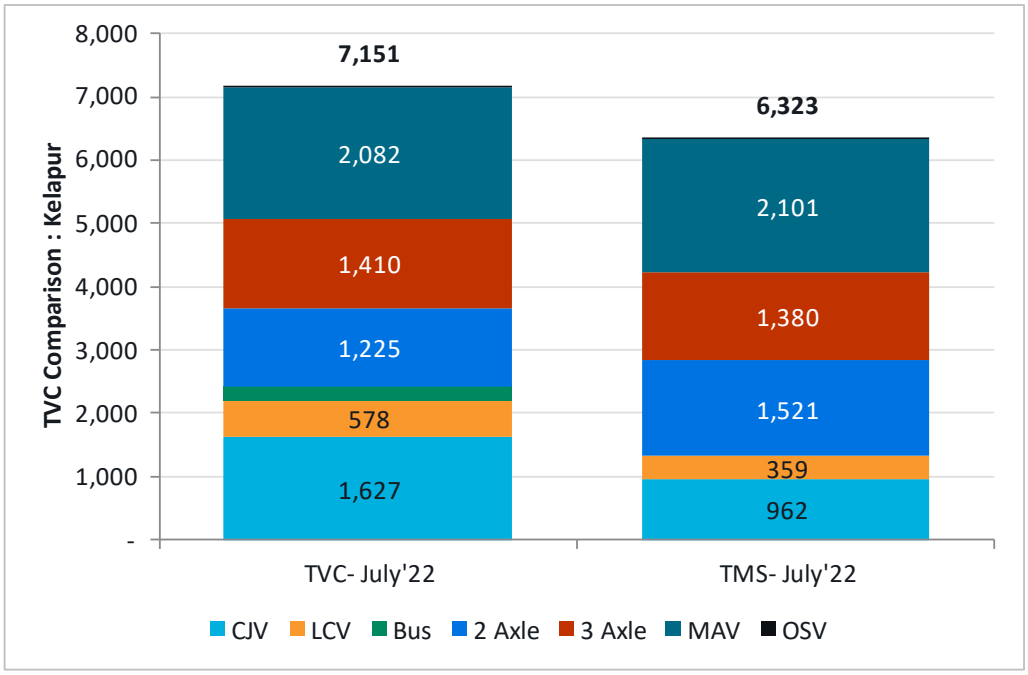
3.83 The figure below compares the vehicle wise shares as recorded by TVC.

Figure 3.20: BK Darodha: Vehicle TVC comparison



Source: Steer analysis of TVC counts, and TMS data

Figure 3.21: BK Kelapur: Vehicle TVC comparison

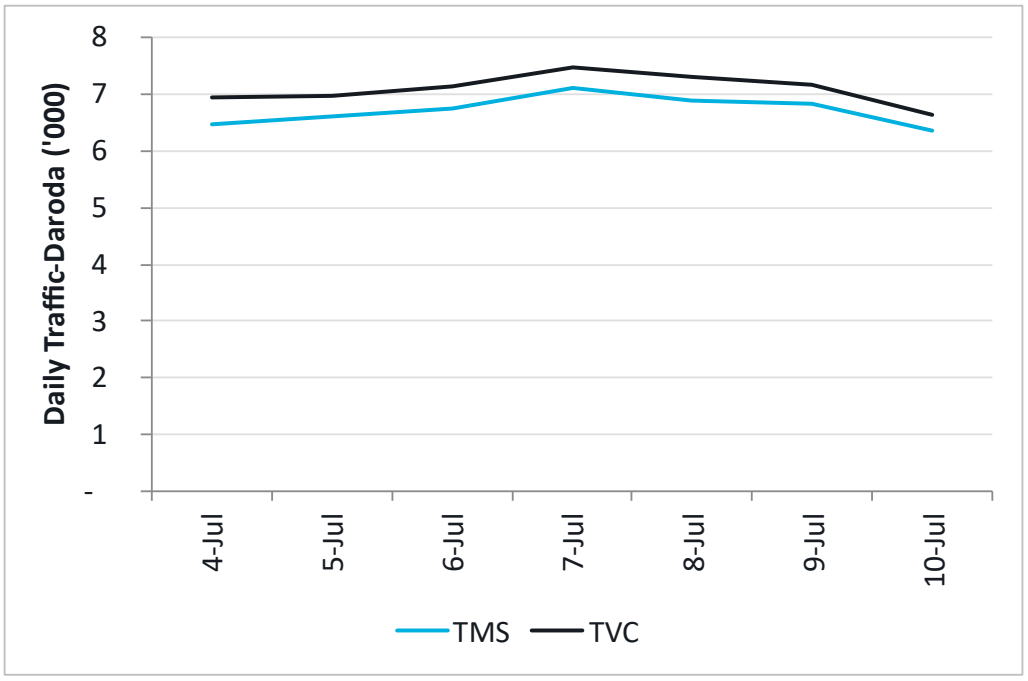


Source: Steer analysis of TVC counts, and TMS data

3.84 The TVC counts conducted in the month of July 2022 were observed to be 7,091 at BK Darodha, and 7,151 at BK Kelapur. Moreover, the Asset was dominated by the traffic shares of MAVs followed by CJVs.

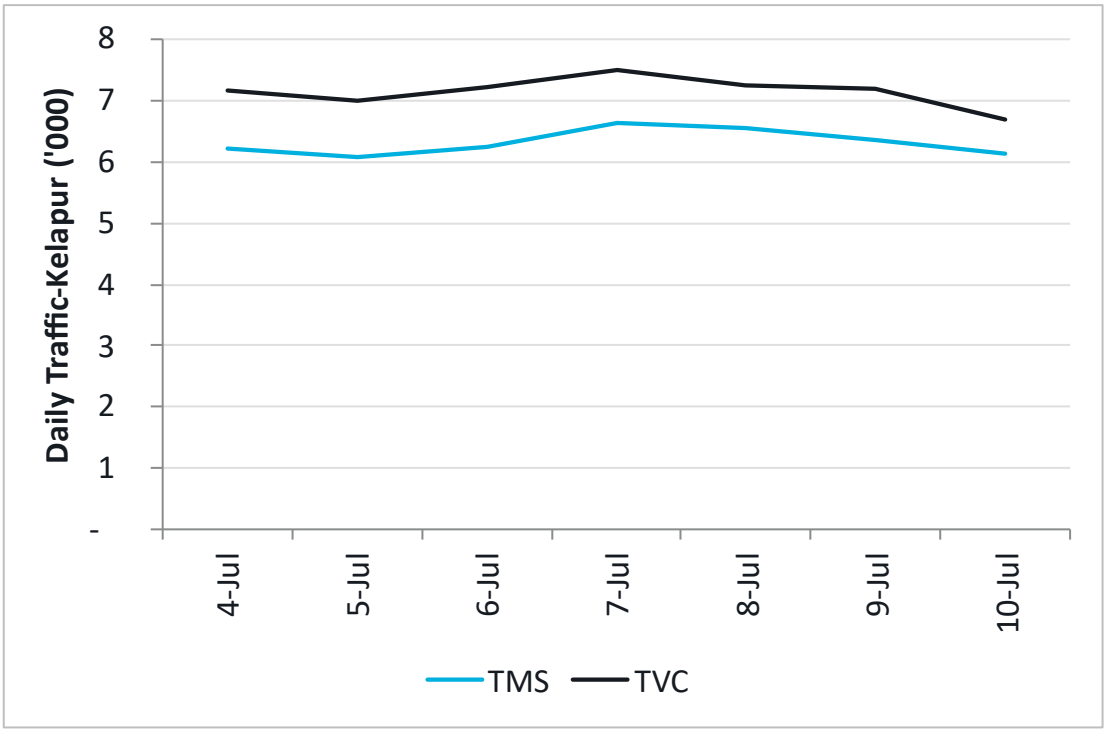
3.85 The following figure shows the daily traffic observed in our TVC-TMS counts for the toll plaza.

Figure 3.22: BK Darodha – Daily Traffic Counts



Source: Steer analysis of TVC counts, and TMS data

Figure 3.23: BK Kelapur – Daily Traffic Counts



Source: Steer analysis of TVC counts, and TMS data

3.86 On an overall level, Steer independent TVC has reported higher traffic volumes than the TMS data. The difference is primarily observed in CJV's 2As and LCVs.

3.87 TVC counts report lesser 2As, but higher LCVs as compared to TMS counts. This could be due to the error in categorization of LCVs and 2As post FASTag implementation. On the whole, TVC reports higher LCV+Bus+2A traffic which can be attributed to the fact that a share of this traffic crosses the plaza without paying and hence isn't getting recorded. The same is the reason for additional CJVs being counted in TVC counts. 3A+MAV traffic levels are similar in both the counts.

Outputs from TVC analysis

3.88 We have further analysed the TVC and TMS data at vehicular category level to ascertain the following outputs:

- **Base Correction:** As observed in the TVC-TMS analysis, the volume of traffic in CJV, LCV, and 2A categories saw a difference in the counts. While estimating the base, these differences were accounted for in the form of base correction factors. The percentage of delta for 3A/MAVs is not being incorporated as the negligible delta can be attributed to the reconciliation of traffic numbers with the data received from the bank**.**
  This adjustment was necessary to understand the capacity at which the Asset is operating.

Table 3.18: Base Correction Factors

Vehicle Category	AB: Raibha	BK: Darodha	BK: Kelapur
CJV	18.8%	22.8%	69.2%
LCV	10%	6.3%	7.9%
2A	10%	6.3%	7.9%

Source: Steer analysis of TVC/TMS data

- **Exemption adjustment:** The additional traffic being added to the base of our forecasts, as mentioned in the previous paragraph, is being treated as 'non-paying' traffic as the traffic isn't getting reported in the TMS counts as provided by the Client. Hence, in the ticket segmentation, the additional traffic in the corrected base traffic is assumed to be 'exemptions.

  Traffic splits: TVC WADT of each plaza was considered to derive the traffic splits for CJVs and Mini LCVs the split is not present in the data we have received. This split is important because in our past experience, we have seen that the growth of Mini LCVs is aligned with that of the LCVs, hence the assumptions applied to Mini LCVs are linked to LCVs and not CJVs. It is summarized for both the toll plazas in the table below:

Table 3.19: Traffic splits from TVC analysis

	AB: Raibha	BK: Darodha	BK: Kelapur
CJV	92.1	80.9%	75.4%
Mini LCV	7.9%	19.1%	24.6%

Source: Steer analysis of TVC/TMS data

The above traffic splits are applied back to TMS data prior to using it for arriving at base year estimates.

- **Kelapur (new) base traffic:** Steer TVC counts were conducted at the proposed new location of the Kelapur toll plaza, which is about 6 kms south of the existing location. The TVC-TMS analysis for the new location observed an adjustment in the base numbers of Kelapur toll plaza by (1.3%) in 3As and (3.0%) in MAVs to estimate the base position for Kelapur's new location. This is also explained in more detail in the later sections.

Table 3.20: Kelapur existing vs new TVC

	3A	MAV
Kelapur (existing)	1,467	2,137
Kelapur (new)	1,447	2,073
Delta	(1.3%)	(3.0%)

Source: Steer analysis of TVC data

Key findings of origin-destination analysis

Overview

3.105 OD surveys were conducted using on the toll plaza locations across the Asset, interviews for 24 hours at the toll location, typically starting at 8 AM and finishing at same time on the following day. The interviews began on 01 July 2022 on the Asset's toll plaza. Each toll lane had an interviewer filling OD records with supervisor monitoring them to minimise errors in data collected. This was accompanied by Steer staff visiting the toll plaza to ensure the data is being collected to quality and standards required to understand the traffic patterns on the Asset.

3.106 Data collected was segregated into vehicle types, origin area, origin zone, destination area, destination zones, commodity being carried, total load, and frequency of travel. The zones were further segmented into Internal, Rest of State, and External zones. The zones were also used to calculate the trip distances of the traffic plying on the Asset.

3.107 Before using the data for final analysis, the data is first cleaned, and numerous checks are applied. Some of these checks include verifying that the zones are physically apart as well as these zones are located within a reasonable distance and boundary. Reliability checks are also used which confirms that the sample rates are 30-50% for passenger and 50-70% for goods. Sanity checks includes verifying the sanctity of direction wise origin and destination as well as establishing that the share of empty vehicles is in line with the site visit observations (not more than 50% in any case). The final check includes matching the OD numbers with the TVC counts of the particular day and substantiating that the OD numbers aren't greater than the TVC counts.

3.108 Origin-destination (OD) analysis enables the understanding of the nature of traffic movement on the Asset. We have analysed the regional drivers of demand based on the following analysis:

- Zonal influence
- Commodity distribution
- Top OD pairs
- Trip length distribution

3.109 While zonal analysis and the list of top OD pairs help to understand 'where' people and goods travel, commodity distribution sheds light on 'what' goods get transported on this asset. Trip length distribution shows 'how far' vehicles and people travel, and goods get transported. This set of analysis is used to estimate key drivers of traffic and aid in making informed forecasting assumptions related to traffic demand elasticities, growth drivers and exogenous impacts.

Sample rates

3.110 Sample rates help understand the reliability of OD data. They are calculated by dividing OD samples by the TVC count observed on the same date for each vehicle category at the toll plaza. The table below presents the sample rates for key vehicle type aggregations at the toll plaza. We believe that the sample rates of the OD data are reasonable for the analysis required.

Table 3.21: Sample rates for OD data

Vehicle type	AB Raiba	BK Darodha	BK Kelapur
CJV + MLCV	36%	39%	10%
LCV	32%	71%	62%
Bus + 2 Axle	61%	51%	64%
3 Axle + MAV	63%	58%	78%

Source: Steer analysis of OD data

3.111 Sample rates achieved on goods vehicles (Bus/2A and above) are very good and more than 50% in all categories. CJV users are traditionally difficult to interview primarily because their waiting times have reduced significantly due to FASTag implementation, and they are also reluctant to answer questions due to Covid19 related concerns.

3.112 As discussed in Chapter 2, the existing Kelapur toll plaza is a 2+2 configuration with only one operational lane in each direction at any given time. Additionally, there is high proportion of reported exemptions in CJV category resulting in low sample rates on the plaza.

Zone categories

3.113 To facilitate better interpretation of key regional drivers of traffic as determined by their OD zones, and influenced by various towns, cities, states, and regions in the vicinity of the Asset, we have aggregated zonal data as described in the table below.

Table 3.22: Zone aggregations for zonal influence analysis, AB

Aggregate Zone	Description
Local	Local zones are those that fall on or very close to the Asset.
IAOI	IAOI zones are the locations which generate traffic and lie within approximately 75-150 km distance from the Asset.
Rest of State	Rest of the cities/Districts in the state that Asset lies in (other than Local/IAOI)
NCT Delhi	National Capital Territory of Delhi
Haryana	Haryana state
Madhya Pradesh	Madhya Pradesh state
Rajasthan	Rajasthan state
Maharashtra	Maharashtra state
Gujarat	Gujarat state
North India	Haryana, Himachal Pradesh, Jammu and Kashmir, Punjab, Uttarakhand.
South India	Andhra Pradesh, Kerala, Tamil Nadu, Telangana, Karnataka
East India	Bihar, West Bengal, Arunachal Pradesh, Assam, Bihar, Jharkhand, Manipur, Meghalaya, Mizoram, Nagaland, Odisha, Tripura, Sikkim, Chhattisgarh
Outside India	Nepal, Bangladesh, Bhutan

Source: Steer analysis

Table 3.23: Zone aggregations for zonal influence analysis, BK

Aggregate Zone	Description
Local	Local zones are those that fall on or very close to the Asset.
IAOI	IAOI zones are the locations which generate traffic and lie within approximately 75-150 km distance from the Asset.
Rest of Telangana	Rest of the cities/Districts in the state that Asset lies in (other than Local/IAOI)
Rest of Maharashtra	Rest of the cities/Districts in the state that Asset lies in (other than Local/IAOI)
NCT Delhi	National Capital Territory of Delhi
Haryana	Haryana state
Madhya Pradesh	Madhya Pradesh state
Rajasthan	Rajasthan state
Maharashtra	Maharashtra state
Gujarat	Gujarat state
North India	Himachal Pradesh, Jammu and Kashmir, Punjab, Uttarakhand.
South India	Andhra Pradesh, Kerala, Tamil Nadu, Telangana, Karnataka
East India	Bihar, West Bengal, Arunachala Pradesh, Assam, Bihar, Jharkhand, Manipur, Meghalaya, Mizoram, Nagaland, Odisha, Tripura, Sikkim, Chhattisgarh

Aggregate Zone	Description
Outside India	Nepal, Bangladesh, Bhutan

Source: Steer analysis

Zonal influence

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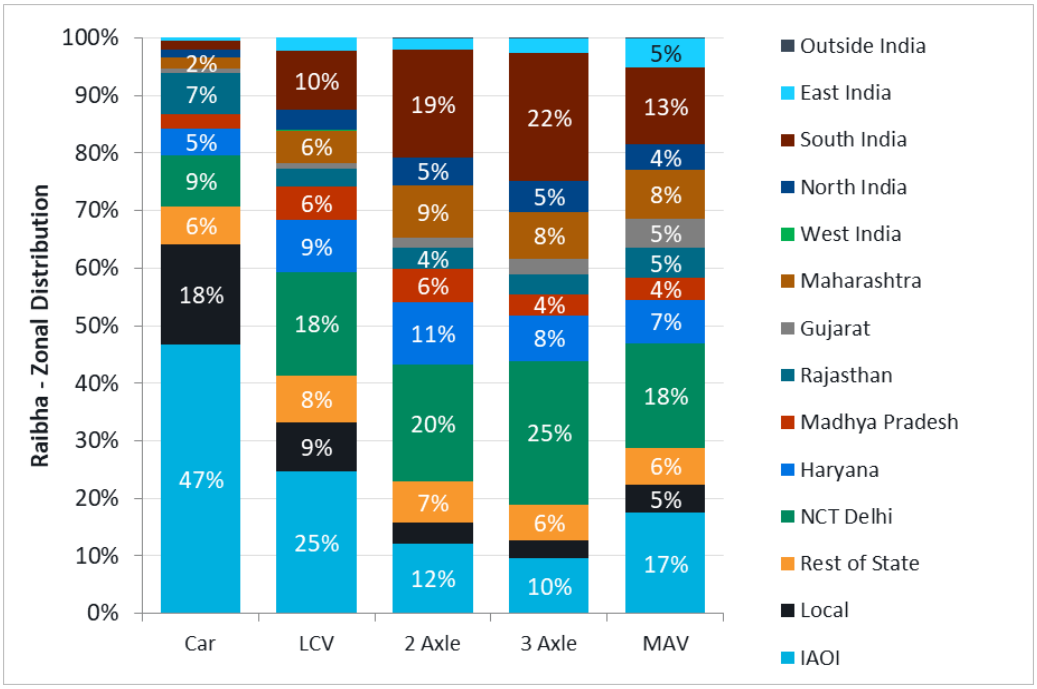
3.114 The zonal influence is the contribution of the zone or the zonal aggregation to trips by a vehicle type. This section presents the zonal influence[2] at the toll plaza for the Asset, based on zonal aggregation listed in the previous sub-section. it should be noted that zonal influence is analysed on trip ends and not trips. Asset wise zonal influence is presented as follows.

Figure 3.24: Zonal distribution: AB: Raibha toll plaza



Source: Steer analysis of OD data

3.115 Given strategic nature of the Asset, facilitating north-south movements by connecting to NH44 and NH19, the zonal influence of this Asset is diverse. Significnat zonal influence of Delhi-NCR, UP, Haryana, Maharashtra, Tamil Nadu, and Karnataka is observed for heavy vehicles (2A+3A+MAV).

3.116 Zones that are located within Uttar Pradesh, collectively contribute to 20-30% in case of 3A and MAV. The remaining 80% is a diverse mix of other zones, including Delhi, Haryana, Rajasthan, South India, Maharashtra, among others. The long-distance nature of this Asset is evident from

[2] For example, if out of 100 trips at a toll plaza on an Asset, 10 trips are between Hyderabad and Delhi and 90 trips are between Hyderabad and Chennai, then zonal influence of Hyderabad would be 50% since one end of all trips are at Hyderabad. Likewise, zonal influence of Delhi and Chennai would be 5% and 45%, respectively.

15%-20% share of zonal influence of South India in case of 2 and 3 Axle vehicles, followed by major shares of Delhi, Haryana, and Maharashtra.

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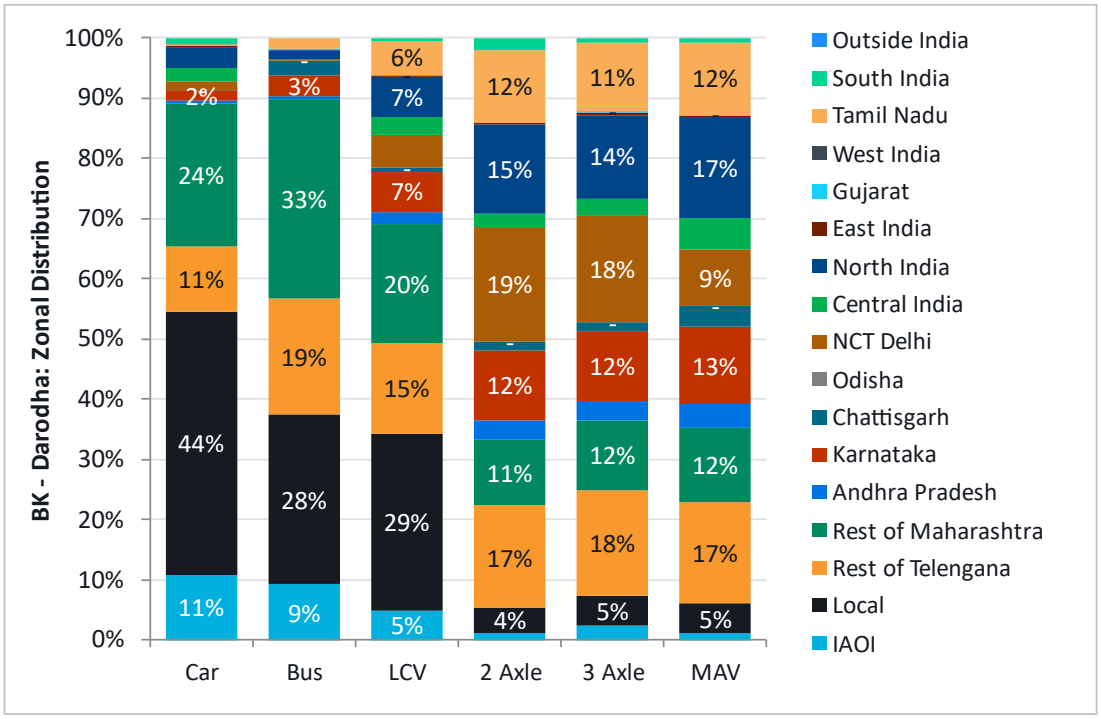
3.117 As the Asset is located on Maharashtra-Telangana border, the states influence ~30% of the truck trips on the Asset. Considerable share of influence is observed of Karnataka, Tamil Nadu, Delhi NCT, and northern Indian states since these zones are connected by the project highway NH44. The long-distance nature of trucks is validated by the zonal influence analysis as the trips are majorly influenced by southern and northern states of the country suggesting through movement on the Asset.

3.118 Car and bus trips are generally focused on catering to the local demands of the users and hence, the influence is dominated by local and rest of state movements. The local movement is typically observed between Hinganghat, Wadner, Badki, and Nagpur.

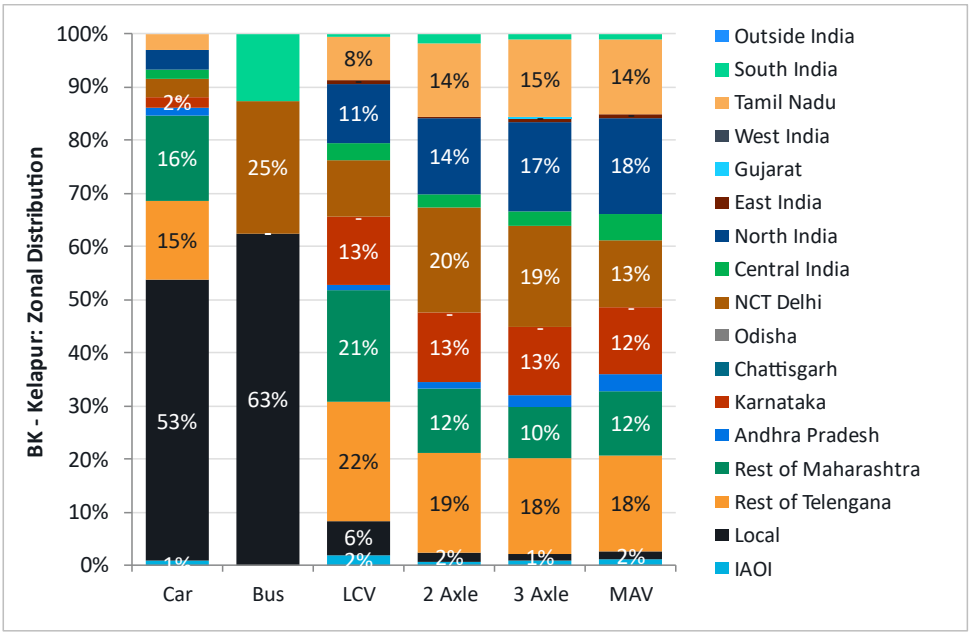
3.119 As both the plazas cater to the same movement of traffic, the zonal influence is also similar.

Figure 3.25: BK Darodha: Zonal Distribution



Source: Steer analysis of OD data

Figure 3.9: BK Kelapur: Zonal Distribution



Source: Steer analysis of OD data

Internal External analysis

3.120 Internal-External analysis helps in identifying the trips which have both an origin and destination on or near the Asset i.e. local/IAOI zones (Internal-Internal or I-I), any one end on the Asset (Internal-External or I-E), or neither end on the Asset i.e. through trips (External-External or E-E). RoS here represents areas within the state which are neither local nor IAOI. 'Internal' zones are those that were analysed as 'local' and 'IAOI' in the zonal influence analysis, i.e. lying on the Asset, while 'External' zones are areas lying outside the state.

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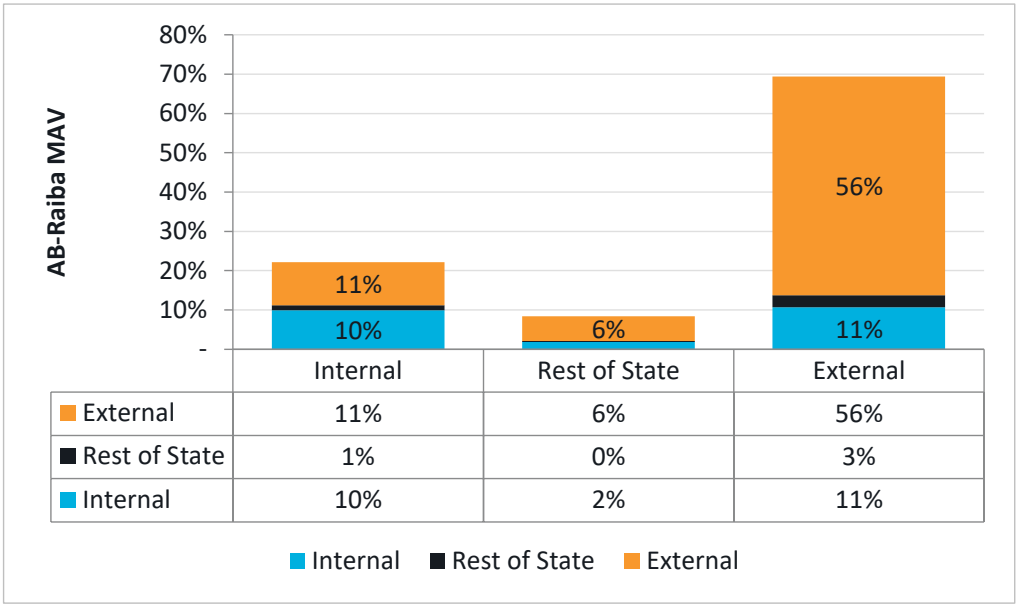
Figure 3.26: Zonal influence: AB: Raibha toll plaza



Source: Steer analysis of OD data

3.121 The internal-external distribution further validates the strategic nature of the asset, with more than 70% influence pertaining to zones that are external. This is further to the zonal distribution that showed that Local and Rest of the State had relatively less influence on the Asset, while aggregate of the remaining zones categorized as External exert the significant proportion of influence on the traffic. This validates that the long-distance nature of the Asset, facilitating long distance through movement—that is trips that originate and end outside of Uttar Pradesh, traversing via the Asset.

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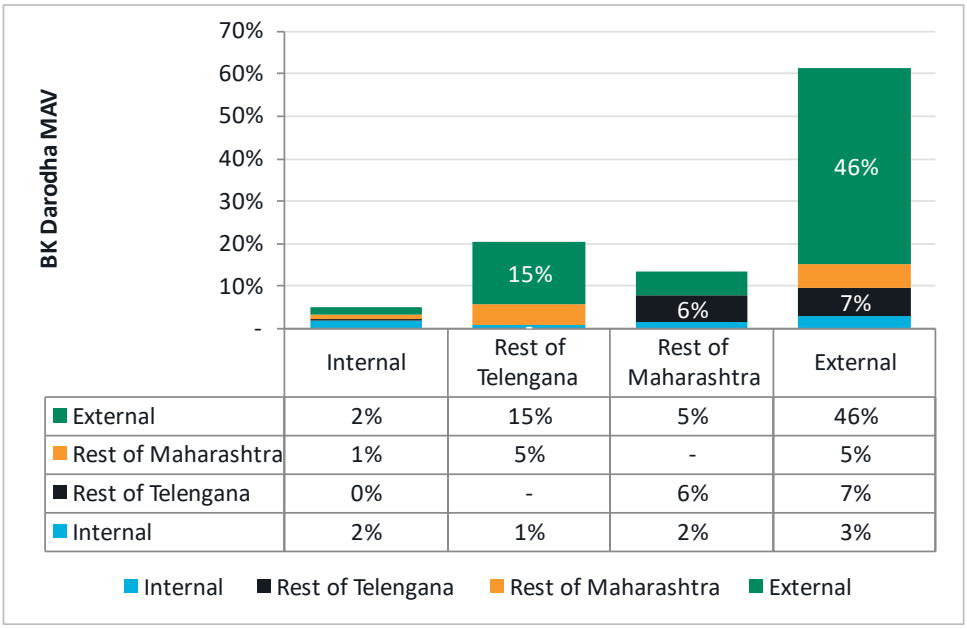
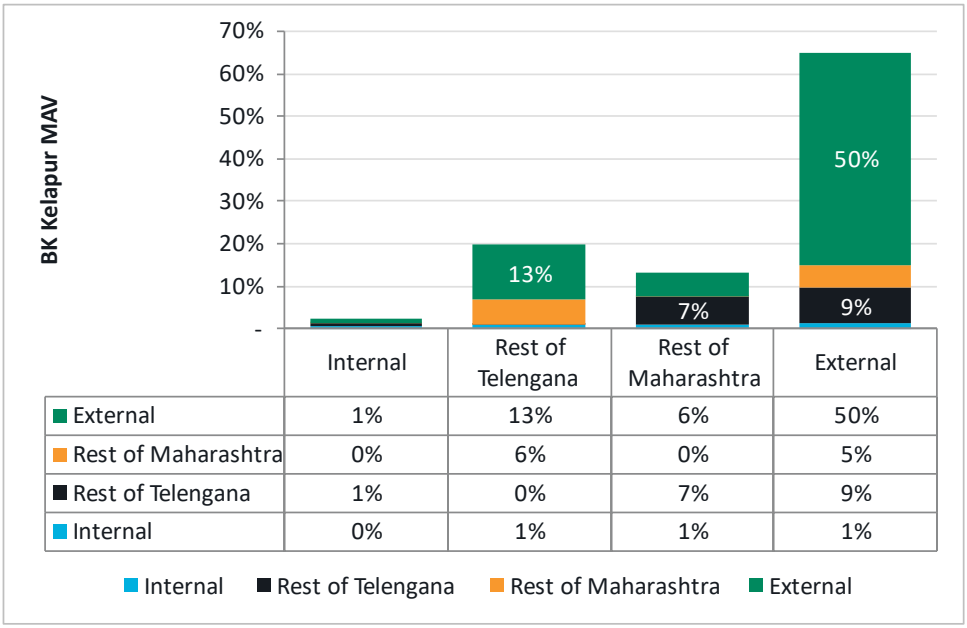
Figure 3.27: BK Darodha: Internal-External analysis



	Internal	Rest of Telengana	Rest of Maharashtra	External
External	2%	15%	5%	46%
Rest of Maharashtra	1%	5%	-	5%
Rest of Telengana	0%	-	6%	7%
Internal	2%	1%	2%	3%

Source: Steer analysis of OD data

Figure 3.28: BK Kelapur: Internal-External Analysis



	Internal	Rest of Telengana	Rest of Maharashtra	External
External	1%	13%	6%	50%
Rest of Maharashtra	0%	6%	0%	5%
Rest of Telengana	1%	0%	7%	9%
Internal	0%	1%	1%	1%

Source: Steer analysis of OD data

3.122 The internal-external distribution further validates the strategic nature of the Asset, with more than 70% influence pertaining to zones that are external. This is further to the zonal distribution that showed that Local and Rest of the State had relatively less influence on 2A/3A/MAVs on the Asset, while aggregate of the remaining zones categorized as External exert the significant proportion of influence on the traffic. This validates that the long-distance nature of the Asset, facilitating long distance through movement—that is trips that originate and end outside of Maharashtra, traversing via the Asset.

3.123 Since the Asset is located on Maharashtra – Telangana border, the remaining trips are influenced by zones present in the mentioned states.

Commodity distribution

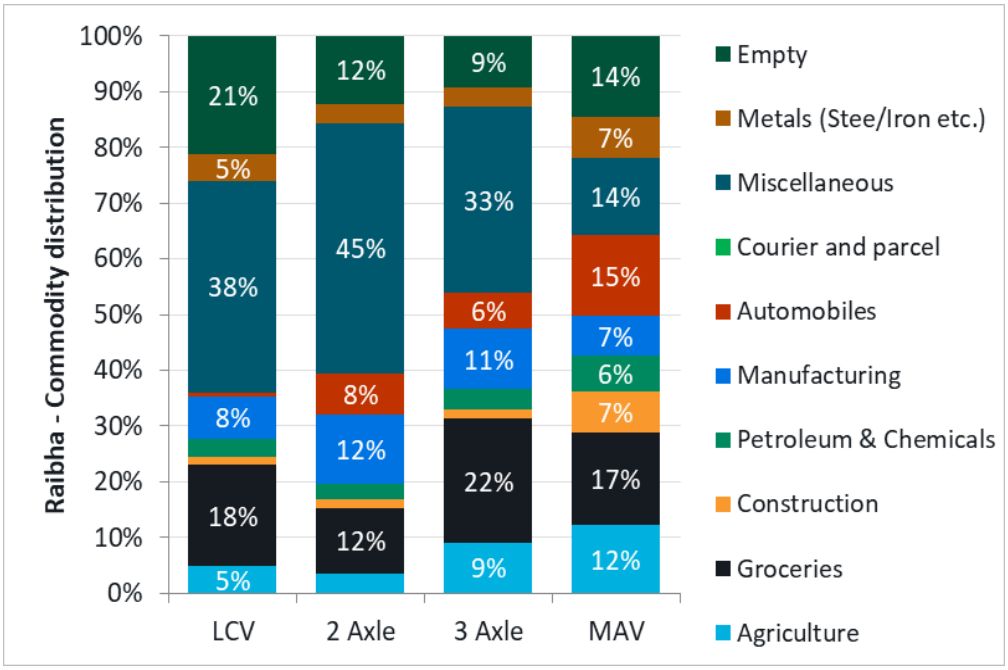
3.124 We have grouped various commodities into aggregate categories for ease of interpretation, as shown in the table below. The charts in the following sub-section present information in terms of aggregate commodity categories.

Table 3.24: Aggregate commodity categories

Commodity Description	Code	Combined codes used for charts
Agricultural Products / Cash crops (Wheat, Rice, Sugar cane, Maize etc.)	AGR	AGR
Perishable Items (Fruits, vegetables, milk, meat, fish etc.)	PER	
Cattle Food / Livestock (sheep, goat, cow, cattle food etc)	LIV	
Building Material / Construction (Cement, Lime, Brick etc)	CNS	CNS
Container	CTR	CTR
Empty	EMT	EMT
Groceries / Food items (Soap, Salt, Sugar, Pulses, Spices, Biscuits, bread, cool drinks, beer etc.)	GRO	GRO
Machinery / Spare parts	MAC	MAC
Steel / Metal (Iron, steel etc)	STL	MAN
Chemicals / Fertilizers (Acids, Fertilizers etc.)	CHM	
Manufacturing (Electronic items, Medicine, Leather, Wine, Rubber/ Tyre, Plastics, Cloth, Paper etc.)	MAN	
Automobiles (Finished products)	AUT	
Basic / Fabricated Metals (steel, iron)	MET	
Raw Wood, Cork & Wood Products, Fern	WUD	
Mining Minerals (Coal, Gypsum, Cobalt etc.)	MIN	MIN
Miscellaneous (Parcel, Courier, Household items etc.)	MSC	MSC
Passengers	PAS	
Petroleum Products (Oil, LPG, CNG, etc.)	PET	PET
Sand	SND	SND
Stone (Kota stone, marble, Granite, Aggregate stone etc.)	STN	STN
Cement	CMT	CMT

Source: Steer Analysis

Figure 3.29: Commodity distribution, AB: Raibha toll plaza



Source: Steer OD analysis

3.125 Direction wise commodity splits are given below:

Table 3.25: Directional commodity distribution – AB, Raibha toll plaza

Mathura to Gwalior					Gwalior to Mathura			
LCV	**2 Axle**	**3 Axle**	**MAV**		**LCV**	**2 Axle**	**3 Axle**	**MAV**
5.1%	1.9%	3.8%	6.9%	Agriculture	3.9%	5.0%	15.8%	16.8%
19.1%	12.8%	22.0%	17.4%	Groceries	15.8%	10.9%	22.3%	16.0%
0.4%	0.4%	0.8%	3.1%	Construction	3.9%	2.4%	3.0%	11.2%
3.0%	2.3%	2.9%	3.5%	Petroleum & Chemicals	3.9%	3.1%	4.5%	8.9%
7.7%	13.0%	10.8%	7.4%	Manufacturing	7.9%	12.0%	10.9%	7.0%
0.9%	8.3%	7.4%	20.6%	Automobiles	-	6.8%	5.1%	9.1%
38.3%	51.5%	40.0%	14.3%	Miscellaneous	36.8%	39.0%	25.3%	13.3%
5.1%	2.1%	3.3%	6.2%	Metals (Steel/Iron etc.)	3.9%	4.8%	3.9%	8.7%
20.4%	7.7%	9.1%	20.6%	Empty	23.7%	16.0%	9.2%	8.9%

Source: Steer Analysis of OD data

3.126 Among all the vehicle types, the largest proportion of goods being carried belong to the miscellaneous category, which includes parcels, couriers, and e-commerce deliveries that are mainly transported from warehouses in Agra, Indore, Hyderabad, Bengaluru, Maharashtra, Gujarat to local areas, Delhi NCR, Rajasthan, Haryana, and other North India regions. Followed by it are the groceries which are majorly being transported from Delhi and NCR regions to Hyderabad and Indore.

3.127 It was observed that, manufacturing goods have the next highest share in the commodities, which comprise of diversity of goods such as plastic, rubber, textiles, pipes, tyres, electronic goods, etc. These are being transported from industrial centres of Maharashtra, Gujarat, Hyderabad, Gwalior, Indore, parts of south India to Delhi NCR, Haridwar, Agra, Mathura, Punjab, Haryana, and other north India regions. Following this is agriculture, which is largely being carried long distance by bigger truck segment- 3A+MAV.

3.128 A mix of agricultural commodities such as lentils, cotton, spices, onions, wheat, etc is being carried across similar locations originating from south and West India regions to major vegetable wholesale markets of Delhi, Agra, Kolkata, Haryana and Punjab, among other regions.

3.129 The direction wise distribution of commodities for each vehicle types helps to gauge a better understanding of the distribution as per the direction of goods movement. The profile of commodities being carried in both the directions is overall is somewhat similar. As for the direction Gwalior to Mathura, agriculture, manufacturing and miscellaneous category are among the highest contribution to commodities being carried. Mathura to Gwalior, a significant proportion of upto 40% are miscellaneous products—couriers and parcels, followed by manufactured products.

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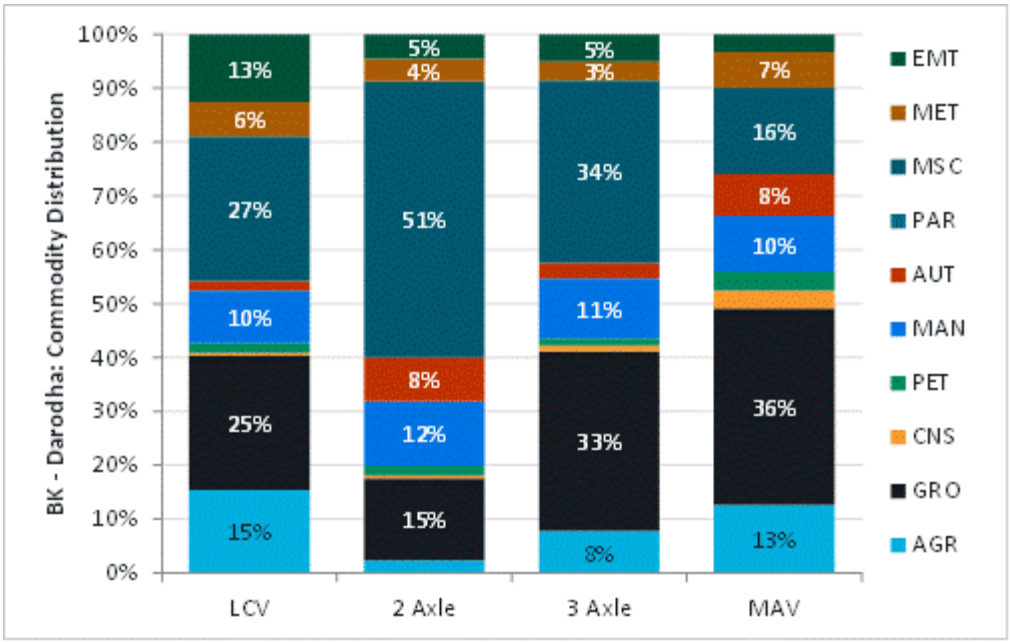
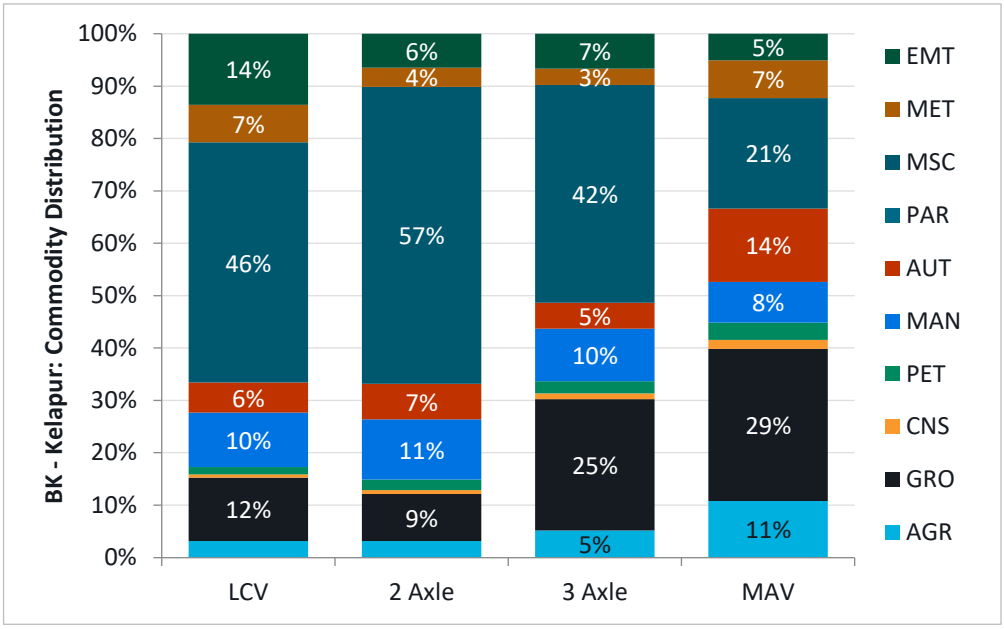
Figure 3.30: BK Darodha: Commodity Distribution



Source: Steer OD analysis

Figure 3.31: BK Kelapur: Commodity Distribution



Source: Steer OD analysis

3.130 The direction wise distribution of commodities for each vehicle types helps to gauge a better understanding of the distribution as per the direction of goods movement. The profile of commodities being carried in both the directions is overall is somewhat similar.

Table 3.26: Directional commodity distribution – BK Darodha: Direction-wise commodity distribution

Nagpur to Hyderabad					Hyderabad to Nagpur			
LCV	2 Axle	3 Axle	MAV	Commodity	LCV	2 Axle	3 Axle	MAV
2.7%	2.5%	9.8%	17.9%	Agriculture	24.6%	2.1%	4.7%	6.2%
18.6%	16.5%	28.6%	28.7%	Groceries	29.5%	12.6%	40.6%	46.0%
1.4%	0.8%	1.4%	1.6%	Construction	-	-	0.6%	5.5%
1.8%	1.3%	2.0%	4.2%	Petroleum & Chemicals	1.6%	2.6%	0.3%	2.3%
14.5%	14.7%	12.2%	13.7%	Manufacturing	6.6%	6.3%	9.4%	6.4%
2.7%	9.9%	2.9%	6.4%	Automobiles	1.0%	4.7%	2.8%	9.6%
41.6%	47.2%	35.9%	19.5%	Miscellaneous	16.1%	59.7%	30.8%	11.7%
7.7%	4.1%	4.1%	6.6%	Metals (Steel/Iron etc.)	5.6%	4.2%	2.5%	6.8%
9.0%	3.0%	3.1%	1.4%	Empty	15.1%	7.9%	8.2%	5.5%

Source: Steer Analysis of OD data

Table 3.27: Directional commodity distribution – BK Kelapur: Direction-wise commodity distribution

Nagpur to Hyderabad					Hyderabad to Nagpur			
LCV	2 Axle	3 Axle	MAV	Commodity	LCV	2 Axle	3 Axle	MAV
2.9%	2.6%	7.9%	16.0%	Agriculture	3.4%	3.8%	2.8%	6.3%
8.6%	8.8%	20.4%	22.0%	Groceries	14.4%	9.2%	29.1%	35.1%
1.4%	1.0%	2.0%	1.6%	Construction	-	0.5%	0.3%	1.7%
-	2.4%	1.0%	3.1%	Petroleum & Chemicals	2.4%	1.7%	3.5%	3.6%
12.9%	13.5%	10.9%	9.0%	Manufacturing	8.7%	9.0%	9.4%	6.7%

Nagpur to Hyderabad					Hyderabad to Nagpur			
5.8%	6.2%	2.6%	9.9%	Automobiles	5.8%	7.6%	6.9%	17.4%
43.2%	53.6%	41.0%	24.5%	Miscellaneous	47.6%	60.3%	42.1%	18.2%
10.8%	4.0%	3.8%	9.0%	Metals (Steel/Iron etc.)	4.8%	3.3%	2.6%	5.7%
14.4%	8.0%	10.5%	4.8%	Empty	13.0%	4.7%	3.3%	5.3%

Source: Steer Analysis of OD data

3.131 The commodities carried on the Asset are majorly miscellaneous goods, groceries, and automobile parts. Miscellaneous goods (generally parcels and couriers) and groceries are being carried from warehouses in Delhi NCR, Agra, Nagpur to the zones connected by NH44. Presence of automobile manufactures in Hyderabad and Bangalore is the reason being generation of automobile traffic on the Asset. As mentioned earlier, presence of industrial hubs near the Asset (Yawatmal, Butibori) as well as along NH44 introduces manufacturing and metal related commodities on the Asset.

Trip length analysis

3.132 Trip-length distribution provides the distance-based profile of various vehicle categories. This aids in validating assumptions around the share of macro-economic drivers, inputs from zonal influence and toll segmentation. For ease of interpretation, we have categorised distances into 4 groups – local and short distance (0-250km), medium-distance (250-500 km), long-distance (500-1000 km) and very-long-distance (+1,000 km). The trip distances were derived as driving distances from Google Distance Matrix Tool based on zonal coordinates for OD pairs.[3]

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3.133 The following table states the average trip lengths of traffic plying on the Asset across the toll plazas.

Table 3.28: Average trip lengths (Kms)

	CJV	Mini LCV	LCV	2 Axle	3 Axle	MAV
AB - Raibha	346	141	921	1,304	1,399	1,171

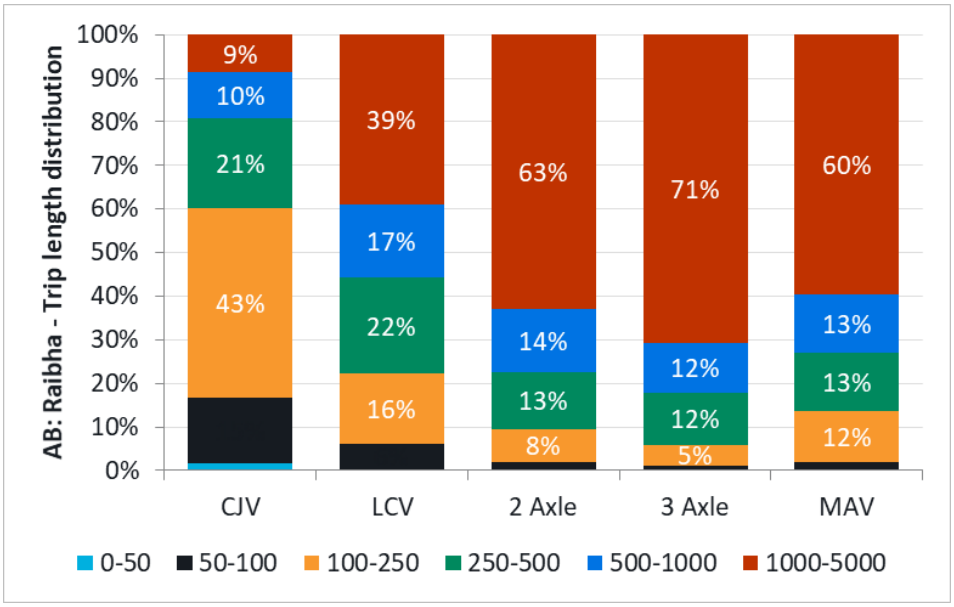
Source: Steer analysis of OD data

3.134 As discussed in the above sections, the Asset cater to the demands of long-distance strategic movements of both, east – west and north – south movements. The same is validated by the average trip lengths observed in the table above where 2A/3A/MAV trucks are travelling more than 1,000 kms per trip.

3.135 The trip length proportions for each vehicle type for each of the toll plaza is discussed below.

[3] Google Distance API is a tool that is available on a chargeable basis from Google Maps Platform. Link: https://developers.google.com/maps/documentation/distance-matrix/start. Travel distance and time information for driving/transit under various congestion scenarios can be extracted through this tool by using macro-enabled Excel, R, etc.

Figure 3.32: Trip length distribution, AB: Raibha toll plaza



Source: Steer analysis of OD data

3.136 As understood from the zonal distribution and commodities' distribution, that the strategic nature of this Asset serves long-distance north-south, east-south/ west movements. Accordingly, over 60% of the trip distances of 2 Axle, 3 Axle and MAV are traveling very long-distance movement of over 1,000 km. LCVs, also serving more local areas have a healthy mix of both short and long-distance trips.

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3.137 The following table states the average trip lengths of traffic plying on the Asset across the toll plazas.

Table 3.29: Average trip lengths (Kms)

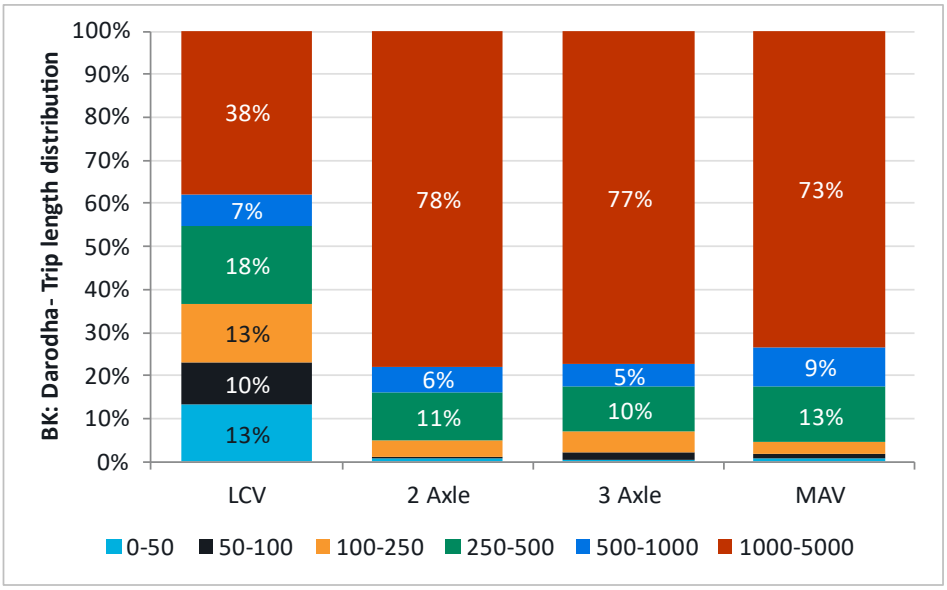
	CJV	Mini LCV	LCV	2 Axle	3 Axle	MAV
BK Darodha	394	200	986	1,590	1,516	1,427
BK Kelapur	497	511	1,256	1,598	1,660	1,514

Source: Steer analysis of OD data

3.138 As discussed in the above sections, the Asset caters to the demands of long-distance strategic movements of mainly north – south movements. The same is validated by the average trip lengths observed in the table above where 2A/3A/MAV trucks are travelling more than 1,500 kms per trip.

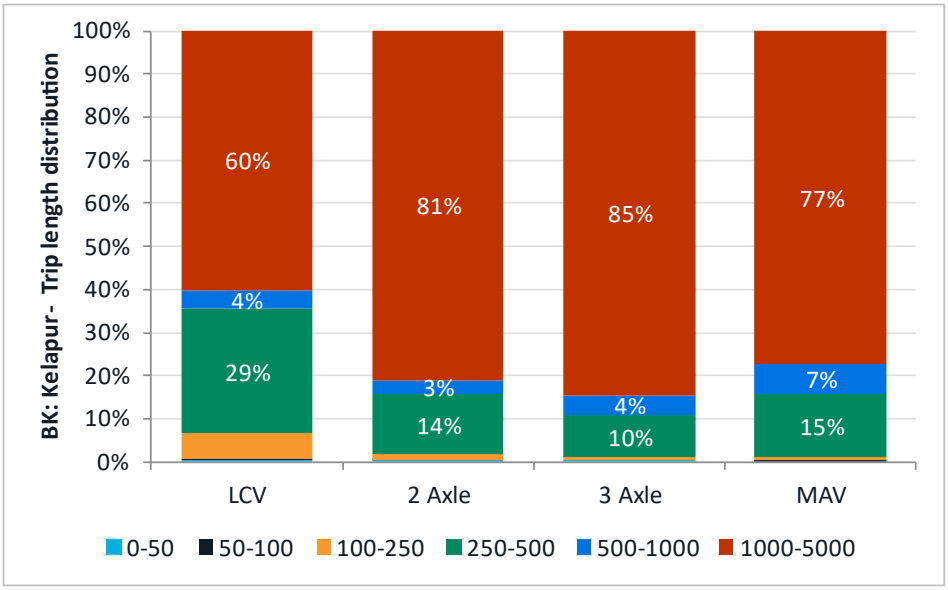
3.139 The trip length proportions for each vehicle type for each of the toll plaza is shown below.

Figure 3.33: BK Darodha: Trip length distribution



Source: Steer analysis of OD data

Figure 3.34: BK Kelapur: Trip length distribution



Source: Steer analysis of OD data

3.140 As understood from the zonal distribution and commodities' distribution, the strategic nature of this Asset serves long-distance north-south movement. Accordingly, over 60% of the trip distances of 2 Axle, 3 Axle and MAV are traveling distances greater than 1,000 km. LCVs, also serving more local areas have a healthy mix of both short and long-distance trips.

3.141 The Asset acts as a facilitator between northern and southern India, connecting Haryana, Punjab, and Delhi NCR to states such as Telangana, Maharashtra, Karnataka and Tamil Nadu. Both Darodha and Kelapur exhibit similar traffic profiles, which observes more than 70% of the truck traffic traversing greater than 1000kms. External trips, which are long-distance trips,

show origin/destination points near Delhi, Rajasthan, Uttar Pradesh in the north and Bangalore, Chennai, Hyderabad in the south.

3.142 As seen in the commodity distribution, these long-distance movements form a part of the through traffic on the asset which meets demand requirements of manufacturing, agriculture, and miscellaneous goods.

Conclusions

3.143 The chapter outlined the current and historical traffic and revenue datasets available on the Asset, as well as our analysis of primary traffic count data, collected as a part of this project. Historical data records were obtained from several sources (PIU, ETC, DPR, etc.) and a review of all the sources was done to estimate the robust traffic and revenue numbers.

3.144 Multiple data sources including PIU data, traffic data provided by client, traffic report as part of the NHAI, and Steer survey results Asset have been analysed and presented in detail in this chapter.

3.145 The analysis of these data sets confirms that the Asset carries high volumes of goods traffic which connect large urban centres and industrial clusters located in various parts of the country. Both traffic and revenue information are available for the toll plaza for a relatively short period. Independent TVC counts, and OD surveys undertaken by Steer to understand the primary traffic movements on each of the Asset.

Agra-Bypass

3.146 Both traffic and revenue information are available for the toll plaza for a relatively short period. For Agra Bypass, traffic data was available as reported in IHMCL counts, Schedule M, and toll plaza (ETC+cash) datasets. Toll plaza data (ETC+cash) data, which is considered to be a more reliable source of information, is available on Asset from April 2021 to July 2022..

3.147 Key takeaways from the data analysis obtained from primary and secondary sources are:

- The strategic nature of traffic on the Asset was validated by the zonal distribution of the OD analysis as for MAVs, more than 80% of influence was from the states connected via NH19 or NH44. The same was confirmed by the internal-external analysis too as the Asset was dominated by the share of external trips and hence, suggesting the presence of through traffic. In line with these observations, the trip length analysis saw that 3As covered ~1,400 kms and the MAVs covered ~1,200 kms per trip.
- The Asset, being situated in agrarian states, observed agri-related commodities being transported. Furthermore, miscellaneous goods (parcels and couriers) also hold a considerable share as they are transported from the warehouses in the neighbouring states, along the strategic corridor of the Asset, towards the other states of the country. Other commodities observed on the Asset were manufacturing, petroleum, groceries, and automobile goods.
- Steer TVC counts when compared to the TMS (only ETC) data on the overlapping dates observed a difference in the traffic volumes for CJVs, LCVs and 2As.
- To account for the delta we found in the TVC-TMS analysis, the observed unreported vehicle traffic has been added as ‘Exemptions’ during the calculation of our base position. This is necessary to identify the true traffic currently moving on the toll plazas.

Borkhedi-Kelapur

3.148 The analysis of the available data sets confirms that the Asset carries high volumes of goods traffic which connect large urban centres and industrial clusters located in various parts of the country, mainly moving along the corridor of NH-44 from north to south. In addition to role as national connector, the Asset provides important regional connectivity between neighbouring states i.e., Maharashtra and Telangana.

3.149 Both traffic and revenue information are available for the toll plaza for a relatively short period. For the Asset, traffic data was available as reported in IHMCL counts, Schedule M, and toll plaza (ETC+cash) datasets.

3.150 Toll plaza data (ETC+cash) data is available on Asset from April 2021 – July 2022 for Darodha and January 2021 – July 2022 for Kelapur.

3.151 Key takeaways from the data analysis obtained from primary and secondary sources are:

- The strategic nature of traffic on the Asset was validated by the zonal distribution of the OD analysis as for MAVs, more than 80% of influence was from the states connected via NH44. The same was confirmed by the internal-external analysis too as the Asset was dominated by the share of External trips and hence, suggesting the presence of through traffic. In line with these observations, the trip length analysis saw that 3As and MAVs cover more than 1,300kms per trip.
- The Asset observed a considerable share of agricultural and grocery-related commodities being transported. Furthermore, miscellaneous goods (parcels and couriers) also hold a considerable share as they are transported from the warehouses in the neighbouring states, along the strategic corridor of the Asset, towards the other states of the country. Other commodities observed on the Asset were manufacturing, metals, and automobile goods.
- Steer TVC counts when compared to the TMS data on the overlapping dates observed a difference in the traffic volumes for CJVs, LCVs and 2As. This difference can be attributed to relatively lower efficiency in reporting and management since the Asset is currently under an OMT contract.
- To account for the delta, we found in the TVC-TMS analysis, the observed unreported vehicle traffic has been added as ‘Exemptions’ during the calculation of our base position. This is necessary to identify the true traffic currently moving on the toll plazas.

3.152 The various data points presented in Chapter 3 feed into our assumptions of base traffic estimation, base revenue estimation, and growth assumptions which form the basis of our forecasts for the Asset discussed in detail In Chapter 5 and 6.

4 Socio Economic Context

Introduction

4.1 The growth of traffic on existing (brownfield) roads depends on, firstly, how quickly the background travel demand grows (background growth); and secondly, how successful the Asset is in attracting that traffic (traffic capture). Background travel demand is driven by the socio-economic conditions of the region where the Asset is located and conditions at a national level. These include:

- Changes in macro-economic factors such as population, economic growth (regional and national) and industrial production; and
- Other local factors such as strategic port growth, and growth of industries in the vicinity of the Asset.

4.2 The change in the competitive position of the Asset (and thus of the traffic capture it will achieve) derives from the level of service and associated cost on the Asset in comparison to competing roads; and whether any new competing road facilities are available.

4.3 In this chapter, we assess the socio-economic indicators relevant to traffic growth on the Asset. The relevant growth drivers where reliable information was available have been selected for establishing growth trends in the traffic forecasts.

Population growth

National Level

4.4 The total population in India has grown at a Compound Annual Growth Rate (CAGR) of 1.5% since 2000, and have been showing decreasing trends over the years, as presented in the table below. The World Bank forecasts this growth to decrease to 0.6% CAGR by the 2030-45 period.

Table 4.1: CAGR of population in India

Years	CAGR		
	Total Population (m)	Rural Population (m)	Urban Population (m)
1970 - 1985	2.3%	1.9%	3.8%
1985 - 2000	2.0%	1.7%	2.9%
2000 - 2015	1.5%	1.0%	2.6%
2015 – 2030*	1.0%	0.3%	2.3%
2030 – 2045*	0.6%	-0.3%	1.9%

Source: World Bank Data on Health Nutrition and Population Statistics, *forecast population growth

4.5 The two assets lie in the state of Uttar Pradesh (AB) and Maharashtra (BK).

4.6 Uttar Pradesh, the most populated state of India represents 17% of the country's population, with the total state population of 200 million (2011 Census), while Maharashtra represents 9.3% of India's population, with the total state population of 112 million (2011 Census).

4.7 The growth rate of urban population in both Uttar Pradesh and Maharashtra have been consistently higher than that of the national population estimates. Uttar Pradesh is largely rural with the share of urban population being 23%. In comparison to the urban population proportion being 31% for India and 45% for Maharashtra.

4.8 The table below shows population evolution in Uttar Pradesh and Maharashtra compared to that of the country.

Table 4.2: Population Growth in India (2001 – 2011)

State	2001 Population (m)			2011 Population (m)			CAGR (2001 – 2011)		
	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban
Uttar Pradesh	166	132	35	200	155	44	1.8%	1.7%	2.6%
Maharashtra	96.9	55.8	41.1	112.4	61.6	50.8	1.5%	1.0%	2.1%
India	1,028.7	742.6	286.1	1,210.9	833.7	377.1	1.6%	1.2%	2.8%

Source: Census 2011 Data

4.9 However, due to complexities in urbanisation trends, and the dynamic nature of local population migration (which are very difficult to forecast), we do not use population growth as a proxy for understanding future travel demand growth on the Asset. It has been included in this section to provide the overall context of the region in which the Assets are located.

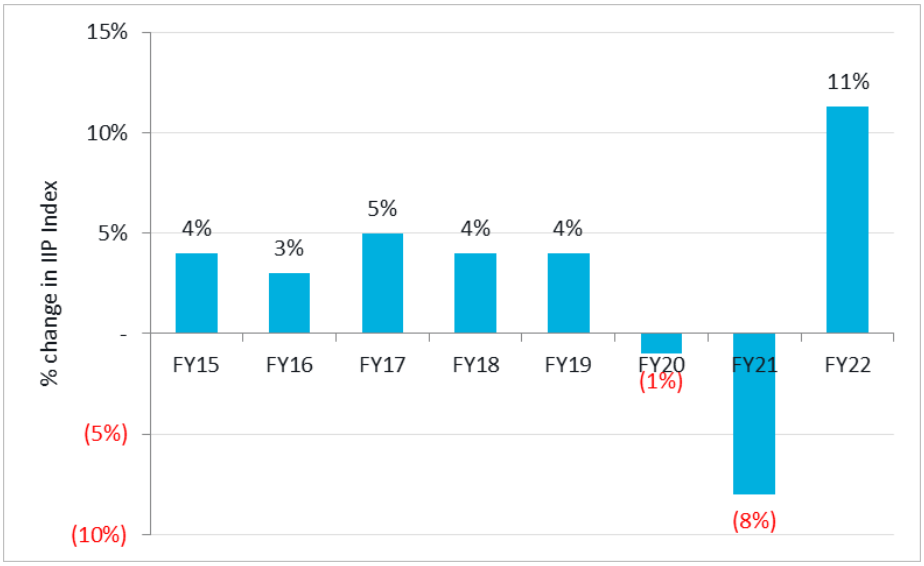
Economic Indicators

Industrial Production

4.10 The Index of Industrial Production (IIP) is a composite indicator that measures the short-term changes in the volume of production for a basket of industrial products. The IIP data tracks the manufacturing activity in different sectors of an economy, with mining, manufacturing, and electricity being the three broad sectors in which IIP constituents fall.

4.11 At an annual level, the IIP was growing on an average of 4% between FY15-19, before being hit by liquidity crisis and the overall economic slowdown in FY20. Post that, the IIP shrank by over 8% in FY21, due to a decline in economic activities in the wake of global lockdowns associated with the Covid19 pandemic. However, with gradual opening of the economy and rebound in consumer demand, the IIP grew by 11.3% in FY22, indicting a revival in economic growth.

Figure 4.1: Annual growth - Index of Industrial Production



Source: Central Statistical Organisation (CSO)

4.12 As the IIP data in India is released only at a national level and not at the state level, we do not use IIP growth as a proxy for understanding future travel demand growth on the Asset. Also, availability of long-term forecast is the key for using an indicator as a growth driver, as the long-term forecast for IIP is not available we refrain from using it to forecast traffic.

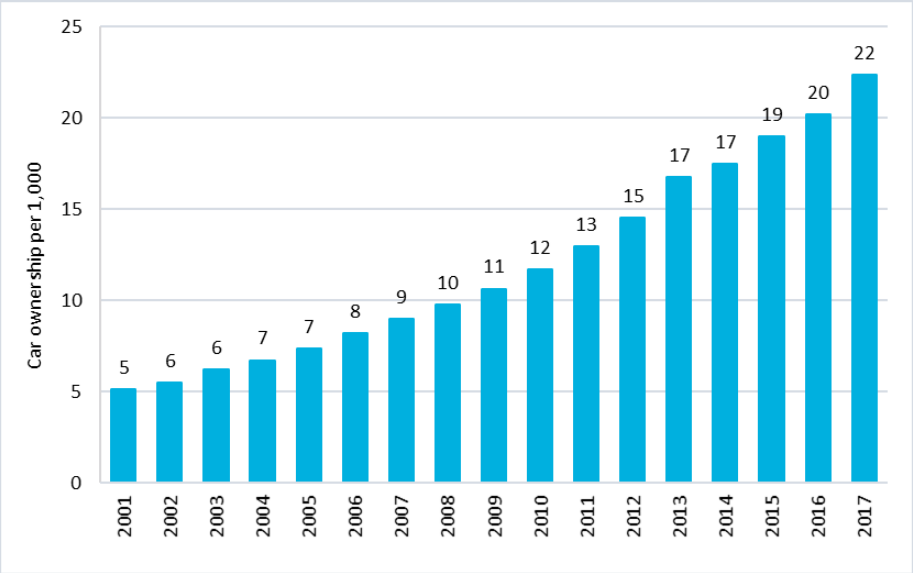
Vehicle ownership

4.13 Car ownership in India has traditionally been very low, however this is slowly changing with the increasing per capita income levels. Between 2007-17, number of cars per 1,000 people has more than doubled and increased at a CAGR of about 11%. The corresponding ownership rates for urban cities like Delhi, Mumbai, Bengaluru, and Chennai are over 100 cars per 1,000 people. The region where the Assets lie is highly rural, therefore the car ownership is lower than the India average.

4.14 India overall also stands at a very nascent stage in the vehicle saturation curve, offering a huge potential, as the income per capita of India and the region itself grow further, we expect the car ownership levels to increase. As per the India Energy Outlook, the car ownership is projected to grow steeply to 175 cars per 1,000 population by 2040 in India[4].

[4] https://www.gita.org.in/Attachments/Reports/IndiaEnergyOutlook_WEO2015.pdf

Figure 4.2: Car ownership in India per 1,000 population

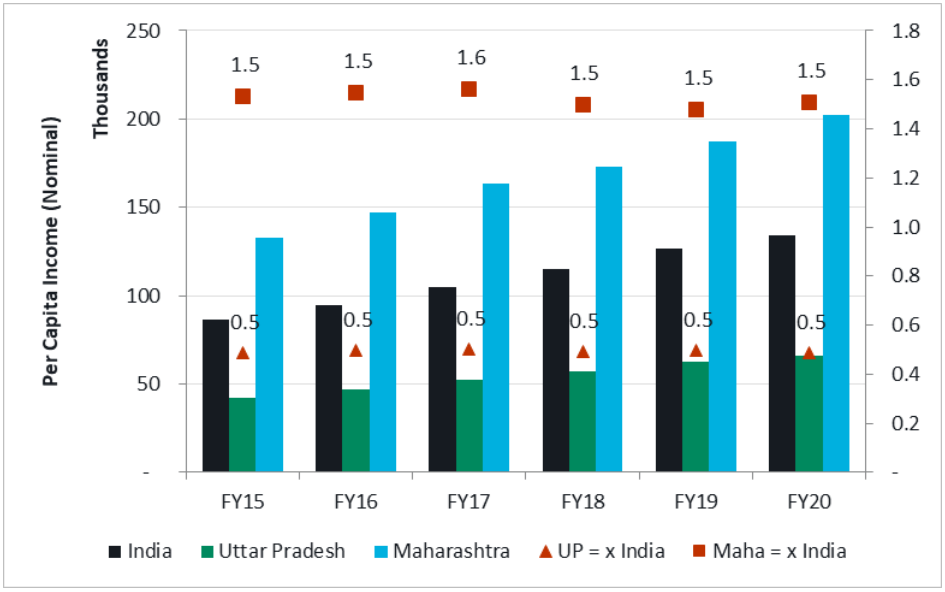


Source: Central Statistical Organisation (CSO)

Per Capita Income (PCI)

4.15 The per capita income of the states where the Assets lies i.e., Uttar Pradesh in case for Agra Bypass is half as compared to the national average, and Maharashtra in case for Borkhedi Kelapur is 1.5 times that of national average. However, in dollar terms, PCI of just $1,000-$2,000 per head indicates that the India is at a very early stage of consumption curve. Going forward, we expect local consumption would be strong with increasing per capita income which would result in growth of both passenger and commercial traffic on the Assets.

Figure 4.3: Per capita income



Source: Central Statistical Organisation (CSO)

4.16 However, given the difficulty in obtaining granular district level PCI data, it is not advisable to use this as a growth driver. Also, the long-term forecast for PCI is not available, we therefore refrain from using it to forecast traffic.

GDP and GSDP Growth

4.17 The Indian economy has grown at a CAGR of 6.6% during FY12-20, aided by a strong growth in the services/tertiary sector. The economic growth of Uttar Pradesh (GSDP)[5] has been slower than the country overall, while the growth of Maharashtra's GSDP has been very similar to the India's GDP. Uttar Pradesh and Maharashtra approximately contribute 8% and 14% to the India's GDP respectively. In terms of per capita income, Uttar Pradesh has lower per capita and Maharashtra higher per capita income than the country.

Uttar Pradesh

4.18 Uttar Pradesh is the most populous state in India with a population of ~200 million people. The state has a large pool of skilled, semi-skilled and unskilled labour. Uttar Pradesh is also considered the largest consumer base in the country. The tertiary sector has the highest sectoral contribution to the state GDP followed by the secondary and primary sectors, with shares remaining stable during the past five years.

4.19 The tourism and transport sector constitute a majority of the state's tertiary sector. Uttar Pradesh is considered as a favoured tourist destination in India, with key tourist attractions being Agra, Varanasi, Mathura and Prayagraj. In 2019, the state attracted the highest domestic tourist in the country with a share of 23% in domestic tourist arrivals. The state holds third position in the country in foreign tourist arrivals with over 4.74 million[6] visitors.

4.20 In secondary sector, the state has key industrial areas in Khurja (ceramic); Moradabad (metals); Meerut, Bareilly, Mirzapur and Lucknow (handloom & handicrafts); Kanpur and Noida (leather and tannery). The state has an Indian oil corporation refinery in Mathura.

4.21 The state has fertile land with a large share of population dependent upon agriculture sector for the livelihood. The key primary industries in the state include food processing, crop production and horticulture. The state is mainly known for production of wheat, sugarcane, potato, and mango.

4.22 Uttar Pradesh's GSDP CAGR was 6.1% between FY12-20 and its relative share to the national GDP was around 8% in FY20.

Maharashtra

4.23 In the past decades, the state of Maharashtra has followed the same economic growth trend as observed at the national level. It is one of the most industrialised states and the financial capital of India-Mumbai is its state capital. Some of the other key cities which contribute towards the state's growth are Pune, Nasik, Aurangabad, Solapur, Kolhapur, and Nagpur. Of the 13 major ports in India, two major ports lie in the state, the largest container port of India, the Jawaharlal Nehru Port Trust (JNPT) and Mumbai Port along with 40+ minor ports. In terms of sectoral contribution, the services sector is the biggest contributor (61%), followed by secondary (26%) and primary sector (13%). The state has good presence of industrial clusters, especially in IT sector, automobile, gems and jewellery, textiles, chemicals, and heavy engineering industries along with agro-based and fishing sector. It is also the biggest onion, pomegranate and cotton producing state in the country.

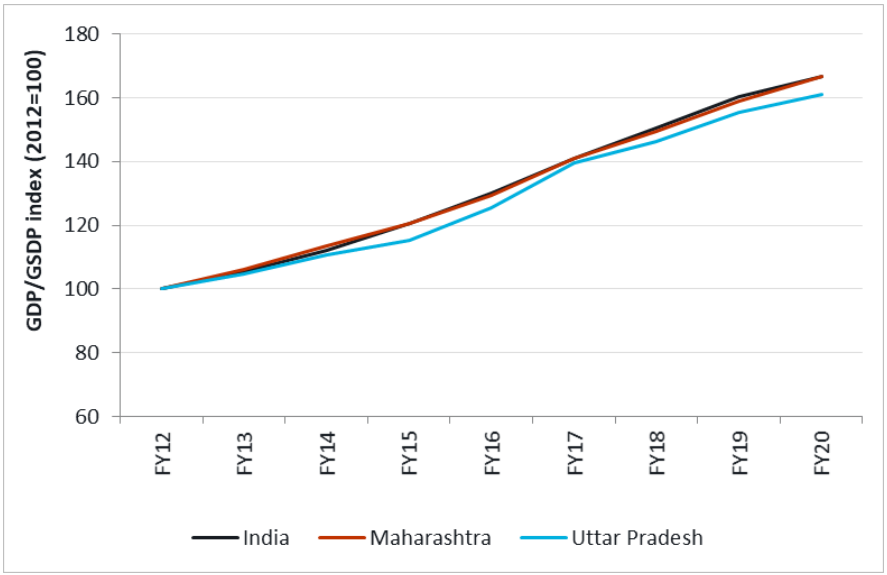
[5] GSDP is the Gross State Domestic Product i.e., the GDP equivalent for a particular state, it is the final value of goods and services produced by a particular state

[6] Tourism Statistics 2020

4.24 Some of the key industrial clusters in the state are in Aurangabad (engineering and gems and jewellery), Mumbai (electronic and gems and jewellery), Nanded (chemicals and pharmaceuticals) and Pune (IT engineering and automobiles).

4.25 Maharashtra's GSDP CAGR was 6.6% between FY12-20 and its relative share to the national GDP was around 14% in FY20, highest amongst all the states.

Table 4.3: GDP/GSDP index (2012=100)



Source: Central Statistical Organisation (CSO)

4.26 The official historical GDP and GSDP data for India are released by the Central Statistical Organisation (CSO). The GDP forecasts for India are available from various reliable sources such as Oxford and Consensus, but the state level GSDP forecasts are not published. However, using the long-term historical trends between GDP and GSDP, we have developed factors which are used to forecast GSDPs for each state.

4.27 Therefore, in our view, GDP is the best source to be used as a growth driver for long term forecasts of traffic.

Summary

4.28 For any indicator to be used as a growth driver to forecast traffic, a reliable source of historical and forecast available for that indicator is the key requirement. Of the key socioeconomic indicators discussed above GDP seems to be the only growth driver for which reliable data is available both in terms of historical and forecast data, therefore, to forecast traffic we would be using GDP/GSDP as our key growth drivers.

Indicator	Remarks
GDP/GSDP	Available annually ***National level reliable historical and forecast available***
Population/Urbanisation	Revised every 10 years, last available 2011. Population estimates are not available annually, making it difficult to run regressions. Also, the very dynamic nature of local population migration (which are very difficult to forecast with accuracy), we do not use population growth as a proxy for understanding future travel demand growth on the Asset.

Indicator	Remarks
	Forecast available but historical data is a constraint
Per Capita income	Forecasts on national and state level per capita income is not available *Historical data available but forecast data is a constraint*
IIP Index (Industrial production)	Unlike GDP, reliable IIP forecasts are not available. Also, the IIP data is only available at national levels and not at a state level.
Vehicle ownership	Latest data on vehicle ownership at India level is available for 2017. At state level, not all states release their vehicle ownership data annually making it difficult for consistency. A lot of research organisations have published forecast at national level, but a reliable estimate is not available.

Source: Steer analysis

5 Base traffic, revenue validation and forecasting assumptions

5.1 In this chapter, we present our approach to arrive at the base pose position and assumptions for baseline (or background) traffic growth for each vehicle category on the Asset.

5.2 The two most important inputs that go into traffic and revenue forecasts are:

- The base position – both in terms of traffic and revenue levels currently being generated by an asset; and
- The future growth trends – which can be correlated to the various growth drivers and used to develop an informed view of the forecasts.

5.3 The following sections discuss our approach to arrive at each of these inputs for both the Assets.

Seasonal Correction Factors

5.4 Traffic on any Asset varies on a month-on-month level. Such variations maybe due to monsoons (typically Jul to Sept) or due to festivals in the region. For e.g. It is observed that typically the truck traffic during the first half of the financial year (April-September) is generally lower than the annual average, mainly because of peak summer season followed by monsoons affecting the freight movement patterns in large parts of the country in the July-September period. In addition to these there may be other seasonal variations specific to the Asset.

5.5 In order to normalise for these variations across the year to provide an AADT estimate, Seasonality Correction Factors (SCF) are used. SCFs are estimated to convert the monthly traffic numbers to an AADT level while accounting for seasonal variation due to local/national festivals, weather changes and/or temporary external impacts. These are typically estimated using historical data for each plaza and vehicle category over multiple years. An SCF >1 means that the traffic for the month is lower than the annual average and vice-versa.

5.6 Historical traffic data was available for all toll vehicle categories starting April 2021 upto 31st July 2022 for AB Asset and Jan 2021 up to 31st July 2022 for BK Asset. Therefore, in absence of longer-term historical data to arrive at the SCF, we have benchmarked our SCF from various sources:

- Assets in the vicinity, east or west of the Asset carrying very similar traffic profiles
- Site observations and information provided by the toll plaza to validate SCF assumptions (such as traffic volume drop during monsoon months).

5.7 The below table presents the assumptions in SCF used to estimate the AADT for each of the Assets:

Table 5.1: SCFs assumed for AB: Raibha toll plaza

	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March
CJV	1.01	1.03	0.93	1.01	1.04	1.20	1.07	0.91	0.95	1.02	0.91	0.98
LCV	0.95	1.00	1.04	1.11	1.11	1.01	0.94	1.00	0.96	1.00	0.94	0.96
Bus	1.01	0.98	1.02	1.07	1.08	0.98	0.95	0.97	1.02	1.05	0.94	0.95
2A	1.01	0.98	1.02	1.07	1.08	0.98	0.95	0.97	1.02	1.05	0.94	0.95
3A	1.01	1.02	1.07	1.17	1.11	1.00	0.98	0.96	0.93	0.97	0.90	0.93
MAV	1.01	1.02	1.07	1.17	1.11	1.00	0.98	0.96	0.93	0.97	0.90	0.93

Source: Steer analysis

5.8 SCF assumptions for BK: Darodha and BK:Kelapur toll plaza are presented below:

Table 5.2: SCFs assumed for BK: Darodha and Kelapur toll plaza

	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March
CJV	1.08	0.89	0.95	1.18	1.00	1.15	1.03	0.97	0.94	1.00	0.92	0.98
LCV	1.06	0.92	0.96	1.09	1.11	1.13	1.00	0.88	0.89	1.09	0.98	0.98
Bus	1.08	0.99	0.97	1.01	1.00	1.04	1.00	1.00	0.98	0.98	0.98	0.98
2A	1.01	0.95	1.00	1.04	1.02	1.03	1.05	1.00	0.95	1.02	0.97	0.96
3A	1.01	0.95	1.00	1.04	1.02	1.03	1.05	1.00	0.95	1.02	0.97	0.96
MAV	1.01	0.95	1.00	1.04	1.02	1.03	1.05	1.00	0.95	1.02	0.97	0.96

Source: Steer analysis

Elasticity and growth drivers

5.9 In this section, we present our approach, and assumptions around estimation of elasticities and forecast assumptions of macro parameters for each vehicle category on the Asset.

5.10 Traffic growth is commonly related to a variety of macro-economic and industry- or commodity-specific factors (hereafter referred to as 'traffic growth drivers'). These growth drivers are typically identified from the results of the OD data analysis and the site visits that help us appreciate the nature of traffic movement – 'what' travels 'where' and 'why'.

5.11 On Asset where long time series historical data is available, to understand the historical traffic trends in relation to these growth drivers, we typically carry out regression analysis, to determine the historical relationship between traffic belonging to each major vehicle category and its macroeconomic growth driver at the toll plaza. The dynamics of traffic demand is the dependent variable while the dynamics of one or more identified growth drivers are the independent or explanatory variables. This is the primary approach to determine the elasticity relationships. However, for Assets under consideration where only limited historical data is available, we have adopted a benchmark approach to finalise our elasticity estimates.

5.12 While working on several Asset across the country where historical data is available, it has been observed that typically, growth of passenger and light commercial vehicles like cars, buses and LCVs which have relatively shorter trip lengths (<200-250 km) is more closely linked to the local economic growth drivers where the Asset is located. These categories are generally driven by the demand of local production/consumption centres and are in most

cases captive to the Asset. Local factors coupled with tourism driven demand is often seen as the key driver for consumption of goods and services in the areas. Therefore, we typically link the growth rate of these vehicle categories with GSDP growth rates of the state where the asset is located as that is closest proxy of the local economic activity in the region.

5.13 Whereas heavy vehicle traffic like 3A trucks (sometimes 2A trucks as well) and MAVs tend to have a much longer average trip lengths (>350-500 km) and serve multiple economic activity centres located along an Asset as well beyond the Asset across multiple states of the country. For these vehicle categories we therefore assume these vehicle categories to grow in line with the national GDP.

5.14 This is because most light goods vehicles tend to travel shorter distances within the state, whereas a significant proportion of heavy vehicles carry commodities for long - distances across the country and have much longer trip lengths. These commodities also tend to be part of industry ecosystems whose demand-supply relationships are scattered across the country and therefore relate more with GDP growth. Therefore, using the OD data trip lengths of various vehicle types and the commodity carried by these goods vehicles form the basis for estimating the elasticity relationships.

Estimation of background elasticities

Overview

5.15 For brownfield Asset, where sufficient historical traffic evolution is available, it is common practice to use regression model analysis to determine the relationship, expressed as elasticity, between traffic growth and key socioeconomic drivers. This relationship is then applied to assumptions of future socio-economic evolution to estimate future traffic growth.

5.16 As for the Asset under consideration, long-time historical traffic trends weren't available as mentioned in the earlier chapters. Therefore, we undertook a benchmarking analysis in order to estimate our forecast elasticities. The sources used included our understanding of the Asset gained from site visits and our understanding of the corridor from previous traffic studies, outputs of the OD data analysis (OD pairs, trip lengths, zonal influence, and commodity mix) and knowledge of working on the Asset serving similar long-distance movement. We also took account of the regional Asset having similar traffic profiles, which give us reasonable confidence in the relationships proposed.

5.17 The forecast elasticities are assumed to remain constant over the concession period as the logistics sector in still in early stages of development in India (95% of trucks still owned by operators owning less than 5 trucks). Car ownership levels are still around 22 per 1000 people, and it is likely to take a few years before the market reaches maturity. These trends are based on a long-term understanding of historical relationships and an overall outlook on the growth of the region and the country.

5.18 The table below detail out the reasoning for selection of respective growth driver(s) and elasticity adopted for each vehicle category for AB: Raibha toll plaza

Table 5.3: Assumed Elasticities for the AB: Raibha toll plaza

Vehicle Category	Adopted elasticity	Growth Driver	Comments
CJV	1.0	GSDP UP	Car traffic is largely driven by the local demand. CJVs are expected to grow with 1 elasticity on both the asset, as the car ownership levels continue to increase in the region with the increase in per capita income levels in future years. An increase in car ownership levels and overall economic growth of the region is likely to result in a healthy growth of CJV's on the asset.
Buses	0.3	GSDP UP	Buses are primarily a mix of public and private inter-city buses. Buses currently are serving local intercity demand. As these cities grow, the buses are also expected to grow to serve the increasing demand however only at a muted rate.
MLCV/LCV	0.4	GSDP UP	LCVs are also found to undertake long distance trips with lengths up to 800km in addition to catering to the local demand. The emergence of ecommerce companies which transport high value low tonnage products over long distances prefer the use of LCV/2A vehicles. It is evident from the survey data that LCV/2A trucks are being used for transporting such materials. Further both LCV and 2A are also serving the manufactured goods industry. Therefore, we believe that the LCV/2A category will continue to grow in the future. However, the classification between 2A and LCV still colours the performance of this category and hence a lower growth assumption on LCV compared to 2A has been assumed on forecasts.
2A	0.6	India GDP	
3A	0.8	India GDP	3A and MAV's make medium to long distance movements. The Asset benefit from agricultural, groceries and industrial movement. More than 65-70% of the 3A and MAV are doing an average trip length of more than 1000 kms on both the asset. MAVs are doing strategic north-south long-distance movements catering to the New Delhi and north India movement towards southern India including Mumbai, Bengaluru, Chennai, Hyderabad, and Karnataka etc. Moreover, an average trip length of around 1000kms just aids the fact that this asset has significant long-distance traffic and is expected to have a closer growth relationship with national GDP. Therefore, an assumption of 1.0 to GDP has been assumed for the forecasts. Although the trip nature of 3As is similar to MAVs, a lower elasticity parameter is considered for 3As due to gradual shift observed from lower to higher axle trucks after a new Axle Load Policy was implemented in FY19, and economies of scale achieved by carrying higher loads per km of distance covered.
MAV	1.0	India GDP	

Source: Steer analysis

5.19 The table below detail out the reasoning for selection of respective growth driver(s) and elasticity adopted for each vehicle category for BK: Darodha and Kelapur toll plaza.

Table 5.4: Assumed Elasticities for the BK: Darodha and Kelapur toll plaza

Vehicle Category	Proposed	Growth Driver	Comments
CJV	1.0	100% GSDP of Maharashtra	Car traffic is largely driven by the local demand from Nagpur, Kelapur, Butibori and Yavatmal. The Asset is also influenced by Hyderabad bound traffic. CJVs are expected to grow with 1.0 elasticity on the Asset as the car ownership levels continue to increase in the region in future years.
Buses	0.3	50% GSDP of Maharashtra 50% GSDP of Telangana	Buses are primarily a mix of public and private inter-city buses. It seems that buses currently are serving local intercity demand with some share of long-distance movement. As these cities grow, the buses are also expected to respond to the increasing demand however only at a muted rate.
MLCV/LCV	0.5	50% GSDP of Maharashtra 50% GSDP of Telangana	LCV have been observed to carry a mix of commodities, doing short to medium distances mostly catering to local demand alongside Nagpur Hyderabad corridor including groceries, agricultural and perishable products. As the region grows, we expect the consumption of these to also increase, combined with an increase in demand due to manufacturing industry along the Asset corridor.
2A	0.6	GDP	2A,3A, MAVs are assumed to carry a mix of commodities over medium to long distance trips catering to national as well as local demand between Nagpur and Hyderabad. The demand for high value low tonnage products over long distances makes 2A trucks as preferred mode. 2A trucks in the region are observed to be carrying such materials including courier, parcel etc. on this corridor between Delhi and Hyderabad, Chennai and Karnataka and local areas in-between. Further both 2A and 3As have also serving the manufactured goods industry. Therefore, we believe that the 2A category will continue to grow in the future with 0.6 elasticity to GDP. 3A trucks are also influenced long distance courier, parcel, and agricultural commodities along with local commodity movement including construction, groceries and perishable items. Therefore, higher elasticity of 0.7 has been assumed.
3A	0.7	GDP	
MAV	1.0	GDP	The Asset is part of the strategic NH44 north south corridor with MAV traversing long distance movements catering to the New Delhi and north India towards Hyderabad and southern parts of India. The Assets benefit from agricultural, groceries and industrial movement from industries along the corridor and in the vicinity. Therefore, an assumption of 1.0 to GDP has been assumed for the forecasts expecting the long-distance traffic to grow more in line with the national GDP.

Source: Steer analysis

Forecasts for growth drivers

5.20 In this section, we have described our assumptions in relation to forecasts of the key macro-economic drivers of traffic growth. India's GDP and the relevant state GSDPs are the primary macroeconomic variables that have been used to drive our traffic growth forecasts.

Macro assumptions: GDP, GSDP and WPI

National GDP

5.21 For the past 2 decades, the Indian economy has grown at an average of about 7% annually. Between 2014-2018, India was the fastest growing major economy globally. In the year 2019-20, there was a trend of economic downturn observed in the country, nevertheless, with government initiatives such as Make in India, and Production-Linked Incentive (PLI) scheme, the national economy was expected to improve.

5.22 The Input assumptions on GDP, GSDP and WPI are presented below. GDP and WPI is sourced from RBI and Consensus forecasts. For UP state GSDP, there are significant investments expected to take place as part of the state's plan and Uttar Pradesh is expected to receive a significant proportion of these investments, given its leading position in industrial investments. The higher-than-expected GSDP growth rate across the concession period could be achieved if such investments were realised as they are expected to give an additional boost to Uttar Pradesh's state economy.

5.23 In the long term, we believe that as other smaller state economies of India catch up with the national economic growth, the gap between growth rates of larger state economies, such as Gujarat, Maharashtra and Karnataka, and the national GDP growth rate will start reducing.

Table 5: GDP, GSDP UP, and WPI assumptions

	GDP	GSDP UP	GSDP Telangana	GSDP Maharashtra	WPI
FY24*	6.1%	6.4%	7.4%	6.1%	10.9%
FY25	6.2%	6.5%	7.4%	6.2%	4.6%
FY26	6.4%	6.6%	7.5%	6.4%	2.5%
FY27	6.2%	6.4%	7.2%	6.2%	3.6%
FY28	6.2%	6.4%	7.2%	6.2%	4.2%
FY29	5.8%	6.0%	6.6%	5.8%	4.6%
FY30	5.8%	6.0%	6.6%	5.8%	4.4%
FY31	5.8%	6.0%	6.5%	5.8%	4.4%
FY32	5.8%	6.0%	6.5%	5.8%	4.4%
FY33	5.8%	6.0%	6.4%	5.8%	4.4%
FY34	5.7%	5.8%	6.3%	5.7%	4.4%
FY35	5.6%	5.7%	6.1%	5.6%	4.4%
FY36	5.5%	5.6%	5.9%	5.5%	4.3%
FY37	5.4%	5.5%	5.7%	5.4%	4.3%
FY38	5.2%	5.4%	5.5%	5.2%	4.3%
FY39	5.1%	5.2%	5.3%	5.1%	4.3%
FY40	5.0%	5.1%	5.2%	5.0%	4.2%

	GDP	GSDP UP	GSDP Telangana	GSDP Maharashtra	WPI
FY41	4.9%	5.0%	5.1%	4.9%	4.2%
FY42	4.8%	4.9%	4.9%	4.8%	4.2%
FY43	4.7%	4.8%	4.8%	4.7%	4.3%

Source: Projections from RBI and Consensus, *In the forecasts, Steer has considered a dampener of 10% on FY 2024 GDP growth rate, **RBI Estimates, https://www.rbi.org.in/Scripts/PublicationsView.aspx?id=20931

5.24 Globally, countries are undergoing an economic slowdown accompanied with inflation raising concerns over stagflation- weak growth accompanied with elevated inflation levels. Global inflation is at the highest levels since 2008 resulting from shocks in energy, food prices, supply side bottlenecks and financial market constraints. In India, there has been consistent high levels of inflation with pressures from energy prices, Russia-Ukraine war and supply side challenges. RBI has been pushing the repo rate upwards to 5.15% however, the higher interest rates are expected to dampen economic growth. The government is introducing fiscal packages to ease the inflationary pressures including cutting of excise duty on crude oil, increasing subsidy on cooking gas etc., however these measures have an impact on the government's exchequer resulting in little room for supporting economic growth. In line with the expectations of possible further monetary tightening amid continued inflationary pressures, we believe that a 10% dampener on GDP forecasts is a reasonable assumption for FY2024.[78]

FY23 Base year AADT estimates

5.25 The base year is the year on which long-term background forecast growth rates are applied to derive year-wise average annual daily traffic (AADT) estimates for forecast years. This is therefore an important aspect of our forecasting approach as baseline traffic and ultimately revenue forecasts for future years are built on top of the base year traffic estimate. We have used FY23 as the base year for AADT estimates for the forecast years.

5.26 As described previously in Chapter 3, to establish the base year (FY23) traffic position, we utilised information from various sources – including from the Client and our context knowledge, to assess a reasonable demand on the corridor for the base year FY23 which formed the basis of future year forecasts.

5.27 Toll plaza data is available for the Assets since Apr'21 – 31st July'2022 on AB:Raibha and Jan'21-31stJuly'2022 on BK:Darodha and BK:Kelapur toll plaza. Due to lack of historical data, we are using elasticity and seasonality correction factors from reference benchmark corridors to triangulate a robust base position.

[7] https://www.theweek.in/theweek/business/2022/06/18/high-inflation-muted-growth-upset-economys-post-pandemic-recovery.html

[8] Today's global economy is eerily similar to the 1970s, but governments can still escape a stagflation episode (brookings.edu)

Normalisation of FY22 AADT

5.28 As discussed earlier in chapter 1 and 3, The second wave of COVID-19 infections peaked in the country during April and May 2021. Therefore, the traffic volumes on the Assets were impacted during Q1FY22. In Q2FY22, the traffic gradually returned to normal as the impact of second wave weaned away, including an element of residual (pent up) demand (from Q1 FY22) impacting traffic on the Asset. The period starting October 2021 up until March 2022 is devoid of any significant event, except Jan 2022 when the third wave of COVID-19 affected traffic volumes. However, the impact was short lived and had limited impact on the goods volumes of the Asset.

5.29 Further, we believe that the traffic levels observed during the October 2021 to March 2022 period when seasonally adjusted, were representative of normalised traffic on the Asset and not a result of temporary shifts or impacts. H2 FY22 period is assumed to be 'normal' as the period.

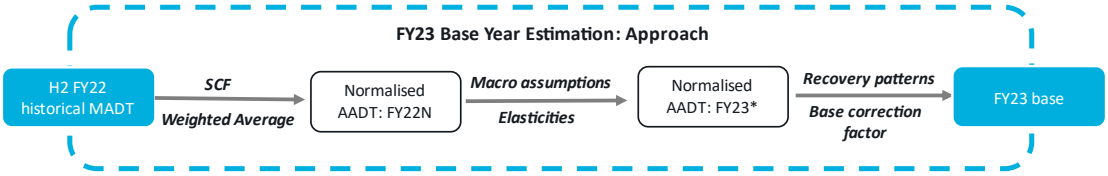
FY23 AADT: Estimation of FY23* and validation using Q1FY23 outturn traffic

5.30 FY23* (Normalised) AADT position is estimated by growing FY22N with elasticity and macro assumptions and underlying hypothesis of no further lockdowns due to severe Covid19 infections.

5.31 FY23* monthly profile (SCF applied on FY23*) has been determined and compared with actual Q1FY23 and July'22 (20 days of data) traffic to study the relationship between estimated FY23* and observed FY23 traffic levels. Based on the comparison of traffic performance for April-July 2022 i.e., actual vs estimated MADT, the remaining months of FY23 have been estimated. Therefore, the base FY23 is a combination of actual April-July traffic volumes and estimated traffic for the remaining year.

5.32 The estimated base FY23 AADT is further corrected using a 'Base Correction Factor' which is estimated from the difference between traffic counted in TVC and the reported traffic from TMS (CJV, LCV, Bus, 2A). The methodology is represented using the below schematic:

Figure 5.1: FY23 Base Estimation methodology



Source: Steer Analysis

5.33 The base estimates for AB:Raibha toll plaza using methodology discussed above is presented below:

Table 5.6: FY23 Estimates for AB: Raibha toll plaza

	FY22	FY22N	FY23*	FY23	FY23	FY23	FY23	FY23	FY23 vs FY22N
	Actual	Normal	Normal	Apr-22	May-22	June-22	Jul-22	Base	Growth rate
CJV	1,804	2,007	2,120	1,929	1,961	2,036	2,240	2,068	3.0%
LCV	398	434	445	443	391	440	442	436	0.5%

	FY22	FY22N	FY23*	FY23	FY23	FY23	FY23	FY23	FY23 vs FY22N
	Actual	**Normal**	**Normal**	**Apr-22**	**May-22**	**June-22**	**Jul-22**	**Base**	**Growth rate**
Bus/2A	1,643	1,806	1,868	1,981	1,785	1,944	1,994	1,952	8.1%
3A	1,760	1,765	1,813	1,933	1,699	1,831	1,830	1,927	9.2%
MAV	2,915	3,072	3,241	3,304	3,041	3,344	3,241	3,342	8.8%
OSV	3	3	3	4	2	3	3	3	
Total	**8,523**	**9,087**	**9,491**	**9,594**	**8,881**	**9,598**	**9,750**	**9,728**	**7.1%**
PCU	**25,742**	**27,210**	**28,432**	**29,222**	**26,698**	**29,081**	**28,973**	**29,413**	**8.1%**

Source: Steer analysis

5.34 As we can see from the above table, Q1FY23 and July FY23 have maintained the 29,000 PCU levels, which is robust performance of the Asset considering the monsoon months starting May upto July'22. Overall, the Asset has performed strongly till July'22, resulting in FY23 estimates rending upto 8% higher for trucks (3A, MAV). 2A growth is also governed by the classification of few LCV's into 2A post implementation of FASTag, therefore, 2A has also shown high growth between FY22N and FY23.

5.35 Similar trends have been observed for BK toll plazas; FY23 estimates have been presented below for each of the toll plaza:

Table 5.7: FY23 Estimates for BK: Darodha toll plaza

	FY22	FY22N	FY23*	FY23	FY23	FY23	FY23	FY23	FY23 vs FY22N
	Actual	Normal	Normal	Apr-22	May-22	Jun-22	Jul-22	Base	Growth rate
CJV	1,786	1,903	2,007	2,151	2,226	1,976	1,657	1,984	4.2%
LCV	420	430	441	435	427	416	406	416	(3.2%)
Bus/2A	1,305	1,412	1,462	1,467	1,556	1,545	1,597	1,531	8.4%
3A	1,347	1,380	1,433	1,413	1,442	1,422	1,460	1,450	5.1%
MAV	1,698	1,679	1,761	1,860	1,932	1,891	2,286	1,892	12.7%
OSV	2	2	2	3	1	1	1	1	
Total	**6,557**	**6,807**	**7,106**	**7,329**	**7,584**	**7,252**	**7,407**	**7,275**	**6.9%**
PCU	**18,018**	**18,491**	**19,287**	**19,825**	**20,559**	**20,017**	**21,728**	**20,075**	**8.6%**

Source: Steer analysis

Table 5.8: FY23 Estimates for BK: Darodha toll plaza

	FY22	FY22N	FY23*	FY23	FY23	FY23	FY23	FY23	FY23 vs FY22N
	Actual	Normal	Normal	Apr-22	May-22	Jun-22	Jul-22	Base	Growth rate
CJV	885	1,035	1,091	1,115	1,236	1,180	898	1,100	6.3%
LCV	442	409	420	392	376	383	374	378	1.5%

	FY22	FY22N	FY23*	FY23	FY23	FY23	FY23	FY23	FY23 vs FY22N
Bus/2A	1,411	1,596	1,652	1,519	1,619	1,627	1,637	1,590	(0.4%)
3A	1,340	1,391	1,444	1,377	1,425	1,443	1,450	1,454	4.5%
MAV	1,738	1,741	1,826	1,871	1,919	1,902	2,311	1,941	11.5%
OSV	2	2	2	2	2	1	1	1	
Total	**5,818**	**6,174**	**6,435**	**6,277**	**6,578**	**6,536**	**6,672**	**6,465**	**4.7%**
PCU	**17,630**	**18,451**	**19,234**	**18,822**	**19,579**	**19,528**	**21,127**	**19,540**	**5.9%**

Source: Steer analysis

Base correction for FY23

5.36 To arrive at the true base traffic position, we have used a base correction factor to adjust the traffic volumes for CJVs, LCVs and 2As. The percentage of this correction has been calculated by comparing the toll plaza traffic volumes with TVC data as explained earlier in the report. As the base AADT of our forecasts is derived using the TMS data, it is imperative to validate the robustness of the reported traffic volumes with independent counts.

5.37 The difference between reported TMS data and the traffic in Steer independent TVC counts is added as part of the base to account for the vehicles which are crossing the plaza as 'unreported' traffic. The traffic observed in the independent counts conducted by Steer report ~7% higher on Raibha, ~5% higher on Darodha, and ~13% higher on Kelapur than the traffic reported in TMS in the same week. This difference is largely driven by CJVs and LCV/Bus/2A categories. The TMS data is for the same dates as the TVC and an average of 7 days

5.38 To correctly account for true traffic levels, we have added the difference between Steer TVC and TMS counts (as a % of TMS) on the FY23 normalised position. We believe that this share of additional and unreported traffic does not pay at the plaza and hence, we treat this share as 'Exemptions' in our forecasts, allowing us to estimate the correct capacity of operations at both the toll plazas.

5.39 The table below illustrates the adjustment for the delta, and how it is factored into our base position:

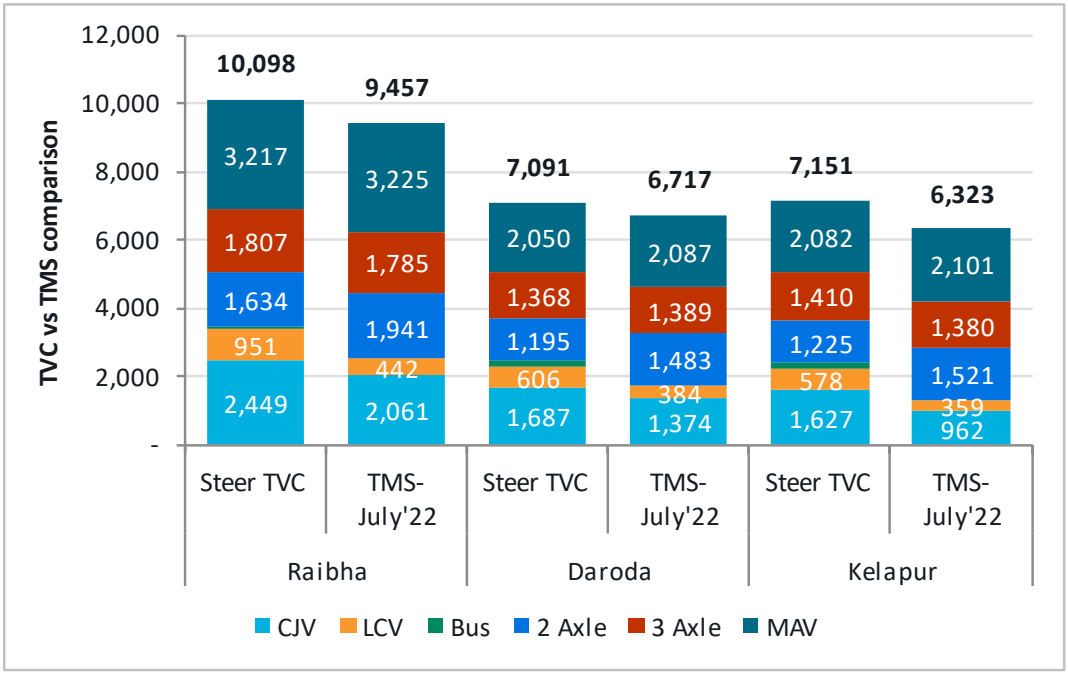
Table 5.9: Base correction factor adjustment

	AB: Raibha			Darodha			Kelapur		
	FY23	**Base Correction Factor**	**FY23 Base**	**FY23**	**Base correction Factor**	**FY23 Base**	**FY23**	**Base correction Factor**	**FY23 Base**
CJV	2,068	18.8%	2,457	1,984	22.8%	2,436	1,100	69.2%	1,861
LCV	436	10.0%	480	416	6.3%	442	378	7.9%	408
Bus	-		-	-		-	-		-
2A	1,952	10%	2,148	1,531	6.3%	1,628	1,590	7.9%	1,716
3A	1,927		1,927	1,450		1,450	1,454		1,454
MAV	3,342		3,342	1,892		1,892	1,941		1,941
OSV	3		3	1		1	1		1
Total	**9,728**		**10,357**	**7,275**		**7,850**	**6,465**		**7,382**

	AB: Raibha			Darodha			Kelapur		
PCU	**29,413**		**30,455**	**20,075**		**20,855**	**19,540**		**20,725**

Source: Steer analysis, AB (data pertains to ETC only)

Figure 5.2: TVC vs TMS comparison



Source: Steer analysis, for AB (data pertains to ETC only)

5.40 As discussed in Chapter 2, the location of the Kelapur toll plaza is being shifted approximately 6kms south of the existing location. Through Steer's independent TVC surveys we have observed a delta of 1.3% in 3As and 3% in MAVs on the new location as compared to the existing location. The adjusted base position for Kelapur New is shown in the table below.

Table 5.10: Kelapur New base traffic

	Existing location (FY23 Base traffic)	% Difference	New location (FY23 Base traffic)
CJV	1,861	-	1,861
LCV	408	-	408
2A	1,716	-	1,716
3A	1,454	(1.3%)	1,435
MAV	1,941	(3.0%)	1,882
OSV	1		1
Total	**7,382**		**7,304**
PCU	**20,725**		**20,402**

Source: Steer analysis

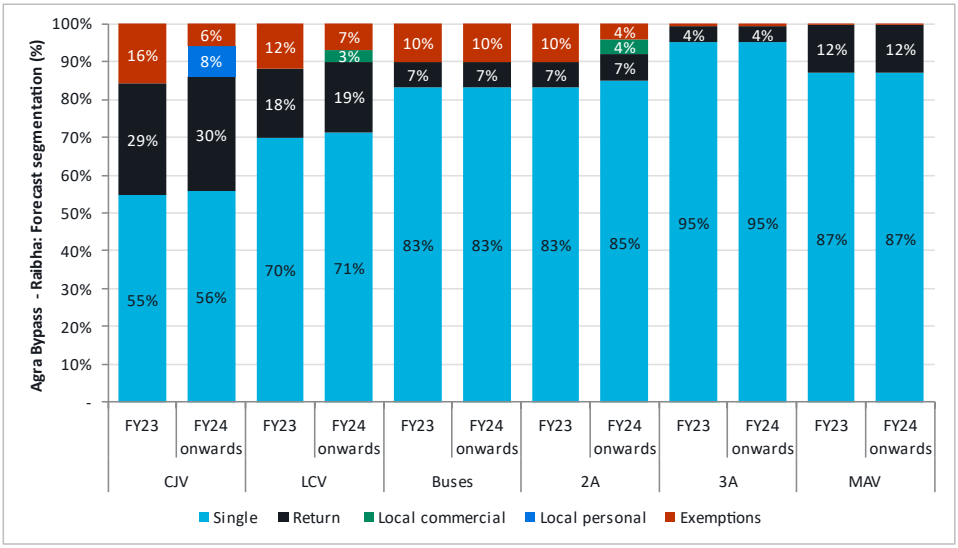
Revenue Estimates

5.41 To estimate the base revenue for the toll plaza, we used the estimated FY23 AADT, established as part of the analysis above, as the assumptions for base FY23 traffic. We then used the segmentation assumptions, discussed in chapter 3, as a starting point to arrive at the base year revenue. This is further discussed in the section below.

Toll Segmentation

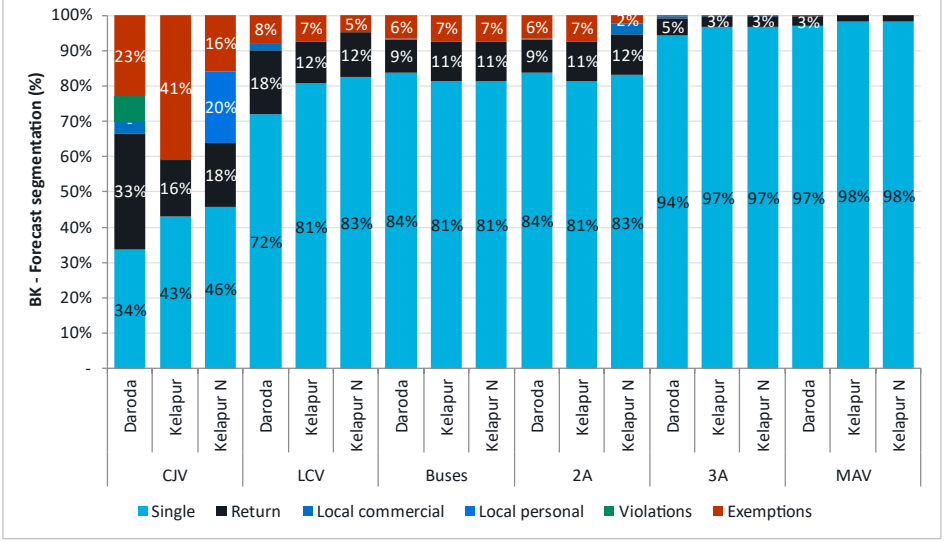
5.42 As discussed in chapter 3, segmentation trends have largely been stabilising over the last few months, with FASTag now being in a compulsory implementation since Feb-21 and more than 95% of transactions are via FASTag, it can be assumed that travel patterns have stabilised. Therefore, we believe the Oct-Mar FY22 average of the segmentation is representative of the travel patterns on the Asset. This is presented below:

Figure 5.3: Toll segmentation (%) for AB FY23 and FY24 onwards



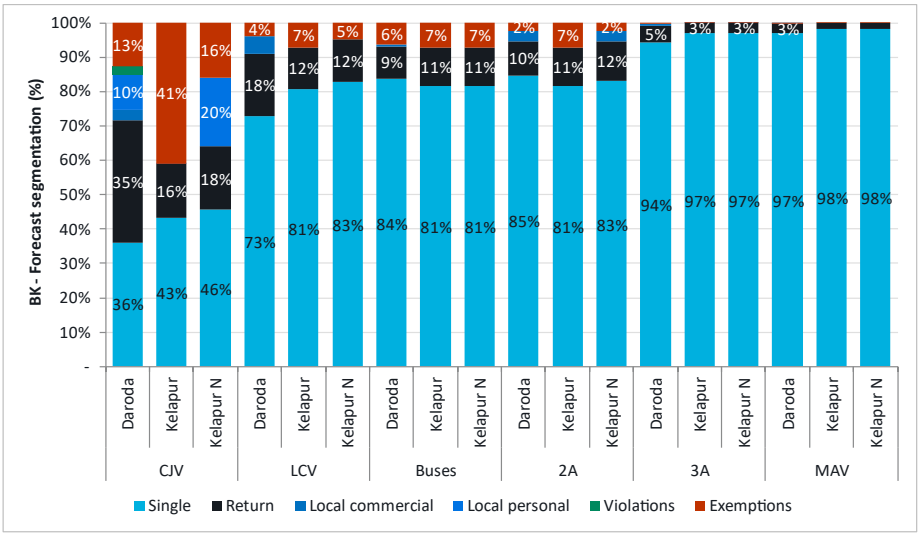
Source: Steer analysis

Figure 5.4: Toll segmentation (%) for BK FY23



Source: Steer analysis

Figure 5.5: Toll segmentation (%) for BK FY24 onwards



Source: Steer analysis

5.43 The changes in forecast toll segmentation observed on all three toll plazas is due to our understanding that once the Assets are taken over by the Client, the overall reporting practises will improve as the toll plaza will be operated by a reputed toll operator and may result in a decrease in total exemptions. Increasing compliance due to better operational efficiency in the next year will see the number of exemptions decrease further, with a subsequent increase in the Local passes, as well as the Single and Return ticket categories.

5.44 Additionally, for Kelapur the change in segmentation will be aided by the relocation of the toll plaza. Currently, the toll plaza is located within the city, once it shifts to its new location, the urban characteristic of the plaza will shrink resulting in lesser traffic exemptions.

Revenue reconciliation – validation of forecast segmentation

5.45 As part of validating the data provided by the Client, as well as our assumptions around toll calculations and forecast segmentation, we have reconciled the actual reported revenue on a monthly level for the Asset. To reconcile we have used our FY23 segmentation as mentioned in the previous section, MADT of the month and compared it with the reported revenue for these months. The exercise was undertaken for Apr, May, June 2022.

5.46 The Steer revenue calculations have been built up from monthly raw traffic data files, containing monthly data and ticket type information; and the toll notifications – all shared by the Client. The comparison, as shown in the table below, depicts the difference between modelled revenue and the reported revenue is within 0-0.2% for both the Assets, this gives us the confidence on the assumptions around segmentation and trip factors used for estimating forecasting revenue.

5.47 The table below shows the delta between our modelled revenue and the actual revenue reported in the toll plaza data:

Table 5.11: Revenue Reconciliation for AB (INR Cr)

Revenue	Modelled	Reported	Delta
AB: Raibha	22.11	22.11	(0.0%)

Source: Steer analysis

Table 5.12: Revenue Reconciliation for BK

Revenue	Modelled	Reported	Delta
BK:Kelapur	20.31	20.28	0.1%
BK:Daroda	20.58	20.51	0.3%
Total	**40.90**	**40.80**	**0.2%**

Source: Steer analysis

6 Traffic and Revenue forecasts

Introduction

6.1 Following the discussion on our forecast of background growth elasticity relationships in the previous chapter, this chapter first covers the forecasting assumptions around estimation of base year AADT and potential network impacts on traffic growth on the Asset. Thereafter, we present our assumptions around toll segmentations, trip factors and evolution of toll rates for the forecast period which are used to forecast revenues as derived from forecast traffic. In the final section, this chapter summarises traffic growth rates for the forecast years.

6.2 The following table lists key intermediate and final outputs that have presented in previous Chapters and in this chapter.

Table 6.1: Key intermediate and final outputs in the forecast

Forecast	Final outputs	Intermediate outputs	Inputs	Chapter
Traffic	Base year AADT	ADT, SCF estimate for base year	Historical SCF and year-to-date AADT	Chapter 3, 5
	Background traffic growth	Background forecast elasticity	Background historical elasticities with respect to growth drivers	Chapter 5,
		Forecasts for growth drivers	Historical performance of growth drivers along with Macro assumptions (GDP and GSDP)	Chapter 4, 5
	Impact growth rates and staging	Impacts	Network analysis	Chapters 6
Revenue	Annual/daily revenue forecasts	Forecast toll segmentation: Trip frequencies and trip factors	Historical trip frequencies	Chapter 3, 6
			Historical trip factors	Chapter 6
		Future toll rates	Toll evolution	Chapter 6

Source: Steer

Analysis of potential impacts

Summary of alternate routes and impact assessments

6.3 The section below details the impacts which we believe would affect traffic on the Asset during the concession period. As discussed in earlier Chapters, in order to assess the impacts on the Asset, whether positive or negative, we have studied developments (alternate roads, feeder roads and regulatory) in the surrounding road network.

Agra Bypass

6.4 The following table lists the impacts considered on the Asset.

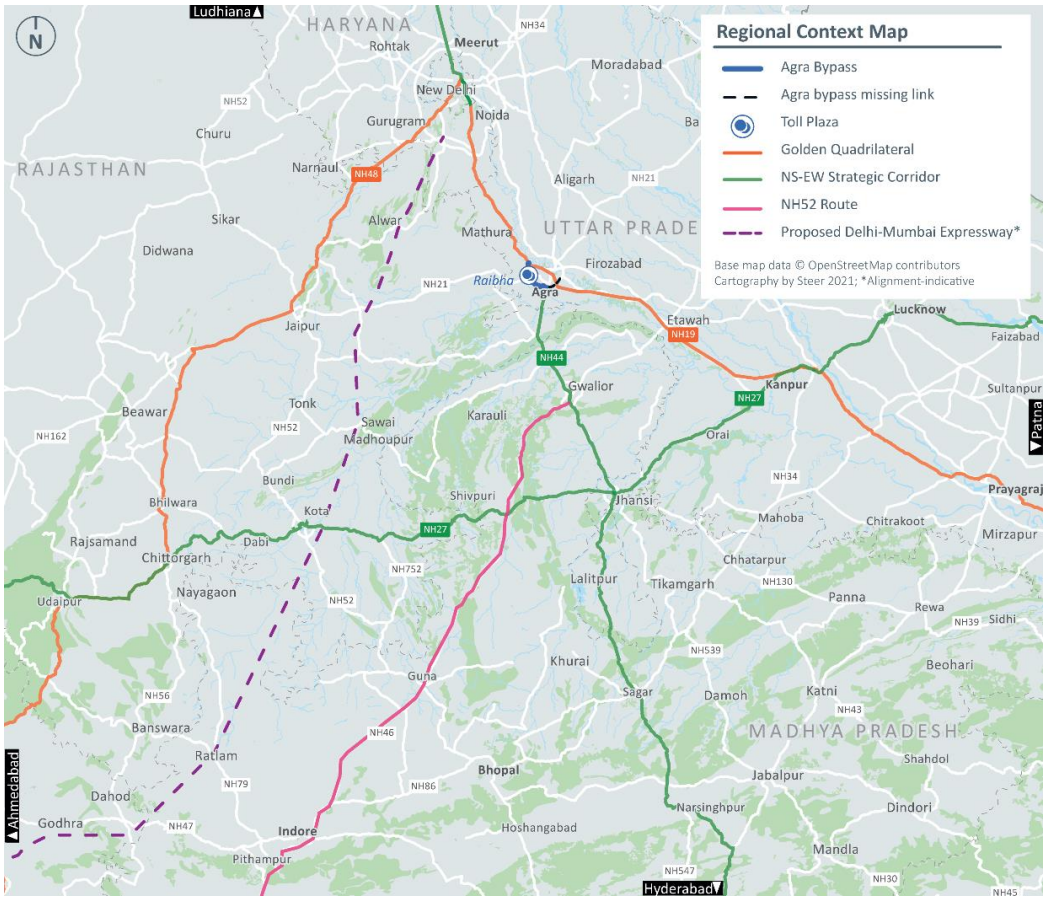
Table 6.2: Summary of impact

Impact	Toll plaza	Probability/Scale of impact	Year of impact	Impact (+/-)
Delhi Mumbai Expressway	AB: Raibha	High/High	FY24 onwards	-ve
WDFC	AB: Raibha	High/Low	FY24 onwards	-ve
Agra Bypass (diversion)	AB: Raibha	Medium/ Medium	FY25 onwards	-ve
Agra Bypass (city congestion)	AB: Raibha	Medium/ High	FY25 onwards	+ve
Revival of bus volumes	AB: Raibha,	Medium/ Medium	FY24 onwards	+ve

Source: Steer analysis of OD data

6.5 The network context in which these upgrades are planned can be analysed in conjunction with the network map below.

Figure 6.1: Asset route shown against the regional network context



Source: Steer analysis and cartography

6.6 The subsections below include a narrative of each of the improvements, and impacts associated from each of these on our traffic forecasts. Please note that all traffic volumes for impacts were estimated as impact rates applied on FY23 normalised AADT.

Western Dedicated Freight Corridor (WDFC)

6.7 The Government of India has plans to develop two Dedicated Freight Rail Corridors (DFC): The WDFC will link Dadri (east Delhi) to Mumbai via rail and EDFC between Ludhiana and Dankuni. We estimate that on completion of WDFC in FY24, the relevant goods carried via roads will shift to rail, causing a reduction in traffic volume on the corridor. As per the DFC website, base commodities which are expected to be carried on WDFC include containers, POL, fertilizers, iron & steel and cement, groceries, agricultural products such as food grains, among other bulk commodities and travelling more than 750Kms to Rail from Road.

6.8 The in-scope demand is all trips travelling more than 750 kms, carrying the above-mentioned commodities travelling between Delhi and Mumbai

Delhi Mumbai Expressway

6.9 NHAI is building a greenfield expressway connecting Delhi and Mumbai. The Delhi-Mumbai Expressway (DME) will connect Delhi to Mumbai with a dual carriageway with six lanes per direction. At 1350km long, it will drastically reduce travel length and times from Delhi to Mumbai. With this alignment, it is expected that once it's completed in FY24, the Delhi-Mumbai Expressway could attract long-distance traffic from the north including Delhi/North of Delhi regions and going that is presently using the asset.

6.10 The In-scope trips considered include movements between

- Delhi and north India including states of Haryana, Punjab, and
- West Madhya Pradesh (Indore) and Maharashtra (excluding trips to Nagpur), Goa , and west Karnataka

6.11 We expect such shifts to take place over course of time once the benefits of the expressway are fully visible and could be influenced by three factors:

- the last and first mile connectivity.
- roadside facilities typically seen along the national highway network such as truck stops, rest/refresh areas, affordable food/drink facilities and;
- fuel and repair shops coming up along the expressway network.

6.12 The benefits will also be most valued by long distance users which can make end to end movements as compared to those users with intermittent destinations. Given the novelty of the expressway and its expected impacts on a fragmented logistics market, we have assumed that 50% of impact will be realised within the first year of its completion whereas the remaining 50% will occur in the subsequent year.

6.13 The commissioning of DME is expected to significantly impact the traffic on the Asset. Since the in-scope traffic for WDFC and DME is same (WDFC as a subset of the total DME in scope), the combined impact is discussed below. For calculation of impact magnitude, we have considered Delhi and Indore (Madhya Pradesh) as entry/exit points where the option of diverting to an alternate route would be available for the road users. The Generalized Journey Cost based estimation suggests that up to 70% of the inscope trips are expected to shift to the expressway post completion starting FY24. The table below summarizes the DME impact on the Asset.

Table 6.3: DME impact - AB: Raibha

	LCV	2A	3A	MAV
Impact %	(4.8%)	(10.8%)	(8.3%)	(9.9%)

Source: Steer analysis

6.14 To estimate the impact magnitude of shift to WDFC, we have taken out trips carrying containers, POL, fertilizers, iron & steel and cement, groceries, agricultural products such as food grains, among other bulk commodities between Delhi and Mumbai and are travelling greater than 750 kms. The impact of WDFC on Agra Bypass is presented in the table below:

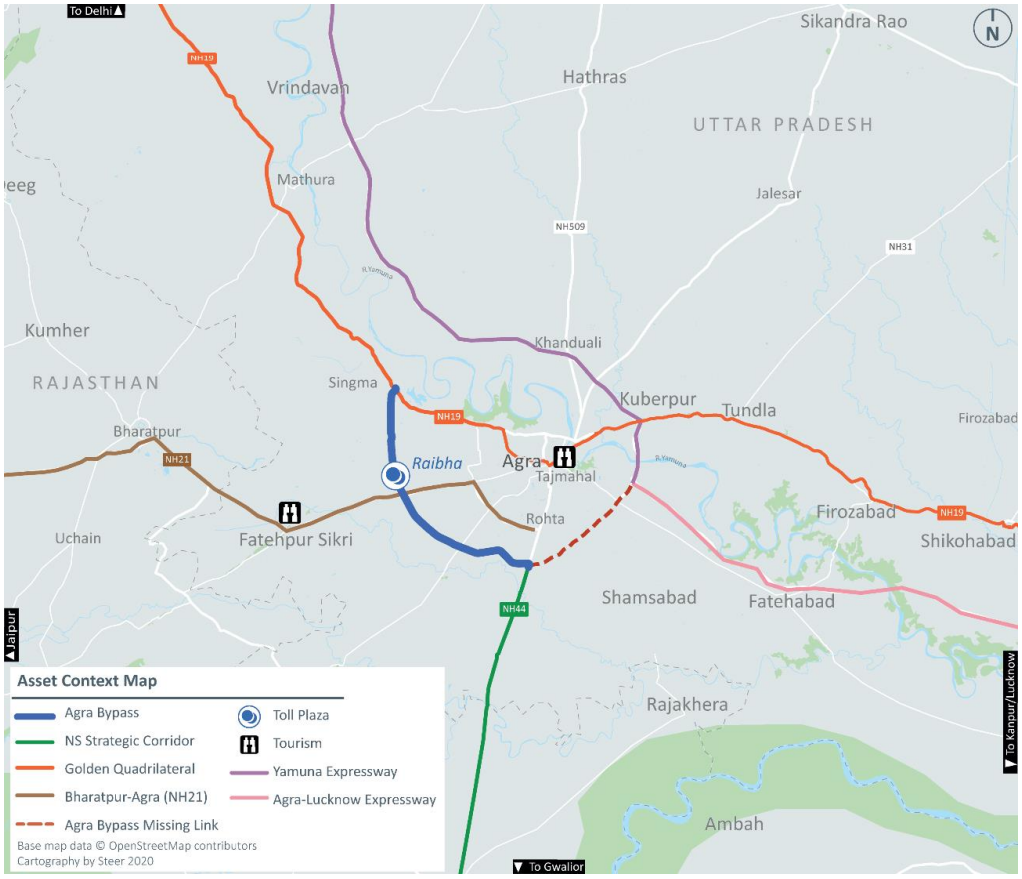
Table 6.4: WDFC impact-AB: Raibha

	LCV	2 Axle	3 Axle	MAV
Impact %	(1.2%)	(1.8%)	(1.3%)	(1.4%)

Source: Steer Analysis, overall impact, the impact will be phased over 4 years on DME and five years on WDFC

Agra Bypass missing link

Figure 6.2: Agra Bypass missing link



Source: Steer cartography using OpenStreetMap data

Agra Bypass diversion

6.15 The missing link would provide an option for east-west traffic current using the Asset to take right along the bypass route and continue towards NH19 or Agra Lucknow expressway by avoiding the toll plaza. The impact on overall traffic is summarised in the table below:

Table 6.5: Agra Bypass diversion impact (%)

Impact	LCV	2A	3A	MAV
Agra Bypass diversion	(1.3%)	(1.3%)	(1.8%)	(5.8%)

Source: Steer Analysis

Agra Bypass (city congestion)

6.16 The completion of the missing link would also have a positive impact as the current NH19 alignment passes through the city, which is already quite congested, therefore post the entire bypass is completed, we believe that the city authorities would ban movement of trucks within the city during daytime resulting in positive diversion on the Asset. The impact assumed is presented below:

Table 6.6: Agra Bypass (city congestion) impact (%)

Impact	2A	3A	MAV
Agra Bypass (city congestion)	10%	5%	9%

Source: Steer Analysis

Tourism revival

6.17 With relaxation of Covid19 related restrictions and improvement in vaccination coverage, it is expected that tourism traffic along the Jaipur-Mathura-Agra triangle would revive to pre-pandemic levels, therefore it is expected that bus volumes would increase starting FY24.

Borkhedi Kelapur

6.18 The following table lists the impacts considered on the Asset.

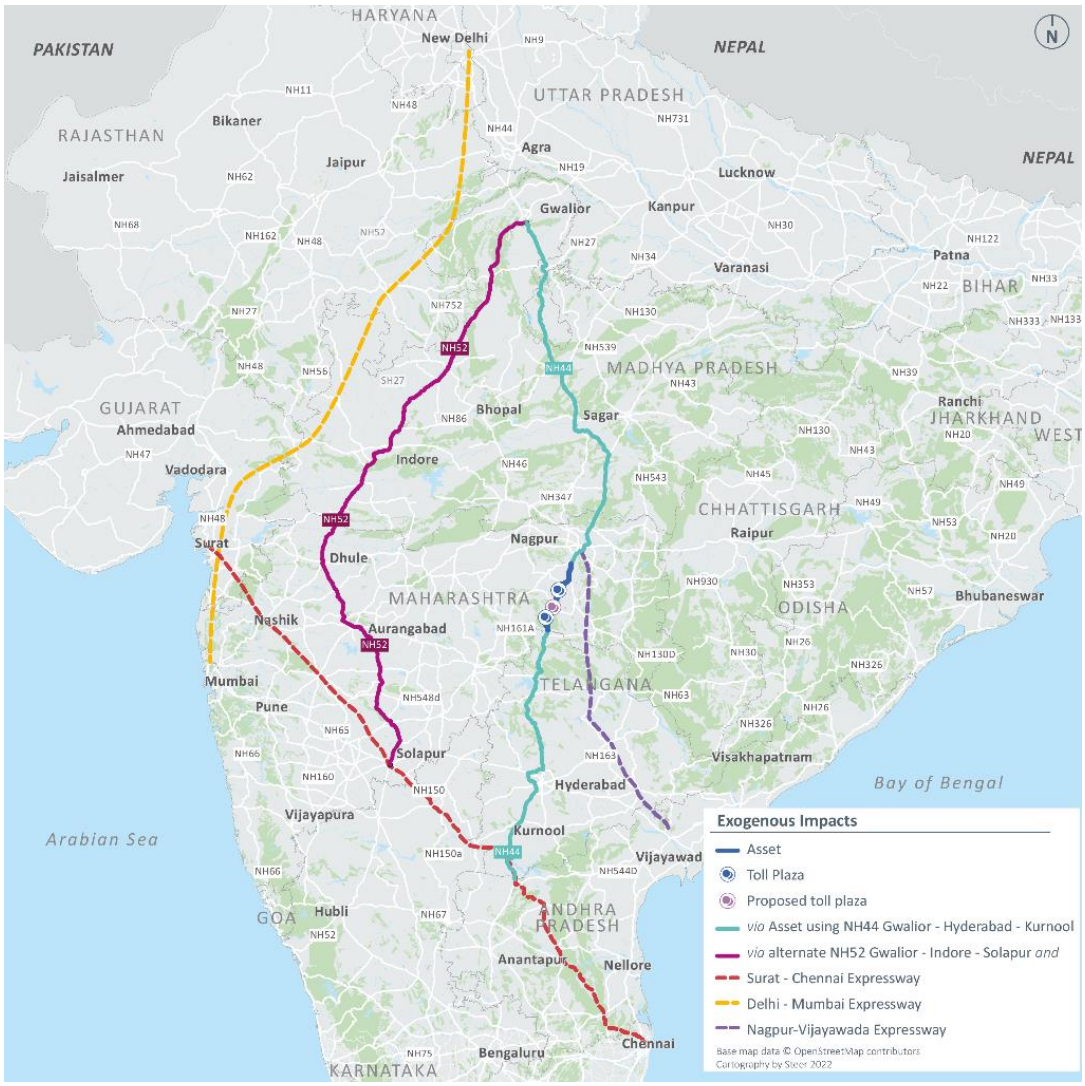
Table 6.7: Summary of impact

Impact	Toll plaza	Probability/Scale of impact	Year of impact	Impact (+/-)
Delhi Mumbai Expressway + Surat Chennai Expressway (long-distance alternate)	BK: Darodha, BK: Kelapur	High/low	FY28	-ve
Nagpur Vijayawada Expressway	BK: Darodha, BK: Kelapur	High/medium	FY27	-ve

Source: Steer analysis of OD data

6.19 The network context in which these upgrades are planned can be analysed in conjunction with the network map below.

Figure 6.3: Asset route shown against the regional network context



Source: Steer analysis and cartography

6.20 The subsections below include a narrative of each of the improvements, and impacts associated from each of these on our traffic forecasts. Please note that all traffic volumes for impacts were estimated as impact rates applied on FY23 normalised AADT.

6.21 *Delhi Mumbai Expressway + Surat Chennai Expressway (DME +SCE)*

6.22 There are currently two key options for north south traffic movement between Delhi/north and Kurnool/south via Gwalior:

- using NH19/NH44 via Delhi-Agra-Gwalior-Sagar-Nagpur-Hyderabad-asset-Kurnool-Karnataka/Chennai
- using NH19/NH44/NH52 via Delhi-Agra-Gwalior-Indore-Dhule-Aurangabad-Solapur-Kurnool-Karnataka/Chennai.

6.23 Currently, the trucks are using NH44 corridor as it is cheaper and shorter for north-south movement. The proposed upgrades on NH52 coupled with upcoming Delhi-Mumbai Expressway (DME) and Surat-Solapur-Chennai Expressway (SCE) will improve the alternate route's overall attractiveness as long-distance corridor for traffic moving north and south.

6.24 The in-scope traffic includes all the trips with origins and destinations in Gwalior/north and Kurnool/south currently moving on the Asset.

6.25 The following are the proposed road developments that will together act as a competing route for long distance traffic:

- Delhi-Mumbai Expressway (FY24)
- 4-laning of Dhule – Chalisgaon section (including Autram tunnel upgrade) + Solapur – Vijaypura upgradation (NH52) (FY27-FY28)
- Surat – Kurnool – Chennai Expressway (FY27)

6.26 The users travelling from Delhi/north to Kurnool/south will have the option to divert to DME at Delhi instead of taking NH44/NH52. The users can then exit from DME at Indore where they can travel till Solapur on an upgraded 4-lane highway (NH52). At Solapur, the users can divert on the upcoming SCE to reach Kurnool. Hence, the route via DME-NH52-SCE, which will be a mix of expressways and upgraded NH, will act as a competing route for the Asset.

6.27 We have assumed the diversion of traffic to being from FY27 in a phased manner.

Table 6.8: Impact of DME+SCE

Impact	2A	3A	MAV
Darodha	(4.1%)	(0.8%)	(3.1%)
Kelapur	(3.9%)	(0.8%)	(3.1%)

Source: Steer Analysis, overall impact, the impact will be phased over 2 years (FY27:50%, FY28 onwards:100%)

Nagpur Vijayawada Expressway

6.28 The existing distance between Nagpur and Vijayawada using Asset is 773 kms which will get reduced to 596 kms after the expressway comes. The existing shortest route between Nagpur and Chennai makes a choice at Hyderabad to reach Chennai via Nagpur-Hyderabad-NAMEL-Ongole-Chennai or via Nagpur-Hyderabad-Kurnool-Tirupati-Chennai. The expressway will add another choice for the long-distance traffic at Nagpur.

6.29 Surat Chennai expressway section (Nadyal-Chennai) coupled with upgradation on NH167 (Hyderabad – Nandyal) will result in an overall improvement in the attractiveness of the Nagpur-Hyderabad-Kurnool-Tirupati-Chennai route.

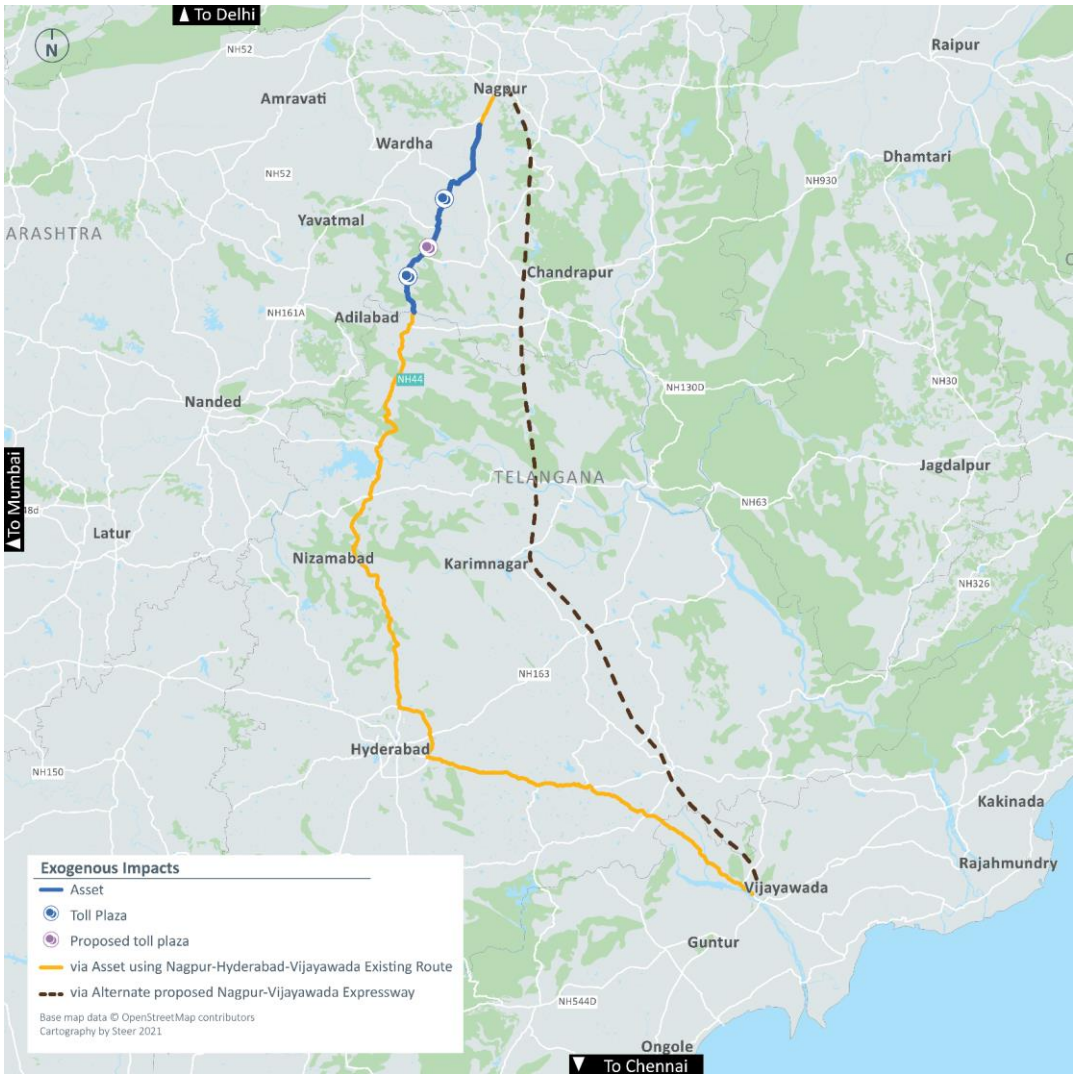
6.30 The proposed expressway between Nagpur and Vijayawada would establish another competing route for long-distance traffic moving between Nagpur/north and Vijayawada/south and the same will be the in-scope traffic moving on the Asset. The staged impact for this has been assumed starting FY28.

Table 6.9: impact of Nagpur Vijayawada Expressway

Impact	LCV	2A	3A	MAV
Darodha	(3.7%)	(6.3%)	(5.2%)	(5.2%)
Kelapur	(4.0%)	(5.9%)	(5.2%)	(5.1%)

Source: Steer Analysis, overall impact, the impact will be phased over 3 years (FY28:50%, FY29:75%, FY30

Figure 6.4: Nagpur Vijayawada Expressway alignment



Source: Steer cartography

Revenue Forecasting Assumptions

6.31 To forecast the revenues for a particular financial year, the traffic forecast for each vehicle type is converted into tickets sold, which is then multiplied with the corresponding toll rate, which grows over the years as defined in the Concession Agreement. While “trip factors” provide the conversion factor to the former, i.e., traffic (trips) to tickets sold, “toll segmentation” provides the latter i.e., the breakup of trips paying each ticket type. This section discusses assumptions related to trip factors, and toll rates for the forecast period.

Trip factors

6.32 As discussed in chapter 3, a user can by different type of tickets to pay toll depending on the vehicle type. Apart from the single trips, trips such as return, monthly, local commercial, local personal, are discounted tickets that are offered to the users. The revenue realised from these discounted trips is lower than a single trip fare. Therefore, in order to calculate the revenue for the trips made on discounted tickets (or passes) a trip factor is applied to calculate revenue realised from that particular pass sold.

6.33 The following trip factors are assumed for both the Asset.

Table 6.10: Trip factors for the forecast years

Ticket category	CJV	LCV	Bus	2A	3A	MAV	OSV
Single	1	1	1	1	1	1	1
Return	2	2	2	2	2	2	2
Monthly	45	45	45	45	45	45	45
Local Commercial	1	1	1	1	1	1	1
Local Personal	45	45	45	45	45	45	45
Exemptions	1	1	1	1	1	1	1
Violations	1	1	1	1	1	1	1

Source: Steer analysis of toll plaza data

Toll evolution

6.34 Based on the concession agreement and the gazetted toll notification, we see that base toll rates increase every year on 1st April based on WPI-linked inflation (December print of previous FY) to provide us unrounded toll rates. These are rounded up to the nearest five to estimate the rounded toll rates charged to the road user. We have used actual toll rates of FY23 toll notifications to validate the modelling of toll evolution. These toll lengths are presented in the table below:

Table 6.11: Tolling lengths for toll evolution assumed- AB

Length (km)	Raibha	
	Existing toll lengths	**Revised toll lengths (FY23 onwards)**
Road length excluding bypass	-	-
Structure on road	0.805	0.656
Converted length of structures	8.054	6.558
Net Tollable length	8.054	6.558
Bypass length	31.999	32.144

Source: Steer analysis of toll notifications and concession agreement (CA) and information shared with Client

Table 6.12: Tolling lengths for toll evolution assumed - BK

Length (km)	Darodha		Kelapur	
	During construction (FY23-25)	**Post construction (FY26 onwards)**	**Existing location**	**New location**
Road length excluding bypass	66.60260	66.5910	69.6494	69.6494
Structure on road	1.34740	1.3590	0.5506	0.5506
Converted length of structures	13.4740	13.5900	5.5060	5.5060
Net Tollable length	80.0766	80.1810	75.1554	75.1554

Source: Steer analysis of toll notifications and concession agreement (CA)

6.35 The change in Darodha's tolling length is due to reconstruction of a major bridge on the Asset. As per our discussion with the Client as well as our review of available documents, it was found out that the construction has to be completed within 18 months of the appointed date. Hence, we have assumed the post-construction tolling length of 80.1810 km for Darodha FY25 onwards.

6.36 Increase in WPI was calculated based on the WPI numbers are based on the latest year number provided by RBI and forecast are based on the numbers estimated in annual report published by Consensus, as shown in the previous chapter

Traffic and Revenue forecasts

PCU factor assumption for forecasts

6.37 The PCU factors considered are given in the table below. These are derived from IRC: 16-1990 code. In case of MAVs, rigid trailer split based PCU has been assumed for PCU calculation. There is reasonable precedence to use this now and we believe this factor (3.62) instead of 4.5 should be used for PCU calculation for MAV in the model. This factor assumes 3.0 PCU for Rigid MAV trucks and 4.5 for Trailer MAV trucks. The splits for the same have been derived from the TVC counts that we have undertaken.

Table 6.13: PCU factors

Vehicle Category	PCU Factor
CJV	1.0
LCV	1.5
Bus	3.0
2A	3.0
3A	3.0
MAV	4.5
OSV	4.5

Source: Steer analysis, IRC Codes

6.38 Based on the traffic and revenue-related forecast assumptions discussed above, we have modelled the traffic and revenue forecasts for the forecast period for the Asset. The table below presents the traffic and revenue forecast growth rates and CAGRs on this Asset. Further, Appendix B presents the AADT and revenues for the forecast period.

AB - Raibha

Table 6.14: Final (background plus impacts) AADT forecast – AB Raibha

Vehicle Type	FY23	FY25	FY30	FY35	FY40	FY43
CJV	2,263	2,548	3,455	4,601	5,977	6,897
Mini LCV	194	203	230	259	288	305
Bus	32	66	71	77	82	85
LCV	480	471	529	594	661	700
2A	2,116	2,089	2,606	3,086	3,603	3,923
3A	1,927	1,938	2,504	3,133	3,847	4,307
MAV	3,342	3,303	4,621	6,106	7,883	9,071

Vehicle Type	FY23	FY25	FY30	FY35	FY40	FY43
OSV	3	4	5	6	7	8
AADT	**10,357**	**10,622**	**14,020**	**17,861**	**22,347**	**25,296**
PCU's	**30,455**	**30,617**	**40,834**	**52,140**	**65,356**	**74,055**

Source: Steer analysis

Table 6.15: Final (background plus impacts) AADT CAGR (%) – AB Raibha

Vehicle Type	FY23-FY25	FY25-FY30	FY30-FY35	FY35-FY40	FY40-FY43	FY23-FY43
CJV	6.1%	6.3%	5.9%	5.4%	4.9%	5.7%
Mini LCV	2.4%	2.5%	2.4%	2.1%	2.0%	2.3%
Bus	43.6%	1.6%	1.5%	1.3%	1.2%	5.0%
LCV	(1.0%)	2.4%	2.4%	2.1%	2.0%	1.9%
2A	(0.6%)	4.5%	3.4%	3.1%	2.9%	3.1%
3A	0.3%	5.3%	4.6%	4.2%	3.8%	4.1%
MAV	(0.6%)	6.9%	5.7%	5.2%	4.8%	5.1%
OSV	5.3%	5.5%	5.2%	4.7%	4.3%	5.0%
AADT	**1.3%**	**5.7%**	**5.0%**	**4.6%**	**4.2%**	**4.6%**
PCU's	**0.3%**	**5.9%**	**5.0%**	**4.6%**	**4.3%**	**4.5%**

Source: Steer analysis

Table 6.16: Final (background plus impacts) revenue (INR crores) forecast – AB Raibha

Vehicle Type	FY23	FY25	FY30	FY35	FY40	FY43
CJV	5	6	11	18	29	39
Mini LCV	0	1	1	1	1	2
Bus	0	1	1	1	2	2
LCV	2	2	3	4	6	7
2A	17	20	31	47	69	87
3A	19	22	35	55	86	111
MAV	47	52	91	152	248	327
OSV	0.0	0.1	0.1	0.2	0.2	0.3
Total Revenue	**90**	**104**	**172**	**278**	**441**	**574**

Source: Steer analysis

Table 6.17: Final (background plus impacts) revenue CAGR (%) – AB Raibha

Vehicle Type	FY23-FY25	FY25-FY30	FY30-FY35	FY35-FY40	FY40-FY43	FY23-FY43
CJV	14.8%	11.1%	11.2%	10.4%	9.8%	11.1%
Mini LCV	13.9%	7.2%	7.4%	7.0%	6.7%	7.8%
Bus	53.3%	6.1%	6.4%	6.3%	5.9%	10.2%
LCV	7.3%	7.1%	7.3%	6.9%	6.7%	7.1%
2A	8.5%	9.2%	8.5%	8.2%	7.6%	8.5%
3A	7.3%	9.9%	9.5%	9.3%	8.8%	9.2%

Vehicle Type	FY23-FY25	FY25-FY30	FY30-FY35	FY35-FY40	FY40-FY43	FY23-FY43
MAV	6.1%	11.7%	10.7%	10.3%	9.7%	10.2%
OSV	12.7%	10.0%	10.2%	9.8%	9.1%	10.1%
Total Revenue	**7.5%**	**10.7%**	**10.0%**	**9.7%**	**9.2%**	**9.7%**

Source: Steer analysis

6.39 It should be noted that we have used bypass length of 32.144 km and tolling length of 6.558 km FY23 onwards as specified in the Schedule M provided during TOT6 bid.

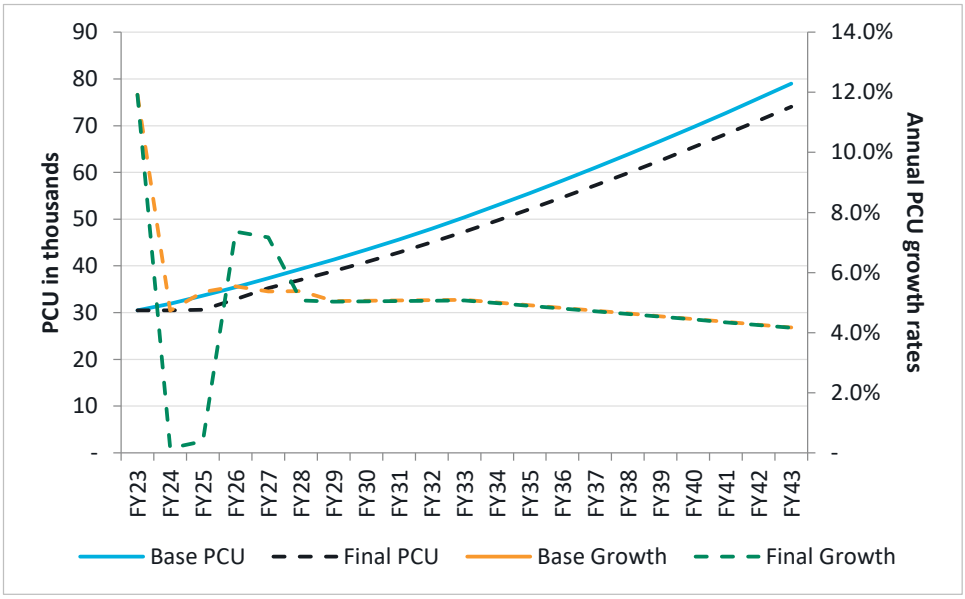
Table 6.18: AB - Raibha: revenue growth wrt tolling length revision

Agra Bypass – Raibha	FY22	FY23	FY24	FY25	CAGR FY23-25
Revenue (with tolling length amendment)	77	90	99	104	10.4%
Revenue (without tolling length amendment)	77	92	102	106	11.2%

Source: Steer analysis

6.40 The growth rates and PCU projections are presented in the chart below:

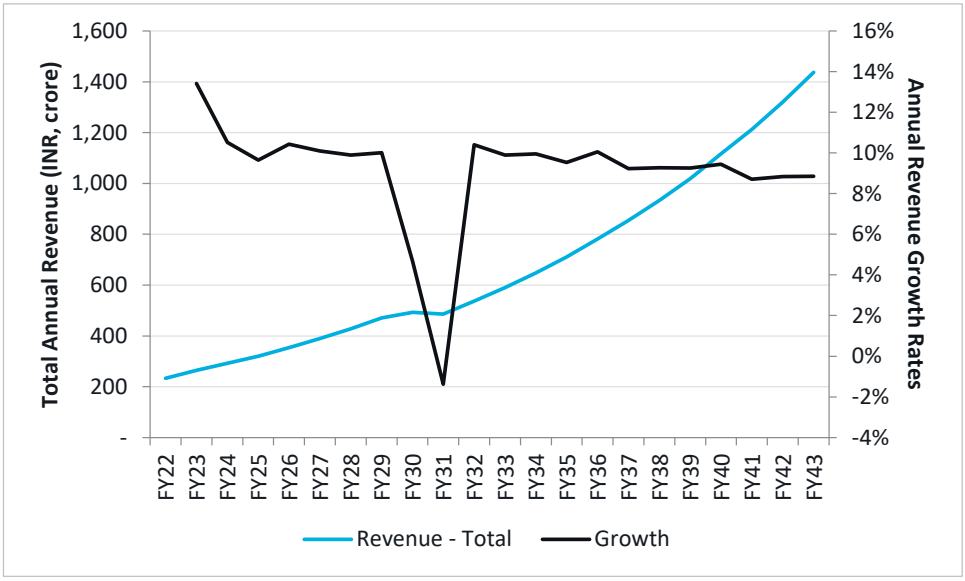
Figure 6.5: PCU growth rates (Base and Final)- AB: Raibha



Source: Steer analysis

6.41 Annual revenue and associated growth rates are presented in the chart below.

Figure 6.6: Revenue Estimates (INR Crore) and growth rates- AB: Raibha



Source: Steer analysis

BK - Darodha

Table 6.19: Final (background plus impacts) AADT forecast – BK - Darodha

Vehicle Type	FY23	FY25	FY30	FY35	FY40	FY43
CJV	1,970	2,207	2,966	3,920	5,061	5,824
Mini LCV	466	497	584	678	774	832
Bus	442	471	531	616	703	755
LCV	194	201	222	243	263	275
2A	1,434	1,536	1,646	1,949	2,276	2,478
3A	1,450	1,572	1,820	2,216	2,653	2,929
MAV	1,892	2,120	2,611	3,450	4,454	5,126
OSV	1	2	2	3	3	4
AADT	**7,850**	**8,605**	**10,382**	**13,074**	**16,187**	**18,223**
PCU	**20,855**	**22,883**	**27,169**	**34,282**	**42,523**	**47,918**

Source: Steer analysis

Table 6.20: Final (background plus impacts) AADT CAGR (%) – BK Darodha

Vehicle Type	FY23-FY25	FY25-FY30	FY30-FY35	FY35-FY40	FY40-FY43	FY23-FY43
CJV	5.9%	6.1%	5.7%	5.2%	4.8%	5.6%
Mini LCV	3.2%	3.3%	3.0%	2.7%	2.4%	2.9%
Bus	3.2%	2.5%	3.0%	2.7%	2.4%	2.7%
LCV	1.9%	2.0%	1.8%	1.6%	1.5%	1.8%
2A	3.5%	1.4%	3.4%	3.1%	2.9%	2.8%
3A	4.1%	3.0%	4.0%	3.7%	3.4%	3.6%
MAV	5.8%	4.3%	5.7%	5.2%	4.8%	5.1%
OSV	5.3%	5.5%	5.2%	4.7%	4.3%	5.0%

Vehicle Type	FY23-FY25	FY25-FY30	FY30-FY35	FY35-FY40	FY40-FY43	FY23-FY43
AADT	**4.7%**	**3.8%**	**4.7%**	**4.4%**	**4.0%**	**4.3%**
PCU's	**4.8%**	**3.5%**	**4.8%**	**4.4%**	**4.1%**	**4.2%**

Source: Steer analysis

Table 6.21: Final (background plus impacts) revenue (INR crores) forecast – BK Darodha

Vehicle Type	FY23	FY25	FY30	FY35	FY40	FY43
CJV	5	7	11	18	30	39
Mini LCV	1	1	2	3	5	6
Bus	2	3	4	6	9	11
LCV	2	3	4	5	7	9
2A	18	22	29	44	65	81
3A	21	26	37	57	87	110
MAV	40	51	77	129	211	278
OSV	0	0	0	0	0	0
Total Revenue	**89**	**112**	**165**	**263**	**413**	**534**

Source: Steer analysis

Table 6.22: Final (background plus impacts) revenue CAGR (%) – BK Darodha

Vehicle Type	FY23-FY25	FY25-FY30	FY30-FY35	FY35-FY40	FY40-FY43	FY23-FY43
CJV	17.1%	10.8%	10.7%	10.4%	9.9%	11.1%
Mini LCV	14.2%	7.8%	7.9%	7.7%	7.4%	8.4%
Bus	11.7%	7.1%	7.8%	7.8%	6.9%	7.9%
LCV	8.6%	6.4%	6.8%	6.6%	6.2%	6.7%
2A	11.8%	5.8%	8.5%	8.2%	7.7%	7.9%
3A	11.6%	7.5%	9.0%	8.7%	8.1%	8.7%
MAV	12.9%	8.9%	10.8%	10.3%	9.7%	10.2%
OSV	12.5%	10.0%	10.2%	9.8%	9.2%	10.1%
Total Revenue	**12.5%**	**8.0%**	**9.8%**	**9.5%**	**8.9%**	**9.4%**

Source: Steer analysis

6.42 It should be noted that we have used tolling length of 80.0766 km for FY23-24 (during construction) period and 80.1810 km FY25 onwards (post construction) as specified in the Schedule M provided during TOT8 bid.

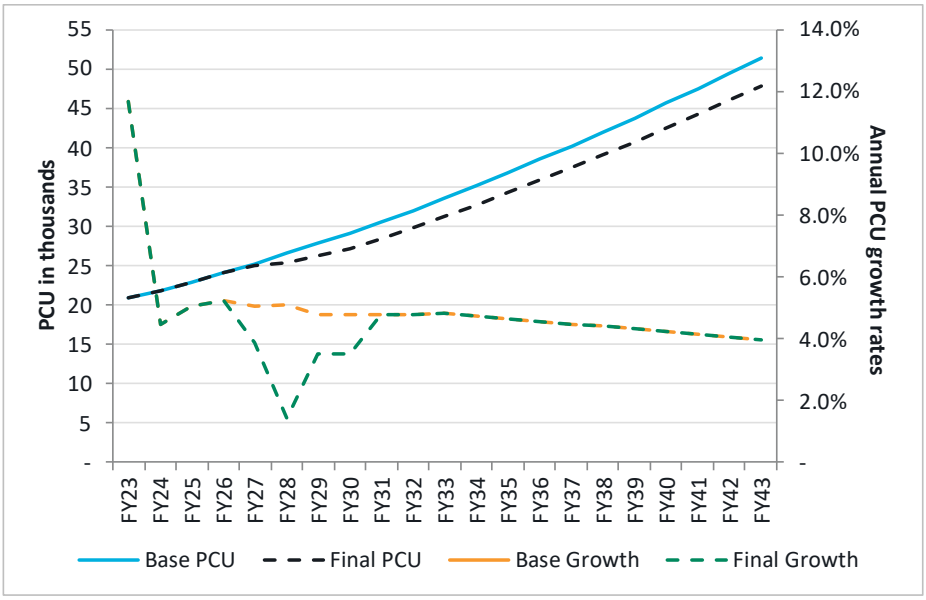
Table 6.23: BK – Darodha: revenue growth wrt tolling length revision

Daroda toll plaza	FY22	FY23	FY24	FY25	CAGR FY23-25
Revenue (with tolling length amendment)	69	89	102	112	17.5%
Revenue (without tolling length amendment)	69	82	95	104	14.6%

Source: Steer analysis

6.43 The growth rates and PCU projections are presented in the chart below:

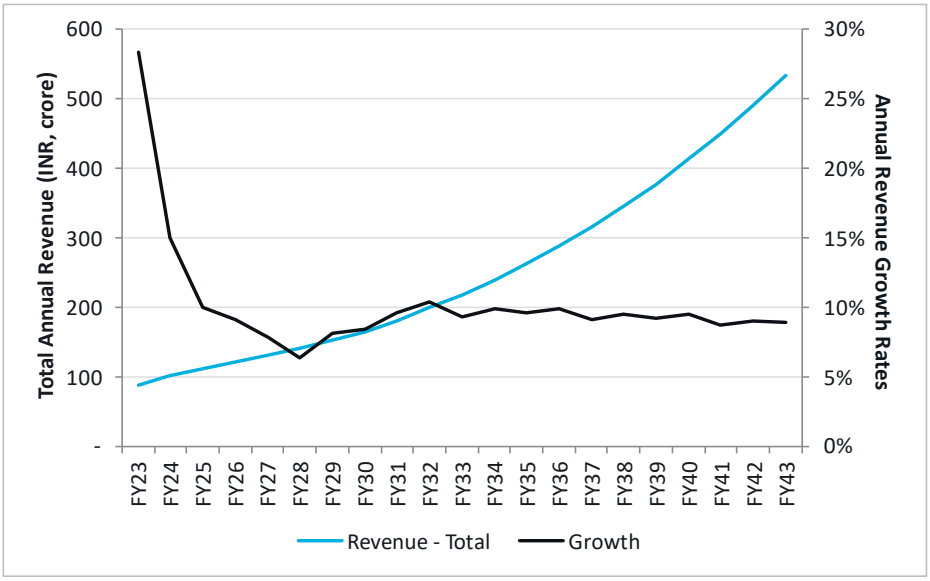
Figure 6.7: PCU growth rates (Base and Final)- BK: Darodha



Source: Steer analysis

6.44 Annual revenue and associated growth rates are presented in the chart below.

Figure 6.8: Revenue Estimates (INR Crore) and growth rates- BK: Darodha



Source: Steer analysis

BK – Kelapur (existing location)

Table 6.24: Final (background plus impacts) AADT forecast – BK - Kelapur

Vehicle Type	FY23	FY25	FY30	FY35	FY40	FY43
CJV	1,404	1,573	2,114	2,794	3,607	4,151
Mini LCV	457	487	573	665	759	816
Bus	408	434	489	566	646	695
LCV	246	256	282	308	334	349

Vehicle Type	FY23	FY25	FY30	FY35	FY40	FY43
2A	1,470	1,575	1,698	2,011	2,348	2,557
3A	1,454	1,576	1,826	2,223	2,661	2,938
MAV	1,941	2,174	2,681	3,542	4,573	5,263
OSV	1	2	2	3	3	4
AADT	**7,382**	**8,077**	**9,664**	**12,112**	**14,933**	**16,773**
PCU	**20,725**	**22,722**	**26,910**	**33,888**	**41,962**	**47,242**

Source: Steer analysis

Table 6.25: Final (background plus impacts) AADT CAGR (%) – BK Kelapur

Vehicle Type	FY23-FY25	FY25-FY30	FY30-FY35	FY35-FY40	FY40-FY43	FY23-FY43
CJV	5.9%	6.1%	5.7%	5.2%	4.8%	5.6%
Mini LCV	3.2%	3.3%	3.0%	2.7%	2.4%	2.9%
Bus	3.2%	2.4%	3.0%	2.7%	2.4%	2.7%
LCV	1.9%	2.0%	1.8%	1.6%	1.5%	1.8%
2A	3.5%	1.5%	3.4%	3.1%	2.9%	2.8%
3A	4.1%	3.0%	4.0%	3.7%	3.4%	3.6%
MAV	**5.8%**	**4.3%**	**5.7%**	**5.2%**	**4.8%**	5.1%
OSV	**5.3%**	**5.5%**	**5.2%**	**4.7%**	**4.3%**	5.0%
AADT	**4.6%**	**3.7%**	**4.6%**	**4.3%**	**3.9%**	**4.2%**
PCU's	**4.7%**	**3.4%**	**4.7%**	**4.4%**	**4.0%**	**4.2%**

Source: Steer analysis

Table 6.26: Final (background plus impacts) revenue (INR crores) forecast – BK Kelapur

Vehicle Type	FY23	FY25	FY30	FY35	FY40	FY43
CJV	3	4	6	10	17	22
Mini LCV	1	1	2	2	4	4
Bus	2	3	4	5	8	10
LCV	3	3	4	6	8	10
2A	16	20	27	40	59	74
3A	20	24	35	54	81	103
MAV	38	48	74	124	202	266
OSV	0	0	0	0	0	0
Total Revenue	**83**	**103**	**152**	**241**	**379**	**489**

Source: Steer analysis

Table 6.27: Final (background plus impacts) revenue CAGR (%) – BK Kelapur

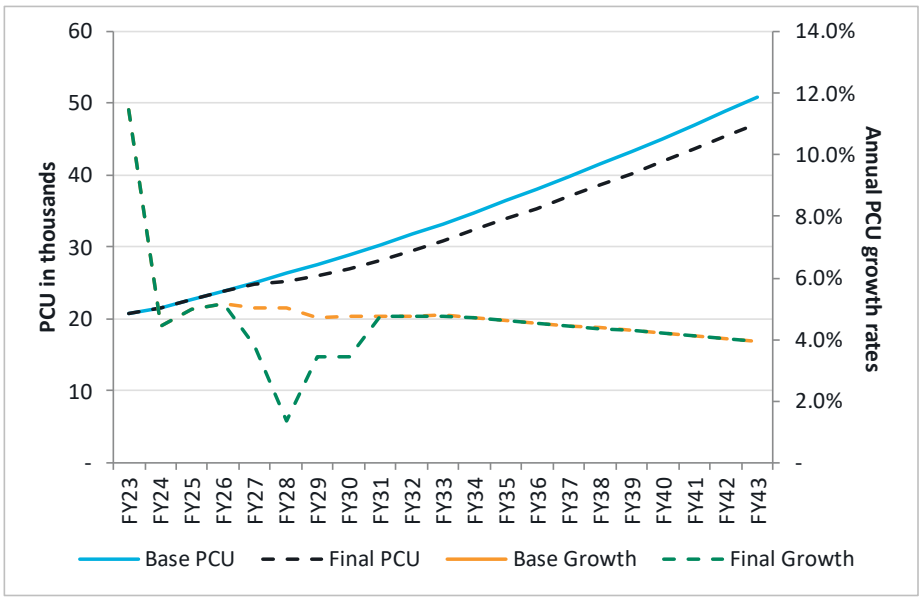
Vehicle Type	FY23-FY25	FY25-FY30	FY30-FY35	FY35-FY40	FY40-FY43	FY23-FY43
CJV	13.7%	11.0%	10.5%	10.5%	9.3%	10.8%
Mini LCV	10.9%	8.1%	7.6%	7.8%	6.8%	8.0%
Bus	9.3%	6.9%	7.9%	7.8%	7.2%	7.7%

Vehicle Type	FY23-FY25	FY25-FY30	FY30-FY35	FY35-FY40	FY40-FY43	FY23-FY43
LCV	9.1%	6.5%	6.6%	6.5%	6.2%	6.7%
2A	10.8%	6.0%	8.3%	8.1%	7.7%	7.8%
3A	10.8%	7.6%	8.8%	8.7%	8.3%	8.6%
MAV	13.0%	9.0%	10.8%	10.3%	9.7%	10.3%
OSV	12.3%	10.1%	10.1%	9.8%	9.2%	10.1%
Total Revenue	**11.8%**	**8.0%**	**9.7%**	**9.4%**	**8.9%**	**9.3%**

Source: Steer analysis

6.45 The growth rates and PCU projections are presented in the chart below:

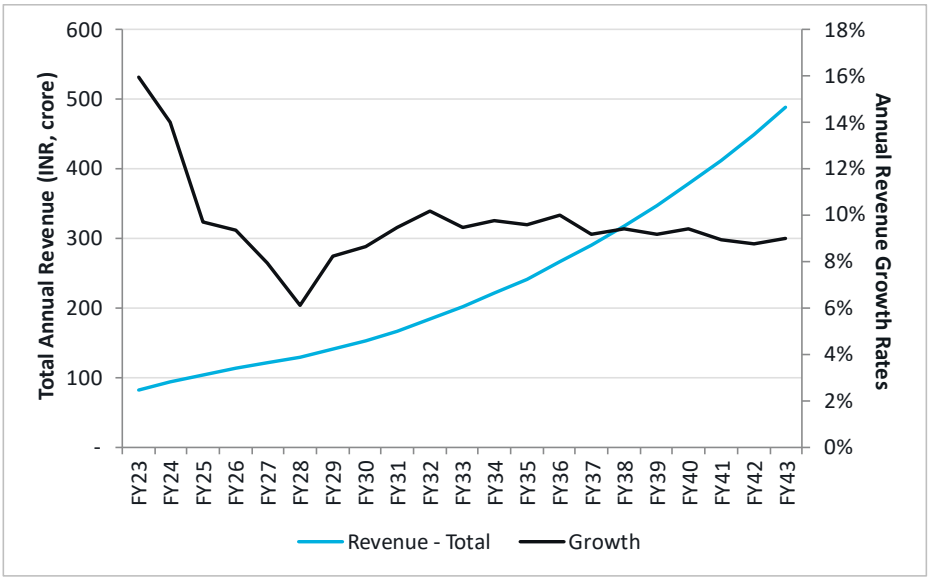
Figure 6.9: PCU growth rates (Base and Final)- BK: Kelapur



Source: Steer analysis

6.46 Annual revenue and associated growth rates are presented in the chart below.

Figure 6.10: Revenue Estimates (INR Crore) and growth rates- BK: Kelapur



Source: Steer analysis

BK – Kelapur (new location)

Table 6.28: Final (background plus impacts) AADT forecast – BK – Kelapur (new)

Vehicle Type	FY23	FY25	FY30	FY35	FY40	FY43
CJV	1,366	1,530	2,056	2,717	3,508	4,037
Mini LCV	496	528	621	721	823	885
Bus	408	434	489	566	646	695
LCV	246	256	282	308	334	349
2A	1,470	1,575	1,698	2,011	2,348	2,557
3A	1,435	1,555	1,801	2,193	2,626	2,899
MAV	1,882	2,108	2,600	3,435	4,435	5,104
OSV	1	2	2	3	3	4
AADT	**7,304**	**7,988**	**9,549**	**11,955**	**14,724**	**16,529**
PCU	**20,402**	**22,361**	**26,462**	**33,296**	**41,197**	**46,362**

Source: Steer analysis

Table 6.29: Final (background plus impacts) AADT CAGR (%) – BK Kelapur (new)

Vehicle Type	FY23-FY25	FY25-FY30	FY30-FY35	FY35-FY40	FY40-FY43	FY23-FY43
CJV	5.9%	6.1%	5.7%	5.2%	4.8%	5.6%
Mini LCV	3.2%	3.3%	3.0%	2.7%	2.4%	2.9%
Bus	3.2%	2.4%	3.0%	2.7%	2.4%	2.7%
LCV	1.9%	2.0%	1.8%	1.6%	1.5%	1.8%
2A	3.5%	1.5%	3.4%	3.1%	2.9%	2.8%
3A	4.1%	3.0%	4.0%	3.7%	3.4%	3.6%
MAV	5.8%	4.3%	5.7%	5.2%	4.8%	5.1%
OSV	5.3%	5.5%	5.2%	4.7%	4.3%	5.0%

Vehicle Type	FY23-FY25	FY25-FY30	FY30-FY35	FY35-FY40	FY40-FY43	FY23-FY43
AADT	**4.6%**	**3.6%**	**4.6%**	**4.3%**	**3.9%**	**4.2%**
PCU's	**4.7%**	**3.4%**	**4.7%**	**4.4%**	**4.0%**	**4.2%**

Source: Steer analysis

Table 6.30: Final (background plus impacts) revenue (INR crores) forecast – BK Kelapur (new)

Vehicle Type	FY23	FY25	FY30	FY35	FY40	FY43
CJV	3	4	7	11	18	24
Mini LCV	1	1	2	3	4	5
Bus	2	3	4	6	8	10
LCV	3	3	5	6	9	10
2A	17	21	28	42	63	78
3A	20	24	35	54	81	103
MAV	37	47	73	121	198	261
OSV	0	0	0	0	0	0
Total Revenue	**84**	**104**	**153**	**243**	**380**	**492**

Source: Steer analysis

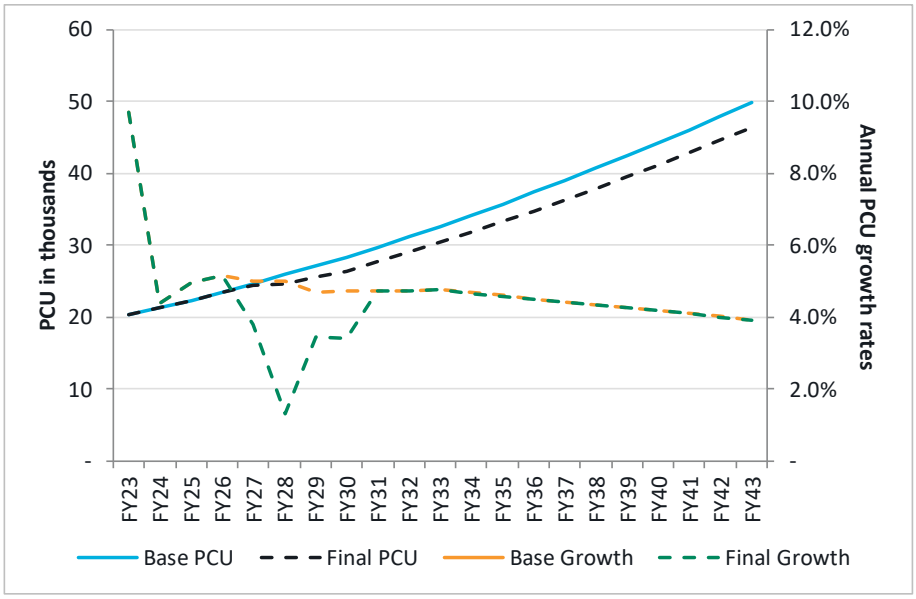
Table 6.31: Final (background plus impacts) revenue CAGR (%) – BK Kelapur (new)

Vehicle Type	FY23-FY25	FY25-FY30	FY30-FY35	FY35-FY40	FY40-FY43	FY23-FY43
CJV	13.3%	11.0%	11.0%	10.0%	9.8%	10.8%
Mini LCV	10.4%	8.0%	8.2%	7.4%	7.3%	8.0%
Bus	10.5%	6.9%	7.8%	7.8%	7.1%	7.7%
LCV	9.0%	6.5%	6.7%	6.4%	6.3%	6.8%
2A	10.7%	6.0%	8.4%	8.1%	7.8%	7.8%
3A	10.7%	7.6%	9.0%	8.6%	8.3%	8.6%
MAV	12.9%	8.9%	10.7%	10.3%	9.7%	10.2%
OSV	12.6%	10.1%	10.2%	9.8%	9.2%	10.1%
Total Revenue	**11.7%**	**8.0%**	**9.7%**	**9.4%**	**9.0%**	**9.3%**

Source: Steer analysis

6.47 The growth rates and PCU projections are presented in the chart below:

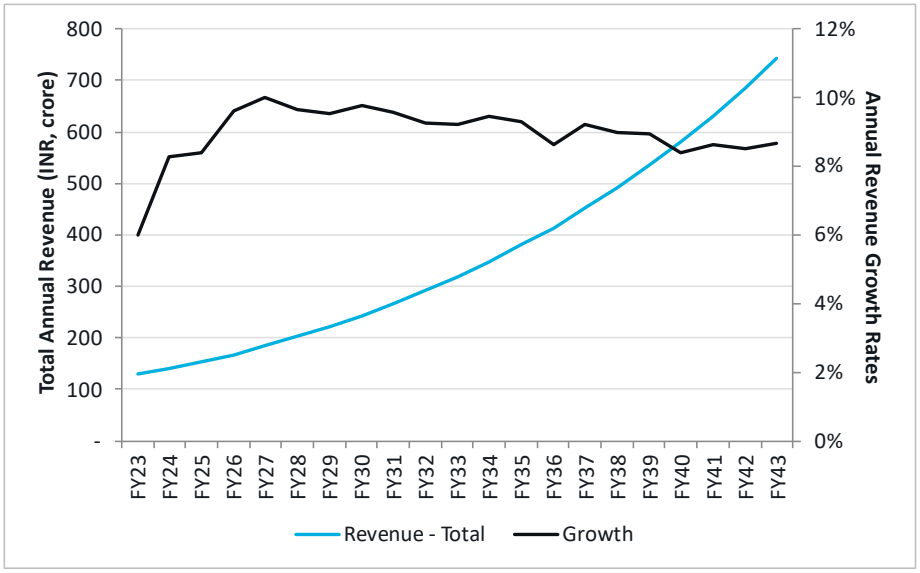
Figure 6.11: PCU growth rates (Base and Final)- BK: Kelapur (new)



Source: Steer analysis

6.48 Annual revenue and associated growth rates are presented in the chart below.

Figure 6.12: Revenue Estimates (INR Crore) and growth rates- BK: Kelapur



Source: Steer analysis

6.49 The traffic and revenue forecast presented above are our base case scenario considering a balanced view on the risks associated with input assumptions around GDP growth and traffic growth elasticities. There is always a risk that the outturn values of these inputs will vary as compared to the assumptions taken due to exogenous impacts, e.g., GDP growth could be influenced both positively and negatively by the impact of monsoons, export-import balances, political changes etc.

6.50 Similarly, traffic growth elasticities could be influenced by increased efficiencies achieved by technology, large shifts in commodity prices globally, changes in local manufacturing practices.

However, at this stage we consider that the base case represents a central case scenario given the risks of variation of input assumptions.

Scenario analysis

6.51 We have developed our base case scenario considering a balanced view on the risks associated with input assumptions around GDP growth and traffic growth elasticities. There is always a risk that the outturn values of these inputs will vary as compared to the assumptions taken due to exogenous impacts, e.g. GDP growth could be influenced both positively and negatively by the impact of monsoons, export-import balances, political changes etc.

6.52 Similarly, traffic growth elasticities could be influenced by increased efficiencies achieved by technology, large shifts in commodity prices globally, changes in local manufacturing practices. However, at this stage we consider that the base case represents a central case scenario given the risks of variation of input assumptions.

6.53 To account for the possible variations in the growth drivers, we are also presenting the forecasts for an Upside (optimistic) and a Downside (pessimistic) scenario.

6.54 These scenarios are defined by the following variations from the base assumptions:

Table 6.32: Summary of upside and downside scenario assumptions--AB: Raibha

Input	Base	Steer scenarios	
		Upside	Downside
Macro assumptions			
GDP/GSDP	As provided in report	+1% every year	-1% every year
WPI	As provided in report	+1% every year	-1% every year
Elasticities	As provided in report	+ 10%	- 10%
Impacts			
DME	As provided in earlier section of the report	LCV: (3.6%) 2A: (8.1%) 3A: (6.3%) MAV: (7.4%)	LCV: (6.0%) 2A: (13.5%) 3A: (10.4%) MAV: (12.3%)
WDFC	As provided in earlier section of the report	LCV: (0.9%) 2A: (1.3%) 3A: (1.0%) MAV: (1.0%)	LCV: (1.5%) 2A: (2.2%) 3A: (1.6%) MAV: (1.7%)
Agra Bypass Diversion	As provided in earlier section of the report	LCV: (1.0%) 2A: (1.0%) 3A: (1.4%) MAV: (4.4%)	LCV: (1.7%) 2A: (1.6%) 3A: (2.3%) MAV: (7.3%)
Agra Bypass (city congestion)	As provided in earlier section of the report	2A:12.5% 3A: 6.3% MAV: 11.2%	2A:7.5% 3A: 3.8% MAV: 6.7%

Table 6.33: Summary of upside and downside scenario assumptions: BK: Darodha

Input	Base	Steer scenarios	
		Upside	Downside
Macro assumptions			
GDP/GSDP	As provided in report	+1% every year	-1% every year

Input	Base	Steer scenarios	
		Upside	Downside
WPI	As provided in report	+1% every year	-1% every year
Elasticities	As provided in report	+ 10%	- 10%
Impacts			
DME + SCE	As provided in report	2A: (3.1%) 3A: (0.6%) MAV: (2.3%)	2A: (5.2%) 3A: (1.0%) MAV: (3.9%)
Nagpur Vijayawada expressway	As provided in report	LCV: (2.8%) 2A: (4.7%) 3A: (3.9%) MAV:(3.9%)	LCV: (4.6%) 2A: (7.9%) 3A: (6.5%) MAV:(6.5%)

Table 6.34: Summary of upside and downside scenario assumptions: BK: Kelapur and Kelapur (new)

Input	Base	Steer scenarios	
		Upside	Downside
Macro assumptions			
GDP/GSDP	As provided in report	+1% every year	-1% every year
WPI	As provided in report	+1% every year	-1% every year
Elasticities	As provided in report	+ 10%	- 10%
Impacts			
DME + SCE	As provided in report	2A: (2.9%) 3A: (0.6%) MAV: (2.3%)	2A: (4.9%) 3A: (1.0%) MAV: (3.9%)
Nagpur Vijayawada expressway	As provided in report	LCV: (3.0%) 2A: (4.5%) 3A: (3.9%) MAV:(3.8%)	LCV: (5.1%) 2A: (7.4%) 3A: (6.5%) MAV:(6.4%)

6.55 The traffic forecast and growth, and revenue incorporating the upside and downside assumptions are presented in the following sections.

Agra Bypass

Upside case

Table 6.35: Final traffic forecasts: Upside case-AB: Raibha

Vehicle Type	FY23	FY25	FY30	FY35	FY40	FY43
CJV	2,263	2,628	3,863	5,568	7,812	9,430
Mini LCV	194	206	241	280	321	347
Bus	32	67	73	81	88	92
LCV	480	490	565	656	753	813
2A	2,116	2,110	2,963	3,682	4,506	5,043
3A	1,927	2,020	2,859	3,812	4,981	5,782
MAV	3,342	3,559	5,526	7,898	11,008	13,250

Vehicle Type	FY23	FY25	FY30	FY35	FY40	FY43
OSV	3	4	5	7	9	11
AADT	**10,357**	**11,082**	**16,094**	**21,984**	**29,478**	**34,768**
PCU	**30,455**	**32,188**	**47,524**	**65,130**	**87,564**	**103,421**

Table 6-36: Traffic growth rates (%): Upside case-AB: Raibha

Vehicle Type	FY23-FY25	FY25-FY30	FY30-FY35	FY35-FY40	FY40-FY43	FY23-FY43
CJV	7.7%	8.0%	7.6%	7.0%	6.5%	7.4%
Mini LCV	3.1%	3.2%	3.0%	2.8%	2.6%	3.0%
Bus	44.2%	2.0%	1.9%	1.8%	1.6%	5.4%
LCV	1.0%	2.9%	3.0%	2.8%	2.6%	2.7%
2A	(0.1%)	7.0%	4.4%	4.1%	3.8%	4.4%
3A	2.4%	7.2%	5.9%	5.5%	5.1%	5.6%
MAV	3.2%	9.2%	7.4%	6.9%	6.4%	7.1%
OSV	6.7%	7.0%	6.7%	6.2%	5.7%	6.5%
AADT	**3.4%**	**7.7%**	**6.4%**	**6.0%**	**5.7%**	**6.2%**
PCU's	**2.8%**	**8.1%**	**6.5%**	**6.1%**	**5.7%**	**6.3%**

Table 6-37: Revenue (INR Crore) : Upside case-AB: Raibha

Vehicle Type	FY23	FY25	FY30	FY35	FY40	FY43
CJV	5	6	12	23	43	62
Mini LCV	0	1	1	1	2	2
Bus	0	1	1	1	2	2
LCV	2	2	3	5	7	9
2A	17	21	37	61	99	130
3A	19	23	42	73	127	173
MAV	47	58	115	216	395	560
OSV	0	0	0	0	0	0
Total Revenue	**91**	**111**	**212**	**381**	**675**	**939**

Table 6.38: Revenue growth rates (%): Upside case-AB: Raibha

Vehicle Type	FY23-FY25	FY25-FY30	FY30-FY35	FY35-FY40	FY40-FY43	FY23-FY43
CJV	17.3%	13.6%	13.8%	12.9%	12.6%	13.7%
Mini LCV	15.5%	8.5%	9.0%	8.5%	8.5%	9.3%
Bus	53.8%	7.4%	7.7%	7.5%	7.2%	11.4%
LCV	11.3%	8.2%	8.7%	8.7%	8.2%	8.8%
2A	8.9%	12.7%	10.4%	10.0%	9.5%	10.6%
3A	10.4%	12.6%	11.7%	11.5%	11.1%	11.7%
MAV	10.7%	14.8%	13.4%	12.9%	12.4%	13.2%
OSV	14.7%	12.4%	12.7%	12.3%	11.6%	12.5%
Total Revenue	**10.8%**	**13.7%**	**12.5%**	**12.1%**	**11.7%**	**12.4%**

Downside case

Table 6.39: Final traffic forecasts: Downside case-AB: Raibha

Vehicle Type	FY23	FY25	FY30	FY35	FY40	FY43
CJV	2,263	2,478	3,126	3,878	4,703	5,214
Mini LCV	194	201	221	241	261	272
Bus	32	65	69	73	77	79
LCV	480	457	497	543	587	612
2A	2,116	1,997	2,300	2,610	2,923	3,106
3A	1,927	1,847	2,209	2,612	3,036	3,292
MAV	3,342	3,086	3,889	4,790	5,777	6,389
OSV	3	3	4	5	6	7
AADT	**10,357**	**10,135**	**12,315**	**14,752**	**17,369**	**18,970**
PCU	**30,455**	**28,997**	**35,347**	**42,398**	**49,975**	**54,615**

Table 6-40: Traffic growth rates (%): Downside case-AB: Raibha

Vehicle Type	FY23-FY25	FY25-FY30	FY30-FY35	FY35-FY40	FY40-FY43	FY23-FY43
CJV	4.6%	4.8%	4.4%	3.9%	3.5%	4.3%
Mini LCV	1.9%	1.9%	1.8%	1.6%	1.4%	1.7%
Bus	43.1%	1.2%	1.1%	1.0%	0.9%	4.6%
LCV	(2.4%)	1.7%	1.8%	1.6%	1.4%	1.2%
2A	(2.8%)	2.9%	2.6%	2.3%	2.0%	1.9%
3A	(2.1%)	3.6%	3.4%	3.1%	2.7%	2.7%
MAV	(3.9%)	4.7%	4.3%	3.8%	3.4%	3.3%
OSV	4.0%	4.1%	3.8%	3.4%	3.1%	3.7%
AADT	**(1.1%)**	**4.0%**	**3.7%**	**3.3%**	**3.0%**	**3.1%**
PCU's	**(2.4%)**	**4.0%**	**3.7%**	**3.3%**	**3.0%**	**3.0%**

Table 6-41: Revenue (INR Crore) : Downside case-AB: Raibha

Vehicle Type	FY23	FY25	FY30	FY35	FY40	FY43
CJV	5	6	9	14	20	25
Mini LCV	0	1	1	1	1	1
Bus	0	1	1	1	1	1
LCV	2	2	3	3	4	5
2A	17	19	26	36	49	59
3A	19	21	29	42	60	72
MAV	46	48	73	110	160	198
OSV	0	0	0	0	0	0
Total Revenue	**90**	**97**	**141**	**207**	**297**	**362**

Table 6.42: Revenue growth rates (%): Downside case-AB: Raibha

Vehicle Type	FY23-FY25	FY25-FY30	FY30-FY35	FY35-FY40	FY40-FY43	FY23-FY43
CJV	13.2%	8.3%	8.5%	8.4%	7.1%	8.7%
Mini LCV	13.3%	5.4%	5.7%	6.0%	4.9%	6.3%
Bus	52.7%	4.8%	5.2%	4.9%	4.7%	8.9%
LCV	5.4%	5.3%	5.8%	5.9%	5.3%	5.6%
2A	6.0%	6.6%	6.7%	6.2%	5.9%	6.4%
3A	3.9%	7.4%	7.5%	7.1%	6.6%	6.9%
MAV	2.0%	8.5%	8.6%	7.9%	7.3%	7.5%
OSV	10.3%	8.0%	8.0%	7.5%	7.0%	7.9%
Total Revenue	**4.1%**	**7.8%**	**7.9%**	**7.4%**	**6.9%**	**7.2%**

BK: Darodha

Upside case

Table 6.43: Final traffic forecasts: Upside case- BK Darodha

Vehicle Type	FY23	FY25	FY30	FY35	FY40	FY43
CJV	1,970	2,276	3,312	4,735	6,600	7,944
Mini LCV	466	505	619	749	890	979
Bus	442	478	573	687	815	897
LCV	194	203	230	258	286	303
2A	1,434	1,565	1,836	2,253	2,757	3,086
3A	1,450	1,606	2,021	2,576	3,257	3,713
MAV	1,892	2,186	3,013	4,262	5,940	7,150
OSV	1	2	2	3	4	5
AADT	**7,850**	**8,821**	**11,606**	**15,523**	**20,550**	**24,077**
PCU	**20,855**	**23,465**	**30,619**	**40,968**	**54,365**	**63,771**

Table 6-44: Traffic growth rates (%): Upside case- BK Darodha

Vehicle Type	FY23-FY25	FY25-FY30	FY30-FY35	FY35-FY40	FY40-FY43	FY23-FY43
CJV	7.5%	7.8%	7.4%	6.9%	6.4%	7.2%
Mini LCV	4.1%	4.2%	3.9%	3.5%	3.2%	3.8%
Bus	4.0%	3.7%	3.7%	3.5%	3.2%	3.6%
LCV	2.4%	2.5%	2.3%	2.1%	1.9%	2.3%
2A	4.5%	3.2%	4.2%	4.1%	3.8%	3.9%
3A	5.2%	4.7%	5.0%	4.8%	4.5%	4.8%
MAV	7.5%	6.6%	7.2%	6.9%	6.4%	6.9%
OSV	6.7%	7.0%	6.7%	6.2%	5.7%	6.5%
AADT	**6.0%**	**5.6%**	**6.0%**	**5.8%**	**5.4%**	**5.8%**
PCU's	**6.1%**	**5.5%**	**6.0%**	**5.8%**	**5.5%**	**5.7%**

Table 6-45: Revenue (INR Crore) : Upside case- BK Darodha

Vehicle Type	FY23	FY25	FY30	FY35	FY40	FY43
CJV	5	7	13	24	44	62
Mini LCV	1	2	2	4	6	8
Bus	2	3	5	8	12	16
LCV	2	3	4	6	9	11
2A	18	23	34	55	90	118
3A	21	27	43	73	121	163
MAV	40	53	94	174	321	455
OSV	0	0	0	0	0	0
Total Revenue	**89**	**117**	**196**	**344**	**603**	**833**

Table 6.46: Revenue growth rates (%): Upside case- BK Darodha

Vehicle Type	FY23-FY25	FY25-FY30	FY30-FY35	FY35-FY40	FY40-FY43	FY23-FY43
CJV	19.7%	13.3%	13.7%	12.8%	12.3%	13.7%
Mini LCV	15.9%	9.5%	9.9%	9.3%	8.9%	10.1%
Bus	13.9%	8.8%	9.7%	9.5%	8.9%	9.7%
LCV	10.4%	7.7%	8.0%	8.0%	7.6%	8.1%
2A	14.2%	8.5%	9.9%	10.1%	9.6%	10.0%
3A	12.8%	10.2%	10.8%	10.8%	10.4%	10.8%
MAV	15.5%	12.1%	13.2%	13.0%	12.3%	13.0%
OSV	14.3%	12.6%	12.6%	12.2%	11.7%	12.5%
Total Revenue	**14.7%**	**10.8%**	**11.9%**	**11.9%**	**11.4%**	**11.8%**

Downside case

Table 6.47: Final traffic forecasts: Downside case- BK Darodha

Vehicle Type	FY23	FY25	FY30	FY35	FY40	FY43
CJV	1,970	2,147	2,686	3,310	3,992	4,415
Mini LCV	466	490	554	620	684	720
Bus	442	464	499	558	615	648
LCV	194	199	215	230	244	252
2A	1,434	1,511	1,504	1,707	1,911	2,031
3A	1,450	1,541	1,670	1,934	2,206	2,368
MAV	1,892	2,063	2,311	2,847	3,434	3,797
OSV	1	2	2	2	3	3
AADT	**7,850**	**8,416**	**9,441**	**11,207**	**13,088**	**14,234**
PCU	**20,855**	**22,376**	**24,564**	**29,200**	**34,145**	**37,161**

Table 6-48: Traffic growth rates (%): Downside case- BK Darodha

Vehicle Type	FY23-FY25	FY25-FY30	FY30-FY35	FY35-FY40	FY40-FY43	FY23-FY43
CJV	4.4%	4.6%	4.3%	3.8%	3.4%	4.1%
Mini LCV	2.5%	2.5%	2.3%	2.0%	1.7%	2.2%
Bus	2.4%	1.5%	2.2%	2.0%	1.7%	1.9%
LCV	1.5%	1.5%	1.4%	1.2%	1.0%	1.3%
2A	2.6%	(0.1%)	2.6%	2.3%	2.0%	1.8%
3A	3.1%	1.6%	3.0%	2.7%	2.4%	2.5%
MAV	4.4%	2.3%	4.3%	3.8%	3.4%	3.5%
OSV	4.0%	4.1%	3.8%	3.4%	3.1%	3.7%
AADT	**3.5%**	**2.3%**	**3.5%**	**3.2%**	**2.8%**	**3.0%**
PCU's	**3.6%**	**1.9%**	**3.5%**	**3.2%**	**2.9%**	**2.9%**

Table 6-49: Revenue (INR Crore) : Downside case- BK Darodha

Vehicle Type	FY23	FY25	FY30	FY35	FY40	FY43
CJV	5	6	9	14	20	26
Mini LCV	1	1	2	3	4	4
Bus	2	3	4	5	7	8
LCV	2	3	4	5	6	7
2A	17	21	25	35	48	57
3A	21	25	32	46	63	76
MAV	39	48	65	98	143	177
OSV	0	0	0	0	0	0
Total Revenue	**88**	**108**	**142**	**206**	**292**	**356**

Table 6.50: Revenue growth rates (%): Downside case- BK Darodha

Vehicle Type	FY23-FY25	FY25-FY30	FY30-FY35	FY35-FY40	FY40-FY43	FY23-FY43
CJV	14.2%	8.5%	8.7%	7.7%	7.7%	8.8%
Mini LCV	12.1%	6.3%	6.7%	5.8%	5.9%	6.8%
Bus	9.6%	5.3%	6.6%	5.9%	5.8%	6.3%
LCV	8.2%	5.2%	5.5%	5.2%	4.9%	5.5%
2A	10.9%	3.5%	6.8%	6.4%	6.0%	6.1%
3A	9.3%	5.4%	7.2%	6.8%	6.4%	6.7%
MAV	11.0%	6.1%	8.5%	7.9%	7.4%	7.8%
OSV	10.4%	8.0%	8.0%	7.6%	7.0%	8.0%
Total Revenue	**10.7%**	**5.5%**	**7.7%**	**7.3%**	**6.8%**	**7.2%**

BK: Kelapur

Upside case

Table 6.51: Final traffic forecasts: Upside case- BK Kelapur

Vehicle Type	FY23	FY25	FY30	FY35	FY40	FY43
CJV	1,404	1,622	2,361	3,375	4,704	5,662
Mini LCV	457	495	607	735	873	960
Bus	408	441	528	632	751	826
LCV	246	258	292	328	364	385
2A	1,470	1,605	1,890	2,321	2,840	3,179
3A	1,454	1,611	2,027	2,583	3,267	3,724
MAV	1,941	2,242	3,092	4,375	6,097	7,339
OSV	1	2	2	3	4	5
AADT	**7,382**	**8,276**	**10,799**	**14,352**	**18,900**	**22,080**
PCU	**20,725**	**23,295**	**30,310**	**40,455**	**53,572**	**62,772**

Table 6-52: Traffic growth rates (%): Upside case- BK Kelapur

Vehicle Type	FY23-FY25	FY25-FY30	FY30-FY35	FY35-FY40	FY40-FY43	FY23-FY43
CJV	7.5%	7.8%	7.4%	6.9%	6.4%	7.2%
Mini LCV	4.1%	4.2%	3.9%	3.5%	3.2%	3.8%
Bus	4.0%	3.6%	3.7%	3.5%	3.2%	3.6%
LCV	2.4%	2.5%	2.3%	2.1%	1.9%	2.3%
2A	4.5%	3.3%	4.2%	4.1%	3.8%	3.9%
3A	5.2%	4.7%	5.0%	4.8%	4.5%	4.8%
MAV	**7.5%**	**6.6%**	**7.2%**	**6.9%**	**6.4%**	6.9%
OSV	**6.7%**	**7.0%**	**6.7%**	**6.2%**	**5.7%**	6.5%
AADT	**5.9%**	**5.5%**	**5.9%**	**5.7%**	**5.3%**	5.6%
PCU's	**6.0%**	**5.4%**	**5.9%**	**5.8%**	**5.4%**	**5.7%**

Table 6-53: Revenue (INR Crore) : Upside case-BK Kelapur

Vehicle Type	FY23	FY25	FY30	FY35	FY40	FY43
CJV	3	4	7	13	25	35
Mini LCV	1	1	2	3	5	6
Bus	2	3	4	7	10	13
LCV	3	3	5	7	11	13
2A	17	21	32	51	82	108
3A	20	25	41	68	114	153
MAV	38	50	90	167	306	434
OSV	0	0	0	0	0	0
Total Revenue	**83**	**107**	**180**	**316**	**553**	**763**

Table 6.54: Revenue growth rates (%): Upside case-BK Kelapur

Vehicle Type	FY23-FY25	FY25-FY30	FY30-FY35	FY35-FY40	FY40-FY43	FY23-FY43
CJV	15.4%	13.6%	13.2%	13.2%	12.1%	13.4%
Mini LCV	11.8%	9.8%	9.5%	9.7%	8.8%	9.7%
Bus	11.7%	9.0%	9.4%	9.3%	8.9%	9.4%
LCV	9.7%	7.9%	8.1%	7.9%	7.7%	8.1%
2A	11.8%	8.7%	10.0%	10.0%	9.7%	9.8%
3A	12.7%	10.2%	10.9%	10.8%	10.4%	10.8%
MAV	15.2%	12.2%	13.2%	12.9%	12.3%	12.9%
OSV	14.6%	12.5%	12.7%	12.3%	11.7%	12.6%
Total Revenue	**13.6%**	**10.9%**	**11.9%**	**11.8%**	**11.4%**	**11.7%**

Downside case

Table 6.55: Final traffic forecasts: Downside case-BK Kelapur

Vehicle Type	FY23	FY25	FY30	FY35	FY40	FY43
CJV	1,404	1,531	1,914	2,359	2,845	3,147
Mini LCV	457	480	544	608	671	706
Bus	408	428	459	513	565	595
LCV	246	254	273	292	310	320
2A	1,470	1,549	1,555	1,764	1,975	2,099
3A	1,454	1,546	1,675	1,940	2,213	2,376
MAV	1,941	2,115	2,374	2,924	3,527	3,900
OSV	1	2	2	2	3	3
AADT	**7,382**	**7,904**	**8,796**	**10,403**	**12,109**	**13,146**
PCU	**20,725**	**22,223**	**24,346**	**28,895**	**33,742**	**36,696**

Table 6-56: Traffic growth rates (%): Downside case-BK Kelapur

Vehicle Type	FY23-FY25	FY25-FY30	FY30-FY35	FY35-FY40	FY40-FY43	FY23-FY43
CJV	4.4%	4.6%	4.3%	3.8%	3.4%	4.1%
Mini LCV	2.5%	2.5%	2.3%	2.0%	1.7%	2.2%
Bus	2.4%	1.4%	2.2%	2.0%	1.7%	1.9%
LCV	1.5%	1.5%	1.4%	1.2%	1.0%	1.3%
2A	2.6%	0.1%	2.6%	2.3%	2.0%	1.8%
3A	3.1%	1.6%	3.0%	2.7%	2.4%	2.5%
MAV	4.4%	2.3%	4.3%	3.8%	3.4%	3.6%
OSV	4.0%	4.1%	3.8%	3.4%	3.1%	3.7%
AADT	**3.5%**	**2.2%**	**3.4%**	**3.1%**	**2.8%**	**2.9%**
PCU's	**3.6%**	**1.8%**	**3.5%**	**3.2%**	**2.8%**	**2.9%**

Table 6-57: Revenue (INR Crore) : Downside case- BK Kelapur

Vehicle Type	FY23	FY25	FY30	FY35	FY40	FY43
CJV	3	4	5	8	11	14
Mini LCV	1	1	1	2	3	3
Bus	2	3	3	5	6	7
LCV	3	3	4	5	7	8
2A	16	20	23	32	44	52
3A	19	23	30	43	59	71
MAV	38	46	62	93	137	169
OSV	0	0	0	0	0	0
Total Revenue	**82**	**100**	**130**	**189**	**268**	**326**

Table 6.58: Revenue growth rates (%): Downside case- BK Kelapur

Vehicle Type	FY23-FY25	FY25-FY30	FY30-FY35	FY35-FY40	FY40-FY43	FY23-FY43
CJV	11.8%	8.1%	8.5%	7.9%	7.5%	8.4%
Mini LCV	9.7%	6.0%	6.5%	6.0%	5.8%	6.4%
Bus	8.4%	5.0%	6.5%	5.9%	5.7%	6.0%
LCV	8.0%	5.2%	5.4%	5.2%	4.8%	5.5%
2A	9.2%	3.7%	6.7%	6.4%	5.8%	6.0%
3A	9.8%	5.2%	7.2%	6.8%	6.3%	6.7%
MAV	10.6%	6.1%	8.5%	7.9%	7.4%	7.8%
OSV	10.2%	8.1%	8.0%	7.6%	6.9%	8.0%
Total Revenue	**10.0%**	**5.5%**	**7.7%**	**7.3%**	**6.8%**	**7.1%**

BK: Kelapur (new)

Upside case

Table 6.59: Final traffic forecasts: Upside case- BK: Kelapur (new)

Vehicle Type	FY23	FY25	FY30	FY35	FY40	FY43
CJV	1,366	1,577	2,296	3,282	4,575	5,507
Mini LCV	496	537	658	796	947	1,041
Bus	408	441	528	632	751	826
LCV	246	258	292	328	364	385
2A	1,470	1,605	1,890	2,321	2,840	3,179
3A	1,435	1,589	2,000	2,549	3,223	3,674
MAV	1,882	2,174	2,998	4,242	5,913	7,117
OSV	1	2	2	3	4	5
AADT	**7,304**	**8,183**	**10,664**	**14,154**	**18,616**	**21,733**
PCU	**20,402**	**22,922**	**29,794**	**39,725**	**52,555**	**61,549**

Table 6-60: Traffic growth rates (%): Upside case BK: Kelapur (new)

Vehicle Type	FY23-FY25	FY25-FY30	FY30-FY35	FY35-FY40	FY40-FY43	FY23-FY43
CJV	7.5%	7.8%	7.4%	6.9%	6.4%	7.2%
Mini LCV	4.1%	4.2%	3.9%	3.5%	3.2%	3.8%
Bus	4.0%	3.6%	3.7%	3.5%	3.2%	3.6%
LCV	2.4%	2.5%	2.3%	2.1%	1.9%	2.3%
2A	4.5%	3.3%	4.2%	4.1%	3.8%	3.9%
3A	5.2%	4.7%	5.0%	4.8%	4.5%	4.8%
MAV	7.5%	6.6%	7.2%	6.9%	6.4%	6.9%
OSV	6.7%	7.0%	6.7%	6.2%	5.7%	6.5%
AADT	**5.8%**	**5.4%**	**5.8%**	**5.6%**	**5.3%**	5.6%
PCU's	**6.0%**	**5.4%**	**5.9%**	**5.8%**	**5.4%**	**5.7%**

Table 6-61: Revenue (INR Crore) : Upside case BK: Kelapur (new)

Vehicle Type	FY23	FY25	FY30	FY35	FY40	FY43
CJV	3	4	8	15	27	38
Mini LCV	1	1	2	4	6	7
Bus	2	3	4	7	11	14
LCV	3	3	5	7	11	13
2A	17	22	33	53	86	114
3A	20	25	41	68	113	152
MAV	37	50	88	163	300	425
OSV	0	0	0	0	0	0
Total Revenue	**84**	**108**	**181**	**317**	**554**	**764**

Table 6.62: Revenue growth rates (%): Upside case-BK: Kelapur (new)

Vehicle Type	FY23-FY25	FY25-FY30	FY30-FY35	FY35-FY40	FY40-FY43	FY23-FY43
CJV	15.1%	12.8%	13.7%	13.1%	12.0%	13.2%
Mini LCV	11.5%	9.0%	9.9%	9.5%	8.7%	9.6%
Bus	11.5%	9.1%	9.7%	9.3%	8.9%	9.5%
LCV	9.6%	7.8%	8.0%	8.0%	7.6%	8.0%
2A	11.7%	8.7%	10.0%	10.1%	9.6%	9.8%
3A	12.6%	10.1%	10.8%	10.8%	10.3%	10.8%
MAV	15.5%	12.0%	13.3%	13.0%	12.3%	12.9%
OSV	14.5%	12.6%	12.6%	12.3%	11.6%	12.5%
Total Revenue	**13.7%**	**10.7%**	**11.9%**	**11.8%**	**11.3%**	11.7%

Downside case

Table 6.63: Final traffic forecasts: Downside case- BK: Kelapur (new)

Vehicle Type	FY23	FY25	FY30	FY35	FY40	FY43
CJV	1,366	1,489	1,862	2,294	2,767	3,060
Mini LCV	496	521	589	659	727	766
Bus	408	428	459	513	565	595
LCV	246	254	273	292	310	320
2A	1,470	1,549	1,555	1,764	1,975	2,099
3A	1,435	1,525	1,652	1,914	2,183	2,344
MAV	1,882	2,051	2,302	2,836	3,420	3,782
OSV	1	2	2	2	3	3
AADT	**7,304**	**7,817**	**8,694**	**10,275**	**11,951**	**12,970**
PCU	**20,402**	**21,871**	**23,948**	**28,405**	**33,151**	**36,042**

Table 6-64: Traffic growth rates (%): Downside case-BK: Kelapur (new)

Vehicle Type	FY23-FY25	FY25-FY30	FY30-FY35	FY35-FY40	FY40-FY43	FY23-FY43
CJV	4.4%	4.6%	4.3%	3.8%	3.4%	4.1%
Mini LCV	2.5%	2.5%	2.3%	2.0%	1.7%	2.2%
Bus	2.4%	1.4%	2.2%	2.0%	1.7%	1.9%
LCV	1.5%	1.5%	1.4%	1.2%	1.0%	1.3%
2A	2.6%	0.1%	2.6%	2.3%	2.0%	1.8%
3A	3.1%	1.6%	3.0%	2.7%	2.4%	2.5%
MAV	4.4%	2.3%	4.3%	3.8%	3.4%	3.6%
OSV	4.0%	4.1%	3.8%	3.4%	3.1%	3.7%
AADT	**3.5%**	**2.1%**	**3.4%**	**3.1%**	**2.8%**	**2.9%**
PCU's	**3.5%**	**1.8%**	**3.5%**	**3.1%**	**2.8%**	**2.9%**

Table 6-65: Revenue (INR Crore) : Downside case-BK: Kelapur (new)

Vehicle Type	FY23	FY25	FY30	FY35	FY40	FY43
CJV	3	4	6	9	13	16
Mini LCV	1	1	2	2	3	4
Bus	2	3	3	5	6	7
LCV	3	3	4	5	7	8
2A	17	21	25	34	47	55
3A	19	23	31	43	59	71
MAV	37	45	61	92	135	166
OSV	0	0	0	0	0	0
Total Revenue	**83**	**100**	**131**	**190**	**270**	**328**

Table 6.66: Revenue growth rates (%): Downside case-BK: Kelapur (new)

Vehicle Type	FY23-FY25	FY25-FY30	FY30-FY35	FY35-FY40	FY40-FY43	FY23-FY43
CJV	11.3%	8.7%	8.4%	7.9%	7.3%	8.5%
Mini LCV	9.2%	6.6%	6.3%	6.0%	5.6%	6.5%
Bus	8.5%	5.0%	6.5%	6.2%	5.6%	6.1%
LCV	7.9%	5.2%	5.4%	5.4%	4.7%	5.5%
2A	9.1%	3.7%	6.6%	6.5%	5.8%	6.0%
3A	9.7%	5.4%	7.1%	6.7%	6.2%	6.7%
MAV	11.0%	6.1%	8.5%	8.0%	7.3%	7.8%
OSV	10.1%	8.0%	8.0%	7.5%	6.9%	7.9%
Total Revenue	**10.1%**	**5.5%**	**7.6%**	**7.3%**	**6.7%**	**7.1%**

Summary outlook

6.56 The analysis presented in this report and the methodology followed adopted presents a custom approach compared to a standard traffic and revenue forecasting approach. We have utilised information from various sources, backed by our knowledge of toll roads in the regional setting of the study Asset, in order to triangulate a robust base T&R position before presenting our views on other key topics, such as base year AADT and revenue, growth forecasts, and traffic segmentation.

6.57 Overall, we believe, we have tabled a robust set of forecast numbers underpinned by a rigorous base T&R position, background growth, exogenous impacts coupled with our unparallel market knowledge of the toll road industry in India.

Agra Bypass

6.58 Agra bypass benefits from its geographic and strategic location. The proximity to an upgraded network of expressways like Kundli Manesar Palwal (KMP) and Eastern Peripheral Expressway (EPE) provides seamless connectivity from Delhi NCR to travel to the west, east or south India. This is evident from the zonal influence observed on the Asset in form of

- north-south movements connecting Jammu and Kashmir, Punjab, Haryana, Delhi to Telangana, Andhra Pradesh, Karnataka and Tamil Nadu using NH7/44.
- north-west movements connecting Delhi NCR and north India to Gujarat and Maharashtra via NH3
- north to central / eastern movements originating from Delhi and northern parts of India to central (UP, Bihar) or eastern/ north-eastern parts of the country

6.59 Delhi Mumbai Expressway is a key risk that has been identified which will impact the traffic on the corridor. As discussed in chapter 6 a phased approach is taken to access the impact of DME, with 50% of estimated traffic loss in the first year of operation and the complete impact in the subsequent year. There is also uncertainty around the timeline of the Agra bypass link maybe constructed. As a base case, we believe FY25 is a reasonable timeline for the link to be completed as it is only a 8 km section, which could be constructed in 2 years once it is started.

6.60 Overall, we see a positive outlook for the region and the Agra by-pass Asset, given that it serves major urban centres of Delhi NCR, Faridabad, Palwal, Agra, Mathura, Vrindavan while also catering to long distance movement to/from Mumbai, Gujarat, Chennai, Bangalore, Hyderabad

etc. The underlying growth drivers of the corridor are strong and are expected to deliver long term sustained growth.

Borkhedi-Kelapur

6.61 The Asset lies on the NH44 which is the key corridor for long distance traffic movements between Delhi and North India to southern states such as Telangana, Karnataka and Tamil Nadu. The traffic movement on the Asset is also supported by industries near Nagpur, Hyderabad and Bengaluru.

6.62 Kelapur plaza is planned to be relocated 6km south from its existing location which is expected to improve the operational efficiency in tolling operations, hence improved compliance in CJV traffic is expected on the Kelapur New Plaza.

6.63 The proposed upgrades on NH52 coupled with Delhi Mumbai Expressway and development of Solapur Kurnool section of Surat-Kurnool-Chennai Expressway would improve the overall attractiveness of the route in comparison to NH7 for long-distance North-South traffic movements. Additionally, the development of Nagpur-Vijaywada expressway under the Bharatmala Pariyojana would act as an alternate for long-distance traffic moving between north of Nagpur to Vijawada and south. About 50% of the negative impact is expected in the first year of operations in FY28 and the rest is staggered in the next two subsequent years.

6.64 Overall, we believe that the Asset have a robust traffic profile as connects key centres of economic growth across the spinal cord of the country. As seen historically, all the industrial nodes along the corridor have grown in line with the country's economic growth. This along with salient features like shortest route among alternatives, local richness of agriculture and allied industry like cotton and food processing and established and growing trade relationship with neighbouring state, it is reasonable to believe that the underlying growth drivers of the corridor are strong and are expected to deliver long term sustained growth.

Appendices

A Data collection exercise

A.1 Below you can find the Zone list used for OD Analysis for both Assets:

OD analysis

Zone list

Table A.1: Zone list used for OD analysis at AB Raibha

Zone No	Zone name	Description/State
1	Farah	Uttar Pradesh
2	Vrindavan	Uttar Pradesh
3	Kagrol	Uttar Pradesh
4	Raibha	Uttar Pradesh
5	Kuthawati	Uttar Pradesh
6	Mundhera	Uttar Pradesh
7	Mangura	Uttar Pradesh
8	Kasoti	Uttar Pradesh
9	Bharatpur	Uttar Pradesh
10	Fatehpur Sikri	Uttar Pradesh
11	Kiraoli	Uttar Pradesh
12	Raipura Jat	Uttar Pradesh
13	Karahara	Uttar Pradesh
14	Kakua	Uttar Pradesh
15	Dholpur	Rajasthan
16	Morena	Madhya Pradesh
17	Gwalior	Madhya Pradesh
18	Agra	Uttar Pradesh
19	Aligarh	Uttar Pradesh
20	Allahabad	Uttar Pradesh
21	Ambedkar Nagar	Uttar Pradesh
22	Amethi	Uttar Pradesh
23	Auraiya	Uttar Pradesh
24	Azamgarh	Uttar Pradesh
25	Baghpat	Uttar Pradesh
26	Bahraich	Uttar Pradesh
27	Ballia	Uttar Pradesh
28	Balrampur	Uttar Pradesh
29	Banda	Uttar Pradesh
30	Bara Banki	Uttar Pradesh
31	Bareilly	Uttar Pradesh
32	Basti	Uttar Pradesh
33	Bijnor	Uttar Pradesh
34	Budaun	Uttar Pradesh
35	Bulandshahr	Uttar Pradesh

Zone No	Zone name	Description/State
36	Chandauli	Uttar Pradesh
37	Chitrakoot	Uttar Pradesh
38	Deoria	Uttar Pradesh
39	Etah	Uttar Pradesh
40	Etawah	Uttar Pradesh
41	Faizabad	Uttar Pradesh
42	Farrukhabad	Uttar Pradesh
43	Fatehpur	Uttar Pradesh
44	Firozabad	Uttar Pradesh
45	Gautam Buddha Nagar	Uttar Pradesh
46	Ghaziabad	Uttar Pradesh
47	Ghazipur	Uttar Pradesh
48	Gonda	Uttar Pradesh
49	Gorakhpur	Uttar Pradesh
50	Hathras	Uttar Pradesh
51	Hapur	Uttar Pradesh
52	Hamirpur	Uttar Pradesh
53	Hardoi	Uttar Pradesh
54	Mahamaya Nagar	Uttar Pradesh
55	Jalaun	Uttar Pradesh
56	Jaunpur	Uttar Pradesh
57	Jhansi	Uttar Pradesh
58	Jyotiba Phule Nagar	Uttar Pradesh
59	Kannauj	Uttar Pradesh
60	Kanpur Dehat	Uttar Pradesh
61	Kanpur Nagar	Uttar Pradesh
62	Kansiram Nagar	Uttar Pradesh
63	Kaushambi	Uttar Pradesh
64	Kheri	Uttar Pradesh
65	Kushinagar	Uttar Pradesh
66	Lakhimpur Kheri	Uttar Pradesh
67	Lalitpur	Uttar Pradesh
68	Lucknow	Uttar Pradesh
69	Maharajganj	Uttar Pradesh
70	Mahoba	Uttar Pradesh
71	Mainpuri	Uttar Pradesh
72	Mathura	Uttar Pradesh
73	Mau	Uttar Pradesh
74	Meerut	Uttar Pradesh
75	Mirzapur	Uttar Pradesh
76	Moradabad	Uttar Pradesh
77	Muzaffarnagar	Uttar Pradesh
78	Pilibhit	Uttar Pradesh
79	Pratapgarh	Uttar Pradesh
80	Rae Bareli	Uttar Pradesh
81	Rampur	Uttar Pradesh
82	Shamli	Uttar Pradesh
83	Saharanpur	Uttar Pradesh
84	Sambhal	Uttar Pradesh
85	Sant Kabir Nagar	Uttar Pradesh

Zone No	Zone name	Description/State
86	Sant Ravi Das Nagar(bhadohi)	Uttar Pradesh
87	Shahjahanpur	Uttar Pradesh
88	Shrawasti	Uttar Pradesh
89	Siddharth Nagar	Uttar Pradesh
90	Sitapur	Uttar Pradesh
91	Sonbhadra	Uttar Pradesh
92	Sultanpur	Uttar Pradesh
93	Unnao	Uttar Pradesh
94	Varanasi	Uttar Pradesh
95	Central Delhi	NCT of Delhi
96	North Delhi	NCT of Delhi
97	West Delhi	NCT of Delhi
98	South West Delhi	NCT of Delhi
99	South East Delhi	NCT of Delhi
100	East Delhi	NCT of Delhi
101	North East Delhi	NCT of Delhi
102	North Haryana	Haryana
103	West Haryana	Haryana
104	Central Haryana	Haryana
105	Gurgaon SW Haryana	Haryana
106	Rewari SW Haryana	Haryana
107	Palwal City	Haryana
108	Faridabad	Haryana
109	Indore	Madhya Pradesh
110	Ratlam	Madhya Pradesh
111	North Madhya Pradesh	Madhya Pradesh
112	Central Madhya Pradesh	Madhya Pradesh
113	East Madhya Pradesh	Madhya Pradesh
114	West Madhya Pradesh	Madhya Pradesh
115	East Rajasthan	Rajasthan
116	South Rajasthan	Rajasthan
117	West Rajasthan	Rajasthan
118	North Rajasthan	Rajasthan
119	East Maharashtra	Maharashtra
120	West Maharashtra	Maharashtra
121	Punjab	Punjab
122	Himachal Pradesh	Himachal Pradesh
123	Uttarakhand	Uttarakhand
124	Jammu & Kashmir	Jammu & Kashmir
125	Gujarat	Gujarat
126	Hyderabad	Telangana
127	Rest of Telangana	Telangana
128	Chhattisgarh	Chhattisgarh
129	Odisha	Odisha
130	Bihar	Bihar
131	Jharkhand	Jharkhand
132	West Bengal Sikkim	West Bengal
133	Goa	Goa
134	Andhra Pradesh	Andhra Pradesh
135	Bengaluru	Karnataka

Zone No	Zone name	Description/State
136	Rest of Karnataka	Karnataka
137	Kerala	Kerala
138	Chennai	Tamil nadu
139	Rest of Tamil Nadu	Tamil nadu
140	Arunachal Pradesh	Arunachal Pradesh
141	Assam	Assam
142	Manipur	Manipur
143	Meghalaya	Meghalaya
144	Mizoram	Mizoram
145	Nagaland	Nagaland
146	Tripura	Tripura
147	Nepal	Nepal
148	Bangladesh	Bangladesh
149	Bhutan	Bhutan
150	Agra cantonment	Uttar Pradesh
151	Nashik	Maharashtra
152	Mumbai, Bhiwandi	Maharashtra
153	Pune	Maharashtra
154	Dhule	Maharashtra

Source: Steer representation

Table A.2: Zone list used for OD Analysis at BK

Zone No	Zone name	Description/State
1	Hinganghat	Telangana
2	Karanji	Telangana
3	Deodhari	Maharashtra
4	Wadner	Maharashtra
5	Nirmal	Telangana
6	Adilabad(U)	Telangana
7	Jamb	Telangana
8	Kandlakoya	Telangana
9	Chegunta	Telangana
10	Kamareddy	Telangana
11	Nadepalle	Telangana
12	Gudihathinur	Telangana
13	Pandharkawada	Telangana
14	Wadki	Telangana
15	Khatara	Telangana
16	Bori	Maharashtra
17	Ramayampet	Telangana
18	Kallakal	Maharashtra
19	Armur	Telangana
20	Ichoda	Telangana
21	Butibori	Maharashtra
22	Sonegaon	Maharashtra
23	Shedgaon Pati	Maharashtra
24	Borkhedi	Maharashtra
25	Daroda	Maharashtra
26	Kelapur	Maharashtra

Zone No	Zone name	Description/State
27	Adilabad	Telangana
28	Komaram Bheem Asifabad	Telangana
29	Bhadradri Kothagudem	Telangana
30	Hyderabad	Telangana
31	Jagtial	Telangana
32	Jangaon	Telangana
33	Jayashankar Bhupalpally	Telangana
34	Jogulamba Gadwal	Telangana
35	Kamareddy	Telangana
36	Karimnagar	Telangana
37	Khammam	Telangana
38	Mahabubabad	Telangana
39	Mahbubnagar	Telangana
40	Mancherial	Telangana
41	Medak	Telangana
42	Medchal	Telangana
43	Mulugu	Telangana
44	Narayanpet	Telangana
45	Nalgonda	Telangana
46	Nagarkurnool	Telangana
47	Nirmal	Telangana
48	Nizamabad	Telangana
49	Peddapalli	Telangana
50	Rajanna Sircilla	Telangana
51	Ranga Reddy	Telangana
52	Sangareddy	Telangana
53	Siddipet	Telangana
54	Suryapet	Telangana
55	Vikarabad	Telangana
56	Wanaparthy	Telangana
57	Warangal (Urban)	Telangana
58	Warangal (Rural)	Telangana
59	Yadadri Bhuvanagiri	Telangana
60	Ahmednagar	Maharashtra
61	Akola	Maharashtra
62	Amravati	Maharashtra
63	Aurangabad	Maharashtra
64	Beed	Maharashtra
65	Bhandara	Maharashtra
66	Buldhana	Maharashtra
67	Chandrapur	Maharashtra
68	Dhule	Maharashtra
69	Gadchiroli	Maharashtra
70	Gondia	Maharashtra
71	Hingoli	Maharashtra
72	Jalgaon	Maharashtra
73	Jalna	Maharashtra
74	Kolhapur	Maharashtra
75	Latur	Maharashtra
76	Mumbai City	Maharashtra

Zone No	Zone name	Description/State
77	Mumbai Suburban	Maharashtra
78	Nanded	Maharashtra
79	Nandurbar	Maharashtra
80	Nagpur	Maharashtra
81	Nashik	Maharashtra
82	Osmanabad	Maharashtra
83	Palghar	Maharashtra
84	Parbhani	Maharashtra
85	Pune	Maharashtra
86	Raigad	Maharashtra
87	Ratnagiri	Maharashtra
88	Sangli	Maharashtra
89	Satara	Maharashtra
90	Sindhudurg	Maharashtra
91	Solapur	Maharashtra
92	Thane	Maharashtra
93	Wardha	Maharashtra
94	Washim	Maharashtra
95	Yavatmal	Maharashtra
96	Ujjain region	Madhya Pradesh
97	Bhopal region	Madhya Pradesh
98	Narmadapuram region	Madhya Pradesh
99	Sagar region	Madhya Pradesh
100	Rewa region	Madhya Pradesh
101	Shahdol region	Madhya Pradesh
102	Gwalior and Chambal region	Madhya Pradesh
103	Chennai region	Tamil Nadu
104	Coimbatore region	Tamil Nadu
105	Madurai region	Tamil Nadu
106	Trichy region	Tamil Nadu
107	Bangalore	Karnataka
108	Anantapur	Andhra Pradesh
109	Chittoor	Andhra Pradesh
110	East Godavari	Andhra Pradesh
111	Guntur	Andhra Pradesh
112	Ysr Kadapa	Andhra Pradesh
113	Krishna	Andhra Pradesh
114	Kurnool	Andhra Pradesh
115	Prakasam	Andhra Pradesh
116	Nellore	Andhra Pradesh
117	Srikakulam	Andhra Pradesh
118	Vishakhapatnam	Andhra Pradesh
119	Vizianagaram	Andhra Pradesh
120	West Godavari	Andhra Pradesh
121	Delhi	Delhi (UT)
122	East Uttar Pradesh	Uttar Pradesh
123	West Uttar Pradesh	Uttar Pradesh
124	North Karnataka	Karnataka
125	South Karnataka	Karnataka
126	Andaman & Nicobar	Andaman & Nicobar

Zone No	Zone name	Description/State
127	Sikkim	Sikkim
128	North eastern states	North eastern states
129	Bihar	Bihar
130	Chandigarh	Chandigarh
131	Rest of Chhattishgarh	Chhattishgarh
132	Daman and Diu and Dadra and Nagar Haveli	Daman and Diu and Dadra and Nagar Haveli
133	Goa	Goa
134	Gujarat	Gujarat
135	Himachal Pradesh	Himachal Pradesh
136	Jammu and Kashmir	Jammu and Kashmir
137	Jharkhand	Jharkhand
138	Kerala	Kerala
139	Ladakh	Ladakh
140	Lakshadweep	Lakshadweep
141	Odisha	Odisha
142	Puducherry	Puducherry
143	Punjab	Punjab
144	Rajasthan	Rajasthan
145	Uttarakhand	Uttarakhand
146	West Bengal	West Bengal
147	Haryana	Haryana
148	Rest of Andhra Pradesh	Andhra Pradesh
149	Raipur	Chhattishgarh
150	NTR district, Vijaywada	Andhra Pradesh

Source: Steer representation

Top OD pairs

A.2 Further to the OD analysis presented in Chapter 3 this appendix presents the OD maps for 3A+MAVs along with top 10 OD pairs at each toll plaza

Table A.3: AB Raibha: 3A/MAV top 10 OD pair shares

	OD Pair	Share
1.	Central Delhi - West Maharashtra	5.9%
2.	Central Delhi - Bengaluru	5.6%
3.	Central Delhi - Hyderabad	4.6%
4.	Central Delhi - Chennai	3.9%
5.	Gwalior - Mathura	3.6%
6.	Gwalior - Central Delhi	3.6%
7.	Central Delhi - Gujarat	2.3%
8.	Central Delhi - Pune	1.8%
9.	Gurgaon SW Haryana - Chennai	1.8%
10.	Central Delhi - Indore	1.7%

Source: Steer analysis

Table A.4: BK Darodha: 3A/MAV top 10 OD pair shares

	OD Pair	Share
1.	Hyderabad - Nagpur	10.0%
2.	Hyderabad - Delhi	8.1%
3.	Bangalore - Delhi	6.7%
4.	Chennai region - Delhi	6.0%
5.	Nagpur - Chennai region	3.9%
6.	Nagpur - Bangalore	3.4%
7.	Hyderabad - West Uttar Pradesh	2.9%
8.	Hyderabad - East Uttar Pradesh	2.3%
9.	Chennai region - East Uttar Pradesh	2.1%
10.	Bangalore - West Uttar Pradesh	2.1%

Source: Steer analysis

Table A.5: BK Kelapur: 3A/MAV top 10 OD pair shares

	OD Pair	Share
1.	Hyderabad - Nagpur	11.0%
2.	Chennai region - Delhi	9.8%
3.	Hyderabad - Delhi	9.6%
4.	Bangalore - Delhi	6.9%
5.	Nagpur - Chennai region	4.4%
6.	Nagpur - Bangalore	3.6%
7.	Chennai region - West Uttar Pradesh	2.6%
8.	Hyderabad - East Uttar Pradesh	2.3%
9.	Hyderabad - West Uttar Pradesh	2.3%
10.	Bangalore - East Uttar Pradesh	2.2%

Source: Steer analysis

7 days TVC count

A.3 The TVC counts recorded at each toll plaza can be seen below. These counts form an important part of TVC-toll plaza data analysis which contributes significantly to our base estimation exercise:

Table A.6: AB Raibha: Daily TVC counts

Date	CJV	Mini LCV	LCV	Bus	2 Axle	3 Axle	MAV	OSV	Total
01-07-2022	2110	199	992	34	1745	1878	3388	2	10348
02-07-2022	2505	196	966	29	1667	1775	3209	0	10347
03-07-2022	2828	247	1037	28	1761	1978	3558	4	11441

Date	CJV	Mini LCV	LCV	Bus	2 Axle	3 Axle	MAV	OSV	Total
04-07-2022	2374	219	876	45	1550	1785	3085	3	9937
05-07-2022	1946	223	894	38	1530	1661	2973	1	9266
06-07-2022	1911	210	949	40	1569	1770	3146	7	9602
07-07-2022	1910	267	942	45	1617	1802	3157	2	9742

Source: Steer analysis

Table A.7: BK Darodha: Daily TVC counts

Date	CJV	Mini LCV	LCV	Bus	2 Axle	3 Axle	MAV	OSV	Total
04-07-2022	1,345	268	548	178	1,213	1,426	1,954	1	6,933
05-07-2022	1,400	400	577	201	1,117	1,338	1,933	3	6,969
06-07-2022	1,467	355	586	205	1,154	1,326	2,058	2	7,153
07-07-2022	1,418	388	673	187	1,243	1,424	2,136	1	7,470
08-07-2022	1,351	260	626	179	1,279	1,537	2,068	1	7,301
09-07-2022	1,329	354	633	180	1,228	1,338	2,117	1	7,180
10-07-2022	1,238	235	598	155	1,129	1,185	2,086	2	6,628

Source: Steer analysis

Table A.8: BK Kelapur: Daily TVC counts

Date	CJV	Mini LCV	LCV	Bus	2 Axle	3 Axle	MAV	OSV	Total
04-07-2022	1,260	441	502	222	1,250	1,485	1,995	2	7,157
05-07-2022	1,277	498	534	254	1,114	1,355	1,972	2	7,006
06-07-2022	1,202	419	564	255	1,237	1,479	2,072	5	7,233
07-07-2022	1,282	422	589	241	1,268	1,490	2,218	5	7,515
08-07-2022	1,209	323	641	223	1,310	1,431	2,122	4	7,263
09-07-2022	1,251	445	634	230	1,199	1,370	2,073	2	7,204
10-07-2022	1,110	251	579	160	1,196	1,259	2,125	1	6,681

Source: Steer analysis

Table A.9: BK Kelapur New: Daily TVC counts for 3 days

Date	CJV	Mini LCV	LCV	Bus	2 Axle	3 Axle	MAV	OSV	Total
06-07-2022	1,428	284	669	208	1,255	1,438	1,953	3	7,238
07-07-2022	1,490	312	641	210	1,280	1,429	2,174	1	7,537
08-07-2022	1,523	250	616	194	1,326	1,474	2,091	1	7,475

Source: Steer analysis

B Traffic and revenue forecasts

B.1 Further to the summary of forecasts presented in Chapter 6, this appendix presents detailed forecasts

Traffic forecasts

B.2 This section presents the detailed traffic forecasts for the forecast period until FY43, year of expected close of the concession. The following two tables show the traffic growth rates and AADT, respectively.

Table B.1: AB Raibha: Forecasts for final (background + impacts) AADT

Vehicle Category	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32
CJV	1,848	2,263	2,393	2,548	2,717	2,891	3,076	3,260	3,455	3,661	3,880
Mini LCV	158	194	198	203	209	214	220	225	230	236	241
LCV	32	32	65	66	67	68	69	70	71	72	73
Bus	434	480	478	471	482	493	504	516	529	541	554
2A	1,774	2,116	2,059	2,089	2,220	2,355	2,434	2,518	2,606	2,697	2,791
3A	1,765	1,927	1,922	1,938	2,059	2,185	2,287	2,393	2,504	2,620	2,741
MAV	3,072	3,342	3,342	3,303	3,593	3,899	4,128	4,367	4,621	4,889	5,172
OSV	3	3	3	4	4	4	4	4	5	5	5
Total	**9,087**	**10,357**	**10,461**	**10,622**	**11,350**	**12,108**	**12,722**	**13,354**	**14,020**	**14,720**	**15,458**
PCU	**27,210**	**30,455**	**30,501**	**30,617**	**32,872**	**35,229**	**37,014**	**38,875**	**40,834**	**42,896**	**45,066**

Source: Steer analysis

Table B.2: AB Raibha: Forecasts for final (background + impacts) AADT

Vehicle Category	FY33	FY34	FY35	FY36	FY37	FY38	FY39	FY40	FY41	FY42	FY43
CJV	4,111	4,352	4,601	4,859	5,126	5,401	5,685	5,977	6,276	6,583	6,897
Mini LCV	247	253	259	264	270	276	282	288	293	299	305
LCV	75	76	77	78	79	80	81	82	83	84	85
Bus	567	581	594	607	621	634	647	661	674	687	700
2A	2,888	2,986	3,086	3,187	3,290	3,393	3,498	3,603	3,709	3,816	3,923
3A	2,869	2,999	3,133	3,270	3,410	3,553	3,699	3,847	3,998	4,151	4,307
MAV	5,472	5,783	6,106	6,439	6,784	7,140	7,506	7,883	8,269	8,666	9,071
OSV	5	6	6	6	6	7	7	7	8	8	8
Total	**16,234**	**17,035**	**17,861**	**18,712**	**19,586**	**20,484**	**21,404**	**22,347**	**23,311**	**24,294**	**25,296**
PCU	**47,350**	**49,708**	**52,140**	**54,645**	**57,220**	**59,865**	**62,578**	**65,356**	**68,197**	**71,098**	**74,055**

Source: Steer analysis

Table B.3: BK Darodha: Forecasts for final (background + impacts) AADT

Vehicle Category	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32
CJV	1,606	1,970	2,078	2,207	2,349	2,494	2,649	2,803	2,966	3,138	3,320
Mini LCV	356	466	480	497	514	531	549	566	584	602	620
LCV	443	442	455	471	487	503	510	520	531	548	564
Bus	-	194	197	201	205	210	214	218	222	226	230
2A	1,422	1,434	1,481	1,536	1,595	1,620	1,591	1,619	1,646	1,703	1,763
3A	1,389	1,450	1,506	1,572	1,642	1,707	1,727	1,773	1,820	1,894	1,971
MAV	1,691	1,892	1,996	2,120	2,255	2,358	2,398	2,503	2,611	2,762	2,922
OSV	2	1	2	2	2	2	2	2	2	2	2
Total	**6,909**	**7,850**	**8,196**	**8,605**	**9,049**	**9,425**	**9,641**	**10,004**	**10,382**	**10,875**	**11,393**

Vehicle Category	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32
PCU	**18,676**	**20,855**	**21,785**	**22,883**	**24,078**	**25,008**	**25,361**	**26,250**	**27,169**	**28,471**	**29,839**

Source: Steer analysis

Table B.4: BK Darodha: Forecasts for final (background + impacts) AADT

Vehicle Category	FY33	FY34	FY35	FY36	FY37	FY38	FY39	FY40	FY41	FY42	FY43
CJV	3,512	3,712	3,920	4,134	4,355	4,584	4,819	5,061	5,309	5,563	5,824
Mini LCV	639	658	678	697	716	735	755	774	793	813	832
LCV	581	598	616	633	651	668	685	703	720	738	755
Bus	234	239	243	247	251	255	259	263	267	271	275
2A	1,824	1,886	1,949	2,013	2,078	2,143	2,209	2,276	2,343	2,410	2,478
3A	2,051	2,133	2,216	2,301	2,387	2,474	2,563	2,653	2,744	2,836	2,929
MAV	3,092	3,268	3,450	3,639	3,833	4,034	4,241	4,454	4,672	4,896	5,126
OSV	2	3	3	3	3	3	3	3	4	4	4
Total	**11,937**	**12,497**	**13,074**	**13,666**	**14,274**	**14,897**	**15,535**	**16,187**	**16,853**	**17,531**	**18,223**
PCU	**31,276**	**32,758**	**34,282**	**35,849**	**37,458**	**39,107**	**40,796**	**42,523**	**44,287**	**46,086**	**47,918**

Source: Steer analysis

Table B.5: BK Kelapur: Forecasts for final (background + impacts) AADT

Vehicle Category	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32
CJV	782	1,404	1,481	1,573	1,674	1,778	1,888	1,998	2,114	2,236	2,366
Mini LCV	284	457	471	487	504	521	539	556	573	590	609
LCV	422	408	420	434	449	464	470	479	489	504	519
Bus	-	246	251	256	261	266	272	277	282	287	292
2A	1,604	1,470	1,518	1,575	1,635	1,663	1,638	1,668	1,698	1,758	1,819

Vehicle Category	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32
3A	1,398	1,454	1,510	1,576	1,646	1,711	1,732	1,779	1,826	1,900	1,977
MAV	1,751	1,941	2,047	2,174	2,313	2,419	2,462	2,569	2,681	2,836	3,001
OSV	2	1	2	2	2	2	2	2	2	2	2
Total	**6,243**	**7,382**	**7,701**	**8,077**	**8,485**	**8,825**	**9,003**	**9,327**	**9,664**	**10,113**	**10,585**
PCU	**18,595**	**20,725**	**21,640**	**22,722**	**23,898**	**24,810**	**25,145**	**26,013**	**26,910**	**28,188**	**29,531**

Source: Steer analysis

Table B.6: BK Kelapur: Forecasts for final (background + impacts) AADT

Vehicle Category	FY33	FY34	FY35	FY36	FY37	FY38	FY39	FY40	FY41	FY42	FY43
CJV	2,504	2,646	2,794	2,946	3,104	3,267	3,435	3,607	3,784	3,965	4,151
Mini LCV	627	646	665	684	703	722	740	759	778	797	816
LCV	535	551	566	582	598	614	630	646	663	679	695
Bus	298	303	308	314	319	324	329	334	339	344	349
2A	1,882	1,946	2,011	2,077	2,144	2,211	2,279	2,348	2,417	2,487	2,557
3A	2,057	2,139	2,223	2,308	2,394	2,482	2,571	2,661	2,753	2,845	2,938
MAV	3,175	3,355	3,542	3,736	3,936	4,142	4,355	4,573	4,798	5,028	5,263
OSV	2	3	3	3	3	3	3	3	4	4	4
Total	**11,080**	**11,589**	**12,112**	**12,650**	**13,201**	**13,766**	**14,343**	**14,933**	**15,535**	**16,148**	**16,773**
PCU	**30,941**	**32,394**	**33,888**	**35,424**	**37,001**	**38,616**	**40,271**	**41,962**	**43,689**	**45,449**	**47,242**

Source: Steer analysis

Table B.7: BK Kelapur New: Forecasts for final (background + impacts) AADT

Vehicle Category	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32
CJV	782	1,366	1,441	1,530	1,628	1,729	1,836	1,943	2,056	2,175	2,301

Vehicle Category	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32
Mini LCV	284	496	511	528	547	565	584	602	621	640	660
LCV	422	408	420	434	449	464	470	479	489	504	519
Bus	-	246	251	256	261	266	272	277	282	287	292
2A	1,604	1,470	1,518	1,575	1,635	1,663	1,638	1,668	1,698	1,758	1,819
3A	1,398	1,435	1,490	1,555	1,624	1,688	1,709	1,755	1,801	1,874	1,950
MAV	1,751	1,882	1,985	2,108	2,243	2,346	2,387	2,491	2,600	2,750	2,910
OSV	2	1	2	2	2	2	2	2	2	2	2
Total	**6,243**	**7,304**	**7,618**	**7,988**	**8,390**	**8,724**	**8,898**	**9,218**	**9,549**	**9,990**	**10,454**
PCU	**18,595**	**20,402**	**21,300**	**22,361**	**23,514**	**24,407**	**24,733**	**25,583**	**26,462**	**27,714**	**29,029**

Source: Steer analysis

Table B.8: BK Kelapur New: Forecasts for final (background + impacts) AADT

Vehicle Category	FY33	FY34	FY35	FY36	FY37	FY38	FY39	FY40	FY41	FY42	FY43
CJV	2,435	2,573	2,717	2,866	3,019	3,177	3,340	3,508	3,680	3,857	4,037
Mini LCV	680	700	721	741	762	782	803	823	844	864	885
LCV	535	551	566	582	598	614	630	646	663	679	695
Bus	298	303	308	314	319	324	329	334	339	344	349
2A	1,882	1,946	2,011	2,077	2,144	2,211	2,279	2,348	2,417	2,487	2,557
3A	2,030	2,110	2,193	2,277	2,362	2,449	2,536	2,626	2,716	2,807	2,899
MAV	3,079	3,254	3,435	3,623	3,817	4,017	4,223	4,435	4,652	4,875	5,104
OSV	2	3	3	3	3	3	3	3	4	4	4
Total	**10,940**	**11,440**	**11,955**	**12,483**	**13,024**	**13,578**	**14,145**	**14,724**	**15,315**	**15,917**	**16,529**
PCU	**30,410**	**31,832**	**33,296**	**34,799**	**36,342**	**37,924**	**39,542**	**41,197**	**42,886**	**44,609**	**46,362**

Source: Steer analysis

B.3 This section presents the detailed revenue forecasts in INR crore for the forecast period until FY43, year of expected close of the concession. The following tables show the revenue forecasts.

Table B.9: AB Raibha: Revenue forecasts

Vehicle Category	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32
CJV	4	5	6	6	7	8	9	9	11	12	13
Mini LCV	-	0	0	1	1	1	1	1	1	1	1
LCV	0	0	1	1	1	1	1	1	1	1	1
Bus	2	2	2	2	2	2	2	3	3	3	3
2A	15	17	19	20	22	25	27	29	31	34	37
3A	16	19	21	22	24	27	29	32	35	39	42
MAV	40	47	51	52	59	67	74	82	91	101	112
Total	**77**	**90**	**99**	**104**	**116**	**129**	**143**	**157**	**172**	**190**	**209**

Source: Steer analysis

Table B.10: AB Raibha Revenue forecasts

Vehicle Category	FY33	FY34	FY35	FY36	FY37	FY38	FY39	FY40	FY41	FY42	FY43
CJV	14	16	18	20	22	24	26	29	32	35	39
Mini LCV	1	1	1	1	1	1	1	1	2	2	2
LCV	1	1	1	1	1	1	1	2	2	2	2
Bus	4	4	4	4	5	5	5	6	6	7	7
2A	40	43	47	51	55	59	64	69	74	80	87
3A	46	51	55	61	66	72	79	86	93	101	111
MAV	124	137	152	168	185	205	225	248	272	299	327
Total	**230**	**253**	**278**	**306**	**335**	**368**	**403**	**441**	**481**	**526**	**574**

Source: Steer analysis

Table B.11: BK Darodha: Revenue forecasts

Vehicle Category	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32
CJV	4	5	6	7	7	8	9	10	11	12	13
Mini LCV	1	1	1	1	2	2	2	2	2	2	3
LCV	2	2	3	3	3	4	4	4	4	5	5
Bus	-	2	3	3	3	3	3	4	4	4	4
2A	16	18	20	22	24	25	26	28	29	32	35
3A	17	21	24	26	28	30	32	35	37	40	44
MAV	30	40	46	51	56	61	65	71	77	86	95
Total	**69**	**89**	**102**	**112**	**123**	**132**	**141**	**152**	**165**	**181**	**200**

Source: Steer analysis

Table B.12: BK Darodha: Revenue forecasts

Vehicle Category	FY33	FY34	FY35	FY36	FY37	FY38	FY39	FY40	FY41	FY42	FY43
CJV	15	16	18	20	22	24	27	30	33	36	39
Mini LCV	3	3	3	3	4	4	4	5	5	5	6
LCV	5	6	6	7	7	8	8	9	10	10	11
Bus	5	5	5	6	6	6	7	7	8	8	9
2A	37	41	44	48	51	56	60	65	70	75	81
3A	48	52	57	62	68	74	80	87	93	101	110
MAV	105	117	129	143	157	174	191	211	231	254	278
Total	**218**	**240**	**263**	**289**	**316**	**346**	**377**	**413**	**450**	**490**	**534**

Source: Steer analysis

Table B.13: BK Kelapur: Revenue forecasts

Vehicle Category	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32
CJV	2	3	3	4	4	4	5	5	6	7	7
Mini LCV	1	1	1	1	1	1	1	2	2	2	2
LCV	2	2	2	3	3	3	3	3	4	4	4
Bus	-	3	3	3	3	4	4	4	4	5	5
2A	18	16	18	20	22	23	24	25	27	29	32
3A	17	20	22	24	26	29	30	33	35	38	42
MAV	31	38	44	48	53	58	62	68	74	82	91
Total	**71**	**83**	**94**	**103**	**113**	**122**	**129**	**140**	**152**	**166**	**183**

Source: Steer analysis

Table B.14: BK Kelapur: Revenue forecasts

Vehicle Category	FY33	FY34	FY35	FY36	FY37	FY38	FY39	FY40	FY41	FY42	FY43
CJV	8	9	10	11	12	14	15	17	18	20	22
Mini LCV	2	2	2	3	3	3	3	4	4	4	4
LCV	5	5	5	6	6	7	7	8	8	9	10
Bus	5	6	6	7	7	7	8	8	9	10	10
2A	34	37	40	44	47	51	55	59	64	69	74
3A	45	49	54	59	63	69	75	81	88	95	103
MAV	101	111	124	137	151	166	183	202	221	242	266
Total	**201**	**220**	**241**	**266**	**290**	**317**	**346**	**379**	**413**	**449**	**489**

Source: Steer analysis

Table B.15: BK Kelapur New: Revenue forecasts

Vehicle Category	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33
CJV	3	4	4	4	5	5	6	7	7	8	9
Mini LCV	1	1	1	1	2	2	2	2	2	2	2
LCV	2	3	3	3	3	3	4	4	4	4	5
Bus	3	3	3	4	4	4	4	5	5	5	6
2A	17	19	21	23	24	25	26	28	31	33	36
3A	20	22	24	26	28	30	32	35	38	41	45
MAV	37	43	47	52	57	61	66	73	80	90	99
Total	**84**	**95**	**104**	**113**	**123**	**130**	**141**	**153**	**168**	**184**	**202**

Source: Steer analysis

Table B.16: BK Kelapur New: Revenue forecasts

Vehicle Category	FY34	FY35	FY36	FY37	FY38	FY39	FY40	FY41	FY42	FY43	FY44
CJV	10	11	12	13	15	16	18	20	22	24	10
Mini LCV	3	3	3	3	4	4	4	4	5	5	3
LCV	5	6	6	7	7	8	8	9	9	10	5
Bus	6	6	7	7	8	8	9	9	10	10	6
2A	39	42	46	50	53	58	63	67	72	78	39
3A	49	54	58	63	69	75	81	88	95	103	49
MAV	109	121	134	148	163	179	198	216	238	261	109
Total	**222**	**243**	**266**	**291**	**318**	**348**	**380**	**413**	**451**	**492**	**222**

Source: Steer analysis

C Vehicle Classification Chart

Vehicle Type	Description
2-Wheeler	
Auto-Rickshaw	
Car/Jeep/Van	
Taxi- shared/private	
Buses (govt/Pvt)	
Mini Bus	

Vehicle Type	Description
Mini LCV	
LCV 4 Tyre	
LCV 6 Tyre	
2 Axle Truck	
3 Axle Truck	
4 Axle Truck (MAV)	
5 Axle Truck (MAV)	

Vehicle Type	Description
6 Axle Truck (MAV)	
Oversized Vehicle/ Earth moving equipment (OSV)	

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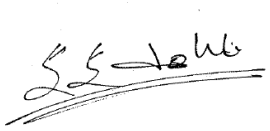

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NOTE ON TRAFFIC AND REVENUE ESTIMATES

Project name	**Traffic Study of Five NHAI InvIT Assets**
Client	**NATIONAL HIGHWAYS INFRA INVESTMENT MANAGERS PRIVATE LIMITED**
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Note on Traffic and Revenue Estimates Based on Recent Data

National Highways Infra Investment Managers Private Limited (NHIIMPL) on behalf of National Highways Infra Trust has appointed Ramboll India Private Ltd as a traffic consultant to carry out a review of the earlier traffic and revenue forecasts pertaining to the report submitted in the month of May 2022 for five InvIT assets with respect to the latest traffic and revenue data. The earlier reports contained a comprehensive coverage of traffic levels, travel pattern and revenue estimation for the projects, duly considering the network characteristics and future economic perspective in the influence area of the projects containing traffic data till April 2022. NHIIMPL has provided latest 3 months data from May 2022 to July 2022 and has requested to provide a note covering the impact of these recent data points on the projections presented in the report. This note presents the analysis base on the traffic data and revenue received from NHIIMPL and the recommendations thereafter. The list of five InvIT assets is provided in **Table 1**.

Sl No	Projects	Toll Plazas
1	Abu Road – Swaroopganj (AS)	Undavariya
2	Abu Road – Palanpur (AP)	Khemana
3	Chittorgarh – Kota (CK)	Bassi
		Aroli
		Dhaneshwar
4	Kagal – Belgaum (KB)	Kognoli
		Hattargi
5	Kothakota – Kurnool (KK)	Pullur

Table 1: List of NHAI InvIT Assets

For the present study, three months of additional data from May 2022 to July 2022 was provided. The month-on-month traffic profile from January 2021 to July 2022 based on the toll data for the five assets is presented in **Figure 1**.

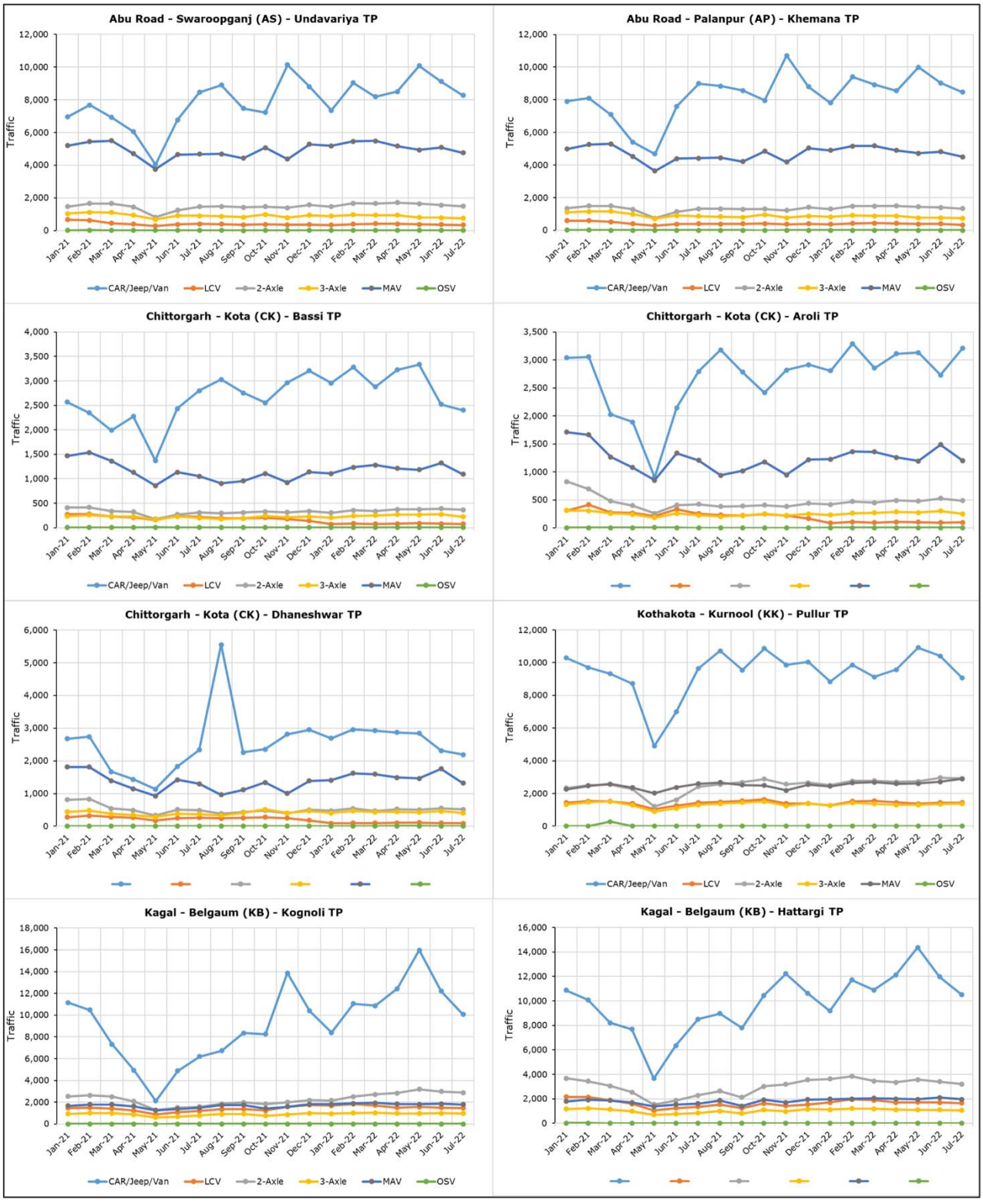

Figure 1: Traffic Profile from January 2021 to July 2022 for Five InvIT Assets

The month-on-month traffic profile indicates that overall, there was a dip in traffic in Q1 of FY22 due to the impact of 2nd wave of Covid-19. Undavariya toll plaza, Khemana toll plaza and three toll plazas on Chittorgarh – Kota asset witnessed a decline in traffic between April 2021 and June 2021. The asset Kagal – Belgaum witnessed a higher dip in traffic from April 2021 to June 2021 as in other assets. Further in case of Kagal – Belgaum, the months of July 2021 and August 2021 were also impacted due to enforcement of strict border controls in place (with the Covid negative tests required for people crossing state borders) for movements of passenger vehicles, resulting in a significant drop in passenger traffic volumes. In case of Kothakota – Kurnool, the traffic on the asset was impacted majorly in the months of May 2021 and June 2021. Traffic has picked up steadily from July 2021 onwards for all the assets except Kagal-Belgaum where a recovery was observed from September 2021.

The monthly traffic and revenue from January 2021 to July 2022 received for all the assets have been presented in **Annexure 1.**

In terms of tolling segmentation, with the InvIT Team taking over operations of these assets from June 2022, there has been reduction in exemptions and violations in some of the assets. Notably, Bassi and Dhaneshwar toll plazas of Chittorgarh – Kota asset have witnessed about 14-18 percent reduction in non-paying traffic whereas Aroli toll plaza has witnessed about 4 percent reduction. The updated segmentation for FY23 has been worked out by considering the actual segmentation from April to June 2022 and the segmentation of July 2022 applicable for the rest of the year. The weighted tolling segmentation for all the five assets has been presented in **Annexure 2.**

With the availability of four months of toll data from April 2022 to July 2022, an assessment of the updated forecast for FY23 is carried out. For this purpose, seasonality profiles have been developed for each of these five assets using FY22 traffic data. Since traffic across all the assets was impacted in Q1 of FY22 (April 2021 to June 2021), corrections were made to Q1 traffic of FY22 to arrive at a normalized seasonality profile for all the assets except KB where in July and August also showed considerable dip. In case of KB, the seasonality profile from one of the operational assets in the vicinity has been used.

Using this derived month-on-month seasonality profile on earlier forecasted FY23 AADT, monthly traffic for FY23 was estimated for all the assets. Revised FY23 AADT has been derived by considering 4 months of actual traffic and 8 months of forecasted traffic based on seasonality profile. The comparison of revised FY23 AADT and the forecast for FY23 as in the earlier study is presented in **Table 2.**

Toll Plazas	Particulars	CJV	LCV	2-Axle	3-Axle	MAV	OSV	Total vehicles	PCUs
Abu Road – Swaroopganj (AS)									
Undavariya	Earlier FY23 AADT	8,919	629	1,582	937	5,282	5	17,354	41,210
	Revised AADT	8,902	539	1,623	893	5,262	6	17,225	40,962
	% Variation	-0.2%	-14.3%	2.6%	-4.6%	-0.4%	4.2%	-0.7%	-0.6%
Abu Road – Palanpur (AP)									
Khemana	Earlier FY23 AADT	9,388	709	1,413	896	5,024	5	17,435	40,009
	Revised AADT	9,262	592	1,423	843	4,955	5	17,081	39,270
	% Variation	-1.4%	-16.4%	0.7%	-5.9%	-1.4%	0.4%	-2.0%	-1.8%
Chittorgarh – Kota (CK)									
Bassi	Earlier FY23 AADT	3,199	141	340	233	1,170	2	5,086	10,406
	Revised AADT	3,107	109	355	245	1,193	2	5,012	10,452
	% Variation	-2.9%	-22.4%	4.3%	5.2%	2.0%	2.9%	-1.4%	0.4%
Aroli	Earlier FY23 AADT	3,161	138	445	256	1,258	1	5,260	11,139
	Revised AADT	3,110	116	465	268	1,281	2	5,242	11,254
	% Variation	-1.6%	-15.6%	4.5%	4.4%	1.8%	43.1%	-0.3%	1.0%
Dhaneshwar	Earlier FY23 AADT	2,943	129	490	448	1,418	2	5,430	12,340
	Revised AADT	2,840	111	492	458	1,452	3	5,356	12,404
	% Variation	-3.5%	-14.4%	0.5%	2.4%	2.4%	39.6%	-1.4%	0.5%
Kagal – Belgaum (KB)									
Kognoli	Earlier FY23 AADT	10,656	1,382	2,231	947	1,845	5	17,066	30,588
	Revised AADT	11,395	1,462	2,513	970	1,865	5	18,210	32,453
	% Variation	6.9%	5.8%	12.6%	2.4%	1.1%	0.3%	6.7%	6.1%
Hattargi	Earlier FY23 AADT	10,997	1,736	3,197	1,085	1,978	7	19,001	35,384
	Revised AADT	11,481	1,771	3,307	1,105	2,017	7	19,687	36,480
	% Variation	4.4%	2.0%	3.4%	1.9%	1.9%	-3.0%	3.6%	3.1%
Kothakota – Kurnool (KK)									
Pullur	Earlier FY23 AADT	10,610	1,595	2,717	1,392	2,723	2	19,040	37,594
	Revised AADT	10,394	1,547	2,822	1,382	2,718	2	18,865	37,567
	% Variation	-2.0%	-3.0%	3.8%	-0.7%	-0.2%	4.5%	-0.9%	-0.1%

Table 2: Comparison of Revised FY23 AADT with FY23 AADT in Earlier Study

The above analysis indicates that revised AADTs are within +/- 1 to 2 percent of earlier forecasted AADTs for all the projects except Kagal – Belgaum where revised AADTs in PCU terms are 6.1 percent higher at Kognoli and 3.1 percent higher at Hattargi toll plaza. The variation is minimum in Kothakota – Kurnool project. At the portfolio level, on an average revised PCUs are higher by 1.2 percent as compared to the earlier forecasted FY23 PCUs.

An assessment of revised AADT for FY23 was also done using seasonality profiles from nearby projects to check the variation. The analysis based on this indicated similar variation of traffic, giving confidence in the current assessment based on correction of Q1 data in assets' seasonality profile.

A comparison of the revenue estimates for revised FY23 (using revised AADT and the weighted toll segmentation) with the revenue forecast of earlier Report is presented in **Table 3**.

Toll Plazas	Toll Revenue	Toll Revenue in Report	Absolute Gain/Loss	Variation from Report
AS				
Undavariya	664.6	677.9	-13.3	-2.0%
AP				
Khemana	973.1	998.8	-25.7	-2.6%
CK				
Bassi	311.6	301.5	10.1	3.4%
Aroli	291.8	289.6	2.2	0.7%
Dhaneshwar	315.4	303.2	12.3	4.0%
Total	918.8	894.2	24.6	2.7%
KB				
Kognoli	713.2	683.1	30.0	4.4%
Hattargi	316.2	303.1	13.1	4.3%
Total	1,029.4	986.3	43.1	4.4%
KK				
Pullur	1,756.7	1,756.8	-0.1	0.0%
Total of Five InvIT Projects				
Portfolio Total	5,342.6	5,314.0	28.7	0.5%

Table 3: Comparison of Revenue Estimates (FY23) for all the Assets (₹ Million)

The revised AADT and toll segmentation in case of AS and AP assets results in a negative variation of about 2.5 percent whereas CK indicated a positive variation of 2.7 percent. In case of KK asset, the revised revenue estimate is almost same as the earlier revenue for FY23. In case of KB, based on the recent data sets, the revenue is likely to witness a positive variation of 4.4 percent. Overall, on the portfolio level, there may be about 0.5 percent positive variation in toll revenue for FY23.

On the basis of this analysis, it can be confirmed that the previous estimates of traffic and revenue for these assets provided in May 2022 report for FY23 and beyond can still be considered as valid.

ANNEXURES

ANNEXURE -1
PAST TRAFFIC & REVENUE

Traffic Study of Five NHAI InvIT Assets
Monthly Traffic for 5 Assets

Asset : Abu Road – Swaroopganj (AS)
Toll Plaza : Undavariya

Month	CJV	LCV	2-Axle	3-Axle	MAV	OSV	Total Traffic	PCUs
Jan-21	6,951	662	1,465	1,033	5,194	9	15,315	38,855
Feb-21	7,682	629	1,655	1,117	5,446	17	16,546	41,527
Mar-21	6,925	455	1,655	1,105	5,501	11	15,651	40,690
Apr-21	6,048	393	1,447	946	4,707	7	13,549	35,031
May-21	4,038	282	814	677	3,761	5	9,578	25,885
Jun-21	6,772	374	1,247	914	4,640	6	13,953	34,724
Jul-21	8,466	402	1,459	902	4,672	6	15,906	37,201
Aug-21	8,897	400	1,473	879	4,692	4	16,346	37,687
Sep-21	7,468	359	1,429	817	4,426	2	14,501	34,671
Oct-21	7,231	376	1,464	977	5,075	3	15,127	37,972
Nov-21	10,129	349	1,399	798	4,372	4	17,051	36,934
Dec-21	8,808	372	1,576	937	5,280	5	16,978	40,688
Jan-22	7,349	344	1,463	884	5,181	6	15,227	38,249
Feb-22	9,038	393	1,670	975	5,453	5	17,534	42,123
Mar-22	8,193	416	1,659	944	5,484	7	16,704	41,338
Apr-22	8,497	401	1,713	938	5,173	8	16,730	40,367
May-22	10,075	374	1,649	810	4,939	5	17,852	40,262
Jun-22	9,122	372	1,561	786	5,086	6	16,933	39,633
Jul-22	8,273	345	1,491	749	4,761	9	15,627	36,973

Asset : Abu Road – Palanpur (AP)
Toll Plaza : Khemana

Month	CJV	LCV	2-Axle	3-Axle	MAV	OSV	Total Traffic	PCUs
Jan-21	7,910	597	1,348	1,110	4,978	13	15,956	38,639
Feb-21	8,095	598	1,497	1,149	5,252	15	16,605	40,626
Mar-21	7,099	523	1,499	1,166	5,296	8	15,591	39,747
Apr-21	5,412	403	1,297	987	4,525	6	12,630	33,259
May-21	4,680	295	746	717	3,638	5	10,081	25,905
Jun-21	7,609	386	1,141	905	4,389	6	14,435	34,101
Jul-21	8,991	403	1,314	870	4,414	6	15,998	36,036
Aug-21	8,837	390	1,317	842	4,448	4	15,837	35,931
Sep-21	8,568	400	1,290	800	4,209	3	15,270	34,390
Oct-21	7,958	419	1,310	961	4,849	2	15,499	37,229
Nov-21	10,697	369	1,226	771	4,181	4	17,248	36,071
Dec-21	8,801	399	1,409	882	5,035	5	16,531	38,954
Jan-22	7,813	377	1,313	826	4,900	6	15,235	36,873
Feb-22	9,406	423	1,478	928	5,165	6	17,405	40,525
Mar-22	8,925	441	1,482	886	5,179	7	16,921	40,031
Apr-22	8,549	430	1,505	887	4,905	8	16,283	38,474
May-22	9,986	393	1,438	776	4,722	5	17,321	38,491
Jun-22	9,031	401	1,398	777	4,817	5	16,428	37,855
Jul-22	8,467	332	1,334	740	4,506	7	15,386	35,494

Traffic Study of Five NHAI InvIT Assets
Monthly Traffic for 5 Assets

Asset : Chittorgarh – Kota (CK)
Toll Plaza : Bassi

Month	CJV	LCV	2-Axle	3-Axle	MAV	OSV	Total Traffic	PCUs
Jan-21	2,567	274	410	237	1,470	4	4,962	11,553
Feb-21	2,347	279	416	261	1,536	4	4,842	11,725
Mar-21	1,989	226	336	233	1,361	3	4,149	10,176
Apr-21	2,275	211	324	227	1,129	2	4,168	9,335
May-21	1,370	156	178	169	858	6	2,737	6,533
Jun-21	2,432	241	268	226	1,133	4	4,304	9,393
Jul-21	2,801	218	309	199	1,051	1	4,580	9,389
Aug-21	3,030	197	298	179	906	1	4,610	8,835
Sep-21	2,753	189	310	192	955	1	4,399	8,844
Oct-21	2,553	206	328	239	1,108	1	4,436	9,555
Nov-21	2,966	177	315	214	921	1	4,595	8,971
Dec-21	3,210	140	336	229	1,140	2	5,056	10,251
Jan-22	2,956	72	305	204	1,107	3	4,647	9,585
Feb-22	3,280	85	355	241	1,232	2	5,196	10,751
Mar-22	2,880	75	338	250	1,279	3	4,824	10,523
Apr-22	3,228	83	372	270	1,214	2	5,168	10,749
May-22	3,337	88	375	264	1,183	3	5,250	10,721
Jun-22	2,520	81	388	272	1,324	2	4,588	10,591
Jul-22	2,401	78	367	223	1,094	3	4,166	9,223

Asset : Chittorgarh – Kota (CK)
Toll Plaza : Aroli

Month	CJV	LCV	2-Axle	3-Axle	MAV	OSV	Total Traffic	PCUs
Jan-21	3,039	310	828	310	1,713	4	6,204	14,644
Feb-21	3,056	417	695	309	1,662	4	6,144	14,194
Mar-21	2,028	277	481	259	1,267	3	4,315	10,376
Apr-21	1,894	268	400	243	1,080	2	3,886	9,093
May-21	902	214	258	185	854	6	2,419	6,421
Jun-21	2,150	335	409	261	1,336	4	4,494	10,689
Jul-21	2,797	255	425	228	1,208	1	4,915	10,580
Aug-21	3,179	231	383	205	938	1	4,938	9,517
Sep-21	2,783	224	392	221	1,022	1	4,642	9,558
Oct-21	2,415	246	408	253	1,180	1	4,503	10,083
Nov-21	2,820	220	385	225	948	1	4,599	9,250
Dec-21	2,916	166	440	252	1,219	1	4,994	10,731
Jan-22	2,810	89	420	231	1,227	2	4,780	10,429
Feb-22	3,293	107	473	263	1,365	2	5,503	11,811
Mar-22	2,855	96	453	272	1,360	3	5,040	11,310
Apr-22	3,113	106	490	289	1,259	2	5,259	11,284
May-22	3,132	104	480	275	1,194	2	5,188	10,939
Jun-22	2,733	95	527	304	1,490	2	5,152	12,083
Jul-22	3,210	99	488	253	1,205	3	5,258	11,020

Asset : Chittorgarh – Kota (CK)
Toll Plaza : Dhaneshwar

Month	CJV	LCV	2-Axle	3-Axle	MAV	OSV	Total Traffic	PCUs
Jan-21	2,676	274	813	442	1,813	4	6,022	15,031
Feb-21	2,738	327	829	481	1,815	4	6,194	15,344
Mar-21	1,670	285	545	379	1,394	2	4,275	11,153
Apr-21	1,434	260	488	348	1,147	2	3,680	9,504
May-21	1,136	171	333	282	928	5	2,855	7,436
Jun-21	1,825	247	512	385	1,420	3	4,391	11,288
Jul-21	2,333	260	486	372	1,299	1	4,751	11,147
Aug-21	5,554	243	389	331	963	1	7,481	12,416
Sep-21	2,259	256	435	412	1,111	1	4,474	10,186
Oct-21	2,356	278	479	515	1,341	1	4,970	11,793
Nov-21	2,817	246	400	408	1,004	1	4,876	10,132
Dec-21	2,951	178	500	466	1,386	1	5,482	12,359
Jan-22	2,690	88	476	410	1,408	2	5,074	11,825
Feb-22	2,956	101	542	467	1,622	2	5,690	13,441
Mar-22	2,922	101	472	435	1,594	4	5,528	12,984
Apr-22	2,870	105	521	443	1,492	6	5,436	12,658
May-22	2,839	110	500	426	1,461	6	5,342	12,382
Jun-22	2,312	98	548	460	1,758	5	5,181	13,418
Jul-22	2,189	94	517	407	1,318	3	4,529	11,049

Traffic Study of Five NHAI InvIT Assets
Monthly Traffic for 5 Assets

Asset : Kagal – Belgaum (KB)
Toll Plaza : Kognoli

Month	CJV	LCV	2-Axle	3-Axle	MAV	OSV	Total Traffic	PCUs
Jan-21	11,162	1,461	2,527	936	1,658	5	17,749	31,225
Feb-21	10,471	1,498	2,633	1,008	1,787	6	17,403	31,708
Mar-21	7,329	1,410	2,516	985	1,796	5	14,041	28,051
Apr-21	4,929	1,226	2,085	865	1,621	4	10,730	22,932
May-21	2,116	883	1,273	600	1,249	2	6,123	14,687
Jun-21	4,885	1,075	1,501	681	1,368	3	9,514	19,214
Jul-21	6,201	1,201	1,593	777	1,477	5	11,253	21,781
Aug-21	6,739	1,354	1,861	907	1,724	5	12,590	24,856
Sep-21	8,354	1,387	1,976	926	1,745	4	14,392	27,011
Oct-21	8,252	1,234	1,841	766	1,412	5	13,509	24,298
Nov-21	13,876	1,575	2,002	873	1,590	5	19,920	32,040
Dec-21	10,394	1,749	2,177	984	1,817	5	17,126	30,699
Jan-22	8,404	1,694	2,156	940	1,817	5	15,017	28,433
Feb-22	11,061	1,832	2,513	1,009	1,884	5	18,304	32,874
Mar-22	10,861	1,707	2,716	1,033	1,938	8	18,262	33,425
Apr-22	12,430	1,497	2,837	973	1,839	6	19,582	34,408
May-22	15,975	1,555	3,188	972	1,813	5	23,509	38,969
Jun-22	12,197	1,509	2,994	983	1,855	4	19,542	34,758
Jul-22	10,065	1,456	2,885	965	1,788	6	17,166	31,873

Asset : Kagal – Belgaum (KB)
Toll Plaza : Hattargi

Month	CJV	LCV	2-Axle	3-Axle	MAV	OSV	Total Traffic	PCUs
Jan-21	10,862	2,153	3,678	1,169	1,791	10	19,663	36,737
Feb-21	10,074	2,143	3,431	1,218	1,925	12	18,804	35,954
Mar-21	8,219	1,892	3,050	1,132	1,870	9	16,171	32,055
Apr-21	7,682	1,596	2,548	982	1,698	7	14,514	28,340
May-21	3,666	1,036	1,541	694	1,366	4	8,307	18,089
Jun-21	6,339	1,253	1,870	775	1,533	5	11,774	23,072
Jul-21	8,508	1,354	2,286	848	1,608	7	14,611	27,208
Aug-21	8,963	1,541	2,629	1,005	1,869	8	16,014	30,621
Sep-21	7,796	1,250	2,129	809	1,418	4	13,406	24,882
Oct-21	10,436	1,621	3,020	1,105	1,926	7	18,115	33,942
Nov-21	12,215	1,429	3,187	976	1,708	6	19,520	34,559
Dec-21	10,617	1,543	3,545	1,147	1,944	7	18,802	35,784
Jan-22	9,191	1,692	3,630	1,114	1,977	7	17,610	34,885
Feb-22	11,703	1,958	3,834	1,203	2,002	7	20,707	38,790
Mar-22	10,878	1,877	3,451	1,188	2,040	9	19,444	36,835
Apr-22	12,118	1,706	3,357	1,124	1,999	7	20,309	37,141
May-22	14,360	1,712	3,572	1,106	1,954	6	22,710	39,783
Jun-22	11,967	1,705	3,401	1,104	2,100	6	20,284	37,519
Jul-22	10,505	1,646	3,196	1,057	1,966	7	18,377	34,611

Asset : Kothakota – Kurnool (KK)
Toll Plaza : Pullur

Month	CJV	LCV	2-Axle	3-Axle	MAV	OSV	Total Traffic	PCUs
Jan-21	10,297	1,436	2,335	1,316	2,251	3	17,639	33,550
Feb-21	9,706	1,528	2,498	1,468	2,462	2	17,665	34,987
Mar-21	9,324	1,523	2,539	1,509	2,580	278	17,753	36,613
Apr-21	8,724	1,393	2,280	1,278	2,355	2	16,033	32,097
May-21	4,900	1,031	1,211	893	2,019	1	10,055	21,850
Jun-21	6,998	1,253	1,617	1,081	2,376	2	13,326	27,670
Jul-21	9,632	1,440	2,403	1,297	2,592	2	17,365	34,562
Aug-21	10,720	1,474	2,551	1,380	2,671	2	18,799	36,756
Sep-21	9,546	1,548	2,687	1,437	2,512	2	17,733	35,553
Oct-21	10,868	1,632	2,886	1,512	2,493	2	19,393	37,738
Nov-21	9,859	1,392	2,571	1,239	2,188	3	17,252	33,235
Dec-21	10,048	1,390	2,653	1,373	2,537	3	18,004	35,640
Jan-22	8,842	1,266	2,496	1,257	2,433	2	16,296	32,956
Feb-22	9,855	1,513	2,763	1,426	2,642	3	18,202	36,592
Mar-22	9,127	1,544	2,771	1,363	2,688	3	17,496	35,952
Apr-22	9,568	1,458	2,715	1,301	2,591	3	17,636	35,474
May-22	10,922	1,379	2,736	1,300	2,607	2	18,947	36,842
Jun-22	10,406	1,436	2,961	1,344	2,710	1	18,858	37,675
Jul-22	9,063	1,440	2,927	1,373	2,897	2	17,702	37,169

Traffic Study of Five NHAI InvIT Assets
Monthly Revenue for 5 Assets (Rs Million)

Asset : Abu Road – Swaroopganj (AS)
Toll Plaza : Undavariya

Month	CJV	LCV	2-Axle	3-Axle	MAV	OSV	Total Revenue
Jan-21	5.92	1.20	5.34	4.43	31.60	0.07	48.57
Feb-21	5.74	1.01	5.43	4.29	29.70	0.11	46.28
Mar-21	4.94	0.81	6.06	4.69	33.43	0.07	50.01
Apr-21	3.65	0.66	5.28	4.08	29.12	0.05	42.84
May-21	2.44	0.42	3.14	3.01	24.08	0.04	33.14
Jun-21	4.30	0.53	4.57	3.83	28.18	0.04	41.46
Jul-21	5.97	0.60	5.50	3.95	29.59	0.04	45.65
Aug-21	6.33	0.63	5.58	3.90	29.89	0.03	46.37
Sep-21	5.11	0.58	5.26	3.55	27.59	0.02	42.11
Oct-21	5.08	0.63	5.56	4.39	32.57	0.02	48.24
Nov-21	7.50	0.57	5.09	3.48	27.30	0.03	43.97
Dec-21	6.13	0.64	5.97	4.21	33.82	0.04	50.80
Jan-22	4.95	0.63	5.58	3.97	33.01	0.05	48.19
Feb-22	5.92	0.65	5.72	3.95	31.44	0.04	47.71
Mar-22	5.70	0.75	6.32	4.24	35.24	0.05	52.30
Apr-22	6.22	0.71	6.97	4.50	35.26	0.07	53.72
May-22	7.88	0.69	6.90	4.00	34.86	0.05	54.37
Jun-22	6.92	0.66	6.34	3.76	34.58	0.05	52.30
Jul-22	6.44	0.65	6.31	3.71	33.69	0.07	50.88

Asset : Abu Road – Palanpur (AP)
Toll Plaza : Khemana

Month	CJV	LCV	2-Axle	3-Axle	MAV	OSV	Total Revenue
Jan-21	7.71	1.49	7.63	6.17	46.95	0.15	70.10
Feb-21	7.29	1.38	7.62	6.04	44.50	0.16	66.98
Mar-21	6.42	1.27	8.54	6.78	50.58	0.09	73.69
Apr-21	4.78	0.98	7.53	5.87	43.42	0.07	62.64
May-21	3.19	0.70	4.56	4.29	36.00	0.06	48.81
Jun-21	6.36	0.89	6.71	5.38	41.78	0.07	61.20
Jul-21	8.47	0.98	7.95	5.72	43.81	0.07	67.01
Aug-21	8.36	0.97	8.02	5.73	44.63	0.05	67.76
Sep-21	7.37	0.95	7.60	5.31	41.22	0.03	62.48
Oct-21	6.82	1.00	7.95	6.56	48.66	0.03	71.02
Nov-21	10.81	0.87	7.14	5.14	40.76	0.04	64.76
Dec-21	8.33	0.99	8.59	6.15	50.75	0.07	74.87
Jan-22	6.75	0.91	8.03	5.66	49.18	0.07	70.61
Feb-22	8.04	0.93	8.09	5.68	46.84	0.06	69.64
Mar-22	8.24	1.06	9.02	6.08	52.45	0.09	76.94
Apr-22	8.26	1.08	9.65	6.49	53.01	0.10	78.60
May-22	11.05	1.04	9.45	5.87	52.68	0.07	80.16
Jun-22	9.56	1.00	8.92	5.65	51.82	0.07	77.03
Jul-22	8.83	0.96	8.91	5.61	50.32	0.09	74.71

Traffic Study of Five NHAI InvIT Assets
Monthly Revenue for 5 Assets (Rs Million)

Asset : Chittorgarh – Kota (CK)
Toll Plaza : Bassi

Month	CJV	LCV	2-Axle	3-Axle	MAV	OSV	Total Revenue
Jan-21	3.69	0.84	2.76	1.76	15.91	0.06	25.01
Feb-21	3.12	0.76	2.47	1.73	14.91	0.05	23.05
Mar-21	2.97	0.66	2.15	1.77	14.87	0.04	22.45
Apr-21	2.48	0.61	2.13	1.77	12.77	0.03	19.79
May-21	1.21	0.47	1.26	1.35	10.20	0.08	14.58
Jun-21	2.71	0.69	1.79	1.74	12.85	0.04	19.83
Jul-21	3.71	0.68	2.12	1.59	12.27	0.02	20.38
Aug-21	4.31	0.68	2.10	1.47	10.74	0.01	19.30
Sep-21	3.55	0.63	2.12	1.54	10.95	0.01	18.79
Oct-21	3.27	0.71	2.32	1.96	13.10	0.02	21.37
Nov-21	3.69	0.59	2.15	1.70	10.66	0.01	18.81
Dec-21	4.02	0.49	2.39	1.89	13.51	0.03	22.32
Jan-22	3.66	0.26	2.15	1.70	13.07	0.04	20.87
Feb-22	3.84	0.27	2.25	1.78	13.14	0.03	21.31
Mar-22	3.68	0.27	2.40	2.03	15.05	0.05	23.48
Apr-22	4.19	0.31	2.82	2.35	15.35	0.04	25.06
May-22	4.69	0.34	2.89	2.39	15.33	0.04	25.68
Jun-22	4.54	0.30	2.87	2.37	16.41	0.03	26.53
Jul-22	4.68	0.30	2.84	2.03	14.34	0.05	24.24

Asset : Chittorgarh – Kota (CK)
Toll Plaza : Aroli

Month	CJV	LCV	2-Axle	3-Axle	MAV	OSV	Total Revenue
Jan-21	3.92	0.89	5.22	2.10	17.31	0.05	29.49
Feb-21	3.71	1.06	4.22	1.88	15.03	0.04	25.95
Mar-21	3.21	0.74	3.14	1.71	12.56	0.03	21.38
Apr-21	2.68	0.67	2.29	1.61	10.79	0.02	18.06
May-21	1.10	0.45	1.53	1.26	8.78	0.06	13.19
Jun-21	2.76	0.68	2.32	1.69	13.01	0.04	20.50
Jul-21	3.73	0.70	2.54	1.57	12.24	0.01	20.79
Aug-21	4.66	0.68	2.31	1.43	9.70	0.01	18.78
Sep-21	3.62	0.63	2.30	1.49	10.16	0.01	18.22
Oct-21	3.33	0.71	2.47	1.75	12.13	0.01	20.41
Nov-21	3.91	0.62	2.26	1.52	9.48	0.01	17.79
Dec-21	4.13	0.49	2.68	1.75	12.50	0.02	21.56
Jan-22	3.89	0.27	2.54	1.62	12.52	0.03	20.86
Feb-22	4.13	0.29	2.60	1.66	12.62	0.02	21.32
Mar-22	3.94	0.29	2.74	1.87	13.81	0.04	22.68
Apr-22	4.37	0.34	3.20	2.15	13.76	0.03	23.84
May-22	4.69	0.35	3.31	2.17	13.82	0.03	24.38
Jun-22	4.60	0.30	3.43	2.23	15.94	0.03	26.53
Jul-22	4.97	0.33	3.34	1.94	13.70	0.05	24.32

Asset : Chittorgarh – Kota (CK)
Toll Plaza : Dhaneshwar

Month	CJV	LCV	2-Axle	3-Axle	MAV	OSV	Total Revenue
Jan-21	3.49	0.82	4.84	2.92	17.74	0.05	29.86
Feb-21	3.23	0.86	4.35	2.82	15.76	0.04	27.06
Mar-21	2.83	0.78	2.92	2.33	12.98	0.03	21.86
Apr-21	2.40	0.69	2.69	2.16	10.76	0.02	18.72
May-21	1.16	0.45	1.85	1.76	8.91	0.06	14.19
Jun-21	2.48	0.63	2.74	2.30	13.04	0.03	21.22
Jul-21	3.06	0.72	2.75	2.33	12.26	0.01	21.13
Aug-21	3.25	0.67	2.27	2.09	9.39	0.01	17.68
Sep-21	2.99	0.69	2.45	2.51	10.39	0.01	19.03
Oct-21	2.75	0.76	2.76	3.18	12.84	0.01	22.30
Nov-21	3.30	0.65	2.25	2.46	9.43	0.01	18.10
Dec-21	3.51	0.50	2.85	2.90	13.21	0.01	22.98
Jan-22	3.39	0.25	2.72	2.57	13.34	0.02	22.29
Feb-22	3.59	0.26	2.80	2.64	13.87	0.02	23.17
Mar-22	3.53	0.29	2.74	2.75	15.08	0.05	24.44
Apr-22	3.84	0.33	3.21	2.99	15.00	0.07	25.44
May-22	4.28	0.35	3.22	3.00	15.23	0.07	26.17
Jun-22	4.07	0.30	3.39	3.10	17.47	0.06	28.38
Jul-22	3.91	0.30	3.40	2.88	13.93	0.04	24.47

Traffic Study of Five NHAI InvIT Assets
Monthly Revenue for 5 Assets (Rs Million)

Asset : Kagal – Belgaum (KB)
Toll Plaza : Kognoli

Month	CJV	LCV	2-Axle	3-Axle	MAV	OSV	Total Revenue
Jan-21	19.40	4.69	16.91	7.58	19.21	0.08	67.88
Feb-21	16.78	4.42	16.09	7.40	18.75	0.08	63.51
Mar-21	11.39	4.57	17.17	8.01	20.90	0.07	62.11
Apr-21	7.80	3.78	14.55	6.94	18.97	0.06	52.10
May-21	3.23	2.64	9.34	4.99	15.00	0.03	35.23
Jun-21	7.53	3.18	10.70	5.47	15.94	0.04	42.87
Jul-21	10.72	3.84	11.91	6.47	17.89	0.07	50.90
Aug-21	12.05	4.42	13.87	7.56	20.93	0.08	58.92
Sep-21	14.98	4.40	14.16	7.47	20.50	0.05	61.56
Oct-21	15.25	3.88	13.34	6.37	17.15	0.07	56.06
Nov-21	25.66	4.06	13.67	6.97	18.62	0.07	69.06
Dec-21	20.15	4.71	16.11	8.15	21.95	0.08	71.15
Jan-22	16.02	4.45	15.89	7.81	21.96	0.07	66.21
Feb-22	19.39	4.36	16.37	7.54	20.57	0.06	68.30
Mar-22	21.21	5.02	19.38	8.55	23.43	0.11	77.70
Apr-22	24.44	5.14	21.19	8.51	23.54	0.09	82.93
May-22	33.17	5.53	24.09	8.70	23.97	0.08	95.53
Jun-22	24.55	5.34	22.25	8.55	23.81	0.07	84.57
Jul-22	19.52	5.51	22.55	8.82	23.85	0.09	80.35

Asset : Kagal – Belgaum (KB)
Toll Plaza : Hattargi

Month	CJV	LCV	2-Axle	3-Axle	MAV	OSV	Total Revenue
Jan-21	8.68	2.88	9.43	3.67	8.14	0.06	32.85
Feb-21	7.12	2.55	7.97	3.45	7.85	0.06	28.99
Mar-21	6.16	2.46	7.81	3.54	8.46	0.05	28.47
Apr-21	5.52	1.99	6.77	3.11	7.67	0.04	25.11
May-21	2.60	1.32	4.36	2.27	6.32	0.02	16.88
Jun-21	4.30	1.46	5.02	2.45	6.86	0.02	20.11
Jul-21	5.86	1.59	6.04	2.78	7.45	0.04	23.76
Aug-21	6.34	1.88	6.98	3.30	8.69	0.04	27.23
Sep-21	5.21	1.41	5.44	2.55	6.40	0.02	21.03
Oct-21	7.42	1.96	7.99	3.60	9.00	0.04	30.00
Nov-21	8.58	1.68	7.98	3.06	7.69	0.04	29.03
Dec-21	7.92	1.95	9.33	3.72	9.05	0.04	32.00
Jan-22	6.70	1.97	9.55	3.61	9.17	0.04	31.03
Feb-22	7.91	2.05	9.07	3.51	8.35	0.03	30.93
Mar-22	8.23	2.28	9.20	3.86	9.51	0.05	33.13
Apr-22	9.25	2.54	9.51	3.84	9.85	0.04	35.03
May-22	11.46	2.69	10.34	3.91	9.96	0.04	38.40
Jun-22	9.19	2.53	9.61	3.79	10.32	0.04	35.48
Jul-22	8.12	2.54	9.50	3.78	10.03	0.04	34.02

Asset : Kothakota – Kurnool (KK)
Toll Plaza : Pullur

Month	CJV	LCV	2-Axle	3-Axle	MAV	OSV	Total Revenue
Jan-21	29.33	8.01	23.97	16.50	39.83	0.06	117.70
Feb-21	24.13	7.38	22.84	16.24	38.87	0.04	109.51
Mar-21	24.86	7.94	25.42	18.16	44.02	0.04	120.44
Apr-21	23.94	6.99	23.05	15.61	41.73	0.04	111.36
May-21	12.93	5.35	13.47	11.36	37.05	0.03	80.19
Jun-21	18.90	6.35	17.39	13.33	42.18	0.03	98.19
Jul-21	27.23	7.58	25.69	16.46	47.59	0.04	124.58
Aug-21	29.83	7.75	27.05	17.47	48.97	0.05	131.13
Sep-21	25.58	7.83	27.65	17.60	44.54	0.04	123.25
Oct-21	30.78	8.47	30.78	19.05	45.72	0.05	134.86
Nov-21	26.69	7.05	26.17	15.04	38.83	0.07	113.86
Dec-21	29.08	7.28	27.94	17.22	46.49	0.06	128.07
Jan-22	25.99	6.54	26.05	15.64	44.24	0.05	118.51
Feb-22	26.78	6.94	25.90	15.82	42.97	0.06	118.46
Mar-22	27.85	7.92	28.67	16.78	48.53	0.06	129.80
Apr-22	30.99	8.03	29.80	17.03	50.11	0.06	136.02
May-22	36.38	7.86	30.81	17.45	51.97	0.05	144.52
Jun-22	33.58	7.96	32.51	17.59	52.43	0.03	144.10
Jul-22	29.96	8.25	33.50	18.68	58.30	0.05	148.74

ANNEXURE -2
TRAFFIC SEGMENTATION

Traffic Study of Five NHAI InvIT Assets

Revised Tolling Segmentation for Five InvIT Assets

Asset : Abu Road – Swaroopganj (AS)
Toll Plaza : Undavariya

Ticket/ Mode	CJV	LCV	2-Axle	3-Axle	MAV	OSV
Single	35.3	61.8	65.7	89.4	89.2	79.1
Return	28.0	32.2	33.2	9.4	9.8	19.3
Monthly	0.0	0.0	0.0	0.0	0.0	0.0
Local Personal	0.0	0.0	0.0	0.0	0.0	0.0
Local Commercial	0.3	0.5	0.5	0.7	1.0	0.0
Exempt/ Violations	36.3	5.5	0.6	0.5	0.1	1.6
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Asset : Abu Road – Palanpur (AP)
Toll Plaza : Khemana

Ticket/ Mode	CJV	LCV	2-Axle	3-Axle	MAV	OSV
Single	34.5	60.0	69.7	87.3	91.9	93.6
Return	18.5	28.6	29.0	11.0	7.1	4.8
Monthly	0.0	0.0	0.0	0.0	0.0	0.0
Local Personal	1.1	0.0	0.0	0.0	0.0	0.0
Local Commercial	0.0	0.2	0.0	0.3	0.4	0.0
Exempt/ Violations	45.9	11.3	1.2	1.4	0.7	1.5
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Asset : Chittorgarh – Kota (CK)
Toll Plaza : Bassi

Ticket/ Mode	CJV	LCV	2-Axle	3-Axle	MAV	OSV
Single	35.6	60.2	49.0	61.1	72.6	90.5
Return	40.5	37.4	40.3	38.7	17.8	7.3
Monthly	0.0	0.0	0.0	0.0	0.0	0.0
Local Personal	0.0	0.0	0.0	0.0	0.0	0.0
Local Commercial	0.1	0.3	10.6	0.1	9.6	0.0
Exempt/ Violations	23.8	2.1	0.2	0.0	0.1	2.2
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Asset : Chittorgarh – Kota (CK)
Toll Plaza : Aroli

Ticket/ Mode	CJV	LCV	2-Axle	3-Axle	MAV	OSV
Single	33.2	54.2	45.4	58.7	69.1	88.4
Return	42.4	45.8	54.6	41.3	30.9	11.6
Monthly	0.0	0.0	0.0	0.0	0.0	0.0
Local Personal	1.8	0.0	0.0	0.0	0.0	0.0
Local Commercial	0.0	0.0	0.0	0.0	0.0	0.0
Exempt/ Violations	22.7	0.1	0.0	0.0	0.0	0.0
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Asset : Chittorgarh – Kota (CK)
Toll Plaza : Dhaneshwar

Ticket/ Mode	CJV	LCV	2-Axle	3-Axle	MAV	OSV
Single	36.9	52.3	46.0	41.9	53.5	60.5
Return	46.5	47.3	51.2	54.0	44.5	39.3
Monthly	0.0	0.0	0.0	0.0	0.0	0.0
Local Personal	0.0	0.0	0.0	0.0	0.0	0.0
Local Commercial	0.0	0.0	2.7	4.0	2.0	0.0
Exempt/ Violations	16.6	0.4	0.1	0.1	0.0	0.2
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Traffic Study of Five NHAI InvIT Assets

Revised Tolling Segmentation for Five InvIT Assets

Asset : Kagal – Belgaum (KB)
Toll Plaza : Kognoli

Ticket/ Mode	CJV	LCV	2-Axle	3-Axle	MAV	OSV
Single	44.5	73.2	65.5	87.5	91.7	99.1
Return	41.3	21.6	28.6	11.7	7.9	0.1
Monthly	0.0	0.0	0.1	0.0	0.0	0.0
Local Personal	4.1	0.0	0.0	0.0	0.0	0.0
Local Commercial	0.0	0.0	5.2	0.0	0.0	0.0
Exempt/ Violations	10.1	5.2	0.6	0.8	0.4	0.8
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Asset : Kagal – Belgaum (KB)
Toll Plaza : Hattargi

Ticket/ Mode	CJV	LCV	2-Axle	3-Axle	MAV	OSV
Single	38.9	71.9	59.5	84.8	87.9	95.5
Return	53.6	23.8	27.1	14.5	11.8	1.0
Monthly	0.0	0.0	0.5	0.0	0.0	0.0
Local Personal	1.3	0.0	0.0	0.0	0.0	0.0
Local Commercial	0.2	1.1	12.7	0.5	0.1	0.0
Exempt/ Violations	5.9	3.2	0.2	0.2	0.2	3.6
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Asset : Kothakota – Kurnool (KK)
Toll Plaza : Pullur

Ticket/ Mode	CJV	LCV	2-Axle	3-Axle	MAV	OSV
Single	52.0	68.6	54.2	82.3	91.3	94.0
Return	44.1	28.9	43.1	15.8	7.2	0.5
Monthly	0.0	0.0	1.1	0.0	0.0	0.0
Local Personal	0.1	0.0	0.0	0.0	0.0	0.0
Local Commercial	0.0	0.0	0.0	0.0	0.0	0.0
Exempt/ Violations	3.8	2.5	1.6	1.9	1.4	5.5
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

ANNEXURE D

LIMITED ENVIRONMENT AND SOCIAL DUE DILIGENCE REPORT

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Intended for
National Highway Infra Trust

Document type
Report

Date

September 2022

LIMITED ENVIRONMENTAL AND SOCIAL DUE DILIGENCE REPORT

AGRA BYPASS

RAMBOLL Bright ideas. Sustainable change.

LIMITED ENVIRONMENTAL AND SOCIAL DUE DILIGENCE REPORT
AGRA BYPASS

Project name	**Toll Road of Agra Bypass**
Project no.	**[xx]**
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Approved by	**Sunil Ojha**
Description	**Limited Environmental and Social Due Diligence Report**

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APPENDICES

Appendix 1
Photolog

ABBREVIATIONS

CCTV	Closed Circuit Television Video
CPCB	Central Pollution Control Board
DG	Diesel Generator
E&S	Environmental and Social
EHS	Environmental Health and Safety
ESAP	Environmental and Social Action Plan
ESDD	Environmental and Social due diligence
ESMS	Environmental and Social Management System
GHG	Green House Gases
GIIP	Good International Industry Practice
GPS	Global Positioning System
HIRA	Hazard Identification and Risk Assessment
HSE	Health, Safety and Environment
IFC	International Finance Corporation
ILO	International Labour Organization
InvIT	Infrastructure Investment Trust
IRC	Indian Roads Congress
IRL	Information Request List
ISO	International Organization for Standardization
Km/Kms	Kilometres
KPI	Key Performance Indicator
kV	Kilo Volt
kWH	Kilo Watt Hour
MoEFCC	Ministry of Environment Forest and Climate Change
NGO	Non-Governmental Organization
NH	National Highway
NHAI	National Highway Authority of India
NHIIMPL	National Highways Infra Investment Managers Private Limited
NoC	No Objection Certificate
O&M	Operations and Maintenance

PIU	Project Implementation Unit
PPEs	Personal Protective Equipment’s
PUC	Pollution Under Control
RoW	Right of Way
SOPs	Standard Operating Procedures
TTZ	Taj Trapezium Zone
TP	Toll Plaza
UP	Uttar Pradesh

1. INTRODUCTION

The National Highways Authority of India ('NHAI') has set up an Infrastructure Investment Trust ('InvIT') namely National Highways Infra Trust. National Highways Infra Investment Managers Private Limited ('NHIIMPL') has retained Ramboll India Private Limited (hereafter called 'Ramboll') to conduct a rapid Environmental and Social due diligence (ESDD) for the following three Assets ('Assets').

Asset 1: Agra Bypass section connecting NH19 (old NH2) to NH3 in Uttar Pradesh

Asset 2: Borkhedi-Kelapur-Maharashtra/Telangana border on NH44 (old NH7) in the state of Maharashtra

Asset 3: Shivpuri – Jhansi on NH27 in the state of Madhya Pradesh

This report presents the results of the ESDD for Asset 1.

1.1 Project Details

Table 1-1 below presents the project details for Asset 1.

Table 1-1 : Project Details

Asset Attributes	Description
Name	Agra Bypass
State	Uttar Pradesh
Length in kms	32.8 km
No of Toll Plaza	1 (No)
Location of Toll Plaza	Raibha at chainage km 32.800
Operation Since	March 2017
Lane Configuration	4 lanes

1.2 Scope of Work

Environment, Health and Safety diligence scope of work

- Gather preliminary information required for categorization of an investment into risk categories, to further inform the level of scrutiny, applicability and extent of onsite due diligence that the project's operations need to be subjected to;
- Obtain a list of documents to assess the project's compliance with national and state level EHS regulations as well as EHS management systems and policies and overall compliance levels with respect to all applicable EHS regulations for Road sector projects (such as those detailed by Ministry of Environment Forests and Climate Change and Ministry of Labour,).

Site based due diligence

- Onsite due diligence to be performed on three projects under the transaction perimeter;

- The purpose of the site visits is to certify information provided through visual observations; collect primary information on EHS risks to check company's regulatory preparedness and statutory compliance levels; and interact with both external and internal stakeholders to verify the information shared by the management;
- Onsite due diligence to be carried out in following four steps:
    - Opening meeting with target: To discuss the objective of the site visits, the review process, and the stakeholder interview schedules with the management;
    - Consultation with internal stakeholder: To interact with the EHS data owners, corporate and project management as well as professionals from the environment, health and safety, human resources teams to assess understanding of critical EHS risks specific to their area of operation. These interactions will also be conducted with the site contractors that are typically deployed on such projects in India;
    - Site investigation: To visually observe gaps in EHS management systems and impending EHS risks. Review to be guided by national regulatory guidelines as well as EHS risks covered in Good International Industrial Practices (GIIP) for toll road projects;
    - Consultation with external stakeholders: A comprehensive understanding of certain EHS issues may require further discreet probing, over and above site investigations. To comprehend detailed EHS risks and impacts, we may interact with the relevant stakeholders.
- Conduct a review to identify from publicly available media sources if there are any potential environmental and/or social issues, including NGO attention/campaigns, or items that may lead to reputational risks to the Company and/or investors.
- Review of regulatory notice(s) or fine(s) issued to the company for violating environmental norms/laws.

Review of information (to the extent made available)

- Develop an information request list (IRL) covering material environment, health and safety topics for the entity operations and seek necessary documents and information for review.
- Understand the nature of operations, clients, facilities, activities carried out, manpower composition and deployment HSE policies, training programs and related SOPs, put in place, if any EHS Certifications obtained (ISO 14001, ISO 45001, etc.), awards and recognitions, industry best practices adopted.
- Onsite facilities available, benefits provided to workers on health and safety including insurance
- Legal compliance reporting mechanism internally and with independent external involvement if any, and monitoring by top management.
- Key HSE consents, permits for their appropriateness and validity
- Approach to physical climate risks assessments and any climate-related strategies

Preparation of report with gap analysis of regulatory compliance and other key findings

- This section will incorporate all findings and gaps that were observed and assessed during information review and site assessments, including the stakeholder interactions.

- The observations will be based on regulatory and statutory compliance as well as reference frameworks for EHS such as guidelines by IFC.
- Any gaps observed will be clearly highlighted corresponding to each, Environmental, Health and Safety as well as social concerns and the level of corresponding risk (risk rating) will be described.

Framing recommendations and mitigation approaches

- Recommendations for improvement opportunities will be drafted and finalized in consultation with the client. Recommendations will expound mitigation approaches cantered around the following areas:
  - Procedural and technological improvements;
  - Upgradation of existing EHS management systems (if found to be inadequate);
  - Training and capacity building requirements;
  - Changes required in existing EHS policies;
  - Disclosure and reporting of EHS information to client, especially in reference to the EHS improvement plan (if any);
  - Recommendations and mitigation approaches will be framed subsequent to careful deliberation on the extent of EHS risks identified and lined to specific regulatory requirements for similar projects in India.

1.3 Approach and Methodology

The methodology for the Scope of work is explained below.

Step-1: The kick-off meeting was done between Ramboll and NHIIMPL on August 4, 2022 .

Step-2: Site Visit - The site visit was undertaken by the environmental and social specialists from Ramboll on 5th August 2022. A consultation with the local Toll Operator and O&M contractor was also held. A consultation with community members during the reconnaissance of the project site to discuss the issues.

Step-3: Document Review – the following documents were reviewed as a part of the rapid ESDD.

- Concession Agreement
- Schedule of the Concession Agreement
- Technical Due diligence report

Step-4: Preparation of ESDD report including ESAP.

1.4 Limitations

This report presents the results of red flag report, limited environmental and social due diligence and ESAP conducted to assess the compliance status of the Project in accordance with the applicable standards. During the course of this site assessment, Ramboll has attempted to independently assess the environmental and social conditions within the limits of the established scope of work as described in the proposal. The conclusions presented in this report represent Ramboll's best professional judgment based upon the information available and conditions existing as of the date of the review. In performing its assignment, Ramboll must rely upon publicly available information,

the information provided during stakeholder consultations and information provided by third parties. Accordingly, the conclusions in this report are valid only to the extent that the information provided to Ramboll was accurate and complete. This review is not intended as legal advice, nor is it an exhaustive review of site conditions or facility compliance. A few specific limitations are presented below:

- The assessment is based on verbal information provided by the Toll Operation and O&M contractor of NHAI.
- Limited documents have been provided.
- Consents and permits have not been made available.
- Consultations with the community were not organised in the manner of prior information and targeted stakeholders.
- Estimation of GHG emission has not been done due to non-availability of data.

2. PROJECT DETAILS

The project is a 32.8 km four-lane road, forming part of the section connecting NH19 (old NH2) to NH44 (old NH7) in Uttar Pradesh, branches out to NH52 (old NH3). According to the available information the project is in operations since March 2017. As this road stretch acts as a bypass to the city of Agra, a majority of approach roads and structures on the project are already 6 lanes as this was required as per the construction requirements when the project's construction was completed by NHAI's contractors. There is one toll plaza that is located at chainage 10.8 km and is shown in the map below:

The four lane divided Project starts from Junction of NH-2 (km 176+800 of NH-2) at km 0+000 and ends at Junction with NH-3 (km 13+030 of NH-3) at km. 32+800 in the State of Uttar Pradesh. The total length of project highway is 32.800 km (excluding the entry & exit ramps of Interchange with NH-2 & NH-3 at start and end of the project road respectively). Apart from above length, the Ramps after km 0+000 (Up Ramp-1: From Agra City (NH-2) to Agra Bypass - 220m; Up Ramp-2 : From Mathura NH-2 to Agra Bypass- 510m; Down Ramp-3: From Agra Bypass to Mathura (NH-2)- 402m; Down Ramp-4: From Agra Bypass to Gwalior (NH-3) - 475m) and for Entry & Exit of Agra Bypass, at flyovers and at -Grade Junction at end with NH-3.

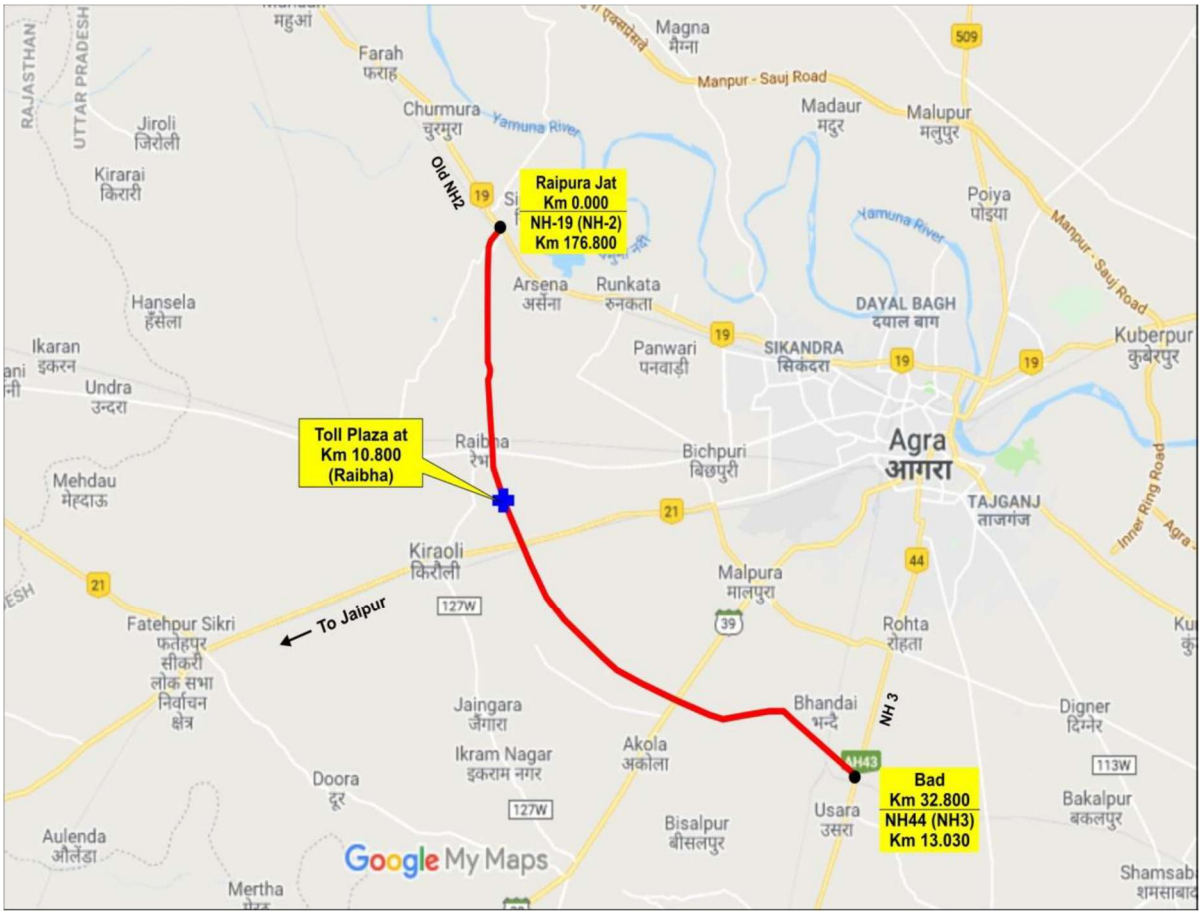

Figure 2-1. Index Map of the Project

Source : Schedule A of Concession Agreement.

The project lies on the outskirts of Agra, bypassing the city and acting as a key connection between Delhi to the regions of Gwalior and south. It further connects the traffic originating from west from

areas such as Gujarat and Jaipur to the cities in the East (Kanpur, Lucknow and beyond), thereby supporting the east-west movement.

2.1 Land Use around the Project Area

The land use observed on both side of the project highways are agricultural land. No built-up area is available on either the left hand side or right hand side of the road.

Figure 2-2. General Land use around the project area

2.2 Right Of Way

The Right of way was noted to be available for most part of the project stretch, and it measures 60 meters (as per the concession agreement it is 62 meters from chainage km 15+000 to km 18+000). The right of way boundary was noted to be missing at a few locations the project road. Ramboll noted likely agricultural encroachment at few locations and also noted some 4-5 squatters were also observed at a few locations. It should however be noted that extent of encroachment cannot be ascertained as the boundary/clear demarcation of the right of way boundary was not available.

Figure 2-3. Encroachment Observed During the Site Visit on 5 August 2022

2.3 Facilities at Toll Plaza

The facilities available at the toll plaza observed during the site visit are provided in the table below.

Sl. No	Item	Details	Observations/ condition
1	Patrolling Vehicle	1 Number	Good condition
2	Crane	1 Number	
3	Hydra	1 Number	
4	Weigh in motion bridge	Not available	
5	Static bridge	Not Available	
6	Tunnel	Not available	
7	Loading and unloading facilities	Not available	
8	High Mast	2 Nos at the toll plaza	Illumination at the toll plaza is said to be not good.
9	Street light	Available on both sides	
10	User fee board	Available	
11	Toilet	2 Nos	It is only on one side of the toll plaza.
12	Water Supply	One submersible pump available	
13	CCTV Room	Available	
14	Complaint Box and book	Available	
15	Rainwater Harvesting	Not available	
16	Avenue Plantation	Available	It is done by the forest department
17	DG Set	2 no’s	Very poor condition. It is taken on rent.

2.4 Toll Collection Agency

The Toll Collection Agency’s details are given in the table below.

Item	Details
Name of Toll Collection Agency	M/s Balaji Enterprises
Start Date	16 October 2021
End Date	15 October 2022
Toll Manger	Mr Ashok Dwivedi
Total Number of Staff	60-65 Nos
No of Security Guards	2 Nos

Figure 2-4. Facilities at Raibha Toll Plaza

2.5 O&M Contractor

The role of the O&M contractor in this project are given below.

- Repair and Rehabilitation of pavement
- Repair and Rehabilitation of Embankment /Earthen Shoulders/ /Paved Shoulders/ Stone Pitching etc.
- Repair and Rehabilitation of Structures
- Maintenance of the toll plaza
- Maintenance of the avenue plantation and median plantation

The details of Maintenance Contractor are given below.

Item	Details
Name of Maintenance Contractor	M/s Greystone Infratech Private Limited
Start Date	March 2022
End Date	March 2023
Name of Site Engineer	Montu Singh
Total number of Staffs	5 Nos. Drivers -2 no's for patrolling vehicle Crane driver – 1 No Engineer – 1 No Supervisor - 1 No

Item	Details
Vendor/ Sub-contractor	1. Water Supply Vendor 2. Hindustan Nursery for plantation and watering

2.5.1 Organisation Structure of the Project

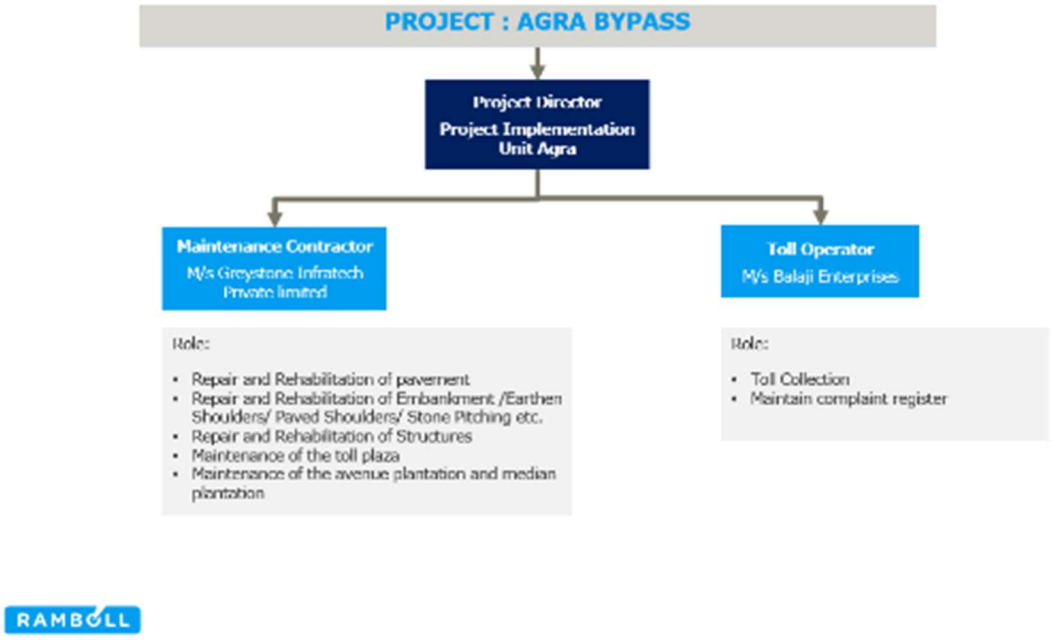

Figure 2-5. Organisation Structure of the Project

2.6 Consultation with Internal Stakeholders

The internal stakeholders include but not limited to Toll Collection Agency, Maintenance contractors, Vendors and suppliers. A consultation with tolling concessionaire and maintenance contractor has been undertaken on the day of site visit. The outcome of the meeting has been provided below.

Table 2-1 Details of consultations undertaken

Consultation	Outcome of the consultation
Balaji Enterprises	• The operation of toll plaza is for one year. • The complaint register is maintained by the toll operator. • The road condition is not properly maintained. Protest by the local public was reported. The latest protest was on 29 July 2022. • All the toll collectors are employed from local villages. • Toll plaza has accommodation for regular staff. • Kitchen facility is also available at the toll plaza.
Greystone Infratech Private Limited	• The contract of the maintenance contractor is for one year. • The contractor engages vendors for water supply and sub-contractor for median plantation water. • The embankment of the road is damaged at several location.

A consultation with local community has also been undertaken in the village of Mahua on the project road. The summary of outcome of the meeting is provided below.

Table 2-2 Details of consultations undertaken

Consultation	Outcome of the consultation
• Ramgopal aged 60 years is shop keeper • Jatin • Abhishek Location - Village Mahura	• The villagers feel the accident has reduced on the road. • The major accidents are related to stray cows on the road. • The habitation is away from the road so no impacts due to air pollution and noise pollution on human health. • Land acquisition has been complete long back and there is no compensation pending. No land dispute is pending for resolution in the village. • The major natural hazard is flooding. However there is a canal, so water level does not rise for the submergence of the road stretch. • Land is very fertile and rice, wheat, potato are the main crop in the village. • Villagers are engaged in farming activities and as labourers working in various industries in Agra.

Figure 2-6. Consultation with Local Community at Village Mahua on 5th August 2022

3. GAP ANALYSIS

3.1 Regulatory Compliances

The permits, no objection certificates (NoC) and other regulatory permission obtained from the regulatory authority was not available with the existing toll collecting agency and maintenance contractor. The permits listed in Table below are noted to be applicable for the project. NHAI InvIT needs to ensure that these permits are obtained before or after the transfer of asset as the case maybe.

Table 3-1 List of Licenses

Sl. No.	List of Licenses	Issuing Authority
1	Labour Licenses,	Labour Department
2	Workmen compensation insurance	Insurance
3	NoC for ground water extraction	Central Ground Water Board
4	NoC from the State pollution Control Board	UP State Pollution Control Board
5	Copy of forest clearance	Forest Department
6	PUC of all vehicles including maintenance vehicles	Regional transport Department authorised Agency
7	Shop and establishment license	Department of Revenue

3.2 Compliances with GIIP

It should be noted that the gaps identified below pertain to the existing conditions at the site and relate to policies and procedures implemented by the current toll collecting agency and the maintenance contractor who have a one-year contract with NHAI. NHAI InvIT needs to ensure that adequate policies and or procedures are developed to close the gaps identified once the assets are transferred.

Table 3-2: Gap Analysis

Sl. No	Topic	Observations/Requirements	Gaps	Risk Level	Recommendation
Environmental and Social Management System					
1	Environmental and Social Management System (ESMS)	An environmental and social management system is required to manage the environmental and social risks associated with the project. The ESMS for the site has not been developed.	ESMS is not available at the site and the toll operator and maintenance contractors are working without Environmental and Social management Plan.	Medium	Develop ESMS in compliant with applicable standards, including but not limited to ISO 14001 and ISO 45001.
2	Environmental and Social (E&S) Policy	An environmental and social policy demonstrating commitment towards managing environmental and social risks for the project has not been developed.	No E&S Policy is available	Medium	Develop E&S policy related to environmental Health and Safety
3	Identification of Environmental, health, safety and Social Risks and Impacts	An Environmental, Health, Safety and Social Risk assessment to identify the risks associated with operation of toll plaza, operation and maintenance of road is required to adequately mitigate the risks. No such risk assessment has been undertaken.	Environmental, health, safety and Social Risk assessment related to operation of toll plaza, operation and maintenance of road is not available.	Medium	Undertake Environmental, health, safety and Social Risk assessment.
4	Organizational Capacity and Competency	An organisation structure is required with set of competent to handle the environmental and social risks associated with the project. Competent people to handle the E&S risks associated with the project are not available.	• No set organisational structure has been created by the toll operator and maintenance contractor to include people with competency to manage the environmental and social risks. • There is not midterm evaluation of the competency and training plan for the engineers, security guards and other staff.	Medium	Develop organisation structure with competency matrix. Develop training plan to address environmental, health, safety and social risk.

Sl. No	Topic	Observations/Requirements	Gaps	Risk Level	Recommendation
5	Emergency Preparedness and Response	No emergency plan has been prepared for the project to identify the anticipated emergency situations and associated responses. It should further be noted that the District Magistrate is responsible for any major disaster management such as major accidents and spillage of large quantities of hazardous chemicals on the road stretch. It should however be noted that emergency equipment like ambulance, trained paramedic (Ambulance driver) is available to respond to emergency situations arising out of accidents.	No emergency response plan has been developed for the site.	Medium	Develop an emergency response plan in consultation with the district magistrate.
6	Monitoring and Review	The monthly progress report is prepared by the Independent engineer, and it is submitted to NHAI PIU. However indicators related to environmental and social issues are not included in the monthly progress report.	A monitoring system to track the environmental, health, safety and social parameters is not available.	Low	Identify key performance indicators based on the environmental and social risks identified as a part of the ESMS and accordingly develop monitoring and reporting program.
7	Stakeholder Engagement	The highway project is spread over many villages. The key stakeholders are: - NHAI PIU - Local Police, - Electricity Department, - Central Ground Water Board - Village panchayat, - Vendors, Sub-contractors, - Local labours, - Regulatory authorities, - Local community, - Village institutions like schools, health centres, - Media.	No policy and procedure is available for the stakeholder mapping and development of stakeholder engagement plan.	Low	Undertake stakeholder mapping and develop stakeholder engagement plan.
8	External Communications and Grievance Redressal Mechanisms	The project does not have any obligation of disclosure of any report in the operation stage except for the reporting obligation to NHAI PIU. An external communication plan for engagement with communities/stakeholders identifying the level/type of information to be disclosed and medium of disclosure is required to manage expectations of the community/stakeholders. A grievance	An external communication plan and grievance redressal mechanism has not been developed for the project.	Low	Develop an external communication plan and grievance redressal mechanism.

Sl. No	Topic	Observations/Requirements	Gaps	Risk Level	Recommendation
		redressal mechanism needs to be also developed.			
Labour and working condition					
9	Human Resources Policies and Procedures	The project operation includes engagement of employees and workers. A human resource policy and associated procedures need to be developed to comply with local regulation, international labour organisation (ILO) covenants, human rights requirements and other GIIP requirements related to labour and working conditions. The current toll operator and the maintenance contractor have not developed a comprehensive human resource policy.	A comprehensive human resource policy and the associated procedures have not been developed by the current toll operator and the maintenance contractor.	Low	Develop a human resource manual consisting of policies and procedures around: • Working conditions and terms of employment • Code of conduct for employees • Minimum wages and overtime payment including working hours • Non-discrimination and equal opportunity • Recruitment and retrenchment procedures •
10	Working Conditions	Health and sanitation facilities in the project (such as adequate toilets, drinking water, bathing areas, etc.) provided by the toll operator was noted to be not in compliance with GIIP requirements related to worker accommodation.	The following gaps were noted: • No separate procedures available for the identification of facilities for the workers. • No uniform provided to the toll collectors, • The chairs provided to the Toll collectors are not in good condition, • No Personal Protective Equipment were noted to be used by the employees of the toll plaza operator or the O&M contractor during the site visit. • No separate facilities for women worker such as toilet for ladies.	Low	Ensure that the health and sanitation facilities provided in the project meet the GIIP requirements.

Sl. No	Topic	Observations/Requirements	Gaps	Risk Level	Recommendation
11	Non-Discrimination and Equal Opportunity	The corporate level policy does not include social diversity and gender inclusion policy.	No non-discrimination and equal opportunity policy and procedure is available.	Low	Develop social diversity and gender and social inclusion policy and it should be encouraged in the supply chain of the company.
12	Internal Grievance Redressal Mechanism	The Toll Collection Agency and maintenance contractor does not have grievance redressal mechanism for the employees.	There is no transparent grievance redressal mechanism for the employees and workers.	Low	Establish internal grievance redressal mechanism to include grievances from employees/workers for registering grievances. This grievance redressal mechanism also needs to be extended to the employees/workers in the supply chain.
13	Protecting the Work Force from Child Labour	The Toll Collection Agency and maintenance contractor are aware of abolition of child labour but not aware of risk associated with child labour in its supply chain.	No process has been developed to check use of child labour by sub-contractor and other vendors in the supply chain.	Low	Establish procedure to check use of child labour sub-contractor and other vendors in the supply chain. Provide suitable posters about the prohibition of child labour.
14	Protecting the Work Force from forced labour	The Toll Collection Agency and maintenance contractor follow government regulations and does not involve in any kind of forced labour or bonded labour.	No written agreement with the workers were available with the toll operator and the maintenance contractor.	Low	Engage all workers with written contract and provide code of conduct to all workers.
15	Occupational Health and Safety	The operation of the project road includes several activities that have occupational health and safety risks. A few examples of such activities are presented below: - working on operational road - dealing with road user for collection toll. - Working in confined space in the culverts and drains. - Working near water. - lifting activities and use of cranes - Working in remote location - Working near live wire. - Working near railway line - Working in night - Operation of ambulance A Hazard Identification and Risk Assessment (HIRA) needs to be undertaken for all the activities at the project and standard operating procedures (SOPs) should be developed that include the mitigation	A Hazard Identification and Risk Assessment (HIRA) and SOPs have not been developed for the various activities by the Toll Collection Agency and the maintenance contractor	Medium	Undertake HIRA and prepare SOPs for the various activities.

Sl. No	Topic	Observations/Requirements	Gaps	Risk Level	Recommendation
		measures in the HIRA. These SOPs have not been developed by the Toll Collection Agency and the maintenance contractor. During the site visit it was noted that the appropriate personal protective equipment (PPEs) like hard hat, reflective vests, safety shoes were not provided to the employees/workers of the Toll Collection Agency and the maintenance contractor.			
16	Supply Chain	The operation of road will require supply of material for road maintenance, water and other consumable. A procedure should be developed to ensure that the environmental & social risks are appropriately addressed in the supply chain. This mechanism can include considering environmental & social parameters in vendor selection, contractual clauses to ensure that the environmental & social risks are adequately managed and a monitoring plan to monitor the environmental & social performance of the vendors in the supply chain. A mechanism to measure and monitor the environmental and social risks in the supply chain was noted to be missing.	The current Toll Collection Agency and maintenance contractor have not developed procedures around measuring and monitoring the environmental & social risks in the supply chain.	Low	Develop a mechanism to include procedures around measuring and monitoring the environmental & social risks in the supply chain.
Resource Efficiency and Environmental Pollution including GHG emission					
17	Resource Efficiency and Pollution Prevention	The resources required for the operation and maintenance of the road are - Electricity usage at toll plaza and for all street lights, - Water for the drinking purpose, maintenance and plantations. - Fuel for diesel generator (DG) and vehicles, and - Material for road maintenance The diesel and electricity consumption are currently being recorded. According to the information provided during the site visit, the average diesel consumption in a summer month is approximately 550 litres per month	• A plan including KPI for efficient use of resources and GHG estimation has not been developed by the current Toll Collection Agency and the maintenance contractor. No monitoring plan has been developed to measure the pollution caused by the diesel generator and other activities at the toll plaza. • Illumination at toll plaza – the night illumination at toll is not	Low	• Prepare plan for the resource efficiency including accurate recording of diesel consumption and electricity consumption to estimate GHG emissions from the project. Prepare a plan to monitor the emissions from the diesel generator and other pollution causing activities in the project. • Provide illumination at the toll plaza and access road to the toilet.

Sl. No	Topic	Observations/Requirements	Gaps	Risk Level	Recommendation
		and the electricity consumption is approximately 7100 kWh in a month. No energy saving measures have been developed to reduce the diesel or electricity consumption. The greenhouse gas emissions (GHG) from the project are not being measured or reported currently. It was further noted that there were gaps in accounting for diesel usage by patrolling vehicle, ambulance, maintenance vehicles and other vehicles. No monitoring is being currently undertaken to measure the emissions from the diesel generator located at the toll plaza. The quality and quantity of wastewater being generated at the toll plaza is also not being monitored.	adequate. The street light at toll plaza and toilet blocks are inadequate. High mast is not working in full capacity of all lights. • Solid Waste disposal facility is not available. It is being dumped withing the toll plaza boundary and sometimes it is burnt. • DG set is in very poor condition. • Maintenance Vehicles are in poor condition. • Storage and transportation of maintenance material in poor condition.		• Provide treatment and disposal facility for wet waste specifically generated from kitchen and dining area. • Reduce and recycle plastic waste generated from the toll plaza. • DG set requires to be replaced with new DG set having noise attenuation measures inbuilt. • Procure or hire standard maintenance vehicles. • Provide safe and suitable storage and covered transportation of material to the maintenance site.
18	Ground Water utilisation	A groundwater abstraction well is installed at the toll plaza to meet the water demands. No flow meters have been installed to measure the quantity of ground water extracted for use. It was further noted that no water conservation measures including installation of rain water harvesting structures have been undertaken for the project.	A system to measure the amount of water used and associated water conservation measures have not been developed for the Project.	Low	Develop a system including installation of flow meters to measure the water use and further develop water conservation measures that can be adopted for the project.
Community Health, Safety and Security					

Sl. No	Topic	Observations/Requirements	Gaps	Risk Level	Recommendation
19	Community Health, Safety, and Security	Risk associated with community health and safety are identified below. - Pedestrian Safety - Traffic Safety	• Installation and maintenance of signs, signals, markings, and other devices used to regulate traffic, including posted speed limits, warnings of sharp turns, or other special road conditions are absent at most of the locations. Barricading is also absent at the unsafe locations. • Public Toilets at the toll plaza is away from the carriage way and access to the toilet is not in a good condition. • The public toilet is available only one side. • Separate ladies' toilet is not available for workers and public. • Ambulance – biomedical waste disposal system is not available. • Cranes are supplied by the local suppliers on rent basis.	Low	• Identify road safety risks and Prepare plan to mitigate and manage these risks. • Provide good access to the toilet. Construction of toilet on other side of toll plaza also. • Disposal of biomedical waste through hospitals where facility of biomedical waste disposal is available or through biomedical waste collection agency. • Procure or hire standard Cranes with examination of lifting tools and tackles.
20	Security Personnel	The toll operation company deploys security guards during operation of toll plaza. Two (2) guards recruited from local community has been deployed. As per the consultation with local persons, no major security threat related to Naxalites, terror attacks haven identified in last 5 years. However local protest related to exemption of toll are frequent in the area.	• No security plan prepared. • No training on behavioural aspects have been covered. • No training on grievance recording have been imparted.	Low	Develop a security management plan.
Land Acquisition and Involuntary Resettlement, Encroachment and					

Sl. No	Topic	Observations/Requirements	Gaps	Risk Level	Recommendation
21	General	The right of way of 60 meters is available throughout the road. Few consultations with local people have been undertaken and it was informed the compensations have been disbursed and no pending issue available. The litigation or the legacy issues cannot be ascertained at this stage.	No gaps have been identified however, a verification with the PIU NHAI should be undertaken for the legacy issue or litigations.	Low	Verify if any legacy issues and litigation related to land are present from the PIU NHAI.
22	General	Some encroachments/ squatters were observed within the right of way. These encroachments are temporary hutment used for commercial purpose. As per the concession agreement, Concessionaire shall protect the Site from any and all occupations, encroachments or Encumbrances. The concession agreement further requires that the concessionaire shall maintain a round-the-clock vigil over the Site and shall ensure and procure that no encroachment thereon takes place, and in the event of any encroachment or occupation on any part thereof, the Concessionaire shall report such encroachment or occupation forthwith to the Authority and undertake its removal at its cost and expenses. Information on whether the encroachment observed during the site visit have been notified to NHAI was not readily available.	An encroachment survey has not been undertaken for the project.	Low	Undertake encroachment survey and prepare plan for the removal including notifying the NHAI about the encroachment.
Biodiversity Conservation and Sustainable Management of Living Natural Resource					
23	General	No wildlife or eco-sensitive area was noted to be present within project area of influence. The nearest eco sensitive area is Bharatpur Bird Sanctuary located at about 40 kms from the Toll Plaza.	No Gap Identified.	Low	No recommendation
Indigenous Peoples					

Sl. No	Topic	Observations/Requirements	Gaps	Risk Level	Recommendation
24	Indigenous Peoples	No village or block in the project area is notified under tribal area of schedule V.	No gaps identified.	Low	No recommendation
Archaeological sites and Cultural Heritage					
25	Protection of Cultural Heritage in project design and execution	Taj Trapezium Zone (TTZ) is a defined area of 10,400 sq. km around the Taj Mahal to protect the monument from pollution. This area is bound within the coordinates of 26.75 N 77.25 E to 27.75 N 77.25 E 27.00 N 78.5 E to 27.5 N 78.5 E. The project road comes under the purview of Taj Trapezium Zone. There is no archaeological and cultural site within the project area of influence.	No Risk Assessment has been undertaken with respect to Taj Trapezium Notification, 1999.	Low	Conduct a risk assessment to identify risks associated with Taz Trapezium notification, if any.

4. CATEGORISATION OF PROJECT

The categorisation of a Project based on the magnitude of potential environmental and social risks and impacts, including those related to Human Rights, climate change, and biodiversity.

The categories are:

Category A – Projects with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented;

Category B – Projects with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures; and

Category C – Projects with minimal or no adverse environmental and social risks and/or impacts.

The project is categorised as **Category B** based on following arguments.

- All the mitigation measures of impacts related to air quality, water and noise are generally site specific and reversible in nature and mitigation measures are within control of the project proponent.
- No incremental impact arises due to operation of the road.
- Land use conversion was one time activity, and no further land use change or conversion is involved.
- All the impact associated with operation of toll plaza and road are reversible and of low significance.
- No additional livelihood loss in the operation of toll road.

5. ENVIRONMENT AND SOCIAL ACTION PLAN

Sl. No	Identified Gap	Recommended actions	Best Practices (if any)	Responsibility	Timeframe	KPI Completion
1.	• No system for environmental and social management is being used by the current toll operator and maintenance contractors. • Environmental, health, safety and Social Risk assessment related to operation of toll plaza, operation and maintenance of road is not available. • No organisation structure available, • No evaluation of competency and training of the staffs. • No environmental and social monitoring system. • Stakeholder engagement plan is not available.	• Develop ESMS in compliant with applicable standards, including but not limited to ISO 14001 and ISO 45001 and include following: • Develop E&S policy related to environmental Health and Safety. • Include environmental and social considerations in selection of contractors and subcontractors • Undertake Environmental, health, safety and Social Risk assessment • Develop EHS manual and procedures for working at toll plaza, maintenance works etc • Develop organisation structure with competency matrix. • Develop training plan to address environmental, health, safety and social risk. • Identify key performance indicators based on the environmental and social risks and develop monitoring and reporting plan accordingly. • Develop stakeholder engagement plan.		NHAI InvIT	Post-acquisition and prior to hiring of toll operator or maintenance contractor.	ESMS incorporating the recommendations
2.	• Licenses and permits to be acquired by NHAI InvIT	NHAI InvIT should obtain all licenses and permits as defined in Concession Agreement but not limited to the following. - Registration for Provident Fund - Labour License - Shop and establishment Licenses - NoC from State Pollution Control Board.		NHAI InvIT	Prior to start of work.	

Sl. No	Identified Gap	Recommended actions	Best Practices (if any)	Responsibility	Timeframe	KPI Completion
		• PUC of Vehicles used for the project.				
3.	• Licenses and permits to be acquired by Contractors and Toll Operators	The contractors and Toll Operators of NHAI InvIT should obtain all necessary licenses and permits but not limited to the following. - Registration for Provident Fund - Labour License - Interstate Migrant Worker License - Workmen Compensation and insurance - PUC of all Vehicles - NoC for extraction of Surface Water/ Ground Water - Authorisation for disposal of Biomedical Waste		Contractors and toll operators of NHAI InvIT	Prior to start of work.	
4.	• No emergency response plan has been developed for the site. • Hazard Identification and Risk Assessment (HIRA) and SOPs have not been developed for the various activities by the Toll Collection Agency and the maintenance contractor.	• Undertake HIRA and prepare SOPs for the various activities. • Develop an emergency response plan in conformance with district level disaster management.		NHAI InvIT	Post-acquisition and prior to start of operation.	Completed HIRA, SOP and ERP.
5.	• A comprehensive human resource policy and the associated procedures have not been developed by the current toll operator and the maintenance contractor.	• Develop a human resource manual consisting of policies and procedures around: • Working conditions and terms of employment • Code of conduct for employees • Minimum wages and overtime payment including working hours • Non-discrimination and equal opportunity • Recruitment and retrenchment procedures. • Abolition of child labour. Establish procedure to check use of child labour sub-contractor and other vendors in the supply chain. • Provide suitable posters about the prohibition of child labour		NHAI InvIT	Post-acquisition and prior to start of operation.	Human resource Manual incorporating the recommendations

Sl. No	Identified Gap	Recommended actions	Best Practices (if any)	Responsibility	Timeframe	KPI Completion
6.	• Working Conditions - The health and sanitation facilities in the project (such as adequate toilets, drinking water, bathing areas, etc.) provided by the toll operator was noted to be not in compliance with GIIP requirements related to worker accommodation.	• Ensure that the health and sanitation facilities provided in the project meet the GIIP requirements.		NHAI InvIT	Post-acquisition and prior to start of operation.	Health and sanitation facilities compliant with GIIP requirements.
7.	• There is no transparent grievance redressal mechanism for the employees and workers.	Establish internal grievance redressal mechanism to include grievances from employees/workers for registering grievances. This grievance redressal mechanism also needs to be extended to the employees/workers in the supply chain.	Technology based online complaint management for employees.	NHAI InvIT	Post-acquisition and prior to start of operation.	Establish GRM
8.	• Protecting the work force from forced labour - No written agreement with the workers were available with the toll operator and the maintenance contractor.	Engage all workers with written contract and provide code of conduct to all workers.		NHAI InvIT	• Record/File of all written contracts of workers in supply chain – within 6 months after the acquisition. • Information disseminatio n on code of conduct to all workers - continuous activity.	• Establish records/file of written contracts for all workers. • Information disseminati on on code of conduct to all workers in supply chain.
	• Supply Chain - The current Toll Collection Agency and maintenance contractor have not developed procedures around measuring and monitoring the environmental & social risks in the supply chain.	As part of ESMS : Develop a mechanism to include procedures around measuring and monitoring the environmental & social risks in the supply chain.		NHAI InvIT	Post-acquisition and prior to start of operation.	Supply Chain measures as part of ESMS
9.	• A plan including KPI for efficient use of resources and GHG estimation has not been developed by the current Toll Collection Agency and the maintenance contractor.	Prepare plan for the resource efficiency including accurate recording of diesel consumption and electricity consumption to estimate GHG emissions from the project.	Develop tool for online estimation of GHG emission. Use energy efficient	NHAI InvIT	• Document preparation - within 6 months after the acquisition.	• Document Preparation - Resource Efficiency Plan

Sl. No	Identified Gap	Recommended actions	Best Practices (if any)	Responsibility	Timeframe	KPI Completion
	• No monitoring plan has been developed to measure the pollution caused by the diesel generator and other activities at the toll plaza.	Prepare a plan to monitor the emissions from the diesel generator and other pollution causing activities in the project.	equipment, machineries, pumps, water fixture, illumination and energy efficient vehicles.		• Monitoring mechanism for emissions for pollution causing activities – continuous activity.	• Bi-annual GHG estimation.
10.	• A system to measure the amount of water used and associated water conservation measures have not been developed for the Project.	• Develop a system including installation of flow meters to measure the water use and further develop water conservation measures that can be adopted for the project.		NHAI InvIT	• Installation and Monitoring system for water use – with9in 6 months after acquisition. • Water Conservation measures included in ESMS – within 6 months after acquisition.	• Monitoring process for water use. • Water conservation measures part of ESMS
11.	Installation and maintenance of signs, signals, markings, and other devices used to regulate traffic, including posted speed limits, warnings of sharp turns, or other special road conditions are absent at most of the locations. Barricading is also absent at the unsafe locations.	• Identify road safety risks and Prepare plan to mitigate and manage these risks.		NHAI InvIT	Post-acquisition and prior to start of operation.	• Road safety /audit/survey report including mitigation plan.
12.	epared. • No training on behavioural aspects have been covered. • No training on grievance recording have been imparted.	management plan. Training Plan for security guards and continuous behavioural based training.		NHAI InvIT	Security Management Plan – within 6 months after the acquisition. Training to security guards - continuous	Completed Security Management Plan
13.	Verification with regards to right of way (RoW) not undertaken for any legacy issues or litigations.	Verify if any legacy issues and litigation related to land are present from the PIU NHAI.		NHAI InvIT	Post-acquisition and prior to start of operation.	Verification completed for RoW legacy issues/litigation.

Sl. No	Identified Gap	Recommended actions	Best Practices (if any)	Responsibility	Timeframe	KPI Completion
14.	An encroachment survey has not been undertaken for the project.	Undertake encroachment survey and prepare plan for the removal of encroachments.	GPS based survey of encroachments.	NHAI InvIT	Post-acquisition and prior to start of operation.	Encroachment Survey report.
15.	• No Risk Assessment has been undertaken with respect to Taj Trapezium Notification, 1999.	Identify risks associated with Taz Trapezium zone notification.		NHAI InvIT	Post-acquisition and prior to start of operation.	Complete Risk assessment report for TTZ.
16.	• Public Toilets at the toll plaza is away from the carriage way and access to the toilet is not in a good condition. available only one side. Separate ladies' toilet is not available for workers and public.	s to the toilet. Construction toilet on other side of toll plaza also.	As per IRC Code for toll plaza.	NHAI InvIT	Within 3 months after the acquisition	Construction of good access to toilet and construction of new toilet on other side of toll plaza.
17.	Illumination at toll plaza – the night illumination at toll is not adequate. The street light at toll plaza and toilet blocks are inadequate. High mast is not working in full capacity of all lights.	Provide illumination at the toll plaza and access road to the toilet.	As per IRC Code for toll plaza.	NHAI InvIT	Within 6 months after the acquisition	Illumination at toll plaza as per IRC Code.
18.	Solid Waste disposal facility is not available. It is being dumped withing the toll plaza boundary and sometimes it is burnt.	• Provide treatment and disposal facility for wet waste specifically generated from kitchen and dining area. • Reduce and recycle plastic waste generated from the toll plaza.	As per IRC Code for toll plaza.	NHAI InvIT	Within 6 months after the acquisition	Segregated Waste Disposal Plan and Procedures(i.e., Dry, Wet, Biomedical, etc.)
19.	oor condition.	• DG set requires to be replaced with new DG set having noise attenuation measures inbuilt.	As per CPCB guidelines.	NHAI InvIT	Within 6 months after the acquisition	DG set adhering to CPCB guidelines.
20.	Ambulance – biomedical waste disposal system is not available.	Disposal of biomedical waste through hospitals where facility of biomedical waste disposal is available or through biomedical waste collection agency[1].	As per IRC Code for toll plaza.	NHAI InvIT	Within 6 months after the acquisition	Biomedical waste disposal process established as per IRC code.

[1] As per requirements under Bio-medical Waste (Management & Handling) Rules, 1998 and subsequent amendments, These rules apply to all persons who generate, collect, receive, store, transport, treat, dispose, or handle bio medical waste in any form including hospitals, nursing homes, clinics, dispensaries, veterinary institutions, animal houses, pathological laboratories, blood banks, ayush hospitals, clinical establishments, research or educational institutions, health camps, medical or surgical camps, vaccination camps, blood donation camps, first aid rooms of schools, forensic laboratories and research labs.

Sl. No	Identified Gap	Recommended actions	Best Practices (if any)	Responsibility	Timeframe	KPI Completion
21.	• Cranes are supplied by the local suppliers on rent basis.	Procure or hire standard Cranes with examination of lifting tools and tackles.	As per the section 29 of Factory Act, 1948 and amendments till date.	NHAI InvIT	Within 6 months after the acquisition	Standard Cranes as per applicable acts.
22.	• Storage and transportation of maintenance material in poor condition.	Provide safe and suitable storage and covered transportation of material to the maintenance site.	As per IRC Code for toll plaza.	NHAI InvIT	Within 6 months after the acquisition	Storage and Transport of material following IRC code.

APPENDIX 1
PHOTOLOG

Photo 1: Land-use type around the project area

Photo 2: Encroachments in the ROW

Title:	Photo Document	**Project-No.:**	**Date:**	**Page 1**
Site:	Agra Bypass	-	August 2022	
Client:	NHAI	RAMBOLL		

Photo 3: **Consultation with the local people in the project area**

Photo 4: Road subsidence along the National Highway

Photo 5: Highway Patrolling Vehicle and Ambulance facility

Photo 6: Toilet facilities at the toll plaza

Photo 7: Crane facility in the project area

Photo 8: Raibha Toll plaza

Title:	Photo Document	**Project-No.:**	**Date:**	
Site:	Agra Bypass	-	August 2022	
Client:	NHAI	RAMBOLL		

Photo 9: Inside view of toll booth

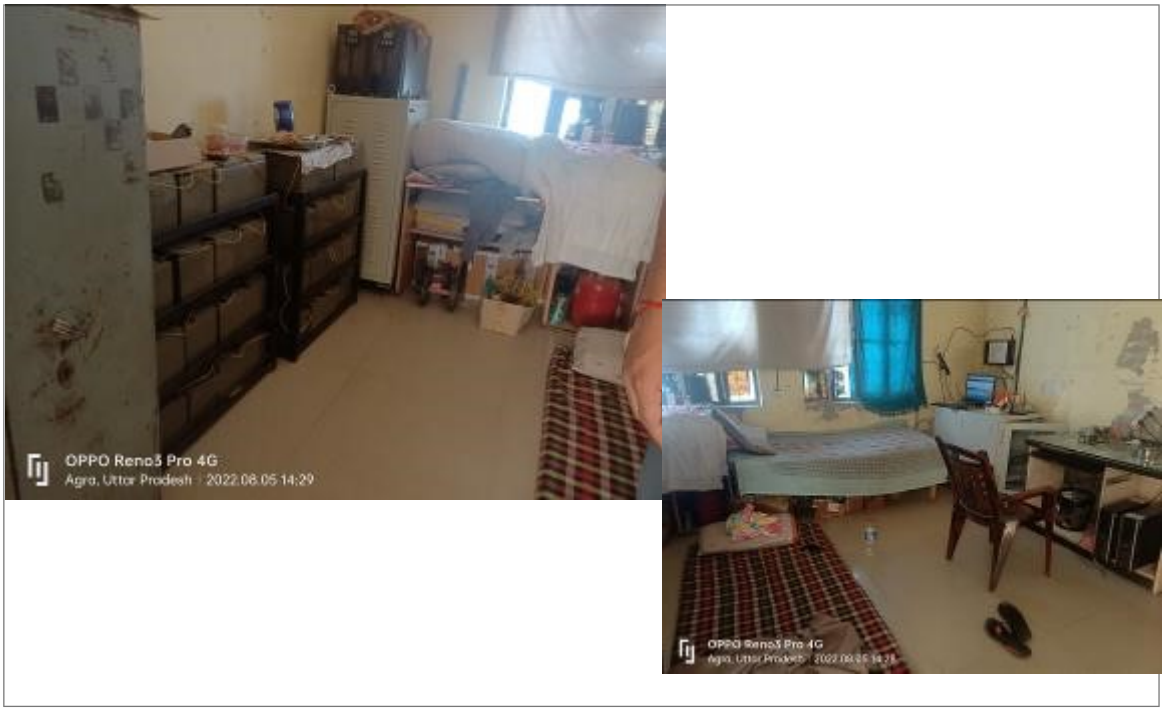

Photo 10: Inside view of toll plaza

Title:	Photo Document	**Project-No.:**	**Date:**	
Site:	Agra Bypass	-	August 2022	
Client:	NHAI	RAMBOLL		

Photo 11: Septic tank in the toll plaza premise

Photo 12: Overweight vehicle crossing tolling lane

Photo 9: Inside view of toll booth

Photo 10: Inside view of toll plaza

Title:	Photo Document	**Project-No.:**	**Date:**	
Site:	Agra Bypass	-	August 2022	
Client:	NHAI	RAMBOLL		

Photo 11: Septic tank in the toll plaza premise

Photo 12: Overweight vehicle crossing tolling lane

Intended for
National Highway Infra Trust

Document type
Report

Date
September 2022

LIMITED ENVIRONMENTAL AND SOCIAL DUE DILIGENCE REPORT

BORKHEDI-TELANGANA

RAMBOLL Bright ideas. Sustainable change.

LIMITED ENVIRONMENTAL AND SOCIAL DUE DILIGENCE REPORT
BORKHEDI-TELANGANA BORDER

Project name	**Toll Road of Borkhedi – Darodha- Kelapur – TL Border**
Project no.	**[xx]**
Recipient	**NHAI InvIT**
Document type	**Due Diligence Report**
Version	**01**
Date	**14/09/2022**
Prepared by	**Anjay Kumar**
Checked by	**Sunil Ojha**
Approved by	**Sunil Ojha**
Description	**Limited Environmental and Social due Diligence report**

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APPENDICES

Appendix 1
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1. INTRODUCTION

The National Highways Authority of India ('NHAI') has set up an Infrastructure Investment Trust ('InvIT') namely National Highways Infra Trust. National Highways Infra Investment Managers Private Limited ('NHIIMPL') has retained Ramboll India Private Limited (hereafter called 'Ramboll') to conduct a rapid Environmental and Social due diligence (ESDD) for the following three Assets ('Assets').

Asset 1: Agra Bypass section connecting NH19 (old NH2) to NH3 in Uttar Pradesh

Asset 2: Borkhedi-Kelapur-Maharashtra/Telangana border on NH44 (old NH7) in the state of Maharashtra

Asset 3:Shivpuri – Jhansi on NH27 in the state of Madhya Pradesh

This report has been prepared for Asset-2 Borkhedi-Kelapur-Maharashtra/Telangana border on NH44 (old NH7) in the state of Maharashtra

1.1 Asset under the Report

Table 1-1 : Project Details

Asset Attributes	Description
Name	Tolling, Operation, Maintenance and Transfer of Borkhedi Wadner Deodhari Kelapur Maharashtra / Telangana Border (from km 36.600 to km 175.600) of NH 44 in the State of Maharashtra
State	Maharashtra
Length in kms	138.400 km
No of Toll Plaza	2 (No)
Location of Toll Plaza	Daroda Toll plaza at chainage km 92+500 Kelapur toll plaza at chainage km 150+500
Operation Since	April 2011
Lane Configuration	4 lanes

1.2 Scope of Work

Environment, Health and Safety diligence scope of work

- Gather preliminary information required for categorization of an investment into risk categories, to further inform the level of scrutiny, applicability and extent of onsite due diligence that the project's operations need to be subjected to;
- Obtain a list of documents to assess the project's compliance with national and state level EHS regulations as well as EHS management systems and policies and overall compliance levels with respect to all applicable EHS regulations for Road sector projects (such as those detailed by Ministry of Environment Forests and Climate Change and Ministry of Labour,).

Site based due diligence

- Onsite due diligence to be performed on three projects under the transaction perimeter;
- The purpose of the site visits is to certify information provided through visual observations; collect primary information on EHS risks to check company's regulatory preparedness and statutory compliance levels; and interact with both external and internal stakeholders to verify the information shared by the management;
- Onsite due diligence to be carried out in following four steps:
    - Opening meeting with target: To discuss the objective of the site visits, the review process, and the stakeholder interview schedules with the management;
    - Consultation with internal stakeholder: To interact with the EHS data owners, corporate and project management as well as professionals from the environment, health and safety, human resources teams to assess understanding of critical EHS risks specific to their area of operation. These interactions will also be conducted with the site contractors that are typically deployed on such projects in India;
    - Site investigation: To visually observe gaps in EHS management systems and impending EHS risks. Review to be guided by national regulatory guidelines as well as EHS risks covered in IFC's general EHS and sector-specific EHS guidelines for toll road projects;
    - Consultation with external stakeholders: A comprehensive understanding of certain EHS issues may require further discreet probing, over and above site investigations. To comprehend detailed EHS risks and impacts, we may interact with the relevant stakeholders.

Conduct a review to identify from publicly available media sources if there are any potential environmental and/or social issues, including NGO attention/campaigns, or items that may lead to reputational risks to the Company and/or investors.

Review of regulatory notice(s) or fine(s) issued to the company for violating environmental norms/laws.

Review of information (to the extent made available)

- Develop an information request list (IRL) covering material environment, health and safety topics for the entity operations and seek necessary documents and information for review.
- Understand the nature of operations, clients, facilities, activities carried out, manpower composition and deployment HSE policies, training programs and related SOPs, put in place, if any EHS Certifications obtained (ISO 14001, ISO 45001, etc.), awards and recognitions, industry best practices adopted.
- Onsite facilities available, benefits provided to workers on health and safety including insurance
- Legal compliance reporting mechanism internally and with independent external involvement if any, and monitoring by top management.
- Key HSE consents, permits for their appropriateness and validity
- Approach to physical climate risks assessments and any climate-related strategies

Preparation of report with gap analysis of regulatory compliance and other key findings

- This section will incorporate all findings and gaps that were observed and assessed during information review and site assessments, including the stakeholder interactions.
- The observations will be based on regulatory and statutory compliance as well as reference frameworks for EHS such as guidelines by IFC.
- Any gaps observed will be clearly highlighted corresponding to each, Environmental, Health and Safety as well as social concerns and the level of corresponding risk (risk rating) will be described.

Framing recommendations and mitigation approaches

- Recommendations for improvement opportunities will be drafted and finalized in consultation with the client. Recommendations will expound mitigation approaches cantered around the following areas:
  - Procedural and technological improvements;
  - Upgradation of existing EHS management systems (if found to be inadequate);
  - Training and capacity building requirements;
  - Changes required in existing EHS policies;
  - Disclosure and reporting of EHS information to client, especially in reference to the EHS improvement plan (if any);
  - Recommendations and mitigation approaches will be framed subsequent to careful deliberation on the extent of EHS risks identified and lined to specific regulatory requirements for similar projects in India.

Emission Estimation / Measurement

- Gathering information required for estimating emissions
- Estimating and/or measuring scope 1, scope 2 and scope 3 (if practical) emissions from each project
- Identifying the top sources of scope 1, scope 2 and scope 3 (if practical) emissions from each project
- Identifying the main levers for reducing scope 1, scope 2 and scope 3 (if practical) emissions

Decarbonisation Plan

- Understand the procedures defined for the incentivization of Greenhouse Gas (GHG) emissions and the Company's short-term and long-term strategy/plan to reduce the same
- Estimating the cost and investment required to achieve a net-zero plan

1.3 Approach and Methodology

The methodology for the Scope of work is explained below.

Step-1: The kick-off meeting was done among the Ramboll team.

Step-2: Consultation with Internal Stakeholders : meeting with O&M contractor and Toll Operator was held on 5th August 2022.

Step-3: Site Visit - The site visit was undertaken by the environmental and social specialists from Ramboll on 5th August 2022. A consultation with the local Toll Operator and O&M contractor was also held. A consultation with community members during the reconnaissance of the project site to discuss the issues.

Step-4: Document Review – the following documents were reviewed as a part of the rapid study.

- Concession Agreement
- Schedule of the Concession Agreement
- Technical Due diligence report

Step-5: Preparation of ESDD report including ESAP.

1.4 Limitations

This report presents the results of red flag report, limited environmental and social due diligence and ESAP conducted to assess the compliance status of the Project in accordance with the applicable standards. During the course of this site assessment, Ramboll has attempted to independently assess the environmental and social conditions within the limits of the established scope of work as described in the proposal. The conclusions presented in this report represent Ramboll's best professional judgment based upon the information available and conditions existing as of the date of the review. In performing its assignment, Ramboll must rely upon publicly available information, the information provided during stakeholder consultations and information provided by third parties. Accordingly, the conclusions in this report are valid only to the extent that the information provided to Ramboll was accurate and complete. This review is not intended as legal advice, nor is it an exhaustive review of site conditions or facility compliance. A few specific limitations are presented below:

- The assessment is based on verbal information provided by the Toll Operation and O& M contractor of NHAI.
- Limited documents have been provided.
- Consents and permits have not been made available.
- Consultations with the community were not organised in the manner of prior information and targeted stakeholders.
- Estimation of GHG emission has not been done due to non-availability of data,

2. PROJECT DETAILS

The start point of the Project stretch is near Borkhedi village at existing km 36+600 and end point is at existing km 175+000(existing km stone of km 175+000 is fixed at km 174+750) before the approach of major bridge on Penganga River at Maharashtra / Telangana border. The existing project stretch is 4-lane with paved shoulder and divided carriageway configuration in the State of Maharashtra. The length of the project stretch as per km stone is 138.400 km and actual length at site is 138.150 km. Presently the project section is under Operation and Maintenance period with fee collection through 2 nos. of Toll Plazas, one at km 92+500 near Daroda village and second at km 150+000 near Kelapur town in Maharashtra for equivalent toll length of a) 155.2320 km (during construction period) and b) 155.3364 (after completion of major bridge) which shall be remain same for tolling purpose except with prior approval of Authority.

The project road can be divided into two homogenous sections based on the traffic characteristics as given below:

Table 2-1 : List of Homogenous Section based om Traffic.

SL No	Homogeneous Section	Start Chainage (km)	End Chainage (km)
1	Section 1 – Borkhedi to Wadki/Bori	36+600	113+000
2	Section 2 – Wadki/Bori to MH/TS border	113+000	175+000

Note: The existing km stone of km 175+000 is fixed at km 174+750

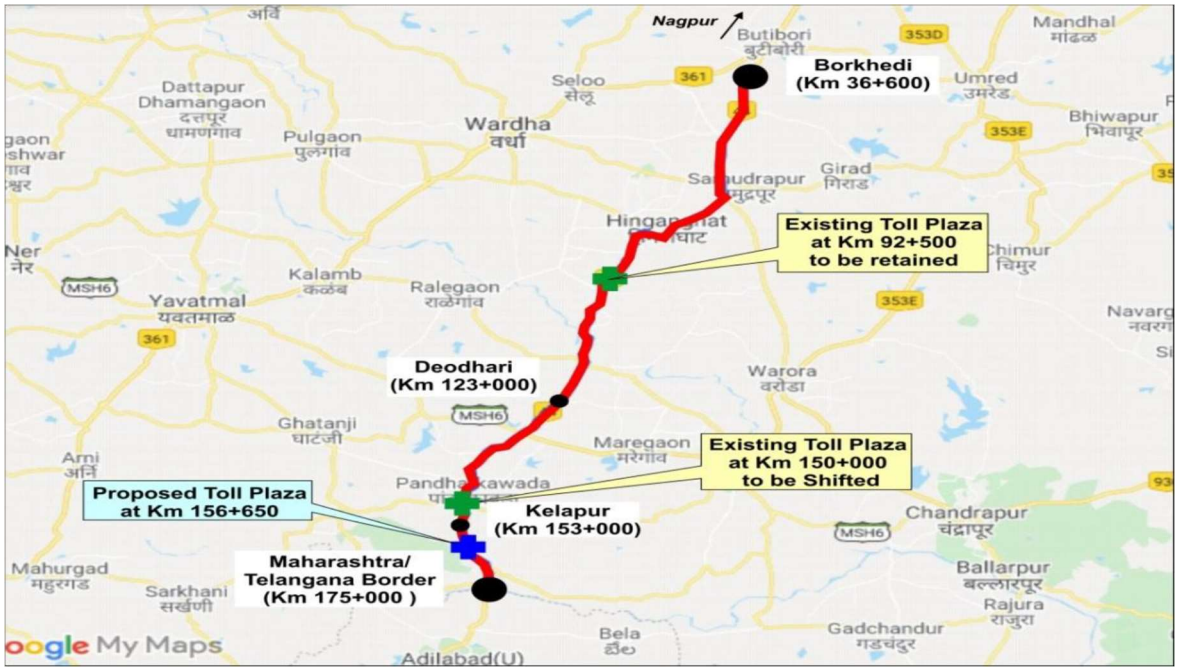

Figure 2-1 Index Map of the Asset

Source : Schedule A of Concession Agreement.

Kelapur toll plaza is proposed to be relocated to a new location, ~6 km south of the existing location in absence of adequate land to construct proper toll plaza at the present location. This is named as Kelpaur New TP (KM 156 +250) in the map above

2.1 Land use Pattern around the Project Area

The land use observed on both side of the project highways are agricultural with some patches of forest of hill section. Few built up areas were also noted on both left hand side and right hand side of the road.

Figure 2-2.General Land Use Pattern of the Project Area

2.2 Right Of Way

Right of way is varies from 45 meters to 60 meters. The section right of way is given in the table below.

Section	Chainage (km)	Right of Way in meters
Section -1	36+600 to 64+500	45 meters
Section -2	64+500 to 93+750	60 meters
Section – 3	93+750 – 175+000	60 meters
Toll Plaza	Proposed at chainage 127+000 km	200m X 200m

The right of way boundary was noted to be missing at a few locations the project road. Ramboll noted likely agricultural encroachment at few locations and also noted several squatters/encroachments along the project stretch. It should however be noted that extent of encroachment cannot be ascertained as the boundary/clear demarcation of the right of way boundary was not available.

Figure 2-3.Encroachment Observed During the Site Visit on 9-10 August 2022

2.3 Facilities at Toll Plaza

The facilities available at the toll plaza observed during the site visit are provided in the table below.

Sl No	Item	Darodha Toll Plaza	Kelapur	Observations/ condition
1	Patrolling Vehicle	1 Number	1 Number	Good condition
2	Crane	1 Number	1 Number	
3	Weigh in motion bridge	Not available	No	
4	Static bridge	Not Available	No	
5	Tunnel	Not available	No	
6	Loading and unloading facilities	Not available	No	
7	High Mast	2 Nos at the toll plaza	No	Illumination at the Kelapur toll plaza is very poor.
8	Street light	Available on both sides	No	
9	User fee board	Available	Yes	
10	Toilet	2 Nos on	No	It is one side of the toll plaza.
11	Water Supply	One submersible pump available	Yes	
12	CCTV Room	Available	No	
13	Complaint Box and book	Available	No	
14	Rainwater Harvesting	Not available	No	
15	Avenue Plantation	Available	Yes	It is done by the forest department
16	DG Set	1 No	125 kV (1 No)	Good condition in Darodha. But DG set at Kelapur is in poor condition.

2.4 Toll Collection Agency

The Toll Collection Agency's details are given in the table below.

Item	Darodha Toll Plaza	Kelapur Toll Plaza
Name of Toll Collection Agency	M/s Highway Tondon Toll bridge	M/s Sanghwi Cylinders Pvt Ltd
Start Date	December 2021	November 2021
End Date	December 2022	November 2022
Toll Manger	Mr Nirmal Dikshit	Mr Deepak Singh
Total Number of Staffs	111 Staffs (10 toll collectors)	40 staffs
No of Security Guards	26 No including 2 gunmen.	Not known

Figure 2-4. Facilities at Darodha Toll Plaza

Figure 2-5. Kelapur Toll Plaza

2.5 O&M Contractor

The role of the O&M contractor in this project are given below.

- Repair and Rehabilitation of pavement
- Repair and Rehabilitation of Embankment /Earthen Shoulders/ /Paved Shoulders/ Stone Pitching etc.
- Repair and Rehabilitation of Structures
- Maintenance of the toll plaza

- Maintenance of the avenue plantation and median plantation

The details of Maintenance Contractor are given below.

Item	Darodha Toll Plaza	Kelapur Toll Plaza
Name of Maintenance Contractor	Maintenance Contractor – M/s Madam Arch Patrolling – Sunrise Constructions	M/s Nirup Constructions
Start Date	One year Contract	August 2021
End Date	Details not known	August 2022 (Extension of 2 months)
Name of Site Engineer	Details not known	Details not known
Total number of Staffs	Details not known	Details not known
Vendor/ Sub-contractor	Details not known	Details not known

2.5.1 Organisation Structure of the Project

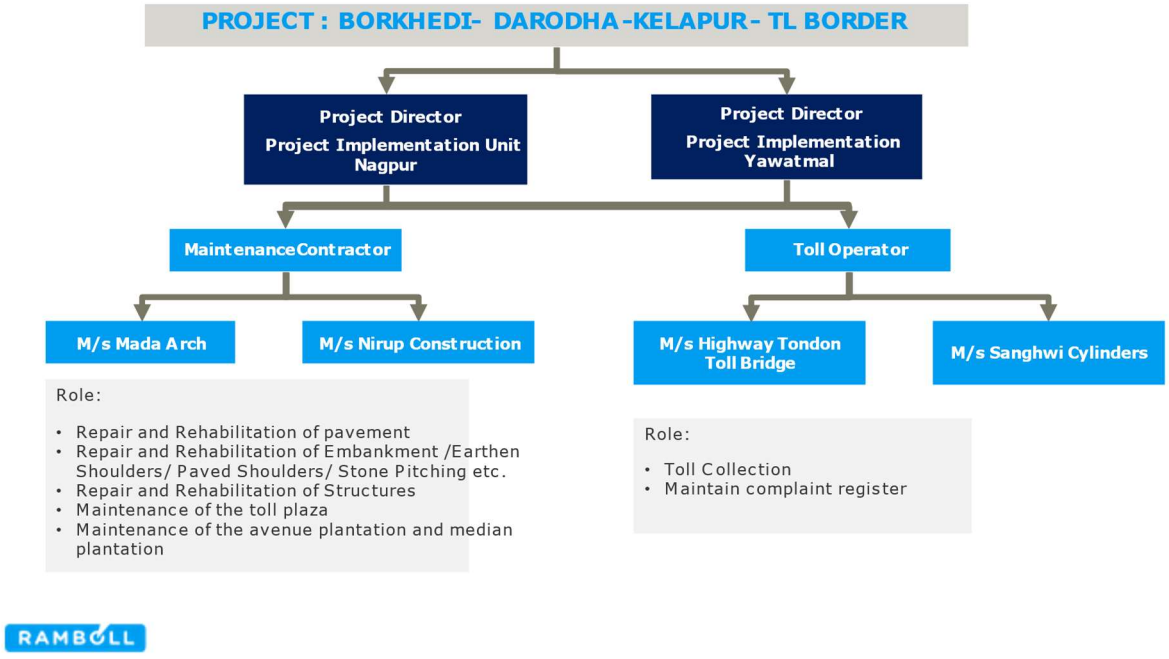

Figure 2-6. Organisation Structure of the Project

2.6 Consultation with Internal Stakeholders

The internal stakeholders include but not limited to Toll Collection Agency, Maintenance contractors, Vendors and suppliers. A consultation with tolling concessionaire and maintenance contractor has been undertaken on the day of site visit. The outcome of the meeting has been provided below.

Table 2-2 Details of consultations undertaken with Internal Stakeholders

Consultation	Outcome of the consultation
1. Mr. Nirmal Dikshit (Toll Manager) 2. Mr. Satpal Singh (Asst. Toll Manager) M/s Highways Tondon Construction Company	• The company is operating the Darodha Toll Plaza. • The contract for operation of toll plaza is for one year. • The complaint register is maintained by the toll operator. • 111 staff are involved in the operation of toll plaza. • The road is in bad condition, so many complaints come to the toll plaza. • All the toll collectors are local. • Toll plaza has accommodation for regular staff. • Kitchen facility is also available at the toll plaza.
1. Mr. Rahul Dange (Toll Manager) 2. Mr. Deepak Kumar Singh (Asst. Toll Manager) M/s Highways Tondon Construction Company	• The company is operating Kelapur Toll Plaza. • The contract for operation of toll plaza is for one year. • The complaint register is maintained by the toll operator. • 40 staff are involved in the operation of toll plaza. • The Road is in bad condition, so many complaints comes to the toll plaza. • All the toll collectors are local. • Toll plaza does not have accommodation or kitchen facility for regular staff.
Mr. P Rajeshwar Rao, Resident Engineer of Independent Engineer, M/s K&J Consultants	• M/s K&J Consultant is the independent engineer for the project. • The project passes through eco-sensitive zone of Tipeswar wildlife sanctuary. About 13 kms of stretch is in the eco-sensitive zone. • The forest area and Ghat sections are in Devdhari hills. • The construction of the project started in 2005-06 and completion of the construction was achieved in 2017. • Land acquisition has been completed and right of way of 45-60 meters available.

A consultation with Forest Department was undertaken at Panther Kawra. The summary of outcome of the meeting is provided below.

Table 2-3 below presents the consultation with the forest department.

Table 2-3 Details of consultations undertaken with Forest Department

Consultation	Outcome of the consultation
Mr. Mesram - Ranger Surveyor, Panther Kawdra Forest Division, Yavatmal	• Tipeswar Wildlife Sanctuary is spread over in an area of 1500 square km. • The population of tigers in the sanctuary is about 28 individuals. • Tipeswar Wildlife Sanctuary was declared as sanctuary in 2015 vide MoEFCC Gazette Notification SO.O. No 4892(E) dated 18 September 2018. • The project road NH-44 does not pass through the wildlife area, but its buffer zone declared as eco-sensitive zone. • An exercise of assessment of proximity was done during the discussion. It was assessed, the project road is about 600 meters from the

	boundary of wildlife sanctuary. About 13 kms of the road section passes through the buffer zone designated as eco-sensitive zone.

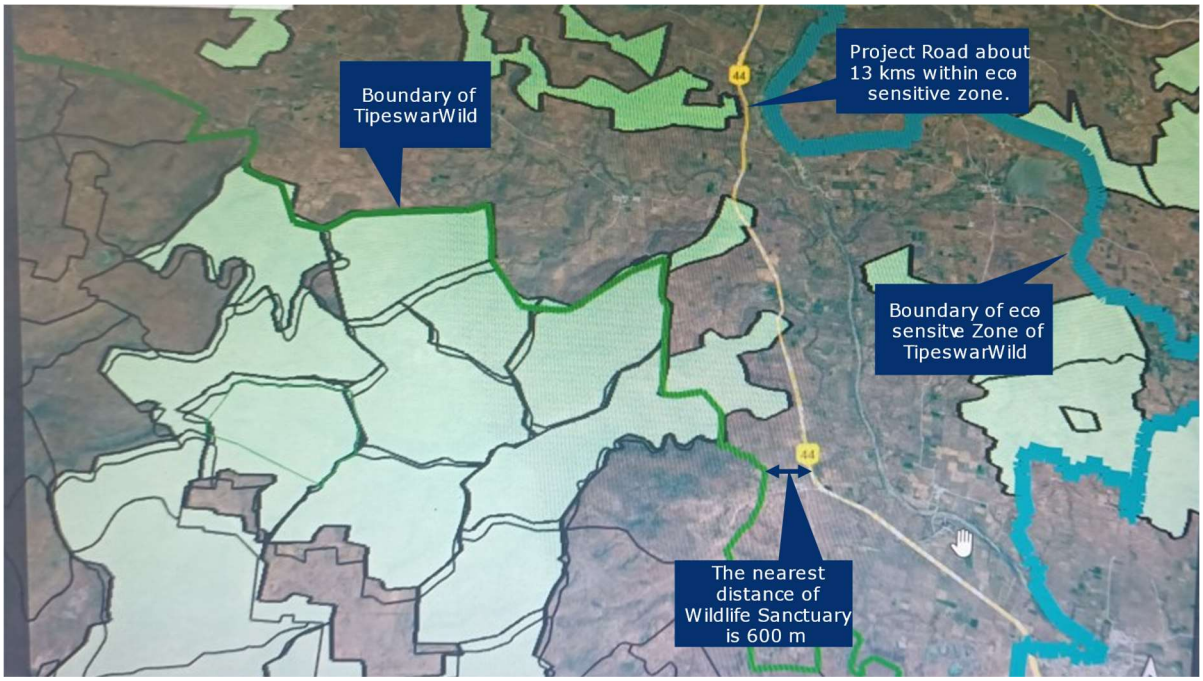

Figure 2-7. Assessment under taken with Forest official about the Buffer Zone and Wildlife Zone of Tipeswar Wildlife Sanctuary.

3. RED FLAG REPORT

3.1 Regulatory Compliances

The permits, no objection certificates (NoC) and other regulatory permission obtained from the regulatory authority was not available with the existing toll collecting agency and maintenance contractor. The permits listed in Table below are noted to be applicable for the project. NHAI InvIT needs to ensure that these permits are obtained before or after the transfer of asset as the case maybe.

Table 3-1: Gaps in regulatory compliance

Sl No	List of Licenses	Issuing Authority
1	Labour Licenses	Labour Department
2	Workmen compensation insurance	Insurance
3	NoC for ground water extraction	Central Ground Water Board
4	NoC from the State pollution Control Board	UP State Pollution Control Board
5	Copy of forest clearance	Forest Department
6	PUC of all vehicles including maintenance vehicles	Regional transport Department authorised Agency
7	Shop and establishment license	Department of Revenue

3.2 Compliance With GIIP

It should be noted that the gaps identified below pertain to the existing conditions at the site and relate to policies and procedures implemented by the current toll collecting agency and the maintenance contractor who have a one-year contract with NHAI. NHAI InvIT needs to ensure that adequate policies and or procedures are developed to close the gaps identified once the assets are transferred.

Table 3-2: Compliance with GIIP requirements

Sl No	Topic	Observations	Gaps	Risk Level	Recommendation
Environmental and Social Management System					
1	Environmental and Social Management System (ESMS)	An environmental and social management system is required to manage the environmental and social risks associated with the project. The ESMS for the site has not been developed.	ESMS is not available at the site and the toll operator and maintenance contractors are working without Environmental and Social management Plan.	Medium	Develop ESMS in compliant with applicable standards, including but not limited to ISO 14001 and ISO 45001.
2	Environmental and Social (E&S) Policy	An environmental and social policy demonstrating commitment towards managing environmental and social risks for the project has not been developed.	No E&S Policy is available	Medium	Develop E&S policy related to environmental Health and Safety
3	Identification of Environmental, health, safety and Social Risks and Impacts	An Environmental, Health, Safety and Social Risk assessment to identify the risks associated with operation of toll plaza, operation and maintenance of road is required to adequately mitigate the risks. No such risk assessment has been undertaken.	Environmental, health, safety and Social Risk assessment related to operation of toll plaza, operation and maintenance of road is not available.	Medium	Undertake Environmental, health, safety and Social Risk assessment.
4	Organizational Capacity and Competency	An organisation structure is required with set of competent to handle the environmental and social risks associated with the project. Competent people to handle the E&S risks associated with the project are not available.	• No set organisational structure has been created by the toll operator and maintenance contractor to include people with competency to manage the environmental and social risks. • There is not midterm evaluation of the competency and training plan for the engineers, security guards and other staff.	Medium	Develop organisation structure with competency matrix. Develop training plan to address environmental, health, safety and social risks.

Sl No	Topic	Observations	Gaps	Risk Level	Recommendation
5	Emergency Preparedness and Response	No emergency plan has been prepared for the project to identify the anticipated emergency situations and associated responses. It should further be noted that the District Magistrate is responsible for any major disaster management such as major accidents and spillage of large quantities of hazardous chemicals on the road stretch. It should however be noted that emergency equipment like ambulance, trained paramedic (Ambulance driver) is available to respond to emergency situations arising out of accidents at Darodha toll plaza. A medical first aid room is also available at the Darodha toll plaza. However, Kelapur does not have these facilities as toll plaza is not constructed there.	No emergency response plan has been developed for the site.	Medium	Develop an emergency response plan in consultation with the district magistrate.
6	Monitoring and Review	The monthly progress report is prepared by the Independent engineer, and it is submitted to NHAI PIU. However indicators related to environmental and social issues are not included in the monthly progress report.	A monitoring system to track the environmental, health, safety and social parameters is not available.	Low	Identify key performance indicators based on the environmental and social risks identified as a part of the ESMS and accordingly develop monitoring and reporting program.
7	Stakeholder Engagement	The highway project is spread over many villages. The key stakeholders are: - NHAI PIU - Local Police, - Electricity Department, - Central Ground Water Board - Village panchayat, - Vendors, Sub-contractors, - Local labours, - Forest Department, - Local community, - Village institutions like schools, health centres, - Media.	No policy and procedure available for the stakeholder mapping and development of stakeholder engagement plan.	Medium	Undertake stakeholder mapping and develop stakeholder engagement plan.
8	External Communications and Grievance Redressal Mechanisms	The project does not have any obligation of disclosure of any report in the operation stage except for the reporting obligation to NHAI PIU. An external communication plan for engagement with communities/stakeholders identifying the level/type of information to be disclosed and medium of disclosure is required to manage expectations of the community/stakeholders. A grievance	An external communication plan and grievance redressal mechanism has not been developed for the project.	Low	Develop an external communication plan and grievance redressal mechanism.

Sl No	Topic	Observations	Gaps	Risk Level	Recommendation
		redressal mechanism needs to be also developed.			
Labour and working condition					
9	Human Resources Policies and Procedures	The project operation includes engagement of employees and workers. A human resource policy and associated procedures need to be developed to comply with local regulation, international labour organisation (ILO) covenants, human rights requirements and other GIIP requirements related to labour and working conditions. The current toll operator and the maintenance contractor have not developed a comprehensive human resource policy.	A comprehensive human resource policy and the associated procedures have not been developed by the current toll operator and the maintenance contractor.	Low	Develop a human resource manual consisting of policies and procedures around: • Working conditions and terms of employment • Code of conduct for employees • Minimum wages and overtime payment including working hours • Non-discrimination and equal opportunity • Recruitment and retrenchment procedures
10	Working Conditions and Terms of Employment	Health and sanitation facilities in the project (such as adequate toilets, drinking water, bathing areas, etc.) provided by the toll operator was noted to be not in compliance with GIIP requirements related to worker accommodation.	The following gaps were noted: • The kitchen at Darodha Toll plaza is poorly maintained. • No procedures have been developed to identify the health and safety facilities that need to be provided for the workers. • No uniform provided to the toll collectors, • The chairs provided to the Toll collectors are not in good condition, • No Personal Protective Equipment were noted to be used by employees of the toll	Low	Ensure that the health and sanitation facilities provided in the project meet the GIIP requirements.

Sl No	Topic	Observations	Gaps	Risk Level	Recommendation
			plaza operator or the O&M contractor during the site visit, • No separate facilities for women worker such as toilet for ladies. • Drinking water and Sanitation facility at Kelapur Toll Plaza is not in compliant to the Indian standards or GIIP.		
11	Non-Discrimination and Equal Opportunity	• The corporate level policy does not include social diversity and gender inclusion policy.	No non-discrimination and equal opportunity policy and procedure is available.	Low	Develop social diversity and gender and social inclusion policy and it should be encouraged in the supply chain of the company.
12	Internal Grievance Redressal Mechanism	The Toll Collection Agency and maintenance contractor does not have grievance redressal mechanism for the employees.	There is no transparent grievance redressal mechanism for the employees and workers.	Low	Establish internal grievance redressal mechanism to include grievances from employees/workers for registering grievances. This grievance redressal mechanism also needs to be extended to the employees/workers in the supply chain.
13	Protecting the Work Force from Child Labour	The Toll Collection Agency and maintenance contractor are aware of abolition of child labour but not aware of risk associated with child labour in its supply chain.	No process has been developed to check use of child labour by sub-contractor and other vendors in the supply chain.	Low	Establish procedure to check use of child labour sub-contractor and other vendors in the supply chain. Provide suitable posters about the prohibition of child labour.
14	Occupational Health and Safety	The operation of road includes - working on operational road - dealing with road user for collection toll. - Working in confined space in the culverts and drains. - Working near water. - lifting activities and use of cranes - Working in remote location - Working near live wire. - Working near railway line - Working in night - Operation of ambulance A Hazard Identification and Risk Assessment (HIRA) needs to be undertaken for all the	A Hazard Identification and Risk Assessment (HIRA) and SOPs have not been developed for the various activities by the Toll Collection Agency and the maintenance contractor	Medium	Undertake HIRA and prepare SOPs for the various activities.

Sl No	Topic	Observations	Gaps	Risk Level	Recommendation
		activities at the project and standard operating procedures (SOPs) should be developed that include the mitigation measures in the HIRA. These SOPs have not been developed by the Toll Collection Agency and the maintenance contractor. During the site visit it was noted that the appropriate personal protective equipment (PPEs) like hard hat, reflective vests, safety shoes were not provided to the employees/workers of the Toll Collection Agency and the maintenance contractor.			
15	Supply Chain	The operation of road will require supply of material for road maintenance, water and other consumable. A procedure should be developed to ensure that the environmental & social risks are appropriately addressed in the supply chain. This mechanism can include considering environmental & social parameters in vendor selection, contractual clauses to ensure that the environmental & social risks are adequately managed and a monitoring plan to monitor the environmental & social performance of the vendors in the supply chain. A mechanism to measure and monitor the environmental and social risks in the supply chain was noted to be missing.	The current Toll Collection Agency and maintenance contractor have not developed procedures around measuring and monitoring the environmental & social risks in the supply chain.	Low	Develop a mechanism to include procedures around measuring and monitoring the environmental & social risks in the supply chain.
Resource Efficiency and Environmental Pollution including GHG emission					
16	Resource Efficiency and Pollution Prevention	The resources required for the operation and maintenance of the road are - Energy illumination of toll plaza and street lights, - Water for the drinking purpose, maintenance and plantations. - Fuel for DG and vehicles, and - Material for road maintenance The energy consumption data is not available for both the plazas. However based on a rough estimate the average diesel consumption in a summer month is approximately 150 litres per month and the electricity consumption is	• A plan including KPI for efficient use of resources and GHG estimation has not been developed by the current Toll Collection Agency and the maintenance contractor. No monitoring plan has been developed to measure the pollution caused by the diesel generator and other activities at the toll plaza. • Illumination at both the toll plaza – the night illumination at toll is not adequate. The street light at	Low	• Prepare plan for the resource efficiency including accurate recording of diesel consumption and electricity consumption to estimate GHG emissions from the project. Prepare a plan to monitor the emissions from the diesel generator and other pollution causing activities in the project. • Provide illumination at the toll plaza and access road to the toilet. • Provide treatment and disposal facility for wet waste specifically generated from kitchen and dining area.

Sl No	Topic	Observations	Gaps	Risk Level	Recommendation
		approximately 4400 kWh in a month for the Kelapur toll plaza. No energy saving measures have been developed to reduce the diesel or electricity consumption. The greenhouse gas emissions (GHG) from the project are not being measured or reported currently. It was further noted that there were gaps in accounting for diesel usage by patrolling vehicle, ambulance, maintenance vehicles and other vehicles. No monitoring is being currently undertaken to measure the emissions from the diesel generator located at the toll plaza. The quality and quantity of wastewater being generated at the toll plaza is also not being monitored.	toll plaza and toilet blocks are inadequate. High mast is not working in full capacity of all lights. • Solid Waste disposal facility is not available. It is being dumped withing the toll plaza boundary and sometimes it is burnt. • DG set Kelapur Toll Plaza is in very poor condition. • Maintenance Vehicles are in poor condition. • Storage and transportation of maintenance material in poor condition		• Reduce and recycle plastic waste generated from the toll plaza. • DG set requires to be replaced with new DG set having noise attenuation measures inbuilt. • Procure or hire standard maintenance vehicles. • Provide safe and suitable storage and covered transportation of material to the maintenance site.
17	Ground Water utilisation	A groundwater abstraction well is installed at the toll plaza to meet the water demands. No flow meters have been installed to measure the quantity of ground water extracted for use. It was further noted that no water conservation measures including installation of rain water harvesting structures have been undertaken for the project.	A system to measure the amount of water used and associated water conservation measures have not been developed for the Project.	Low	Develop a system including installation of flow meters to measure the water use and further develop water conservation measures that can be adopted for the project.
Community Health, Safety and Security					
18	Community Health, Safety, and Security	Risk associated with community health and safety are identified below. - Pedestrian Safety - Traffic Safety	• Installation and maintenance of signs, signals, markings, • and other devices used to regulate traffic, including posted speed limits, warnings of sharp turns, or other special road conditions are absent at most of the locations. Barricading is also absent at the unsafe locations. • Public Toilets at the Kelapur toll plaza is not available. However, the common toilet for employees are used for the public purpose. • Ambulance – biomedical waste disposal system is not available.	Medium	• Identify road safety risks and Prepare plan to mitigate and manage these risks. • Provide good access to the toilet. Construction of toilet on other side of toll plaza also. • Disposal of biomedical waste through hospitals where facility of biomedical waste disposal is available or through biomedical waste collection agency. • Disposal of biomedical waste through hospitals where facility of biomedical waste disposal is available or through biomedical waste collection agency. • Procure or hire standard Cranes with examination of lifting tools and tackles.

Sl No	Topic	Observations	Gaps	Risk Level	Recommendation
			• Cranes are supplied by the local suppliers on rent basis and are of local manufacture and it does not have report on examination of lifting tools and tackles are not available.		
19	Security Personnel	The toll operation company deploys security guards during operation of toll plaza. Two (2) guards recruited from local community has been deployed. As per the consultation with local persons, no major security threat related to Naxalites, terror attacks haven identified in last 5 years. However local protest related to exemption of toll are frequent in the area.	• No security plan prepared. • No training on behavioural aspects have been covered. • No training on grievance recording have been imparted.	Low	Develop a security management plan.
Land Acquisition and Involuntary Resettlement, Encroachment and					
20	General	The right of way of 60 meters is available throughout the road. Land acquisition of toll plaza in Kelapur is yet to be done. this will require 4 ha of land. Few consultations with local people have been undertaken and it was informed the compensations have been disbursed and no pending issue available. The litigation or the legacy land issues cannot be ascertained at this stage in the absence of detailed information	The land acquisition for toll plaza proposed at Kelapur will be done by the NHAI and supported by the NHAI InvIT. Since this will be involuntary resettlement so, provisions of the Land Acquisition Act will be followed.	Medium	Prepare Land Acquisition and resettlement Plan as per the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013. Verify if any legacy issues and litigation related to land are present from the PIU NHAI.

Sl No	Topic	Observations	Gaps	Risk Level	Recommendation
21	General	Some encroachments/ squatters have been observed within the right of way. These encroachments are temporary hutment used for commercial purpose. As per the concession agreement, Concessionaire shall protect the Site from any and all occupations, encroachments or Encumbrances. Concessionaire shall maintain a round-the-clock vigil over the Site and shall ensure and procure that no encroachment thereon takes place, and in the event of any encroachment or occupation on any part thereof, the Concessionaire shall report such encroachment or occupation forthwith to the Authority and undertake its removal at its cost and expenses.	No survey records of encroachment available.	Medium	Undertake encroachment survey and prepare plan for the removal.
Biodiversity Conservation and Sustainable Management of Living Natural Resource					
22	General	Tipeswar Wildlife Sanctuary is spread over in an area of 1500 square km. The population of tigers in the sanctuary is about 28 individuals. Tipeswar Wildlife Sanctuary was declared as sanctuary in 2015 vide MoEFCC Gazette Notification SO.O. No 4892(E) dated 18 September 2018. The project road NH-44 passes through the buffer zone of Tipeswar sanctuary that is declared as eco-sensitive zone. An exercise of assessment of proximity was done during the discussion. It was assessed that the project road is about 600 meters from the boundary of wildlife sanctuary. About 13 kms of the road section passes through the buffer zone designated as eco-sensitive zone.	The copy of forest clearance is not available. However during consultation with the forest department no gaps were identified by the forest officer. It should however be noted that a permission under the Wildlife Protection act will be required for any major construction or maintenance work on the 13 kilometres stretch passing through the eco sensitive zone.	Medium	Obtain permission for any construction or major maintenance in the stretch of 13 km falling within the eco-sensitive zone of the Tipeswar Wildlife Sanctuary. Obtain the Forest clearance from NHAI office and review for any gap/ legacy issues.
Indigenous Peoples					

Sl No	Topic	Observations	Gaps	Risk Level	Recommendation
23	Indigenous Peoples	Yavatmal district has tribal population. Since the land acquisition has been completed long back in 2010-11, so no residual impact has been identified.	No gaps identified.	Low	Undertake assessment of tribal land in case of land acquisition for proposed toll plaza.
Archaeological sites and Cultural Heritage					
24	Protection of Cultural Heritage in project design and execution	There is no archaeological and cultural site found within the project area of influence during the site visit. However a detailed survey to identify any archaeological sites found within the area of influence of the project road	No survey has been conducted to identify and archaeological sites found within the area of influence of the project road.	Low	Under take survey related to identification of archaeological sites within the area of influence of the project road.

4. CATEGORISATION OF PROJECT

The categorisation of a Project based on the magnitude of potential environmental and social risks and impacts, including those related to Human Rights, climate change, and biodiversity.

The categories are:

Category A – Projects with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented;

Category B – Projects with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures; and

Category C – Projects with minimal or no adverse environmental and social risks and/or impacts.

The project is categorised as **Category B**. based on following arguments.

- All the mitigation measures of impacts related to air quality, water and noise are generally site specific and reversible in nature and mitigation measures are within control of the project proponent.
- No incremental impact arises due to operation of the road.
- Land use conversion was one time activity, and no further land use change or conversion is involved.
- All the impact associated with operation of toll plaza and road are reversible and of low significance.
- No additional livelihood loss in the operation of toll road.

5. ENVIRONMENT AND SOCIAL ACTION PLAN

Sl No	Identified Gap	Recommended actions	Best Practices (If any)	Responsibility	Timeframe	KPI Completion
1.	• No system for environmental and social management is being used by the current toll operator and maintenance contractors. • Environmental, health, safety and Social Risk assessment related to operation of toll plaza, operation and maintenance of road is not available. • No organisation structure available, • No evaluation of competency and training of the staffs. • No environmental and social monitoring system. • Stakeholder engagement plan is not available.	Develop ESMS in compliant with applicable standards, including but not limited to ISO 14001 and ISO 45001 and include following: • Develop E&S policy related to environmental Health and Safety. • Include environmental and social considerations in selection of contractors and subcontractors • Undertake Environmental, health, safety and Social Risk assessment • Develop EHS manual and procedures for working at toll plaza, maintenance works etc • Develop organisation structure with competency matrix. • Develop training plan to address environmental, health, safety and social risk. • Identify key performance indicators based on the environmental and social risks and develop monitoring and reporting plan accordingly. • Develop stakeholder engagement plan.		NHAI InvIT	Post-acquisition and prior to hiring of toll operator or maintenance contractor.	ESMS incorporating the recommendations
2.	• Licenses and permits to be acquired by NHAI InvIT	NHAI InvIT should obtain all licenses and permits as defined in Concession Agreement but not limited to the following. - Registration for Provident Fund - Labour License - Shop and establishment Licenses - NoC from State Pollution Control Board. PUC of Vehicles used for the project.		NHAI InvIT	Prior to start of work.	

Sl No	Identified Gap	Recommended actions	Best Practices (If any)	Responsibility	Timeframe	KPI Completion
3.	• Licenses and permits to be acquired by Contractors and Toll Operators	The contractors and Toll Operators of NHAI InvIT should obtain all necessary licenses and permits but not limited to the following. - Registration for Provident Fund - Labour License - Interstate Migrant Worker License - Workmen Compensation and insurance - PUC of all Vehicles - NoC for extraction of Surface Water/ Ground Water - Authorisation for disposal of Biomedical Waste		Contractors and toll operators of NHAI InvIT	Prior to start of work.	
4.	• No emergency response plan has been developed for the site. • Hazard Identification and Risk Assessment (HIRA) and SOPs have not been developed for the various activities by the Toll Collection Agency and the maintenance contractor.	• Undertake HIRA and prepare SOPs for the various activities. • Develop an emergency response plan in conformance with district level disaster management.		NHAI InvIT	6 months after the acquisition	Completed HIRA, SOP and ERP.
5.	• A comprehensive human resource policy and the associated procedures have not been developed by the current toll operator and the maintenance contractor.	Develop a human resource manual consisting of policies and procedures around: • Working conditions and terms of employment • Code of conduct for employees • Minimum wages and overtime payment including working hours • Non-discrimination and equal opportunity • Recruitment and retrenchment procedures. • Abolition of child labour. Establish procedure to check use of child labour sub-contractor and other vendors in the supply chain. • Provide suitable posters about the prohibition of child labour		NHAI InvIT	6 months after the acquisition	Human Resource manual incorporating the recommendations
6.	• Working Conditions - Health and sanitation facilities in the project (such as adequate toilets, drinking	• Ensure that the health and sanitation facilities provided in the		NHAI InvIT	6 months after the acquisition	Health and sanitation facilities

Sl No	Identified Gap	Recommended actions	Best Practices (If any)	Responsibility	Timeframe	KPI Completion
	water, bathing areas, etc.) provided by the toll operator was noted to be not in compliance with GIIP requirements related to worker accommodation.	project meet the GIIP requirements.				compliant with GIIP requirements.
7.	• There is no transparent grievance redressal mechanism for the employees and workers.	• Establish internal grievance redressal mechanism to include grievances from employees/workers for registering grievances. This grievance redressal mechanism also needs to be extended to the employees/workers in the supply chain.	Technology based online complaint management for employees.	NHAI InvIT	6 months after the acquisition	Establish GRM
14.	• Supply Chain - The current Toll Collection Agency and maintenance contractor have not developed procedures around measuring and monitoring the environmental & social risks in the supply chain.	As part of ESMS: • Develop a mechanism to include procedures around measuring and monitoring the environmental & social risks in the supply chain.		NHAI InvIT	6 months after acquisition	Supply Chain measures as part of ESMS
8.	• A plan including KPI for efficient use of resources and GHG estimation has not been developed by the current Toll Collection Agency and the maintenance contractor. • No monitoring plan has been developed to measure the pollution caused by the diesel generator and other activities at the toll plaza.	• Prepare plan for the resource efficiency including accurate recording of diesel consumption and electricity consumption to estimate GHG emissions from the project. • Prepare a plan to monitor the emissions from the diesel generator and other pollution causing activities in the project.	Develop tool for online estimation of GHG emission. Use energy efficient equipment, machineries, pumps, water fixture, illumination and energy efficient vehicles.	NHAI InvIT	• Document preparation - 6 months after the acquisition. • Monitoring mechanism for emissions for pollution causing activities – continuous activity.	• Document Preparation - Resource Efficiency Plan • Bi-annual GHG estimation.
9.	• A system to measure the amount of water used and associated water conservation measures have not been developed for the Project.	• Develop a system including installation of flow meters to measure the water use and further develop water conservation measures that can be adopted for the project.		NHAI InvIT	• Installation and Monitoring system for water use – 6 months after acquisition. • Water Conservation measures included in	• Monitoring process for water use. • Water conservation measures part of ESMS

Sl No	Identified Gap	Recommended actions	Best Practices (If any)	Responsibility	Timeframe	KPI Completion
					ESMS – 6 months after acquisition.	
10.	• Installation and maintenance of signs, signals, markings, and other devices used to regulate traffic, including posted speed limits, warnings of sharp turns, or other special road conditions are absent at most of the locations. Barricading is also absent at the unsafe locations.	• Identify road safety risks and Prepare plan to mitigate and manage these risks.		NHAI InvIT	6 months after the acquisition	• Road safety /audit/survey report including mitigation plan.
11.	• No security plan prepared. • No training on behavioural aspects have been covered. • No training on grievance recording have been imparted.	• Develop a security management plan. • Training Plan for security guards and continuous behavioural based training.		NHAI InvIT	Security Management Plan - 6 months after the acquisition. Training to security guards - continuous	Completed security management plan Training Plan for security guards.
12.	• Provisions of the Land Acquisition Act should be followed to address the involuntary resettlement resulting from the land acquisition for the proposed toll plaza at Kelapur	• Prepare Land Acquisition and resettlement Plan as per the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013. • Verify if any legacy issues and litigation related to land are present from the PIU NHAI.		NHAI InvIT	6 months after the acquisition	Land Acquisition and Resettlement plan
13.	• An encroachment survey has not been undertaken for the project.	• Undertake encroachment survey and prepare plan for the removal of encroachments.	GPS based survey of encroachments.	NHAI InvIT	6 months after the acquisition	Encroachment survey report.
14.	• Copy of Forest Clearance is not available. • Permission under the Wildlife Protection Act will be required for any major construction or maintenance work on the 13 Kms stretch passing through the eco sensitive zone.	• Obtain permission for any construction or major maintenance in the stretch of 13 km falling within the eco-sensitive zone of the Tipeswar Wildlife Sanctuary. • Obtain the Forest clearance from NHAI office and review for any gap/ legacy issues.		NHAI InvIT	As and when needed	Obtain required permissions for any major construction/maintenance activity in the eco-sensitive zone

Sl No	Identified Gap	Recommended actions	Best Practices (If any)	Responsibility	Timeframe	KPI Completion
15.	• No survey has been conducted to identify the archaeological sites found in the area of influence of the project road	• Undertake survey related to identification of archaeological sites within the area of influence of the project road		NHAI InVIT	6 months after the acquisition	Archaeological survey report listing archaeological sites within AOI of the project.
16.	• Public Toilets at the Kelapur toll plaza is not available. However, the common toilet for employees are used for the is away from the carriage way and access to the toilet is not in a good condition. • The public toilet is available only one side. • Separate ladies' toilet is not available for workers and public.	• Provide good access to the toilet. • Construction toilet on other side of toll plaza also.	As per IRC Code for toll plaza.	NHAI InvIT	3 months after the acquisition	Construction of good access to toilet and construction of new toilet on other side of toll plaza.
17.	• Illumination at toll plaza – the night illumination at toll is not adequate. The street light at toll plaza and toilet blocks are inadequate. • High mast is not working in full capacity of all lights.	• Provide illumination at the toll plaza and access road to the toilet.	As per IRC Code for toll plaza.	NHAI InvIT	6 months after the acquisition	Illumination at toll plaza as per IRC Code.
18.	• Solid Waste disposal facility is not available. It is being dumped withing the toll plaza boundary and sometimes it is burnt.	• Provide treatment and disposal facility for wet waste specifically generated from kitchen and dining area. • Reduce and recycle plastic waste generated from the toll plaza.	As per IRC Code for toll plaza.	NHAI InvIT	6 months after the acquisition	Segregated Waste Disposal Plan and Procedures (i.e., Dry, Wet, Biomedical, etc.)
19.	• DG set is in poor condition.	• DG set requires to be replaced with new DG set having noise attenuation measures inbuilt.	As per CPCB guidelines.	NHAI InvIT	6 months after the acquisition	DG set adhering to CPCB guidelines.
20.	• Ambulance – biomedical waste disposal system is not available.	• Disposal of biomedical waste through hospitals where facility of biomedical waste disposal is	As per IRC Code for toll plaza.	NHAI InvIT	6 months after the acquisition	Biomedical waste disposal process established as per IRC code.

Sl No	Identified Gap	Recommended actions	Best Practices (If any)	Responsibility	Timeframe	KPI Completion
		available or through biomedical waste collection agency[1].				
21.	• Cranes are supplied by the local suppliers on rent basis. • Crane – cranes are of local manufacture, and it does report on examination of lifting tools and tackles are not available.	• Procure or hire standard Cranes with examination of lifting tools and tackles.	As per the section 29 of Factory Act, 1948 and amendments till date.	NHAI InvIT	6 months after the acquisition	Standard Cranes as per applicable acts.
22.	• Maintenance vehicles are in poor condition	• Procure or hire standard maintenance vehicles.	As per Motor Vehicles Act 1988.	NHAI InvIT	6 months after the acquisition	Standard Maintenance Vehicles as per Motor Vehicles Act.
23.	• Storage and transportation of maintenance material in poor condition.	• Provide safe and suitable storage and covered transportation of material to the maintenance site.	As per IRC Code for toll plaza.	NHAI InvIT	6 months after the acquisition	Storage and Transport of material following IRC code.

[1] As per requirements under Bio-medical Waste (Management & Handling) Rules, 1998 and subsequent amendments, These rules apply to all persons who generate, collect, receive, store, transport, treat, dispose, or handle bio medical waste in any form including hospitals, nursing homes, clinics, dispensaries, veterinary institutions, animal houses, pathological laboratories, blood banks, ayush hospitals, clinical establishments, research or educational institutions, health camps, medical or surgical camps, vaccination camps, blood donation camps, first aid rooms of schools, forensic laboratories and research labs.

APPENDIX 1
PHOTOLOG

Intended for
National Highway Infra Trust

Document type
Report

Date
September 2022

LIMITED ENVIRONMENTAL AND SOCIAL DUE DILIGENCE REPORT

BORKHEDI-TELANGANA

RAMBOLL Bright ideas. Sustainable change.

LIMITED ENVIRONMENTAL AND SOCIAL DUE DILIGENCE REPORT
BORKHEDI-TELANGANA BORDER

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APPENDICES

Appendix 1
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1. INTRODUCTION

The National Highways Authority of India ('NHAI') has set up an Infrastructure Investment Trust ('InvIT') namely National Highways Infra Trust. National Highways Infra Investment Managers Private Limited ('NHIIMPL') has retained Ramboll India Private Limited (hereafter called 'Ramboll') to conduct a rapid Environmental and Social due diligence (ESDD) for the following three Assets ('Assets').

Asset 1: Agra Bypass section connecting NH19 (old NH2) to NH3 in Uttar Pradesh

Asset 2: Borkhedi-Kelapur-Maharashtra/Telangana border on NH44 (old NH7) in the state of Maharashtra

Asset 3:Shivpuri – Jhansi on NH27 in the state of Madhya Pradesh

This report has been prepared for Asset-2 Borkhedi-Kelapur-Maharashtra/Telangana border on NH44 (old NH7) in the state of Maharashtra

1.1 Asset under the Report

Table 1-1 : Project Details

Asset Attributes	Description
Name	Tolling, Operation, Maintenance and Transfer of Borkhedi Wadner Deodhari Kelapur Maharashtra / Telangana Border (from km 36.600 to km 175.600) of NH 44 in the State of Maharashtra
State	Maharashtra
Length in kms	138.400 km
No of Toll Plaza	2 (No)
Location of Toll Plaza	Daroda Toll plaza at chainage km 92+500 Kelapur toll plaza at chainage km 150+500
Operation Since	April 2011
Lane Configuration	4 lanes

1.2 Scope of Work

Environment, Health and Safety diligence scope of work

- Gather preliminary information required for categorization of an investment into risk categories, to further inform the level of scrutiny, applicability and extent of onsite due diligence that the project's operations need to be subjected to;
- Obtain a list of documents to assess the project's compliance with national and state level EHS regulations as well as EHS management systems and policies and overall compliance levels with respect to all applicable EHS regulations for Road sector projects (such as those detailed by Ministry of Environment Forests and Climate Change and Ministry of Labour,).

Site based due diligence

- Onsite due diligence to be performed on three projects under the transaction perimeter;
- The purpose of the site visits is to certify information provided through visual observations; collect primary information on EHS risks to check company's regulatory preparedness and statutory compliance levels; and interact with both external and internal stakeholders to verify the information shared by the management;
- Onsite due diligence to be carried out in following four steps:
    - Opening meeting with target: To discuss the objective of the site visits, the review process, and the stakeholder interview schedules with the management;
    - Consultation with internal stakeholder: To interact with the EHS data owners, corporate and project management as well as professionals from the environment, health and safety, human resources teams to assess understanding of critical EHS risks specific to their area of operation. These interactions will also be conducted with the site contractors that are typically deployed on such projects in India;
    - Site investigation: To visually observe gaps in EHS management systems and impending EHS risks. Review to be guided by national regulatory guidelines as well as EHS risks covered in IFC's general EHS and sector-specific EHS guidelines for toll road projects;
    - Consultation with external stakeholders: A comprehensive understanding of certain EHS issues may require further discreet probing, over and above site investigations. To comprehend detailed EHS risks and impacts, we may interact with the relevant stakeholders.

Conduct a review to identify from publicly available media sources if there are any potential environmental and/or social issues, including NGO attention/campaigns, or items that may lead to reputational risks to the Company and/or investors.

Review of regulatory notice(s) or fine(s) issued to the company for violating environmental norms/laws.

Review of information (to the extent made available)

- Develop an information request list (IRL) covering material environment, health and safety topics for the entity operations and seek necessary documents and information for review.
- Understand the nature of operations, clients, facilities, activities carried out, manpower composition and deployment HSE policies, training programs and related SOPs, put in place, if any EHS Certifications obtained (ISO 14001, ISO 45001, etc.), awards and recognitions, industry best practices adopted.
- Onsite facilities available, benefits provided to workers on health and safety including insurance
- Legal compliance reporting mechanism internally and with independent external involvement if any, and monitoring by top management.
- Key HSE consents, permits for their appropriateness and validity
- Approach to physical climate risks assessments and any climate-related strategies

Preparation of report with gap analysis of regulatory compliance and other key findings

- This section will incorporate all findings and gaps that were observed and assessed during information review and site assessments, including the stakeholder interactions.
- The observations will be based on regulatory and statutory compliance as well as reference frameworks for EHS such as guidelines by IFC.
- Any gaps observed will be clearly highlighted corresponding to each, Environmental, Health and Safety as well as social concerns and the level of corresponding risk (risk rating) will be described.

Framing recommendations and mitigation approaches

- Recommendations for improvement opportunities will be drafted and finalized in consultation with the client. Recommendations will expound mitigation approaches cantered around the following areas:
  - Procedural and technological improvements;
  - Upgradation of existing EHS management systems (if found to be inadequate);
  - Training and capacity building requirements;
  - Changes required in existing EHS policies;
  - Disclosure and reporting of EHS information to client, especially in reference to the EHS improvement plan (if any);
  - Recommendations and mitigation approaches will be framed subsequent to careful deliberation on the extent of EHS risks identified and lined to specific regulatory requirements for similar projects in India.

Emission Estimation / Measurement

- Gathering information required for estimating emissions
- Estimating and/or measuring scope 1, scope 2 and scope 3 (if practical) emissions from each project
- Identifying the top sources of scope 1, scope 2 and scope 3 (if practical) emissions from each project
- Identifying the main levers for reducing scope 1, scope 2 and scope 3 (if practical) emissions

Decarbonisation Plan

- Understand the procedures defined for the incentivization of Greenhouse Gas (GHG) emissions and the Company's short-term and long-term strategy/plan to reduce the same
- Estimating the cost and investment required to achieve a net-zero plan

1.3 Approach and Methodology

The methodology for the Scope of work is explained below.

Step-1: The kick-off meeting was done among the Ramboll team.

Step-2: Consultation with Internal Stakeholders : meeting with O&M contractor and Toll Operator was held on 5th August 2022.

Step-3: Site Visit - The site visit was undertaken by the environmental and social specialists from Ramboll on 5th August 2022. A consultation with the local Toll Operator and O&M contractor was also held. A consultation with community members during the reconnaissance of the project site to discuss the issues.

Step-4: Document Review – the following documents were reviewed as a part of the rapid study.

- Concession Agreement
- Schedule of the Concession Agreement
- Technical Due diligence report

Step-5: Preparation of ESDD report including ESAP.

1.4 Limitations

This report presents the results of red flag report, limited environmental and social due diligence and ESAP conducted to assess the compliance status of the Project in accordance with the applicable standards. During the course of this site assessment, Ramboll has attempted to independently assess the environmental and social conditions within the limits of the established scope of work as described in the proposal. The conclusions presented in this report represent Ramboll's best professional judgment based upon the information available and conditions existing as of the date of the review. In performing its assignment, Ramboll must rely upon publicly available information, the information provided during stakeholder consultations and information provided by third parties. Accordingly, the conclusions in this report are valid only to the extent that the information provided to Ramboll was accurate and complete. This review is not intended as legal advice, nor is it an exhaustive review of site conditions or facility compliance. A few specific limitations are presented below:

- The assessment is based on verbal information provided by the Toll Operation and O& M contractor of NHAI.
- Limited documents have been provided.
- Consents and permits have not been made available.
- Consultations with the community were not organised in the manner of prior information and targeted stakeholders.
- Estimation of GHG emission has not been done due to non-availability of data,

2. PROJECT DETAILS

The start point of the Project stretch is near Borkhedi village at existing km 36+600 and end point is at existing km 175+000(existing km stone of km 175+000 is fixed at km 174+750) before the approach of major bridge on Penganga River at Maharashtra / Telangana border. The existing project stretch is 4-lane with paved shoulder and divided carriageway configuration in the State of Maharashtra. The length of the project stretch as per km stone is 138.400 km and actual length at site is 138.150 km. Presently the project section is under Operation and Maintenance period with fee collection through 2 nos. of Toll Plazas, one at km 92+500 near Daroda village and second at km 150+000 near Kelapur town in Maharashtra for equivalent toll length of a) 155.2320 km (during construction period) and b) 155.3364 (after completion of major bridge) which shall be remain same for tolling purpose except with prior approval of Authority.

The project road can be divided into two homogenous sections based on the traffic characteristics as given below:

Table 2-1 : List of Homogenous Section based om Traffic.

SL No	Homogeneous Section	Start Chainage (km)	End Chainage (km)
1	Section 1 – Borkhedi to Wadki/Bori	36+600	113+000
2	Section 2 – Wadki/Bori to MH/TS border	113+000	175+000

Note: The existing km stone of km 175+000 is fixed at km 174+750

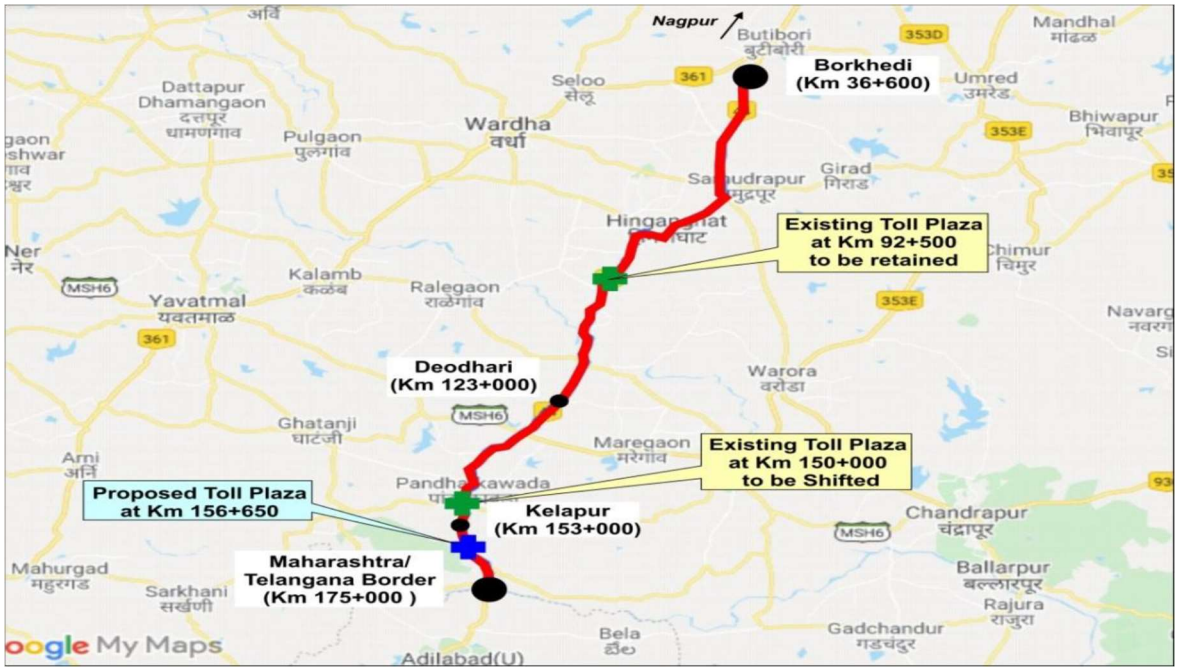

Figure 2-1 Index Map of the Asset

Source : Schedule A of Concession Agreement.

Kelapur toll plaza is proposed to be relocated to a new location, ~6 km south of the existing location in absence of adequate land to construct proper toll plaza at the present location. This is named as Kelpaur New TP (KM 156 +250) in the map above

2.1 Land use Pattern around the Project Area

The land use observed on both side of the project highways are agricultural with some patches of forest of hill section. Few built up areas were also noted on both left hand side and right hand side of the road.

Figure 2-2.General Land Use Pattern of the Project Area

2.2 Right Of Way

Right of way is varies from 45 meters to 60 meters. The section right of way is given in the table below.

Section	Chainage (km)	Right of Way in meters
Section -1	36+600 to 64+500	45 meters
Section -2	64+500 to 93+750	60 meters
Section – 3	93+750 – 175+000	60 meters
Toll Plaza	Proposed at chainage 127+000 km	200m X 200m

The right of way boundary was noted to be missing at a few locations the project road. Ramboll noted likely agricultural encroachment at few locations and also noted several squatters/encroachments along the project stretch. It should however be noted that extent of encroachment cannot be ascertained as the boundary/clear demarcation of the right of way boundary was not available.

Figure 2-3.Encroachment Observed During the Site Visit on 9-10 August 2022

2.3 Facilities at Toll Plaza

The facilities available at the toll plaza observed during the site visit are provided in the table below.

Sl No	Item	Darodha Toll Plaza	Kelapur	Observations/ condition
1	Patrolling Vehicle	1 Number	1 Number	Good condition
2	Crane	1 Number	1 Number	
3	Weigh in motion bridge	Not available	No	
4	Static bridge	Not Available	No	
5	Tunnel	Not available	No	
6	Loading and unloading facilities	Not available	No	
7	High Mast	2 Nos at the toll plaza	No	Illumination at the Kelapur toll plaza is very poor.
8	Street light	Available on both sides	No	
9	User fee board	Available	Yes	
10	Toilet	2 Nos on	No	It is one side of the toll plaza.
11	Water Supply	One submersible pump available	Yes	
12	CCTV Room	Available	No	
13	Complaint Box and book	Available	No	
14	Rainwater Harvesting	Not available	No	
15	Avenue Plantation	Available	Yes	It is done by the forest department
16	DG Set	1 No	125 kV (1 No)	Good condition in Darodha. But DG set at Kelapur is in poor condition.

2.4 Toll Collection Agency

The Toll Collection Agency's details are given in the table below.

Item	Darodha Toll Plaza	Kelapur Toll Plaza
Name of Toll Collection Agency	M/s Highway Tondon Toll bridge	M/s Sanghwi Cylinders Pvt Ltd
Start Date	December 2021	November 2021
End Date	December 2022	November 2022
Toll Manger	Mr Nirmal Dikshit	Mr Deepak Singh
Total Number of Staffs	111 Staffs (10 toll collectors)	40 staffs
No of Security Guards	26 No including 2 gunmen.	Not known

Figure 2-4. Facilities at Darodha Toll Plaza

Figure 2-5. Kelapur Toll Plaza

2.5 O&M Contractor

The role of the O&M contractor in this project are given below.

- Repair and Rehabilitation of pavement
- Repair and Rehabilitation of Embankment /Earthen Shoulders/ /Paved Shoulders/ Stone Pitching etc.
- Repair and Rehabilitation of Structures
- Maintenance of the toll plaza

- Maintenance of the avenue plantation and median plantation

The details of Maintenance Contractor are given below.

Item	Darodha Toll Plaza	Kelapur Toll Plaza
Name of Maintenance Contractor	Maintenance Contractor – M/s Madam Arch Patrolling – Sunrise Constructions	M/s Nirup Constructions
Start Date	One year Contract	August 2021
End Date	Details not known	August 2022 (Extension of 2 months)
Name of Site Engineer	Details not known	Details not known
Total number of Staffs	Details not known	Details not known
Vendor/ Sub-contractor	Details not known	Details not known

2.5.1 Organisation Structure of the Project

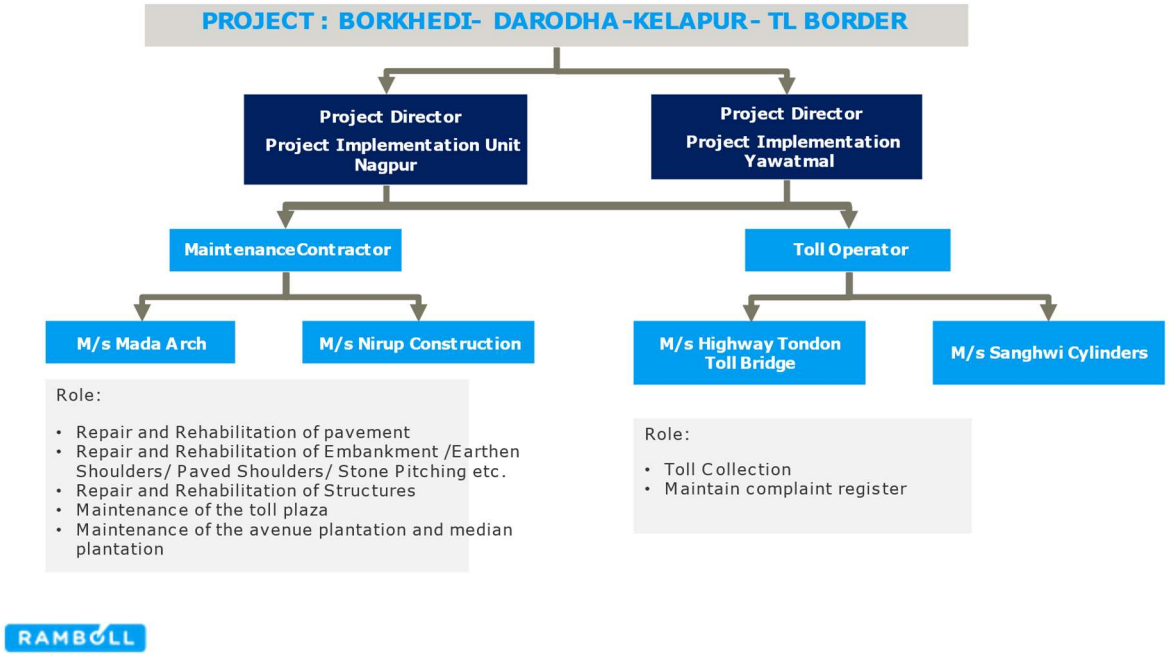

Figure 2-6. Organisation Structure of the Project

2.6 Consultation with Internal Stakeholders

The internal stakeholders include but not limited to Toll Collection Agency, Maintenance contractors, Vendors and suppliers. A consultation with tolling concessionaire and maintenance contractor has been undertaken on the day of site visit. The outcome of the meeting has been provided below.

Table 2-2 Details of consultations undertaken with Internal Stakeholders

Consultation	Outcome of the consultation
1. Mr. Nirmal Dikshit (Toll Manager) 2. Mr. Satpal Singh (Asst. Toll Manager) M/s Highways Tondon Construction Company	• The company is operating the Darodha Toll Plaza. • The contract for operation of toll plaza is for one year. • The complaint register is maintained by the toll operator. • 111 staff are involved in the operation of toll plaza. • The road is in bad condition, so many complaints come to the toll plaza. • All the toll collectors are local. • Toll plaza has accommodation for regular staff. • Kitchen facility is also available at the toll plaza.
1. Mr. Rahul Dange (Toll Manager) 2. Mr. Deepak Kumar Singh (Asst. Toll Manager) M/s Highways Tondon Construction Company	• The company is operating Kelapur Toll Plaza. • The contract for operation of toll plaza is for one year. • The complaint register is maintained by the toll operator. • 40 staff are involved in the operation of toll plaza. • The Road is in bad condition, so many complaints comes to the toll plaza. • All the toll collectors are local. • Toll plaza does not have accommodation or kitchen facility for regular staff.
Mr. P Rajeshwar Rao, Resident Engineer of Independent Engineer, M/s K&J Consultants	• M/s K&J Consultant is the independent engineer for the project. • The project passes through eco-sensitive zone of Tipeswar wildlife sanctuary. About 13 kms of stretch is in the eco-sensitive zone. • The forest area and Ghat sections are in Devdhari hills. • The construction of the project started in 2005-06 and completion of the construction was achieved in 2017. • Land acquisition has been completed and right of way of 45-60 meters available.

A consultation with Forest Department was undertaken at Panther Kawra. The summary of outcome of the meeting is provided below.

Table 2-3 below presents the consultation with the forest department.

Table 2-3 Details of consultations undertaken with Forest Department

Consultation	Outcome of the consultation
Mr. Mesram - Ranger Surveyor, Panther Kawdra Forest Division, Yavatmal	• Tipeswar Wildlife Sanctuary is spread over in an area of 1500 square km. • The population of tigers in the sanctuary is about 28 individuals. • Tipeswar Wildlife Sanctuary was declared as sanctuary in 2015 vide MoEFCC Gazette Notification SO.O. No 4892(E) dated 18 September 2018. • The project road NH-44 does not pass through the wildlife area, but its buffer zone declared as eco-sensitive zone. • An exercise of assessment of proximity was done during the discussion. It was assessed, the project road is about 600 meters from the

	boundary of wildlife sanctuary. About 13 kms of the road section passes through the buffer zone designated as eco-sensitive zone.

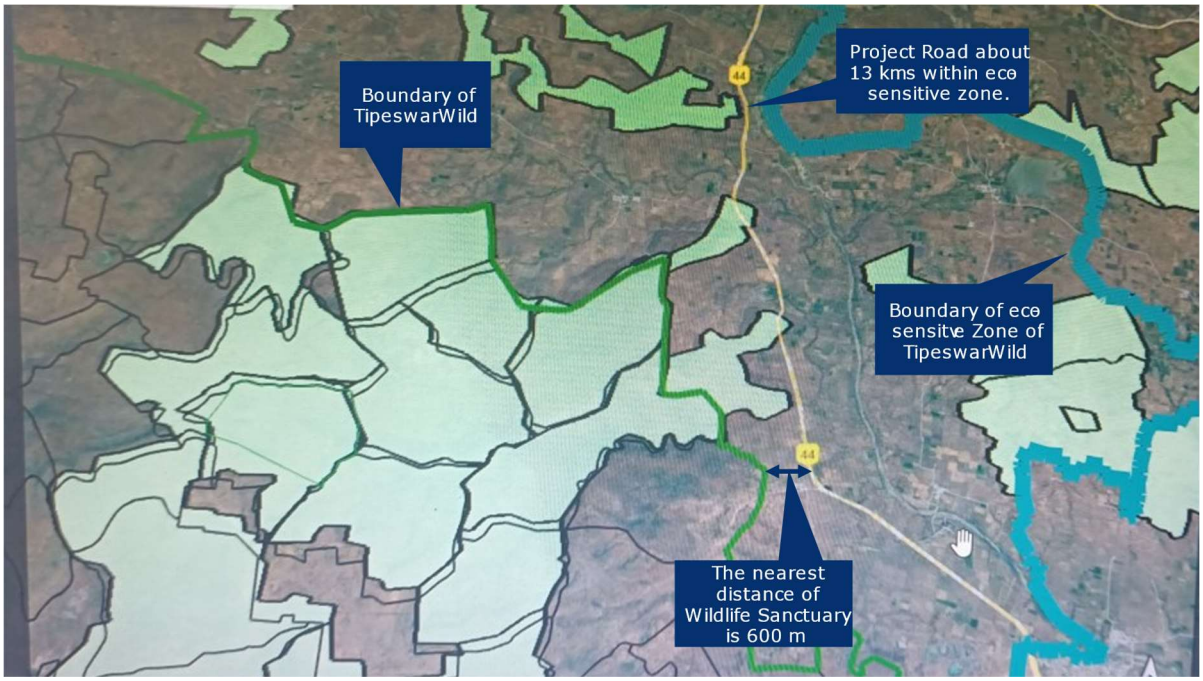

Figure 2-7. Assessment under taken with Forest official about the Buffer Zone and Wildlife Zone of Tipeswar Wildlife Sanctuary.

3. RED FLAG REPORT

3.1 Regulatory Compliances

The permits, no objection certificates (NoC) and other regulatory permission obtained from the regulatory authority was not available with the existing toll collecting agency and maintenance contractor. The permits listed in Table below are noted to be applicable for the project. NHAI InvIT needs to ensure that these permits are obtained before or after the transfer of asset as the case maybe.

Table 3-1: Gaps in regulatory compliance

Sl No	List of Licenses	Issuing Authority
1	Labour Licenses	Labour Department
2	Workmen compensation insurance	Insurance
3	NoC for ground water extraction	Central Ground Water Board
4	NoC from the State pollution Control Board	UP State Pollution Control Board
5	Copy of forest clearance	Forest Department
6	PUC of all vehicles including maintenance vehicles	Regional transport Department authorised Agency
7	Shop and establishment license	Department of Revenue

3.2 Compliance With GIIP

It should be noted that the gaps identified below pertain to the existing conditions at the site and relate to policies and procedures implemented by the current toll collecting agency and the maintenance contractor who have a one-year contract with NHAI. NHAI InvIT needs to ensure that adequate policies and or procedures are developed to close the gaps identified once the assets are transferred.

Table 3-2: Compliance with GIIP requirements

Sl No	Topic	Observations	Gaps	Risk Level	Recommendation
Environmental and Social Management System					
1	Environmental and Social Management System (ESMS)	An environmental and social management system is required to manage the environmental and social risks associated with the project. The ESMS for the site has not been developed.	ESMS is not available at the site and the toll operator and maintenance contractors are working without Environmental and Social management Plan.	Medium	Develop ESMS in compliant with applicable standards, including but not limited to ISO 14001 and ISO 45001.
2	Environmental and Social (E&S) Policy	An environmental and social policy demonstrating commitment towards managing environmental and social risks for the project has not been developed.	No E&S Policy is available	Medium	Develop E&S policy related to environmental Health and Safety
3	Identification of Environmental, health, safety and Social Risks and Impacts	An Environmental, Health, Safety and Social Risk assessment to identify the risks associated with operation of toll plaza, operation and maintenance of road is required to adequately mitigate the risks. No such risk assessment has been undertaken.	Environmental, health, safety and Social Risk assessment related to operation of toll plaza, operation and maintenance of road is not available.	Medium	Undertake Environmental, health, safety and Social Risk assessment.
4	Organizational Capacity and Competency	An organisation structure is required with set of competent to handle the environmental and social risks associated with the project. Competent people to handle the E&S risks associated with the project are not available.	• No set organisational structure has been created by the toll operator and maintenance contractor to include people with competency to manage the environmental and social risks. • There is not midterm evaluation of the competency and training plan for the engineers, security guards and other staff.	Medium	Develop organisation structure with competency matrix. Develop training plan to address environmental, health, safety and social risks.

Sl No	Topic	Observations	Gaps	Risk Level	Recommendation
5	Emergency Preparedness and Response	No emergency plan has been prepared for the project to identify the anticipated emergency situations and associated responses. It should further be noted that the District Magistrate is responsible for any major disaster management such as major accidents and spillage of large quantities of hazardous chemicals on the road stretch. It should however be noted that emergency equipment like ambulance, trained paramedic (Ambulance driver) is available to respond to emergency situations arising out of accidents at Darodha toll plaza. A medical first aid room is also available at the Darodha toll plaza. However, Kelapur does not have these facilities as toll plaza is not constructed there.	No emergency response plan has been developed for the site.	Medium	Develop an emergency response plan in consultation with the district magistrate.
6	Monitoring and Review	The monthly progress report is prepared by the Independent engineer, and it is submitted to NHAI PIU. However indicators related to environmental and social issues are not included in the monthly progress report.	A monitoring system to track the environmental, health, safety and social parameters is not available.	Low	Identify key performance indicators based on the environmental and social risks identified as a part of the ESMS and accordingly develop monitoring and reporting program.
7	Stakeholder Engagement	The highway project is spread over many villages. The key stakeholders are: - NHAI PIU - Local Police, - Electricity Department, - Central Ground Water Board - Village panchayat, - Vendors, Sub-contractors, - Local labours, - Forest Department, - Local community, - Village institutions like schools, health centres, - Media.	No policy and procedure available for the stakeholder mapping and development of stakeholder engagement plan.	Medium	Undertake stakeholder mapping and develop stakeholder engagement plan.
8	External Communications and Grievance Redressal Mechanisms	The project does not have any obligation of disclosure of any report in the operation stage except for the reporting obligation to NHAI PIU. An external communication plan for engagement with communities/stakeholders identifying the level/type of information to be disclosed and medium of disclosure is required to manage expectations of the community/stakeholders. A grievance	An external communication plan and grievance redressal mechanism has not been developed for the project.	Low	Develop an external communication plan and grievance redressal mechanism.

Sl No	Topic	Observations	Gaps	Risk Level	Recommendation
		redressal mechanism needs to be also developed.			
Labour and working condition					
9	Human Resources Policies and Procedures	The project operation includes engagement of employees and workers. A human resource policy and associated procedures need to be developed to comply with local regulation, international labour organisation (ILO) covenants, human rights requirements and other GIIP requirements related to labour and working conditions. The current toll operator and the maintenance contractor have not developed a comprehensive human resource policy.	A comprehensive human resource policy and the associated procedures have not been developed by the current toll operator and the maintenance contractor.	Low	Develop a human resource manual consisting of policies and procedures around: • Working conditions and terms of employment • Code of conduct for employees • Minimum wages and overtime payment including working hours • Non-discrimination and equal opportunity • Recruitment and retrenchment procedures
10	Working Conditions and Terms of Employment	Health and sanitation facilities in the project (such as adequate toilets, drinking water, bathing areas, etc.) provided by the toll operator was noted to be not in compliance with GIIP requirements related to worker accommodation.	The following gaps were noted: • The kitchen at Darodha Toll plaza is poorly maintained. • No procedures have been developed to identify the health and safety facilities that need to be provided for the workers. • No uniform provided to the toll collectors, • The chairs provided to the Toll collectors are not in good condition, • No Personal Protective Equipment were noted to be used by employees of the toll	Low	Ensure that the health and sanitation facilities provided in the project meet the GIIP requirements.

Sl No	Topic	Observations	Gaps	Risk Level	Recommendation
			plaza operator or the O&M contractor during the site visit, • No separate facilities for women worker such as toilet for ladies. • Drinking water and Sanitation facility at Kelapur Toll Plaza is not in compliant to the Indian standards or GIIP.		
11	Non-Discrimination and Equal Opportunity	• The corporate level policy does not include social diversity and gender inclusion policy.	No non-discrimination and equal opportunity policy and procedure is available.	Low	Develop social diversity and gender and social inclusion policy and it should be encouraged in the supply chain of the company.
12	Internal Grievance Redressal Mechanism	The Toll Collection Agency and maintenance contractor does not have grievance redressal mechanism for the employees.	There is no transparent grievance redressal mechanism for the employees and workers.	Low	Establish internal grievance redressal mechanism to include grievances from employees/workers for registering grievances. This grievance redressal mechanism also needs to be extended to the employees/workers in the supply chain.
13	Protecting the Work Force from Child Labour	The Toll Collection Agency and maintenance contractor are aware of abolition of child labour but not aware of risk associated with child labour in its supply chain.	No process has been developed to check use of child labour by sub-contractor and other vendors in the supply chain.	Low	Establish procedure to check use of child labour sub-contractor and other vendors in the supply chain. Provide suitable posters about the prohibition of child labour.
14	Occupational Health and Safety	The operation of road includes - working on operational road - dealing with road user for collection toll. - Working in confined space in the culverts and drains. - Working near water. - lifting activities and use of cranes - Working in remote location - Working near live wire. - Working near railway line - Working in night - Operation of ambulance A Hazard Identification and Risk Assessment (HIRA) needs to be undertaken for all the	A Hazard Identification and Risk Assessment (HIRA) and SOPs have not been developed for the various activities by the Toll Collection Agency and the maintenance contractor	Medium	Undertake HIRA and prepare SOPs for the various activities.

Sl No	Topic	Observations	Gaps	Risk Level	Recommendation
		activities at the project and standard operating procedures (SOPs) should be developed that include the mitigation measures in the HIRA. These SOPs have not been developed by the Toll Collection Agency and the maintenance contractor. During the site visit it was noted that the appropriate personal protective equipment (PPEs) like hard hat, reflective vests, safety shoes were not provided to the employees/workers of the Toll Collection Agency and the maintenance contractor.			
15	Supply Chain	The operation of road will require supply of material for road maintenance, water and other consumable. A procedure should be developed to ensure that the environmental & social risks are appropriately addressed in the supply chain. This mechanism can include considering environmental & social parameters in vendor selection, contractual clauses to ensure that the environmental & social risks are adequately managed and a monitoring plan to monitor the environmental & social performance of the vendors in the supply chain. A mechanism to measure and monitor the environmental and social risks in the supply chain was noted to be missing.	The current Toll Collection Agency and maintenance contractor have not developed procedures around measuring and monitoring the environmental & social risks in the supply chain.	Low	Develop a mechanism to include procedures around measuring and monitoring the environmental & social risks in the supply chain.
Resource Efficiency and Environmental Pollution including GHG emission					
16	Resource Efficiency and Pollution Prevention	The resources required for the operation and maintenance of the road are - Energy illumination of toll plaza and street lights, - Water for the drinking purpose, maintenance and plantations. - Fuel for DG and vehicles, and - Material for road maintenance The energy consumption data is not available for both the plazas. However based on a rough estimate the average diesel consumption in a summer month is approximately 150 litres per month and the electricity consumption is	• A plan including KPI for efficient use of resources and GHG estimation has not been developed by the current Toll Collection Agency and the maintenance contractor. No monitoring plan has been developed to measure the pollution caused by the diesel generator and other activities at the toll plaza. • Illumination at both the toll plaza – the night illumination at toll is not adequate. The street light at	Low	• Prepare plan for the resource efficiency including accurate recording of diesel consumption and electricity consumption to estimate GHG emissions from the project. Prepare a plan to monitor the emissions from the diesel generator and other pollution causing activities in the project. • Provide illumination at the toll plaza and access road to the toilet. • Provide treatment and disposal facility for wet waste specifically generated from kitchen and dining area.

Sl No	Topic	Observations	Gaps	Risk Level	Recommendation
		approximately 4400 kWh in a month for the Kelapur toll plaza. No energy saving measures have been developed to reduce the diesel or electricity consumption. The greenhouse gas emissions (GHG) from the project are not being measured or reported currently. It was further noted that there were gaps in accounting for diesel usage by patrolling vehicle, ambulance, maintenance vehicles and other vehicles. No monitoring is being currently undertaken to measure the emissions from the diesel generator located at the toll plaza. The quality and quantity of wastewater being generated at the toll plaza is also not being monitored.	toll plaza and toilet blocks are inadequate. High mast is not working in full capacity of all lights. • Solid Waste disposal facility is not available. It is being dumped withing the toll plaza boundary and sometimes it is burnt. • DG set Kelapur Toll Plaza is in very poor condition. • Maintenance Vehicles are in poor condition. • Storage and transportation of maintenance material in poor condition		• Reduce and recycle plastic waste generated from the toll plaza. • DG set requires to be replaced with new DG set having noise attenuation measures inbuilt. • Procure or hire standard maintenance vehicles. • Provide safe and suitable storage and covered transportation of material to the maintenance site.
17	Ground Water utilisation	A groundwater abstraction well is installed at the toll plaza to meet the water demands. No flow meters have been installed to measure the quantity of ground water extracted for use. It was further noted that no water conservation measures including installation of rain water harvesting structures have been undertaken for the project.	A system to measure the amount of water used and associated water conservation measures have not been developed for the Project.	Low	Develop a system including installation of flow meters to measure the water use and further develop water conservation measures that can be adopted for the project.
Community Health, Safety and Security					
18	Community Health, Safety, and Security	Risk associated with community health and safety are identified below. - Pedestrian Safety - Traffic Safety	• Installation and maintenance of signs, signals, markings, • and other devices used to regulate traffic, including posted speed limits, warnings of sharp turns, or other special road conditions are absent at most of the locations. Barricading is also absent at the unsafe locations. • Public Toilets at the Kelapur toll plaza is not available. However, the common toilet for employees are used for the public purpose. • Ambulance – biomedical waste disposal system is not available.	Medium	• Identify road safety risks and Prepare plan to mitigate and manage these risks. • Provide good access to the toilet. Construction of toilet on other side of toll plaza also. • Disposal of biomedical waste through hospitals where facility of biomedical waste disposal is available or through biomedical waste collection agency. • Disposal of biomedical waste through hospitals where facility of biomedical waste disposal is available or through biomedical waste collection agency. • Procure or hire standard Cranes with examination of lifting tools and tackles.

Sl No	Topic	Observations	Gaps	Risk Level	Recommendation
			• Cranes are supplied by the local suppliers on rent basis and are of local manufacture and it does not have report on examination of lifting tools and tackles are not available.		
19	Security Personnel	The toll operation company deploys security guards during operation of toll plaza. Two (2) guards recruited from local community has been deployed. As per the consultation with local persons, no major security threat related to Naxalites, terror attacks haven identified in last 5 years. However local protest related to exemption of toll are frequent in the area.	• No security plan prepared. • No training on behavioural aspects have been covered. • No training on grievance recording have been imparted.	Low	Develop a security management plan.
Land Acquisition and Involuntary Resettlement, Encroachment and					
20	General	The right of way of 60 meters is available throughout the road. Land acquisition of toll plaza in Kelapur is yet to be done. this will require 4 ha of land. Few consultations with local people have been undertaken and it was informed the compensations have been disbursed and no pending issue available. The litigation or the legacy land issues cannot be ascertained at this stage in the absence of detailed information	The land acquisition for toll plaza proposed at Kelapur will be done by the NHAI and supported by the NHAI InvIT. Since this will be involuntary resettlement so, provisions of the Land Acquisition Act will be followed.	Medium	Prepare Land Acquisition and resettlement Plan as per the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013. Verify if any legacy issues and litigation related to land are present from the PIU NHAI.

Sl No	Topic	Observations	Gaps	Risk Level	Recommendation
21	General	Some encroachments/ squatters have been observed within the right of way. These encroachments are temporary hutment used for commercial purpose. As per the concession agreement, Concessionaire shall protect the Site from any and all occupations, encroachments or Encumbrances. Concessionaire shall maintain a round-the-clock vigil over the Site and shall ensure and procure that no encroachment thereon takes place, and in the event of any encroachment or occupation on any part thereof, the Concessionaire shall report such encroachment or occupation forthwith to the Authority and undertake its removal at its cost and expenses.	No survey records of encroachment available.	Medium	Undertake encroachment survey and prepare plan for the removal.
Biodiversity Conservation and Sustainable Management of Living Natural Resource					
22	General	Tipeswar Wildlife Sanctuary is spread over in an area of 1500 square km. The population of tigers in the sanctuary is about 28 individuals. Tipeswar Wildlife Sanctuary was declared as sanctuary in 2015 vide MoEFCC Gazette Notification SO.O. No 4892(E) dated 18 September 2018. The project road NH-44 passes through the buffer zone of Tipeswar sanctuary that is declared as eco-sensitive zone. An exercise of assessment of proximity was done during the discussion. It was assessed that the project road is about 600 meters from the boundary of wildlife sanctuary. About 13 kms of the road section passes through the buffer zone designated as eco-sensitive zone.	The copy of forest clearance is not available. However during consultation with the forest department no gaps were identified by the forest officer. It should however be noted that a permission under the Wildlife Protection act will be required for any major construction or maintenance work on the 13 kilometres stretch passing through the eco sensitive zone.	Medium	Obtain permission for any construction or major maintenance in the stretch of 13 km falling within the eco-sensitive zone of the Tipeswar Wildlife Sanctuary. Obtain the Forest clearance from NHAI office and review for any gap/ legacy issues.
Indigenous Peoples					

Sl No	Topic	Observations	Gaps	Risk Level	Recommendation
23	Indigenous Peoples	Yavatmal district has tribal population. Since the land acquisition has been completed long back in 2010-11, so no residual impact has been identified.	No gaps identified.	Low	Undertake assessment of tribal land in case of land acquisition for proposed toll plaza.
Archaeological sites and Cultural Heritage					
24	Protection of Cultural Heritage in project design and execution	There is no archaeological and cultural site found within the project area of influence during the site visit. However a detailed survey to identify any archaeological sites found within the area of influence of the project road	No survey has been conducted to identify and archaeological sites found within the area of influence of the project road.	Low	Under take survey related to identification of archaeological sites within the area of influence of the project road.

4. CATEGORISATION OF PROJECT

The categorisation of a Project based on the magnitude of potential environmental and social risks and impacts, including those related to Human Rights, climate change, and biodiversity.

The categories are:

Category A – Projects with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented;

Category B – Projects with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures; and

Category C – Projects with minimal or no adverse environmental and social risks and/or impacts.

The project is categorised as **Category B**. based on following arguments.

- All the mitigation measures of impacts related to air quality, water and noise are generally site specific and reversible in nature and mitigation measures are within control of the project proponent.
- No incremental impact arises due to operation of the road.
- Land use conversion was one time activity, and no further land use change or conversion is involved.
- All the impact associated with operation of toll plaza and road are reversible and of low significance.
- No additional livelihood loss in the operation of toll road.

5. ENVIRONMENT AND SOCIAL ACTION PLAN

Sl No	Identified Gap	Recommended actions	Best Practices (If any)	Responsibility	Timeframe	KPI Completion
1.	• No system for environmental and social management is being used by the current toll operator and maintenance contractors. • Environmental, health, safety and Social Risk assessment related to operation of toll plaza, operation and maintenance of road is not available. • No organisation structure available, • No evaluation of competency and training of the staffs. • No environmental and social monitoring system. • Stakeholder engagement plan is not available.	Develop ESMS in compliant with applicable standards, including but not limited to ISO 14001 and ISO 45001 and include following: • Develop E&S policy related to environmental Health and Safety. • Include environmental and social considerations in selection of contractors and subcontractors • Undertake Environmental, health, safety and Social Risk assessment • Develop EHS manual and procedures for working at toll plaza, maintenance works etc • Develop organisation structure with competency matrix. • Develop training plan to address environmental, health, safety and social risk. • Identify key performance indicators based on the environmental and social risks and develop monitoring and reporting plan accordingly. • Develop stakeholder engagement plan.		NHAI InvIT	Post-acquisition and prior to hiring of toll operator or maintenance contractor.	ESMS incorporating the recommendations
2.	• Licenses and permits to be acquired by NHAI InvIT	NHAI InvIT should obtain all licenses and permits as defined in Concession Agreement but not limited to the following. - Registration for Provident Fund - Labour License - Shop and establishment Licenses - NoC from State Pollution Control Board. PUC of Vehicles used for the project.		NHAI InvIT	Prior to start of work.	

Sl No	Identified Gap	Recommended actions	Best Practices (If any)	Responsibility	Timeframe	KPI Completion
3.	• Licenses and permits to be acquired by Contractors and Toll Operators	The contractors and Toll Operators of NHAI InvIT should obtain all necessary licenses and permits but not limited to the following. - Registration for Provident Fund - Labour License - Interstate Migrant Worker License - Workmen Compensation and insurance - PUC of all Vehicles - NoC for extraction of Surface Water/ Ground Water - Authorisation for disposal of Biomedical Waste		Contractors and toll operators of NHAI InvIT	Prior to start of work.	
4.	• No emergency response plan has been developed for the site. • Hazard Identification and Risk Assessment (HIRA) and SOPs have not been developed for the various activities by the Toll Collection Agency and the maintenance contractor.	• Undertake HIRA and prepare SOPs for the various activities. • Develop an emergency response plan in conformance with district level disaster management.		NHAI InvIT	6 months after the acquisition	Completed HIRA, SOP and ERP.
5.	• A comprehensive human resource policy and the associated procedures have not been developed by the current toll operator and the maintenance contractor.	Develop a human resource manual consisting of policies and procedures around: • Working conditions and terms of employment • Code of conduct for employees • Minimum wages and overtime payment including working hours • Non-discrimination and equal opportunity • Recruitment and retrenchment procedures. • Abolition of child labour. Establish procedure to check use of child labour sub-contractor and other vendors in the supply chain. • Provide suitable posters about the prohibition of child labour		NHAI InvIT	6 months after the acquisition	Human Resource manual incorporating the recommendations
6.	• Working Conditions - Health and sanitation facilities in the project (such as adequate toilets, drinking	• Ensure that the health and sanitation facilities provided in the		NHAI InvIT	6 months after the acquisition	Health and sanitation facilities

Sl No	Identified Gap	Recommended actions	Best Practices (If any)	Responsibility	Timeframe	KPI Completion
	water, bathing areas, etc.) provided by the toll operator was noted to be not in compliance with GIIP requirements related to worker accommodation.	project meet the GIIP requirements.				compliant with GIIP requirements.
7.	• There is no transparent grievance redressal mechanism for the employees and workers.	• Establish internal grievance redressal mechanism to include grievances from employees/workers for registering grievances. This grievance redressal mechanism also needs to be extended to the employees/workers in the supply chain.	Technology based online complaint management for employees.	NHAI InvIT	6 months after the acquisition	Establish GRM
14.	• Supply Chain - The current Toll Collection Agency and maintenance contractor have not developed procedures around measuring and monitoring the environmental & social risks in the supply chain.	As part of ESMS: • Develop a mechanism to include procedures around measuring and monitoring the environmental & social risks in the supply chain.		NHAI InvIT	6 months after acquisition	Supply Chain measures as part of ESMS
8.	• A plan including KPI for efficient use of resources and GHG estimation has not been developed by the current Toll Collection Agency and the maintenance contractor. • No monitoring plan has been developed to measure the pollution caused by the diesel generator and other activities at the toll plaza.	• Prepare plan for the resource efficiency including accurate recording of diesel consumption and electricity consumption to estimate GHG emissions from the project. • Prepare a plan to monitor the emissions from the diesel generator and other pollution causing activities in the project.	Develop tool for online estimation of GHG emission. Use energy efficient equipment, machineries, pumps, water fixture, illumination and energy efficient vehicles.	NHAI InvIT	• Document preparation - 6 months after the acquisition. • Monitoring mechanism for emissions for pollution causing activities – continuous activity.	• Document Preparation - Resource Efficiency Plan • Bi-annual GHG estimation.
9.	• A system to measure the amount of water used and associated water conservation measures have not been developed for the Project.	• Develop a system including installation of flow meters to measure the water use and further develop water conservation measures that can be adopted for the project.		NHAI InvIT	• Installation and Monitoring system for water use – 6 months after acquisition. • Water Conservation measures included in	• Monitoring process for water use. • Water conservation measures part of ESMS

Sl No	Identified Gap	Recommended actions	Best Practices (If any)	Responsibility	Timeframe	KPI Completion
					ESMS – 6 months after acquisition.	
10.	• Installation and maintenance of signs, signals, markings, and other devices used to regulate traffic, including posted speed limits, warnings of sharp turns, or other special road conditions are absent at most of the locations. Barricading is also absent at the unsafe locations.	• Identify road safety risks and Prepare plan to mitigate and manage these risks.		NHAI InvIT	6 months after the acquisition	• Road safety /audit/survey report including mitigation plan.
11.	• No security plan prepared. • No training on behavioural aspects have been covered. • No training on grievance recording have been imparted.	• Develop a security management plan. • Training Plan for security guards and continuous behavioural based training.		NHAI InvIT	Security Management Plan - 6 months after the acquisition. Training to security guards - continuous	Completed security management plan Training Plan for security guards.
12.	• Provisions of the Land Acquisition Act should be followed to address the involuntary resettlement resulting from the land acquisition for the proposed toll plaza at Kelapur	• Prepare Land Acquisition and resettlement Plan as per the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013. • Verify if any legacy issues and litigation related to land are present from the PIU NHAI.		NHAI InvIT	6 months after the acquisition	Land Acquisition and Resettlement plan
13.	• An encroachment survey has not been undertaken for the project.	• Undertake encroachment survey and prepare plan for the removal of encroachments.	GPS based survey of encroachments.	NHAI InvIT	6 months after the acquisition	Encroachment survey report.
14.	• Copy of Forest Clearance is not available. • Permission under the Wildlife Protection Act will be required for any major construction or maintenance work on the 13 Kms stretch passing through the eco sensitive zone.	• Obtain permission for any construction or major maintenance in the stretch of 13 km falling within the eco-sensitive zone of the Tipeswar Wildlife Sanctuary. • Obtain the Forest clearance from NHAI office and review for any gap/ legacy issues.		NHAI InvIT	As and when needed	Obtain required permissions for any major construction/maintenance activity in the eco-sensitive zone

Sl No	Identified Gap	Recommended actions	Best Practices (If any)	Responsibility	Timeframe	KPI Completion
15.	• No survey has been conducted to identify the archaeological sites found in the area of influence of the project road	• Undertake survey related to identification of archaeological sites within the area of influence of the project road		NHAI InVIT	6 months after the acquisition	Archaeological survey report listing archaeological sites within AOI of the project.
16.	• Public Toilets at the Kelapur toll plaza is not available. However, the common toilet for employees are used for the is away from the carriage way and access to the toilet is not in a good condition. • The public toilet is available only one side. • Separate ladies' toilet is not available for workers and public.	• Provide good access to the toilet. • Construction toilet on other side of toll plaza also.	As per IRC Code for toll plaza.	NHAI InvIT	3 months after the acquisition	Construction of good access to toilet and construction of new toilet on other side of toll plaza.
17.	• Illumination at toll plaza – the night illumination at toll is not adequate. The street light at toll plaza and toilet blocks are inadequate. • High mast is not working in full capacity of all lights.	• Provide illumination at the toll plaza and access road to the toilet.	As per IRC Code for toll plaza.	NHAI InvIT	6 months after the acquisition	Illumination at toll plaza as per IRC Code.
18.	• Solid Waste disposal facility is not available. It is being dumped withing the toll plaza boundary and sometimes it is burnt.	• Provide treatment and disposal facility for wet waste specifically generated from kitchen and dining area. • Reduce and recycle plastic waste generated from the toll plaza.	As per IRC Code for toll plaza.	NHAI InvIT	6 months after the acquisition	Segregated Waste Disposal Plan and Procedures (i.e., Dry, Wet, Biomedical, etc.)
19.	• DG set is in poor condition.	• DG set requires to be replaced with new DG set having noise attenuation measures inbuilt.	As per CPCB guidelines.	NHAI InvIT	6 months after the acquisition	DG set adhering to CPCB guidelines.
20.	• Ambulance – biomedical waste disposal system is not available.	• Disposal of biomedical waste through hospitals where facility of biomedical waste disposal is	As per IRC Code for toll plaza.	NHAI InvIT	6 months after the acquisition	Biomedical waste disposal process established as per IRC code.

Sl No	Identified Gap	Recommended actions	Best Practices (If any)	Responsibility	Timeframe	KPI Completion
		available or through biomedical waste collection agency[1].				
21.	• Cranes are supplied by the local suppliers on rent basis. • Crane – cranes are of local manufacture, and it does report on examination of lifting tools and tackles are not available.	• Procure or hire standard Cranes with examination of lifting tools and tackles.	As per the section 29 of Factory Act, 1948 and amendments till date.	NHAI InvIT	6 months after the acquisition	Standard Cranes as per applicable acts.
22.	• Maintenance vehicles are in poor condition	• Procure or hire standard maintenance vehicles.	As per Motor Vehicles Act 1988.	NHAI InvIT	6 months after the acquisition	Standard Maintenance Vehicles as per Motor Vehicles Act.
23.	• Storage and transportation of maintenance material in poor condition.	• Provide safe and suitable storage and covered transportation of material to the maintenance site.	As per IRC Code for toll plaza.	NHAI InvIT	6 months after the acquisition	Storage and Transport of material following IRC code.

[1] As per requirements under Bio-medical Waste (Management & Handling) Rules, 1998 and subsequent amendments, These rules apply to all persons who generate, collect, receive, store, transport, treat, dispose, or handle bio medical waste in any form including hospitals, nursing homes, clinics, dispensaries, veterinary institutions, animal houses, pathological laboratories, blood banks, ayush hospitals, clinical establishments, research or educational institutions, health camps, medical or surgical camps, vaccination camps, blood donation camps, first aid rooms of schools, forensic laboratories and research labs.

APPENDIX 1
PHOTOLOG

Photo 1: **Toll plaza building**

Photo 2: Bridge over the river in project area

Title:	Photo Document	**Project-No.:**	**Date:**	**Page 1**
Site:	Borkhedi	-	August 2022	
Client:	NHAI	RAMBOLL		

Photo 3: Water logging on the road in project area

Photo 4: Potholes on the highway

Photo 5: ROW plantation in the project area

Photo 6: Land-Use type in the project area

Title:	Photo Document	**Project-No.:**	**Date:**	
Site:	Borkhedi	-	August 2022	
Client:	NHAI	RAMBOLL		

Photo 7: Washroom facility on the toll plaza

Photo 8: Road Signages along the National Highway

Title:	Photo Document	**Project-No.:**	**Date:**	
Site:	Borkhedi	-	August 2022	
Client:	NHAI	RAMBOLL		

Photo 8: Unbalanced truck accident due to overloading

Photo 9: Electronic Toll Collection (ETC) lane

Title:	Photo Document	**Project-No.:**	**Date:**	
Site:	Borkhedi	-	August 2022	
Client:	NHAI	RAMBOLL		

Photo 10: Bus stop along National highway

Photo 11: Diesel Generator at the toll plaza

Title:	Photo Document	**Project-No.:**	**Date:**	
Site:	Borkhedi	-	August 2022	
Client:	NHAI	RAMBOLL		

Photo 12: Medical aid post and traffic aid post facility at toll plaza

Photo 13: Inside view of toll plaza

Title:	Photo Document	**Project-No.:**	**Date:**	
Site:	Borkhedi	-	August 2022	
Client:	NHAI	RAMBOLL		

Intended for
National Highway Infra Trust

Document type
Report

Date
September 2022

LIMITED ENVIRONMENTAL AND SOCIAL DUE DILIGENCE REPORT

SHIVPURI-JHANSI

RAMBOLL Bright ideas. Sustainable change.

LIMITED ENVIRONMENTAL AND SOCIAL DUE DILIGENCE REPORT
SHIVPURI-JHANSI

Project name	**Toll Road of Shivpuri-Jhansi**
Project no.	**[xx]**
Recipient	**NHAI InvIT**
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Description	**Limited Environmental and Social Due Diligence report**

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APPENDICES

Appendix 1
Photolog

ABBREVIATIONS

CCTV	Closed Circuit Television Video
DG	Diesel Generator
E&S	Environmental and Social
EHS	Environmental Health and Safety
ESAP	Environmental and Social Action Plan
ESDD	Environmental and Social due diligence
ESMS	Environmental and Social Management System
ESZ	Eco-Sensitive Zone
GHG	Green House Gases
GIIP	Good International Industry Practice
GPS	Global Positioning System
HIRA	Hazard Identification and Risk Assessment
HSE	Health, Safety and Environment
IFC	International Finance Corporation
ILO	International Labour Organization
InvIT	Infrastructure Investment Trust
IRC	Indian Roads Congress
IRL	Information Request List
ISO	International Organization for Standardization
IUCN	International Union for Conservation of Nature
km	kilometres
KPI	Key Performance Indicator
kV	Kilo Volt
MoEFCC	Ministry of Environment Forest and Climate Change
NGO	Non-Governmental Organization
NH	National Highway
NHAI	National Highway Authority of India
NHIIMPL	National Highways Infra Investment Managers Private Limited
NoC	No Objection Certificate
O&M	Operations and Maintenance
PIU	Project Implementation Unit

PPEs	Personal Protective Equipment’s
PUC	Pollution Under Control
RoW	Right of Way
SOPs	Standard Operating Procedures
TP	Toll Plaza
VU	Vulnerable

1. INTRODUCTION

The National Highways Authority of India ('NHAI') has set up an Infrastructure Investment Trust ('InvIT') namely National Highways Infra Trust. National Highways Infra Investment Managers Private Limited ('NHIIMPL') has retained Ramboll India Private Limited (hereafter called 'Ramboll') to conduct a rapid Environmental and Social due diligence (ESDD) for the following three Assets ('Assets').

Asset 1: Agra Bypass section connecting NH19 (old NH2) to NH3 in Uttar Pradesh

Asset 2: Borkhedi-Kelapur-Maharashtra/Telangana border on NH44 (old NH7) in the state of Maharashtra

Asset 3: Shivpuri – Jhanshi on NH27 in the state of Madhya Pradesh

This report has been prepared for Asset-3 Shivpuri – Jhansi on NH27 in the state of Madhya Pradesh.

1.1 Asset under the Report

Table 1-1 : Project Details

Asset Attributes	Description
Name	Tolling, Operation, Maintenance and Transfer of Jhansi – Shivpuri section (from Chainage. Km 1305+087 to Chainage. Km 1380+387) of NH 27 in the State of Madhya Pradesh
State	Madhya Pradesh and Uttar Pradesh
Length in kms	75.300 km
No of Toll Plaza	1 (No)
Location of Toll Plaza	RAKSHA, Km 1374.650
Operation Since	Km 15.000 to 50.000 November 2008, Km 50.000 to 91.000 April 2009
Lane Configuration	4 lanes

1.2 Scope of Work

Environment, Health and Safety diligence scope of work

- Gather preliminary information required for categorization of an investment into risk categories, to further inform the level of scrutiny, applicability and extent of onsite due diligence that the project's operations need to be subjected to;
- Obtain a list of documents to assess the project's compliance with national and state level EHS regulations as well as EHS management systems and policies and overall compliance levels with respect to all applicable EHS regulations for Road sector projects (such as those detailed by Ministry of Environment Forests and Climate Change and Ministry of Labour,).

Site based due diligence

- Onsite due diligence to be performed on three projects under the transaction perimeter;
- The purpose of the site visits is to certify information provided through visual observations; collect primary information on EHS risks to check company's regulatory preparedness and statutory compliance levels; and interact with both external and internal stakeholders to verify the information shared by the management;
- Onsite due diligence to be carried out in following four steps:
    - Opening meeting with target: To discuss the objective of the site visits, the review process, and the stakeholder interview schedules with the management;
    - Consultation with internal stakeholder: To interact with the EHS data owners, corporate and project management as well as professionals from the environment, health and safety, human resources teams to assess understanding of critical EHS risks specific to their area of operation. These interactions will also be conducted with the site contractors that are typically deployed on such projects in India;
    - Site investigation: To visually observe gaps in EHS management systems and impending EHS risks. Review to be guided by national regulatory guidelines as well as EHS risks covered in IFC's general EHS and sector-specific EHS guidelines for toll road projects;
    - Consultation with external stakeholders: A comprehensive understanding of certain EHS issues may require further discreet probing, over and above site investigations. To comprehend detailed EHS risks and impacts, we may interact with the relevant stakeholders.

Conduct a review to identify from publicly available media sources if there are any potential environmental and/or social issues, including NGO attention/campaigns, or items that may lead to reputational risks to the Company and/or investors.

Review of regulatory notice(s) or fine(s) issued to the company for violating environmental norms/laws.

Review of information (to the extent made available)

- Develop an information request list (IRL) covering material environment, health and safety topics for the entity operations and seek necessary documents and information for review.
- Understand the nature of operations, clients, facilities, activities carried out, manpower composition and deployment HSE policies, training programs and related SOPs, put in place, if any EHS Certifications obtained (ISO 14001, ISO 45001, etc.), awards and recognitions, industry best practices adopted.
- Onsite facilities available, benefits provided to workers on health and safety including insurance
- Legal compliance reporting mechanism internally and with independent external involvement if any, and monitoring by top management.
- Key HSE consents, permits for their appropriateness and validity
- Approach to physical climate risks assessments and any climate-related strategies

Preparation of report with gap analysis of regulatory compliance and other key findings

- This section will incorporate all findings and gaps that were observed and assessed during information review and site assessments, including the stakeholder interactions.
- The observations will be based on regulatory and statutory compliance as well as reference frameworks for EHS such as guidelines by IFC.
- Any gaps observed will be clearly highlighted corresponding to each, Environmental, Health and Safety as well as social concerns and the level of corresponding risk (risk rating) will be described.

Framing recommendations and mitigation approaches

- Recommendations for improvement opportunities will be drafted and finalized in consultation with the client. Recommendations will expound mitigation approaches cantered around the following areas:
  - Procedural and technological improvements;
  - Upgradation of existing EHS management systems (if found to be inadequate);
  - Training and capacity building requirements;
  - Changes required in existing EHS policies;
  - Disclosure and reporting of EHS information to client, especially in reference to the EHS improvement plan (if any);
  - Recommendations and mitigation approaches will be framed subsequent to careful deliberation on the extent of EHS risks identified and lined to specific regulatory requirements for similar projects in India.

1.3 Approach and Methodology

The methodology for the Scope of work is explained below.

Step-1: The kick-off meeting was done between Ramboll and NHIIMPL on August 4, 2022 .

Step-2: Site Visit - The site visit was undertaken by the environmental and social specialists from Ramboll on August 18 and 19, 2022. A consultation with the local Toll Operator and O&M contractor was also held. A consultation with community members during the reconnaissance of the project site to discuss the issues.

Step-3: Document Review – the following documents were reviewed as a part of the rapid ESDD.

- Concession Agreement
- Schedule of the Concession Agreement
- Technical Due diligence report

Step-4: Preparation of ESDD report including ESAP.

1.4 Limitations

This report presents the results of red flag report, limited environmental and social due diligence and ESAP conducted to assess the compliance status of the Project in accordance with the applicable standards. During the course of this site assessment, Ramboll has attempted to independently assess the environmental and social conditions within the limits of the established scope of work as described in the proposal. The conclusions presented in this report represent Ramboll's best professional judgment based upon the information available and conditions existing as of the date of the review. In performing its assignment, Ramboll must rely upon publicly available information, the information provided during stakeholder consultations and information provided by third parties. Accordingly, the conclusions in this report are valid only to the extent that the information provided to Ramboll was accurate and complete. This review is not intended as legal advice, nor is it an exhaustive review of site conditions or facility compliance. A few specific limitations are presented below:

- The assessment is based on verbal information provided by the Toll Operation and O& M contractor of NHAI.
- Limited documents have been provided.
- Consents and permits have not been made available.
- Consultations with the community were not organised in the manner of prior information and targeted stakeholders.
- Estimation of GHG emission has not been done due to non-availability of data,

2. PROJECT DETAILS

The project stretch of NH 27 connects Shivpuri district of Madhya Pradesh to Jhansi district of Uttar Pradesh. The project study area starts from Km 1305+087 (Latitude: 25.415766, Longitude: 77.783312) of NH-27, located at Shivpuri and ends at Km 1380+387 (Latitude: 25.4576215, Longitude: 78.5031053) Jhansi of NH-27. The total length of project road is 75.30 Km.

Based on the traffic characteristics, the project road consists of one homogeneous section only from Shivpuri to Jhansi as most of the traffic travels full length of the project road.

1. Index Map of the Asset

Source : Schedule A of Concession Agreement.

2.1 Land use Pattern around the Project Area

The land use observed on both side of the project highways are agricultural, some patches of forest and few built up areas.

2. General Land Use Pattern of the Project Area

2.2 Right Of Way

There is no Right of Way (ROW) demarcation at site in most of the sections of project stretch. The available ROW of as per the concession agreement it is 45 meters.

Commercial and agricultural encroachment was noted at various locations along the project stretch. It should however be noted that extent of encroachment cannot be ascertained as the boundary/clear demarcation of the right of way boundary was not available.

3. Encroachment Observed During the Site Visit.

2.3 Facilities at Toll Plaza

The facilities available at the toll plaza observed during the site visit are provided in the table below.

Sl No	Item	Raksha Toll Plaza	Observations/ condition
1	Patrolling Vehicle	1 Number	Good condition
2	Crane	1 Number	
3	Weigh in motion bridge	Not available	
4	Static bridge	Two static weigh bridges	
5	Tunnel	Not available	
6	Loading and unloading facilities	Not available	
7	High Mast	2 Nos at the toll plaza	
8	Street light	Street lights at median for few hundred meters from toll plaza side.	
9	User fee board	Available	

10	Toilet	1 Nos on	There is 1 public toilet facility (i. e. 1 toilet each for men and women)
11	Water Supply	One submersible pump available	
12	CCTV Room	Available	
13	Complaint Box and book	Available	
14	Rainwater Harvesting	Not available	
15	Avenue Plantation	Available	The plantation at toll plaza is managed by the toll operator and for rest of the highway stretch, plantation is managed by various contractors
16	DG Set	1 No	At the administrative building.

2.4 Toll collecting agency

The toll collecting agency's details are given in the table below.

Item	Raksha Toll Plaza
Name of Toll collecting agency	M/s Indradeep Construction Pvt Ltd
Start Date	Dates not known; however, it was informed by the toll collecting agency that they are operational for last 7 months.
End Date	Not Known
Toll Manger	Mr Pawan Sharma
Total Number of Staffs	There are total of 95 staff at toll plaza, with 8 toll operators, 8 supervisors and 2 SWB staff per shift
No of Security Guards	Not known

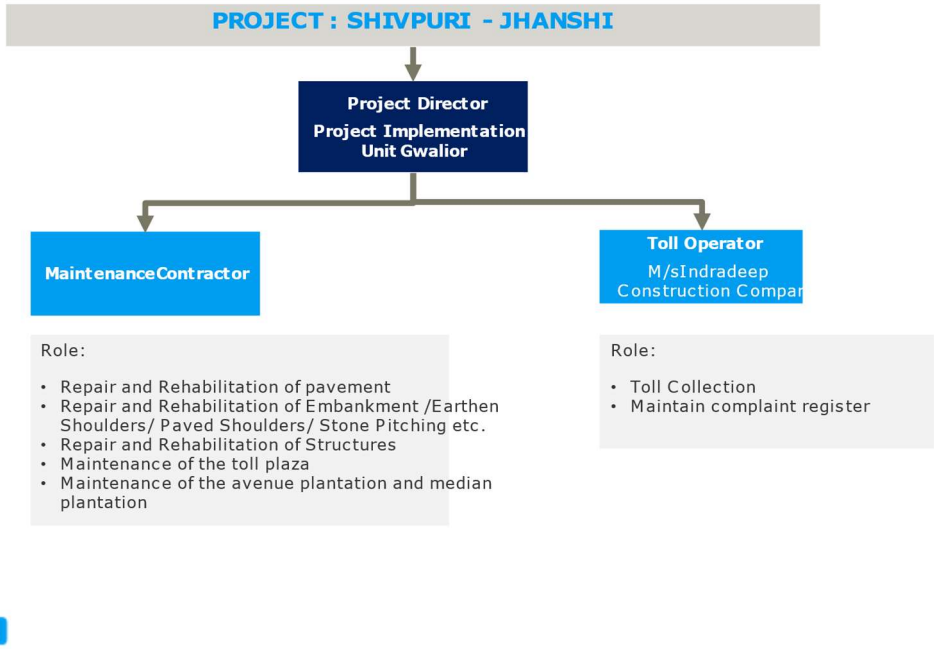
4. Photographs of Facilities at Raksha Toll Plaza

2.5 O&M Contractor

The role of the O&M contractor in this project are given below.

- Repair and Rehabilitation of pavement
- Repair and Rehabilitation of Embankment /Earthen Shoulders/ /Paved Shoulders/ Stone Pitching etc.
- Repair and Rehabilitation of Structures
- Maintenance of the toll plaza
- Maintenance of the avenue plantation and median plantation

2.5.1 Organisation Structure of the Project



5. Organisation Structure of the Project

2.6 Consultation with Internal Stakeholders

The internal stakeholders include but not limited to Toll collecting agency, Maintenance contractors, Vendors and suppliers. A consultation with tolling concessionaire and maintenance contractor has been undertaken on the day of site visit. The outcome of the meeting has been provided below.

Table 2-1 Details of consultations undertaken with Internal Stakeholders

Consultation	Outcome of the consultation
1. Mr. Pawan Sharma (Toll Manager) 2. Raghavendra Singh (Maintenance Manager) M/s Indra deep Constructions Company	• The company operating Raksha Toll Plaza. • The operation of toll plaza is for one year. • The complaint register is maintained by the toll operator. • 95 staff are involved in the operation of toll plaza. • All the toll collectors are local.

	• Toll plaza has accommodation for regular staffs • About 4-5 km of the stretch passes through the eco sensitive Zone of the Madhav National Park. • Road Kills are mainly of cattle, • One Sloth Bear (IUCN Vulnerable) was killed in road accident on 18 August 2022. • The toll administrative building, which has been newly constructed (6 months prior) has control room, server room for monitoring as well as accounts room. Majority of the payments (around 95%) are via Fastrack. • Firefighting systems are installed however none of them are functional, including fire extinguisher cylinders. • No rainwater harvesting facilities available at the toll plaza. • There are no rainwater harvesting systems installed at the toll plaza or through the highway stretch.

A consultation with local community has also been undertaken in the village of Sirsod on the project road. The summary of outcome of the meeting is provided below.

Table 2-2 Details of Consultations Undertaken with Local Community

Consultation	Outcome of the consultation
Mr Hariprashad, Shop Keeper, Village - Sirsod	• Drainage issue for the locals, as no drains/stormwater drains has been constructed throughout the highway, resulting in waterlogging and inundation of the establishments adjacent to highway as well as into the residences slightly farther away from the road stretches. • The main livelihood of the project area is agriculture and dependent on livestock. • Main crops grown are peanuts, sesame and rice. • There are lots of livestock collisions/hits on the highway however no compensation is paid to the owners.

3. RED FLAG REPORT

3.1 Regulatory Compliances

The permits, no objection certificates (NoC) and other regulatory permission obtained from the regulatory authority was not available with the existing toll collecting agency and maintenance contractor. The permits listed in Table 4.1 below are noted to be applicable for the project. NHAI InvIT needs to ensure that these permits are obtained before or after the transfer of asset as the case maybe.

Table 3-1: Gaps in regulatory compliance

Sl No	List of Licenses	Responsibility	Issuing Authority
1	Labour Licenses	Contractor (Toll Operator and maintenance Contractor)	Labour Department
2	Workmen compensation insurance	Contractor (Toll Operator and maintenance Contractor)	Insurance
3	NoC for ground water extraction	NHAI	Central Ground Water Board
4	NoC from the State pollution Control Board	NHAI InvIT	UP State Pollution Control Board
5	Forest clearance	NHAI	Forest Department
6	PUC of all vehicles including maintenance vehicles	Vehicle Owners	Regional transport Department authorised Agency
7	Shop and establishment license	NHAI InvIT	Department of Revenue

3.2 Compliance With GIIP

It should be noted that the gaps identified below pertain to the existing conditions at the site and relate to policies and procedures implemented by the current toll collecting agency and the maintenance contractor who have a one-year contract with NHAI. NHAI InvIT needs to ensure that adequate policies and or procedures are developed to close the gaps identified once the assets are transferred.

Table 3-2: Compliance with GIIP requirements

Sl No	Topic	Observations	Gaps	Risk Level	Recommendation
Environmental and Social Management System					
1	Environmental and Social Management System (ESMS)	An environmental and social management system is required to manage the environmental and social risks associated with the project. The ESMS for the site has not been developed.	ESMS is not available at the site and the toll operator and maintenance contractors are working without Environmental and Social management Plan.	Medium	Develop ESMS in compliant with applicable standards, including but not limited to ISO 14001 and ISO 45001.
2	Environmental and Social (E&S) Policy	An environmental and social policy demonstrating commitment towards managing environmental and social risks for the project has not been developed.	No E&S Policy is available	Medium	Develop E&S policy related to environmental Health, Safety and social
3	Identification of Environmental, health, safety and Social Risks and Impacts	An Environmental, Health, Safety and Social Risk assessment to identify the risks associated with operation of toll plaza, operation and maintenance of road is required to adequately mitigate the risks. No such risk assessment has been undertaken.	Environmental, health, safety and Social Risk assessment related to operation of toll plaza, operation and maintenance of road is not available.	Medium	Undertake Environmental, health, safety and Social Risk assessment.
4	Organizational Capacity and Competency	An organisation structure is required with set of competent to handle the environmental and social risks associated with the project. Competent people to handle the E&S risks associated with the project are not available.	• No set organisational structure has been created by the toll operator and maintenance contractor to include people with competency to manage the environmental and social risks. • There is not midterm evaluation of the competency and training plan for the engineers, security guards and other staff.	Medium	Develop organisation structure with competency matrix. Develop training plan to address environmental, health, safety and social risks.

Sl No	Topic	Observations	Gaps	Risk Level	Recommendation
5	Emergency Preparedness and Response	No emergency plan has been prepared for the project to identify the anticipated emergency situations and associated responses. It should further be noted that the District Magistrate is responsible for any major disaster management such as major accidents and spillage of large quantities of hazardous chemicals on the road stretch. It should however be noted that emergency equipment like ambulance, trained paramedic (Ambulance driver) is available to respond to emergency situations arising out of accidents. A medical first aid room is also available at the toll plaza.	No emergency response plan has been developed for the site.	Medium	Develop an emergency response plan in consultation with the district magistrate.
6	Monitoring and Review	The monthly progress report is prepared by the Independent engineer, and it is submitted to NHAI PIU. However, indicators related to environmental and social issues are not included in the monthly progress report.	A monitoring system to track the environmental, health, safety and social parameters is not available.	Low	Identify key performance indicators based on the environmental and social risks identified as a part of the ESMS and accordingly develop monitoring and reporting program.
7	Stakeholder Engagement	The highway project is spread over many villages. The key stakeholders are: - NHAI PIU - Local Police, - Electricity Department, - Central Ground Water Board - Village panchayat, - Vendors, Sub-contractors, - Local labours, - Forest Department, - Local community, - Village institutions like schools, health centres, - Media.	No policy and procedure available for the stakeholder mapping and development of stakeholder engagement plan.	Medium	Undertake stakeholder mapping and develop stakeholder engagement plan.
8	External Communications and Grievance Redressal Mechanisms	The project does not have any obligation of disclosure of any report in the operation stage except for the reporting obligation to NHAI PIU. An external communication plan for engagement with communities/stakeholders identifying the level/type of information to be disclosed and medium of disclosure is required to manage expectations of the community/stakeholders. A grievance redressal mechanism needs to be also developed.	An external communication plan and grievance redressal mechanism has not been developed for the project.	Low	Develop an external communication plan and grievance redressal mechanism.

Sl No	Topic	Observations	Gaps	Risk Level	Recommendation
Labour and working condition					
9	Human Resources Policies and Procedures	The project operation includes engagement of employees and workers. A human resource policy and associated procedures need to be developed to comply with local regulation, international labour organisation (ILO) covenants, human rights requirements and other GIIP requirements related to labour and working conditions. The current toll operator and the maintenance contractor have not developed a comprehensive human resource policy.	A comprehensive human resource policy and the associated procedures have not been developed by the current toll operator and the maintenance contractor.	Low	Develop a human resource manual consisting of policies and procedures around: • Working conditions and terms of employment • Code of conduct for employees • Minimum wages and overtime payment including working hours • Non-discrimination and equal opportunity • Recruitment and retrenchment procedures
10	Working Conditions and Terms of Employment	Health and sanitation facilities in the project (such as adequate toilets, drinking water, bathing areas, etc.) provided by the toll operator was noted to be not in compliance with GIIP requirements related to worker accommodation.	The following gaps were noted: • The old administrative building is being used as accommodations for some of the toll plaza employees; these accommodations are not having proper ventilation and lighting. • No procedures have been developed to identify the health and safety facilities that need to be provided for the workers. • No uniform provided to the toll collectors, • No Personal Protective Equipment were noted to be used by the employees of the toll plaza operator or the O&M contractor during the site visit, • Drinking water and Sanitation facility at Raksha	Low	Ensure that the health and sanitation facilities provided in the project meet the GIIP requirements.

Sl No	Topic	Observations	Gaps	Risk Level	Recommendation
			Toll Plaza is not in compliant to the Indian standards or GIIP.		
11	Non-Discrimination and Equal Opportunity	• The corporate level policy does not include social diversity and gender inclusion policy.	No non-discrimination and equal opportunity policy and procedure is available.	Low	Develop social diversity and gender and social inclusion policy and it should be encouraged in the supply chain of the company.
12	Internal Grievance Redressal Mechanism	The toll collecting agency and maintenance contractor does not have grievance redressal mechanism for the employees.	There is no transparent grievance redressal mechanism for the employees and workers.	Low	Establish internal grievance redressal mechanism to include grievances from employees/workers for registering grievances. This grievance redressal mechanism also needs to be extended to the employees/workers in the supply chain.
13	Protecting the Work Force from Child Labour	The toll collecting agency and maintenance contractor are aware of abolition of child labour but not aware of risk associated with child labour in its supply chain.	No process has been developed to check use of child labour by sub-contractor and other vendors in the supply chain.	Low	Establish procedure to check use of child labour sub-contractor and other vendors in the supply chain. Provide suitable posters about the prohibition of child labour.
14	Occupational Health and Safety	The operation of road includes - working on operational road - dealing with road user for collection toll. - Working in confined space in the culverts and drains. - Working near water. - lifting activities and use of cranes - Working in remote location - Working near live wire. - Working in night - Operation of ambulance A Hazard Identification and Risk Assessment (HIRA) needs to be undertaken for all the activities at the project and standard operating procedures (SOPs) should be developed that include the mitigation measures in the HIRA. These SOPs have not	A Hazard Identification and Risk Assessment (HIRA) and SOPs have not been developed for the various activities by the toll collecting agency and the maintenance contractor	Medium	Undertake HIRA and prepare SOPs for the various activities.

Sl No	Topic	Observations	Gaps	Risk Level	Recommendation
		been developed by the toll collecting agency and the maintenance contractor. During the site visit it was noted that the appropriate personal protective equipment (PPEs) like hard hat, reflective vests, safety shoes were not provided to the employees/workers of the toll collecting agency and the maintenance contractor.			
15	Supply Chain	The operation of road will require supply of material for road maintenance, water and other consumable. A procedure should be developed to ensure that the environmental & social risks are appropriately addressed in the supply chain. This mechanism can include considering environmental & social parameters in vendor selection, contractual clauses to ensure that the environmental & social risks are adequately managed and a monitoring plan to monitor the environmental & social performance of the vendors in the supply chain. A mechanism to measure and monitor the environmental and social risks in the supply chain was noted to be missing.	The current toll collecting agency and maintenance contractor have not developed procedures around measuring and monitoring the environmental & social risks in the supply chain.	Low	Develop a mechanism to include procedures around measuring and monitoring the environmental & social risks in the supply chain.
Resource Efficiency and Environmental Pollution including GHG emission					
16	Resource Efficiency and Pollution Prevention	The resources required for the operation and maintenance of the road are - Energy for illumination of toll plaza and street lights, - Water for the drinking purpose, maintenance and plantations. - Fuel for DG and vehicles, and - Material for road maintenance The energy consumption data is not available for both the plazas. No energy saving measures have been developed to reduce the diesel or electricity consumption.	• A plan including KPI for efficient use of resources and GHG estimation has not been developed by the current toll collecting agency and the maintenance contractor. No monitoring plan has been developed to measure the pollution caused by the diesel generator and other activities at the toll plaza. • Solid Waste disposal facility is not available. It is being dumped withing the toll plaza boundary	Low	• Prepare plan for the resource efficiency including accurate recording of diesel consumption and electricity consumption to estimate GHG emissions from the project. Prepare a plan to monitor the emissions from the diesel generator and other pollution causing activities in the project. • Provide treatment and disposal facility for wet waste specifically generated from kitchen and dining area. • Reduce and recycle plastic waste generated from the toll plaza.

Sl No	Topic	Observations	Gaps	Risk Level	Recommendation
		The greenhouse gas emissions (GHG) from the project are not being measured or reported currently. It was further noted that there were gaps in accounting for diesel usage by patrolling vehicle, ambulance, maintenance vehicles and other vehicles. No monitoring is being currently undertaken to measure the emissions from the diesel generator located at the toll plaza. The quality and quantity of wastewater being generated at the toll plaza is also not being monitored.	and there is no clear solid waste disposal mechanism.		
17	Ground Water utilisation	A groundwater abstraction well is installed at the toll plaza to meet the water demands. No flow meters have been installed to measure the quantity of ground water extracted for use. It was further noted that no water conservation measures including installation of rain water harvesting structures have been undertaken for the project.	A system to measure the amount of water used and associated water conservation measures have not been developed for the Project.	Low	Develop a system including installation of flow meters to measure the water use and further develop water conservation measures that can be adopted for the project.
Community Health, Safety and Security					
18	Community Health, Safety, and Security	Risk associated with community health and safety are identified below. - Pedestrian Safety - Traffic Safety	• Installation and maintenance of signs, signals, markings, and other devices used to regulate traffic, including posted speed limits, warnings of sharp turns, or other special road conditions are not present at many of the sections of the highway stretch. Barricading is also absent at many of the unsafe locations. • Public Toilets at the toll plaza are not in a good condition. • The public toilet is available only on one side. • Ambulance –biomedical waste disposal system is not available. • Cranes are supplied by the local suppliers on rent basis and are of local manufacture and it does not	Medium	• Identify road safety risks and Prepare plan to mitigate and manage these risks. • Provide public toilets at both sides of toll plaza; these toilets should be maintained in good condition. • Disposal of biomedical waste through hospitals where facility of biomedical waste disposal is available or through biomedical waste collection agency. • Procure or hire standard Cranes with examination of lifting tools and tackles.

Sl No	Topic	Observations	Gaps	Risk Level	Recommendation
			have report on examination of lifting tools and tackles are not available.		
19	Security Personnel	No security threat assessment and its plan been prepared.	• No security plan prepared. • No training on behavioural aspects have been covered. • No training on grievance recording have been imparted.	Low	Develop a security management plan.
Land Acquisition and Involuntary Resettlement, Encroachment and					
20	General	The right of way of 45 meters is available throughout the road. Few consultations with local people have been undertaken and it was informed the compensations have been disbursed and no pending issue available. The litigation or the legacy land issues cannot be ascertained at this stage in the absence of detailed information.	No gaps have been identified however, a verification with the PIU NHAI should be undertaken for the legacy issue or litigations.	Medium	Verify if any legacy issues and litigation related to land are present from the PIU NHAI.

Sl No	Topic	Observations	Gaps	Risk Level	Recommendation
21	General	Some encroachments/ squatters have been observed within the right of way. These encroachments are temporary hutment/ structure/ kiosk used for commercial purpose. As per the concession agreement, Concessionaire shall protect the Site from any and all occupations, encroachments or Encumbrances. Concessionaire shall maintain a round-the-clock vigil over the Site and shall ensure and procure that no encroachment thereon takes place, and in the event of any encroachment or occupation on any part thereof, the Concessionaire shall report such encroachment or occupation forthwith to the Authority and undertake its removal at its cost and expenses.	No survey records of encroachment available.	Medium	Undertake encroachment survey and prepare plan for the removal.
Biodiversity Conservation and Sustainable Management of Living Natural Resource					
22	General	Madhav National Park is located adjacent to the Project road stretch. The road passes along the boundary of the Protected Area and from within the Eco-Sensitive Zone of the park. Approximately 4-5 km of the road stretch passes through the ESZ. Madhav National Park was established in 1956 and it covers an area of 354 km².	The forest clearance/permits copy was not available for review. However, appropriate permission under the Wildlife Protection act may be required for any major construction or maintenance work on the road stretch passing through the ESZ.	Medium	Consult with the local Forest Department regarding the necessary permissions for any construction or major maintenance work along the road stretch passing through the ESZ.
	General	Based on the consultations, a few road kills of wild animals along the road stretch have been reported. Most of the road kills (2-3 livestock/day) reported were of livestock, however, a road kill of Sloth Bear (*Melursus ursinus*) (IUCN VU) was reported during the site visit where the road passes from the vicinity of the National Park.	No biodiversity management plan has been developed for management of movement of wild animals through the 4-5 kilometres stretch that passes through the eco-sensitive zone.	Medium	Undertake assessment of biodiversity and prepare a biodiversity management plan.
Indigenous Peoples					

Sl No	Topic	Observations	Gaps	Risk Level	Recommendation
23	Indigenous Peoples	This highway stretch does not pass through any Schedule 5 area notified by Ministry of Tribal Affairs.	No gaps identified.	Not Applicable	Not Applicable
Archaeological sites and Cultural Heritage					
24	Protection of Cultural Heritage in project design and execution	There is no archaeological and cultural site found within the project area of influence during the site visit. However, a detailed survey to identify any archaeological sites found within the area of influence of the project road.	No survey has been conducted to identify and archaeological sites found within the area of influence of the project road.	Low	Under take survey related to identification of archaeological sites within the area of influence of the project road.

4. CATEGORISATION OF PROJECT

The categorisation of a Project based on the magnitude of potential environmental and social risks and impacts, including those related to Human Rights, climate change, and biodiversity.

The categories are:

Category A – Projects with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented.

Category B – Projects with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures; and

Category C – Projects with minimal or no adverse environmental and social risks and/or impacts.

The project is categorised as **Category B**. based on following arguments.

- All the mitigation measures of impacts related to air quality, water and noise are generally site specific and reversible in nature and mitigation measures are within control of the project proponent.
- No incremental impact arises due to operation of the road.
- Land use conversion was one time activity, and no further land use change or conversion is involved.
- All the impact associated with operation of toll plaza and road are reversible and of low significance.
- No additional livelihood loss in the operation of toll road.

5. ENVIRONMENT AND SOCIAL ACTION PLAN

Sl No	Identified Gap	Recommended actions	Best Practices (if any)	Responsibility	Timeframe	KPI Completion
1.	• No system for environmental and social management is being used by the current toll operator and maintenance contractors. • Environmental, health, safety and Social Risk assessment related to operation of toll plaza, operation and maintenance of road is not available. • No organisation structure available, • No evaluation of competency and training of the staffs. • No environmental and social monitoring system. • Stakeholder engagement plan is not available.	Develop ESMS in compliant with applicable standards, including but not limited to ISO 14001 and ISO 45001 and include following: • Develop E&S policy related to environmental Health and Safety. • Include environmental and social considerations in selection of contractors and subcontractors • Undertake Environmental, health, safety and Social Risk assessment • Develop EHS manual and procedures for working at toll plaza, maintenance works etc • Develop organisation structure with competency matrix. • Develop training plan to address environmental, health, safety and social risk. • Identify key performance indicators based on the environmental and social risks and develop monitoring and reporting plan accordingly. • Develop stakeholder engagement plan.		NHAI InvIT	Post-acquisition and prior to hiring of toll operator or maintenance contractor.	ESMS incorporating the recommendations
2.	• Licenses and permits to be acquired by NHAI InvIT	NHAI InvIT should obtain all licenses and permits as defined in Concession Agreement but not limited to the following. - Registration for Provident Fund - Labour License - Shop and establishment Licenses - NoC from State Pollution Control Board. - PUC of Vehicles used for the project.		NHAI InvIT	Prior to start of work.	

Sl No	Identified Gap	Recommended actions	Best Practices (if any)	Responsibility	Timeframe	KPI Completion
3.	• Licenses and permits to be acquired by Contractors and Toll Operators	The contractors and Toll Operators of NHAI InvIT should obtain all necessary licenses and permits but not limited to the following. - Registration for Provident Fund - Labour License - Interstate Migrant Worker License - Workmen Compensation and insurance - PUC of all Vehicles - NoC for extraction of Surface Water/ Ground Water - Authorisation for disposal of Biomedical Waste		Contractors and toll operators of NHAI InvIT	Prior to start of work.	
4.	• No emergency response plan has been developed for the site. • Hazard Identification and Risk Assessment (HIRA) and SOPs have not been developed for the various activities by the Toll Collection Agency and the maintenance contractor.	• Undertake HIRA and prepare SOPs for the various activities. • Develop an emergency response plan in conformance with district level disaster management.		NHAI InvIT	Within 6 months after the acquisition	Completed HIRA, SOP and ERP.
5.	• A comprehensive human resource policy and the associated procedures have not been developed by the current toll operator and the maintenance contractor.	Develop a human resource manual consisting of policies and procedures around: • Working conditions and terms of employment. • Code of conduct for employees • Minimum wages and overtime payment including working hours • Non-discrimination and equal opportunity • Recruitment and retrenchment procedures. • Abolition of child labour. Establish procedure to check use of child labour sub-contractor and other vendors in the supply chain. • Provide suitable posters about the prohibition of child labour.		NHAI InvIT	Within 6 months after the acquisition	Human resource Manual incorporating the recommendations

Sl No	Identified Gap	Recommended actions	Best Practices (if any)	Responsibility	Timeframe	KPI Completion
6.	• Working Conditions - Health and sanitation facilities in the project (such as adequate toilets, drinking water, bathing areas, etc.) provided by the toll operator was noted to be not in compliance with GIIP requirements related to worker accommodation.	• Ensure that the health and sanitation facilities provided in the project meet the GIIP requirements.		NHAI InvIT	Within 6 months after the acquisition	Health and sanitation facilities compliant with GIIP requirements.
7.	• There is no transparent grievance redressal mechanism for the employees and workers.	• Establish internal grievance redressal mechanism to include grievances from employees/workers for registering grievances. This grievance redressal mechanism also needs to be extended to the employees/workers in the supply chain.	Technology based online complaint management for employees.	NHAI InvIT	Within 6 months after the acquisition	Establish GRM
8.	• Supply Chain - The current toll collecting agency and maintenance contractor have not developed procedures around measuring and monitoring the environmental & social risks in the supply chain.	As part of ESMS : • Develop a mechanism to include procedures around measuring and monitoring the environmental & social risks in the supply chain.		NHAI InvIT	Within 6 months after acquisition	Supply Chain measures as part of ESMS
9.	• A plan including KPI for efficient use of resources and GHG estimation has not been developed by the current toll collecting agency and the maintenance contractor. • No monitoring plan has been developed to measure the pollution caused by the diesel generator and other activities at the toll plaza.	• Prepare plan for the resource efficiency including accurate recording of diesel consumption and electricity consumption to estimate GHG emissions from the project. • Prepare a plan to monitor the emissions from the diesel generator and other pollution causing activities in the project.	Develop tool for online estimation of GHG emission. Use energy efficient equipment, machineries, pumps, water fixture, illumination and energy efficient vehicles.	NHAI InvIT	• Document preparation - Within 6 months after the acquisition. • Monitoring mechanism for emissions for pollution causing activities – continuous activity.	• Document Preparation - Resource Efficiency Plan • Bi-annual GHG estimation.
10.	• A system to measure the amount of water used and associated water conservation measures have not been developed for the Project.	• Develop a system including installation of flow meters to measure the water use and further develop water conservation measures that can be adopted for the project.		NHAI InvIT	• Installation and Monitoring system for water use – Within 6 months after acquisition.	• Monitoring process for water use. • Water conservation measures part of ESMS

Sl No	Identified Gap	Recommended actions	Best Practices (if any)	Responsibility	Timeframe	KPI Completion
					• Water Conservation measures included in ESMS – Within 6 months after acquisition.	
11.	• Installation and maintenance of signs, signals, markings, and other devices used to regulate traffic, including posted speed limits, warnings of sharp turns, or other special road conditions are not present at many of the sections of the highway stretch. Barricading is also absent at many of the unsafe locations.	• Identify road safety risks and prepare plan to mitigate and manage these risks.		NHAI InvIT	6 months after the acquisition	• Road safety /audit/survey report including mitigation plan.
12.	• No security plan prepared. • No training on behavioural aspects have been covered. • No training on grievance recording have been imparted.	• Develop a security management plan.		NHAI InvIT	Security Management Plan - Within 6 months after the acquisition. Training to security guards - continuous	Completed Security Management Plan
13.	• Verification with regards to right of way (RoW) not undertaken for any legacy issues or litigations.	• Verify if any legacy issues and litigation related to land are present from the PIU NHAI.		NHAI InvIT	Within 6 months after the acquisition	Verification completed for RoW legacy issues/litigation.
14.	• No survey records of encroachment available.	• Undertake encroachment survey and prepare plan for the removal.	GPS based survey of encroachments.	NHAI InvIT	Within 6 months after the acquisition	Encroachment Survey report.
15.	• The forest clearance/permits copy was not available for review. However, appropriate permission under the Wildlife Protection act may be required for any major construction or maintenance work on the road stretch passing through the ESZ.	• Consult with the local Forest Department regarding the necessary permissions for any construction or major maintenance work along the road stretch passing through the ESZ.		NHAI InVIT	As and when needed.	Obtain required permissions for any major construction/maintenance activities along road stretch passing through ESZ

Sl No	Identified Gap	Recommended actions	Best Practices (if any)	Responsibility	Timeframe	KPI Completion
16.	• No biodiversity management plan has been developed for management of movement of wild animals through the 4-5 kilometres stretch that passes through the eco-sensitive zone.	• Undertake assessment of biodiversity and prepare a biodiversity management plan.	GPS based survey.	NHAI InvIT	Within 6 months after the acquisition	• Undertake biodiversity assessment • Document preparation - Biodiversity Management Plan
17.	• No survey has been conducted to identify and archaeological sites found within the area of influence of the project road.	• Under take survey related to identification of archaeological sites within the area of influence of the project road.	GPS based survey.	NHAI InvIT	Within 6 months after the acquisition	Archaeological survey report listing archaeological sites within AoI of project.
18.	• Solid Waste disposal facility is not available. It is being dumped withing the toll plaza boundary and there is no clear solid waste disposal mechanism.	• Provide treatment and disposal facility for wet waste specifically generated from kitchen and dining area. • Reduce and recycle plastic waste generated from the toll plaza.	As per IRC Code for toll plaza.	NHAI InvIT	Within 6 months after the acquisition	Segregated Waste Disposal Plan and Procedures(i.e., Dry, Wet, Biomedical, etc.)
19.	• Public Toilets at the toll plaza are not in a good condition. • The public toilet is available only one side.	• Provide public toilets at both sides of toll plaza; these toilets should be maintained in good condition.	As per IRC Code for toll plaza.	NHAI InvIT	Within 3 months after the acquisition	Public toilets in good condition at both sides of toll plaza.
20.	• Ambulance – biomedical waste disposal system is not available.	• Disposal of biomedical waste through hospitals where facility of biomedical waste disposal is available or through biomedical waste collection agency after obtaining Authorisation of Biomedical Waste[1].	As per IRC Code for toll plaza.	NHAI InvIT	Within 6 months after the acquisition	Biomedical waste disposal process established as per IRC code.
21.	• Cranes are supplied by the local suppliers on rent basis. • Crane – cranes are of local manufacture and it does not have	• Procure or hire standard Cranes with examination of lifting tools and tackles.	As per the section 29 of Factory Act, 1948 and	NHAI InvIT	Within 6 months after the acquisition	Standard Cranes as per applicable acts.

[1] As per requirements under Bio-medical Waste (Management & Handling) Rules, 1998 and subsequent amendments, These rules apply to all persons who generate, collect, receive, store, transport, treat, dispose, or handle bio medical waste in any form including hospitals, nursing homes, clinics, dispensaries, veterinary institutions, animal houses, pathological laboratories, blood banks, ayush hospitals, clinical establishments, research or educational institutions, health camps, medical or surgical camps, vaccination camps, blood donation camps, first aid rooms of schools, forensic laboratories and research labs.

Sl No	Identified Gap	Recommended actions	Best Practices (if any)	Responsibility	Timeframe	KPI Completion
	report on examination of lifting tools and tackles are not available.		amendments till date.			

APPENDIX 1
PHOTOLOG

[Text]

Photo 1: **Toll plaza building**

Photo 2: Electronic Toll Collection (ETC) lanes and toll booths at the toll plaza

Title:	Photo Document	**Project-No.:**	**Date:**	**Page 1**
Site:	Shivpuri Jhansi	-	August 2022	
Client:	NHAI	RAMBOLL		

Photo 3: User Fee board and broken toll exemption board at the toll plaza

Photo 4: Medical Aid Post facility in the project area

Title:	Photo Document	**Project-No.:**	**Date:**	**Page 2**
Site:	Shivpuri Jhansi	-	August 2022	
Client:	NHAI	RAMBOLL		

Photo 5: Ambulance and crane facility in the project area

Photo 6: Sign boards along the road in the project area

Title:	Photo Document	**Project-No.:**	**Date:**	
Site:	Shivpuri Jhansi	-	August 2022	
Client:	NHAI	RAMBOLL		

Photo 7: Animals movement in the ROW

Photo 8: Scrap and plastic waste dumped in the ROW of project area

Title:	Photo Document	**Project-No.:**	**Date:**	
Site:	Shivpuri Jhansi	-	August 2022	
Client:	NHAI			